Final Integrated Natural Resources Management Plan (INRMP)

Portland Air National Guard Base

September 2022

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Air National Guard
3501 Fetchet Avenue
Joint Base Andrews, Maryland 20762

Portland Air National Guard
142d Wing
6801 NE Cornfoot Rd.,
Portland, Oregon 97218

Contract W912DR-19-D-0005
Task Order W912DR20F0474

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SIGNATURE PAGE

This Integrated Natural Resources Management Plan (INRMP) has been prepared for the 142d Wing of the Oregon Air National Guard (Oregon ANG). The Oregon ANG includes the Portland Air National Guard Base (hereafter referred to as the Portland ANGB), located at the Portland International Airport. This INRMP has been prepared to manage significant natural resources in support of the military training mission. Significant natural resources include a federally listed bird species and native habitat. This INRMP meets the intent of the Sikes Act, (16 United States Code [USC] § 670a–670l, 74 Stat. 1052).

To the extent that resources permit, the U.S. Fish and Wildlife Service (USFWS), Oregon Department of Fish and Wildlife (ODFW), and Portland ANGB, by signature of their agency representative, do hereby enter into an agreement for the conservation, protection, and management of the natural resources present on Portland ANGB. This INRMP may be modified and amended by agreement of the authorized representatives of the three agencies. The agreement will become effective upon the date of the last signatory and shall continue in full force for a period of 5 years or until terminated by written notice to the other parties, in whole or in part, by any of the parties signing the agreement.

Approving Officials:

SHATTLS.DAVID.JASON.1243737342 Digitally signed by SHATTLS.DAVID.JASON.12437373 42 Date: 2022.10.07 14:21:53 -07'00'

DAVID J. SHATTLS, Colonel, Oregon Air National Guard — 7 OCT 2022
Commander, 142d Mission Support Group — Date

CRAIG ROWLAND Digitally signed by CRAIG ROWLAND Date: 2022.09.30 11:11:30 -07'00'

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Curtis E Melcher — 10/05/2022

Curt Melcher — Date
Director
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ANNUAL REVIEW PROCEDURES

The Environmental Manager (EM) of the Portland Air National Guard Base (Portland ANGB) will annually review the Integrated Natural Resources Management Plan (INRMP), prior to September 30, in cooperation with the U.S. Fish and Wildlife Service (USFWS) and Oregon Department of Fish and Wildlife (ODFW) to ensure the goals and objectives of the INRMP remain current. Prior to the annual meeting with the USFWS and ODFW, the EM will schedule an internal stakeholder's meeting with the Installation Pest Management Coordinator (IPMC), Safety Office, the Portland International Airport (PDX) Wildlife Management Staff, and tenant organizations to obtain feedback on how implementation of the INRMP affected or did not affect their programs and obtain any comments and recommendations they may have. Following the internal stakeholders meeting, the EM will prepare a summary of the actions taken in support of the INRMP over the past year, the actions that were not completed with an explanation of why they were not implemented, and the actions planned for the coming year. The EM will send out invitations with the written summary to the USFWS, ODFW, NGB/A4VN Natural Resources Program Manager, IPMC, Safety Office, PDX Wildlife Management Staff, and other entities deemed necessary to participate in an annual meeting held in-person, via a conference call, or via a Teams meeting to discuss the written summary, address any questions regarding implementation of the INRMP over the past year, and discuss the proposed actions for the coming year. The EM will document the meeting with the invitation, an agenda, meeting minutes, and a sign-in roster of attendees. Following the meeting, the EM will submit the documentation to the USFWS and ODFW for their review and comment and for concurrence that the documentation reflects the discussions held and the agreements made during the annual meeting. The installation's natural resources management progress will be determined based on information obtained annually that supports the focus areas in Department of Defense Instruction (DoDI) 4715.03, *Natural Resources Conservation Program* through the U.S. Air Force/National Guard Bureau biannual environmental quality data calls.

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ACRONYMS

°C	degrees Celsius
°F	degrees Fahrenheit
142 Wing	142d Wing
AFI	Air Force Instruction
AFMAN	Air Force Manual
AFPAM	Air Force Pamphlet
AJD	Approved Jurisdictional Determination
ANG	Air National Guard
ANGB	Air National Guard Base
AOB	Airport Operations Board
BASH	Bird/Wildlife Aircraft Strike Hazard
BHWG	Bird/Wildlife Hazard Working Group
BMP	Best Management Practice
CE	Civil Engineer
CECOS	Civil Engineer Corps Officers School
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CWA	Clean Water Act
DB	Drainage basin
DEPARC	Defense Environmental Programs Annual Report to Congress
DoD	Department of Defense
DoDI	Department of Defense Instruction
DoDM	Department of Defense Manual
DUSD	Deputy Under Secretary of Defense
EIAP	Environmental Impact Analysis Process
EM	Environmental Manager
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FIRM	Federal Insurance Rate Maps
ft	Foot (feet)
FW	Fish and Wildlife Monitoring
FY	Fiscal year
GIS	Geographic information system
GM	Grounds Maintenance and Landscaping
IFAW	International Fund for Animal Welfare
IN	Invasive Species
INRMP	Integrated Natural Resources Management Plan
IPaC	Information for Planning and Consultation
IPM	Integrated Pest Management
IPMC	Installation Pest Management Coordinator

IRP	Installation Restoration Program
MBTA	Migratory Bird Treaty Act
MNA	Monitored Natural Attenuation
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MS4	Municipal Separate Storm Sewer System
NEPA	National Environmental Policy Act
NGB	National Guard Bureau
NGB/A4VN NRPM	NGB/A4VN Natural Resources Program Manager
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
ODA	Oregon Department of Agriculture
OPR	Office of Primary Responsibility
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
PDX	Portland International Airport
PM	Program Management
PO	Public Outreach
Port	Port of Portland
Red Plan	Quick Reference Spill Response Guide
SPCCP	Spill Prevention, Control & Countermeasure Plan
SWPCP	Stormwater Pollution Control Plan
TE	Threatened and Endangered
U.S.	United States
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	United States Code
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VM	Vegetative Management
WA	Water Resource Protection
WIS	Wildlife Information System
WOTUS	Waters of the United States
WQC	Water Quality Certification

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1.0 EXECUTIVE SUMMARY

The Sikes Act Improvement Act of 1997, 16 United States Code (USC) § 670a et seq., as amended, (herein referred to as the Sikes Act) requires federal military installations with significant natural resources to develop a long-range Integrated Natural Resources Management Plan (INRMP) and implement cooperative agreements with other agencies. The Sikes Act is implemented through Department of Defense (DoD) and U.S. Air Force (USAF) instructions and manuals. The conservation measures discussed in the INRMP help manage water resources, reduce bird/wildlife aircraft strike hazard (BASH) risk, manage federal- and state-protected species, manage invasive species, and sustain natural resources. The INRMP is intended to be in support of and consistent with the Sikes Act.

The Portland INRMP is the primary guidance document and tool for managing natural resources on Portland Air National Guard Base (Portland ANGB), which leases approximately 222 acres of land from the Port of Portland (Port) at Portland International Airport in Portland, Oregon. The primary federal mission of the 142d Wing (142 Wing) is to provide continuous air defense and air superiority capabilities in the Pacific Northwest. The primary state mission of the Portland ANGB is to provide protection of life and property, and preserves peace, order, and public safety, as directed by the Governor of Portland.

Natural resource management activities on Portland ANGB must be conducted in a way that provides for sustainable land use, complies with applicable environmental laws and regulations, real estate leases, and licenses, and provides for “no net loss” in the capability to support the military mission. This INRMP provides a structure and plan to manage natural resources effectively and ensures that facilities remain available to support the installation’s military mission into the future.

Specific actions in this INRMP are supported by its goals and objectives, the annual work plans, and the management strategies. Goals and objectives are listed in Section 8.0, and annual work plans are provided in Section 9.0. The INRMP provides a description of the installation, the military mission, the environment on the installation, and specific plans and strategies for natural resource management designed for sustainable military training. The implementation of this INRMP will ensure the successful accomplishment of the military mission while promoting adaptive management that sustains ecosystem and biological integrity and provides for multiple uses of natural resources.

2.0 GENERAL INFORMATION

2.1 Purpose and Scope

This INRMP is the primary guidance document and tool for natural resource management at the Portland ANGB. It provides for sustainable, healthy ecosystems, complies with applicable environmental laws and regulations, real estate leases and licenses, and provides for “no net loss” in the capability of installation lands to support the military mission. The Installation Commander and Environmental Manager (EM) can use this INRMP to manage natural resources more effectively to ensure that installation lands remain available and in good condition to support the installation’s military mission over the long term. The Portland INRMP is consistent with the Sikes Act as required by the DoD, USAF, and the National Guard Bureau (NGB). A

multiple-use approach is implemented to allow for the presence of mission-oriented activities, as well as protecting environmental quality through the efficient management of natural resources.

This INRMP solely directs lands under the management authority of the Portland ANGB. If the Portland ANGB acquires additional lands in the future, revision of the INRMP will provide management direction for such additional lands and will identify applicable natural resources management actions to address those resources. The comprehensive planning process, which incorporates logistics and operations of Portland Air National Guard (ANG) facilities, should incorporate the concerns presented in this INRMP, so that the growth of the installation can progress in a manner consistent with, and complementary to, the objectives of the USAF with respect to the protection of natural resources.

2.2 Management Philosophy

2.2.1 Ecosystem Management

Natural resources at Portland ANGB are managed with an ecosystem management approach as directed by Air Force Manual (AFMAN) 32-7003, *Environmental Conservation*, DoD Instruction (DoDI) 4715.03, *Natural Resources Conservation Program* and DoD Manual (DoDM) 4715.03, *INRMP Implementation Manual* (Table 1). Ecosystem management may be defined as management to restore and maintain the health, sustainability, and biological diversity of ecosystems while supporting sustainable economies and communities. The goal of ecosystem management on military lands is to ensure that military lands support present and future training and testing requirements while preserving, improving, and enhancing ecosystem integrity.

Ecosystem management provides a means for the USAF to conserve biodiversity and to provide high-quality military readiness. This INRMP is a mechanism through which Portland ANGB can maintain sustainable land use through ecosystem management. Each of the management strategies described in this INRMP should be monitored so that modifications can be made during implementation as conditions change. Human communities are entirely and completely dependent on the goods and services provided by our diverse ecosystems (Bernstein 2008). Decline of these ecosystems, and the biodiversity within them, is one of the foremost limitations to human prosperity. Ecosystem sustainability is the key to both biological diversity and human existence. It is the goal of this INRMP to successfully integrate ecological sustainability with goals and objectives that will sustain human communities and the operational missions of Portland ANGB. By protecting a mosaic of habitats that support the greatest variety of life, this INRMP helps perpetuate viable, sustainable populations of native species and the communities they compose. The protection of these species and communities, in turn, promotes the sustainability of functional ecosystems across the landscape.

Table 1. Elements and Principles of Ecosystem Management

DoDI 4715.03 Elements	
1	Avoid single-species management and implement an ecosystem-based multiple species management approach that is consistent with the requirements of the Endangered Species Act (ESA).
2	Use an adaptive management approach to manage natural resources-related issues, such as climate change.
3	Evaluate and engage in the formation of local or regional partnerships that benefit the goals and objectives of the INRMP.
4	Use the best available scientific information in decision-making and adaptive management techniques in natural resource management.
5	Foster long-term sustainability of ecosystem services.
AFMAN 32-7003 Principles	
1	Maintain or restore native ecosystem types across their natural range where practical and consistent with the military mission.
2	Maintain or restore natural ecological processes, such as fire and other disturbance regimes, where practical and consistent with the military mission.
3	Maintain or restore the hydrological processes in streams, floodplains, and wetlands when feasible and practical and consistent with the military mission.
4	Use regional approaches to implement ecosystem management on an installation by collaboration with other DoD components, as well as other federal, state, and local agencies, and adjoining property owners.
5	Provide for outdoor recreation, agricultural production, harvesting of forest products, and other practical utilization of the land and its resources, provided that such use does not inflict long-term ecosystem damage or negatively impact the ANG mission.

2.2.2 Biodiversity

Biodiversity is the degree of variation of life within a given ecosystem, region, or even the entire planet. The DoD's challenge is to manage for biodiversity in a way that supports the military mission. Specific management practices identified in this INRMP have been developed to enhance and maintain biological diversity within the installation's ecosystems. Biodiversity conservation and invasive species control are integral parts of ecosystem management. ANG installations maintain or reestablish viable populations of all native species when practical and consistent with the military mission. ANG installations also identify the presence of exotic and invasive species and implement programs to control and/or eradicate those species. Finally, when feasible, ANG installations develop joint control strategies with other federal, state, and local cooperating agencies and adjacent landowners to increase the effectiveness of control measures and for the benefits illustrated in Figure 1.

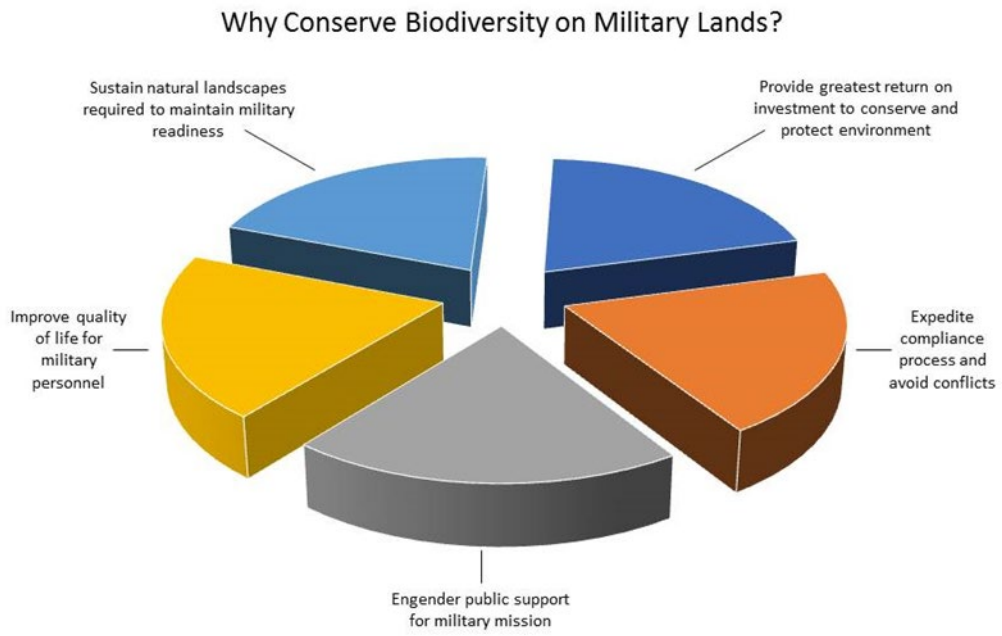

Figure 1. Why Conserve Biodiversity on Military Lands?

***Adapted from Keystone Center 1996.**

2.3 Authority

2.3.1 Natural Resources Law, Regulations & Policy

The Oregon ANG, U.S. Fish and Wildlife Service (USFWS), and the Oregon Department of Fish and Wildlife (ODFW) determined an INRMP was required for the Portland ANGB due to the potential presence of federally threatened listed species, thereby necessitating conservation and management. To ensure proper consideration of fish, wildlife, and habitat needs, this INRMP was prepared in cooperation with USFWS and ODFW. DoDI 4715.03, *Natural Resources Conservation Program*, identifies the DoD policies and procedures concerning natural resources management and INRMP reviews, public comment, and endangered species consultation. INRMPs are required to be jointly reviewed by USFWS, ODFW, and the ANG installation for operation and effect on a regular basis but not less than every 5 years. Minor updates and continued implementation of an existing INRMP do not require public comment. Major revisions to an INRMP do require an opportunity for public review. Specific projects in the INRMP may need informal or formal consultation under the Endangered Species Act (ESA) Section 7 at the time the projects begin the design process when impacts to natural resources are identified.

2.3.2 National Environmental Policy Act Compliance

The Environmental Impact Analysis Process (EIAP) is the process by which the USAF facilitates compliance with the National Environmental Policy Act (NEPA; 42 USC § 4321 et seq.), the primary legislation affecting these agencies' decision-making process. NEPA requires that any organization using federal monies, proposing work on federal lands, or requiring a federal permit

consider potential environmental consequences of proposed actions. The law's intent is to protect, restore, or enhance the environment through well-informed decisions.

The Council on Environmental Quality (CEQ) was established under NEPA for the purpose of implementing and overseeing federal policies as they relate to the NEPA process. The adoption of an INRMP can be considered a major federal action as defined by Section 1508.18 of the CEQ regulations. This requires an analysis of potential environmental impacts for the implementation of an INRMP, although a complete Environmental Assessment is not necessarily required, as individual actions and projects for an INRMP typically undergo their own separate NEPA analysis.

The EIAP for the implementation of the Portland ANGB's 2017 INRMP was conducted in accordance with NEPA, the CEQ *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 Code of Federal Regulations [CFR] § 1500-1508), and 32 CFR Part 989, *Environmental Impact Analysis Process*. The EIAP and decision-making process for the Proposed Action (implementation of the 2017 Portland INRMP) involved an examination of all environmental issues pertinent to the action proposed. Impact evaluations of the 2017 INRMP determined that no significant environmental impacts would result from implementation of the Proposed Action or any identified alternative. This determination was based on thorough review and analysis of existing resource information, and coordination with knowledgeable, responsible personnel from the Portland ANGB and other relevant local, state, and federal agencies. A new EIAP is not required for this INRMP update, as impacts to the environment have not changed since the initial EIAP.

If a future action or project has the potential to impact the environment, the initial step in compliance with NEPA is to complete USAF Form 813 "Request for Environmental Impact Analysis." The form is prepared to aid in the development of the assessment, providing information on the Proposed Action and its alternatives, purpose, and potential environmental effects. This allows the proponent to identify potential environmental impacts early and facilitates making a determination about whether an Environmental Assessment or an Environmental Impact Statement might be required for a specific action. Natural resources management actions in this INRMP at the time of implementation will be reviewed to determine if they qualify for a categorical exclusion or an Environmental Assessment or would require an Environmental Impact Statement, depending on the impacts to the natural resources.

2.3.3 Responsibilities

The Portland INRMP has been organized to ensure the implementation of year-round, cost-effective management activities and projects that meet the requirements of the installation. Various personnel and organizations within the ANG that are responsible for the implementation of this INRMP are described in the following subsections.

2.3.3.1 *Installation Commander*

The Installation Commander oversees the installation and is responsible for ensuring that the goals and objectives of this INRMP are implemented to the fullest extent practicable based on funding and manpower availability. The Installation Commander is the official signatory for the Portland INRMP.

2.3.3.2 *Base Civil Engineer*

The Base Civil Engineer (CE) plans, budgets, approves, and oversees all maintenance and construction activities performed on the installation. All maintenance and construction-related projects or management activities proposed in this INRMP should be approved by the Base CE to ensure that funding is available, and that these projects are complementary to the installation's comprehensive planning processes.

2.3.3.3 *NGB/A4VN Natural Resources Program Manager*

The NGB/A4VN Natural Resources Program Manager (NGB/A4VN NRPM) is the technical point of contact on all natural resource related activities for the ANG. The NGB/A4VN NRPM tracks DoD and USAF policies and approves funding for projects identified as a priority in the Portland INRMP. The development of projects included in the INRMP and any deviations from those projects will be submitted to the NGB/A4VN NRPM for review. Decisions resulting from those reviews will be a cooperative effort between the NGB/A4VN NRPM and the EM and/or the installation's Natural Resources Manager, when applicable.

2.3.3.4 *Environmental Manager*

The EM plans, budgets, approves, and oversees all environmental activities performed on the installation and is responsible for ensuring that activities associated with the implementation of this INRMP adhere to applicable federal, state, local, and USAF environmental regulations and guidelines. Projects proposed in the Portland INRMP are reviewed by the EM and the NGB/A4VN NRPM. The EM should independently review deviation from the projects proposed in this INRMP. Persons responsible for implementation of the INRMP are required to attend the Civil Engineer Corps Officers School (CECOS) DoD Natural Resources Compliance course https://denix.osd.mil/cecos/.

2.3.3.5 *Pest Management Coordinator*

The Installation Pest Management Coordinator (IPMC) is responsible for the control of undesirable and/or nuisance plants and animals (including insects), and prevention of damage to natural resources. Pest management personnel utilize Integrated Pest Management (IPM) approaches and are responsible for the implementation of the IPM Plan. The IPMC is also responsible for submitting monthly pesticide usage reports to the NGB/A4VN Pest Management Consultant. The IPMC will, when required, assist in obtaining depredation permits for the management of wildlife on the installations and/or in the confines of the airfield on behalf of or in cooperation with the Safety Office and the Portland International Airport (PDX) Wildlife Management Staff. The IPMC is also responsible for coordinating with the installation's Public Health Officer and/or Medical offices to ensure monitoring efforts and control methods for potential disease vectors or animals of other medical importance are specified in the IPM Plan and reported on. The IPMC will coordinate pest management activities with the EM to ensure sensitive areas are identified and to ensure actions taken do not impact those sensitive areas. The IPMC will ensure the goals and objectives of pest management activities are explained in the INRMP and will report all pest management activities to the INRMP Working Group and when applicable, the Bird/Wildlife Hazard Working Group (BHWG).

2.3.3.6 *Operations and Maintenance*

Operations and Maintenance personnel are responsible for all grounds maintenance activities on the installation. Operations and Maintenance personnel will assist the IPMC and the EM in the implementation of natural resource management projects when applicable. The Operations and Maintenance personnel will also periodically review grounds maintenance equipment to determine if new or additional equipment is needed for the proper maintenance of the installation's landscapes.

2.3.3.7 *Wing Safety Office*

The Wing Safety Office is responsible for development, implementation, and management of the BASH Program at the Portland ANGB. The Wing Safety Office also ensures that bird/wildlife strikes resulting from aircraft assigned to transient units at Portland ANGB are accurately documented and reported to the EM and the USAF BASH Team. The Wing Safety Office participates in Portland ANGB's BHWG, which conducts meetings to evaluate and refine strategies for the reduction of BASH risk on Portland ANGB. The Wing Safety Office is responsible for coordinating with and providing required information on BASH activities to the EM and ensures that the BHWG conducts meetings on the reduction of the BASH threat on the installation.

2.3.3.8 *Airfield Management*

Airfield Management is responsible for ensuring that the airfield is acceptable and appropriate for flight activity.

2.3.3.9 *Port of Portland*

The PDX Wildlife Management Staff is responsible for monitoring hazardous wildlife that have the potential to create an aircraft strike hazard. PDX Wildlife Management Staff support activities that pertain to the BASH Program and are responsible for wildlife depredation requirements within the airfield, as well as dispersal/harassment, capture and translocation, trapping and removal, and surveillance and monitoring. The PDX Wildlife Management Staff will coordinate efforts in regard to the removal of species and studies needed with the EM. The PDX Wildlife Management Staff also provides guidance, oversight, and approval of any landscape plantings/plans with a goal of minimizing habitat favorability for wildlife, especially birds.

2.3.3.10 *Legal Office*

The Legal Office is responsible for ensuring the implementation of the management objectives contained within the Portland INRMP meet all regulatory and statutory requirements that pertain to natural resources management. The Legal Office will review future natural resources management proposals and alert the Installation Commander and the EM should there be any regulatory conflicts or shortfalls. In addition, the Legal Office will keep participating INRMP parties informed of any new statutes or regulations that might affect natural resources management.

2.3.3.11 *Public Affairs Office*

The Public Affairs Office is responsible for the coordination of public access for events at Portland ANGB. The Public Affairs Office serves as the point of contact to interface between the Installation Commander and civilian groups interested in installations for environmental, educational, or other purposes.

2.3.3.12 *U.S. Fish and Wildlife Service*

The USFWS is a signatory of the Portland INRMP and provides input regarding natural resource projects and operational component plans. The USFWS reviews and comments on the operations and effect update of the INRMP every 5 years and, when feasible, attends the task force meeting. The USFWS, when feasible, attends the annual meetings to discuss the status of the projects identified in the Annual Work Plans. At both the 5-year operations and effect and the annual meetings, the USFWS advises on the status of any pending additions or deletions to the federal threatened and endangered species list that have the potential for inhabiting Portland ANGB. When feasible the USFWS will support ANG wildlife and vegetation surveys conducted at Portland ANGB.

2.3.3.13 *Oregon Department of Fish and Wildlife*

The ODFW is a signatory of the Portland INRMP and provides input regarding wildlife projects and operational component plans with regard to the conservation of biodiversity and wildlife including fish, shellfish, amphibians, reptiles, birds, and mammals. The ODFW reviews and comments on the operations and effect update of the INRMP every 5 years and, when feasible, attends the task force meeting. ODFW, when feasible, attends the annual meetings to discuss the status of the projects identified in the Annual Work Plans. At both the 5-year operations and effect and the annual meetings, ODFW advises on the status of any pending additions or deletions to the state threatened and endangered species list, that have the potential for inhabiting Portland ANGB. When feasible, ODFW will support ANG wildlife surveys conducted at Portland ANGB.

2.4 Integration with Other Plans

By its nature, an INRMP is multidisciplinary and provides a summary of natural resources and associated management at a specific installation. As a result, information from an INRMP is incorporated into other plans and other plans are written to support an INRMP. The Portland ANGB plans include the following:

- *Integrated Pest Management (IPM) Plan*—Provides a summary of management of pest species to minimize impact to mission, natural resources, and the environment (*Integrated Pest Management Plan, 142d Wing, Portland ANGB, Updated June 2022*).
- *Bird/Wildlife Aircraft Strike Hazard (BASH) Plan*—Provides an active program to minimize bird and other wildlife strikes to aircraft on Portland ANGB, including techniques, processes, responsibilities, and management recommendations (*142d Wing, Oregon Air National Guard, Bird/Wildlife Strike Hazard Plan 91-212, November 2020)*.
- *Hazardous Waste Management Plan*—Provides information to maintain compliance with waste management regulations (*Hazardous Waste Management Plan, August 2015)*.

- *Oil and Hazardous Substance Spill Prevention and Response Plan*—Provides information on sources of pollution associated with mission activities that may potentially affect the quality of stormwater discharges at the installation. The plan also describes the Oil and Hazardous Substances Pollution Contingency Plan that should be implemented in the event of a reportable spill (*Oil and Hazardous Substances Spill prevention and Response Plan*, *September 2015*).

- *Portland International Airport Wildlife Hazard Management Plan*—Provides long-term management strategies and general operational strategies to effectively manage risk of wildlife/aircraft collisions at Portland International Airport. These strategies are based on four program components or "pillars" (short-term operational strategies, research and development projects, long-term management strategies, and information and educational programs). (*Portland International Airport Wildlife Hazard Management Plan, April 2019*).

- *Portland International Airport Landscape Standards*—Provides Portland International Airport Landscape Standards to reduce the attractiveness of the airport to wildlife species of concern and to eliminate the vertical intrusion of vegetation into aircraft operating airspace while retaining an aesthetically pleasing landscape (*Airport Landscaping Standards, January 6, 2017*).

- *Stormwater Pollution Control Plan (SWPCP)*—Provides best management practices (BMPs) to minimize and control pollutants from entering the stormwater discharges. The SWPCP also ensures compliance with the terms and conditions of the National Pollutant Discharge Elimination System (NPDES) permit (*Stormwater Pollution Control Plan, March 2019*).

- *Integrated Cultural Resource Management Plan*—Provides installation policies and procedures for the protection, management, and preservation of cultural resources on the installation, including historic properties. The plan also provides standard operating procedures for managing unanticipated discoveries and compliance procedures for identifying and protecting cultural resources (*Integrated Cultural Resource Management Plan, 142nd Fighter Wing, December 2012*).

In addition, this INRMP is also integrated with the following plan from another agency.

- *Oregon Conservation Strategy* —The Oregon Conservation Strategy is an overarching plan to conserve Oregon's fish, wildlife, and habitat. The plan identified priority conservation issues which include 294 strategy species, 11 strategy habitats, 206 priority conservation areas, and 7 statewide threats affecting Oregon's fish and wildlife. The EM will consult with the ODFW to determine areas where the installation can participate in future wildlife conservation partnerships in support of the Oregon Conservation Strategy (*Oregon Conservation Strategy, ODFW, 2016*).

3.0 INSTALLATION OVERVIEW

3.1 Location and Area

The Portland ANGB is located at the Portland International Airport in Multnomah County, Oregon (Figure 2). The Portland ANGB is approximately 6 miles northeast of Portland and totals approximately 222 acres. The 222 acres of land is leased from the Port, and the base shares runways with the Portland International Airport. The Portland ANGB is located south of the runways, while the Portland International Airport facilities are located north of the runways (Figure 3). The entrance to Portland ANGB is located on NE Cornfoot Road (Figure 3).

The Columbia River flows in a westerly direction north of the airport, and to the south of the airport, the Upper and Lower Columbia Sloughs drain the former marsh land now occupied by the airport. The area, which was previously comprised of predominantly marshland, was filled with dredged sediment to form buildable land between 1930 and 1939 (Oregon ANG 2012). Portland ANGB is bordered to the south by NE Cornfoot Road, which runs along the Upper Columbia Slough. Two golf courses, Colwood Public Golf Course and Broadmoor Golf Course, are located to the east and west of the base (Oregon ANG 2012).

Figure 2. Portland ANGB Regional Map

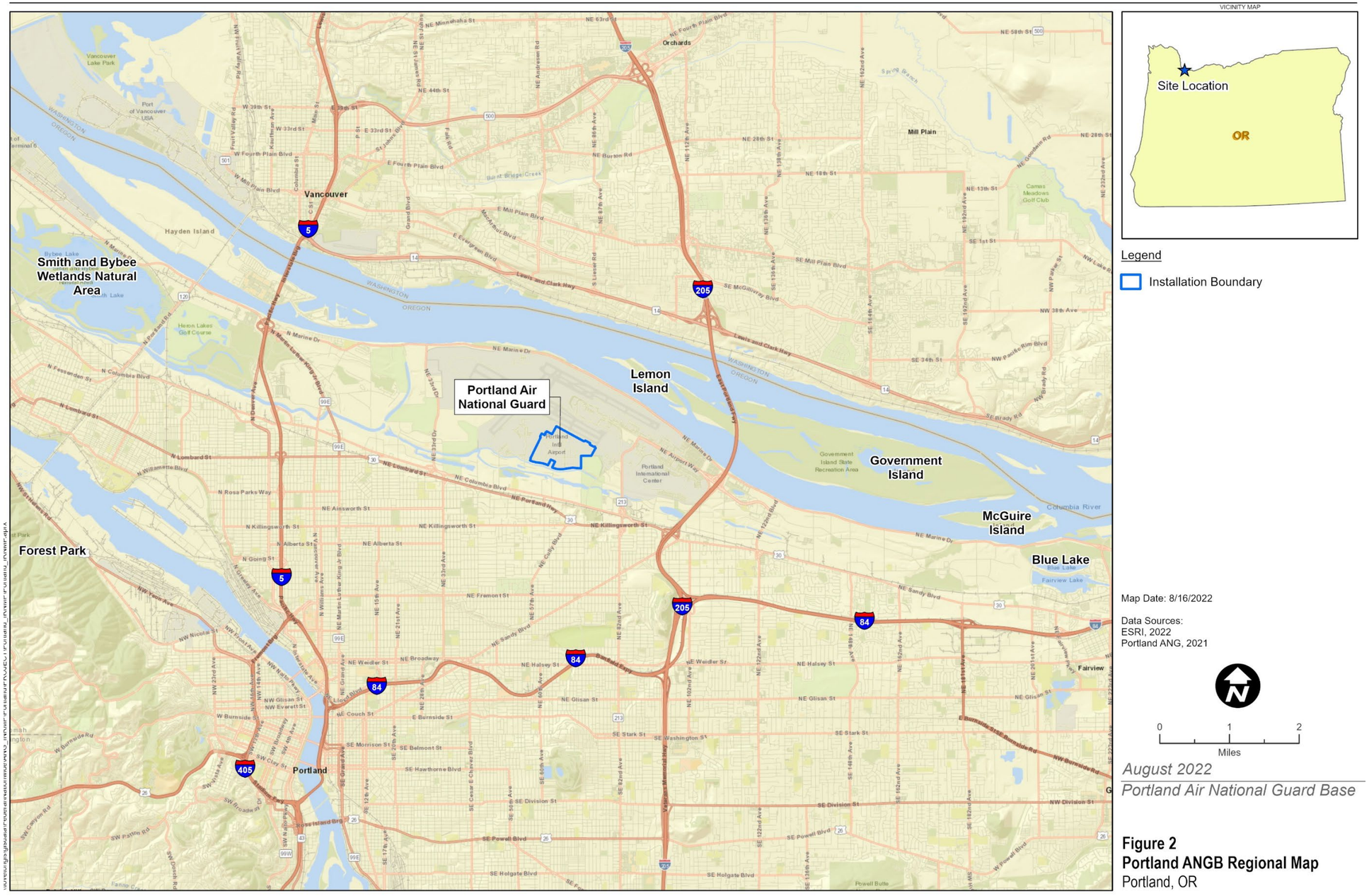

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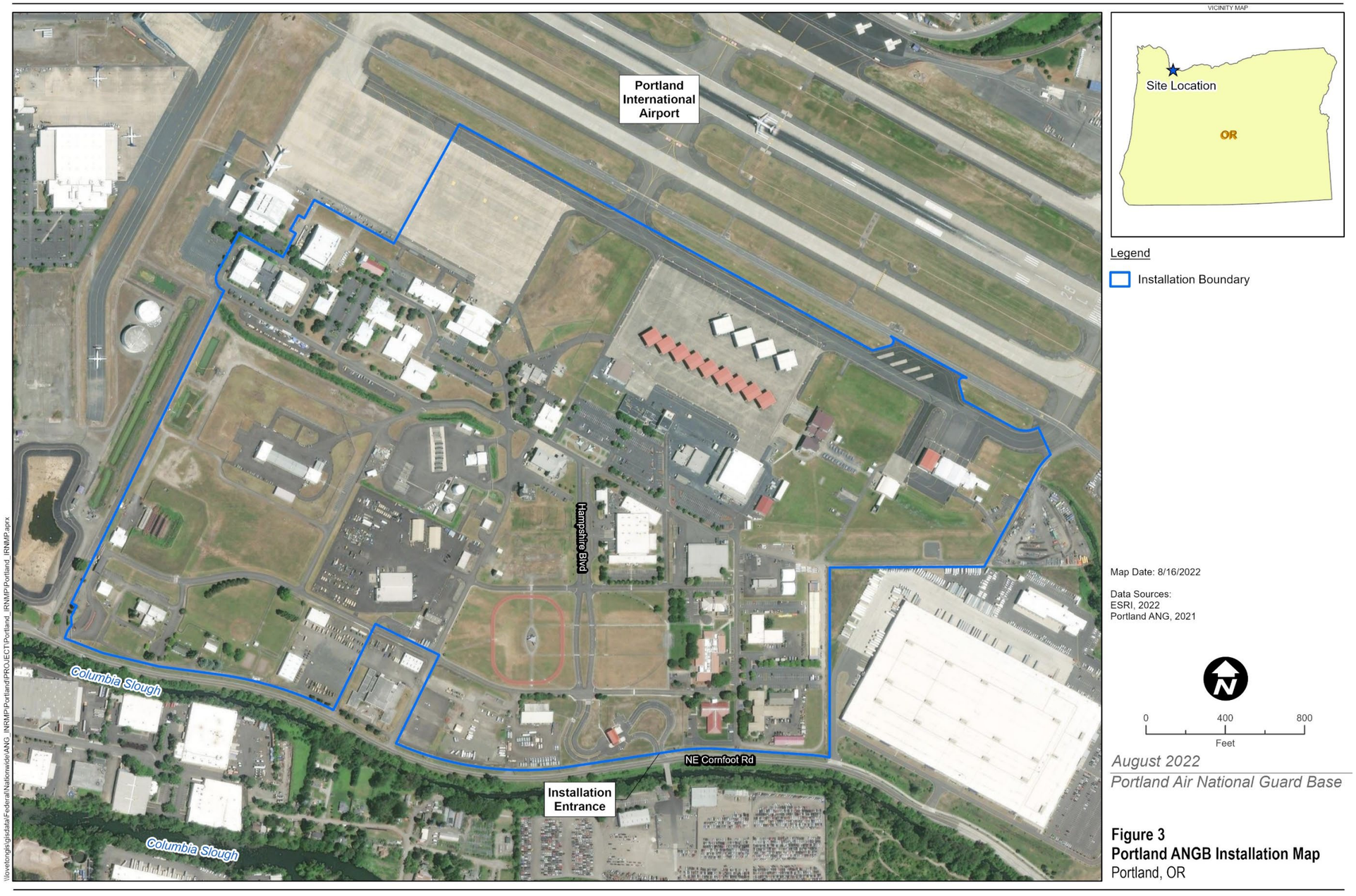
Figure 3. Portland ANGB Installation Map



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3.2 Installation History

The Portland ANGB was constructed in 1936 as part of a Great Depression-era Works Progress Administration project to construct a civilian airport. After construction was concluded in 1940, this airport replaced the previous municipal airport for the City of Portland, which was located on Swan Island. In this same year, the airport was selected by Army planners to be used as an Army Air Base and was officially dedicated as the Portland Army Air Base on 14 June 1941. Starting in spring 1941, the 55th Pursuit Group began to conduct pilot proficiency training and air defense exercises with fighter planes. Training, air transport, and air defense activities continued at the base throughout World War II and included an anti-submarine patrol. In 1946 the base was closed, and the ANG began to use the base for air and ground operations. In this year, the 142d Fighter Group began operations at the base using P-51D Mustang fighters, as well as support aircraft (ANG undated).

In 1950, the land at the base was conveyed to the Port, but the USAF was granted a lease of 400 acres of the site, and starting in 1951, the 142d Fighter Group was activated for service at the Portland ANGB during the Korean War. Between 1951 and 1968, several units operated at the Portland base for varying lengths of time and operational missions, including the 503rd Air Defense Group, the 337th Fighter Group, the 403d Troop Carrier Wing, the 939th Troop Carrier Group, and the 304th Air Rescue Squadron. The 142d Fighter Group was active with continued defense operations during this time (ANG undated).

Photo 1: *Aircraft assigned to 142d Fighter Group*
Source: https://www.142wg.ang.af.mil/

In 1968, the Oregon ANG assumed host responsibilities for the Portland Air Force property, with the 142d Fighter Group as the principal unit at the base. Several tenants were also present at the site, including the 142d Fighter Wing, 224th Mobile Communications Squadrons, the 83d Aerial Port Squadron (Air Force Reserve), and the 304th Aerospace Rescue and Recovery Squadron (ANG undated).

In 1969, approximately 180 acres of the land operated under the military lease was acquired by the Port for the creation of the Portland International Airport. In 1978, an additional 80 acres of land occupied by the USAF active duty flight interceptors were returned to the Port, including the original large aircraft maintenance hangar. This reduced the size of the base to 246 acres (ANG 2018).

In 1985, the 939th Aerospace Rescue and Recovery Group was activated at the base with rescue helicopters. In 2003, the 939th Rescue Wing was converted to the 939th Air Refueling Wing, which was inactivated in 2008. The 304th Rescue Squadron remained in place until 2008, when the squadron was relocated. Upgrades in fighters for the 142d Fighter Group occurred in 1989, 2007, and 2011 with a continued air defense alert mission. In 1995, the 142d Fighter Group was elevated to wing status, beginning the designation of 142d Fighter Wing. In 2011, this mission became known as the Aerospace Control Alert mission. This mission continues today (ANG 2018).

In 2013, a new 50-year lease was signed with the Port. As part of this lease, the base will be reduced from 222 acres to 200 acres over the next 12 years. Further reductions may occur in 2043 as part of airport expansion plans (ANG 2018). In March 2020, the 142d Fighter Wing was re-designated as the 142 Wing.

3.3 Military Missions

The ANG has a dual mission, one federal and one state. Portland ANGB is the North American Aerospace Defense Command's principal Aerospace Control Alert location in the Pacific Northwest. The 142 Wing operates 18 F-15C model aircraft to provide air defense from northern California up to Canadian British Columbia (ANG 2018). The 142 Wing conducts Air Sovereignty Alert Operations at any time on any day, completes contingency operations, and has completed air defense, humanitarian, and expeditionary tasks worldwide. The 142 Wing also stands ready for participation in state missions as directed by the governor (ANG 2018).

The Portland ANGB includes facilities for refueling, light repairs, and staging of aircraft on to the runways of Portland International Airport. The Portland ANGB also provides vehicle maintenance facilities and other support equipment, as well as facilities and staff to maintain roadways, structures, and grounds. The staff at Portland ANGB also supplies a shipping warehouse (Oregon ANG 2015a).

3.4 Surrounding Communities

Portland ANGB is located in Multnomah County within in the city limits of Portland. Portland occupies approximately 145 square miles and has a population of 652,530 residents (U.S. Census Bureau 2021). Portland is bordered by the Columbia River and Vancouver, Washington, to the north, the city of Gresham to the east, the cities of Happy Valley and Milwaukie to the south, and the towns of West Slope and Metzger to the west. Portland ANGB is located in the southern portion of Portland International Airport. Vancouver, Washington, is located approximately 5 miles northwest of the base, and downtown Portland is approximately 6 miles to the southwest. Although the main land use located directly adjacent to the Portland ANGB is the Portland International Airport, the land uses surrounding the Portland ANGB include a mix of manufacturing, residential, commercial uses, and open space, as well as several golf courses. Land immediately north of the base is primarily associated with transportation and the Portland International Airport, including runways and taxiways. Farther north, land includes the Columbia River and open space. In the west, land use is primarily commercial but includes open space. To the east of the base is an area that was formerly the Colwood Golf Course, which now is largely comprised of industrial warehouses. Manufacturing, industrial, and residential uses are found south of the base.

3.5 Local and Regional Natural Areas

There are several local natural areas and parks located within 10 miles of Portland ANGB. Government, Lemon, and McGuire Islands are part of an island complex located in the Columbia River, approximately 2 miles northeast of the Portland International Airport. This island complex is only accessible by boat and are owned by the Port. Government Island is the largest (approximately 1,927 acres) and is connected by a land bridge throughout most of the year to Lemon Island (approximately 97 acres), located downstream. McGuire Island (approximately 170 acres) is on the upstream end of Government Island on the left bank of the river, south of the

eastern end of Government Island. During the summer, the islands are popular for boating, camping, and hiking. Public use is restricted to the perimeter of the islands below the vegetation line and in a few upland areas where a picnic shelter and tables have been installed. There are protected natural areas and mitigation sites within the interior of the island that are restricted to authorized personnel only. The island provides diverse habitat and vegetation. Four main water features are found on the island, including emergent and aquatic communities, forested and meadow wetlands, upland forests and meadows, and sandy dredged areas. The island's many emergent wetland areas and riparian habitats provide important habitat for a diversity of bird species, including migratory waterfowl, raptors, and songbirds. Several mammal species can also be found (Port of Portland 2021).

The Smith and Bybee Wetlands Natural Area is located approximately 7 miles to the west of the Portland ANGB. This natural area includes over 2,100 acres of wetland and upland areas and is one of the last remnants of the semi-natural Columbia River Watershed bottomland areas near Portland. The area provides habitats for many species, including bald eagle (*Haliaeetus leucocephalus*), western painted turtle (*Chrysemys picta bellii*), river otters (*Lontra canadensis*), and black-tailed deer (*Odocoileus hemionus*). The site includes two shallow lakes with ample emergent, meadow, and forested wetlands. The area also includes upland grasslands and forests. The park supports 17 species of fish and over 150 species of birds, as well as numerous reptile, amphibian, mammal, and invertebrate species (Portland Metro 2022).

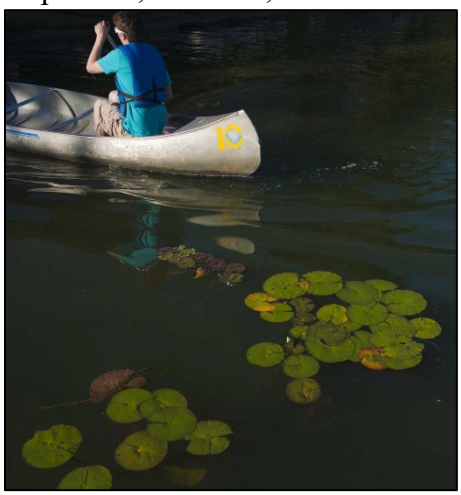


Photo2: *Smith and Bybee Wetlands Natural Area*
Source: Portland Metro 2022

Blue Lake Regional Park is located approximately 7 miles east of the Portland ANGB. The park includes a large spring-fed lake and wetland areas. Recreation activities include swimming, fishing, biking, playgrounds, and sport courts (Portland Metro 2022).

Forest Park is located 8 miles to the west of the Portland ANGB. The park includes 5,200 acres of undeveloped forested habitat that supports over 100 species of birds, 50 species of mammals, and 400 species of invertebrates. Forest Park provides important interior forest habitat and serves as part of a wildlife corridor to the Coast Range. The park is used for research, recreation, and environmental education opportunities. Recreation includes hiking, biking, and horseback riding on over 80 miles of trails (City of Portland 2022).

4.0 PHYSICAL ENVIRONMENT

4.1 Climate

4.1.1 Portland ANGB

The climate of Portland area is characterized as temperate, with cool, wet winters and dry, warm summers. The average annual temperature ranges from a minimum of 41 degrees Fahrenheit (°F) (5 degrees Celsius [°C]) to a maximum of 71°F (22°C). Annual total precipitation averages 37 inches, with the least rainfall occurring in June through September (National Oceanic and Atmospheric Administration [NOAA] 2021). Average monthly temperatures and precipitation

data for Portland ANGB are based on data recorded at Portland International Airport, as shown in Table 2. The climate of Portland is largely influenced by its location between the Coast Range to the west and Cascades Range to the east. The Coast Range provides Portland some degree of shielding from the storms of the Pacific Ocean. In addition, the Cascades Mountains result in moderate rainfall for the region, and prevent colder continental air masses from arctic areas of Canada from entering western Oregon (NOAA undated).

Table 2. Average Monthly Temperatures and Precipitation in the Portland ANGB Region, 1991-2020

Month	Average Low Temperature (°F)	Average High Temperature (°F)	Average Precipitation (inches)
January	36.2	47.5	5.03
February	36.8	51.5	3.68
March	39.7	56.8	3.97
April	43.7	62.0	2.89
May	49.4	69.3	2.51
June	54.1	74.3	1.63
July	58.5	81.9	0.50
August	58.9	82.3	0.54
September	54.1	76.7	1.52
October	46.7	64.4	3.42
November	40.6	53.5	5.45
December	36.2	46.9	5.77

Source: NOAA 2021

4.1.2 Climate Change

DoDI 4715.03 requires the INRMP to include an assessment of the potential impacts of climate change on natural resources and to adaptively manage such resources to minimize adverse mission impacts. Effects of climate change in Portland could include hotter, drier summers, and warmer, wetter winters with heavier rainfalls and less snowfall. The predicted average annual increase in temperature will lead to lower snow volumes and earlier snowmelt, which will affect natural systems and watersheds across the Portland region. Changes in precipitation patterns affect streamflow, groundwater recharge and flooding, and may increase risks of wildfire, drought, and invasive plant and animal species. Increasing surface water temperatures affect resident and migratory fish and wildlife species and their habitats, threatening their long-term survival. Warmer temperatures and more extreme heat events will also increase the number of heat-related illnesses and deaths (City of Portland 2015).

To reduce the severity of these regional impacts, the City of Portland has prepared a Climate Action Plan. The Climate Action Plan includes strategies to reduce local carbon emissions, the primary cause of climate change, by 80 percent by 2050. The plan includes over 100 actions to be implemented in the near term to evaluate progress which will allow the city to adapt and revise the action plan as needed. Some of the 2030 objectives include reducing the total energy use of all buildings, creating neighborhoods that allow most residents the opportunity to bike or walk to meet daily needs, reducing waste, supporting a community-based food system (locally

produced food), increasing green infrastructure and natural areas, and reducing risks from impacts of heat, drought, wildfire, and flooding (City of Portland 2015).

