February

2019

Revised Draft

Environmental Assessment

Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance and Escape (SERE) Training, 336th Training Group

Tillamook, Oregon, and Forks, Washington

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FINDING OF NO SIGNIFICANT IMPACT

COASTAL, OPEN OCEAN, AND TROPICAL SURVIVAL, EVASION, RESISTANCE AND ESCAPE (SERE) TRAINING
336th Training Group, Tillamook, Oregon, and Forks, Washington

Pursuant to provisions of the National Environmental Policy Act (NEPA), Title 42 United States Code (U.S.C.) Sections 4321 to 4347, implemented by Council on Environmental Quality (CEQ) Regulations, Title 40, Code of Federal Regulations (CFR) §§1500-1508, and 32 CFR §989, Environmental Impact Analysis Process, the U.S. Air Force (USAF) assessed the potential environmental consequences associated with extending Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance and Escape (SERE) Training for an additional 5 years at Tillamook, Oregon and Forks, Washington.

The purpose of this Proposed Action is to conduct coastal, open ocean, and tropical training in appropriate natural terrain areas that represent real-world conditions that USAF aircrews might encounter. The Proposed Action is needed in order to continue to meet the 336th Training Group (TRG)'s mission to properly train USAF aircrew members in realistic environments in SERE Training skills for survival and to avoid capture during times of conflict and high risk isolation.

The Environmental Assessment (EA), incorporated by reference into this finding, analyzes the potential environmental consequences of activities associated with is renewing permits held with the U.S. Army Corps of Engineers, Portland District (USACE), Tillamook County, and Oregon State Parks and Recreation that will extend SERE training for an additional 5 years, and provides environmental protection measures to avoid or reduce adverse environmental impacts when applicable as identified in the Environmental Consequences section throughout this document.

The EA considers all potential impacts of the Proposed Action and the No Action Alternative. The EA also considers cumulative environmental impacts with other projects in the Region of Influence.

Proposed Action and Alternatives

Proposed Action

The Proposed Action is to conduct the following activities twice per year:

- Transport to and between training areas, including helicopter flight
- SERE Specialist coastal and open ocean training for 6 days on properties identified in **Figures 2-1** and **2-2** of the EA and permitted under permits described in **Section 1.4.1.1** of the EA
- SERE Specialist tropical training for 5 days on properties identified in **Figures 2-3** through **2-5** of the EA and permitted under permits described in **Section 1.4.1.2** of the EA
- Raft launches within the 5 days of tropical training on the Calawah, Sol Duc, and Hoh rivers in the Forks, Washington area under agreements with the Washington DNR, Forks.

Under the Proposed Action, there would be no changes to the existing training areas or activities (e.g., no changes in duration, numbers of students/instructors, equipment usage, etc.). As described in **Section 1.4** of the EA, the SERE Specialist training course would continue to be conducted twice per year, with the coastal, open ocean, and tropical phases occurring once in the spring and once in the fall. Each course would consist of up to 50 students and 13 instructors and take approximately 14 days total days (including 3 days for travel). Training activities would continue to consist mainly of land navigation, camping, and natural materials gathering. Training would not include use of any live-fire weapons or tracked vehicles but would include the use of handheld flares. Training operations can be closely compared to recreational camping or training done by recreation groups (e.g., Boy Scouts).

No Action Alternative

The CEQ regulation, 40 CFR §1502.14(d), requires the inclusion of a No Action Alternative in the NEPA analysis. Under the No Action Alternative, the Air Force would not renew the permits to continue SERE Training at Tillamook, Oregon and Forks, Washington.

SUMMARY OF FINDINGS

The analyses of the affected environment and environmental consequences of implementing the Proposed Action presented in the EA concluded that no significant adverse impacts would result to the following resources as a result of the Preferred Alternative: noise, air quality, airspace, land use, biological resources, cultural resources, hazardous materials and wastes, and health and safety. Executive Order 11990 *Protection of Wetlands* requires federal *agencies to* prepare a Finding of No Practicable Alternative (FONPA) for actions that would result in destruction, loss, or degradation of wetlands. Executive Order 11998, *Floodplain Management* requires federal agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. There are floodplains and wetlands present in the Proposed Action Area; however, all activities associated with the Proposed Action would be short-term and would not disrupt, degrade, or change the characteristics of the floodplain or wetlands. No significant adverse cumulative impacts would result from activities associated with Proposed Action when considered with past, present, or reasonably foreseeable future projects.

FINDING OF NO SIGNIFICANT IMPACT

Based on my review of the facts and analyses contained in the attached EA, conducted under the provisions of NEPA, CEQ Regulations, and 32 CFR §989, I conclude that the Proposed Action would not have a significant environmental impact, either by itself or cumulatively with other known projects. Accordingly, an Environmental Impact Statement is not required. The signing of this Finding of No Significant Impact completes the environmental impact analysis process.

_____ _____

RONALD R. DANIELS, GS-14, DAF
Deputy Base Civil Engineer Date

ABBREVIATIONS AND ACRONYMS

µg/m_3	micrograms per cubic meter
AETC	Air Education Training Command
AFB	Air Force Base
AFI	Air Force Instruction
AFOSH	Air Force Occupational and Environmental Safety, Fire Protection, and Health
AFPD	Air Force Policy Directive
AGL	above ground level
AHPA	Archaeological and Historic Preservation Act
AIRFA	American Indian Religious Freedom Act
ARPA	Archaeological Resources Protection Act
ARTCC	Air Route Traffic Control Center
BA	Biological Assessment
BMP	best management practice
BOEM	Bureau of Ocean Energy Management
BP	before present
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFA	controlled firing area
CFETP	Career Field Education and Training