4.2 Landforms

Portland is located within the Portland/Vancouver Basin of the Willamette Valley Physiographic region. The Portland/Vancouver Basin is characterized by undulating terraces with many meandering streams and rivers, wetlands, oxbow lakes, and ponds (Thorson et al. 2003). In areas surrounding Portland ANGB, the floodplains of the Columbia River and Willamette Valley are flat with some gently undulating terraces. The elevation in areas surrounding Portland ANGB is 14 feet (ft) above sea level. Topography on Portland ANGB is relatively flat, with elevations varying from 10 to 20 ft above sea level (Environmental Resources Management 2001). The base is developed with buildings, parking areas, roadways, aircraft aprons, and mowed maintained lawns.

4.3 Geology and Soils

The geology of the Portland/Vancouver basin is characterized by Quaternary unconsolidated and semi-consolidated alluvium and glacial lacustrine deposits (Thorson et al. 2003). This basin was formed in the early tertiary period and filled with approximately 1,800 ft of late Tertiary and Quaternary sediments. Portland ANGB is located in the central portion of the Portland/ Vancouver basin. Basin deposits in the vicinity of Portland ANGB include Eocene and Miocene rocks, the Sandy River Mudstone, the Troutdale Formation, the Parkrose Formation, the Troutdale Gravel, the Columbia River Sand, and Pleistocene to Recent Alluvium (Environmental Resources Management 2001).

There are three soil series on Portland ANGB. The Pilchuck-Urban Land complex covers approximately 67 percent of the northern portion of the base. The Sauvie-Rafton-Urban Land Complex covers approximately 32 percent of the southern portion of the base. Sauvie silt loam protected (from flooding) cover approximately 1 percent of the southeastern portion of the base (Figure 4). All three soils are designated as hydric soils (Natural Resources Conservation Service [NRCS] 2022). Hydric soils are defined as a soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in their upper part. Hydric soils are typically found in association with wetlands (see wetland discussion in Section 5.5). These soils are considered hydric because they are poorly drained or very poorly drained and have a water table at a depth of 1 ft or less during the growing season. These soils are also frequently flooded for long or very long durations during the growing season.

The Pilchuck soil series is considered a prime farmland soil. Prime farmland has the soil quality, growing season, and moisture supply needed to produce economically sustained high yields of crops when treated and managed according to acceptable farming methods. The urban land component is a material that has been manipulated or disturbed by either removing nearly all of the natural soil or by burying the natural soil. Sauvie silt loam is considered prime farmland if drained and protected. The Sauvie silt loam occurring at Portland ANGB is only protected from flooding, not drained; therefore, the soil is not considered a prime farmland soil. Table 3 further describes the characteristics of the soil series.

Table 3. Soils Occurring on Portland ANGB

Soil Mapping Unit Symbol	Soil Mapping Unit Name	Farmland Classification	Drainage Class	Hydric Soil?	K-Factor	Wind Erodibility Group	Percent of Total Area (%)
33A	Pilchuck-Urban land complex, 0 to 3 percent slopes	Prime farmland	Somewhat excessively drained	Yes	0.02	1	67
47A	Sauvie-Rafton-Urban Land Complex, 0 to 3 percent slopes	Not prime farmland	Poorly drained	Yes	0.43	6	32
45	Sauvie silt loam, 0 to 2 percent slopes	Not prime farmland	Very poorly drained	Yes	0.43	6	1

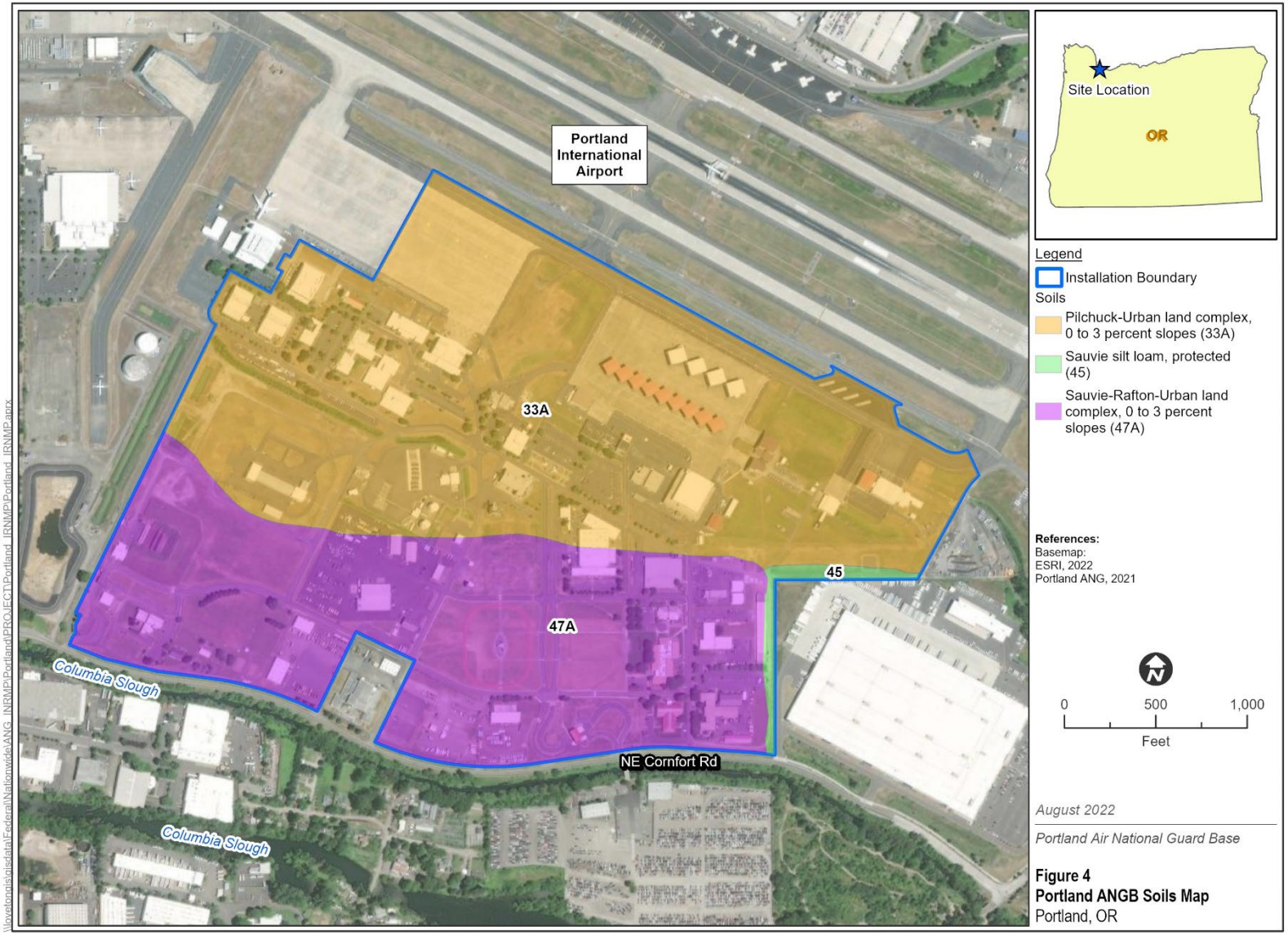
Source: U.S. Department of Agriculture (USDA) 2019

4.4 Hydrology

4.4.1 Groundwater

There are two principal aquifers beneath the Portland ANGB, the unconsolidated deposits and the Miocene basaltic-rock aquifers. These aquifers provide an important water source to the Portland area. Beneath the installation, there are four distinct zones of groundwater: the upper zone, which is 5.5 to 9 ft below ground surface; the shallow zone, which ranges in depth from 7.5 to 21 ft below ground surface; the deep zone, which is 28 to 41 ft below ground surface; and the Columbia River Sand Aquifer, which extends from 48 to 280 ft below ground surface (ANG 2008). Groundwater flow varies in direction between these zones and is also seasonally fluctuating. The groundwater flow at the base is also influenced by changes in the Columbia River that result from releases of water out of the Bonneville Dam. In the shallow zone, water levels are also influenced by surface water recharge that occurs from drainage ditches and to some degree from the Columbia Slough. In the deeper groundwater zones (the deep zone and the Columbia River Sand Aquifer), water levels and flow direction are influenced by water levels in the Columbia River (ANG 2008).

Figure 4. Portland ANGB Soils Map



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4.4.2 Surface Water

The Portland ANGB is located about 1.5 miles south of the Columbia River. In addition, the Middle Reach of the Columbia Slough is located 50 ft south of the base's boundary and flows east to west. The slough is pumped by Multnomah Drainage District Pump Station #1, which manages water outflow into the Willamette River (ANG 2019).

The Portland ANGB is located within the Columbia Slough drainage basin (DB). The base is divided into four DBs (DB 010, DB 040, DB 050, and DB 495) that collect stormwater via runoff. The collected stormwater flows to three associated outfalls (Outfalls 010, 050, and 495) that discharge stormwater off base. The surface water system on the installation is part of the Port's Municipal Separate Storm Sewer System (MS4). DB/Outfall 495 is located in the southwestern corner of the base and includes runoff from the chapel and contains no industrial facilities or outdoor material storage. DB/Outfall 050 is located on the north side of the 142d Wing East Apron. DB/Outfall 010 is located on the west side of the base. Outfalls 050 and 010 are permitted outfalls associated with industrial activities on base and discharge stormwater to the Port's MS4. Locations of outfalls are included in Figure 5. DB 040 is designed to collect leachate from the Firing Range and discharges directly to Portland ANGB's sanitary sewer system; therefore, DB 040 does not include a stormwater outfall. (ANG 2019).

Approximately 75 percent of the base is characterized by impervious surfaces, which introduce stormwater runoff to the basins and their associated outfalls during rainfall events. In addition, industrial activities at the base, including refueling, airfield pavement de-icing, and aircraft maintenance activities, may introduce potential pollutants into some of these drainage outfalls (ANG 2019). Potential pollutants from these activities include sediment, fecal coliforms, oil, fuel, solvents, antifreeze, hydraulic fluid, grease, acids, bases, paints, herbicides, pesticides, aqueous film forming foam, high expansion foam, lubricants, heavy metals, magnesium chloride, calcium chloride, propylene glycol, and potassium acetate (ANG 2019).

The installation implements a SWPCP, which provides measures for the monitoring and maintenance of stormwater discharges. In addition, the installation complies with regulations associated with the following NPDES Permits:

- NPDES General Stormwater Discharge Permit 1200-Z (Oregon Department of Environmental Quality [ODEQ] File No. 107654 and U.S. Environmental Protection Agency [USEPA] No. ORR80059) for industrial facilities discharging to the Columbia Slough.
- NPDES General Stormwater Discharge Permit (Permit No. 1200-C) for stormwater from periodic construction activities on base. Contractors disturbing greater than 1 acre are required to obtain and comply with the 1200-C permits issued to the contractor.
- NPDES Waste Discharge Permit (Permit No. 101647) for discharge of aircraft and pavement deicing materials into stormwater. Under this permit, Portland ANGB is a co-permittee with the Port.
- NPDES Waste Discharge Permit (Permit No. GEN17A-1700-A) for discharge of vehicle and equipment wash water (ANG 2019).

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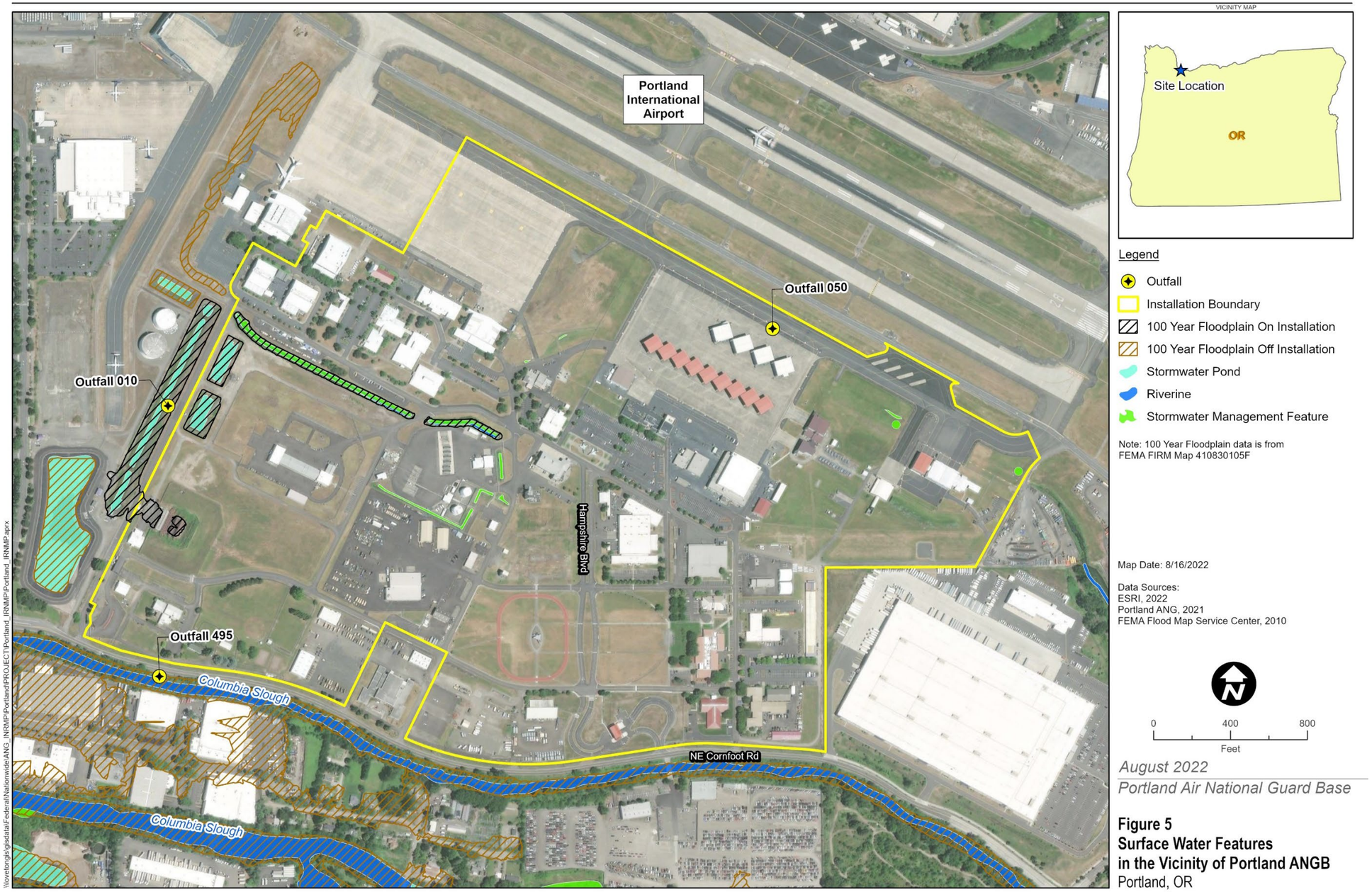
Figure 5. Surface Water Features in the Vicinity of Portland ANGB



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5.0 ECOSYSTEMS AND THE BIOTIC ENVIRONMENT

5.1 Ecosystem Classification

The installation is located within the Portland/Vancouver Basin in the Willamette Valley physiographic province. This physiographic province is characterized by nearly level to undulating terraces, low-gradient floodplains, and meandering rivers and streams. The basin also includes wetlands, oxbow lakes, and ponds. The overall area of the Portland/Vancouver Basin is highly developed with urban and suburban development (Thorson et al. 2003). The installation is located in a developed urban area, characterized by cut and fill areas with drainage modifications. The installation has been significantly altered from its natural state due to large-scale land changes, including the development of runways and extensive paved areas

5.2 Vegetation

5.2.1 Historic Vegetative Cover

The Portland ANGB is located within the historic floodplain of the Columbia River. Historic vegetation of the area was characterized primarily by floodplain species as a result of seasonal inundation prior to the diking and damming of the Columbia River. Deposition of sediment as a result of flooding provided islands and floodplains adjacent to river channels, where cottonwood (*Populus* spp.), willows (*Salix sp.*), and Oregon ash (*Fraxinus latifolia*) occurred. Other areas supported abundant grasses and meadows (Port of Portland 2021). Alder (*Alnus* spp.), ash, and western red cedar (*Thuja plicata*) were typical in more riparian areas, and more upland areas were open prairies historically vegetated with camas (*Camassia quamash*), sedges (*Carex* spp.), tufted hairgrass (*Deschampsia cespitosa*), and California oatgrass (*Danthonia californica*).

5.2.2 Current Vegetative Cover

A reconnaissance-level vegetation survey was conducted at Portland ANGB in 2017 to delineate habitat units and document plant species within the installation (Oregon ANG 2019a). A total of 221.51 acres within the installation boundary were surveyed. Two habitat units were identified and are described below (Figure 6). A total of 215 unique plant species were observed at Portland ANGB during the vegetation survey (Table 4).

Habitat Unit 1: Mowed/Maintained Habitat – This unit has an area of 220.62 acres and encompasses the mowed/maintained and landscaped portions of the installation (Figure 6). This unit is dominated by herbaceous grasses and weed species and is mowed to a short height in most areas. Dominant species include English plantain (*Plantago lanceolata*), broadleaf plantain (*P. major*), red sorrel (*Rumex acestosella*), rabbitsfoot clover (*Trifolium arvense*), white clover (*Trifolium*

Photo 3: *Typical vegetation in Habitat Unit 1*

repens), dandelion (*Taraxacum officinale*), black medick (*Medicago lupulina*), field pennycress (*Thlapsi arvense*), tall fescue (*Schenodorus arundinaceus*), and Kentucky bluegrass (*Poa pratensis*).

Photo 4: *Typical emergent wetland weedy vegetation within Habitat Unit 2*

Habitat Unit 2: Emergent Wetland Habitat – This unit has an area of 0.89 acre and consists of emergent wetland species found in drainage ditches and wetland areas on the installation. Ditches contain standing water with algal growth and emergent wetland vegetation. Dominant species are generally weedy emergent species such as horsetail (*Equisetum* sp.), narrowleaf cattail (*Typha angustifolia*), common rush (*Juncus effusus*), floating marsh pennywort (*Hydrocotyle ranunculoides*), and softstem bulrush (*Schoenoplectus tabernaemontani*).

5.2.2.1 *Invasive Species*

During the 2017 plant survey, a total of 12 plant species recorded were invasive species. These species included orange eye butterflybush (*Buddleja davidii*), Canada thistle (*Cirsium arvense*), bull thistle (*Cirsium vulgare*), field bindweed (*Convolvulus arvensis*), scotch broom *(Cytisus scoparius*), English ivy (*Hedera helix*), common St. Johnswort (*Hypericum perforatum*), perennial pea (*Lathyrus latifolius*), reed canarygrass (*Phalaris arundinacea*), creeping yellowcress (*Rorippa slyvestris*), Armenian (Himalayan) blackberry (*Rubus armeniacus*), and blessed milk thistle (*Silybum mariamum*) (Oregon ANG 2019a). In July 2021, a comprehensive planning level survey for invasive species was completed at Portland ANGB. During this survey effort, a total of six invasive species were recorded. These included rush skeletonweed (*Chondrilla juncea*), Canada thistle, field bindweed, scotch broom, reed canarygrass, and Armenian (Himalayan) blackberry. The extent of the population was delineated and the percent cover of each species within the delineated area was recorded for each invasive species documented during the 2021 survey.

Figure 7 delineates the areas (polygons) where invasive species were identified during the 2021 site survey. Within these delineated areas, estimates of percent aerial cover were made and are discussed here. For some species, individual plants were observed outside of the delineated areas; these individual plants are shown as point locations on Figure 7.

Rush skeletonweed was observed on the western portion of the base within the sparsely vegetated dry upland area with large bare spots along the top of slopes of the existing drainage ditch and stormwater management ponds. Three areas of rush skeletonweed were delineated with 15 percent aerial cover of the species within each of the three areas (Figure 7). Seven areas of Canada thistle were delineated with percent aerial cover ranging from 5 to 25 percent within the seven areas. Canada thistle was observed in small patches throughout the mowed maintained

Photo 5: *Reed canarygrass at Portland ANGB*

areas of the base. In addition to the seven areas delineated, five individual plants were observed along the northern boundary (Figure 7). Many stems are routinely mowed, and only basal leaves were identifiable except for sporadic individuals at full growth height along the edge of the mowed lawn near fence lines and concrete barricades. Eleven areas of field bindweed were delineated within the base with percent aerial cover ranging from 5 to 25 percent within the eleven areas. Field bindweed was observed within the mowed maintained areas. This species is dominant in the northeast corner of the base but was also observed in smaller patches throughout the mowed lawns. In addition to the eleven areas delineated, four individual plants were observed in different areas throughout the base (Figure 7). On the western portion of the base, one area of scotch broom was delineated along the top of the bank of the drainage ditch . In this area, scotch broom had 15 percent aerial cover (Figure 7). Reed canarygrass was observed in the bottom of the drainage ditches on site and along the edge of the water within the existing stormwater management ponds on the western portion of the site. Seven areas of reed canarygrass were delineated within the base with percent aerial cover ranging from 2 to 35 percent within each of the seven areas (Figure 7). Twelve areas of Armenian (Himalayan) blackberry were delineated within the base with percent aerial cover ranging from 5 to 35 percent within each of the twelve areas. Armenian (Himalayan) blackberry was observed along the steep slopes of drainage ditches on site and the slopes of the existing stormwater management ponds on the western portion of the site. In addition, one individual plant was observed on the western portion of the base (Figure 7).

Table 4. Observed Plant Species

Scientific Name	Common name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Abelia x *grandiflora*	Glossy abelia	X		
Abies grandis	Grand fir	X		
Abies spp. *1*	Fir	X		
Abies spp. *2*	Fir	X		
Acer circinatum	Vine maple	X		
Acer ginnala	Amur maple	X		
Acer griseum	Paperbark maple	X		
Acer palmatum	Japanese maple	X		
Acer platanoides	Norway maple (red cultivar and purple cultivar)	X	X	
Acer rubrum	Red maple	X		
Achillea millefolium	Common yarrow	X	X	
Alisma plantago-aquatica	European water plantain		X	

Scientific Name	Common name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Allium spp.	Onion species		X	
Anaphalis margaritacea	Pearly everlasting	X	X	
Anthemis cotula	Stinking chamomile	X		
Arbutus unedo	Strawberry tree	X		
Arctostaphylos uva-ursi	Kinnikinnick	X		
Artemisia spp.	Mugwort	X		
Asclepias spp.	Milkweed	X		
Athyrium filix-femina	Common lady fern		X	
Aucuba japonica	Japanese laurel	X		
Barbarea orthoceras	American yellowrocket, American winter cress	X		
Berberis thunbergii	Japanese barberry	X		
Betula papyrifera	Paper birch	X		
Betula pendula	European white birch	X		
Botrium spp.			X	
Brassica rapa	Field mustard	X		
Bromus inermis	Smooth bromegrass	X	X	
Buddleja davidii	Orange eye butterflybush	X	X	X
Buxus sempervirens	Common box	X		
Callitropsis nootkatensis	Alaska cedar	X		
Calocedrus decurrens	Incense cedar	X		
Canna spp.	Canna lily	X		
Carex feta	Green-sheath		X	
Carex spp.	Sedge species		X	
Cedrus atlantica	Atlas cedar	X		
Cedrus deodara	Himalayan cedar	X		
Centaurium erythraea	European centaury	X	X	
Cerastrium fontanum	Common mouse-ear chickweed	X		
Cercidiphyllum japonicum	Katsura tree	X		
Chamaecyparis lawsoniana	Port Orford cedar	X		
Chamerion angustifolium ssp. *Angustifolium*	Fireweed	X		
Chenopodium album	Lambsquarters		X	
*Chondrilla juncea**	Rush skeletonweed	X		X
Chrysanthemum leucathemum	Oxeye daisy		X	
Cichorium intybus	Chicory	X		
Cirsium arvense	Canada thistle		X	X
Cirsium vulgare	Bull thistle	X		X
Claytonia perfoliata	Miner's lettuce		X	

Scientific Name	Common name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Convolvulus arvensis	Field bindweed	X		X
Cornus kousa	Kousa dogwood	X		
Cornus spp.	Dogwood	X		
Corylus avellana	Common filbert	X		
Corylus cornuta	Beaked hazelnut	X		
Corylus spp.	Hazelnut		X	
Cotinus coggygria	European smoketree	X		
Cotoneaster dammeri	Bearberry cotoneaster	X		
Crataegus monogyna	Oneseed hawthorn	X		
Cupressus sempervirens	Italian cypress	X		
Cytisus scoparius	Scotch broom	X	X	X
Daphne odora	Winter daphne	X		
Daucus carota	Queen Anne's lace	X	X	
Digitaria spp.	Crabgrass	X		
Diospyros virginiana	Common persimmon	X		
Dipsacus sativus	Indian teasel	X	X	
Eleocharis palustris	Common spikerush	X		
Epilobium ciliatum	Fringed willowherb	X		
Equisetum arvense	Common horsetail	X	X	
Equisetum laevigatum	Smooth horsetail		X	
Erigeron annuus	Eastern daisy fleabane	X		
Fagus sylvatica 'Pendula'	Weeping European beech	X		
Festuca rubra	Red fescue	X		
Forsythia spp.	Forsythia	X		
Fraxinus oxycarpa 'Raywood'	Raywood ash	X		
Fraxinus pennsylvanica	Green ash	X		
Fuchsia spp.	Fuchsia	X		
Galium aparine	Cleavers, stickywilly	X	X	
Geranium molle	Dovefoot geranium	X	X	
Gleditsia triacanthos	Honey locust	X		
Hamamelis x *intermedia*	Witch hazel	X		
Hedera helix	English ivy	X		X
Hemerocallis spp.	Daylily	X		
Hieracium umbellatum	Narrowleaf hawkweed	X	X	
Holcus lanatus	Common velvetgrass	X		
Holcus spp.	Velvetgrass species		X	
Hydrangea spp.	Hydrangea	X		
Hydrocotyle ranunculoides	Floating marshpennywort		X	

Scientific Name	Common name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Hypericum calcinum	Aaron's beard	X		
Hypericum perforatum	Common St. Johnswort	X	X	X
Ilex cornuta	Chinese holly	X		
Ilex opaca	American holly		X	
Juncus sp.	Rush species		X	
Juncus effusus	Common rush	X	X	
Juniperus spp. 1	Creeping juniper species 1	X		
Juniperus spp. 2	Creeping juniper species 2	X		
Juniperus spp. 3	Groundcover juniper	X		
Koelreutaria paniculata	Goldenrain tree	X		
Lathyrus latifolius	Perennial pea	X		X
Lavandula stoechas	French lavender	X		
Lemna minor	Common duckweed		X	
Lepidium campestris	Peppergrass	X		
Leucothoe fontanesiana 'Rainbow'	Highland doghobble 'rainbow'	X		
Ligustrum spp.	Privet	X		
Liquidambar styraciflua	Sweetgum	X		
Lolium perenne	Perennial ryegrass	X		
Lonicera spp. 1	Honeysuckle 1	X		
Lonicera spp. 2	Honeysuckle 2 (no flowers)	X		
Lotus corniculatus	Bird's-foot trefoil	X	X	
Lupinus spp.	Lupine	X		
Lychnis coronaria	Rose campion	X		
Lythrum portula	Spatulaleaf loosestrife	X		
Magnolia spp. 1	Magnolia, pink flower	X		
Magnolia spp. 2	Magnolia	X		
Magnolia spp. 3	Magnolia (no flowers)	X		
Mahonia aquifolium	Holly-leaved barberry, tall Oregon grape	X		
Malus spp.	Apple	X		
Medicago lupulina	Black medick	X	X	
Melissa officinalis	Common balm, lemon balm	X		
Metasequoia glyptostroboides	Dawn redwood	X		
Nandina domestica	Heavenly bamboo	X		
Navarretia intertexta	Needleleaf navarretia	X		
Oenothera biennis	Common evening primrose	X	X	
Osmanthus spp.	Devilwood	X		
Oxalis corniculata	Creeping woodsorrel	X		
Paeonia spp.	Peony	X		

Scientific Name	Common name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Panicum dichotomiflorum	Fall panicgrass	X		
Papaver spp.	Poppy	X		
Parentucellia viscosa	Yellow glandweed		X	
Parrotia persica	Persian ironwood	X		
Persicaria microcephala	Fleeceflower	X		
Phalaris arundinacea	Reed canarygrass	X	X	X
Photinia spp.	Chokeberry, photinia	X		
Phytolacca decandra	American pokeweed	X		
Picea abies	Norway spruce	X		
Picea abies 'Pendula'	Dwarf weeping Norway spruce	X		
Picea spp. 1	Spruce species 1	X		
Picea spp. 2	Spruce species 2	X		
Pieris japonica	Japanese pieris	X		
Pinus contorta	Lodgepole pine	X		
Pinus jefferyi	Jeffrey pine	X		
Pinus monticola	Western white pine	X		
Pinus mugo	Mugo pine	X		
Pinus parviflora	Five-needle pine, Japanese white pine	X		
Pinus spp.	Pine	X		
Pinus sylvestris	Scots pine	X		
Plantago lanceolata	English plantain	X	X	
Plantago major	Common plantain	X		
Platanus occidentalis	American sycamore	X		
Poa pratensis	Kentucky bluegrass	X		
Poa spp.	Bluegrass	X	X	
Polygonum pensylvanicum	Pennsylvania smartweed	X		
Polygonum persicaria	Spotted ladysthumb		X	
Polystichum munitum	Western swordfern	X	X	
Populus balsamifera spp. *Trichocarpa*	Black cottonwood		X	
Prunella vulgaris	Common selfheal	X		
Prunus cerasifera	Cherry plum	X		
Prunus laurocerasus	Cherry laurel	X		
Prunus spp. 1	Cherry 1	X		
Prunus spp. 2	Cherry 2	X		
Pseudotsuga menziesii	Douglas fir	X		
Pterocarya fraxinfolia	Wingnut	X		
Pyrus calleryana	Callery pear	X		

Scientific Name	Common name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Quercus garryana	Garry oak		X	
Quercus phellos	Willow oak	X		
Ranunculus repens	Creeping buttercup	X		
Rhododendron spp.	Rhododendron	X		
Rhododendron spp.	Azalea	X		
Robinia pseudoacacia	Black locust		X	
Rorippa sylvestris	Creeping yellowcress	X		X
Rosa multiflora	Multiflora rose	X		
Rosa spp.	Rose	X		
Rosmarinus officinalis	Rosemary	X		
Rubus armeniacus	Armenian (Himalayan) blackberry	X	X	X
Rumex acetosella	Sheep sorrel, red sorrel	X	X	
Rumex aquaticus L. var. *fenestratus*	Western dock	X		
Rumex crispus	Curly dock	X	X	
Sagittaria latifolia	Broadleaf arrowhead		X	
Salix spp.	Willow		X	
Sambucus racemosa	Red elderberry	X	X	
Schedonorus arundinaceus	Tall fescue	X		
Schoenoplectus tabernaemontani	Softstem bulrush		X	
Sedum leibergii	Leiberg stonecrop	X		
Senecio sylvaticus	Wood groundsel, woodland ragwort	X		
Sequoiadendron giganteum 'Pendula'	Weeping giant seqouia	X		
Silybum marianum	Blessed milkthistle	X	X	X
Solanum dulcamara	Bittersweet or climbing nightshade	X	X	
Solidago spp.	Goldenrod (no flower)		X	
Solidago spp.	Goldenrod	X		
Spiraea douglasii	Hardhack, rose spiraea	X	X	
Stachys byzantina	Woolly hedgenettle, lambs ear	X		
Stewartia pseudocamellia	Japanese stewartia	X		
Tanacetum corymbosum	Corymbflower tansy		X	
Tanacetum vulgare	Common tansy	X	X	
Taraxacum officiniale	Common dandelion	X		
Taxus spp.	Yew	X		
Thlaspi arvense	Field pennycress	X		
Thuja plicata	Western redcedar	X		
Thuja spp.	Arborvitae	X		

Scientific Name	Common name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Tilia spp.	Linden tree	X		
Tragopogon spp.	Goatsbeard	X		
Trifolium arvense	Rabbitfoot clover	X	X	
Trifolium pratense	Red clover	X	X	
Trifolium repens	White clover	X		
Typha angustifolia	Narrowleaf cattail		X	
Vaccinium corymbosum	Highbush blueberry	X		
Vaccinium ovatum	California or evergreen huckleberry	X		
Verbascum blattaria	Moth mullein		X	
Verbascum thapsus	Common mullein	X	X	
Veronica arvensis	Corn speedwell	X		
Veronica spicata	Spiked speedwell (pink variety)	X		
Viburnum davidii	David viburnum	X		
Viburnum rhytidophyllum	Leatherleaf viburnum	X		
Viburnum x *bodnantense*	Arrowwood	X		
Vicia americana	American vetch	X	X	
Vinca minor	Common periwinkle	X		
Viola tricolor	Johnny jumpup	X		

*Recorded during the 2021 Invasive Species Survey

Source: Oregon ANG 2019a

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Figure 6. Habitat Distribution at Portland ANGB

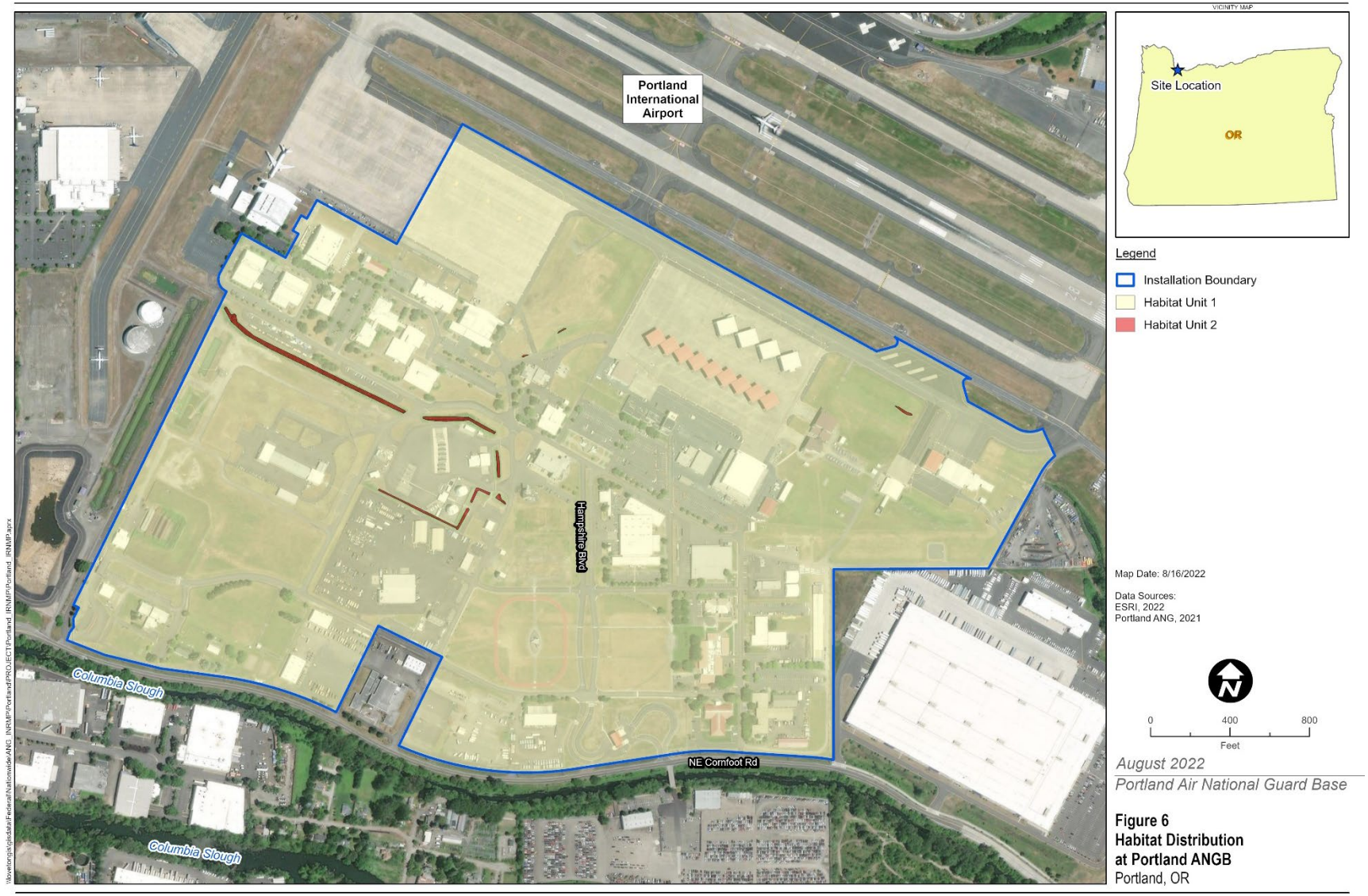

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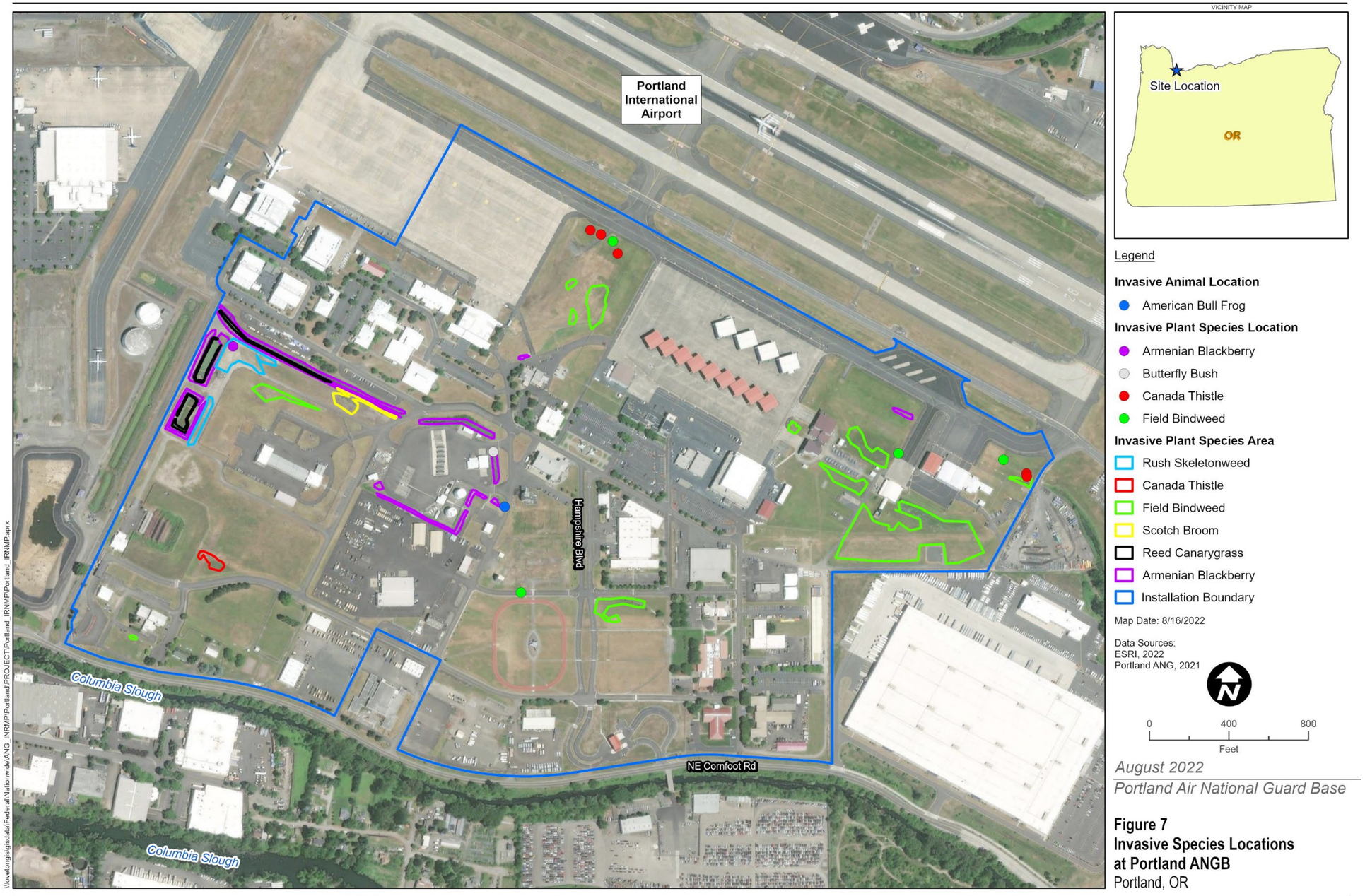
Figure 7. Invasive Species Locations at Portland ANGB



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5.3 Fish and Wildlife

Photo 6: *Cardinal meadowhawk observed within Habitat 2*

Wildlife habitat within the Portland ANGB is limited due to fragmentation and the extent to which the installation is developed. In addition, the high level of activity, noise, and the surrounding airport also contribute to diminishing the quality of the habitat to support wildlife.

Wildlife observations were recorded throughout the base across all habitat units during the reconnaissance-level fauna surveys in 2017. A total of 26 fauna species were observed at Portland ANGB, including 14 birds, two mammals, one reptile, two amphibians, and seven insects (Table 5) (Oregon ANG 2019a). Most of the bird species, except for the mallard (*Anas platyrhynchos*) and the great blue heron (*Ardea herodias*) were observed within Habitat Unit 1. Two mammal species, the European rabbit (*Oryctolagus cuniculus*) and the deer mouse (*Peromyscus maniculatus*), were observed. Rabbits were seen in both habitat units, while the deer mouse was only seen in Habitat Unit 1. One reptile, a common garter snake (*Thamnophis sirtalis*), and two amphibians, the Pacific tree frog (*Hyla regilla*) and American bullfrog (*Lithobates catesbeianus*) were observed in Habitat Unit 2 (Oregon ANG 2019a).

During the 2017 fauna survey, the only invasive wildlife species observed was the American bullfrog. In July 2021, a comprehensive planning level survey for invasive species was completed at Portland ANGB. During this survey effort, the American bullfrog was heard calling in the drainage ditch system near the center of the base adjacent to the fuel depot (Figure 7). Japanese beetles (*Popillia japonica*) and chafer beetles (*Amphimallon majale*), invasive insects, are also known to occur at Portland ANGB; however, the beetles were not observed during the 2017 fauna survey or the 2021 invasive species survey. The Port has been managing the treatments for Japanese and chafer beetle grubs to help control the spread of these species in coordination with the Oregon Department of Agriculture and Portland ANGB.

Table 5. Wildlife Species Observed at Portland ANGB

Group	Scientific Name	Common Name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Bird	*Anas platyrhynchos*	Mallard		X	
Bird	*Ardea herodias*	Great blue heron		X	
Bird	*Buteo jamaicensis*	Red-tailed hawk	X		
Bird	*Charadrius vociferus*	Killdeer	X	X	
Bird	*Corvus brachyrhynchos*	American crow	X	X	
Bird	*Haemorhous mexicanus*	House finch	X	X	
Bird	*Hirundo rustica*	Barn swallow	X	X	
Bird	*Junco hyemelis*	Dark-eyed junco	X		
Bird	*Passer domesticus*	House sparrow	X		
Bird	*Pipilo maculatus*	Spotted towhee	X		

Group	Scientific Name	Common Name	Habitat Unit 1	Habitat Unit 2	Invasive Species
Bird	*Spizella passerina*	Chipping sparrow	X		
Bird	*Sturnus vulgaris*	European starling	X		
Bird	*Zenaida macroura*	Mourning dove	X		
Bird	*Anas platyrhynchos*	Mallard	X		
Reptile	*Thamnophis sirtalis*	Common garter snake		X	
Amphibian	*Hyla regilla*	Pacific tree frog		X	
Amphibian	*Lithobates catesbeianus**	American bullfrog	X	X	X
Mammal	*Oryctolagus cuniculus*	European rabbit	X	X	
Mammal	*Peromyscus maniculatus*	Deer mouse	X		
Invertebrate	*Araneus diadematus*	Cross orbweaver	X		
Invertebrate	*Bombus* spp.	Bumblebee	X		
Invertebrate	*Coccinella* spp.	Ladybug	X		
Invertebrate	*Coleoptera* spp.	Beetle	X		
Invertebrate	*Enallagma boreale*	Boreal bluet	X		
Invertebrate	*Ischnura cervula*	Pacific forktail		X	
Invertebrate	*Sympetrum illotum*	Cardinal meadowhawk		X	

*American bullfrog recorded in Habitat Unit 1 during the 2021 Invasive Species Survey. Recorded in Habitat Unit 2 during the 2017 Flora and fauna Survey.
Source: ANG 2019a

5.4 Threatened and Endangered Species and Species of Concern

Federal status as a threatened or endangered species is derived from the ESA of 1973 (16 USC § 1531 et seq.) and administered, depending on the species, by the USFWS or the National Marine Fisheries Service under NOAA. The ODFW identifies and designates threatened or endangered wildlife species within the state of Oregon, and maintains a list of these species. Oregon Department of Agriculture (ODA) has legal authority of state listed plant species. Table 6 identifies all the federal and state-listed species with the potential to occur on Portland ANGB.

According to the USFWS Information for Planning and Consultation (IPaC) database, six federally listed species have the potential to occur at Portland ANGB (USFWS 2022a). Species include three threatened birds – northern spotted owl (*Strix occidentalis caurina*), streaked horned lark (*Eremophila alpestris strigata*), and yellow-billed cuckoo (*Coccyzus americanus*); one threatened fish – bull trout (*Salvelinus confluentus*); one threatened plant – Nelson's checker-mallow (*Sidalcea nelsoniana*); and one candidate species – monarch butterfly (*Danaus plexippus*) (USFWS 2022a). Habitat for the streaked horned larks occurs adjacent to the installation, but no habitat for yellow-bellied cukoos, northern spotted owls, bull trout, or monarch butterflies occurs on the base. Nelson's checker-mallow could occur in the emergent wetland habitat found in Habitat Unit 2; however, no individuals or populations were located during the 2017 surveys. On 28 April 2022, the USFWS proposed to delist Nelson's checker-mallow from the ESA due to recovery. The final determination for delisting of this species will be made in the near future. No critical habitat has been designated within the boundaries of Portland ANGB.

Under state law (ORS 496.171-496.192), the Fish and Wildlife Commission through ODFW maintains a list of native wildlife species in Oregon that have been determined to be either threatened or endangered. ODFW lists a total of 29 wildlife species as threatened or endangered. The only state listed species with the potential of occurring on Portland ANGB is the northern spotted owl (ODFW 2021). ODFW lists the streaked horned lark as a sensitive species and a conservation strategy species. ODA lists six plant species as threatened or endangered occurring in Multnomah County. Of these six species, only the white rock larkspur (*Delphinium leucophaeum*) and peacock larkspur (*Delphinium pavonaceum*) have the potential of occurring within the vicinity of Portland ANGB (ODA 2022). Table 6 lists the federal and state listed species potentially occurring on Portland ANGB or within the vicinity of the base and their habitat preference.

Photo 7: *Streaked horned lark (Eremophila alpestris strigata) Source: USFWS 2022b*

No federal or state-listed threatened and endangered species were documented during the flora and fauna surveys conducted at Portland ANGB (Oregon ANG 2019a). The streaked horned lark is known to nest and forage on Port property and has been observed on the property since 2006. PDX Wildlife Management Staff survey for streaked horned larks during the nesting season each year to determine site occupancy and abundance and to ensure compliance with the ESA (Port of Portland 2019). The PDX Wildlife Management Staff conducts daily patrols on the base to identify risks wildlife may pose to safe airport operations and document the presence of sensitive species of concern, such as the streaked horned larks. To date, there have not been any observations of streaked horned larks on the base due to the lack of suitable habitat, abundance of development, and elevated structures (i.e., buildings, paved roads, signs, fences, vehicles, and equipment). All sensitive species observations are recorded in the Port's Wildlife Information System (WIS), which be shared with the Portland ANGB and the Streaked Horned Lark Working Group during the annual meetings or on request.

Streaked horned larks nest from March through August in shallow depressions, which are found on open ground or near grass clumps. Females typically lay four eggs, which incubate for 11 days, with young being able to fly 9 to 12 days after hatching. Streaked horned larks feed on insects and seeds and appear to choose habitat based on structure, rather than the food resources available.

Table 6. Federal and State Listed Threatened and Endangered Species with the Potential to Occur in the Vicinity of Portland ANGB

Scientific Name	Common Name	Federal Status	State Status	Habitat Preferences
Coccyzus americanus	Yellow-billed cuckoo	Threatened		Coastal scrub, second growth forests, small riparian patches

Scientific Name	Common Name	Federal Status	State Status	Habitat Preferences
Danaus plexippus	Monarch butterfly	Candidate		Meadows and grasslands containing milkweed (Asclepias sp.)
Delphinium leucophaeum	White rock larkspur		Endangered	Edges of oak woodlands, roadside ditches, along river banks, moist lowland meadows
Delphinium pavonaceum	Peacock larkspur		Endangered	Native wet prairies, edges of oak woodlands, along roadsides and fence rows
Eremophila alpestris strigata	Streaked horned lark	Threatened	Sensitive/ Conservation Strategy	Open, disturbed areas with low, sparse vegetation
Salvelinus confluentus	Bull trout	Threatened		Cold water streams
Sidalcea nelsoniana	Nelson's checker-mallow*	Threatened		Wetlands, riparian areas, sedges, and grass meadows
Strix occidentalis caurina	Northern spotted owl	Threatened	Threatened	Old growth forests

* Nelson's checker-mallow was proposed for delisting on 28 April 2022.

Source: USFWS 2022a, ODFW 2021, ODA 2022

5.5 Waters of the U.S., Wetlands, and Floodplains

A review and delineation of Waters of the U.S. (WOTUS), including wetlands, was conducted at Portland ANGB in 2017 to locate all jurisdictional waterways on the site (Oregon ANG 2019b). Wetlands were delineated and classified in accordance with the "Routine Determination" procedures outlined in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (U.S. Army Corps of Engineers [USACE] 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region – Version 2.0* (USACE 2010). During the survey four wetlands totaling 0.89 acre were delineated. No stream channels were identified as WOTUS (Oregon ANG 2019b). The USACE Portland District reviewed the Draft Final Wetlands Report and issued a written Approved Jurisdictional Determination (AJD) dated 18 January 2019. The USACE determined that the wetlands described in the report were not WOTUS and are not considered jurisdictional. The USACE found that the 0.86-acre wetland on the western boundary of the base is part of an NPDES stormwater system. The USACE also found that the 0.02-acre wetland on the northern portion of the base and the 0.006-acre and 0.005-acre wetlands located on the northcentral portion of the base are lawfully constructed grassed swales that are part of the stormwater management system. Locations of these stormwater management features are shown in Figure 5. Appendix C includes the Final Wetland Delineation Report and a copy of the AJD. The Oregon Department of State Lands issued a AJD dated August 22, 2020 concurring with the USACE's AJD that all drainage ways and stormwater features are part of the Airport's MS4 system and are therefore not jurisdictional under state law. The features found provide stormwater treatment for discharges and they slow stormwater flow rates to reduce the amount of suspended sediments from the waters discharging at Outfall 010.

Photo 8: *Stormwater Management Feature*

Floodplains are lowlands and relatively flat areas adjoining waters that are subject to flooding. The 100-year floodplain is designated based on different factors on the Federal Insurance Rate Maps (FIRM) along with other flooding and storm surge information. With respect to occurrence a 100-year flood has a 1 percent chance of occurring in any given year and the 500-year flood has a 0.2 percent chance in any given year. The limits to which that flood reaches, defines the floodplains.

Portions of Portland ANGB are located within the 100-year floodplain (Flood Insurance Rate Map 410830105F, Figure 5). The 100-year floodplain is associated with the drainage ditches that run along the western boundary of the site and into the center of the site. The 100-year floodplain is also associated with the Upper Columbia Slough, which runs near the southern boundary of the installation. The floodplain ranges in width from approximately 100 to 250 ft in some areas. Portland ANGB is not located within the 500-year floodplain.

6.0 MISSION IMPACTS ON NATURAL RESOURCES

6.1 Natural Resources Needed to Support the Military Mission

The Portland ANGB requires operation areas to serve as a buffer to provide support facilities and functions. The military mission and training requirements are dynamic and can change over time, requiring potential changes to natural resource needs to support the mission. Degradation of natural resources can result in unintended impacts to the military mission, impaired readiness, and increased expenses for natural resources management rather than the military mission. The Portland ANGB needs the land and its natural resources to function together in a healthy ecosystem to support the military mission. Management activities in this INRMP are designed to support the desired habitats and ecosystem functions to meet the military mission.

6.2 Natural Resources Constraints to Mission and Mission Planning

The natural resources constraints to installation planning and mission are summarized as:

- Any project that is anticipated to impact floodplains must undergo the NEPA process per 32 CFR Part 989. For any project that alters the hydrology of the floodplain, the installation will also work with the ODEQ, the state agency that is responsible for the administration of floodplain laws and regulations.
- In accordance with Section 7 of the ESA, training activities in areas containing federal- or state-protected species or their habitats should be avoided or minimized. The streaked horned lark, a federally threatened species is known to nest and forage on airport property.

6.2.1 Land Use

The scope and intensity of the land management depends on the land-use category. The land-use categories at Portland ANGB include improved (approximately 221 acres and unimproved grounds (approximately 1 acre).

Improved grounds include developed/paved impervious areas including buildings, parking areas, roadways, sidewalks, aircraft aprons, lawns, and landscape plantings. The north portion of the installation contains largely airfield pavement and mowed grassy areas. Aircraft maintenance, operations, and supporting functions, including fueling operations, airside pavement de-icing, and maintenance generally occur on the northern portion of the site. The southern parts of the site are largely industrial and include command and support buildings. Much of the central portion of the installation is maintained lawn. INRMP activities in improved areas include grounds maintenance, stormwater management, and pest management.

Unimproved grounds include any areas where natural vegetation is allowed to grow unimpeded by maintenance activities. Unimproved grounds at Portland ANGB are limited to the stormwater management features.

6.2.2 Current Major Impacts

Mission activities at Portland ANGB include those related to air defense and air superiority capabilities. The 142 Wing is on 24-hour Air Sovereignty Alert, flying the skies from Northern

California to the Canadian border as part of Air Combat Command and North American Aerospace Defense Command. The Portland ANGB includes facilities for refueling, light repairs, and staging of aircraft on to the runways of Portland International Airport. The Portland ANGB also provides vehicle maintenance facilities and other support equipment, as well as facilities and staff to maintain roadways, structures, and grounds.

Impacts to natural resources are more likely to result from mission support activities, including aircraft and vehicle maintenance, runway-related activities, and facility and utility maintenance activities. In addition, support and non-mission-related activities, such as management and disposal of hazardous substances, industrial operations, and landscape maintenance activities, can potentially affect natural resources. Potential conflicts with the acceptable stewardship of military lands at Portland ANGB are avoided through active planning, education, and management activities. The current major impacts to natural resources from the Portland ANGB military mission include:

- Impacts to the environment from the use of hazardous materials and pesticides
- Impacts to wildlife populations including feeding, breeding, and foraging from aircraft operations
- Impacts to native vegetation from the introduction of invasive vegetation through support and non-mission related activities

6.2.2.1 *Encroachment*

Encroachment is defined as the impacts of community actions on military activities, as well as the impact of the military's actions on the surrounding community. The Portland ANGB facilities are not likely to be subject to future encroachment issues. Portland ANGB is bounded by the Portland International Airport runways and taxiways to the north, where future development would not be feasible. Manufacturing, industrial, and residential uses are found south of the base. Industrial warehouses are located east of the base, and commercial area with some open space is located west of the base. There is potential for development within the undeveloped off-base space east of the Portland ANGB boundary.

6.2.2.2 *Hazardous Materials and Waste*

Hazardous wastes are managed at the Portland ANG facilities through the base-level Hazardous Waste Management Plan in accordance with Air Force Instruction (AFI) 32-7042, *Solid and Hazardous Waste Compliance*. The 142 Wing is regulated as a Large Quality Generator of hazardous wastes and maintains a USEPA identification number (USEPA ID No. OR1570024264). Large Quantity Generators generate more than 2,200 pounds of hazardous wastes in a calendar month. Some of the hazardous waste generated at the 142 Wing include sludge, sealant debris, chem lights, weapons cleaning debris, solid paint debris, jet A filters, solvent rags, and gasoline fuel filters (Oregon ANG 2015a). This plan will implement the "cradle-to-grave" management control of hazardous waste, as mandated by the USEPA.

Hazardous materials and petroleum products are used throughout the Portland ANGB for various functions, including aircraft fueling, deicing, and maintenance; ground vehicle fueling and maintenance; and facilities maintenance. Hazardous materials used in these functions include jet fuel, motor gasoline, diesel fuel, lubricating oils, solvents, paints and thinners, antifreeze, and

acids. Issues associated with hazardous material and waste typically center around the storage, transport, use, and disposal of these substances. When such materials are improperly used in any way, they can adversely impact wildlife species, habitats, and soil and water systems, as well as humans.

The Oil and Hazardous Substances Spill Prevention and Response Plan (Oregon ANG 2015b) was prepared in accordance with good engineering practices and also functions as the Quick Reference Spill Response Guide (Red Plan) and the Oil Spill Prevention, Control & Countermeasure Plan (SPCCP) (in accordance with 40 CFR 112). The Oil and Hazardous Substance Spill Prevention and Response Plan provides guidance to Portland ANG personnel on the handling, storage, and disposal of hazardous materials. The SPCCP provides guidance on petroleum storage, spill prevention measures, and contingency procedures including spill containment and cleanup. This plan establishes responsibilities for handling fuels and other hazardous fluids, containing and recovering spills, spill training, and spill reporting procedures. The Red Plan includes various sections of the Oil and Hazardous Substances Spill Prevention and Response Plan that needs to be readily available if an emergency spill occurs at the base.

6.2.2.3 *Installation Restoration Program Sites*

Six Installation Restoration Program (IRP) sites were identified at Portland ANGB as having hazardous substances present in groundwater or sediment at concentrations that pose unacceptable risks to human health or the environment. Selected remedies were chosen for each site in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (as amended by the Superfund Amendments and Reauthorization Act of 1986) and the Oregon Environmental Cleanup Law of 1987 (ANG 2004) contains a summary of the IRP sites at the Portland ANG facilities and selected remedies.

Table 7. Summary of IRP Sites at the Portland ANGB

IRP Site Number	Site Description	Selected Remedies
Site 1	Central Hazard Waste Storage Area	In Situ Oxidation – Potassium Permanganate Injection with Monitored Natural Attenuation (MNA)
Site 2	Civil Engineering Hazardous Material Storage Area	In Situ Oxidation – Potassium Permanganate Injection with MNA
Site 3	Hush House Area	In Situ Oxidation – Potassium Permanganate Injection with MNA
Site 4	Main Drainage Ditch	Ditch Filling/Sediment Capping
Site 9	Petroleum, Oil, and Lubricant Facility	In Situ Oxidation – Sodium Persulfate Injection with MNA
Site 11	Washrack West of Building 250	In Situ Oxidation – Potassium Permanganate Injection with MNA

Source: ANG 2004

7.0 NATURAL RESOURCES PROGRAM MANAGEMENT

7.1 Natural Resources Program Management

The guiding philosophy of this INRMP is to take an ecosystems approach to managing natural resources. Ecosystem management is based on clearly stated goals and objectives, and associated projects. This INRMP identifies goals and objectives and presents the means to accomplish them as well as the methodologies to monitor results.

7.2 Fish and Wildlife Management

Wildlife management involves manipulating various aspects of an ecosystem to benefit chosen wildlife species. Management of habitats generally is focused to benefit native species, particularly rare species and game species. Fish and wildlife management at the Portland ANGB include maintaining and enhancing biodiversity while supporting the ANG mission. Management of these resources is a stewardship responsibility of the Portland ANGB. The primary fish and wildlife management concerns at the Portland ANGB include the federally threatened streaked horned lark, migratory birds, nuisance wildlife, and other wildlife habitat management. There are no hunting and fishing opportunities at the Portland ANG facilities. Authority for fish and wildlife management is outlined in AFMAN 32-7003, *Environmental Conservation*. Relevant laws include the ESA and the Migratory Bird Treaty Act (MBTA).

Oregon has developed an Oregon Conservation Strategy that identifies the goals and conservation focus of the state. Where feasible, the fish and wildlife management goals of this INRMP are integrated with the goals of the Conservation Strategy. These include the goals to maintain species diversity on the installation, and to preserve and protect species of conservation concern.

7.2.1 Federal Wildlife Policies and Regulations

7.2.1.1 *Endangered Species Act (ESA)*

The ESA of 1973, as amended (16 USC §1531 et seq.) provides for the identification and protection of threatened and endangered plants and animals, including their critical habitats. The ESA requires federal agencies to conserve threatened and endangered species and cooperate with state and local authorities to resolve water resources issues in concert with the conservation of threatened and endangered species. This law establishes a consultation process involving federal agencies with input from state agencies to minimize impacts to the greatest extent practicable by agency action that would adversely affect species or habitat. Further, it prohibits all persons subject to U.S. jurisdiction from taking, including any harm or harassment, endangered or threatened species.

7.2.1.2 *Migratory Bird Treaty Act (MBTA)*

The MBTA prohibits, unless permitted by regulations, the pursuit, hunting, take, capture, killing or attempting to take, capture, kill, or possess any migratory bird included in the Act, including any part, nest, or egg of any such bird (16 USC § 703). The DoD has a Memorandum of Understanding (MOU) with the USFWS pursuant to Executive Order (EO) 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, which outlines a collaborative approach to promote the conservation of migratory bird populations. This MOU specifically

pertains to natural resource management activities, including, but not limited to, habitat management, erosion control, forestry activities, invasive weed management, and prescribed burning. It also pertains to installation support functions, operation of industrial activities, construction and demolition activities, and hazardous waste cleanup. In February 2007, the USFWS finalized regulations for issuing incidental take permits to the DoD (50 CFR 21.15). If any of the Armed Forces determine that a proposed or an ongoing military readiness activity may result in a significant adverse effect on a population of migratory bird species, then they must confer and cooperate with the USFWS to develop appropriate and reasonable conservation measures to minimize or mitigate identified significant adverse effects (50 CFR Part 21).

7.2.1.3 *Bald and Golden Eagle Protection Act*

The Bald and Golden Eagle Protection Act (16 USC 668-668c), enacted in 1940 and amended several times since then, prohibits anyone, without a permit issued by the Secretary of the Interior, from "taking" bald eagles, including their parts, nests, or eggs. The Act provides criminal penalties for persons who "take, possess, sell, purchase, barter, offer to sell, purchase of barter, transport, export or import, at any time of any manner, any bald eagle… [or any golden eagle], alive or dead, or any part, nest, or egg thereof."

In addition to immediate impacts, this definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during a time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that interferes with or interrupts normal breeding, feeding, or sheltering habitats, and causes injury, death, or nest abandonment. No eagle nests are present on the installation or on adjacent properties.

7.2.2 Nuisance Wildlife and Wildlife Diseases

A BASH Plan exists at Portland ANGB to address bird/wildlife hazards to the flying mission. Nuisance or hazardous wildlife species at Portland ANGB include coyotes (*Canis latrans*), waterfowl, shorebirds, wading birds, raptors, gulls, crows, European starlings (*Sturnus vulgaris*), Canada geese (*Branta canadensis*), and vultures (Oregon ANG 2020). Canada geese can cause public health concerns and can be safety hazards near airports. Future nuisance wildlife problems will be evaluated, and solutions will follow the IPM Plan. Any large-scale fish and wildlife deaths and unnatural behavior occurring on the installation will be reported, recorded, and investigated in conjunction with USFWS and ODFW, as appropriate.

7.2.3 Management of Threatened and Endangered Species and Habitats

This section presents information about the management of priority species that are located within or have the potential to occur at the Portland ANGB, along with requirements and strategies for their management. As additional surveys and natural resources management activities are conducted, it is possible other species may be added in the future.

7.2.3.1 *Federally Listed Special Status Wildlife Species*

No federally listed threatened and endangered species were documented during the flora and fauna surveys conducted at Portland ANGB (Oregon ANG 2019a). However, the federally threatened streaked horned lark is known to nest and forage on Port property and has been observed on the property since 2006 (see Section 5.4).

Installation Roads and Grounds personnel have been trained to identify the streaked horned lark. Annual streaked horned lark identification training was initially established in 2019 to assist grounds personnel who might encounter the bird during normal work activities, but the EM office has now migrated to flyer postings as an alternative training tool. The flyer in Appendix D provides photographic representations of male, female, and juvenile birds along with common behaviors and characteristic features to look for. Flyers are posted in key areas, such as shops, work control, and contractor sign-in locations as a reminder to those conducting work across the base to report any potential sighting to the EM office. The flyer method provides a more frequent cue for Portland ANGB staff and contractors to remain vigilant in their efforts to protect this threatened species. If a bird is seen that could be a streaked horned lark, a picture is taken and submitted to the EM office for identification. The EM Office then consults with the Port's wildlife managers to confirm potential identification and to conduct field investigations, if needed. To date, a positive streaked horned lark identification has not been made.

7.2.3.2 *State Special Status Species*

No state listed threatened or endangered species were documented during the flora and fauna surveys conducted at Portland ANGB (Oregon ANG 2019a). The only state listed species with the potential of occurring on or in the vicinity of Portland ANGB are the northern spotted owl, white rock larkspur, and peacock larkspur (see Section 5.4) (ODFW 2021 and ODA 2022).

7.2.3.3 *Management Strategies for Special Status Species*

To facilitate the continuation of the military mission and meet natural resource management objectives while minimizing impacts to special status species, the Portland ANG will:

- Update biological inventories regularly, as the occurrence of listed species is subject to change over time as a result of either recruitment, responses to management activities, identification of additional protected species, or changes in the status of species currently present at the Portland ANGB.
- Where feasible, maintain existing forested areas, grasslands, and wetlands, and minimize disturbance in riparian and wetland buffers. Periodic mowing of overgrown vegetation in the stormwater ditch is performed outside of sensitive nesting and foraging time frames.
- Continue supporting the BASH Program to minimize impacts to special status species.

7.3 Water and Wetland Resource Protection

Aquatic habitats at the Portland ANGB include stormwater management features including man-made ditches, storm sewers, drainage swales, and two stormwater detention ponds (Figure 5). Other surface water features occur outside of the boundaries, but adjacent to the Portland ANGB. The Middle Reach of the Columbia Slough is located 50 ft south of the base's boundary and flows east to west. In addition, the Portland ANGB is located about 1.5 miles south of the Columbia River. These surface waters provide habitat for amphibians, reptiles, fish, and waterfowl. Water resource protection is important to natural resources management because it directly affects surface water quality and the value of aquatic habitats. Wetlands, floodplains, and surface water buffers are critical in the protection and maintenance of wildlife resources.

7.3.1 Regulatory and Permitting

The Clean Water Act (CWA) (33 USC 1251 et seq.) is the primary federal statute that protects the nation's waters. The intent of the CWA is to prevent, reduce, and eliminate pollution in the nation's waters for the purposes of restoring and maintaining the chemical, physical, and biological integrity of the nation's waters. WOTUS include, but are not limited to, coastal and inland waters, lakes, rivers, ponds, streams, intermittent streams, vernal pools, and wetlands. See 33 CFR Part 328.3(a) for the full list of WOTUS.

The three primary sections of the CWA that may affect day-to-day operations are Sections 404, 401, and 402. The USACE is the regulatory agency responsible for implementation of the CWA and the USEPA has oversight over the CWA. Section 404 regulates the discharge of dredged or fill material into WOTUS, including wetlands. When impacts to WOTUS, including wetlands, cannot be avoided, a Section 404 permit must be obtained from the USACE. When a Section 404 permit is required, a Section 401 Water Quality Certification (WQC) is also required.

Section 10 of the Rivers and Harbors Act (33 USC 403) regulates the placement of any obstructions in and the excavation or fill in any navigable WOTUS. The USACE is the regulatory agency responsible for implementation of the Rivers and Harbors Act.

Management of wetlands on federal lands, including military installations, is further governed by EO 11990, *Protection of Wetlands* and DoDI 4715.03. Under EO 11990 and DoDI 4715.03, wetlands are required to be managed for no net loss. This means short- and long-term impacts to WOTUS and wetlands must be avoided. If they cannot be avoided, the impacts must be minimized to the least damaging practicable alternative. When impacts cannot be avoided, they must be mitigated to ensure there is no net loss of acreage.

To obtain Section 404 and Section 401 WQC, applicants are, depending on the state in which the installation is located, required to submit joint permit applications that will go to both the USACE and the state agency responsible for implementation of Section 401.There are different types of Section 404 permits that include but are not limited to individual and Nationwide Permits. The specific type of permit is based on the total area of impact and the overall impact to the system. In Oregon, the state agency responsible for implementation of Section 401 is ODEQ. WQCs can be individual, or they can be issued as part of a Nationwide Permit.

Applications for Section 404 permits must include an avoidance and minimization analysis that addresses the USEPA Section 404(b)(1) Guidelines (40 CFR Part 230.10). The analysis must demonstrate the effort made to first avoid the impacts and then the rationale for the selected least damaging practicable alternative. The analysis must also demonstrate the impacts will not cause or contribute to violations of state water quality standards and the activity does not jeopardize protected species or sensitive cultural resources (33 CFR Part 320.3 [e] and [g]). The analysis must also identify mitigation alternatives and the preferred alternative selected to meet mitigation requirements.

Wastewater, construction, stormwater, and pre-treatment discharges, also known as point source discharges, are managed through the NPDES Permit Program as authorized by Section 402 of the CWA. In Oregon, the USEPA has delegated the authority to issue NPDES permits to ODEQ. Portland ANGB is covered under the state's Stormwater Discharge General Permit No. 1200-Z. The Portland ANGB-issued Permit is ODEQ File No. 107654 and USEPA No. ORR80059

(ANG 2019). All point source discharges must have an NPDES permit. NPDES permits require specific actions, including monitoring and analysis work that must be conducted during the lifetime of the permit. In addition to the General Stormwater Discharge Permit No. 1200-Z, Portland ANGB must also comply with the NPDES Waste Discharge Permit (Permit No. 101647) for aircraft and pavement deicing materials, NPDES Waste Discharge Permit (Permit No. GEN17A-1700-A) for vehicle wash water, and NPDES General Stormwater Discharge Permit (Permit No 1200-C) for construction activities.

EO 11988, *Floodplain Management*, requires all federal agencies to provide leadership and take action to reduce the risk of floodplain loss; minimize the impacts of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains when acquiring, managing, or disposing of federal lands. In addition, if action is taken that permits an encroachment within the floodplain that alters the flood hazards on a national FIRM (e.g., changes to the floodplain boundary), the Portland ANGB must submit an analysis reflecting those changes to Federal Emergency Management Agency (FEMA). FEMA headquarters can be contacted at 202-646-3461 to obtain booklet MT-2, *Revisions to National Flood Insurance Program Maps*, for further guidance.

This INRMP focuses mainly on the potential impacts to water resources related to ground disturbance and stormwater associated with changes in impervious areas. Specific watershed protection measures used by the Portland ANGB include:

- Implementing the SWPCP, which provides engineering and management strategies designed to improve the quality of stormwater runoff from the Portland ANGB and thereby improve the quality of receiving waters.
- Implementing the four NPDES Discharge Permits listed above for Portland ANGB.
- Obtain ODEQ approval for all development activities within the 100- year floodplain.
- Managing invasive species by promoting the use of native species.

7.3.2 Coastal Management Zones

The Portland ANGB is not located within the coastal zone; therefore, construction projects are not subject to review by Oregon Department of Land Conservation and Development to determine the effects on coastal resources (Oregon Coastal Management Program 2022).

7.3.3 Vegetative Buffers

Vegetative buffers (e.g., grass filter strips, forested buffers) improve stormwater runoff quality by slowing down the rate of flow, trapping sediment and other pollutants, and increasing infiltration into the ground.

7.4 Grounds Maintenance

The land at Portland ANGB is maintained based on ground maintenance categories: improved (approximately 221 acres) and unimproved grounds (approximately 1 acre). The improved areas (i.e., buildings, aircraft aprons, and landscaped lawns) and unimproved grounds at the Portland ANGB are managed by the 142d Civil Engineering Squadron.

AFMAN 32-7003 notes that the INRMP should provide goals and objectives that support the desired future condition of the base's urban forest, which is comprised of the installation's landscape trees. Current management activities at Portland ANGB that support proper care and maintenance of the urban forest include replacing trees, pruning or removing hazardous trees, and ensuring that contractors comply with approved planting specifications. When feasible, mowing practices that decrease impacts to wildlife are applied in natural grassy areas, such as the fields north of O'Connor Way on the east side of the base, areas north of Rees Way, and areas surrounding Building 400 outside the fencing.

AFMAN 32-7003 recommends that installations plant regionally native plants in landscape designs in improved and semi-improved areas and do not use non-native species that tend to be invasive and reproduce outside the intended growing area. Native plants generally require less maintenance inputs in terms of energy, water, manpower, equipment, and chemicals. Native plants are implemented to the extent feasible as outlined in Section 207 of EO 13148, *Greening the Government Through Leadership in Environmental Management*. All ground maintenance activities at Portland ANGB are conducted in a manner to ensure compliance with environmental legislation, regulations, and guidelines. Grounds maintenance actions also follow the Landscape Planting Guidelines issued by the Port in accordance with the Airport's 2019 Wildlife Hazard Management Plan. Landscape designs and plantings by the base require Port approval.

7.5 Wildland Fire Management

The threat of wildfire to the mission and natural resources is extremely low and a wildland fire management plan for the Portland ANGB is not required.

7.6 Forest Management

Portland ANGB has no natural forest habitat and forest management is limited to the landscaping trees within the base. Current management activities at the Portland ANGB include replacing trees, pruning or removing hazardous trees, and ensuring that contractors comply with approved planting specifications.

7.7 Soil Conservation and Sediment Management

The soils at the Portland ANGB are susceptible to water erosion and are somewhat susceptible to wind erosion if not protected with vegetation or other cover. Maintenance of key ecosystem functions, such as erosion control and sediment retention, require a healthy, uniform ground cover be established as quickly as possible following land use conversion or disturbance and that interim soil stabilization measures be implemented. Sites where soils are exposed to environmental variables (i.e., water and wind) can have erosion and sedimentation problems. Sedimentation occurs when soil particles are suspended in surface runoff or wind and are deposited in streams or other water bodies. Sediments affect water clarity, decrease oxygen levels in water, and transport pollutants. Construction activities that disturb the ground surface can accelerate erosion by removing vegetation, compacting or disturbing the soil, changing natural drainage patterns, and by covering the ground with impermeable surfaces (i.e., pavement, concrete, buildings). When the land surface is impermeable, stormwater can no longer infiltrate, resulting in larger amounts of water that can move more quickly across a site and which can carry larger amounts of sediment and other pollutants into stormwater drains and drainage basins and ultimately into streams and rivers. As soil quality declines, adverse impacts to on-site and

off-site environments increase. Therefore, the maintenance of soil quality is important for efficient and productive land management and utilization. Soil drainage, texture, strength, and erodibility all determine the suitability of the ground to support man-made structures, facilities, and military activities. The plan for water resources at the Portland ANGB specifically focuses on stormwater drainage and retention.

Portland ANGB operates under NPDES permits, which provide engineering and management strategies designed to improve the quality of stormwater runoff from the installation and thereby improve the quality of receiving waters. Construction activities that disturb one or more acres are regulated under the federal NPDES construction stormwater program and would need a Construction General Permit. To protect surface water quality, the Portland ANGB implements the following strategies:

- Monitor surface water quality.
- Implement BMPs for construction and industrial activities.
- Prevent surface water pollution by ensuring environmental plans (e.g., SWPCP, Oil and Hazardous Substances Spill Prevention and Response Plan) are implemented.
- Minimize the use of pesticides.
- When possible, maintain vegetation buffers around water resources.
- Re-seed disturbed areas after construction.

7.8 Outdoor Recreation, Public Access, and Public Outreach

Portland ANGB facilities contain limited areas suitable for outdoor recreation. Class I areas include two athletic courts, a baseball field in the southwest corner of the property, and a running track located in the parade area by the main gate. There are no outdoor recreation resources available for use by the general public.

7.9 Conservation Law Enforcement

No hunting or fishing is allowed on the installation; therefore, conservation law enforcement is not required.

7.10 Geographic Information Systems

A geographic information system (GIS) is used to manage and catalog information acquired in natural resources research. GIS assists in planning by charting areas of environmental concern and providing a baseline for analyzing the potential impacts of any proposed natural resources management action. Managers can implement the capabilities of a GIS to watershed, wetlands, wildlife, and various other natural resource management applications. GIS needs and requirements will be addressed through the ANG GeoBase Program.

7.11 Other Plans

7.11.1 Integrated Pest Management Plan

The Portland ANGB IPM Plan describes how the Portland ANGB will manage and control pests while complying with DoDI 4150.07, *DoD Pest Management Program*, and AFMAN 32-1053,

Integrated Pest Management Program. The purpose of IPM is to prevent or control pests and disease vectors that may adversely impact readiness or military operations by affecting the health of personnel or damaging structures, material, or property. Pest management at Portland ANGB incorporates continuous monitoring, education, recordkeeping, and communication to prevent pests and disease vectors from causing unacceptable damage to operations, people, property, material, or the environment.

Public-health related pests, pests found in and around buildings, noxious or invasive plants and animals, undesirable vegetation, and quarantine and regulated pests have been identified at Portland ANGB (Oregon ANG 2022). Table 8 includes some of the pests identified at Portland ANGB.

DoDI 4150.07 also requires installations to implement vertebrate pest management programs to prevent vertebrate pest interference with operations, destruction of real property, and adverse impacts on health and morale. No vertebrate pests have been identified at Portland ANGB (Oregon ANG 2022).

Table 8. Pests at Portland ANGB

Category	Pests
Public Health-Related Pests	– Mice/rats – Cockroaches – Bees, hornets, and wasps – Spiders – Mosquitos – Ants – Ticks – Snakes
Pests Found In and Around Buildings	– Stored product pests
Structural Pests	– Subterranean termites – Drywood termites
Vertebrate Pests	– European starlings – Canada geese – Coyotes
Undesirable Vegetation	– Noxious weeds and invasive species – Vegetative overgrowth
Quarantine and Regulated Pests	– Japanese beetles

Source: Oregon ANG 2022

7.11.2 Invasive Species

Non-native, invasive, and pest species have the potential to be a major contributor to ecosystem destabilization. Non-native species (also termed exotic), as the name indicates, are species from other regions of the world which have been artificially introduced to the region, primarily through human activities. Invasive species are those that, whether native or non-native, tend to

become established in disturbed systems and competitively exclude native species. Invasive plant species should be monitored to prevent further spread and infestation.

EO 13751, *Safeguarding the Nation from the Impacts of Invasive Species*, requires all federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause. Invasive plants are nonnative or native species that can thrive in areas beyond their natural range of dispersal. Noxious weeds are invasive species that are difficult to control or eradicate and have the ability to cause economic harm to the agricultural industry. Information on invasive species in Oregon can be found on the ODA Noxious Weed website https://www.oregon.gov/oda/programs/weeds/oregonnoxiousweeds/pages/aboutoregonweeds.aspx and the Oregon Invasive Species Council website: https://www.oregoninvasivespeciescouncil.org/infohub. A total of 138 plant species are considered invasive by the State of Oregon and are classified by the ODA Noxious Weed Program (ODA 2016). The ODFW also identifies 42 invasive or nuisance wildlife species (ODFW 2017). Table 9 lists the 14 invasive species identified at Portland ANGB during the 2017 Flora and Fauna Survey and/or the 2021 Invasives Species Survey. This includes 13 plant species and 1 amphibian species.

Table 9. Invasive Species Observed at the Portland ANGB

Scientific Name	Common Name	Habitat Type(s) Observed
Buddleja davidii	Orange eye butterflybush	Habitat 1; Habitat 2
Chondrilla juncea	Rush skeletonweed	Habitat 1
Cirsium arvense	Canada thistle	Habitat 2
Cirsium vulgare	Bull thistle	Habitat 1
Convolvulus arvensis	Field bindweed	Habitat 1
Cytisus scoparius	Scotch broom	Habitat 1; Habitat 2
Hedera helix	English ivy	Habitat 1
Hypericum perforatum	Common St. Johnswort	Habitat 1; Habitat 2
Lathyrus latifolius	Perennial pea	Habitat 1
Lithobates catesbeianus	American bullfrog	Habitat 1; Habitat 2
Phalaris arundinacea	Reed canarygrass	Habitat 1; Habitat 2
Rorippa sylvestris	Creeping yellowcress	Habitat 1
Rubus armeniacus	Armenian (Himalayan) blackberry	Habitat 1; Habitat 2
Silybum marianum	Blessed milk thistle	Habitat 1; Habitat 2

Source: Oregon ANG 2019a

Habitat 1 = Mowed, maintained areas; Habitat 2 = stormwater features/drainage ditches

Invasive, non-native species, and noxious weeds have the capability to significantly impact native vegetation and wildlife. A key element of INRMP implementation is to ensure no net loss of military training capability. Management of undesirable species is necessary to maintain military lands and facilities in usable condition. In addition, uncontrolled animal pests can become health hazards, which could threaten the military mission.

The objectives of the IPM Plan are to establish and maintain safe, effective, and environmentally sound IPM practices to control pests that may adversely impact readiness of military operations by affecting the health of personnel or damaging structures, material, or property. Management strategies outlined for implementation of this INRMP are to ensure no net loss of military training capabilities. General management strategies are as follows:

- Control invasive and exotic species and noxious weeds through early detection and isolation of infested areas.
    - Establish and maintain systematic and pest-specific surveillance and monitoring programs to determine the status of pest presence at the installation and if and when treatments are needed rather than by a predetermined schedule.
    - Implement BMPs to minimize land disturbances that favor invasion of non-native species and re-vegetate disturbed areas with native species.
    - If required, only use those pesticides approved for use in aquatic environments in and around wetlands and other surface waters.
    - Do not use invasive, non-native species in landscaping.
- Implement judicious use of both non-chemical and chemical control techniques to achieve effective pest management that minimizes economic, health, and environmental risks. Emphasize the use of mechanical, biological, and cultural control techniques, using chemical techniques sparingly with caution. Use chemical controls only after careful consideration of alternative controls.
    - Educate site users.
    - Ensure all pest management operations involving the application of pesticides on the installation are performed by DoD or state-certified pesticide applicators and by licensed commercial pest management companies.
    - Ensure pesticides used at Portland ANGB are applied and stored in accordance with the product labels, their Safety Data Sheets, DoDI 4150.07, and federal, Commonwealth, and local regulations.
    - Ensure the Integrated Pest Management Coordinator monitors contracts for pest management at Portland ANGB.

7.11.3 Stormwater Management

ODEQ issued an NPDES Stormwater Discharge General Permit No. 1200-Z (ODEQ File No. 107654 and USEPA No. ORR80059) for stormwater at Portland ANGB (ANG 2019). In addition to the General Stormwater Discharge Permit No. 1200-Z, Portland ANGB has also been issued an NPDES Waste Discharge Permit (Permit No. 101647) for aircraft and pavement deicing materials, NPDES Waste Discharge Permit (Permit No. GEN17A) for vehicle wash water, and NPDES General Stormwater Discharge Permit (Permit No 1200-C) for construction activities. Portland ANGB operates under a SWPCP, which provides engineering and management strategies designed to improve the quality of stormwater runoff from the Portland

ANGB (ANG 2019). A Construction General Permit for discharge of stormwater and dewatering wastewaters from construction activities that disturb greater than 1 acre) is required from ODEQ.

7.11.4 Bird/Wildlife Aircraft Strike Hazard

Portland ANGB currently has a BASH Plan, which is managed by the Safety Office. The purpose of the BASH Plan is to provide an active program to minimize bird and other wildlife strikes to aircraft. The plan is based on hazards from both resident and seasonal bird species, as well as other species of wildlife. Daily and seasonal bird movements create various hazardous conditions. The plan establishes procedures to minimize the hazard to Portland ANGB and the deployed aircraft at the installation and in their operating areas.

The 142 Wing has had approximately 37 bird/wildlife strikes between 2006 and 2020; most strikes have been with small perching birds and passerines. However, the 142 Wing aircraft have also hit large raptors, wading birds, shore birds, and waterfowl. A minor strike peak occurs in May followed by an increase during summer months and into the fall migratory period (Oregon ANG 2020). Controls of animal and bird populations, both migratory and resident populations, can be accomplished through operational controls, vegetation maintenance, habitat modification, exclusion harassment, and lethal control by PDX Wildlife Management Staff.

7.11.5 Oregon Conservation Strategy

The Oregon Conservation Strategy is a plan to conserve Oregon's fish, wildlife, and habitat. The plan identifies priority conservation issues The Oregon Conservation Strategy provides an essential foundation for the future of wildlife conservation through the identification of species of greatest conservation need and provides an opportunity for state and federal agencies and other conservation partners to coordinate roles in conservation efforts across Oregon (ODFW 2016). The EM will consult with the ODFW to determine areas where the installation can participate in future wildlife conservation partnerships in support of the Oregon Conservation Strategy.

8.0 MANAGEMENT GOALS AND OBJECTIVES

Goals and objectives provide the framework for natural resources management programs. Goals provide a general guiding direction for each technical area, and objectives are more specific actions that facilitate achieving those goals. The objectives then drive the development of specific activities and projects to achieve those objectives. Management goals and objectives for the INRMP were developed by a thorough evaluation of the natural resources present on Portland ANGB in accordance with AFMAN 32-7003 and the principles of adaptive ecosystem management by an interdisciplinary team of biologists, planners, and environmental scientists. Goals and objectives should be revised over time to reflect evolving environmental conditions, adaptive management, and the completion of tasks as the INRMP is implemented.

GOAL – Natural Resources Program Management (PM): Manage resources in a manner that is compatible with and supports the military missions of Portland ANGB, while complying with applicable federal and state laws, USAF regulations, and policies.

- OBJECTIVE PM1: Ensure Environmental Management staff are trained in accordance with the requirements of AFMAN 32-7003. At a minimum, members of the

Environmental Management Office must attend the CECOS Natural Resources Compliance Course as part of their training requirements for implementation of the INRMP. When feasible, members of the Environmental Management Office will attend the annual National Military Fish and Wildlife Association Training Workshop.

- OBJECTIVE PM2: Prepare a budget and identify project needs to implement the natural resources management program at the Portland ANGB. Project needs are to be submitted to the NGB/A4VN NRPM for budget and contracting.
- OBJECTIVE PM3: Conduct an annual INRMP review meeting with internal stakeholders. The Portland ANGB EM will promote discussion with Installation Command, personnel, and pertinent internal stakeholders to identify operational needs relative to natural resources management. The EM will document, in writing, the discussions held and agreements made and will address the document at the annual meeting with USFWS, ODFW, and NGB/ZA4VN NRPM.
- OBJECTIVE PM4: Conduct an annual INRMP review meeting with the USFWS, ODFW, IPMC, the NGB/A4VN NRPM, Safety Office, and the Port. The annual meeting can be conducted as an in-person meeting, via a teleconference, via Teams, or via email. The EM will present the status of the project actions taken over the previous year, any changes that occurred, and the project actions to be undertaken over the coming year. The EM will record the discussions held and the agreements made and will provide an attendance roster for attendees to sign. The EM will submit the written record and attendance roster to the attendees and will request review and concurrence with the documents provided. Receipt of written concurrence from the USFWS and ODFW Habitat Division will constitute conclusion of the annual meeting. On the fifth annual review, the team should determine if the INRMP will continue or if the INRMP will be terminated.

GOAL – Fish and Wildlife Monitoring (FW): Establish a general wildlife and plant population trend monitoring program as a component of long-term ecological trend monitoring.

- OBJECTIVE FW1: Based on the Final Flora and Fauna Surveys (Oregon ANG 2019a), determine what additional surveys, and at what frequency, may be needed to understand the existing fish and wildlife habitat and the species using Portland ANGB.
- OBJECTIVE FW2: Coordinate with the PDX Wildlife Management Staff to maintain an updated inventory of plants and animals present on Portland ANGB.
- OBJECTIVE FW3: Support the Portland ANGB Safety Office and the Port Wildlife Management Office in the implementation of the BASH Plan.
- OBJECTIVE FW4: Attend quarterly Airport Operations Board (AOB) meetings to ensure natural resources compliance.

GOAL – Vegetative Management (VM): Establish survey and monitoring protocols to identify and address various vegetative communities on the installation.

- OBJECTIVE VM1: Based on the Final Flora and Fauna Surveys (Oregon ANG 2019a), determine what additional surveys may be needed to address the vegetative communities, including the presence of non-native, invasive, and noxious species on the installation.
- OBJECTIVE VM2: Revegetate areas where vegetation has been removed with native, non-invasive, drought tolerant species. Plantings will follow the Port's approved planting list and will be in compliance with the Oregon Department of Transportation *Erosion Control Manual*.

GOAL – Invasive Species (IN): Manage invasive, non-native, and noxious species at Portland ANGB in accordance with state and federal laws and regulations.

- OBJECTIVE IN1: Implement management strategies provided in the Invasive Species Management Plan.
- OBJECTIVE IN2: Annually review federal and state listings of invasive and noxious flora and fauna species to maintain current lists of species that potentially could be on or near Portland ANGB and determine which ones may pose a threat to the facilities. Information on invasive species in Oregon can be found on the ODA Noxious Weed website: https://www.oregon.gov/oda/programs/weeds/oregonnoxiousweeds/pages/aboutoregonweeds.aspx and the Oregon Invasive Species Council website: https://www.oregoninvasivespeciescouncil.org/infohub.
- OBJECTIVE IN3: Ensure pest management projects and invasive species projects undertaken by either the Pest Management Office or the Environmental Office are coordinated and provide mutual benefit.
- OBJECTIVE IN4: Participate in managing the chafer beetle and Japanese beetle on Portland ANGB in cooperation with the PDX Wildlife Management Staff.

GOAL – Threatened and Endangered Species (TE): Identify and monitor the presence of federally and state-listed threatened and endangered species to include any species of greatest conservation need identified in the Oregon Conservation Strategy.

- OBJECTIVE TE1: Annually review state and federal lists of endangered, threatened, and species of concern with potential to occur on Portland ANGB. Maintain current lists of federally and state-listed species..
- OBJECTIVE TE2: Based on the Final Flora and Fauna Survey (Oregon ANG 2019a) for the Portland ANGB, as well as state and federal information sites identifying listed species, determine what additional surveys may be needed.
- OBJECTIVE TE3: Coordinate with the PDX Wildlife Management Staff to review annual survey data to assess the presence/occupancy of the streaked horned lark on the airport and Portland ANGB. Continue to follow monitoring and response protocols for the streaked horned lark. Streaked horned lark survey protocols are included in Appendix D.

- OBJECTIVE TE4: Attend annual Streaked Horned Lark Working Group meetings to support protection of the streaked horned lark and to keep abreast of the current status and trends of larks in the area.

GOAL – Grounds Maintenance and Landscaping (GM): Manage vegetative cover, forested areas, and soil to minimize sediment loss and erosion, while protecting water quality.

- OBJECTIVE GM1: Work with Grounds Maintenance to identify landscaping BMPs that could be implemented at Portland ANGB.

GOAL – Water Resource Protection (WA): Manage water resources to prevent potential degradation of water quality while ensuring no net loss of acreage, functions, and values.

- OBJECTIVE WA1: Ensure all NPDES permits are current and all conditions of those permits, including water quality monitoring, are implemented in accordance with the permits.
- OBJECTIVE WA2: Ensure all ground disturbance activities are conducted in accordance with state or local erosion and sediment control laws and regulations to prevent erosion from disturbed areas causing sediment to enter waterways and/or wetlands.
- OBJECTIVE WA3: Implement the SWPCP and manage stormwater runoff to reduce nutrients and contaminants from entering on site and adjacent stream and wetland systems.
- OBJECTIVE WA4: Review all land-disturbing projects, including but not limited to demolition, construction, and maintenance projects, to determine if the projects will impact open drainage systems on the installation including floodplains. Ensure an Air Force 813 form is submitted to the Environmental Office for each land-disturbing project.

GOAL – Public Outreach (PO): Promote natural resources education and awareness.

- OBJECTIVE PO1: Investigate outreach opportunities with the Starbase program to educate youth about natural resources management at the 142 Wing.

9.0 ANNUAL WORK PLANS

The INRMP Annual Work Plans contain projects listed by fiscal year (FY). For each project, a specific timeframe for implementation is provided (as applicable), as well as the Office of Primary Responsibility (OPR), funding sources, and priority for implementation (see Table 10 through 14) Priorities are defined as follows:

- High: The INRMP signatories assert that if the project is not funded, the INRMP is not being implemented and the USAF is non-compliant with the Sikes Act, or that it is specifically tied to an INRMP goal and objective and is part of a "Benefit of the Species" determination necessary for ESA Sec 4(a)(3)(B)(i) critical habitat exemption.
- Medium: Project supports a specific INRMP goal and objective and is deemed by INRMP signatories to be important for preventing non-compliance with a specific requirement within a natural resources law or by EO 13112, *Invasive Species*. However,

the INRMP signatories would not contend that the INRMP is not being implemented if not accomplished within the programmed year due to other priorities and/or funding shortfalls.

- Low: Project supports a specific INRMP goal and objective, enhances conservation resources or the integrity of the installation mission, and/or supports long-term compliance with specific requirements within natural resources law but is not directly tied to specific compliance within the programmed year.

Table 10. Work Plans FY 2023

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Prepare annual budget to implement the natural resources management program at Portland ANGB.	PM2	Annual	142 Wing EM	NGB	High
Complete annual review of INRMP with installation stakeholders.	PM3	Annual	142 Wing EM	Portland ANGB	High
Complete annual review of INRMP with USFWS and ODFW.	PM4	Annual	142 Wing EM	Portland ANGB	High
Review federal and state listings for threatened, endangered, and species of concern to maintain current lists of federal and state species.	FW2, TE1	Annual	142 Wing EM	Portland ANGB	High
Review natural resource studies conducted at Portland ANGB to identify additional project/studies that may be needed.	FW1, TE2, VM1	Annual	142 Wing EM	Portland ANGB	Medium
Annually review federal and state listings of invasive and noxious flora and fauna species to maintain current lists of species that potentially could be on or near Portland ANGB, and to determine which ones may pose a threat to the facilities.	IN2	Annual	142 Wing EM	NGB	High
Coordinate with the PDX Wildlife Management staff to review annual streaked horned lark surveys to assess the presence of streaked horned larks on the base. If present, coordinate with USFWS.	TE3	Annual	142 Wing EM	NGB	High
Ensure all NPDES permits are current and all conditions of those permits, including water quality monitoring, are implemented in accordance with the permits.	WA1	Ongoing	142 Wing EM	Portland ANGB	Medium
Support the BASH Plan by attending quarterly AOB meetings to ensure natural resources compliance.	FW4, FW5	Ongoing	142 Wing EM	NGB	High
Ensure demolition, construction, and renovation projects use Port-approved vegetation as part of project design plans.	VM2	Ongoing, as needed	142 Wing EM	Portland ANGB	Medium

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Both the Federal EM and the State EM must attend and complete the CECOS Natural Resources Compliance Course. If only one can attend in a fiscal year, one must complete the course by 30 September 2023 and the other by 30 September 2024.	PM1	Every 5 years	NGB	Portland ANGB	Medium
Determine with the USACE and the state if their findings of no jurisdictional waters or wetlands on the installation because the systems found are part of the Port's MS4 system will require extensions every five years.	WT1	One-time	142 Wing EM	Portland ANGB	High
Investigate opportunities for collaboration with the Starbase program to educate youth about natural resources management at the 142 Wing.	PO2	Ongoing	142 Wing EM	NGB	Low
Attend the annual the Streaked Horned Lark Working Group meeting to support protection of the streaked horned lark.	TE4	Ongoing	142 Wing EM	NGB	Low
Review all land-disturbing activities proposed on the installation to determine what actions may be required (i.e., implementation of erosion and sediment control) and what permits may be required.	WA2, WA4	Ongoing, as needed	142 Wing EM	NGB	High
Continue to train grounds personnel on identification of the streaked horned lark and the need to take pictures when one is thought be seen. Submit photographs to the EM office for coordination with PDX Wildlife Management Staff.	TE3	Ongoing, as needed	142 Wing EM	NGB	Medium
Identify areas to implement alternative mowing practices to minimize impacts to wildlife.	GM1	As needed	142 Wing Grounds Maintenance 142 Wing EM	Portland ANGB	Medium

Table 11. Work Plans FY 2024

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Prepare annual budget to implement the natural resources management program at Portland ANGB.	PM2	Annual	142 Wing EM	NGB	High
Complete annual review of INRMP with installation stakeholders.	PM3	Annual	142 Wing EM	Portland ANGB	High
Complete annual review of INRMP with USFWS and ODFW.	PM4	Annual	142 Wing EM	Portland ANGB	High
Review federal and state listings for threatened, endangered, and species of concern to maintain current lists of federal and state species.	FW2, TE1	Annual	142 Wing EM	Portland ANGB	High

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Annually review federal and state listings of invasive and noxious flora and fauna species to maintain current lists of species that potentially could be on or near Portland ANGB, and to determine which ones may pose a threat to the facilities.	IN2	Annual	142 Wing EM	NGB	High
Coordinate with the PDX Wildlife Management staff to review annual streaked horned lark surveys to assess the presence of streaked horned larks on the base. If present, coordinate with USFWS.	TE3	Annual	142 Wing EM	NGB	High
Ensure all NPDES permits are current and all conditions of those permits, including water quality monitoring, are implemented in accordance with the permits.	WA1	Ongoing	142 Wing EM	Portland ANGB	Medium
Support the BASH Plan by attending quarterly AOB meetings to ensure natural resources compliance.	FW4, FW5	Ongoing	142 Wing EM	NGB	High
Ensure demolition, construction, and renovation projects use Port-approved vegetation as part of project design plans.	VM2	Ongoing, as needed	142 Wing EM	Portland ANGB	Medium
Investigate opportunities for collaboration with the Starbase program to educate youth about natural resources management at the 142 Wing.	PO2	Ongoing	142 Wing EM	NGB	Low
Attend the annual Streaked Horned Lark Working Group meeting to support protection of the streaked horned lark.	TE4	Ongoing	142 Wing EM	NGB	Low
Both the Federal EM and the State EM must attend and complete the CECOS Natural Resources Compliance Course. If only one can attend in a fiscal year, one must complete the course by 30 September 2023 and the other by 30 September 2024.	PM1	Every 5 years	NGB	Portland ANGB	Medium
In accordance with the approved *Invasive Species Management Plan*, monitor invasive species populations and implement invasive species management techniques if species thresholds are exceeded.	IN1, IN3	Ongoing, as needed	142 Wing Grounds Maintenance 142 Wing EM	NGB	Medium
Coordinate with PDX Wildlife Management Staff to manage the chafer and Japanese beetle population on base.	IN4	Ongoing, as needed	142 Wing EM	NGB	Medium
Continue to train grounds personnel on identification of the streaked horned lark and the need to take pictures when one is thought be seen. Submit the photographs the EM office for coordination with PDX Wildlife Management Staff.	TE3	Ongoing, as needed	142 Wing EM	NGB	Medium

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Review all land-disturbing activities proposed on the installation to determine what actions may be required (i.e., implementation of erosion and sediment control) and what permits may be required.	WA2, WA4	Ongoing, as needed	142 Wing EM	NGB	High
Identify areas to implement alternative mowing practices to minimize impacts to wildlife.	GM1	As needed	142 Wing Grounds Maintenance 142 Wing EM	Portland ANGB	Medium

Table 12. Work Plans FY 2025

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Prepare annual budget to implement the natural resources management program at Portland ANGB.	PM2	Annual	142 Wing EM	NGB	High
Complete annual review of INRMP with installation stakeholders.	PM3	Annual	142 Wing EM	Portland ANGB	High
Complete annual review of INRMP with USFWS and ODFW.	PM4	Annual	142 Wing EM	Portland ANGB	High
Review federal and state listings for threatened, endangered, and species of concern to maintain current lists of federal and state species.	FW2, TE1	Annual	142 Wing EM	Portland ANGB	High
Annually review federal and state listings of invasive and noxious flora and fauna species to maintain current lists of species that potentially could be on or near Portland ANGB, and to determine which ones may pose a threat to the facilities.	IN2	Annual	142 Wing EM	NGB	High
Coordinate with the PDX Wildlife Management staff to review annual streaked horned lark surveys to assess the presence of streaked horned larks on the base. If present, coordinate with USFWS.	TE3	Annual	142 Wing EM	NGB	High
Ensure all NPDES permits are current and all conditions of those permits, including water quality monitoring, are implemented in accordance with the permits.	WA1	Ongoing	142 Wing EM	Portland ANGB	Medium
Support the BASH Plan by attending quarterly AOB meetings to ensure natural resources compliance.	FW4, FW5	Ongoing	142 Wing EM	NGB	High
Ensure demolition, construction, and renovation projects use Port-approved vegetation as part of project design plans.	VM2	Ongoing, as needed	142 Wing EM	Portland ANGB	Medium

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Investigate opportunities for collaboration with the Starbase program to educate youth about natural resources management at the 142 Wing.	PO2	Ongoing	142 Wing EM	NGB	Low
Attend the annual Streaked Horned Lark Working Group meeting to support protection of the streaked horned lark.	TE4	Ongoing	142 Wing EM	NGB	Low
In accordance with the approved *Invasive Species Management Plan*, monitor invasive species populations and implement invasive species management techniques if species thresholds are exceeded.	IN1, IN3	Ongoing, as needed	142 Wing Grounds Maintenance 142 Wing EM	NGB	Medium
Coordinate with PDX Wildlife Management Staff to manage the chafer and Japanese beetle population on base.	IN4	Ongoing, as needed	142 Wing EM	NGB	Medium
Continue to train grounds personnel on identification of the streaked horned lark and the need to take pictures when one is thought be seen. Submit the photographs the EM office for coordination with PDX Wildlife Management Staff.	TE3	Ongoing, as needed	142 Wing EM	NGB	Medium
Review all land-disturbing activities proposed on the installation to determine what actions may be required (i.e., implementation of erosion and sediment control) and what permits may be required.	WA2, WA4	Ongoing, as needed	142 Wing EM	NGB	High
Identify areas to implement alternative mowing practices to minimize impacts to wildlife.	GM1	As needed	142 Wing Grounds Maintenance 142 Wing EM	Portland ANGB	Medium

Table 13. Work Plans FY 2026

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Prepare annual budget to implement the natural resources management program at Portland ANGB.	PM2	Annual	142 Wing EM	NGB	High
Complete annual review of INRMP with installation stakeholders.	PM3	Annual	142 Wing EM	Portland ANGB	High
Complete annual review of INRMP with USFWS and ODFW.	PM4	Annual	142 Wing EM	Portland ANGB	High
Review federal and state listings for threatened, endangered, and species of concern to maintain current lists of federal and state species.	FW2, TE1	Annual	142 Wing EM	Portland ANGB	High

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Annually review federal and state listings of invasive and noxious flora and fauna species to maintain current lists of species that potentially could be on or near Portland ANGB, and to determine which ones may pose a threat to the facilities.	IN2	Annual	142 Wing EM	NGB	High
Coordinate with the PDX Wildlife Management staff to review annual streaked horned lark surveys to assess the presence of streaked horned larks on the base. If present, coordinate with USFWS.	TE3	Annual	142 Wing EM	NGB	High
Ensure all NPDES permits are current and all conditions of those permits, including water quality monitoring, are implemented in accordance with the permits.	WA1	Ongoing	142 Wing EM	Portland ANGB	Medium
Support the BASH Plan by attending quarterly AOB meetings to ensure natural resources compliance.	FW4, FW5	Ongoing	142 Wing EM	NGB	High
Ensure demolition, construction and renovation projects use Port-approved vegetation as part of project design plans.	VM2	Ongoing, as needed	142 Wing EM	Portland ANGB	Medium
Investigate opportunities for collaboration with the Starbase program to educate youth about natural resources management at the 142 Wing.	PO2	Ongoing	142 Wing EM	NGB	Low
Attend the annual Streaked Horned Lark Working Group meeting to support protection of the streaked horned lark.	TE4	Ongoing	142 Wing EM	NGB	Low
In accordance with the approved *Invasive Species Management Plan*, monitor invasive species populations and implement invasive species management techniques if species thresholds are exceeded.	IN1, IN3	Ongoing, as needed	142 Wing Grounds Maintenance 142 Wing EM	NGB	Medium
Coordinate with PDX Wildlife Management Staff to manage the chafer and Japanese beetle population on base.	IN4	Ongoing, as needed	142 Wing EM	NGB	Medium
Continue to train grounds personnel on what a streaked horned lark looks like and need for them to take pictures when one is thought be seen and submit the photo the EM office for coordination with PDX Wildlife Management Staff	TE3	Ongoing, as needed	142 Wing EM	NGB	Medium
Review all land-disturbing activities proposed on the installation to determine what actions may be required (i.e., implementation of erosion and sediment control) and what permits may be required.	WA2, WA4	Ongoing, as needed	142 Wing EM	NGB	High

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Identify areas to implement alternative mowing practices to minimize impacts to wildlife.	GM1	As needed	142 Wing Grounds Maintenance 142 Wing EM	Portland ANGB	Medium

Table 14. Work Plans FY 2027

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Prepare annual budget to implement the natural resources management program at Portland ANGB.	PM2	Annual	142 Wing EM	NGB	High
Complete annual review of INRMP with installation stakeholders.	PM3	Annual	142 Wing EM	Portland ANGB	High
Complete annual review of INRMP with USFWS and ODFW. Determine if INRMP will continue or be terminated.	PM4	Annual	142 Wing EM	Portland ANGB	High
Review federal and state listings for threatened, endangered, and species of concern to maintain current lists of federal and state species.	FW2, TE1	Annual	142 Wing EM	Portland ANGB	High
Annually review federal and state listings of invasive and noxious flora and fauna species to maintain current lists of species that potentially could be on or near Portland ANGB, and to determine which ones may pose a threat to the facilities.	IN2	Annual	142 Wing EM	NGB	High
Coordinate with the PDX Wildlife Management staff to review annual streaked horned lark surveys to assess the presence of streaked horned larks on the base. If present, coordinate with USFWS.	TE3	Annual	142 Wing EM	NGB	High
Ensure all NPDES permits are current and all conditions of those permits, including water quality monitoring, are implemented in accordance with the permits.	WA1	Ongoing	142 Wing EM	Portland ANGB	Medium
Support the BASH Plan by attending quarterly AOB meetings to ensure natural resources compliance.	FW4, FW5	Ongoing	142 Wing EM	NGB	High
Ensure demolition, construction and renovation projects use Port-approved vegetation as part of project design plans.	VM2	Ongoing, as needed	142 Wing EM	Portland ANGB	Medium
Investigate opportunities for collaboration with the Starbase program to educate youth about natural resources management at the 142 Wing.	PO2	Ongoing	142 Wing EM	NGB	Low
Attend the annual Streaked Horned Lark Working Group meeting to support protection of the streaked horned lark.	TE4	Ongoing	142 Wing EM	NGB	Low

Project	Objective	Frequency	OPR	Funding Source	Priority Level
Monitor invasive species populations and implement invasive species management techniques if species thresholds are exceeded per the Invasive Species Management Plan.	IN1, IN3	Ongoing, as needed	142 Wing Grounds Maintenance 142 Wing EM	NGB	Medium
Coordinate with PDX Wildlife Management Staff to manage the chafer and Japanese beetle population on base.	IN4	Ongoing, as needed	142 Wing EM	NGB	Medium
Continue to train grounds personnel on what a streaked horned lark looks like and need for them to take pictures when one is thought be seen and submit the photo the EM office for coordination with PDX Wildlife Management Staff	TE3	Ongoing, as needed	142 Wing EM	NGB	Medium
Review all land-disturbing activities proposed on the installation to determine what actions may be required (i.e., implementation of erosion and sediment control) and what permits may be required.	WA2, WA4	Ongoing, as needed	142 Wing EM	NGB	High
Identify areas to implement alternative mowing practices to minimize impacts to wildlife.	GM1	As needed	142 Wing Grounds Maintenance 142 Wing EM	Portland ANGB	Medium

10.0 INRMP IMPLEMENTATION, UPDATE, AND REVISION PROCESS

10.1 INRMP Implementation

In accordance with AFMAN 32-7003, an INRMP is considered implemented if an installation:

- Actively requests, receives, and uses funds for "must fund" projects and activities as defined by Chapter 4 of AFI 32-7001, *Environmental Quality Programming and Budgeting*.
- Executes all "must fund" projects and activities in accordance with specific time frames identified in the INRMP.
- Prepares the INRMP in cooperation with appropriate stakeholders. Notifies stakeholders when a new or revised INRMP will be prepared and solicits participation and input to the INRMP development and review process.
- Ensures that sufficient numbers of professionally trained natural resources management personnel are available to perform the tasks required by the INRMP.
- Ensures INRMP has been approved in writing by the appropriate representative from each cooperating agency within the past 5 years.
- Reviews the INRMP annually and coordinates annually with cooperating agencies.

- Establishes and maintains regular communications with the appropriate federal and state agencies for the region where the installation is located.
- Documents specific INRMP action accomplishments undertaken each year.
- Ensures INRMP updates and reviews are conducted in cooperation with the USFWS and ODFW, where applicable.
- Ensures the INRMP implements ecosystem management on ANG installations by setting goals for attaining a desired land condition.

Natural resource and land use management issues are not the only factors contributing to the development and implementation of this INRMP. Facility management and other seemingly unrelated issues affect implementation. It is important to the implementation of this INRMP that Portland ANGB personnel take ownership of this INRMP to provide the necessary resources (e.g., personnel and equipment) and utilize the appropriate funding allocated by the ANG NGB/A4VN NRPM to implement this INRMP. It is extremely important that the INRMP Working Group continue to participate in the implementation of this INRMP. The INRMP Working Group is made up of key Portland ANGB personnel, representatives from the USFWS, ODFW, and the PDX Wildlife Management Staff. It has an oversight role to ensure the effective implementation of this INRMP. Top and middle-level management representation, as well as representation from individuals with day-to-day on-site experience will provide the INRMP Working Group with the leadership and structure necessary for the successful implementation of this INRMP.

10.1.1 Monitoring INRMP Implementation

10.1.1.1 *Portland ANGB INRMP Implementation Analysis*

Implementation of this INRMP will be monitored for meeting the legal requirements of the Sikes Act, as well as for other mission and biological measures of effectiveness. The ultimate successful implementation of this INRMP is realized in no net loss in the capability of the Portland ANGB to support the military mission, while at the same time providing effective natural resources management.

To monitor and evaluate the effectiveness of the INRMP implementation, the following will be reviewed, as applicable, and discussed within the context of the annual review and/or a formal review of operation and effect:

- Impacts to and from military mission
- Conservation program budget
- Staff requirements
- Program budget
- Compliance with regulatory requirements
- Program and project implementation
- Feedback from military trainers, the USFWS, ODFW, and others

- Trends in species and habitat diversity as evidenced by recurring biological surveys, land use changes, and opinions of natural resource experts

Some of these areas may not be reviewed every year due to lack of data or pertinent information. The effectiveness of this INRMP as a mission enabling conservation tool will be decided by mutual agreement of the USFWS, ODFW, and Portland ANGB during annual reviews and/or reviews for operation and effect.

10.1.1.2 *USAF and DoD INRMP Implementation Monitoring*

The USAF uses the Defense Environmental Programs Annual Report to Congress (DEPARC) to monitor Sikes Act compliance. DEPARC is the automated system used to collect installation environmental information for reporting to DoD and Congress. Established to fulfill an annual requirement to report the status of DoD's Environmental Quality program to Congress, DEPARC collects information on enforcement actions, inspections, and other performance measures for high-level reports and quarterly reviews. DEPARC also helps the USAF track fulfillment of DoD measures of merit requirements. The Deputy Under Secretary of Defense's (DUSD) Updated Guidance for Implementation of the Sikes Act also includes an updated section, Conservation Metrics for Preparing and Implementing INRMPs. Progress toward meeting these measures of merit is reported in the annual report to Congress.

10.1.2 Priorities and Scheduling

The Office of Management and Budget considers funding for the preparation and implementation of this INRMP, as required by the Sikes Act, to be a high priority. However, the reality is that not all the projects and programs identified in this INRMP will receive immediate funding. Therefore, projects need to be funded consistent with timely execution to meet future deadlines. Projects are generally prioritized with respect to compliance. Highest priority projects are projects related to recurring or current compliance, and these are generally scheduled earliest. The prioritization of the projects is based on need, legal drivers, and ability to further implement the INRMP.

Current compliance includes projects and activities needed because an installation is currently or will be out of compliance if projects or activities are not implemented in the current program year. Examples include:

- Environmental analyses, monitoring, and studies required to assess and mitigate potential effects of the military mission on conservation resources
- Planning documents
- Baseline inventories and surveys of natural resources (historical and archeological sites)
- Biological assessments, surveys, or habitat protection for a specific listed species
- Mitigation to meet existing regulatory permit conditions or written agreements
- Wetland delineations in support of subsequent jurisdictional determinations
- Efforts to achieve compliance with requirements that have deadlines that have already passed

Maintenance requirements include those projects needed that are not currently out of compliance but shall be out of compliance if projects are not implemented in time to meet an established deadline beyond the current program year. Examples include:

- Compliance with future requirements that have deadlines
- Conservation and GIS mapping to be in compliance
- Efforts undertaken in accordance with non-deadline specific compliance requirements of leadership initiatives
- Wetlands enhancement to achieve the goal of the EO for no net loss or to achieve enhancement of existing degraded wetlands
- Public education programs that explain the importance of protecting natural resources

Lower priority projects include those that enhance conservation resources of the installation mission or are needed to address overall environmental goals and objectives but are not specifically required under regulation or executive order and are not of an immediate nature. These projects are generally funded after those of higher priority are funded. Examples include:

- Community outreach activities such as Earth Day and Historic Preservation Week activities
- Educational and public awareness projects, such as interpretive displays, nature trails, wildlife checklists, and conservation teaching materials
- Biological assessments, biological surveys, or habitat protection for a non-listed species
- Restoration or enhancement of natural resources when no specific compliance requirement dictates a course or timing of action
- Management and execution of volunteer and partnership programs

10.1.3 Funding

Implementation of this INRMP is subject to the availability of annual funding. Funding for specific projects can be grouped into three main categories by source: federal ANG or NGB funds, other federal funds, and non-federal funds. When projects identified in the plan are not implemented due to lack of funding, or other compelling circumstances, the installation will review the goals and objectives of this INRMP to determine whether adjustments are necessary. Funding options include:

- The Legacy Resource Management Program provides financial assistance to DoD efforts to conserve natural and cultural resources on federal lands. Legacy projects could include regional ecosystem management initiatives, habitat preservation efforts, archeological investigations, invasive species control, and/or flora or fauna surveys. Project proposals are submitted to the Legacy program during their annual funding cycle (https://www.denix.osd.mil/legacy/home).

- Grant and assistance programs are administered by other federal agencies that could be accessed for natural resources management at Portland ANGB. Examples include funds associated with the CWA and endangered species.
- Other non-federal funding sources that could be considered include The Public Lands Day Program, which coordinates volunteers to improve the public lands they use for recreation, education, and enjoyment, and the National Environmental Education and Training Foundation, which manages, coordinates, and generates financial support for the program (https://www.neefusa.org/npld).
- Portland ANGB may also consider entering into cooperative or mutual aid agreements with state agencies, local governments, non-governmental organizations, and other individuals.

10.1.4 Cooperative Agreements

The DoD and subcommand entities have MOUs, Memorandums of Agreement (MOAs), and other cooperative agreements with other federal agencies, conservation and special interest groups, and various state agencies to provide assistance with natural resources management at installations across the United States. Generally, these agreements allow installations and agencies, or conservation and special interest groups to obtain mutual conservation objectives. The DoD agreements applicable to the Portland ANGB include:

- MOU between DoD and USFWS/International Fund for Animal Welfare (IFAW) to promote the conservation of migratory birds (2011).
- MOU between DoD and USFWS/IFAW for a Cooperative Integrated Natural Resource Program associated with the ecosystem-based management of fish, wildlife, and plant resources on military lands (2006).
- MOU between the DoD and USEPA to form a working partnership to promote environmental stewardship by adopting IPM strategies to reduce the potential risks to human health and the environment associated with pesticides (2012).
- MOA for federal Neotropical Migratory Bird Conservation Program and addendum (Partners in Flight-Aves De Las Americas) among DoD, through each of the Military Services, and over 110 other federal and state or Commonwealth agencies and non-governmental organizations (1991).
- MOU between the DoD and Ducks Unlimited, Inc. to provide a foundation for cooperative development of selected wetlands and associated uplands to maintain and increase waterfowl populations and to fulfill the objectives of the North American Waterfowl Management Plan, within the context of DoD's environmental security and military missions (2006).
- MOU between DoD and NRCS to promote cooperative conservation, where appropriate (2006).
- MOU with Watchable Wildlife Incorporated (2002).

- MOU between the DoD and Bat Conservation International to identify, document, and maintain bat populations and habitats on DoD installations (2011).
- MOA between the Federal Aviation Administration, USAF, U.S. Army, USEPA, USFWS, and USDA to address aircraft-wildlife strikes (2003).

10.1.5 Consultation Requirements

The Portland ANGB has multiple natural resources consultation requirements in addition to the INRMP development and review requirements, as identified in the Sikes Act. Federally listed species management requires ESA Section 7 consultation with the USFWS. State-listed species management requires consultation with ODFW. Actions that fall under the jurisdiction of Section 401 of the CWA necessitate permitting from the ODEQ, while Section 404 actions necessitate permitting from the USACE.

The USFWS has updated the way federal agencies may consult on the effects of their actions on the northern long-eared bat (*Myotis septentrionalis*). In 2016, the USFWS developed the optional streamlined Section 7 consultation framework for the northern long-eared bat. The framework was part of the USFWS' 5 January 2016 biological opinion on their issuance of a 4(d) rule for the species. Agencies can use the online determination key available through the USFWS IPaC website (https://ecos.fws.gov/ipac/).

10.2 Annual INRMP Review and Coordination Requirements

Per DoD policy, the Portland ANGB will review the INRMP annually in cooperation with the USFWS and ODFW. On an annual basis, the EM will invite the USFWS Regional Office, the USFWS local field office, the ODFW, and NGB/A4VN NRPM to attend a meeting or participate in a conference call to review previous year INRMP implementation and discuss implementation of upcoming programs and projects. Invitations will be either by letter or email. Attendance is at the option of those invited, but at minimum the USFWS local field office and a representative from ODFW are expected to attend. The meeting will be documented with an agenda, meeting minutes, and sign-in roster of attendees.

At this annual meeting the need for updates or revisions will be discussed. If updates are needed, Portland ANGB will initiate the updates and, after agreement of all three parties, they will be incorporated in the INRMP. If it is determined that major changes are needed, all three parties will provide input, and an INRMP revision will be initiated with the Portland ANGB acting as the lead coordinating agency. The annual meeting will be used to expedite the more formal review for operation and effect and, if all parties agree and document their mutual agreement, it can fulfill the requirement to review the INRMP for operation and effect.

If not already determined in previous annual meetings, by the fourth-year annual review a determination will be made jointly to continue implementation of the existing INRMP with updates or to proceed with a revision. If the parties feel that the annual reviews have not been sufficient to evaluate operation and effect and they cannot determine if the INRMP implementation should continue or be revised, a formal review for operation and effect will be initiated. The determination on how to proceed with INRMP implementation or revision will be made after the parties have had time to complete this review.

As part of the annual review, the Portland ANGB will specifically:

- Invite feedback from USFWS and ODFW on the effectiveness of the INRMP.
- Inform USFWS and ODFW which INRMP projects are required to meet current natural resources compliance needs.
- Document specific INRMP action accomplishments from the previous year and demonstrate that the INRMP has been implemented appropriately.

10.3 INRMP Update and Revision Process

10.3.1 Review for Operation and Effect

Not less than every 5 years, the INRMP will be reviewed for operation and effect to determine if the INRMP is being implemented as required by the Sikes Act and contributing to the management of natural resources at Portland ANGB. The review will be conducted by the cooperating parties to include the Commander responsible for the INRMP, the Supervisor of the USFWS Ecological Field Office, and a representative from ODFW. While these are the responsible parties, technical representatives generally are the personnel who actually conduct the review.

The review for operation and effect will either conclude that the INRMP is meeting the intent of the Sikes Act and only needs an update and implementation can continue, or that it is not effective in meeting the intent of the Sikes Act and it must be revised. The conclusion of the review will be documented in a jointly executed memorandum, meeting minutes, or in some way that reflects mutual agreement.

If only updates are needed, they will be completed in a manner agreed to by all parties. The updated INRMP will be reviewed by the local USFWS Ecological Field Office and ODFW. Once concurrence letters or signatures are received, the update of the INRMP will be complete and implementation will continue. Generally, the environmental impact analysis will continue to be applicable to updated INRMPs, and a new analysis will not be required.

If a review of operation and effect concludes that an INRMP must be revised, there is no set time to complete the revision. The existing INRMP remains in effect until the revision is complete and USFWS and ODFW concurrence on the revised INRMP is received. The Portland ANGB will endeavor to complete such revisions within 18 months, depending upon funding availability. Revisions to the INRMP will go through a detailed review process similar to development of the initial INRMP to ensure Portland ANGB military mission, USFWS, and ODFW concerns are adequately addressed, and the INRMP meets the intent of the Sikes Act.

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APPENDIX A. REFERENCES

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APPENDIX B. LAWS, REGULATIONS, POLICIES, AND EXECUTIVE ORDERS

Federal Laws

American Antiquities Act of 1906 (Public Law 59-209; 16 USC §431-433) – authorizes the President to designate historic and natural resources of national significance, located on federal lands, as National Monuments for the purpose of protecting items of archeological significance.

American Indian Religious Freedom Act of 1978 (Public Law 95-341; 42 USC §1196) – requires the United States, where appropriate, to protect and preserve religious rights of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites.

Animal Damage Control Act of 1931 (7 USC §426 et seq.) – provides broad authority for investigation, demonstrations, and control of mammalian predators, rodents, and birds.

Anti-Deficiency Act of 1982 (31 USC §1341 et seq.) – provides that no federal official or employee may obligate the government for the expenditure of funds before funds have been authorized and appropriated by Congress for that purpose.

Archeological and Historical Preservation Act of 1974 (Public Law 95-96; 16 USC §469 et seq.) – provides for the preservation of historical and archeological data, including relics and specimens, threatened by federally funded or assisted construction projects.

Archeological Resources Protection Act of 1979 (16 USC §470 et seq.) – prohibits the excavation or removal from federal or Indian lands any archeological resources without a permit.

Bald Eagle Protection Act of 1940 (Public Law 87-884; 16 USC §668a-d) – prohibits the taking or harming (i.e. harassment, sale, or transportation) of bald eagles or golden eagles, including their eggs, nests, or young, without appropriate permit.

Clean Air Act of 1970 (42 USC §7401 et seq.) – regulates air emissions from stationary, area, and mobile sources. This law authorizes the USEPA to establish National Ambient Air Quality Standards (NAAQS) to protect public health and the environment.

Clean Water Act of 1972 (Public Law 92-500; 33 USC §1251 et seq.) – aims to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Under Section 401, states have authority to review federal permits that may result in a discharge to wetlands or water bodies under state or Commonwealth jurisdiction. Under Section 404, a program is established to regulate the discharge of dredged or fill material into the nation's waters, including wetlands.

Coastal Zone Management Act of 1972 (Public Law 92-583; 16 USC §1451 et seq.) – provides incentives for coastal states to develop coastal zone management programs. Federal actions that impact the coastal zone must be consistent to the maximum extent practicable with the state or Commonwealth program.

Conservation and Rehabilitation Program on Military and Public Lands (Public Law 93-452; 16 USC §670 et seq.) – provides for fish and wildlife habitat improvements, range rehabilitation, and control of off-road vehicles on federal lands.

Conservation Programs on Military Reservations (Public Law 90-465; 16 USC §670 et seq.) – requires each military department to manage natural resources and to ensure that services are provided which are necessary for management of fish and wildlife resources on each installation; to provide their personnel with professional training in fish and wildlife management; and to give priority to contracting work with federal and state or Commonwealth agencies that have responsibility for conservation or management of fish and wildlife. In addition, it authorizes cooperative agreements (with states, local governments, non-governmental organizations, and individuals) which call for each party to provide matching funds or services to carry out natural resources projects or initiatives.

Endangered Species Act of 1973, as amended (16 USC §1531 et seq.) – provides for the identification and protection of threatened and endangered plants and animals, including their critical habitats. Requires federal agencies to conserve threatened and endangered species and cooperate with state or Commonwealth and local authorities to resolve water resources issues in concert with the conservation of threatened and endangered species. This law establishes a consultation process involving federal agencies to facilitate avoidance of agency action that would adversely affect species or habitat. Further, it prohibits all persons subject to U.S. jurisdiction from taking, including any harm or harassment, endangered species.

Federal Insecticide, Fungicide, and Rodenticide Act of 1947 (Public Law 92-516; 7 USC §136 et seq.) – governs the use and application of pesticides in natural resource management programs. This law provides the principal means for preventing environmental pollution from pesticides through product registration and applicator certification.

Federal Land Policy and Management Act of 1976 (43 USC §1701) – establishes public land policy and guidelines for its administration and provides for the management, protection, development, and enhancement of the public lands.

Federal Noxious Weed Act of 1974 (Public Law 93-629; 7 USC §2801) – provides for the control and eradication of noxious weeds and their regulation in interstate and foreign commerce.

Fish and Wildlife Conservation Act of 1980 (Public Law 96-366; 16 USC §2901 et seq.) – encourages management of non-game species and provides for conservation, protection, restoration, and propagation of certain species, including migratory birds threatened with extinction.

Fish and Wildlife Coordination Act of 1934 (16 USC §661 et seq.) – provides a mechanism for wildlife conservation to receive equal consideration and coordinate with water-resource development programs.

Land and Water Conservation Act of 1965 (16 USC §4601 et seq.) – assists in preserving, developing, and assuring accessibility to outdoor recreation resources.

Migratory Bird Conservation Act of 1929 (16 USC §715 et seq.) – establishes a Migratory Bird Conservation Commission to approve areas recommended by the Secretary of the Interior for acquisition with Migratory Bird Conservation Funds.

Migratory Bird Treaty Act of 1918 (Public Law 65-186; 16 USC §703 et seq.) – provides for regulations to control taking of migratory birds, their nests, eggs, parts, or products without the appropriate permit and provides enforcement authority and penalties for violations.

National Environmental Policy Act of 1969 (Public Law 91-190; 42 USC §4321 et seq.) – mandates federal agencies to consider and document environmental impacts of proposed actions and legislation. In addition, it mandates preparation of comprehensive environmental impact statements where the Proposed Action is "major" and significantly affects the quality of the human environment.

Native American Graves Protection and Repatriation Act of 1990 (Public Law 101-601; 25 USC §§3001-3013) – addresses the recovery, treatment, and repatriation of Native American and Native Hawaiian cultural items by federal agencies and museums. It includes provisions for data gathering, reporting, consultation, and issuance of permits.

Resource Conservation and Recovery Act of 1976 (42 USC §6901 e 1860 t seq.) – establishes a comprehensive program which manages solid and hazardous waste. Subtitle C, Hazardous Waste Management, sets up a framework for managing hazardous waste from its initial generation to its final disposal. Waste pesticides and equipment/containers contaminated by pesticides are included under hazardous waste management requirements.

Sikes Act Improvement Act of 1997 (Public Law 105-85; 16 USC §670a et seq.) – amends the Sikes Act of 1960 to mandate the development of an INRMP through cooperation with the Department of the Interior (through the USFWS), DoD, and each state or Commonwealth fish and wildlife agency for each military installation supporting natural resources.

Soil Conservation Act of 1935 (16 USC §590a et seq.) – provides for soil conservation practices on federal lands.

Federal Regulations

40 CFR 1500-1508 – CEQ Regulations on Implementing NEPA Procedures

40 CFR 6 – USEPA Regulations on Implementation of NEPA Procedures

40 CFR 162 – USEPA Regulations on Insecticide, Fungicide, and Rodenticide Use

15 CFR 930 – Federal Consistency with Approved Coastal Management Programs

50 CFR 17 – USFWS List of Endangered and Threatened Wildlife

50 CFR 10.13 – List of Migratory Birds

32 CFR 190 – Natural Resources Management Program

Federal Executive Orders (EOs)

Environmental Safeguard for Activities for Animal Damage Control on Federal Lands (EO 11870) – restricts the use of chemical toxicants for mammal and bird control.

Exotic Organisms (EO 11987) – restricts federal agencies in the use of exotic plant species in any landscape and erosion control measures.

Energy Efficiencies and Water Conservation at Federal Facilities (EO 12902) – federal agency use of energy and water resources towards the goals of increased conservation and efficiency.

Floodplain Management (EO 11988) – specifies that agencies shall encourage and provide appropriate guidance to applicant to evaluate the effects of their proposals in floodplains prior to submitting applications. This includes wetlands that are within the 100-year floodplain and especially discourages filling.

Off-Road Vehicles on Public Lands (EO 11989) – specifies that the respective agency shall determine if the use of off-road vehicles will cause or is causing considerable adverse effects on the soil, vegetation, wildlife, wildlife habitat or cultural or historic resources of particular areas or trails of the public lands, and immediately close such areas or trails to the type of off-road vehicle causing such effects, until such time as it determines that such adverse effects have been eliminated and that measures have been implemented to prevent future recurrence.

Greening the Government through Leadership in Environmental Management (EO 13148) – requires the head of each federal agency to be responsible for ensuring that all necessary actions are taken to integrate environmental accountability into agency day-to-day decision making and long-term planning processes across all agency missions, activities, and functions.

Indian Sacred Sites (EO 13007) – provides for the protection of and access to Indian sacred sites.

Invasive Species (EO 13751) – directs federal agencies to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause.

Protection and Enhancement of Environmental Quality (EO 11514) – provides for environmental protection of federal lands and enforces requirements of NEPA.

Protection of Wetlands (EO 11990) – directs all federal agencies to take action to minimize the destruction loss or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands. This applies to the acquisition, management, and disposal of federal lands and facilities; to construction or improvements undertaken, financed, or assisted by the federal government; and to the conduct of federal activities and programs which affect land use.

Responsibilities of Federal Entities to Protect Migratory Birds (EO 13186) – directs all federal agencies taking actions that have a potential to negatively affect migratory bird populations to develop and implement a MOU with the USFWS by January 2003 that shall promote the conservation of migratory bird populations.

DoDI, AFI, and Air Force Pamphlets

DoDI 4715.03 – Natural Resources Conservation Program

DoDI 4165.57 – Air Installations Compatible Use Zones

DoDI 4150.07 – Pest Management Program

DoDI 6055.06 – Fire and Emergency Services Program

DoDI 4150.03 – Integrated Pest Management Program

DoDM 4715.03 – INRMP Implementation Manual

DoDM 4150.07 – DOD Pest Management Program Manual Volumes 1-3

AFI 32-7062 – Air Force Comprehensive Planning

AFMAN 32-1053 – Pest Management Program

AFMAN 32-7003 – Environmental Conservation

Air Force Pamphlet (AFPAM) 91-212 – BASH Techniques

Department of Defense Memoranda

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 20 Sept 11, Subject: *Interim Policy on Management of White Nose Syndrome in Bats.*

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 3 Apr 07, Subject: *Guidance to Implement the Memorandum of Understanding to Promote the Conservation of Migratory Birds.*

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 14 Aug 06, Subject: *Integrated Natural Resource Management Plan (INRMP) Template.*

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 17 May 05, Subject: *Implementation of Sikes Act Improvement Amendments: Supplemental Guidance concerning Leased Lands.*

Memorandum, Assistant DUSD (Environment, Safety and Occupational Health), 1 Nov 04, Subject: *Implementation of Sikes Act Improvement Amendments: Supplemental Guidance concerning INRMP Reviews.*

Memorandum, DUSD (Installations and Environment), 10 Oct 02, Subject: *Implementation of Sikes Act Improvement Act: Updated Guidance.*

Memorandum, Assistant DUSD (Environment), 5 Aug 02, Subject: *Access to Outdoor Recreation Programs on Military Installations for Persons with Disabilities*.

Memorandum, Assistant Secretary of Army (Environment, Safety and Occupational Health), Deputy Assistant Secretary of the Navy (Environment), Deputy Assistant Secretary of the Air Force (Environment, Safety and Occupational Health), 20 Sep 11, Subject: *Interim Policy on Management of White Nose Syndrome in Bats.*

Local Statutes

Oregon Administrative Rules

Chapter 340 Department of the Environment

Division 40: Groundwater Quality Protection

Division 41: Water Quality Standards: Beneficial Uses, Policies, and Criteria for Oregon

Division 42: Total Maximum Daily Loads

Division 45: Regulations Pertaining to NPDES and WPCF Permits

Division 48: Certification of Compliance with Water Quality Requirements and Standards

Division 100: Hazardous Waste Management

Chapter 635 Department of Fish and Wildlife

Division 120: Wildlife Management Plan

Division 900: Climate and Ocean Change Policy

APPENDIX C. FINAL WETLAND DELINEATION REPORT

Final Wetland Delineation Report

Air National Guard-142nd Civil Engineer Squadron
Portland Air National Guard Base
Portland, Oregon

Contract W9133L-14-D-0004, DO# 0009

Prepared for:

Headquarters ANG
NGB/A4AM
3501 Fetchet Avenue
Joint Base Andrews, Maryland 20762-5157

JANUARY 2019

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Final Wetland Delineation Report

Air National Guard-142nd Civil Engineer Squadron
Portland Air National Guard Base
Portland, Oregon

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
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Hunt Valley, Maryland 21031

JANUARY 2019

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ACRONYMS AND ABBREVIATIONS

ANG	Air National Guard
AOR	Area of review
CES	Civil Engineering Squadron
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
GPS	Global positioning system
NAD	North American Datum
NRCS	Natural Resources Conservation Service
OBL	Obligate
OHWM	Ordinary high water mark
ORANG	Oregon Air National Guard
RPW	Relatively permanent waterway
UPL	Upland
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
WUS	Waters of the United States

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1.0 INTRODUCTION

On 27 June 2017, scientists conducted a review and delineation of the "Waters of the United States," including wetlands, on the property of the 142nd Civil Engineering Squadron (CES) of the Oregon Air National Guard (ORANG), located on a portion of the Portland International Airport, Portland, Multnomah County, Oregon (Figure 1). The main entrance to the property is located on NE Shilling Street, off Northeast Cornfoot Road.

The delineation was conducted in an effort to clearly locate all jurisdictional waterways, including wetlands, to facilitate future management decisions. The area of review (AOR) for this wetland delineation included the property boundary of the 142nd CES, which was provided by the National Guard Bureau (221.51 acres) (Figure 2). The approximate latitude and longitude for the center of the AOR is 45°34'44.20"N and 122°35'45.08"W.

The USACE completed a desktop determination of the wetlands and waterways presented in this report on 14 January 2019. An approved jurisdictional determination was received on 18 January 2019 for the wetland and waterway described in this report.

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Figure 1. Vicinity Map

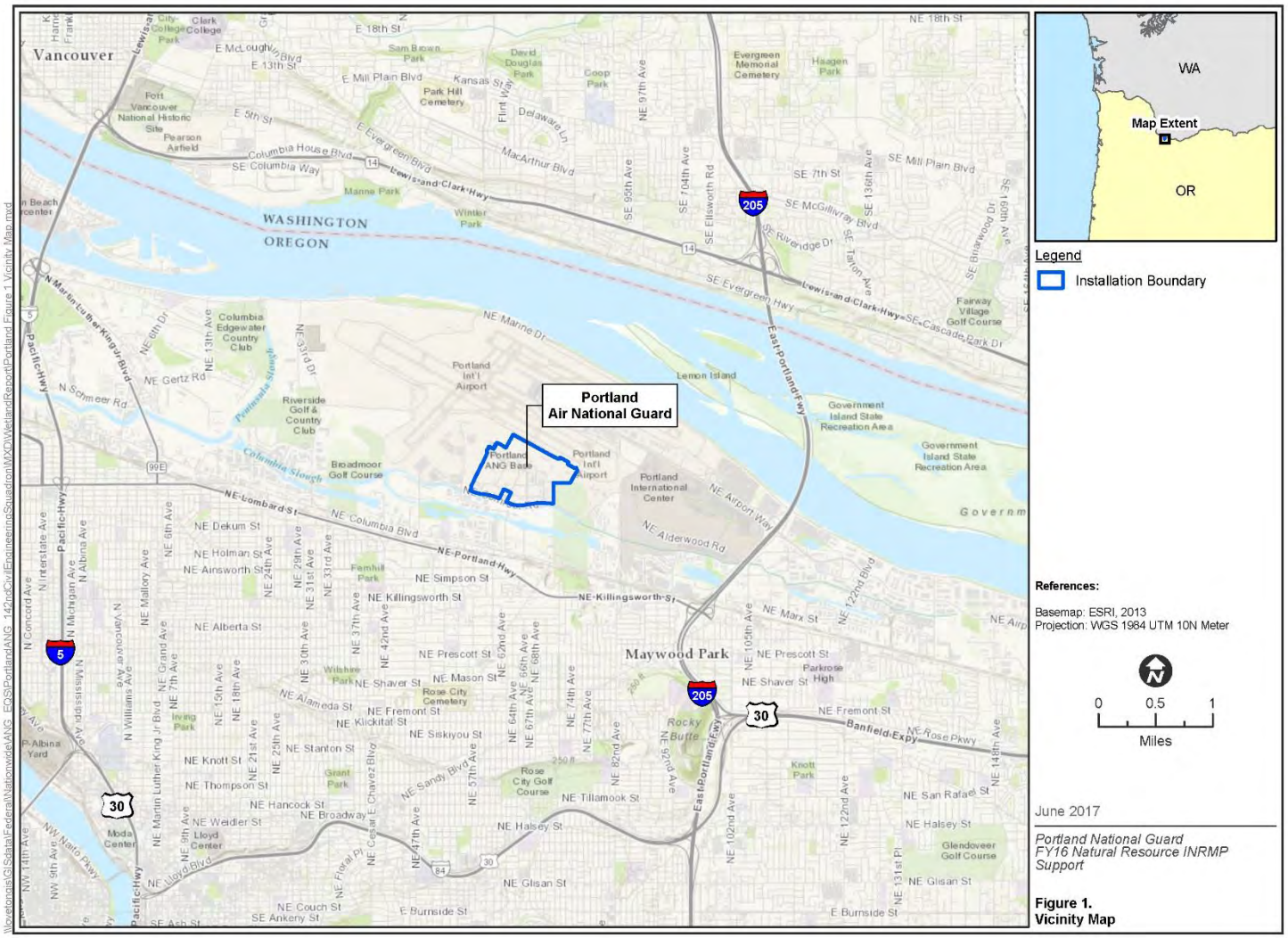

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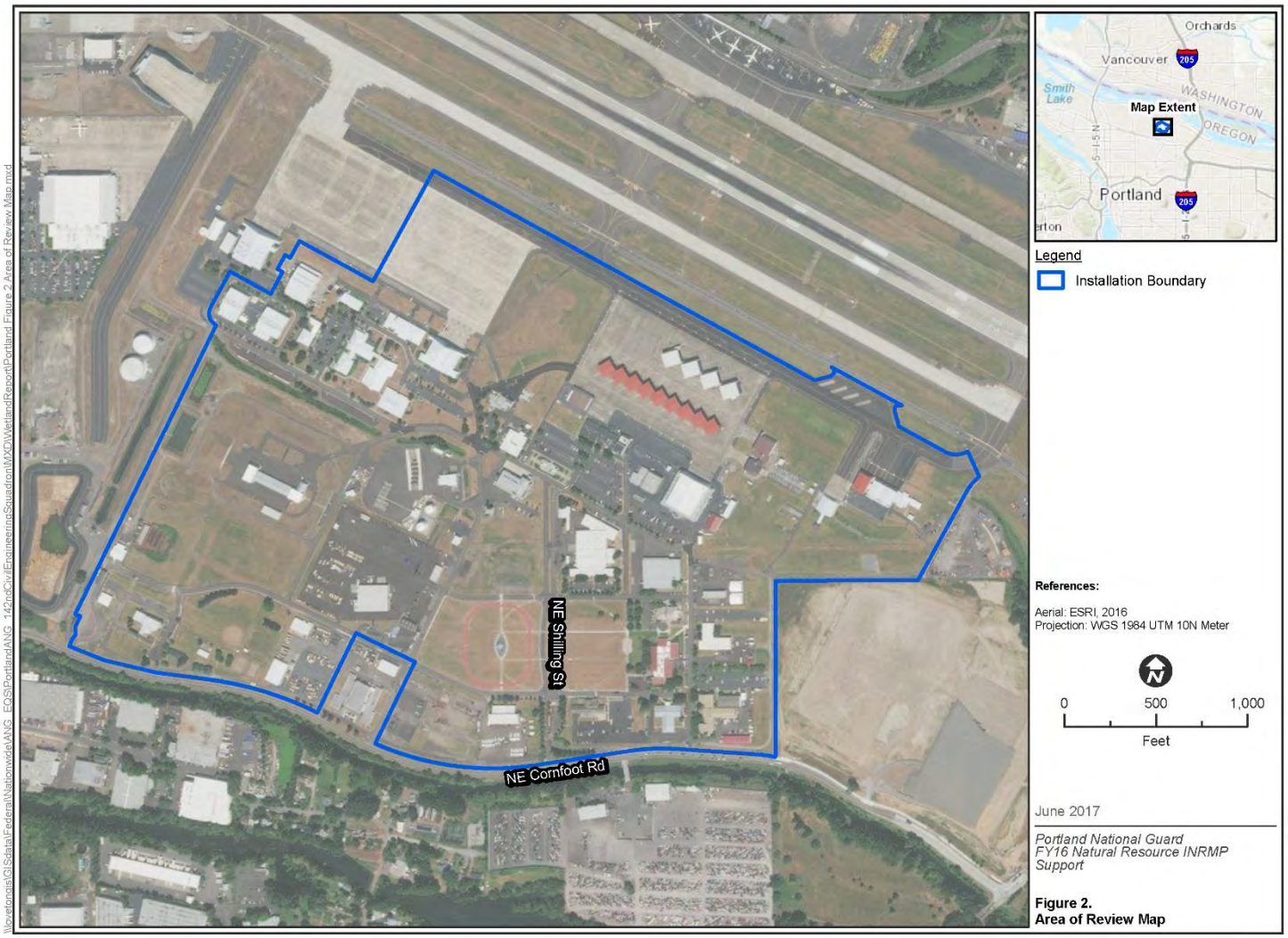
Figure 2. Area of Review Map



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2.0 RESEARCH OF AVAILABLE DOCUMENTS

2.1 Background Information

The AOR includes of 221.51 acres located on the 142nd CES property (Figure 2). The majority of the AOR consists of paved and developed land including roads, buildings, parking areas, mowed, maintained lawn, and landscaped areas. A drainage ditch that runs northwest through a portion of the AOR contains emergent wetland vegetation.

Typical mowed lawn areas identified throughout the AOR.

Ornamental landscaping typical of areas within the AOR.

2.2 United States Geological Survey Topographic Maps

The United States Geological Survey (USGS) topographic map for the area (Mount Tabor Quadrangle) was used as a reference to identify possible waterways, including wetlands, within the AOR (Figure 3). Topographic maps identify elevations, forested areas, streams, ponds, roads and structures. The USGS map does not depict stream channels within the AOR, but does depict a drainage pond along the northwest border of the AOR and a drainage channel in the center of the AOR. The AOR is also adjacent to the Columbia Slough which conveys flow into the Willamette River. The AOR is relatively flat and ranges in elevation from approximately 10 feet to 20 feet above mean sea level.

2.3 Soil Survey Information

The online Web Soil Survey for Multnomah County was reviewed for the AOR; three soil types were found within the AOR (Figure 4). According to the Natural Resources Conservation Service (NRCS) hydric soils list for Oregon, the three soil types within the AOR are listed as hydric soils (NRCS 2017, NRCS 2014). Table 1 summarizes the soils mapped within the AOR.

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Figure 3. USGS Topographic Map

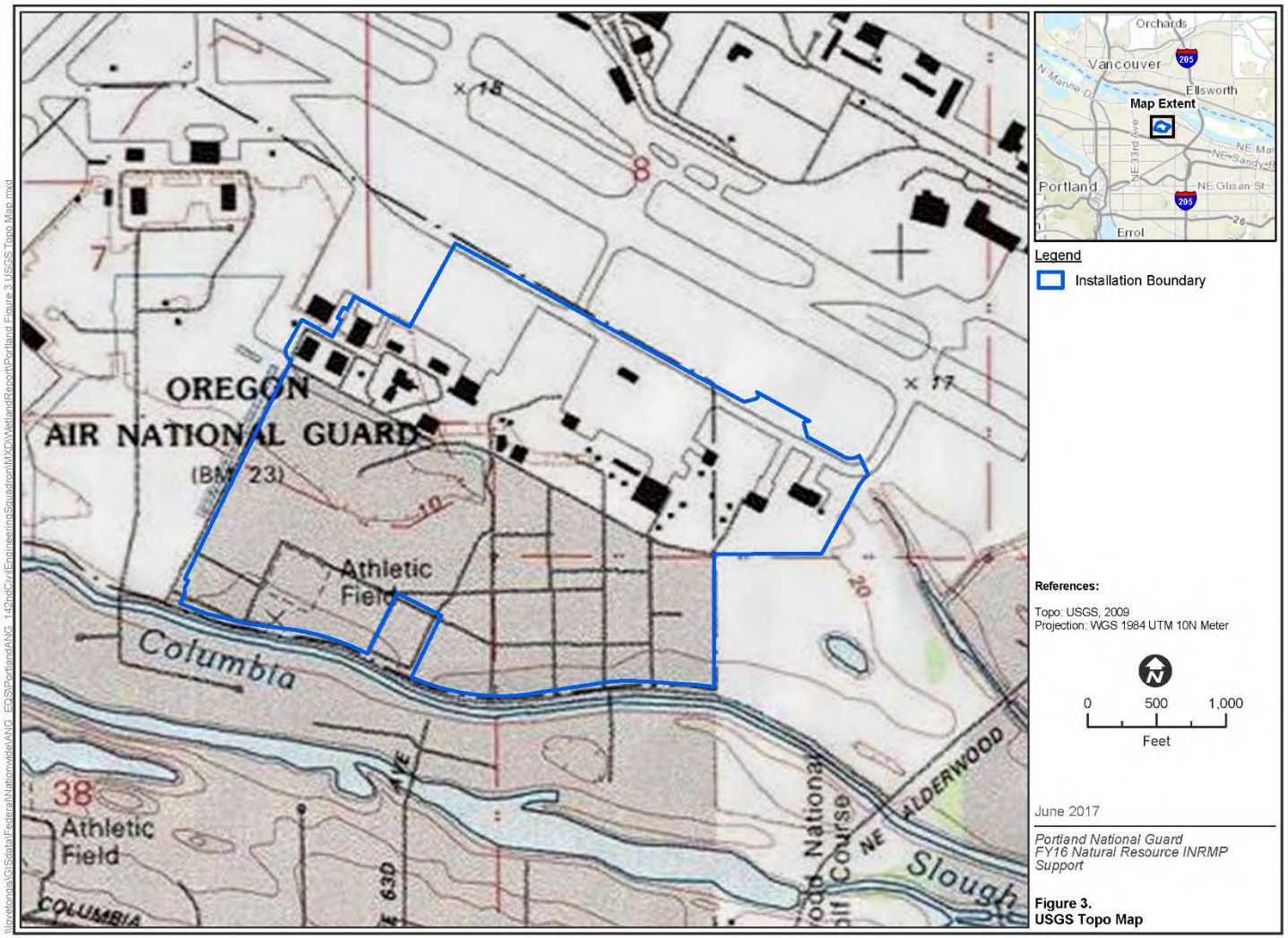

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Figure 4. Soil Survey Map

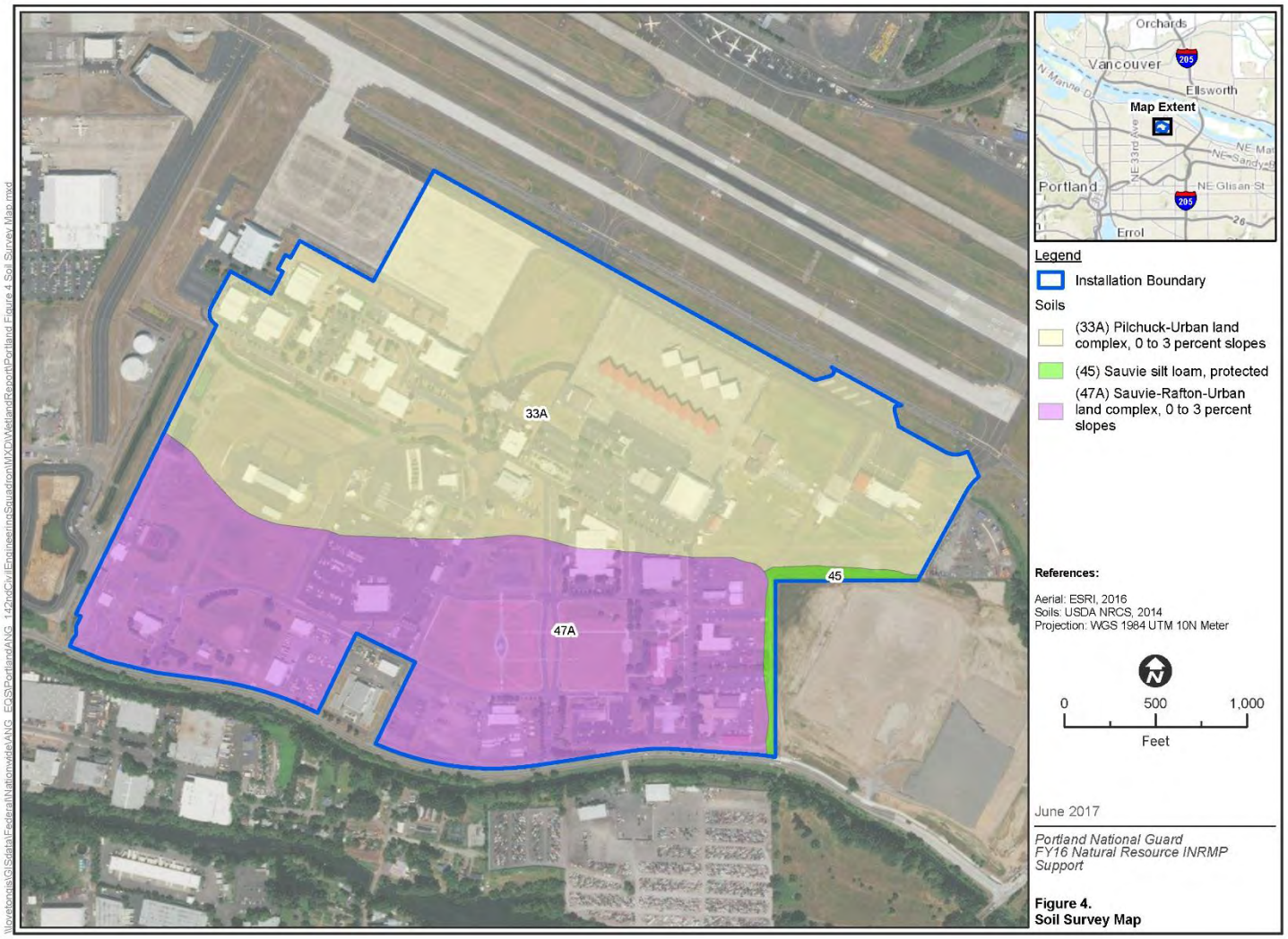

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Table 1. Mapped Soil Types

SOIL SERIES	HYDRIC CATEGORY	HYDRIC PERCENT OF SOIL SERIES	DRAINAGE CLASS
Pilchuck-Urban land complex, 0-3% slopes (33A)	Hydric	15	Somewhat excessively drained
Sauvie silt loam, protected (45)	Hydric	95	Poorly drained
Sauvie-Rafton-Urban land complex, 0-3% slopes (47A)	Hydric	71	Very poorly drained

Source: Adapted from the *USDA-NRCS Web Soil Survey (*http://websoilsurvey.nrcs.usda.gov); NRCS 2014; NRCS 2017

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3.0 METHODS

The wetland delineation was conducted in accordance with the "Routine Determination" procedures outlined in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* (USACE 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region – Version 2.0* (USACE 2010). The wetland delineation approach for the U.S. Army Corps of Engineers (USACE) is based on the presence of three parameters (i.e., wetland hydrology, hydric soils and hydrophytic vegetation). The USACE technical guidelines for wetlands require that a positive wetland indicator be present for each of the three parameters, except in specialized cases identified in the regional supplement.

3.1 Hydrophytic Vegetation

Hydrophytic vegetation is defined in the USACE manual as a community of macrophytes that occurs in areas where inundation or soil saturation is either permanent or of sufficient frequency and duration to influence plant occurrence. A plant-community approach to evaluate vegetation is used and, therefore, hydrophytic vegetation decisions are based on the community of plant species growing in a particular area rather than the presence or absence of particular indicator species. Common wetland plant species have been categorized regionally by USACE in the 2016 *National Wetland Plant List v3.3* (USACE 2016). Each plant is classified into one of five categories as follows:

- Obligate (OBL) = Greater than 99 percent estimated probability of occurring in wetlands.
- Facultative Wetland (FACW) = 67 to 99 percent estimated probability of occurring in wetlands.
- Facultative (FAC) = 34 to 66 percent estimated probability of occurring in wetlands.
- Facultative Upland (FACU) = 1 to 33 percent estimated probability of occurring in wetlands.
- Upland (UPL) = less than 1 percent estimated probability of occurring in wetlands.

Plants that have an indicator status of OBL, FACW, or FAC are considered to be typically adapted for life in anaerobic soil conditions. When the dominant species in a plant community are typically adapted for life in anaerobic soil conditions, hydrophytic vegetation is present. Several indicators may be used to determine whether hydrophytic vegetation is present on a site; however, the presence of a single individual of a hydrophytic species does not mean that hydrophytic vegetation is present.

Evaluation of the vegetation begins with a rapid field test for hydrophytic vegetation to determine if there is a need to collect more detailed vegetation data. If the area is not dominated solely by OBL and FACW species, the standard dominance test is performed to determine if more than 50 percent of the dominant species are OBL, FACW, or FAC. Some wetland plant communities may

not be considered hydrophytic based only on dominant species. Therefore, in those cases where indicators of hydric soil and wetland hydrology are present, the vegetation would be reevaluated with the prevalence index taking into account non-dominant plant species as well. A plant community is considered hydrophytic if one of these three tests is passed.

3.2 Hydric Soils

Hydric soils are soils that are saturated, ponded, or flooded long enough during the growing season to develop anaerobic conditions in the upper portion of the soil column (typically within the upper 18 inches). The prolonged presence of water results in the chemical reduction of elements, particularly iron and manganese. Reduced soils often exhibit a gray (or "gleyed") color that reflects either the leaching of elements or the presence of reduced elements (again, generally iron and manganese).

Hydric soils are often characterized by bright mottles, sometimes called redoxymorphic features. Mottles are an indication of incomplete saturation. They typically represent isolated pockets where elements (mainly iron) have remained oxidized. Another feature of hydric soils is a low matrix chroma in the diagnostic zone, which is typically identified as the upper 18 inches of the soil layer but may vary. For mineral hydric soils, the diagnostic zone typically must have a matrix chroma of two or less for soils with mottles, or a matrix chroma of one or less for soils without mottles. To make this determination, soil cores are collected in the field in suspected wetland areas and the soil colors are compared to a Munsell Soil Color Chart (Munsell 2000). Other examples of field indicators for hydric soils include, but are not limited to, high organic content, histic epipedons, concretions, and/or a sulfidic odor.

3.3 Wetland Hydrology

Wetland hydrology supplies the moisture required to support wetland vegetation and also creates the conditions necessary for the formation of hydric soils. Primary indicators of wetland hydrology include, but are not limited to, observed inundation or saturation, watermarks, drift deposits, sediment deposits, aquatic invertebrates, and oxidized rhizospheres on living roots. Secondary indicators of wetland hydrology include, but are not limited to, drainage patterns, dry season water table, saturation visible on aerial imagery, geomorphic position, and the FAC-Neutral test. The FAC-Neutral test involves comparing the number of OBL and FACW plant species to the number of FACU and UPL plant species, with FAC species being neutral. If 50 percent or more of the plant species are OBL or FACW, the FAC-Neutral test is met. Meeting the FAC-Neutral test is considered a secondary indicator of wetland hydrology. An area must contain at least one primary indicator or two secondary indicators of wetland hydrology for the parameter of wetland hydrology to be met.

3.4 Stream Channels

In addition to identifying wetlands, stream channels were flagged that would likely be considered jurisdictional. Waters of the United States (WUS) stream channels were identified by the presence of a defined bed and bank, as well as a defined ordinary high water mark (OHWM). Furthermore, identified stream channels were classified into one of three categories: perennial stream channels

that typically flow year-round, intermittent stream channels that only flow seasonally, and ephemeral stream channels that typically flow less than seasonally. Ephemeral channels receive hydrology from surficial sources, such as runoff from surrounding uplands during and immediately following precipitation events and/or snow melt (i.e., they do not have a direct connection to groundwater and may be hydraulically connected to WUS). In addition to observations made during the site visits, review of desktop information such as USGS maps, soil surveys, and other materials was used to assist in classifying stream channels. As part of this desktop review, previous wetland delineations completed at Portland 142nd CES were reviewed. Previous wetland determinations were conducted in 1998 and in 2007.

3.5 Field Data Collection

Locations for data collection were established on-site to evaluate the presence or absence of jurisdictional wetlands/waterways, and to demonstrate the typical characteristics of uplands and wetlands along the line of delineation. Surrounding vegetation and hydrologic indicators were observed at the sample locations. Field personnel collected soil to a depth of approximately 18 inches or until refusal was encountered to observe soil conditions and classify the soil as either hydric or non-hydric. The sample plot within the wetland boundary was marked and surveyed with a Trimble Geo 7x – sub-meter accurate global positioning system (GPS). Routine wetland determination data sheets were used to summarize observations on vegetation, soils, and hydrology for both the wetland and upland sample plots. Copies of these Wetland Data Sheets are included in Appendix A. In addition to the Wetland Determination Data Forms, scientists also completed Jurisdictional Determination "Rapanos" Forms for the delineated areas, which are included in Appendix B. Photographs of the wetlands and streams identified on-site were taken and are included in Chapter 4.0 of this report.

3.6 Field Delineation

A field review was performed to evaluate whether jurisdictional wetlands and/or waterways are present within the AOR. The field delineation of potentially jurisdictional WUS consisted of identifying the limits of the wetlands and waterways and locating the boundary of the wetland using a handheld Trimble Geo7x GPS unit with sub-meter horizontal accuracy. Locations were recorded in the North American Datum of 1984 (NAD83), Oregon North State Plane Coordinate System. Because of the proximity of the AOR to an active runway, no flags were hung during the wetland delineation. The wetland/waterway boundaries are shown on the Wetland Delineation Maps included in Chapter 4.0 of this report.

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4.0 SYSTEMS IDENTIFIED

On 27 June 2017, scientists conducted an on-site review of the AOR and identified four potentially jurisdictional wetlands within the AOR (Figure 5). No stream channels were identified as WUS. These four wetland features are described in the following sections of this report. A total of 0.89 acre of wetlands were delineated within the AOR. Wetland numbering was congruent with the numbering scheme presented in previous wetland delineations completed in the AOR. Wetlands are presented on the Wetland Delineation Maps (Figures 5-9). In addition to delineating the wetlands and streams within the AOR, a preliminary significant nexus determination of each system was completed. The results of the significant nexus determination are presented in Table 2.

Wetlands were previously delineated at the 142nd CES property in 1998 and 2007; a figure of the wetlands delineated during these past surveys are provided in Appendix C. The four wetlands described below (Wetlands 2-5) were consistent with these previous delineations. During the 2017 field effort, scientists evaluated the formerly delineated area called Wetland 1. This area consisted of a slight depression within a mowed area. A drop inlet was identified in this area which conveys surface flow in this area offsite to a defined drainageway. A data point was collected within this area and is included in Appendix A of this report (DP-1U). The vegetation in this area did not pass the dominance test for hydrophytic vegetation and did not consist of plants with an indicator status wetter than FAC. Additionally, during the time of the wetland delineation no hydrology indicators were observed within this area. A soil sample could not be obtained beyond 2 inches due to the presence of gravel and compacted clay along the runway area.

Data points were taken in wetland and upland locations within the AOR. An upland data point (DP-1U) was taken in the area formerly identified as Wetland 1 (WET1). Data points were also taken in all wetlands (DP-2W, DP-3W, DP-4W, and DP-5W). An upland data point was taken in-between Wetlands 3 and 4 (DP-4U). No representative upland point was taken adjacent to Wetland 5, as the wetland occurred within a drainage ditch.

4.1 Wetland 2

Overview of Wetland 2

Wetland 2 (WET2) was identified as a 0.02-acre emergent wetland located on the northern portion of the AOR adjacent to the airfield (Figure 6). WET2 is a mowed maintained drainage swale which conveys flow to the southwest through an existing culvert which outfalls offsite. During the field assessment, WET2 was dominated by reed canarygrass (*Phalaris arundinacea*). Other species present included white clover (*Trifolium repens*), tall fescue (*Schedonorus arundinaceus*), and common dandelion (*Taraxcum officinale*). The soil matrix within the top 3 inches of soil in WET2 had a chroma value of one. Soils from 3 to 12 inches had a chroma value of 2 and displayed a depleted matrix, with redox concentrations in the matrix. Secondary wetland hydrology indicators present at WET2 included drainage patterns, geomorphic

position, and vegetation successfully passing the FAC-neutral test. During the field review, scientists performed a preliminary significant nexus evaluation and identified WET2 is an adjacent wetland with a connection to the Columbia Slough, a year-round relatively permanent waterway (RPW).

4.2 Wetland 3

Overview of Wetland 3

Wetland 3 (WET3) has an area of 0.006 acres and is located on the northcentral portion of the AOR, within a drainage swale along a paved road leading to an aircraft parking area (Figure 7). WET3 is a narrow drainage swale with emergent wetland vegetation. The dominant vegetation species found in WET3 during the field assessment consisted of reed canarygrass and common spikerush (*Eleocharis palustris*); both of these species are hydrophytic. American yellowrocket (*Barbarea orthoceras*) and pearly everlasting (*Anaphalis margaritacea*) were also present in the wetland. The soil matrix within WET3 had chroma values of 2 below 3 inches, and displayed characteristics of a depleted matrix, including redox features in the middle 3 to 8 inches of the soil profile. Redox features are concentrations in the pore linings. Soil above 3 inches has a chroma value of one. Wetland hydrology indicators observed throughout the wetland included saturation at the surface, a high water table, oxidized rhizospheres on living roots, and drainage patterns. During the field review, a significant nexus evaluation was performed and identified WET3 as isolated. An upland data point was taken between WET3 and WET4; indicating isolation of WET3.

Wetland 4, with drainage culvert to Wetland 5

4.3 Wetland 4

Wetland 4 (WET4) is located in the northcentral portion of the AOR in a drainage swale between two roads and culverts in the vicinity of WET3 (Figure 7). WET4 has an area of 0.005 acres. The dominant species in WET4 identified during the field assessment included common rush (*Juncus effusus*), reed canarygrass, common horsetail (*Equisetum arvense*), and common spikerush. Several upland species were also present in WET4, including Himalayan blackberry (*Rubus armeniacus*), multiflora rose (*Rosa multiflora*), common dandelion, and English plantain (*Plantago lanceolata*). No soil sample was obtained during the field survey beyond 2 inches due to rock refusal. Hydrology in WET4 was determined by secondary indicators, including drainage patterns and the FAC-neutral test. During the field review, a significant nexus evaluation was performed and identified WET4 as being adjacent to a year-round RPW. WET4 conveys flow through a pipe into Wetland 5, which eventually connects to the Colombia Slough offsite.

4.4 Wetland 5

Overview of Wetland 5

Wetland 5 (WET5) has an area of 0.86 acres and is found on the western boundary of the AOR. This wetland is a palustrine emergent wetland in a constructed drainage ditch that runs east-west and continues offsite to a bioremediation pond (Figure 8 and Figure 9). During the field assessment, WET5 was dominated by hydrophytic vegetation consisting of reed canarygrass, and panicled bulrush (*Scirpus microcarpus*). Other hydrophytic species also found included common rush, narrowleaf cattail (*Typha angustifolia*), floating marsh pennywort (*Hydrocotyle ranunculoides*), and spotted lady's thumb (*Polygonum persicaria*). The soil matrix within WET5 had a chroma value of one, with redox features as concentrations in the pore lining from 4 to 12 inches. The top 4 inches of the soil matrix was organic mucky material. Wetland hydrology indicators observed in the wetland included 3 inches of surface water, oxidized rhizospheres on living roots, and drainage patterns. During the field review, a significant nexus evaluation was performed and identified WET5 as abutting a year-round RPW, the Columbia Slough, located outside of the AOR. WET5 runs into a bioremediation pond prior to its connection with the RPW offsite.

Table 2. Delineated Features

Delineated Feature*	Resource	Significant Nexus Determination	Dimensions (within the study area)
Wetland 1	Upland	N/A	N/A
Wetland 2	Emergent Wetland	Adjacent to year-round RPW	941.64 square feet / 0.022 acre
Wetland 3	Emergent Wetland	Isolated	257.86 square feet / 0.006 acre
Wetland 4	Emergent Wetland	Adjacent to year-round RPW	199.41 square feet / 0.005 acre
Wetland 5	Emergent Wetland	Adjacent to year-round RPW	37,527.59 square feet / 0.86 acre

* Features delineated in 1998 and 2007 are included for reference, and the naming convention originally used for these areas was maintained.

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Figure 5. Wetland Delineation Overview Map

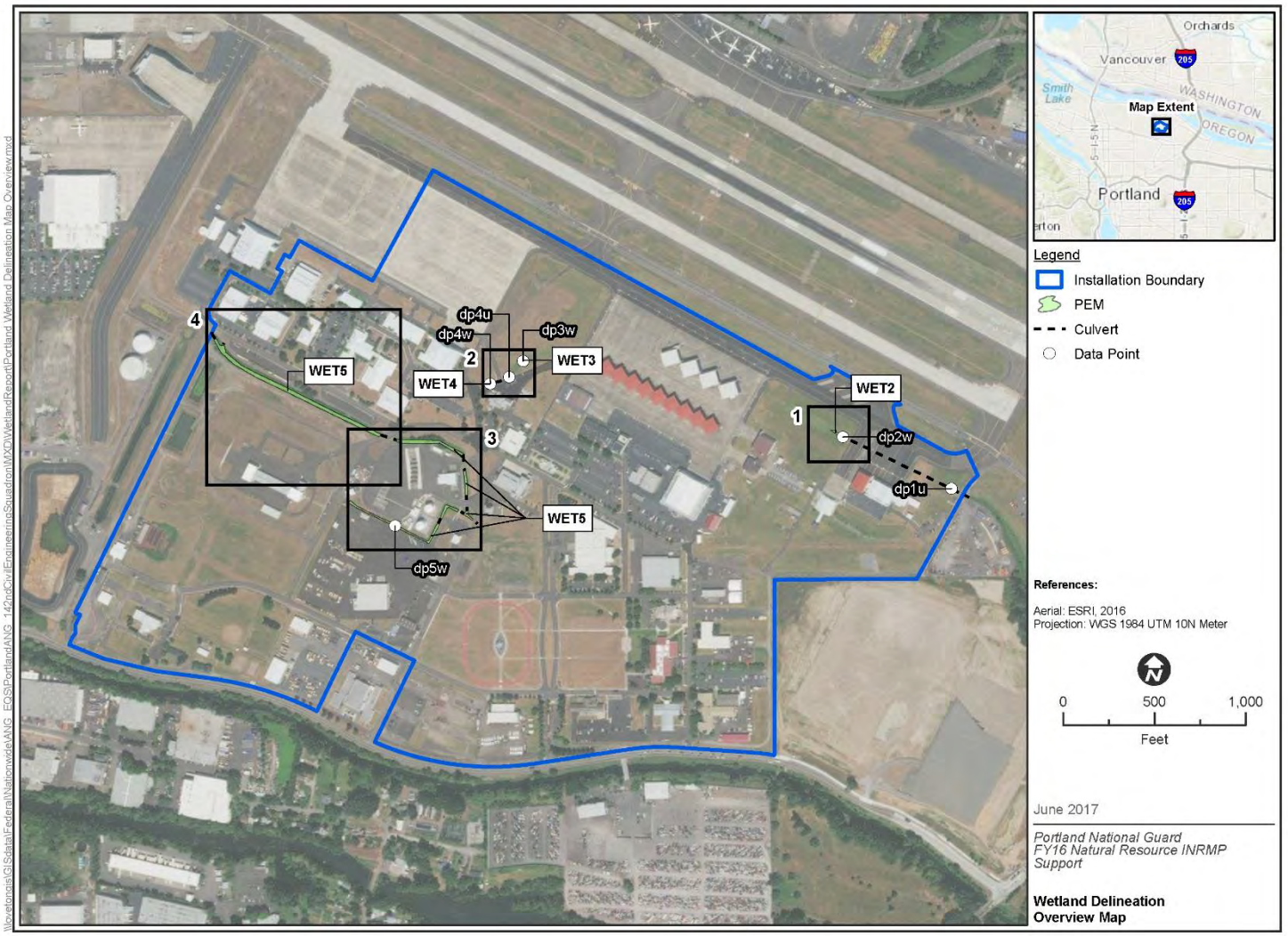

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Figure 6. Wetland Delineation Map #1

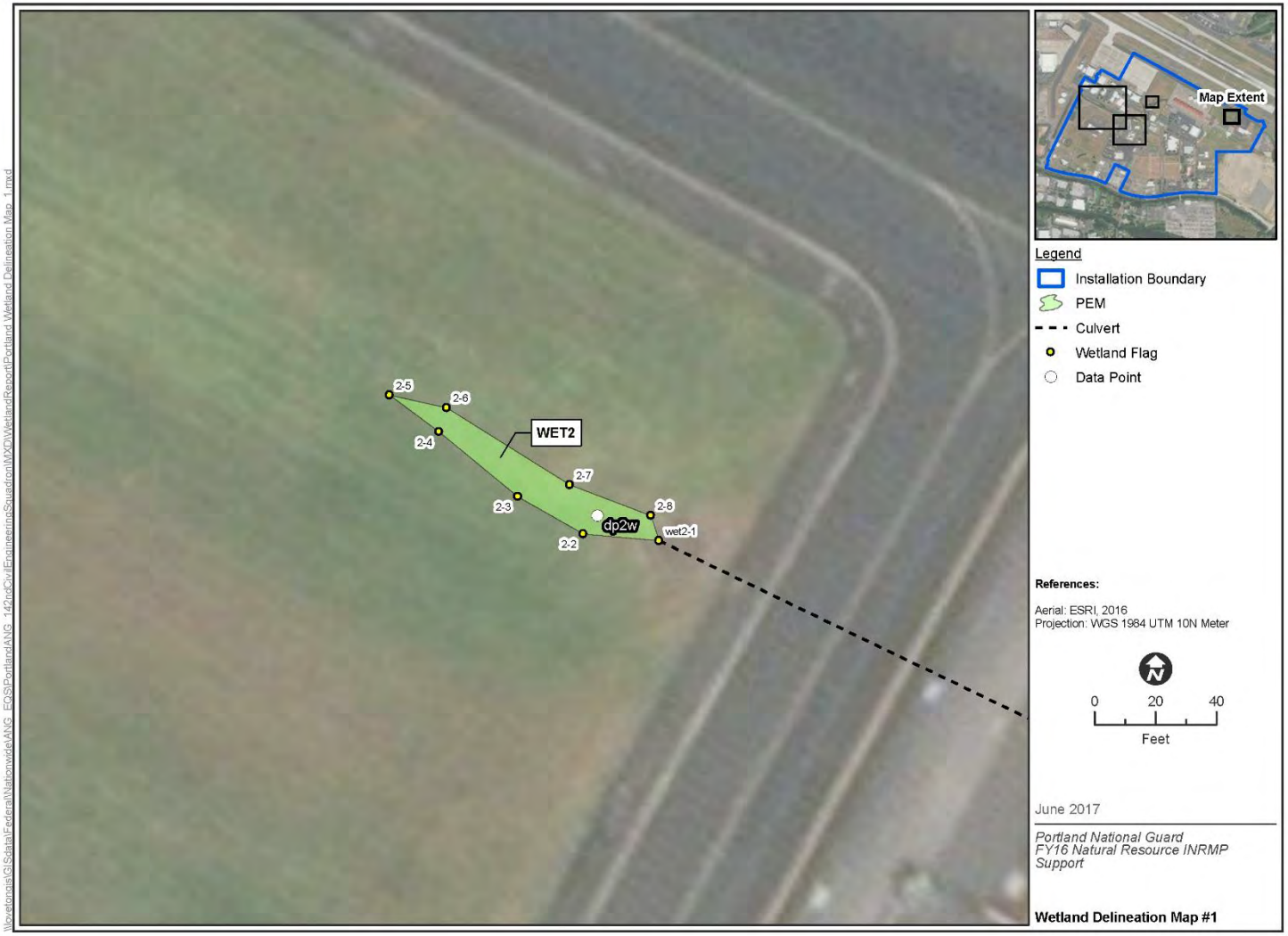

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Figure 7. Wetland Delineation Map #2

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Figure 8. Wetland Delineation Map #3

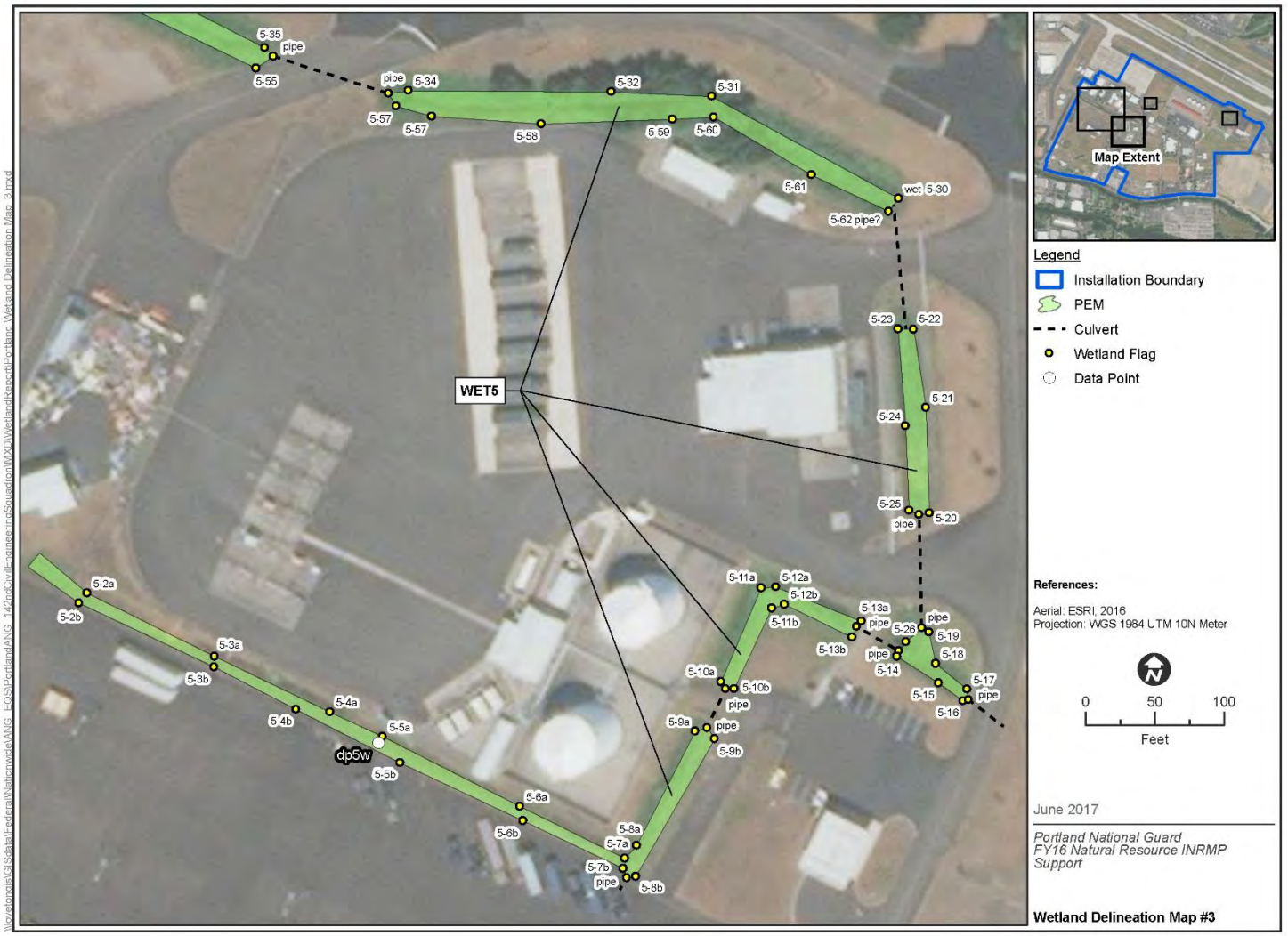

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Figure 9. Wetland Delineation Map #4

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5.0 CONCLUSION

The four wetlands identified within the AOR (Table 2), exhibited characteristics of all three wetland parameters as defined in the *Corps of Engineers Wetland Delineation Manual* (USACE 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region – Version 2.0* (USACE 2010). These areas were not flagged in the field due to the proximity to the airfield, but the boundaries were recorded using a GPS. Wetland boundaries are identified on the Wetland Delineation Maps (Figures 5-9).

Five wetlands were delineated in previous delineations within the AOR. These wetlands were reviewed during the 2017 field delineation, and four of them were determined to meet the criteria to be considered a wetland. One wetland (Wetland 1) did not exhibit the characteristics of a wetland and was not delineated in 2017.

This investigation characterized the nontidal waterways and wetland resources identified within the AOR, as shown on Figure 5. Wetland investigations of this type reflect the current state of temporal and variable conditions, thus requiring individual professional judgment when evaluating a site. Therefore, this report provides an estimate of the nontidal streams and wetlands located in the AOR at the Portland 142nd CES based on the delineation method utilized and the best technical information available related to the project site at the time of the study.

An approved jurisdictional determination was received from the USACE Portland District on 18 January 2019. The USACE determined that the wetlands described in this report are not WUS and would not be considered jurisdictional. Wetland 5 is part of a NPDES permitted stormwater system, and wetlands 2, 3, and 4 are lawfully constructed grassed swales that are part of a stormwater management system. This approved jurisdictional determination is valid for a period of five years unless new information warrants revisions of the determination. The approved jurisdictional determination is provided in Appendix D.

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6.0 REFERENCES

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APPENDIX A

WETLAND DETERMINATION DATA FORMS

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WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Portland ANG City/County: Portland/Multnomah Sampling Date: 6/27/17

Applicant/Owner: NGB State: OR Sampling Point: DP-1U

Investigator(s): TMK, KRC Section, Township, Range: 1.00 N, 2.00 E, 8

Landform (hillslope, terrace, etc.): depression Local Relief (concave, convex, none): Concave

Slope %: <5% Latitude: 45° 34' 42.604" Longitude: -122° 35' 9.442" Datum: WGS 1984

Subregion (LRR or MLRA) LRR-A Soil Map Unit Name: (33A) Pilchuck-Urban land complex, 0-3% slopes NWI Classification: --

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☑, or hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or hydrology ☐ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS - Attach site map shoing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☐	No ☑	
Hydric Soil Present?	Yes ☐	No ☑	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☑
Wetland Hydrology Present?	Yes ☐	No ☑	

Remarks: (Explain alternative procedures here or in a separate report.) Old wetland #1. Mowed grass near inlet

VEGETATION - Use Scientific Names of Plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
	= Total cover		
	= 50%	= 20%	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
	= Total Cover		
	= 50%	= 20%	
Herb Stratum (Plot size: 30 ft)			
1 *Taraxacum officiniale - common dandelion*	15	YES	FACU
2 *Trifolium repens - white clover*	20	YES	FAC
3 *Plantago lanceolata - English plantain*	10	NO	FACU
4 *Medicago lupulina - black medick*	15	YES	FACU
5 *Plantago major - common plantain*	5	NO	FAC
6 *Thlaspi arvense - field pennycress*	5	NO	UPL
7 *Convolvulus arvensis - field bindweed*	5	NO	UPL
8 *Schedonorus arundinaceus - tall fescue*	20	YES	FAC
9			
10			
11			
	95 = Total Cover		
	47.5 = 50%	19 = 20%	
Woody-vine Stratum (Plot size:)			
1			
2			
	= Total Cover		
	= 50%	= 20%	

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1
FACW species	x 2
FAC species	x 3
FACU species	x 4
UPL Species	x 5
Column Totals: (A)	(B)
Prevalance Index = B/A =	

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance test is >50%
- ☐ 3 - Prevalence Index is ≤3.01
- ☐ 4 - Morphological Adaptations1 (Provide Supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants 1
- ☐ Problematic Hydrophytic Vegetation1 (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless distrubed or problematic.

Hydrophytic Vegetation Present? **Yes** ☐ **No** ☑

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

SOIL Sampling Point: DP-1U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 4/2	95	10YR 4/4	5	C	M	Silt loam	--
2+	--	--	--	--	--	--	--	Gravel and compacted clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydron Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophtic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: gravel and compacted clay

Depth (inches): 2 in

Hydric Soil Present? Yes ☐ **No** ☑

Remarks: Soil sample greater than 2 inches could not be obtained due to compacted gravel and clay near the airfield

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of 2)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): --

Water Table Present? Yes ☐ No ☑ Depth (inches): --

Saturation Present? Yes ☐ No ☑ Depth (inches): --

(includes capillary fringe)

Wetland Hydrology Present? Yes ☐ **No** ☑

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Portland ANG City/County: Portland/Multnomah Sampling Date: 6/27/17

Applicant/Owner: NGB State: OR Sampling Point: DP-2W

Investigator(s): TMK, KRC Section, Township, Range: 1.00 N, 2.00 E, 8

Landform (hillslope, terrace, etc.): depression Local Relief (concave, convex, none): Concave

Slope %: <5% Latitude: 45° 34' 45.433" Longitude: -122° 35' 17.754" Datum: WGS 1984

Subregion (LRR or MLRA) LRR-A Soil Map Unit Name: (33A) Pilchuck-Urban land complex, 0-3% slopes NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or hydrology ☐ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS - Attach site map shoing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	
Hydric Soil Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** **Yes** ☑ **No** ☐
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) Slight swale, drains to riprap culvert in mowed grass.

VEGETATION - Use Scientific Names of Plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
	= Total cover		
	= 50%	= 20%	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
	= Total Cover		
	= 50%	= 20%	
Herb Stratum (Plot size: 30 ft)			
1 *Phalaris arundinacea - reed canarygrass*	65	YES	FACW
2 *Trifolium repens - white clover*	15	NO	FAC
3 *Schedonorus arundinaceus - tall fescue*	15	NO	FAC
4 *Taraxacum officiniale - common dandelion*	5	NO	FACU
5			
6			
7			
8			
9			
10			
11			
	100 = Total Cover		
	50 = 50%	20 = 20%	
Woody-vine Stratum (Plot size:)			
1			
2			
	= Total Cover		
	= 50%	= 20%	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1	
FACW species	x 2	
FAC species	x 3	
FACU species	x 4	
UPL Species	x 5	
Column Totals: (A)		(B)
Prevalance Index = B/A =		

Hydrophytic Vegetation Indicators:

- ☑ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance test is >50%
- ☐ 3 - Prevalence Index is ≤3.01
- ☐ 4 - Morphological Adaptations1 (Provide Supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants 1
- ☐ Problematic Hydrophytic Vegetation1 (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless distrubed or problematic.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

SOIL Sampling Point: DP-2W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3.1	100	--	--	--	--	silt loam	--
3-12	10YR 4/2	80	7.5YR 5/6	20	C	M	clay loam	--
12+	--	--	--	--	--	--	--	compacted clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydron Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophtic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted clay

Depth (inches): 12 in

Hydric Soil Present? **Yes** ☑ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of 2)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): --

Water Table Present? Yes ☐ No ☑ Depth (inches): --

Saturation Present? Yes ☐ No ☑ Depth (inches): --

(includes capillary fringe)

Wetland Hydrology Present? **Yes** ☑ **No** ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Portland ANG City/County: Portland/Multnomah Sampling Date: 6/27/17

Applicant/Owner: NGB State: OR Sampling Point: DP-3W

Investigator(s): TMK, KRC Section, Township, Range: 1.00 N, 2.00 E, 8

Landform (hillslope, terrace, etc.): depression Local Relief (concave, convex, none): Concave

Slope %: <5% Latitude: 45° 34' 49.621" Longitude: -122° 35' 42.345" Datum: WGS 1984

Subregion (LRR or MLRA) LRR-A Soil Map Unit Name: (33A) Pilchuck-Urban land complex, 0-3% slopes NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or hydrology ☐ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS - Attach site map shoing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	
Hydric Soil Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** **Yes** ☑ **No** ☐
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) Narrow swale with mowed grass

VEGETATION - Use Scientific Names of Plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
	= Total cover		
	= 50%	= 20%	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
	= Total Cover		
	= 50%	= 20%	
Herb Stratum (Plot size: 30 ft)			
1 *Anaphalis margaritacea - pearly everlasting*	10	NO	FACU
2 *Eleocharis palustris - common spikerush*	30	YES	OBL
3 *Phalaris arundinacea - reed canarygrass*	40	YES	FACW
4 *Barbarea orthoceras - American yellowrocket*	10	NO	FACW
5			
6			
7			
8			
9			
10			
11			
	90 = Total Cover		
	45 = 50%	18 = 20%	
Woody-vine Stratum (Plot size:)			
1			
2			
	= Total Cover		
	= 50%	= 20%	

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1	
FACW species	x 2	
FAC species	x 3	
FACU species	x 4	
UPL Species	x 5	
Column Totals: (A)		(B)
Prevalance Index = B/A =		

Hydrophytic Vegetation Indicators:

- ☑ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance test is >50%
- ☐ 3 - Prevalence Index is ≤3.01
- ☐ 4 - Morphological Adaptations1 (Provide Supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants 1
- ☐ Problematic Hydrophytic Vegetation1 (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless distrubed or problematic.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

SOIL Sampling Point: DP-3W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/1	100	--	--	--	--	silt loam	--
3-8	10YR 4/2	90	10YR 4/6	10	C	PL	sandy silt	--
8-14	1-YR 5/2	100	--	--	--	--	clay loam	--
14+	--	--	--	--	--	--	--	compaction/refusal

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydron Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophtic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compacted

Depth (inches): 14 in

Hydric Soil Present? Yes ☑ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of 2)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): --

Water Table Present? Yes ☑ No ☐ Depth (inches): surface

Saturation Present? Yes ☑ No ☐ Depth (inches): surface

(includes capillary fringe)

Wetland Hydrology Present? Yes ☑ **No** ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Portland ANG City/County: Portland/Multnomah Sampling Date: 6/27/17

Applicant/Owner: NGB State: OR Sampling Point: DP-4U

Investigator(s): TMK, KRC Section, Township, Range: 1.00 N, 2.00 E, 8

Landform (hillslope, terrace, etc.): depression Local Relief (concave, convex, none): concave

Slope %: <5% Latitude: 45° 34' 48.750" Longitude: -122° 35' 43.441" Datum: WGS 1984

Subregion (LRR or MLRA) LRR-A Soil Map Unit Name: (33A) Pilchuck-Urban land complex, 0-3% slopes NWI Classification: --

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or hydrology ☐significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or hydrology ☐naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS - Attach site map shoing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	
Hydric Soil Present?	Yes ☐	No ☑	**Is the Sampled Area within a Wetland?** **Yes** ☐ **No** ☑
Wetland Hydrology Present?	Yes ☐	No ☑	

Remarks: (Explain alternative procedures here or in a separate report.) Mowed grass between wetlands 3 and 4.

VEGETATION - Use Scientific Names of Plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
	= Total cover		
	= 50%	= 20%	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
	= Total Cover		
	= 50%	= 20%	
Herb Stratum (Plot size: 30 ft)			
1 *Schedonorus arundinaceus - tall fescue*	35	YES	FAC
2 *Trifolium repens - white clover*	25	YES	FAC
3 *Plantago lanceolata - English plantain*	10	NO	FACU
4 *Medicago lupulina - black medick*	15	NO	FACU
5 *Taraxacum officiniale - common dandelion*	5	NO	FACU
6 *Barbarea orthoceras - American yellowrocket*	5	NO	FACW
7			
8			
9			
10			
11			
	95 = Total Cover		
	47.5 = 50%	19 = 20%	
Woody-vine Stratum (Plot size:)			
1			
2			
	= Total Cover		
	= 50%	= 20%	

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1
FACW species	x 2
FAC species	x 3
FACU species	x 4
UPL Species	x 5
Column Totals: (A)	(B)
Prevalance Index = B/A =	

Hydrophytic Vegetation Indicators:

- ☐ 1 - Rapid Test for Hydrophytic Vegetation
- ☑ 2 - Dominance test is >50%
- ☐ 3 - Prevalence Index is ≤3.01
- ☐ 4 - Morphological Adaptations1 (Provide Supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants 1
- ☐ Problematic Hydrophytic Vegetation1 (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless distrubed or problematic.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

SOIL Sampling Point: DP-4U

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 3/1	100	--	--	--	--	silt loam	--
4-12	10Yr 3/3	100	--	--	--	--	silt loam	--
12+	--	--	--	--	--	--	--	compaction

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydron Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophtic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: compaction

Depth (inches): 12 in

Hydric Soil Present? Yes ☐ **No** ☑

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of 2)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): --

Water Table Present? Yes ☐ No ☑ Depth (inches): --

Saturation Present? Yes ☐ No ☑ Depth (inches): --

(includes capillary fringe)

Wetland Hydrology Present? Yes ☐ **No** ☑

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Portland ANG City/County: Portland/Multnomah Sampling Date: 6/27/17

Applicant/Owner: NGB State: OR Sampling Point: DP-4W

Investigator(s): TMK, KRC Section, Township, Range: 1.00 N, 2.00 E, 8

Landform (hillslope, terrace, etc.): swale Local Relief (concave, convex, none): Concave

Slope %: <5% Latitude: 45° 34' 48.410" Longitude: -122° 35' 44.885" Datum:

Subregion (LRR or MLRA) LRR-A Soil Map Unit Name: (33A) Pilchuck-Urban land complex, 0-3% slopes NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☑, or hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☐ No ☑

Are Vegetation ☐, Soil ☐, or hydrology ☐ naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS - Attach site map shoing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	
Hydric Soil Present?	Yes ☐	No ☐	**Is the Sampled Area within a Wetland?** **Yes** ☑ **No** ☐
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) Large erosional ditch/swale between two roads/culverts.

VEGETATION - Use Scientific Names of Plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
	= Total cover		
	= 50%	= 20%	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
	= Total Cover		
	= 50%	= 20%	
Herb Stratum (Plot size: 30 ft)			
1 *Juncus effusus - common rush*	30	YES	FACW
2 *Equisetum arvense - common horsetail*	15	NO	FAC
3 *Phalaris arundinacea - reed canarygrass*	20	YES	FACW
4 *Eleocharis palustris - common spikerush*	10	NO	OBL
5 *Rubus armeniacus - Himalayan blackberry*	3	NO	FAC
6 *Rosa multiflora - multiflora rose*	5	NO	FACU
7 *Taraxacum officiniale - common dandelion*	5	NO	FACU
8 *Plantago lanceolata - English plantain*	2	NO	FACU
9			
10			
11			
	90 = Total Cover		
	45 = 50%	18 = 20%	
Woody-vine Stratum (Plot size:)			
1			
2			
	= Total Cover		
	= 50%	= 20%	

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1	
FACW species	x 2	
FAC species	x 3	
FACU species	x 4	
UPL Species	x 5	
Column Totals: (A)		(B)
Prevalance Index = B/A =		

Hydrophytic Vegetation Indicators:

- ☑ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance test is >50%
- ☐ 3 - Prevalence Index is ≤3.01
- ☐ 4 - Morphological Adaptations1 (Provide Supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants 1
- ☐ Problematic Hydrophytic Vegetation1 (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless distrubed or problematic.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

SOIL Sampling Point: DP-4W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
--	--	--	--	--	--	--	--	--

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydron Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophtic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: rock

Depth (inches): 2 in

Hydric Soil Present? Yes ☐ **No** ☐

Remarks: No soil sample obtained beyond 2 inches - rock refusal.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of 2)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial (C9)
- ☑ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☑ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☐ No ☑ Depth (inches): --

Water Table Present? Yes ☐ No ☑ Depth (inches): --

Saturation Present? Yes ☐ No ☑ Depth (inches): --

(includes capillary fringe)

Wetland Hydrology Present? Yes ☑ **No** ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Portland ANG City/County: Portland/Multnomah Sampling Date: 6/27/17

Applicant/Owner: NGB State: OR Sampling Point: DP-5W

Investigator(s): TMK, KRC Section, Township, Range: 1.00 N, 2.00 E, 18

Landform (hillslope, terrace, etc.): drainage ditch Local Relief (concave, convex, none): Concave

Slope %: <5% Latitude: 45° 34' 40.758" Longitude: -122° 35' 52.276" Datum: WGS 1984

Subregion (LRR or MLRA) LRR-A Soil Map Unit Name: (33A) Pilchuck-Urban land complex, 0-3% slopes NWI Classification: PEM

Are climatic/hydrologic conditions on the site typical for this time of year? Yes ☑ No ☐ (If no, explain in Remarks.)

Are Vegetation ☐, Soil ☐, or hydrology ☐significantly disturbed? Are "Normal Circumstances" present? Yes ☑ No ☐

Are Vegetation ☐, Soil ☐, or hydrology ☐naturally problematic? (If needed, explain any answers in remarks.)

SUMMARY OF FINDINGS - Attach site map shoing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ☑	No ☐	
Hydric Soil Present?	Yes ☑	No ☐	**Is the Sampled Area within a Wetland?** **Yes** ☑ **No** ☐
Wetland Hydrology Present?	Yes ☑	No ☐	

Remarks: (Explain alternative procedures here or in a separate report.) Wet ditches

VEGETATION - Use Scientific Names of Plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
	= Total cover		
	= 50%	= 20%	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
	= Total Cover		
	= 50%	= 20%	
Herb Stratum (Plot size: 30 ft)			
1 *Phalaris arundinacea - reed canarygrass*	30	YES	FACW
2 *Scirpus microcarpus - panicled bulrush*	20	YES	OBL
3 *Juncus effusus - common rush*	15	NO	FACW
4 *Typha angustifolia - narrowleaf cattail*	15	NO	OBL
5 *Hydrocotyle ranunculoides - floating marsh pennywort*	10	NO	OBL
6 *Polygonum persicaria - spotted lady's thumb*	10	NO	FACW
7			
8			
9			
10			
11			
	100	= Total Cover	
	50	= 50% 20	= 20%
Woody-vine Stratum (Plot size:)			
1			
2			
	= Total Cover		
	= 50%	= 20%	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: (A)

Total Number of Dominant Species Across All Strata: (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1	
FACW species	x 2	
FAC species	x 3	
FACU species	x 4	
UPL Species	x 5	
Column Totals: (A)		(B)
Prevalance Index = B/A =		

Hydrophytic Vegetation Indicators:

- ☑ 1 - Rapid Test for Hydrophytic Vegetation
- ☐ 2 - Dominance test is >50%
- ☐ 3 - Prevalence Index is ≤3.01
- ☐ 4 - Morphological Adaptations1 (Provide Supporting data in Remarks or on a separate sheet)
- ☐ 5 - Wetland Non-Vascular Plants 1
- ☐ Problematic Hydrophytic Vegetation1 (Explain)

1Indicators of hydric soil and wetland hydrology must be present, unless distrubed or problematic.

Hydrophytic Vegetation Present? **Yes** ☑ **No** ☐

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

SOIL Sampling Point: DP-5W

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100	--	--	--	--	Organic mucky mineral	--
4-12	10YR 4/1	85	10YR 4/6	15	C	PL	silt clay loam	--
12+	--	--	--	--	--	--	--	refusal

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydron Sulfide (A4)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (Explain in Remarks)

[3]Indicators of hydrophtic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: --

Depth (inches): 12 in

Hydric Soil Present? Yes ☑ **No** ☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ☑ Surface Water (A1)
- ☑ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Surface Soil Cracks (B6)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water Stained Leaves (B9) **(except MLRA 1, 2, 4A, and 4B)**
- ☐ Salt Crust (B11)
- ☐ Aquatic Invertebrates (B13)
- ☐ Hydrogen Sulfide Odor (C1)
- ☑ Oxidized Rhizospheres on Living Roots (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Stunted or Stressed Plants (D1) **(LRR A)**
- ☐ Other (Explain in Remarks)

Secondary Indicators (minimum of 2)

- ☐ Water-Stained Leaves (B9) **(MLRA 1, 2, 4A, and 4B)**
- ☑ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ☑ No ☐ Depth (inches): 3 inches

Water Table Present? Yes ☑ No ☐ Depth (inches): surface

Saturation Present? Yes ☑ No ☐ Depth (inches): surface

(includes capillary fringe)

Wetland Hydrology Present? Yes ☑ **No** ☐

Describe Recorded Data (stream guage, monitoring well, aerial photos, previous inspections), if available:

Remarks:

APPENDIX B

JURISDICTIONAL DETERMINATION "RAPANOS" FORMS

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APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): October 2017

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Portland ANGB - Wetland 2

State: Oregon County/parish/borough: Multnomah County City: Portland
Center coordinates of site (lat/long in degree decimal format): Lat. 45°34'44.20" ° **N**, Long. 122°35'45.08"° **W**.

Universal Transverse Mercator: 10N
Name of nearest waterbody: Columbia Slough
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows: Willamette River
Name of watershed or Hydrologic Unit Code (HUC): HUC 12-170900120201

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:
☒ Field Determination. Date(s): 27 June 2017

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply): [1]

☐ TNWs, including territorial seas
☐ Wetlands adjacent to TNWs
☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
☐ Non-RPWs that flow directly or indirectly into TNWs
☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
☐ Impoundments of jurisdictional waters
☐ Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:
Non-wetland waters: linear feet: variable width (ft) and/or acres.
Wetlands: 0.022 acres.

c. Limits (boundaries) of jurisdiction based on: **1987 Delineation Manual**
Elevation of established OHWM (if known): Wetland boundaries were based on procedures and defenitions established in the USACE regional supplimental delineation manual.

2. Non-regulated waters/wetlands (check if applicable):[3]

☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
Explain: .

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: **Willamette River**.

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": Wetland conveys flow off-site into the Columbia Slough, a year-round RPW that conveys flow to the Willamette River and ultimately the Columbia River.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **acres**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: 0.022 acres

Wetland type. Explain: PEM.

Wetland quality. Explain: Low.

Project wetlands cross or serve as state boundaries. Explain: No.

(b) General Flow Relationship with Non-TNW:

Flow is: **Intermittent flow**. Explain: .

Surface flow is**: Confined**

Characteristics: .

Subsurface flow: **Unknown**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☒ Not directly abutting
  - ☒ Discrete wetland hydrologic connection. Explain: Wetland 2 is connected to RPWs offsite through defined ditches and pipes.
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain:

(d) Proximity (Relationship) to TNW

Project wetlands are **2-5** river miles from TNW.

Project waters are **1 (or less)** aerial (straight) miles from TNW.

Flow is from: **Wetland to navigable waters.**

Estimate approximate location of wetland as within the **100 - 500-year** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Wetlands receive stormwater input from surrounding roads, parking areas and runways.

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☒ Vegetation type/percent cover. Explain: Emergent wetland with 100% vegetation cover.
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **1**

Approximately (0.022) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
N	0.022 acres		

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Adjacent wetland delineated onsite conveys flow to RPW located offsite through various culverts and pipes. Connection to RPW determined using topography and aerial maps.

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. Non-RPWs[8] that flow directly or indirectly into TNWs.

☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.

☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.

☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: **0.022** acres.

6. Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.

☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. Impoundments of jurisdictional waters.[9]

As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]

☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.
☐ Interstate isolated waters. Explain: .

[8] See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☒ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☐ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Mount Tabor Quadrangle .
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: NRCS Web Soil Survey - Multnomah County.
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☐ Aerial (Name & Date):See .
or ☒ Other (Name & Date):Wetland Delineation Photos, Taken 27 June 2017.
☒ Previous determination(s). File no. and date of response letter: File No. 1997-01555 (15 December 1998) and subsequent approvals (6 June 2001, 26 March 2007, 20 January 2011).
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

This form should be completed by following the instructions provided in Section IV of the JD Form Instructional Guidebook.

SECTION I: BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (JD): October 2017

B. DISTRICT OFFICE, FILE NAME, AND NUMBER:

C. PROJECT LOCATION AND BACKGROUND INFORMATION: Portland ANGB - Wetlands 3, 4, and 5

State: Oregon County/parish/borough: Multnomah County City: Portland
Center coordinates of site (lat/long in degree decimal format): Lat. 45°34'44.20" ° **N**, Long. 122°35'45.08"° **W**.

Universal Transverse Mercator: 10N
Name of nearest waterbody: Columbia Slough
Name of nearest Traditional Navigable Water (TNW) into which the aquatic resource flows:Willamette River
Name of watershed or Hydrologic Unit Code (HUC): HUC 12-170900120201

☒ Check if map/diagram of review area and/or potential jurisdictional areas is/are available upon request.
☐ Check if other sites (e.g., offsite mitigation sites, disposal sites, etc…) are associated with this action and are recorded on a different JD form.

D. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☐ Office (Desk) Determination. Date:
☒ Field Determination. Date(s): 27 June 2017

SECTION II: SUMMARY OF FINDINGS

A. RHA SECTION 10 DETERMINATION OF JURISDICTION.

There **Are no** "*navigable waters of the U.S.*" within Rivers and Harbors Act (RHA) jurisdiction (as defined by 33 CFR part 329) in the review area. [*Required*]

☐ Waters subject to the ebb and flow of the tide.
☐ Waters are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.
Explain: .

B. CWA SECTION 404 DETERMINATION OF JURISDICTION.

There **Are no** "*waters of the U.S.*" within Clean Water Act (CWA) jurisdiction (as defined by 33 CFR part 328) in the review area. [*Required*]

1. Waters of the U.S.

a. Indicate presence of waters of U.S. in review area (check all that apply): [1]

☐ TNWs, including territorial seas
☐ Wetlands adjacent to TNWs
☐ Relatively permanent waters[2] (RPWs) that flow directly or indirectly into TNWs
☐ Non-RPWs that flow directly or indirectly into TNWs
☐ Wetlands directly abutting RPWs that flow directly or indirectly into TNWs
☒ Wetlands adjacent to but not directly abutting RPWs that flow directly or indirectly into TNWs
☐ Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs
☐ Impoundments of jurisdictional waters
☒ Isolated (interstate or intrastate) waters, including isolated wetlands

b. Identify (estimate) size of waters of the U.S. in the review area:
Non-wetland waters: linear feet: variable width (ft) and/or acres.
Wetlands: Wetland 3 = 0.0006 ac., Wetland 4 = 0.005 ac., Wetland 5 = 0.86 ac. acres.

c. Limits (boundaries) of jurisdiction based on: **1987 Delineation Manual**
Elevation of established OHWM (if known): Wetland boundaries were based on procedures and defenitions established in the USACE regional supplimental delineation manual.

2. Non-regulated waters/wetlands (check if applicable):[3]

☐ Potentially jurisdictional waters and/or wetlands were assessed within the review area and determined to be not jurisdictional.
Explain: .

[1] Boxes checked below shall be supported by completing the appropriate sections in Section III below.
[2] For purposes of this form, an RPW is defined as a tributary that is not a TNW and that typically flows year-round or has continuous flow at least "seasonally" (e.g., typically 3 months).
[3] Supporting documentation is presented in Section III.F.

SECTION III: CWA ANALYSIS

A. TNWs AND WETLANDS ADJACENT TO TNWs

The agencies will assert jurisdiction over TNWs and wetlands adjacent to TNWs. If the aquatic resource is a TNW, complete Section III.A.1 and Section III.D.1. only; if the aquatic resource is a wetland adjacent to a TNW, complete Sections III.A.1 and 2 and Section III.D.1.; otherwise, see Section III.B below.

1. TNW
Identify TNW: **Willamette River**.

Summarize rationale supporting determination: .

2. Wetland adjacent to TNW
Summarize rationale supporting conclusion that wetland is "adjacent": Wetlands 4 and 5 convey flow off-site into a bioremediation pond, which conveys flow into the Columbia Slough, a year-round RPW that flow into the Willamette River and ultimately into the Columbia River.

B. CHARACTERISTICS OF TRIBUTARY (THAT IS NOT A TNW) AND ITS ADJACENT WETLANDS (IF ANY):

This section summarizes information regarding characteristics of the tributary and its adjacent wetlands, if any, and it helps determine whether or not the standards for jurisdiction established under *Rapanos* have been met.

The agencies will assert jurisdiction over non-navigable tributaries of TNWs where the tributaries are "relatively permanent waters" (RPWs), i.e. tributaries that typically flow year-round or have continuous flow at least seasonally (e.g., typically 3 months). A wetland that directly abuts an RPW is also jurisdictional. If the aquatic resource is not a TNW, but has year-round (perennial) flow, skip to Section III.D.2. If the aquatic resource is a wetland directly abutting a tributary with perennial flow, skip to Section III.D.4.

A wetland that is adjacent to but that does not directly abut an RPW requires a significant nexus evaluation. Corps districts and EPA regions will include in the record any available information that documents the existence of a significant nexus between a relatively permanent tributary that is not perennial (and its adjacent wetlands if any) and a traditional navigable water, even though a significant nexus finding is not required as a matter of law.

If the waterbody[4] is not an RPW, or a wetland directly abutting an RPW, a JD will require additional data to determine if the waterbody has a significant nexus with a TNW. If the tributary has adjacent wetlands, the significant nexus evaluation must consider the tributary in combination with all of its adjacent wetlands. This significant nexus evaluation that combines, for analytical purposes, the tributary and all of its adjacent wetlands is used whether the review area identified in the JD request is the tributary, or its adjacent wetlands, or both. If the JD covers a tributary with adjacent wetlands, complete Section III.B.1 for the tributary, Section III.B.2 for any onsite wetlands, and Section III.B.3 for all wetlands adjacent to that tributary, both onsite and offsite. The determination whether a significant nexus exists is determined in Section III.C below.

1. Characteristics of non-TNWs that flow directly or indirectly into TNW

(i) General Area Conditions:
Watershed size: **acres**
Drainage area: **Pick List**
Average annual rainfall: inches
Average annual snowfall: inches

(ii) Physical Characteristics:
(a) Relationship with TNW:
☐ Tributary flows directly into TNW.
☐ Tributary flows through **Pick List** tributaries before entering TNW.

Project waters are **Pick List** river miles from TNW.
Project waters are **Pick List** river miles from RPW.
Project waters are **Pick List** aerial (straight) miles from TNW.
Project waters are **Pick List** aerial (straight) miles from RPW.
Project waters cross or serve as state boundaries. Explain: .

Identify flow route to TNW[5]: .

[4] Note that the Instructional Guidebook contains additional information regarding swales, ditches, washes, and erosional features generally and in the arid West.
[5] Flow route can be described by identifying, e.g., tributary a, which flows through the review area, to flow into tributary b, which then flows into TNW.

Tributary stream order, if known: .

(b) General Tributary Characteristics (check all that apply):

Tributary is: ☐ Natural
☐ Artificial (man-made). Explain: .
☐ Manipulated (man-altered). Explain: .

Tributary properties with respect to top of bank (estimate):
Average width: feet
Average depth: feet
Average side slopes: **Pick List.**

Primary tributary substrate composition (check all that apply):

☐ Silts	☐ Sands	☐ Concrete
☐ Cobbles	☐ Gravel	☐ Muck
☐ Bedrock	☐ Vegetation. Type/% cover:	
☐ Other. Explain: .		

Tributary condition/stability [e.g., highly eroding, sloughing banks]. Explain: .
Presence of run/riffle/pool complexes. Explain: .
Tributary geometry: **Pick List**
Tributary gradient (approximate average slope): %

(c) Flow:
Tributary provides for: **Pick List**
Estimate average number of flow events in review area/year: **Pick List**
Describe flow regime: .
Other information on duration and volume: .

Surface flow is: **Pick List.** Characteristics: .

Subsurface flow: **Pick List**. Explain findings: .
☐ Dye (or other) test performed: .

Tributary has (check all that apply):
☐ Bed and banks
☐ OHWM[6] (check all indicators that apply):

☐ clear, natural line impressed on the bank	☐ the presence of litter and debris
☐ changes in the character of soil	☐ destruction of terrestrial vegetation
☐ shelving	☐ the presence of wrack line
☐ vegetation matted down, bent, or absent	☐ sediment sorting
☐ leaf litter disturbed or washed away	☐ scour
☐ sediment deposition	☐ multiple observed or predicted flow events
☐ water staining	☐ abrupt change in plant community
☐ other (list):	

☐ Discontinuous OHWM.[7] Explain: .

If factors other than the OHWM were used to determine lateral extent of CWA jurisdiction (check all that apply):

☐ High Tide Line indicated by:	☐ Mean High Water Mark indicated by:
☐ oil or scum line along shore objects	☐ survey to available datum;
☐ fine shell or debris deposits (foreshore)	☐ physical markings;
☐ physical markings/characteristics	☐ vegetation lines/changes in vegetation types.
☐ tidal gauges	
☐ other (list):	

(iii) Chemical Characteristics:
Characterize tributary (e.g., water color is clear, discolored, oily film; water quality; general watershed characteristics, etc.).
Explain: .
Identify specific pollutants, if known: .

[6]A natural or man-made discontinuity in the OHWM does not necessarily sever jurisdiction (e.g., where the stream temporarily flows underground, or where the OHWM has been removed by development or agricultural practices). Where there is a break in the OHWM that is unrelated to the waterbody's flow regime (e.g., flow over a rock outcrop or through a culvert), the agencies will look for indicators of flow above and below the break.
[7]Ibid.

(iv) Biological Characteristics. Channel supports (check all that apply):

- ☐ Riparian corridor. Characteristics (type, average width): .
- ☐ Wetland fringe. Characteristics: .
- ☐ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☐ Aquatic/wildlife diversity. Explain findings: .

2. Characteristics of wetlands adjacent to non-TNW that flow directly or indirectly into TNW

(i) Physical Characteristics:

(a) General Wetland Characteristics:

Properties:

Wetland size: Wetland 4 = 0.005 ac., Wetland 5 = 0.86 acres

Wetland type. Explain: PEM.

Wetland quality. Explain: Low.

Project wetlands cross or serve as state boundaries. Explain: No.

(b) General Flow Relationship with Non-TNW:

Flow is: **Intermittent flow**. Explain: .

Surface flow is**: Confined**

Characteristics: .

Subsurface flow: **Unknown**. Explain findings: .

- ☐ Dye (or other) test performed: .

(c) Wetland Adjacency Determination with Non-TNW:

- ☐ Directly abutting
- ☒ Not directly abutting
  - ☒ Discrete wetland hydrologic connection. Explain: Wetland 2 is connected to RPWs offsite through defined ditches and pipes.
  - ☐ Ecological connection. Explain: .
  - ☐ Separated by berm/barrier. Explain: Wetlands 1 and 2 are seperated by a man made upland berm.

(d) Proximity (Relationship) to TNW

Project wetlands are **2-5** river miles from TNW.

Project waters are **1-2** aerial (straight) miles from TNW.

Flow is from: **Wetland to navigable waters.**

Estimate approximate location of wetland as within the **100 - 500-year** floodplain.

(ii) Chemical Characteristics:

Characterize wetland system (e.g., water color is clear, brown, oil film on surface; water quality; general watershed characteristics; etc.). Explain: Wetlands receive stormwater input from surrounding roads, parking areas and runways.

Identify specific pollutants, if known: .

(iii) Biological Characteristics. Wetland supports (check all that apply):

- ☐ Riparian buffer. Characteristics (type, average width): .
- ☒ Vegetation type/percent cover. Explain: Wetland 4 = 90% cover (PEM), Wetland 5 = 100% cover (PEM) .
- ☒ Habitat for:
  - ☐ Federally Listed species. Explain findings: .
  - ☐ Fish/spawn areas. Explain findings: .
  - ☐ Other environmentally-sensitive species. Explain findings: .
  - ☒ Aquatic/wildlife diversity. Explain findings: Ducks and duck nests, garter snake, green frog and fish observed in wetland 5.

3. Characteristics of all wetlands adjacent to the tributary (if any)

All wetland(s) being considered in the cumulative analysis: **2**

Approximately (0.865) acres in total are being considered in the cumulative analysis.

For each wetland, specify the following:

Directly abuts? (Y/N)	Size (in acres)	Directly abuts? (Y/N)	Size (in acres)
Wetland 4 = N, 0.005 ac., Wetland 5 = N, 0.86 ac.			

Summarize overall biological, chemical and physical functions being performed: .

C. SIGNIFICANT NEXUS DETERMINATION

A significant nexus analysis will assess the flow characteristics and functions of the tributary itself and the functions performed by any wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical, and biological integrity of a TNW. For each of the following situations, a significant nexus exists if the tributary, in combination with all of its adjacent wetlands, has more than a speculative or insubstantial effect on the chemical, physical and/or biological integrity of a TNW. Considerations when evaluating significant nexus include, but are not limited to the volume, duration, and frequency of the flow of water in the tributary and its proximity to a TNW, and the functions performed by the tributary and all its adjacent wetlands. It is not appropriate to determine significant nexus based solely on any specific threshold of distance (e.g. between a tributary and its adjacent wetland or between a tributary and the TNW). Similarly, the fact an adjacent wetland lies within or outside of a floodplain is not solely determinative of significant nexus.

Draw connections between the features documented and the effects on the TNW, as identified in the *Rapanos* Guidance and discussed in the Instructional Guidebook. Factors to consider include, for example:

- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to carry pollutants or flood waters to TNWs, or to reduce the amount of pollutants or flood waters reaching a TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), provide habitat and lifecycle support functions for fish and other species, such as feeding, nesting, spawning, or rearing young for species that are present in the TNW?
- Does the tributary, in combination with its adjacent wetlands (if any), have the capacity to transfer nutrients and organic carbon that support downstream foodwebs?
- Does the tributary, in combination with its adjacent wetlands (if any), have other relationships to the physical, chemical, or biological integrity of the TNW?

Note: the above list of considerations is not inclusive and other functions observed or known to occur should be documented below:

1. **Significant nexus findings for non-RPW that has no adjacent wetlands and flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary itself, then go to Section III.D: .

2. **Significant nexus findings for non-RPW and its adjacent wetlands, where the non-RPW flows directly or indirectly into TNWs.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: .

3. **Significant nexus findings for wetlands adjacent to an RPW but that do not directly abut the RPW.** Explain findings of presence or absence of significant nexus below, based on the tributary in combination with all of its adjacent wetlands, then go to Section III.D: Adjacent wetland delineated onsite conveys flow to RPW located offsite through various culverts and pipes and a bioremediation pond. Connection to RPW determined using topography and aerial maps.

D. DETERMINATIONS OF JURISDICTIONAL FINDINGS. THE SUBJECT WATERS/WETLANDS ARE (CHECK ALL THAT APPLY):

1. **TNWs and Adjacent Wetlands.** Check all that apply and provide size estimates in review area:
   - ☐ TNWs: linear feet width (ft), Or, acres.
   - ☐ Wetlands adjacent to TNWs: acres.

2. **RPWs that flow directly or indirectly into TNWs.**
   - ☐ Tributaries of TNWs where tributaries typically flow year-round are jurisdictional. Provide data and rationale indicating that tributary is perennial: .
   - ☐ Tributaries of TNW where tributaries have continuous flow "seasonally" (e.g., typically three months each year) are jurisdictional. Data supporting this conclusion is provided at Section III.B. Provide rationale indicating that tributary flows seasonally: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

3. **Non-RPWs[8] that flow directly or indirectly into TNWs.**
☐ Waterbody that is not a TNW or an RPW, but flows directly or indirectly into a TNW, and it has a significant nexus with a TNW is jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional waters within the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .

4. **Wetlands directly abutting an RPW that flow directly or indirectly into TNWs.**
☐ Wetlands directly abut RPW and thus are jurisdictional as adjacent wetlands.
☐ Wetlands directly abutting an RPW where tributaries typically flow year-round. Provide data and rationale indicating that tributary is perennial in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

☐ Wetlands directly abutting an RPW where tributaries typically flow "seasonally." Provide data indicating that tributary is seasonal in Section III.B and rationale in Section III.D.2, above. Provide rationale indicating that wetland is directly abutting an RPW: .

Provide acreage estimates for jurisdictional wetlands in the review area: acres.

5. **Wetlands adjacent to but not directly abutting an RPW that flow directly or indirectly into TNWs.**
☒ Wetlands that do not directly abut an RPW, but when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisidictional. Data supporting this conclusion is provided at Section III.C.

Provide acreage estimates for jurisdictional wetlands in the review area: **Wetland 4 = 0.005 ac., Wetland 5 = 0.86** acres.

6. **Wetlands adjacent to non-RPWs that flow directly or indirectly into TNWs.**
☐ Wetlands adjacent to such waters, and have when considered in combination with the tributary to which they are adjacent and with similarly situated adjacent wetlands, have a significant nexus with a TNW are jurisdictional. Data supporting this conclusion is provided at Section III.C.

Provide estimates for jurisdictional wetlands in the review area: acres.

7. **Impoundments of jurisdictional waters.[9]**
As a general rule, the impoundment of a jurisdictional tributary remains jurisdictional.
☐ Demonstrate that impoundment was created from "waters of the U.S.," or
☐ Demonstrate that water meets the criteria for one of the categories presented above (1-6), or
☐ Demonstrate that water is isolated with a nexus to commerce (see E below).

E. ISOLATED [INTERSTATE OR INTRA-STATE] WATERS, INCLUDING ISOLATED WETLANDS, THE USE, DEGRADATION OR DESTRUCTION OF WHICH COULD AFFECT INTERSTATE COMMERCE, INCLUDING ANY SUCH WATERS (CHECK ALL THAT APPLY):[10]
☐ which are or could be used by interstate or foreign travelers for recreational or other purposes.
☐ from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
☐ which are or could be used for industrial purposes by industries in interstate commerce.

[8]See Footnote # 3.
[9] To complete the analysis refer to the key in Section III.D.6 of the Instructional Guidebook.
[10] Prior to asserting or declining CWA jurisdiction based solely on this category, Corps Districts will elevate the action to Corps and EPA HQ for review consistent with the process described in the Corps/EPA *Memorandum Regarding CWA Act Jurisdiction Following Rapanos.*

☐ Interstate isolated waters. Explain: Wetland 3 is an emergent wetland that has been isolated from wetlands 4 and 5. An upland data point was taken to establish the isolation of this wetland from Wetland 4.
☐ Other factors. Explain: .

Identify water body and summarize rationale supporting determination: .

Provide estimates for jurisdictional waters in the review area (check all that apply):
☐ Tributary waters: linear feet width (ft).
☐ Other non-wetland waters: acres.
Identify type(s) of waters: .
☐ Wetlands: acres.

F. NON-JURISDICTIONAL WATERS, INCLUDING WETLANDS (CHECK ALL THAT APPLY):
☐ If potential wetlands were assessed within the review area, these areas did not meet the criteria in the 1987 Corps of Engineers Wetland Delineation Manual and/or appropriate Regional Supplements.
☒ Review area included isolated waters with no substantial nexus to interstate (or foreign) commerce.
☐ Prior to the Jan 2001 Supreme Court decision in "*SWANCC*," the review area would have been regulated based solely on the "Migratory Bird Rule" (MBR).
☐ Waters do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction. Explain: .
☐ Other: (explain, if not covered above): .

Provide acreage estimates for non-jurisdictional waters in the review area, where the sole potential basis of jurisdiction is the MBR factors (i.e., presence of migratory birds, presence of endangered species, use of water for irrigated agriculture), using best professional judgment (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: acres.

Provide acreage estimates for non-jurisdictional waters in the review area that do not meet the "Significant Nexus" standard, where such a finding is required for jurisdiction (check all that apply):
☐ Non-wetland waters (i.e., rivers, streams): linear feet, width (ft).
☐ Lakes/ponds: acres.
☐ Other non-wetland waters: acres. List type of aquatic resource: .
☐ Wetlands: Wetland 3 = 0.006 acres.

SECTION IV: DATA SOURCES.

A. SUPPORTING DATA. Data reviewed for JD (check all that apply - checked items shall be included in case file and, where checked and requested, appropriately reference sources below):
☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant: .
☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
☐ Office concurs with data sheets/delineation report.
☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
☐ USGS NHD data.
☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name:Mount Tabor Quadrangle .
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: NRCS Web Soil Survey - Multnomah County.
☐ National wetlands inventory map(s). Cite name: .
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☐ Aerial (Name & Date):See .
or ☒ Other (Name & Date):Wetland Delineation Photos, Taken 27 June 2017.
☒ Previous determination(s). File no. and date of response letter: File No. 1997-01555 (15 December 1998) and subsequent approvals (6 June 2001, 26 March 2007, 20 January 2011).
☐ Applicable/supporting case law: .
☐ Applicable/supporting scientific literature: .
☐ Other information (please specify): .

APPENDIX C

HISTORICAL WETLAND DELINEATION MAPS

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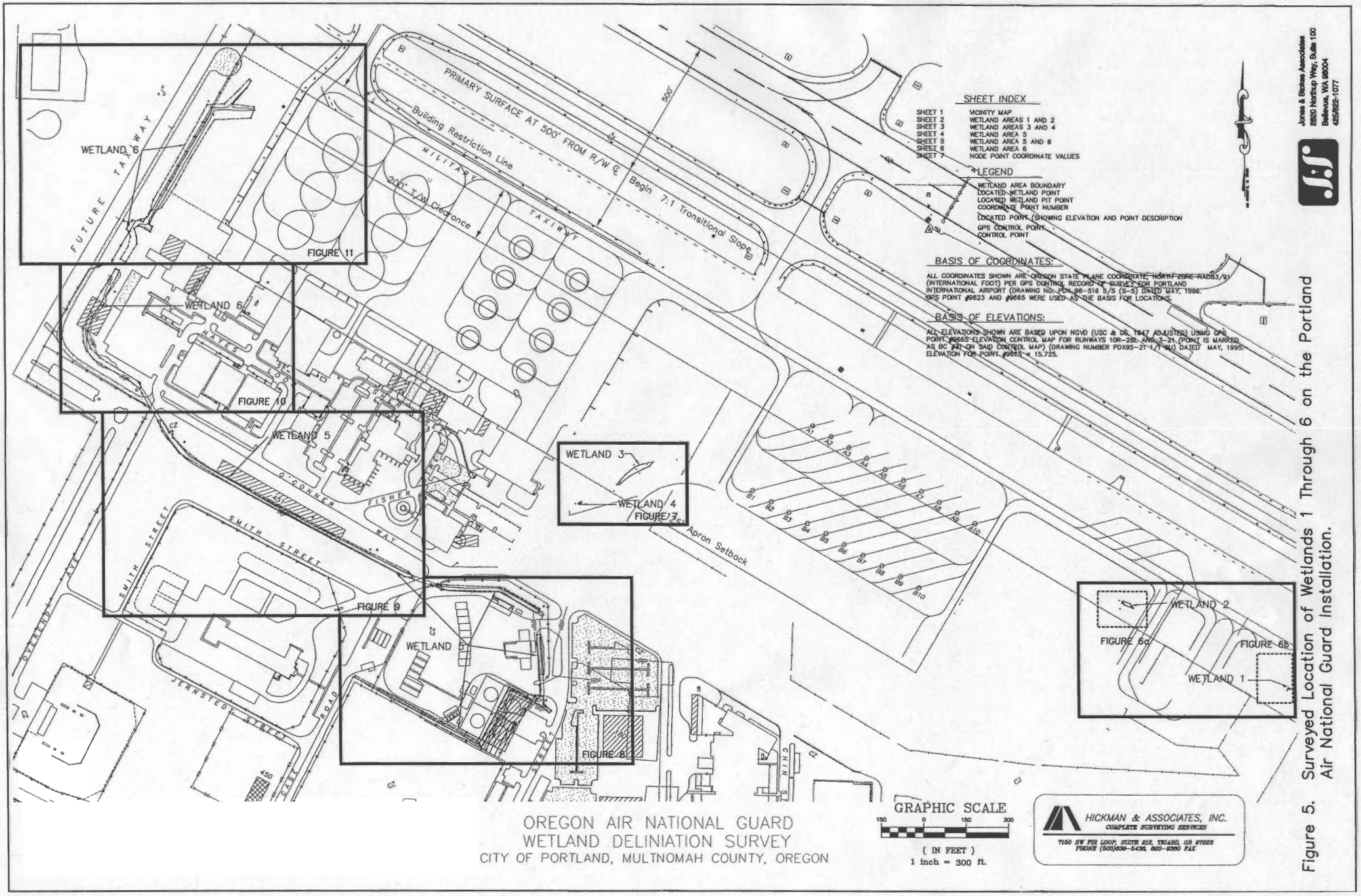

OREGON AIR NATIONAL GUARD
WETLAND DELINIATION SURVEY
CITY OF PORTLAND, MULTNOMAH COUNTY, OREGON

Figure 5. Surveyed Location of Wetlands 1 Through 6 on the Portland Air National Guard Installation.

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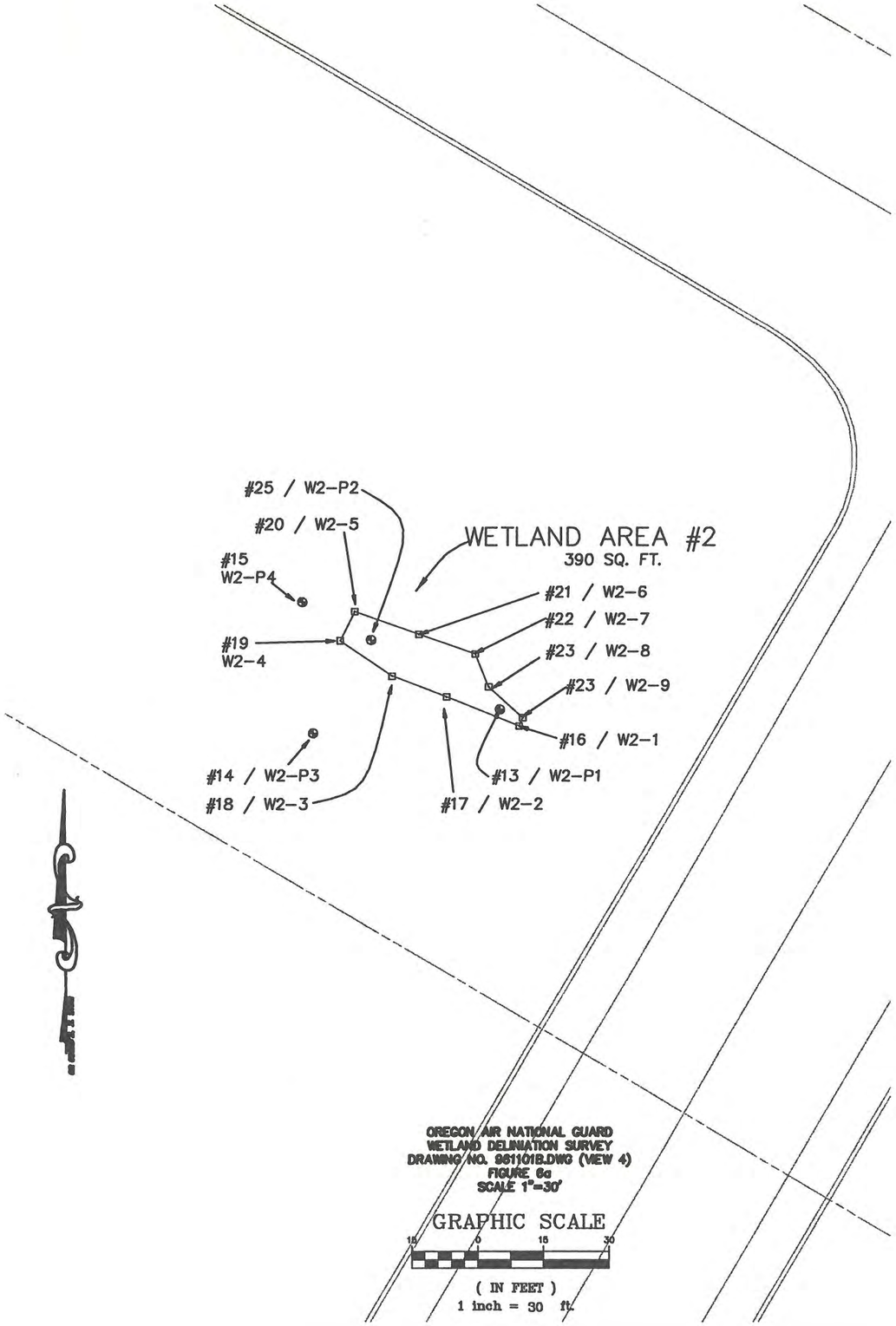
OREGON AIR NATIONAL GUARD
WETLAND DELINIATION SURVEY
CITY OF PORTLAND, MULTNOMAH COUNTY, OREGON

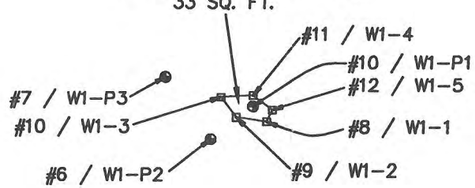
HICKMAN & ASSOCIATES, INC.
COMPLETE SURVEYING SERVICES
7150 SW FIR LOOP, SUITE 212, TIGARD, OR 97223
PHONE (503)639-5436, 620-9360 FAX

Jones & Stokes Associates
2820 Northup Way, Suite 100
Bellevue, WA 98004
425/822-1077



OREGON AIR NATIONAL GUARD
WETLAND DELINIATION SURVEY
DRAWING NO. 961101B.DWG (VIEW 4)
FIGURE 6a
SCALE 1"=30'

GRAPHIC SCALE
15 0 15 30
(IN FEET)
1 inch = 30 ft.



OREGON AIR NATIONAL GUARD
WETLAND DELINIATION SURVEY
DRAWING NO. 961101B.DWG (VIEW 4)
FIGURE 6b
SCALE 1"=30'

GRAPHIC SCALE
15 0 15 30
(IN FEET)
1 inch = 30 ft.

Figure 6a & 6b. Wetlands 1 and 2 Detail.

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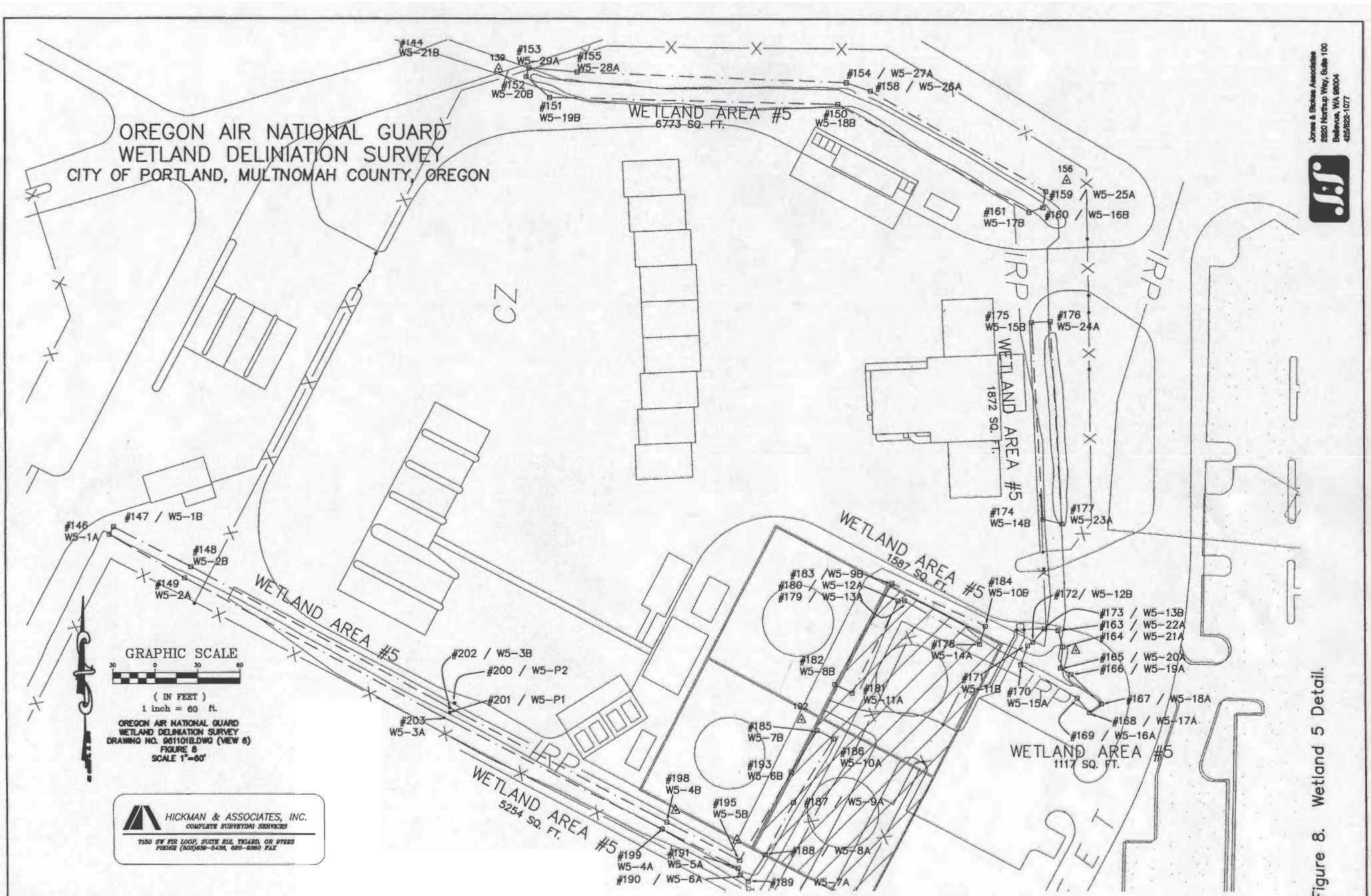

Figure 8. Wetland 5 Detail.

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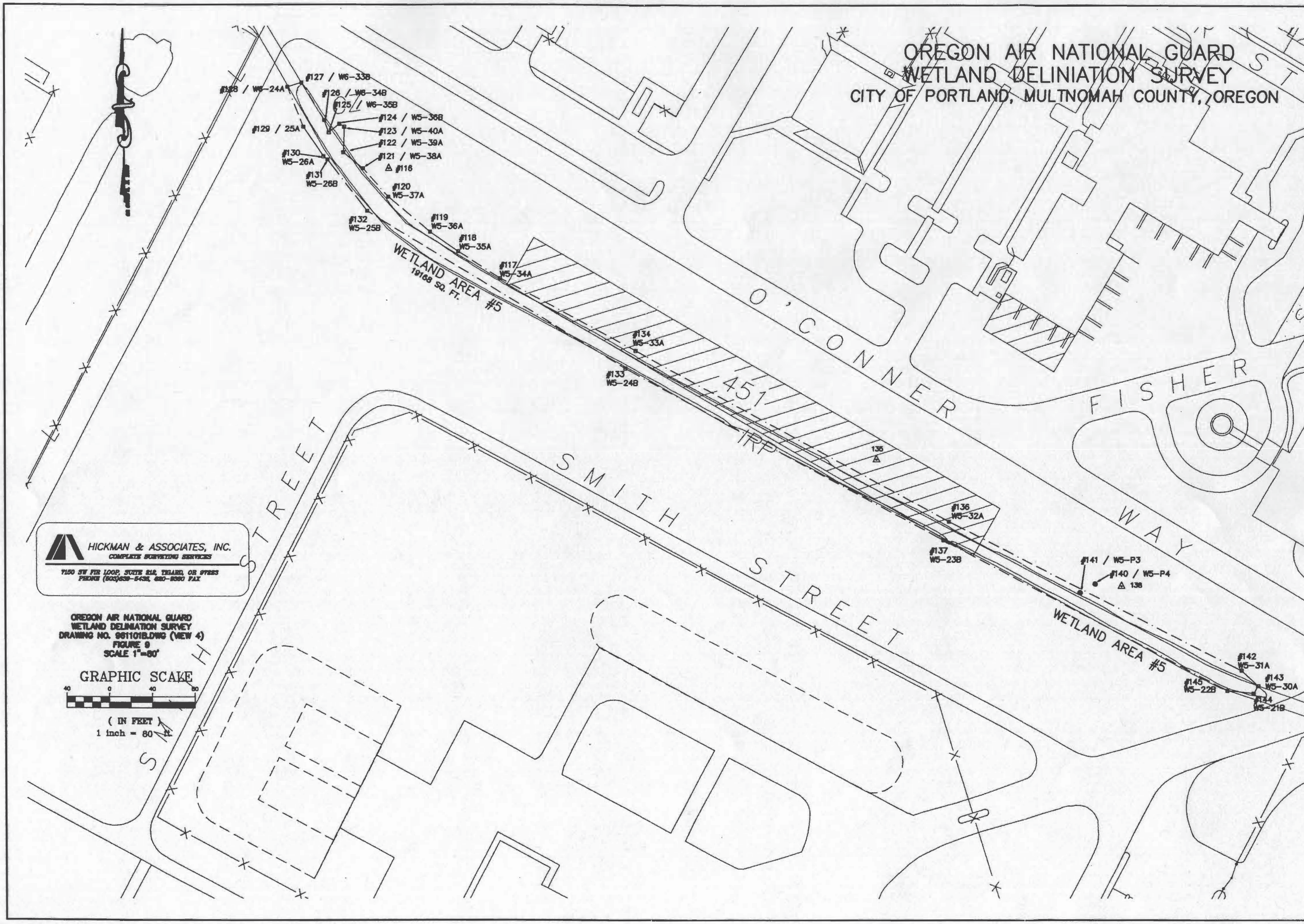

Jones & Stokes Associates
2820 Northup Way, Suite 100
Bellevue, WA 98004
425/822-1077

Figure 9. Wetland 5 Detail.

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APPENDIX D

APPROVED JURISDICTIONAL DETERMINATION

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DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, PORTLAND DISTRICT
P.O. BOX 2946
PORTLAND, OREGON 97208-2946

January 18, 2019

Regulatory Branch
Corps No.: NWP-2011-36-1

Melanie A. Frisch
National Guard Bureau
NGB A4AM
3501 Fetchet Avenue
JB Andrews, MD 20762
Melanie.a.frisch.civ@mail.mil

Dear Ms. Frisch:

The U.S. Army Corps of Engineers (Corps) received your request for an Approved Jurisdictional Determination (AJD) of the aquatic resources within the review area as shown on the enclosed drawings (Enclosure 1). The review area is located on the property of the 142nd Civil Engineer Squadron, Portland, Oregon located on a portion of the Portland International Airport in Multnomah County, Oregon at Latitude/Longitude: 45.57975°, -122.59925 °. Other aquatic resources that may occur on this property or on adjacent properties outside the review area are not the subject of this determination.

The Corps has determined WET 2, WET 3, WET 4, and WET 5 are not waters of the U.S. The enclosed *Approved Jurisdictional Determination Form* (Enclosure 2) provides the basis for jurisdiction. A copy of the AJD Form can also be found on our website at http://www.nwp.usace.army.mil/Missions/Regulatory/Appeals/.

If you object to the enclosed AJD, you may request an administrative appeal under 33 CFR Part 331 as described in the enclosed *Notification of Administrative Appeal Options and Process and Request for Appeal* (*RFA*) form (Enclosure 3). To appeal this AJD, you must submit a completed *RFA* form to the Corps Northwestern Division (NWD) office at the address listed on the form. In order for the request for appeal to be accepted, the Corps must determine that the form is complete, that the request meets the criteria for appeal under 33 CFR Part 331.5, and the form must also be received by the NWD office within 60 days from the date on the form. It is not necessary to submit the form to the NWD office if you do not object to the enclosed AJD.

This AJD is valid for a period of five years from the date of this letter unless new information warrants revisions of the determination.

If you have any questions regarding our Regulatory Program or permit requirements for work in waters of the U.S., please contact Ms. Melody White at the letterhead address, by telephone at (503) 808-4385, or E-mail Melody.J.White@usace.army.mil.

FOR THE COMMANDER, AARON L. DORF, COLONEL, CORPS OF ENGINEERS, DISTRICT COMMANDER:

WHITE.MELODY.J.1292348157

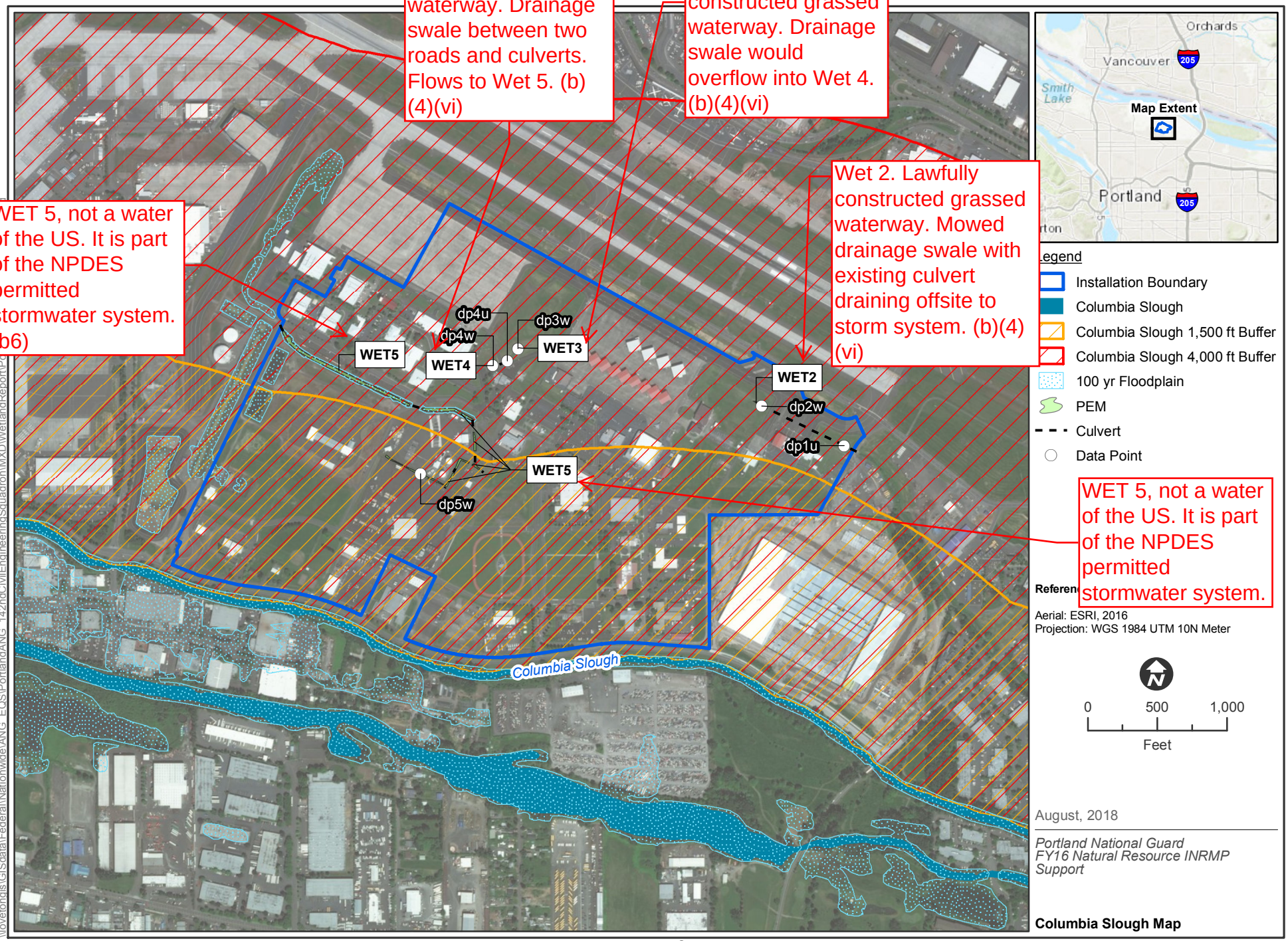
Digitally signed by WHITE.MELODY.J.1292348157
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=WHITE.MELODY.J.1292348157
Date: 2019.01.18 09:44:22 -08'00'

FOR William D. Abadie
Chief, Regulatory Branch

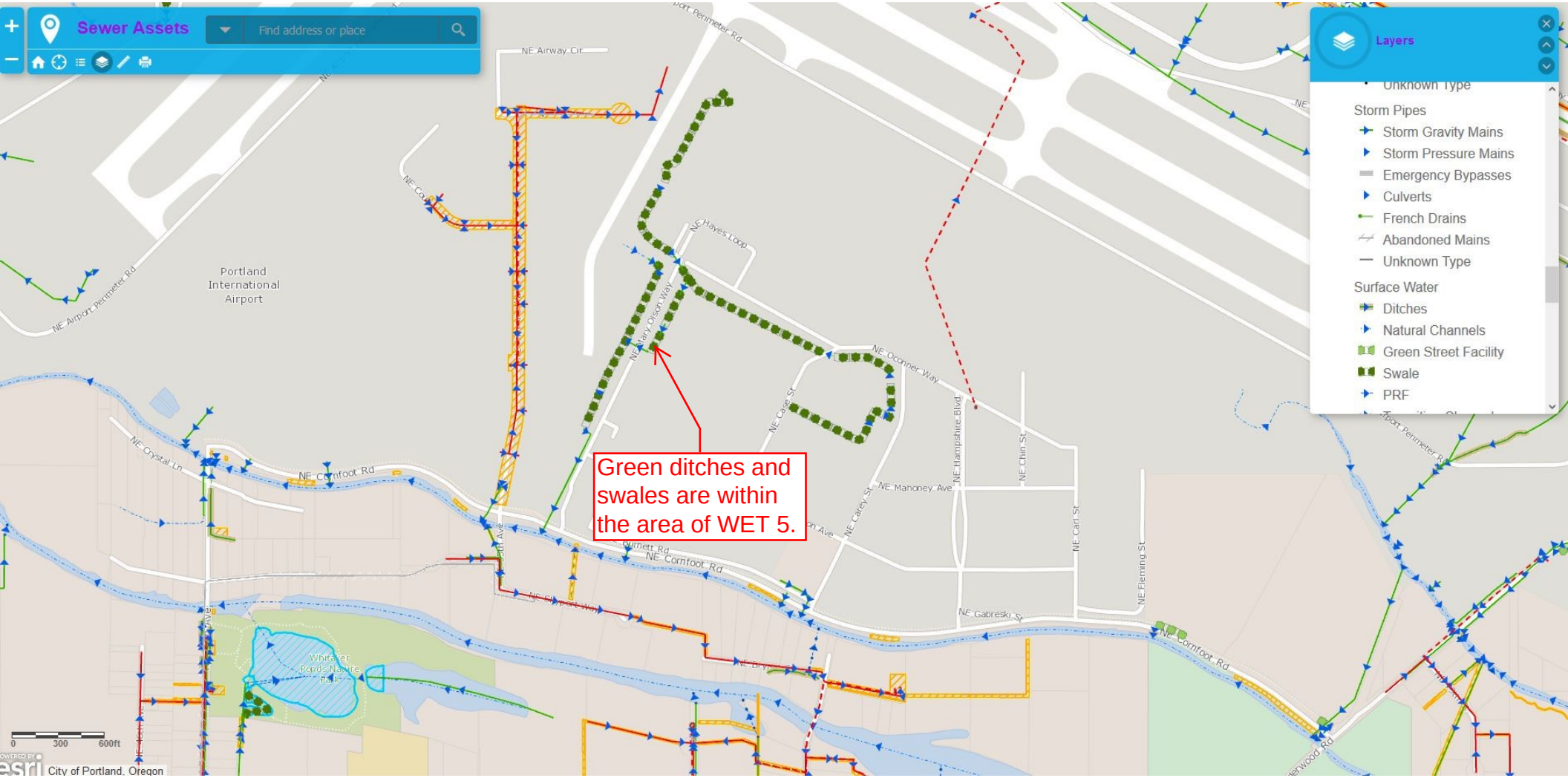
Enclosures

cc with drawings:

Thomas King (tking@eaest.com)


Wet 4. Lawfully constructed grassed waterway. Drainage swale between two roads and culverts. Flows to Wet 5. (b)(4)(vi)
Wet 3. Lawfully constructed grassed waterway. Drainage swale would overflow into Wet 4. (b)(4)(vi)
Wet 2. Lawfully constructed grassed waterway. Mowed drainage swale with existing culvert draining offsite to storm system. (b)(4)(vi)
WET 5, not a water of the US. It is part of the NPDES permitted stormwater system. (b6)
WET 5, not a water of the US. It is part of the NPDES permitted stormwater system.
WET5
WET4
WET3
WET2
WET5
dp4u
dp4w
dp3w
dp2w
dp1u
dp5w
Columbia Slough
Orchards
Vancouver
205
Smith Lake
Map Extent
Portland
205
Legend
Installation Boundary
Columbia Slough
Columbia Slough 1,500 ft Buffer
Columbia Slough 4,000 ft Buffer
100 yr Floodplain
PEM
Culvert
Data Point
Aerial: ESRI, 2016
Projection: WGS 1984 UTM 10N Meter
0
500
1,000
Feet
August, 2018
Portland National Guard
FY16 Natural Resource INRMP Support
Columbia Slough Map
\\lovetonais\GISdata\Federal\Nationwide\ANG_EQS\Portland\ANG_142ndCivilEngineeringSquadron\MXD\WetlandReport\P

Portlandmaps.com
Sewer Assetts
1/16/2019



DRAINAGE BASIN AREAS

BASIN #	AREA (AC)
BASIN 1	1,504
BASIN 2	347
BASIN 3	13
BASIN 4	51
BASIN 5	48
BASIN 6	480
BASIN 7	621
BASIN 8	437
BASIN 9	335

GRESHAM SMITH AND PARTNERS

28485.00
PROJECT NUMBER

PORT OF PORTLAND

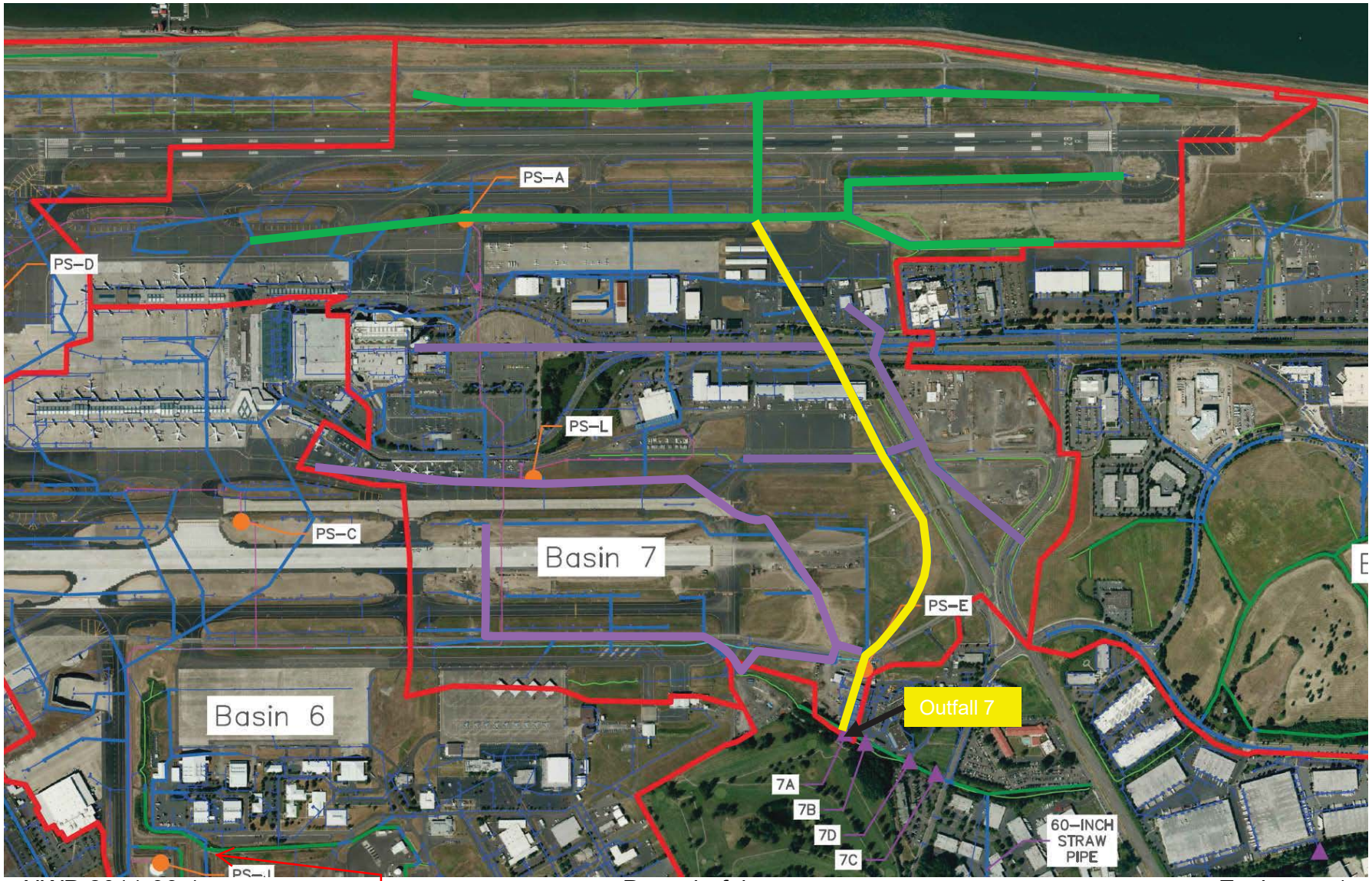
DATE: DEC, 2012

0 1600 3200
GRAPHICAL SCALE BAR

PORTLAND INTERNATIONAL AIRPORT
STORMWATER MASTER PLAN
PDX DRAINAGE BASIN BOUNDARIES

FIGURE 1

Basin 7: Undersized and Ageing Infrastructure



Regulatory Program

INTERIM APPROVED JURISDICTIONAL DETERMINATION FORM
U.S. Army Corps of Engineers

SECTION I: BACKGROUND INFORMATION

A.COMPLETION DATE FOR APPROVED JURISDICTIONAL DETERMINATION (AJD): 16 January 2019

B.ORM NUMBER IN APPROPRIATE FORMAT (e.g., HQ-2015-00001-SMJ): NWP-2011-36/1

C.PROJECT LOCATION AND BACKGROUND INFORMATION:

State: Oregon County/parish/borough: Multnomah County City: Portland
Center coordinates of site (lat/long in degree decimal format): Lat. 45.578944°, Long. -122.5958°.
Map(s)/diagram(s) of review area (including map identifying single point of entry (SPOE) watershed and/or potential jurisdictional areas where applicable) is/are: ☑ attached ☐ in report/map titled .

☐ Other sites (e.g., offsite mitigation sites, disposal sites, etc.) are associated with this action and are recorded on a different jurisdictional determination (JD) form. List JD form ID numbers (e.g., HQ-2015-00001-SMJ-1): .

D.REVIEW PERFORMED FOR SITE EVALUATION:

☑ Office (Desk) Determination Only. Date: 1-14-2019.

☐ Office (Desk) and Field Determination. Office/Desk Dates: Field Date(s): .

SECTION II: DATA SOURCES

Check all that were used to aid in the determination and attach data/maps to this AJD form and/or references/citations in the administrative record, as appropriate.

☑ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant. Title/Date: Map provided by applicant with overlays dated August 2018 .

☑ Data sheets prepared/submitted by or on behalf of the applicant/consultant.

- ☑ Data sheets/delineation report are sufficient for purposes of AJD form. Title/Date: Draft Final Wetland Delineation Report, Air National Guard-142, dated August 2018.
- ☐ Data sheets/delineation report are not sufficient for purposes of AJD form. Summarize rationale and include information on revised data sheets/delineation report that this AJD form has relied upon: .
  Revised Title/Date: .

☐ Data sheets prepared by the Corps. Title/Date: .
☐ Corps navigable waters study. Title/Date: .
☐ CorpsMap ORM map layers. Title/Date: .
☐ USGS Hydrologic Atlas. Title/Date: .
☐ USGS, NHD, or WBD data/maps. Title/Date: .
☐ USGS 8, 10 and/or 12 digit HUC maps. HUC number: .
☐ USGS maps. Scale & quad name and date: .
☐ USDA NRCS Soil Survey. Citation: .
☐ USFWS National Wetlands Inventory maps. Citation: .
☐ State/Local wetland inventory maps. Citation: .
☐ FEMA/FIRM maps. Citation: .
☐ Photographs: ☐ Aerial. Citation: . or ☐ Other. Citation: .

☐ LiDAR data/maps. Citation: .

☐ Previous JDs. File no. and date of JD letter: .

☐ Applicable/supporting case law: .

☐ Applicable/supporting scientific literature: .

☑ Other information (please specify): Port of Portland stormwater presentation, List of Navigable Waterways - 1993, City of Portland Sewer Assets website (portlandmaps.com).

SECTION III: SUMMARY OF FINDINGS

A.RIVERS AND HARBORS ACT (RHA) SECTION 10 DETERMINATION OF JURISDICTION:

☐ "*navigable waters of the U.S.*" within RHA jurisdiction (as defined by 33 CFR part 329) in the review area.

- **Complete Table 1 - Required**

NOTE: If the navigable water is not subject to the ebb and flow of the tide or included on the District's list of Section 10 navigable waters list, DO NOT USE THIS FORM TO MAKE THE DETERMINATION. The District must continue to follow the procedure outlined in 33 CFR part 329.14 to make a Section 10 RHA navigability determination.

B.CLEAN WATER ACT (CWA) SECTION 404 DETERMINATION OF JURISDICTION: "*waters of the U.S.*" within CWA jurisdiction (as defined by 33 CFR part 328.3) in the review area. **Check all that apply.**

☐ (a)(1): All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide. (Traditional Navigable Waters (TNWs))

- **Complete Table 1 - Required**

☐ This AJD includes a case-specific (a)(1) TNW (Section 404 navigable-in-fact) determination on a water that has not previously been designated as such. Documentation required for this case-specific (a)(1) TNW determination is attached.

☐ (a)(2): All interstate waters, including interstate wetlands.

- **Complete Table 2 - Required**

☐ (a)(3): The territorial seas.

- **Complete Table 3 - Required**

☐ (a)(4): All impoundments of waters otherwise identified as waters of the U.S. under 33 CFR part 328.3.

- **Complete Table 4 - Required**

☐ (a)(5): All tributaries, as defined in 33 CFR part 328.3, of waters identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 5 - Required**

☐ (a)(6): All waters adjacent to a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3, including wetlands, ponds, lakes, oxbows, impoundments, and similar waters.

- **Complete Table 6 - Required**

☐ Bordering/Contiguous.
Neighboring:

☐ (c)(2)(i): All waters located within 100 feet of the ordinary high water mark (OHWM) of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3.

☐ (c)(2)(ii): All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3 and not more than 1,500 feet of the OHWM of such water.

☐ (c)(2)(iii): All waters located within 1,500 feet of the high tide line of a water identified in paragraphs (a)(1) or (a)(3) of 33 CFR part 328.3, and all waters within 1,500 feet of the OHWM of the Great Lakes.

☐ (a)(7): All waters identified in 33 CFR 328.3(a)(7)(i)-(v) where they are determined, on a case-specific basis, to have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 7 for the significant nexus determination. Attach a map delineating the SPOE watershed boundary with (a)(7) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☐ (a)(8): All waters located within the 100-year floodplain of a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3 not covered by (c)(2)(ii) above and all waters located within 4,000 feet of the high tide line or OHWM of a water identified in paragraphs (a)(1)-(a)(5) of 33 CFR part 328.3 where they are determined on a case-specific basis to have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 8 for the significant nexus determination. Attach a map delineating the SPOE watershed boundary with (a)(8) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

C.NON-WATERS OF THE U.S. FINDINGS:

Check all that apply.

☐ The review area is comprised entirely of dry land.

☐ Potential-(a)(7) Waters: Waters that DO NOT have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 9 and attach a map delineating the SPOE watershed boundary with potential (a)(7) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☐ Potential-(a)(8) Waters: Waters that DO NOT have a significant nexus to a water identified in paragraphs (a)(1)-(a)(3) of 33 CFR part 328.3.

- **Complete Table 9 and attach a map delineating the SPOE watershed boundary with potential (a)(8) waters identified in the similarly situated analysis. - Required**

☐ Includes water(s) that are geographically and physically adjacent per (a)(6), but are being used for established, normal farming, silviculture, and ranching activities (33 USC Section 1344(f)(1)) and therefore are not adjacent and require a case-specific significant nexus determination.

☑ Excluded Waters (Non-Waters of U.S.), even where they otherwise meet the terms of paragraphs (a)(4)-(a)(8):

- **Complete Table 10 - Required**

☐ (b)(1): Waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of the CWA.

☐ (b)(2): Prior converted cropland.

☐ (b)(3)(i): Ditches with ephemeral flow that are not a relocated tributary or excavated in a tributary.

☐ (b)(3)(ii): Ditches with intermittent flow that are not a relocated tributary, excavated in a tributary, or drain wetlands.

☐ (b)(3)(iii): Ditches that do not flow, either directly or through another water, into a water identified in paragraphs (a)(1)-(a)(3).

☐ (b)(4)(i): Artificially irrigated areas that would revert to dry land should application of water to that area cease.

☐ (b)(4)(ii): Artificial, constructed lakes and ponds created in dry land such as farm and stock watering ponds, irrigation ponds, settling basins, fields flooded for rice growing, log cleaning ponds, or cooling ponds.

☐ (b)(4)(iii): Artificial reflecting pools or swimming pools created in dry land. [1]

☐ (b)(4)(iv): Small ornamental waters created in dry land. [1]

☐ (b)(4)(v): Water-filled depressions created in dry land incidental to mining or construction activity, including pits excavated for obtaining fill, sand, or gravel that fill with water.

☑ (b)(4)(vi): Erosional features, including gullies, rills, and other ephemeral features that do not meet the definition of tributary, non-wetland swales, and lawfully constructed grassed waterways. [1]

[1] In many cases these excluded features will not be specifically identified on the AJD form, unless specifically requested. Corps Districts may, in case-by-case instances, choose to identify some or all of these features within the review area.

☐ (b)(4)(vii): Puddles.[1]

☐ (b)(5): Groundwater, including groundwater drained through subsurface drainage systems.[1]

☑ (b)(6): Stormwater control features constructed to convey, treat, or store stormwater that are created in dry land.[1]

☐ (b)(7): Wastewater recycling structures created in dry land; detention and retention basins built for wastewater recycling; groundwater recharge basins; percolation ponds built for wastewater recycling; and water distributary structures built for wastewater recycling.

☐ Other non-jurisdictional waters/features within review area that do not meet the definitions in 33 CFR 328.3 of (a)(1)-(a)(8) waters and are not excluded waters identified in (b)(1)-(b)(7).

- **Complete Table 11 - Required.**

D.ADDITIONAL COMMENTS TO SUPPORT AJD: .

Jurisdictional Waters of the U.S.

Default field entry is "N/A". Delete "N/A" and fill out all fields in the table where applicable for waters/features present in the review area.

Table 1. (a)(1) Traditional Navigable Waters

(a)(1) Waters Name	(a)(1) Criteria	Rationale to Support (a)(1) Designation Include High Tide Line or Ordinary High Water Mark indicators, when applicable.
N/A	Choose an item.	N/A

Table 2. (a)(2) Interstate Waters

(a)(2) Waters Name	Rationale to Support (a)(2) Designation
N/A	N/A

Table 3. (a)(3) Territorial Seas

(a)(3) Waters Name	Rationale to Support (a)(3) Designation
N/A	N/A

Table 4. (a)(4) Impoundments

(a)(4) Waters Name	Rationale to Support (a)(4) Designation
N/A	N/A
N/A	N/A

Table 5. (a)(5)Tributaries

(a)(5) Waters Name	Flow Regime	(a)(1)-(a)(3) Water Name to which this (a)(5) Tributary Flows	Tributary Breaks	Rationale for (a)(5) Designation and Additional Discussion. Identify flowpath to (a)(1)-(a)(3) water or attach map identifying the flowpath; explain any breaks or flow through excluded/non-jurisdictional features, etc.
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A
N/A	Choose an item.	N/A	Choose an item.	N/A

Table 6. (a)(6) Adjacent Waters

(a)(6) Waters Name	(a)(1)-(a)(5) Water Name to which this Water is Adjacent	Rationale for (a)(6) Designation and Additional Discussion. Identify the type of water and how the limits of jurisdiction were established (e.g., wetland, 87 Manual/Regional Supplement); explain how the 100-year floodplain and/or the distance threshold was determined; whether this water extends beyond a threshold; explain if the water is part of a mosaic, etc.
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A
N/A	N/A	N/A

Table 7. (a)(7) Waters

SPOE Name	(a)(7) Waters Name	(a)(1)-(a)(3) Water Name to which this Water has a Significant Nexus	Significant Nexus Determination Identify SPOE watershed; discuss whether any similarly situated waters were present and aggregated for SND; discuss data, provide analysis, and summarize how the waters have more than speculative or insubstantial effect on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water, etc.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Table 8. (a)(8) Waters

SPOE Name	(a)(8) Waters Name	(a)(1)-(a)(3) Water Name to which this Water has a Significant Nexus	Significant Nexus Determination Identify SPOE watershed; explain how 100-yr floodplain and/or the distance threshold was determined; discuss whether waters were determined to be similarly situated to subject water and aggregated for SND; discuss data, provide analysis, and then summarize how the waters have more than speculative or insubstantial effect the on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water, etc.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Non-Jurisdictional Waters

Default field entry is "N/A". Delete "N/A" and fill out all fields in the table where applicable for waters/features present in the review area.

Table 9. Non-Waters/No Significant Nexus

SPOE Name	Non-(a)(7)/(a)(8) Waters Name	(a)(1)-(a)(3) Water Name to which this Water DOES NOT have a Significant Nexus	Basis for Determination that the Functions DO NOT Contribute Significantly to the Chemical, Physical, or Biological Integrity of the (a)(1)-(a)(3) Water. Identify SPOE watershed; explain how 100-yr floodplain and/or the distance threshold was determined; discuss whether waters were determined to be similarly situated to the subject water; discuss data, provide analysis, and summarize how the waters did not have more than a speculative or insubstantial effect on the physical, chemical, or biological integrity of the (a)(1)-(a)(3) water.
N/A	N/A	N/A	N/A
N/A	N/A	N/A	N/A

Table 10. Non-Waters/Excluded Waters and Features

Paragraph (b) Excluded Feature/Water Name	Rationale for Paragraph (b) Excluded Feature/Water and Additional Discussion.
Wet 2	Not a Water of the US. A 0.02 acre emergent wetland which is mowed. Lawfully constructed grassed waterway to catch and divert water draining from adjacent roadways with existing culvert draining offsite to storm system. (b)(4)(vi)
Wet 3	Not a water of the US. 0.006 acre emergent wetland in a drainage swale which is mowed. Lawfully constructed grassed waterway to catch and divert water draining from adjacent roadways draining to WET 4, which leads to stormwater system. (b)(4)(vi)
Wet 4	Not a Water of the US. A 0.005 acre wetland in a lawfully constructed grassed waterway drainage swale between two roads and culverts which drains to WET 5. (b)(4)(vi)
Wet 5	Not a Water of the US. It is part of the NPDES permitted stormwater system. (b)(6).

Table 11. Non-Waters/Other

Other Non-Waters of U.S. Feature/Water Name	Rationale for Non-Waters of U.S. Feature/Water and Additional Discussion.

N/A	N/A

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant: National Guard Bureau	File Number: NWP-2011-36-1	Date: 1-18-2019

Attached is:		See Section below
	INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)	A
	PROFFERED PERMIT (Standard Permit or Letter of permission)	B
	PERMIT DENIAL	C
x	APPROVED JURISDICTIONAL DETERMINATION	D
	PRELIMINARY JURISDICTIONAL DETERMINATION	E

SECTION I - The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found in Corps regulations at 33 CFR Part 331, or at http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/FederalRegulation.aspx

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit.

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions therein, you may request that the permit be modified accordingly. You must complete Section II of this form and return the form to the district engineer. Your objections must be received by the district engineer within 60 days of the date of this notice, or you will forfeit your right to appeal the permit in the future. Upon receipt of your letter, the district engineer will evaluate your objections and may: (a) modify the permit to address all of your concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit having determined that the permit should be issued as previously written. After evaluating your objections, the district engineer will send you a proffered permit for your reconsideration, as indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to the district engineer for final authorization. If you received a Letter of Permission (LOP), you may accept the LOP and your work is authorized. Your signature on the Standard Permit or acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to appeal the permit, including its terms and conditions, and approved jurisdictional determinations associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C: PERMIT DENIAL: You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

D: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information.

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice, means that you accept the approved JD in its entirety, and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: PRELIMINARY JURISDICTIONAL DETERMINATION: You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also you may provide new information for further consideration by the Corps to reevaluate the JD.

SECTION II - REQUEST FOR APPEAL or OBJECTIONS TO AN INITIAL PROFFERED PERMIT

REASONS FOR APPEAL OR OBJECTIONS: (Describe your reasons for appealing the decision or your objections to an initial proffered permit in clear concise statements. You may attach additional information to this form to clarify where your reasons or objections are addressed in the administrative record.)

ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.

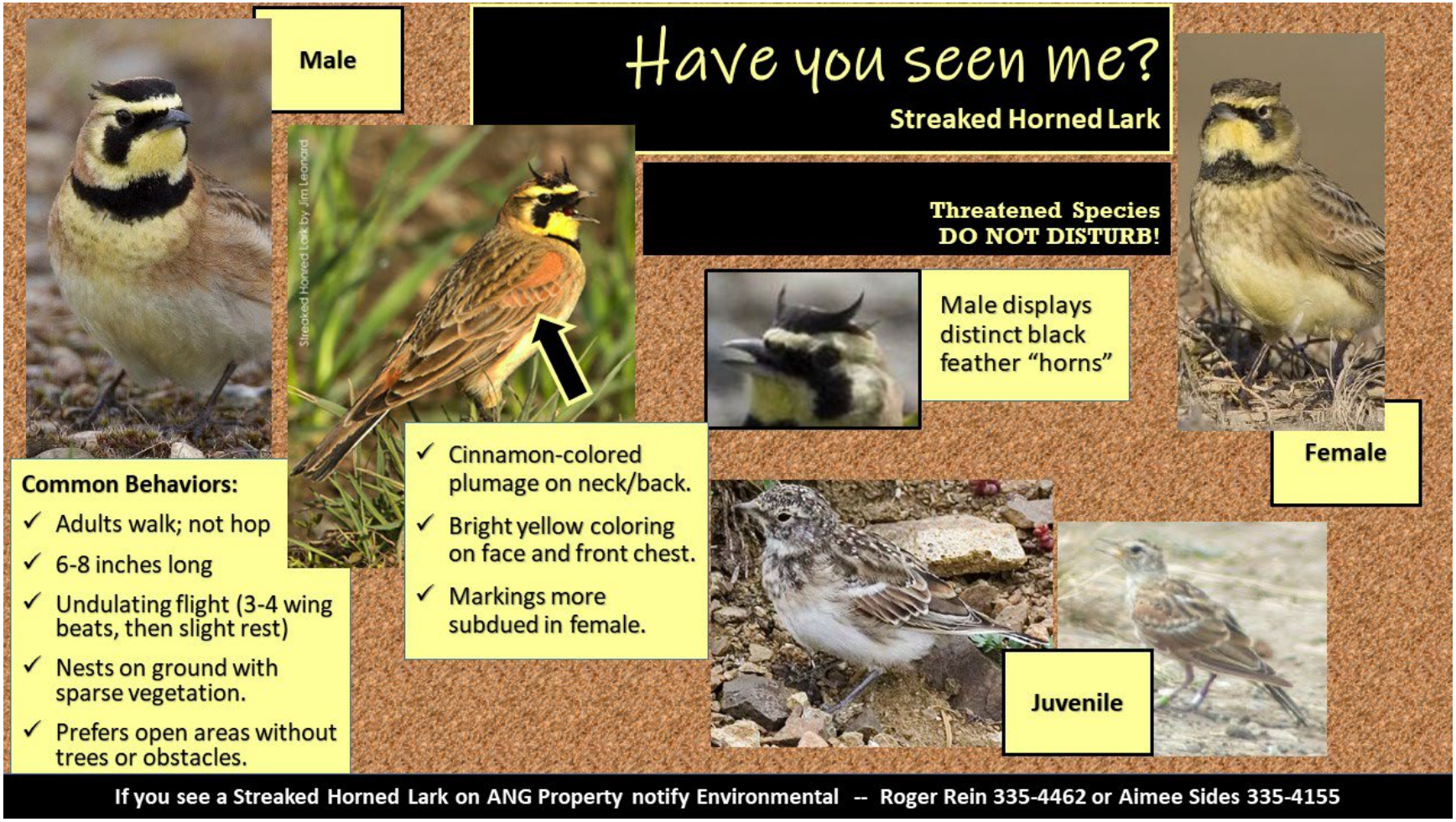
POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision and/or the appeal process you may contact: Mr. William D. Abadie U.S. Army Corps of Engineers Portland District Office PO Box 2946 Portland, OR 97208-2946 Telephone: (503)808-4373	If you only have questions regarding the appeal process you may also contact: Melinda M. Witgenstein, Regulatory Appeals Review Officer U.S. Army Corps of Engineers, Northwestern Division P.O. Box 2870 Portland, OR 97208-2870 Telephone: (503) 808-3888

RIGHT OF ENTRY: Your signature below grants the right of entry to Corps of Engineers personnel, and any government consultants, to conduct investigations of the project site during the course of the appeal process. You will be provided a 15 day notice of any site investigation, and will have the opportunity to participate in all site investigations.

_____ Signature of appellant or agent.	Date:	Telephone number:

APPENDIX D. STREAKED HORNED LARK IDENTIFICATION AND SURVEY PROTOCOLS


Male
Have you seen me?
Streaked Horned Lark
Threatened Species
DO NOT DISTURB!
Male displays distinct black feather "horns"
Female
Streaked Horned Lark by Jim Leonard
Common Behaviors:
✓ Adults walk; not hop
✓ 6-8 inches long
✓ Undulating flight (3-4 wing beats, then slight rest)
✓ Nests on ground with sparse vegetation.
✓ Prefers open areas without trees or obstacles.
✓ Cinnamon-colored plumage on neck/back.
✓ Bright yellow coloring on face and front chest.
✓ Markings more subdued in female.
Juvenile
If you see a Streaked Horned Lark on ANG Property notify Environmental -- Roger Rein 335-4462 or Aimee Sides 335-4155

Survey Protocols and Strategies for Assessing Streaked Horned Lark Site Occupancy Status, Population Abundance, and Trends

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Hannah Anderson[2,1], Randy Moore[3],

Gary Slater[2], and Ann Kreager[4]

A collaboration by

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[4]Oregon Department of Fish and Wildlife, Corvallis

Recommended citation:

Pearson, S.F., M. Linders, I. Keren, H. Anderson, R. Moore, G. Slater, and A. Kreager. 2016. Survey protocols and strategies for assessing streaked horned lark site occupancy status, population abundance, and trends. Wildlife Science Division, Washington Department of Fish and Wildlife, Olympia, Washington.

Introduction

The streaked horned lark (*Eremophila alpestris strigata*) is listed as threatened under the Federal Endangered Species Act (USFWS 2013) and as endangered by the State of Washington, yet no standardized range-wide survey protocol or monitoring strategy exists. Assessing population distribution, abundance and trends is critical for making informed management decisions and to understand relationships between animal populations and environmental conditions. Such information is used to describe changes in the size of rare or declining populations, identify mechanisms for population changes, assess changes in ecological conditions, and evaluate the effectiveness of conservation actions (e.g., progress towards recovery).

To gain a better understanding of lark distribution and abundance, we advocate a hierarchical approach (see Olson and Pearson 2014). This hierarchical approach consists of three components:

1. A probability of occurrence map that determines the sampling frame where one should look for and count larks. This map would preferably be range-wide (or regional) in scale and portray the species probability of occurrence based on habitat suitability and current distribution. This is a landscape-scale assessment. The extent of the map may be defined by political, geographical, and/or biological boundaries.
2. A statistically-based sampling plan (or set of plans) to monitor population trends within occupied sites (a temporal assessment that may be conducted at the site or landscape scale). Trends may be based on abundance or occurrence as appropriate.
3. Survey protocols for determining site occupancy status within suitable habitat - site scale assessment. Once the best places to look for the species have been identified, these protocols help determine how to search in a manner that is likely to detect the species if it is present.

The first step in this process is to develop a landscape-scale map that would quantitatively or qualitatively express the probability of lark occurrence within the defined map extent based on factors determined to affect occupancy. This map would then be used to concentrate survey, management, conservation, and other efforts in areas where occurrence probability is moderate to high, while also enabling such efforts to be reduced or eliminated in areas of low probability of occurrence. This results in a much more efficient and for a statistically based sampling approach. The second step is to develop species-specific survey protocols to determine site occupancy status using methods that take into account the uncertainty associated with detecting the presence of animals. The final step is to develop a strategy for assessing species abundance and trends within occupied sites.

We organize this document as follows:

1) Recommendations on developing a probability of occurrence map and, in the absence of such a map, a potential interim sampling framework approach. These recommendations allow us to move forward with surveys even though the occurrence map has not been built.

2) Lark breeding phenology and detectability information needed to develop occupancy and survey protocols.
3) Sampling strategy for assessing breeding season lark abundance and trend at sites with public access and recommendations for potential road–side surveys for sites without public access.
4) Field protocols for assessing a site's occupancy status by breeding larks.

Developing the sampling frame (probability of occurrence map)

The sampling frame is the space where one is either going to assess occupancy, abundance, and or trend. In Washington State, the sampling frame was originally defined by Rogers (1999, 2000). Rogers essentially created a probability of occurrence map for Washington using habitat and historic occurrence criteria. He started with a map of the State depicting all of the townships. He then identified townships with relatively recent lark records (1960 or later) and potential or suitable nesting habitat (see Rogers 1999 for details) – these were identified as high priority survey sites. He also identified lower priority survey sites, which consisted of patches of unknown or marginal habitat conditions with older nesting records. Habitat conditions were determined by visually interpreting orthographic photographs. Using this approach to identify sites and using established survey methods, he detected forty-nine singing streaked horned larks in 11 of the 86 townships surveyed in 1999. Additional surveys were conducted by MacLaren (2000) to survey the last few high priority survey townships not surveyed by Rogers and to survey the remaining lower priority townships. She also conducted repeat surveys at occupied sites. Since these original surveys, a number of additional surveys have been conducted (including within season replicated surveys) on suitable habitat near currently occupied sites (see Pearson and Hopey 2004, Pearson et al. 2005, and Anderson and Slater 2015). Finally, to fill in any missing occupied sites, formal requests have gone out to birding listservs to request notifications of observed horned larks within the breeding season in order to identify locations of potential breeders. Finally, state and federal biologists periodically monitor eBird (ebird.org/) to look for horned lark records from skilled birders during the nesting period. As a consequence of these relatively systematic and intensive efforts, many and perhaps most of the potential nesting sites in western Washington and on the Columbia River islands/shore of Oregon and Washington have been identified.

Extensive surveys have also been conducted in Oregon (e.g., Altman 1999, ODFW 2008, 2010, Moore 2010). The ODFW (2010) survey effort, for example, focused on historically occupied sites and potentially suitable habitat. In addition, they attempted to spread their sampling effort throughout the Willamette Valley and across the various physiographic regions and within areas that historically supported grasslands. Assessing site occupancy status and Lark abundance and trend in the Valley are complicated because it is largely a privately owned agricultural matrix (no public access) with a shifting mosaic of potential habitat. As a consequence, our knowledge of the lark's distribution and abundance within the Valley is incomplete.

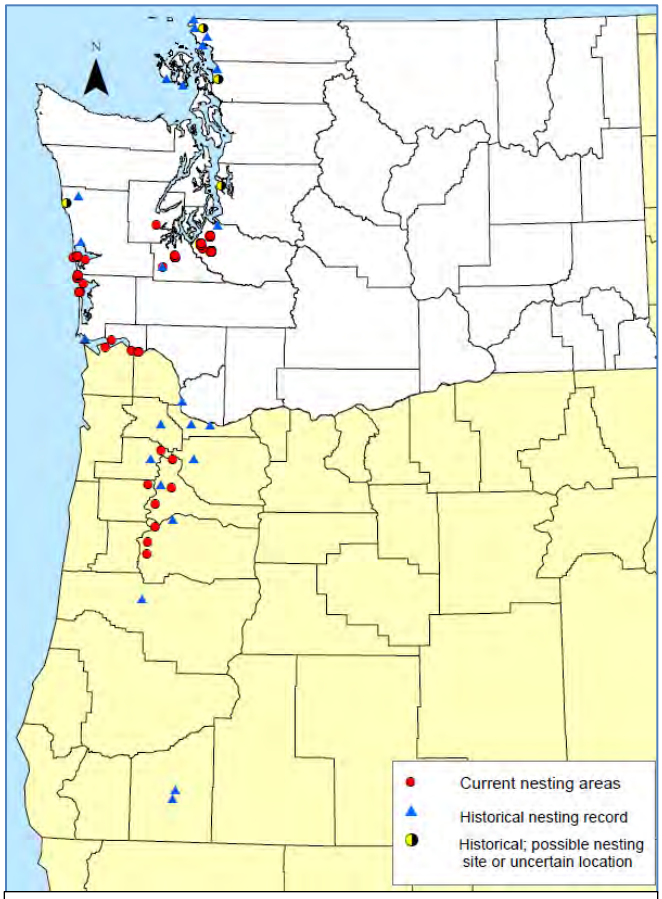

Figure 1. *Historic and relatively current nesting locations (Stinson 2005).*

Given this historic context and the data currently available, this is an ideal time to build a probability of occurrence map for the lark. Preferably, this map would cover the current and historic range of the species.

However, the streaked horned lark presents unique challenges for developing such a map. This species depends on specific habitats during the nesting and non-nesting periods – large open and sparsely vegetated habitats dominated by grasses and forbs (see Anderson and Pearson 2015). Many of the occupied sites are continuously occupied because the habitat is maintained in this condition, for example, airports, field edges and road sides. While other sites tend to be ephemeral because they are generally early successional and, without additional disturbance, succeed to other habitat types. As a result, it is difficult to predict the distribution of suitable habitat conditions over space and time. Even with good broad-scale assessment tools such as remote sensing techniques, it would be necessary to update this map at regular intervals - perhaps, every 5-10 years - to account for the ever-changing conditions. Unfortunately, these techniques have not been completely developed for the lark (but see Anderson 2009, 2013).

Despite these difficulties, we believe it is possible to build a coarse region-specific landscape probability of occurrence map that would be extremely useful. We recommend starting with a map of historical lark occurrence in the Georgia Basin, Puget Trough, Willamette Valley, and Rogue River Valley (Figure 1). We recommend dividing this historically occupied area into strata based on a combination of land cover types and population dynamics. For example, one could potentially split the occupied portion of the range into the following strata: 1) southern Puget Trough, 2) lower Columbia River and Washington coast, 3) north and western Willamette Valley, and 4) south and eastern Willamette Valley. These strata are initial suggestions, determining the specific strata and their boundaries would be defined as a component of this mapping project.

Within defined strata, removing unsuitable habitat would narrow the sampling frame considerably. For example, streaked horned larks are not known to use habitats: (1) Above 800' in elevation; (2) Any landscape with > 10 % tree canopy cover; (3) Urban landscapes without large patches of open habitat; and (4) Lakes, wetlands with permanently standing water, and forested wetlands. A map

with these and potentially other variables removed could be used as the sampling frame. Or alternatively, one could try some relatively straightforward GIS modeling to further refine this map to build a predictive map for each of the geographic strata.

To accomplish this, one could use a modelling approach to examine the relationship between site occupancy and a variety of predictor variables. The occupancy assessments that were conducted at fairly large scales to identify occupied and unoccupied sites (Altman 1999, ODFW 2008, 2009, Rogers 1999, MacLaren 2000) could be used for this effort. A variety of variables could potentially be used to explain lark occupancy pattern including elevation, slope, soils, and large scale land use/land cover information (especially agriculture for the Willamette Valley), field size (Willamette Valley), proportion of contiguous farm land, and distance to nearest occupied site. If the probability of occupancy is related to the distance from known occupied sites, and we suspect that it is, this variable alone could be helpful in identifying and focusing areas for survey.

Recent analyses by the Center for Natural Lands Management in cooperation with CoreGIS, indicates that remotely derived variables can be used to identify potential lark habitat (Anderson 2013). They found that Normalized Difference Vegetation Index (NDVI) rasters, which measure photosynthetic activity or greenness in each square meter pixel, was useful in classifying a variety of plant cover types. In particular, it was useful in identifying bare ground, grass/forb, and horsetail/grass cover. Again, because of the ephemeral nature of lark habitat, it may be necessary to periodically "refresh" these probability of occurrence maps. The specifics of the analytical approach and the variables to include would be worked out as part of this recommended mapping effort.

Once a probability of occurrence map is developed, it could be used to develop a spatially appropriate sampling strategy suitable for each region. Particularly, it would help us determine where to focus occupancy and abundance sampling efforts using the protocols developed in this document. For the agricultural landscape of the Willamette Valley, it may be important to integrate both occupancy and abundance/trend protocols simultaneously.

Developing protocols for assessing site occupancy and abundance

The probability of occurrence map tells us where to focus our survey effort. Here we focus on developing protocols that will define how and when we should conduct surveys. We define the appropriate temporal window using information on breeding phenology, and we selected analytical and survey methods that are likely to maximize lark detection by addressing the issues that influence detectability.

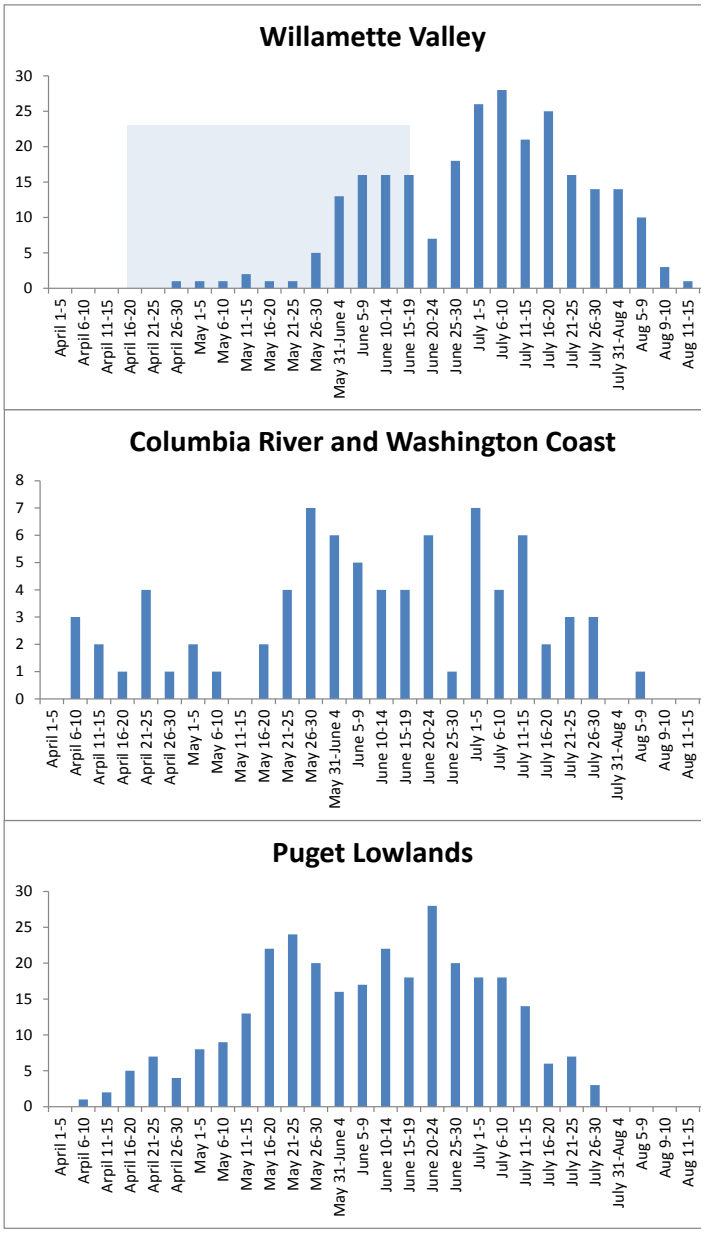

Figure 2. *Clutch initiation by geographic region. Clutch initiation dates include all nests that could be dated in the Puget lowlands, Washington coast, and lower Columbia River. For the Willamette Valley, only information from successful nests was available and most early nests failed (R. Moore pers. com.). As a result, very few of the early nests are included in this graph and the first clutch initiation dates appear later in the year than when they actually occur. We shade this area of uncertainty in that panel. Randy Moore indicates that most first nests are initiated by May 15 in the Valley.*

Using breeding phenology to define the nesting period survey window

Our goal is to develop nesting period survey protocol and consequently, we don't provide information on survey protocols for other times of the year. The "population" of birds that nest in the Puget Sound region is primarily migratory (Pearson et al. 2005) with birds from this region moving to the Columbia River, Washington coast, or the Willamette Valley during the late fall and winter months where they are found in large mixed species and mixed lark subspecies flocks (Pearson et al. 2005). Larks throughout the rest of the range may be partially migratory or non-migratory (Pearson et al. 2005). For the migratory portion of the population, birds leave their over-wintering grounds and arrive on nesting sites in mid- to late-February (Pearson and Hopey 2004, Wolf and Anderson 2014). Conversely, they leave the breeding sites in mid- to late-October (Wolf and Anderson 2014). In the spring, males arrive on the breeding grounds first followed by females several weeks later (Pearson and Hopey 2004). Singing and flight displays occur shortly after females arrive on nesting sites (Pearson and Hopey 2004) with periodic singing occurring prior to female arrival.

Most approaches for assessing either site occupancy or regional abundance and trend require/assume site closure or no movement of individuals among sites during the survey window. In our experience and throughout the range, there is considerable movement of birds among sites in the early spring prior to clutch initiation

(March to mid-April) as birds are settling into their breeding sites. Therefore, we use clutch initiation dates, a time period when larks are more settled and committed to a specific site, to establish appropriate survey windows for assessing both site occupancy and lark abundance (Figure 2).

Based on clutch initiation information, we recommend that the survey window begin no earlier than late April in all regions. By mid-July, the frequency of male singing declines as fewer nests are being initiated and fewer mates/territories are being defended. In addition, the number of young-of-the-year on these sites increases dramatically after mid-June. This can influence adult population detection because males are feeding young and not displaying (singing and flight displays) or can result in false assignment of young-of-the-year to adults if birds are only detected by call or flight. In other words, there would be an apparent change in the abundance not resulting from a change in the adult population.

For adult abundance estimates it is desirable to narrow the survey window to minimize the opportunity for potential movement among sites and reduce the number of young birds detected. To accomplish this, we recommend abundance surveys occur between 1 May and the end of June. For occupancy surveys we recommend a survey window from mid-April to mid-July because occupancy status on a given site can potentially change throughout the nesting period (e.g., a bird moves between sites because of vegetative succession, nest failure or predator presence at a given site), and because we are not necessarily interested in assessing abundance with occupancy surveys.

Factors influencing detectability

Non-detection during a survey does not mean that a species was absent from a site unless the probability of detecting the species (detectability) was 100%. The fact that probability of detecting a species is almost never 100% leads to a fundamental problem -- the measure of occupancy is confounded with the detectability of the species. Specifically, an observed "absence" occurs if either the species was present at the site but not detected, or the species was truly absent. The same is true when attempting to estimate density or abundance. Because only a portion of the population is detected during a given visit to a site, it is important to survey in a manner that will maximize the probability of detection and to address issues of detectability in the selected analytical methods.

One's ability to detect a lark, given that it is present, can be influenced by a variety of environmental and non-environmental factors. As a result, apparent changes in abundance or site occupancy status over time can be influenced by these factors rather than true changes in abundance or occupancy. For example, if an experienced crew is used in the first year and another, less experienced crew, in the second year, differences in apparent abundance between years could be attributed to differences in the abilities of the two field crews. Alternatively, inter-annual changes in ratio of males to females could have significant impacts on estimates of abundance because male larks draw attention to themselves with territorial displays while females are relatively quiet and cryptic, leading to significant differences in detectability between sexes (See Keren and Pearson 2015). To address these issues, we developed consistent protocols for surveys to minimize factors

that can be controlled and address issues of detectability in the analytical method used to assess changes in abundance or occupancy over time (Keren and Pearson 2015).

Table 1. Factors influencing detection.

Observer
• Skill level (especially with grassland birds) • Eyesight and hearing abilities
Environmental conditions
• Density of vegetation • External noise such as airplanes at airports or road noise
Weather conditions
• Wind • Rain
Bird behavior
• Singing Visual detection vs. aural detections (song or call). In larks, only the males sing • Actively displaying (males) vs slinking quietly through the habitat (females) or other behaviors that influence whether or not a bird is detected by sight or sound. • Singing rates that are influenced by local population density or whether or not a male is paired. • Singing rates and other behaviors that change with time of day and/or as the nesting period progresses.

Identifying the factors that influence lark detectability from survey data

In 2014, we initiated a pilot study on two islands of the Columbia River that used distance sampling techniques (Buckland et al. 2001) to help us better understand, in part, the relationship between detectability and distance from an observer (for full description of pilot see Anderson and Slater 2015). In Figure 3 below, we plot the number of birds detected as a function of distance from the observer and whether or not the detected bird was a male or female, and whether it was initially detected by song/call (aural detection) or visually. Females were almost exclusively detected visually (27 out of 29 detections) and, in general, nearly all birds detected visually, regardless of sex, were detected within 75m. We also conducted a similar analysis with data from Oregon Department of Fish and Wildlife's Willamette Valley grassland surveys conducted in 2008 (ODFW 2008). This survey used road-side point counts and did not include information on sex and detection type (visual vs. aural) and, as a result this information does not appear for the Willamette Valley panel in Figure 3. There were 94 point count stations with two visits each where larks were detected on at least one of those visits.

For the Columbia River distance surveys, male and female detection probabilities were similar for visual detections. Overall, the detection probability for males was higher than for females likely due to many males being detected both by sight and sound while females were essentially only detected visually (93% of female detections). Notice that detection distances for males and females detected visually is relatively small when compared to males detected aurally in Figure 3. Even for visual detections, males spend more time in open habitat and on higher topographic positions or

perches making them more visible to observers and, unlike females, they perform flight displays while singing also making them relatively easy to detect.

Our preliminary analyses of repeated abundance surveys using the protocol in Appendix 2 from the Puget Sound region and from the lower Columbia River/Washington Coast region between 2010 and 2014 support the results from the pilot distance sampling effort on the Columbia River. We found that male detection was higher than that for females in both regions (46-53% vs. 26-28%), which was likely driven by the detection factors discussed above. In fact, based on this survey effort (n = 25 sites, 2010-2014), we detected 1,536 males during repeated visits to these sites (not necessarily unique individuals but they are unique detections) and 49% were detected by song/call. During the same effort, we detected 542 females and only 4% were detected by call indicating a significant difference in the method of detection which ultimately influences detectability. In addition, we found that wind reduced detection probability for males in the Puget Sound region indicating the importance of not conducting surveys under higher wind conditions.

Because virtually all visual detections occurred within 75m (see Figure 3) and detection probability goes up when truncated at 75m when compared to longer distances, we recommend that surveys designed to assess site occupancy should be conducted in a manner so that all suitable lark habitat at a given site within 75 m of an observer is covered. See occupancy protocol in Appendix 1.

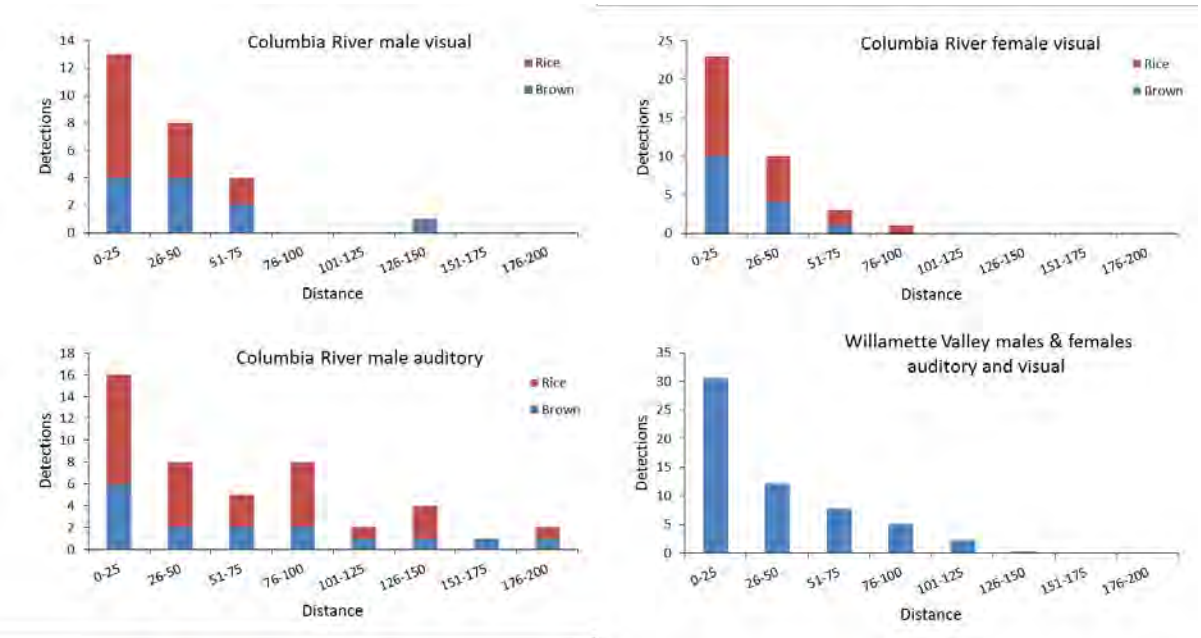

Figure 3. *Number of lark detections by distance (in 25m bins) of male and female streaked horned larks on the lower Columbia River using line transects (perpendicular distances from the transect) and in the Willamette Valley using road-side point counts (radial distances from the observer). Note that the radial distances from the Willamette Valley were standardized by area within distance bins to make them comparable to the other graphs. Columbia River surveys occurred on Rice and Brown islands.*

Accounting for detectability when assessing site occupancy status

Even when surveying within 75m, one's ability to detect a lark that is present is less than 100% with a single visit. As a result, repeated visits to a site are needed to increase the probability of correctly determining a given site's occupancy status. To examine the effect of repeated visits on our ability to assess a site's occupancy status, it is first necessary to calculate lark detection probabilities (p). We focus on male detection probabilities because sex ratios in passerines generally, and for the lark specifically, tend to be male-biased. As a result, it is possible for a site to be occupied by a single male but extremely unlikely for a site to be occupied by a single female during the nesting period without her also having a mate. For this assessment, we assume that the site is walked slowly by an observer so that no suitable habitat is observed from a distance greater than 75m. We also focus on visual detections only because we could imagine a site being occupied by a single non-singing male (at least during one or two hour survey window).

Using the program Distance derived detection from the Columbia River survey effort in 2014, the detection probability for males detected visually within 67 m was 63-64% (area under the curve). This detection probability only pertains to the two islands and the single year included in this study (see Anderson and Slater 2015). Because this effort was limited in temporal and spatial scope, we also examined visual male detection probability using repeated visits from the broader scale and site survey effort in the Puget lowlands, Washington coast and Columbia River (2010-2014). For this survey, we used an N-mixture analysis approach and found male detection probability to be around 46-53% which is lower than what we found from our independent Distance analysis (Keren and Pearson 2015). This difference may be the result of sampling relatively open sites in the two-site lower Columbia effort where it is easier to detect birds visually and where there were a reasonable number of birds. In contrast, the broader assessment included sites with one or two lark pairs to sites with many pairs and included a wide variety of habitats - from dredged material islands with different habitat characteristics, airports, and native prairies - that influence lark detectability. Also in our broader assessment, we found that detection probability was lower in the Puget lowlands when compared to the relatively open habitat of the Columbia River dredge material islands, which is expected. The take home message here is <u>not</u> that one method of determining detection probability is necessarily better, but that it is important to consider that detection probability is influenced by the local lark population size and by local environmental conditions that influence our ability to see and hear larks. In addition, detection probability is influenced by the field methods used (timing, weather restrictions, skill of the observers, etc.). The detection probabilities calculated in this document were derived by relatively skilled observers following the protocols in the appendices of this document. This final influence is a critical assumption when applying these probabilities.

In Figure 4 we plot the relationship between detection probability and number of site visits using the detection probability from both the Columbia River (2014) effort and the broader Puget lowland and Columbia River surveys (2010-2014). Using the lower detection rate from the broader survey (Figure 4, right graph), there is an 84% probability of assessing site occupancy with three visits, a 91% probability with four visits, and a 95% probability with five visits. This all assumes that surveys are conducted following the protocol in Appendix 1. Again, the probability of correctly

assessing site occupancy would increase fairly dramatically with an increase in the number of larks actually present at the site. If we use the results from the Columbia River Distance Sampling, there is an 86% probability of assessing site occupancy with three visits, a 93% probability with four visits, and a 96% probability with five visits.

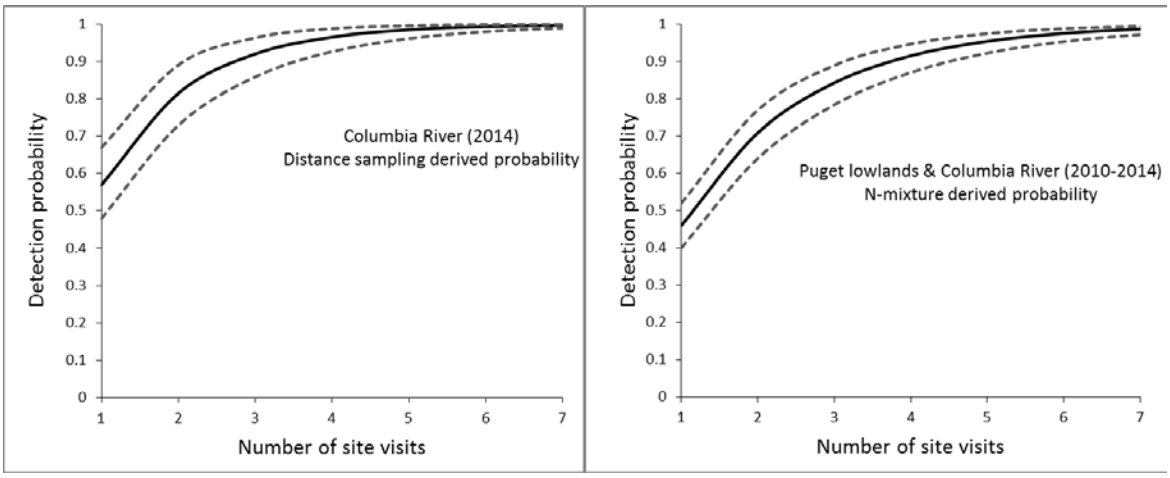

Figure 4. *Assuming a site is occupied, this is the relationship between detection probability and the number of visits to a site using either the detection probability derived from the program Distance using samples from two Columbia River sites in 2014 (left) or that derived using repeated site surveys from may sites in the Puget lowlands, lower Columbia River and Washington coast between 2010 and 2014 (right).*

Assessing site occupancy from road-side counts

Looking at the repeated road-side point counts from a single season (2008) in the Willamette Valley that were conducted by Oregon Department of Fish and Wildlife (ODFW 2008), there is a 62% (SE = 3.6%) probability of detecting larks at a given point count station (n = 93) if they are present at the site. There may be a very different probability of detection within the center of the site that is not surveyed by the road-side point count. We suspect this may be true because larks are often but not always concentrated around field edges that have open habitat. As a consequence, we do not recommend road-side surveys to assess site occupancy status, especially for large sites that may have high quality habitat in the interior. This does not preclude the use of road-side surveys for assessing population trends (see below).

Occupancy & Abundance/trend Protocols

We use the information above on breeding phenology, factors that influence detectability and probability of detection to develop both site occupancy and population abundance and trend protocols. For site occupancy, our goal is to develop a protocol that, when repeated, provides the desired probability of correctly assigning site occupancy status. For abundance and trend, our goal is to provide reasonably precise estimates of abundance and trend using protocol that is readily used by multiple partners.

Site occupancy

Assessing site occupancy status can be critical for determining the distribution of a species or for assessing change in site occupancy over time within suitable habitat (see Anderson and Pearson 2015). Alternatively, within appropriate habitat and for regulatory purposes, one may be required to determine if a site is occupied by breeding streaked horned larks prior to conducting activities that could impact suitable habitat or the species. To assess site occupancy status, we recommend following the protocol in Appendix 1 and check with the US Fish and Wildlife Service to determine the number of surveys that will be needed to be conducted. The objective of this protocol is to have a high probability of detecting the presence of larks at a given site during the breeding period.

Assessing abundance and trends at relatively permanent sites with access

We currently have a reasonably accurate assessment of where streaked horned larks breed in Washington and on the lower Columbia River in Oregon and Washington. This is not to say that all potentially occupied sites have been surveyed and that we fully understand the locations of all breeding birds.

For these occupied sites in the Puget lowlands, lower Columbia River, and for "permanently" occupied sites in the Willamette valley (e.g., Basket Slough and Finley National Wildlife Refuges and the airports) with site access, we recommend assessing abundance and trends using repeated visits to strip transects (150m apart) that cover all of the suitable nesting habitat as defined in Anderson and Pearson (2015). We also considered using line transect or Distance Sampling techniques but are currently not recommending this approach because such surveys require accurate estimates of distance (which is notoriously difficult to achieve, especially with high frequency song) and regular assessment of observers' abilities to accurately estimate distances. With several different agencies and organizations involved in these surveys, we felt that obtaining accurate estimates of distance would be very difficult with adequate quality control.

Instead, we recommend addressing issues of detectability within and among seasons by using repeated visits within season (n = 3 minimum) and an N-mixture modelling approach that incorporates detectability into the model (Dorazio and Royle 2005). We recommend conducting surveys annually for the first five years and then move into surveys every two to three years unless more frequent surveys are needed for management. For detailed protocol see Appendix 2 and for a preliminary description of our analytical approach and results between 2010 and 2014, please refer to Keren and Pearson (2015). In much of Washington and along the lower Columbia River of Oregon and Washington, it may be feasible and desirable to survey the entire suitable habitat at regular intervals. Intervals can range from 1 to five years or more depending on the need for such information.

Assessing abundance and trends in the agricultural landscape of the Willamette Valley

In this document, we don't develop protocol or survey strategies for landscapes dominated by private agriculture. Because so much of the Willamette Valley will likely have moderate to high probability of occurrence (but likely low abundance), using the methods described above will not be tenable in this core part of the subspecies' breeding range. Adding to the difficulty is the fact

that the valley is dominated by private agricultural land where access for surveying is impossible or difficult. Here we present a couple of survey strategies to consider. For all of these strategies, we would again recommend starting with a probability of occurrence map as described above that could help stratify the effort and make sampling much more efficient.

A potential sampling approach would be to take advantage of an ongoing survey effort that uses volunteers to gather data. The Breeding Bird Survey (BBS) is a cooperative effort between the U.S. Geological Survey's Patuxent Wildlife Research Center and Environment Canada's Canadian Wildlife Service to monitor the status and trends of North American bird populations. Following a rigorous protocol, BBS data are collected by thousands of volunteers who survey thousands of randomly established roadside routes throughout North America. The sample unit for the BBS is a roadside survey route, and each route is surveyed by a single volunteer observer one time each year during a morning in late-spring/early summer (May-June). Each route is composed of 50 stops, at which a 3 min point count is conducted and all birds heard or seen within ~400 m of the point are counted. BBS analysis approach has been subject to a thorough statistical review (e.g., Link and Sauer 2002, 2007, Sauer et al. 2008, Sauer et al. 2011) and consists of very long-term datasets (≥ 45 years locally) that are well documented. Potential issues to consider if using this sampling approach are statistical power to assess trends (number of routes), representativeness of routes, and the relationship between routes and suitable habitat. If these concerns are addressed, this approach will likely be a good approach for assessing population trends.

Moore (2008c) intentionally developed a survey protocol based on the BBS effort but that addresses these potential issues. Under his strategy, the sampling frame is populated with primary sampling blocks (e.g., 1 minute latitude by 1 minute longitude), and then sampling blocks are randomly selected for sampling during a given survey year. Within the selected blocks, all accessible roadways and all suitable breeding habitat along the roadways are identified. Point count stations are systematically placed along road edges with suitable habitat. Moore (2008c) also describes an approach for estimating the amount of suitable nesting habitat in the sampling blocks and ultimately extrapolating the abundance estimates derived from the point count stations to the total habitat available. Density estimates accounting for detectability can be derived using information on time-of-detection and either a closed population removal analytical framework (Farnsworth et al. 2002) or closed population capture-recapture framework (Alldredge et al. 2007), both of which have been adapted to generate estimates of detection probabilities and density from point count data (Moore 2008c). Although a bit complicated analytically, the additional information needed for these approaches while in the field is relatively easy to acquire.

Another citizen science sampling approach that holds some promise is the use of eBird to assess population distribution and trends. eBird documents the presence or absence of species, as well as bird abundance through checklist data that are entered on-line by the birding community. eBird data have been used to model species probabilities of occurrence across space and time. Spatio-Temporal Exploratory Models (STEM) have been developed using eBird data (Finke et al. 2010). These models relate environmental predictors to observed occurrences that allow researchers to make occurrence predictions at unsampled areas. Recent modelling efforts suggest that eBird data

can be used to model relative abundance and ultimately population trend (Johnston et al. 2015). Given the current sparsity of focused eBird data in the regions of the Valley where larks are most abundant, it would likely require a focused lark or agriculture-specific monitoring effort for eBird data to be suitable for estimating lark trend or abundance. However, eBird already provides meaningful information on new localities to check for breeding larks throughout the range based on birders reported sightings.

Regardless of the approach selected, all of these methods may suffer from the same problem in the private agricultural landscape where access is confined to public roads – the potential bias associated with roadside surveys. If larks are more abundant along road edges in an agricultural landscape, then attributing densities resulting from roadside surveys to the interior of an agricultural field is problematic. However, as long as this bias is systematic (e.g., lark density is almost always greater along roads) and it is understood, then these methods would be adequate for estimating population size. To determine if this potential bias exists and to develop a method for addressing it we recommend research project focusing on this relationship. However, this is not necessarily a problem if we are only interested in trend estimates and not population size.

Again, additional effort is needed before selecting a monitoring strategy. Regardless of the strategy selected, it would be ideal to integrate abundance estimates and trends derived from regions where public access is possible with regions where public access is not possible.

In the appendices that follow, we provide occupancy and abundance/trend protocol and a sample data sheet.

Acknowledgements
We thank all of the field biologists in Oregon and Washington that contributed to the various field efforts that informed this protocol development. We thank Bob Altman, Michelle Tirhi, Eric Holman, and Martha Jensen for helpful comments on an earlier version of this document. A special thanks to Martha Jensen, Cat Brown, and Kim Flotlin for supporting this work. This work was funded by US Fish and Wildlife Contract F13AF01196

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Appendix 1: Streaked Horned Lark Site Occupancy Protocol

Introduction: This is not a regulatory document or intended to function as a regulatory document. If landowners are assessing site occupancy status per requirements under the Endangered Species Act, it is critical to work with US Fish and Wildlife Service on how to apply this or other protocols. The effectiveness of this protocol in assessing site occupancy is contingent upon surveyors meeting the outlined qualifications of this document and following the methods outlined below.

Goal: Assess with high confidence a site's occupancy status by streaked horned larks during a given nesting season in suitable habitat. The number of surveys needed to have high confidence in a site's occupancy status for a given year depends on one's comfort level (see Figure 4 above). For determining lark distribution at a state-wide level, three visits may be adequate. However, for regulatory purposes, it is up to the regulating agency to work with the land owner/manager to select the number of site visits needed to meet the detection probability that they believe will minimize risks to a listed species. It is important to keep in mind that occupancy status can change between years and that the purpose of this document is to assess site occupancy status within a given nesting season.

Survey window: Mid-April to mid-July

Method: Survey the entire portion of the site dominated by grasses and forbs (suitable habitat) using strip transects (150 m wide – 75 m to each side of the observer). For information on suitable habitat for breeding larks, please see Anderson and Pearson 2015. Place parallel transects across suitable portions of the site starting 75m from the edge and then every 150m from each other (please see above for justification for this distance). The placement of transects can be accomplished in an ArcGIS environment to identify potential habitat. Once the transects have been identified and mapped, they can be loaded onto a hand-held gps unit. Observers should walk at a slow pace and stop periodically to listen for singing or calling birds.

Number of surveys and survey window: The number of surveys required for a given site will need to be determined by consulting with US Fish and Wildlife Service for regulatory purposes. For our efforts to determine the distribution and abundance of this species, we recommend a minimum of 3 surveys per site within a nesting season (one in late April, a second in mid-June and a final survey in early to mid-July). Please see above for explanation for our information on why we selected the survey window that we did and for information on the relationship between the number of visits and correctly determining a site's occupancy status.

Surveyors: Should be experienced with grassland bird surveys, very competent using binoculars and spotting scopes, should be able to identify all of the grassland associated birds in western Washington and Oregon by sight and sound, and have excellent hearing and eyesight (corrected). Should also be able to distinguish young of the year larks from adults and distinguish the different subspecies of horned larks from each other. Consider testing/training of observers – a training approach needs to be developed.

Time of day: Start surveys within one half hour of sunrise and should be completed by 11:00 am. Surveys can be started before sunrise. Start and finish earlier on days where the temperature will be > 80° F.

Environmental conditions: If conditions such as wind, rain or external noises are affecting your ability to detect larks, then you should reconsider conducting the survey at that time. Some general guidelines:

- Wind: < 15 mph (a couple of brief gusts in excess of 15 are ok)
- Rain: Little to no precipitation (light drizzle and brief showers are fine)
- External noises: does the noise impair your ability to detect larks consistently? (periodic airplane noise where the survey can be halted during the noise and resumed after is not an issue)

Data to be recorded (please see data sheet, Appendix 3):

- General
    - Site name (please be consistent)
    - Date: DD-Mon-YYYY (e.g., 26 Feb 2010)
    - Observers (full name)
    - Length of all transects (in meters) added together for the site. Note: there is no need to number transects or to record transect number.
    - Start and end time (24 hour clock)
- Environmental
    - Average wind speed for the survey (in mph, e.g., 5mph – not 5.3mph)
    - Average temperature for the survey (in Fahrenheit, e.g., 65°F not 65.2°F)
- Bird detection information
    - Species (e.g., SHLA)
    - Age (YOY = young of the year, A = adult, U = unknown)
    - Sex (M = male, F= female, U = unknown)
    - Behavior at the second detected (this is what allowed you to detect the bird)
        - AUD = detected by song or call, VIS = detected by observing with your eyes
            - If AUDIO - when first detected, indicate if it was detected by Song = S, call = C
    - Other behavior (this information is not essential but helps us determine if the site is being used for breeding).
        - Singing = S
        - Flight display = FD
        - Male-female observed together = MF
        - Copulating = CO
        - Carrying nest material = NM
        - Carrying food = FC

        - Nest observed = N (record location with gps and take all precautions to avoid luring predators to the nest. Please do not touch the nest or approach closer than a couple of meters. Note nest contents.
- Behavior codes: These codes provide various forms of evidence of local breeding from the presence of territorial males (weakest evidence) to evidence of local production of young (strongest evidence). These are currently intended to be used qualitatively.
- Maps
    - WDFW/ODFW and USFWS would like to receive orthographic maps of your survey that includes your survey transects, the locations of all birds detected (initial locations), and nest locations.

Appendix 2: Streaked Horned Lark Abundance and Trend Protocol

Goal: Assess regional changes in the breeding season abundance of adult streaked horned larks at sites consistently used by nesting streaked horned larks and where site access is possible and reliable (all Washington sites, lower Columbia River sites and sites like the Corvallis Airport, and the valley National Wildlife Refuges – Finley, Basket Slough). The effectiveness of this protocol is contingent upon surveyors meeting the outlined qualifications of this document and following the methods outlined below.

Survey window: May and June

Method: Survey the entire portion of the site dominated by grasses and forbs (suitable habitat) using strip transects (150 m wide – 75 m to each side of the observer). For information on suitable habitat for breeding larks, please see Anderson and Pearson 2015. Place parallel transects across suitable portions of the site starting 75m from the edge and then every 150m from each other (please see above for justification for this distance). The placement of transects can be accomplished in an ArcGIS environment to identify potential habitat. Once the transects have been identified, they can be loaded onto a hand-held gps unit. Observers should walk at a slow pace and stop periodically to listen for singing or calling birds.

Number of surveys and survey window: A minimum of 2 surveys per site within a given nesting season but preferably 3 surveys evenly between early May and late June. Please see above for explanation for the number of visits and for the survey window.

Surveyors: Should be experienced with grassland bird surveys, very competent using binoculars and spotting scopes, should be able to identify all of the grassland associated birds in western Washington and Oregon by sight and sound, and have excellent hearing and eyesight (corrected). Should also be able to distinguish young of the year larks from adults and distinguish the different subspecies of horned larks from each other. Consider testing/training of observers – a training approach needs to be developed.

Time of day: Ideally, start surveys within a half hour of sunrise and complete surveys by 11:00 am. Surveys can be started before sunrise. We recognize that surveying the Columbia River islands is a challenge and we therefore recommend relaxing these timing restrictions for those surveys to allow for time to transit to and between islands. Start and finish earlier on days where the temperature will be > 80° F.

Environmental conditions: If conditions such as wind, rain or external noises are affecting your ability to detect larks, then you should reconsider conducting the survey at that time. Some general guidelines:

- Wind: < 15 mph (a couple of brief gusts in excess of 15 are ok)
- Rain: Little to no precipitation (light drizzle and brief showers are fine)

- External noises: does the noise impair your ability to detect larks consistently? (periodic airplane noise where the survey can be halted during the noise and resumed after is not an issue)

Data to be recorded (please see data sheet, Appendix 3):

- General
    - Site name (please be consistent)
    - Date: DD-Mon-YYYY (e.g., 26 Feb 2010)
    - Observers (full name)
    - Length of all transects (in meters) added together for the site (do not change the location or length of transect covered between visits within a season!!!). Note: there is no need to number transects or to record transect number.
    - Start and end time (24hour clock)
- Environmental
    - Average wind speed for the survey (in mph, e.g., 5mph – not 5.3mph)
    - Average temperature for the survey (in Fahrenheit, e.g., 65°F not 65.2°F)
- Bird detection information
    - Species (e.g., SHLA)
    - Age (YOY = young of the year, A = adult, U = unknown)
    - Sex (M = male, F= female, U = unknown)
    - Behavior at the second detected (this is what allowed you to detect the bird)
        - AUD = detected by song or call, VIS = detected by observing with your eyes
            - If AUDIO - when first detected, indicate if it was detected by Song = S, call = C
    - Other behavior (this information is not essential but helps us determine if the site is being used for breeding).
        - Singing = S
        - Flight display = FD
        - Male-female observed together = MF
        - Copulating = CO
        - Carrying nest material = NM
        - Carrying food = FC
        - Nest observed = N (record location with gps and take all precautions to avoid luring predators to the nest. Please do not touch the nest or approach closer than a couple of meters. Note nest contents.
- Behavior codes: These codes provide various forms of evidence of local breeding from the presence of territorial males (weakest evidence) to evidence of local production of young (strongest evidence). These are currently intended to be used qualitatively.
- Maps
    - WDFW/ODFW (depending on the State) and USFWS would receive orthographic maps of your survey that includes your survey transects, the locations of all birds detected (initial locations), and nest locations.

Streaked Horned Lark Bird Detection Form (20 March 2015)

Site:_____ Date (DD-Mon-YYYY):_____OBSERVER: _____

Start time (24 hr):_____ End time (24hr):_____ OBSERVER (2): _____

Ave. temp (°F):_____ Ave. wind (mph):_____

Predators/competitors (tally number)	
WEME	
AMCR	
CORA	
CORVID	
NOHA	
KILL	
VESP	
AMKE	
Other	

Data Codes

Age: A = Adult, YOY = young of the year, U = unknown

Sex: M = Male, F = Female, U = unknown

Initial Detection (choose only one):

If audio: If initial detection was audio pick **S**ong or **C**all

Other Behavior (circle all that apply): S= Song, FD = flight display, MF = male within few meters of female, CO = copulation, NM = nest material, FC = food carry

Bird#	**Time**	**Age**	**Sex**	**Initial Detctn**	**If AUDIO Pick 1**		**Other Behavior Circle all that apply**						**Notes - If banded record color.**
1				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
2				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
3				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
4				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
5				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
6				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
7				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
8				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
9				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
10				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
11				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
12				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
13				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
14				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
15				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
16				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	

*Record color for left leg first, right leg second; record color top to bottom for each leg.

Bold is color code: **A**qua, **B**lue, **G**reen, Blac**K**, Brow**N**, **L**ime, **O**range, **P**ink, **R**ed, **S**ilver, **V**iolet, **W**hite, **Y**ellow

Appendix 1: Streaked Horned Lark Site Occupancy Protocol

Introduction: This is not a regulatory document or intended to function as a regulatory document. If landowners are assessing site occupancy status per requirements under the Endangered Species Act, it is critical to work with US Fish and Wildlife Service on how to apply this or other protocols. The effectiveness of this protocol in assessing site occupancy is contingent upon surveyors meeting the outlined qualifications of this document and following the methods outlined below.

Goal: Assess with high probability a site's occupancy status by streaked horned larks during a given nesting season in suitable habitat. The number of surveys needed to have high confidence in a site's occupancy status for a given year depends on one's comfort level with uncertainty (see Figure 4 above). For some, an 80% probability might be acceptable and for others an 98% probability is acceptable. For determining lark distribution at a large spatial scale (e.g., state-wide level), three visits may be adequate. However, for regulatory purposes, it is up to the regulating agency to work with the landowner/manager to select the number of site visits needed to meet the detection probability that they believe will minimize risks to a listed species. It is important to keep in mind that occupancy status can change between years and that the purpose of this document is to assess site occupancy status within a given nesting season.

Survey window: Mid-April to mid-July

Method: Survey the entire portion of the site dominated by grasses and forbs (suitable habitat) using strip transects (150 m wide – 75 m to each side of the observer). For information on suitable habitat for breeding larks, please see Anderson and Pearson (2015). Place parallel transects across suitable portions of the site starting 75m from the edge and then every 150m from each other (please see above for justification for this distance). The placement of transects can be accomplished in an ArcGIS environment to both identify potential habitat and to populate a site with transects. Once the transects have been identified and mapped, they can be loaded onto a hand-held gps unit. Observers should walk at a slow pace and stop periodically (approximately every 50 m) to listen for singing or calling birds.

Number of surveys and survey window: The number of surveys required for a given site will need to be determined by consulting with US Fish and Wildlife Service for regulatory purposes. For our efforts to determine the distribution and abundance of this species, we recommend a minimum of 3 surveys per site within a nesting season (one in late April, a second in mid-June and a final survey in early to mid-July). Please see above for our justification for the selected survey window and for information on the relationship between the number of visits and the probability of correctly determining a site's occupancy status.

Surveyors: Should be experienced with grassland bird surveys, very competent using binoculars and spotting scopes, should be able to identify all of the grassland associated birds in western Washington and Oregon by sight and sound, and must have excellent hearing and eyesight

(corrected). We recommend field testing all potential observers for their ability to hear both lark calls and songs at distances > 50 m, and if they cannot and their hearing cannot be corrected with hearing aids, they should not conduct surveys. Surveyors must also be able to distinguish young of the year larks from adults and distinguish the different subspecies of horned larks from each other. It is very easy to confuse lark calls with those given by American Pipits and with swallows – it is critical that observers be able to reliably distinguish these species. Highly recommend testing and training all field observers – a training approach needs to be developed.

Time of day: Start surveys within one half hour of sunrise and should ideally be completed by 11:00 am. Surveys can be started before sunrise. Start and finish earlier on days where the temperature will be > 80° F.

Environmental conditions: If conditions such as wind, rain or external noises are affecting your ability to detect larks, then you should reconsider conducting the survey at that time. Some general guidelines:

- Wind: < 15 mph (a couple of brief gusts in excess of 15 are ok)
- Rain: Little to no precipitation (light drizzle and brief showers are fine)
- External noises: does the noise impair your ability to detect larks consistently? (periodic airplane noise where the survey can be halted during the noise and resumed after is not an issue)

Data to be recorded (please see data sheet, Appendix 3):

- General
    - Site name (please be consistent)
    - Date: DD-Mon-YYYY (e.g., 26 Feb 2010)
    - Observers (full name)
    - Length of all transects (in meters) added together for the site. Note: there is no need to number transects or to record transect number.
    - Start and end time (24 hour clock)
- Environmental
    - Average wind speed for the survey (in mph, e.g., 5mph – not 5.3mph)
    - Average temperature for the survey (in Fahrenheit, e.g., 65°F not 65.2°F)
- Bird detection information (only birds detected while on survey are recorded)
    - Species (e.g., SHLA)
    - Age (YOY = young of the year, A = adult, U = unknown)
    - Sex (M = male, F= female, U = unknown)
    - Behavior at the moment it was detected (this is what allowed you to detect the bird – you either saw it first or you heard it first)
        - AUD = detected by song or call, VIS = detected by observing with your eyes

        - If AUDIO - when first detected, indicate if it was detected by Song = S, call = C
    - Other behavior (this information is not essential but helps us determine if the site is being used for breeding).
        - Singing = S
        - Flight display = FD
        - Male-female observed together = MF
        - Copulating = CO
        - Carrying nest material = NM
        - Carrying food = FC
        - Nest observed = N (record location with gps and take all precautions to avoid luring predators to the nest. Please do not touch the nest or approach closer than a couple of meters. Note nest contents.
- Behavior codes: These codes provide various forms of evidence of local breeding from the presence of territorial males (weakest evidence) to evidence of local production of young (strongest evidence). These are currently intended to be used qualitatively.
- Maps
    - WDFW/ODFW and USFWS would like to receive orthographic maps of your survey that includes your survey transects, the locations of all birds detected (initial locations), and nest locations.

Appendix 2: Streaked Horned Lark Abundance and Trend Protocol

Goal: Assess regional changes in the breeding season abundance of adult streaked horned larks at sites occupied by nesting streaked horned larks and where site access is possible and reliable (all Washington sites, lower Columbia River sites and sites like the Corvallis Airport, and the valley National Wildlife Refuges – Finley, Basket Slough). The effectiveness of this protocol is contingent upon surveyors meeting the outlined qualifications of this document and following the methods outlined below.

Survey window: May and June

Method: Survey the entire portion of the site dominated by grasses and forbs (suitable habitat) using strip transects (150 m wide – 75 m to each side of the observer). For information on suitable habitat for breeding larks, please see Anderson and Pearson (2015). Place parallel transects across suitable portions of the site starting 75m from the edge and then every 150m from each other (please see above for justification for this distance). The placement of transects can be accomplished in an ArcGIS environment to both identify potential habitat and to populate a site with transects. Once the transects have been identified and mapped, they can be loaded onto a hand-held gps unit. Observers should walk at a slow pace and stop periodically (approximately every 50 m) to listen for singing or calling birds. Once transects are established, they should not be changed within a breeding season. The transect lengths must be provided to WDFW, ODFW and USFWS at the end of the field season.

Number of surveys and survey window: A minimum of 2 surveys per site within a given nesting season but preferably 3 surveys evenly between early May and late June. Please see above for explanation for the number of visits and for the survey window.

Surveyors: Should be experienced with grassland bird surveys, very competent using binoculars and spotting scopes, should be able to identify all the grassland associated birds in western Washington and Oregon by sight and sound, and must have excellent hearing and eyesight (corrected). We recommend field testing all potential observers for their ability to hear both lark calls and songs at distances > 50 m, and if they cannot and their hearing cannot be corrected with hearing aids, they should not conduct surveys. Surveyors must also be able to distinguish young of the year larks from adults and distinguish the different subspecies of horned larks from each other. It is very easy to confuse lark calls with those given by American Pipits and with swallows – it is critical that observers be able to reliably distinguish these species. Highly recommend testing and training of all field observers – a training approach needs to be developed.

Communicating: When surveying a site with multiple surveyors it is important to coordinate so that all observers are starting the survey at the same time (the moment that the survey begins and you start recording bird observations), end of the survey at the same time (after which, no birds are recorded), and communicate with each other so that you move through a site in a coordinated fashion to avoid double counting or missing birds. When walking parallel to each

other across a site (the preferred approach), it is important that observers stay in a line and that they communicate with each other when recording birds via hand-held radios. As you move through a site, it is important to move quickly enough to reduce the probability of double counting (e.g., birds from behind the observer that were already counted that fly in front of the observer), and at the same time walk slowly enough to have high probability of encountering and detecting larks if they are present.

Here is an example of the type of communication via radios that is necessary to avoid double counting, "I just recorded a bird 20 m in front of me that flew to "your" transect" (only the person first detecting the bird records it) and make sure there is an acknowledgement of the communication ("ok, I see the bird and won't record it"). Another scenario - two observers are walking parallel to each other on adjacent transects and there is a male lark singing in the 100+ meters in the air close to the border between the two transects. In this scenario, it is essential that both observers communicate with each other to make sure both are aware of its location and decide who is going to record it (only one observer records a given bird during a survey). Again, acknowledgement of any message is essential when communicating by radio. Whenever there is a bird in flight, it is important that all observers remain aware of the bird's location even after recording the detection. A bird in flight can land in front of you or move to another transect where it can potentially be counted again by another observer. If a bird that you have already recorded lands 100 m in front of you, it is important to remain aware of the bird to avoid double counting it again when you get closer. It is easy to push the birds in front of you or to cause territorial interactions when you flush birds which can result in double counting if observers are not paying attention. Staying alert is essential to gathering quality data.

Time of day: Ideally, start surveys within a half hour of sunrise and complete surveys by 11:00 am. Surveys can be started before sunrise. We recognize that surveying the Columbia River islands is a challenge and we therefore recommend relaxing these timing restrictions for those surveys to allow for time to transit to and between islands. Start and finish earlier on days where the temperature will be > 80° F.

Environmental conditions: If conditions such as wind, rain or external noises are affecting your ability to detect larks, then you should reconsider conducting the survey at that time. Some general guidelines:

- Wind: < 15 mph (a couple of brief gusts in excess of 15 are ok)
- Rain: Little to no precipitation (light drizzle and brief showers are fine)
- External noises: does the noise impair your ability to detect larks consistently? (Periodic airplane noise where the survey can be halted during the noise and resumed after is not an issue)

Data to be recorded (please see data sheet, Appendix 3):

- General
    - Site name (please be consistent)

    - Date: DD-Mon-YYYY (e.g., 26 Feb 2010)
    - Observers (full name)
    - Length of all transects (in meters) added together for the site (do not change the location or length of transect covered between visits within a season!!!). Note: there is no need to number transects or to record transect number.
    - Start and end time (24hour clock)
- Environmental
    - Average wind speed for the survey (in mph, e.g., 5mph – not 5.3mph)
    - Average temperature for the survey (in Fahrenheit, e.g., 65°F not 65.2°F)
- Bird detection information
    - Species (e.g., SHLA)
    - Age (YOY = young of the year, A = adult, U = unknown)
    - Sex (M = male, F= female, U = unknown), this can be updated based on a better look or hearing the bird sing after the initial detection.
    - Behavior at the second detected (this is what allowed you to detect the bird)
        - AUD = detected by song or call, VIS = detected by observing with your eyes
            - If AUDIO - when first detected, indicate if it was detected by Song = S, call = C
    - Other behavior (this information is not essential but helps us determine if the site is being used for breeding).
        - Singing = S
        - Flight display = FD
        - Male-female observed together = MF
        - Copulating = CO
        - Carrying nest material = NM
        - Carrying food = FC
        - Nest observed = N (record location with gps and take all precautions to avoid luring predators to the nest. Please do not touch the nest or approach closer than a couple of meters. Note nest contents.
- Behavior codes: These codes provide various forms of evidence of local breeding from the presence of territorial males (weakest evidence) to evidence of local production of young (strongest evidence). These are currently intended to be used qualitatively.
- Maps
    - WDFW/ODFW (depending on the State) and USFWS would receive orthographic maps of your survey that includes your survey transects, the locations of all birds detected (initial locations), and nest locations.

Streaked Horned Lark Bird Detection Form (20 March 2015)

Site:_____ Date (DD-Mon-YYYY):_____OBSERVER: _____

Start time (24 hr):_____ End time (24hr):_____ OBSERVER (2): _____

Ave. temp (°F):_____ Ave. wind (mph):_____

Predators/competitors (tally number)	
WEME	
AMCR	
CORA	
CORVID	
NOHA	
KILL	
VESP	
AMKE	
Other	

Data Codes

Age: A = Adult, YOY = young of the year, U = unknown

Sex: M = Male, F = Female, U = unknown

Initial Detection (choose only one):

If audio: If initial detection was audio pick **S**ong or **C**all

Other Behavior (circle all that apply): S= Song, FD = flight display, MF = male within few meters of female, CO = copulation, NM = nest material, FC = food carry

Bird#	Time	Age	Sex	Initial Detctn	If AUDIO Pick 1		Other Behavior Circle all that apply						Notes - If banded record color.
1				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
2				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
3				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
4				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
5				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
6				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
7				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
8				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
9				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
10				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
11				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
12				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
13				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
14				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
15				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	
16				VIS / AUD	S	C	S	FD	MF	CO	NM	FC	

*Record color for left leg first, right leg second; record color top to bottom for each leg.

Bold is color code: **A**qua, **B**lue, **G**reen, Blac**K**, Brow**N**, **L**ime, **O**range, **P**ink, **R**ed, **S**ilver, **V**iolet, **W**hite, **Y**ellow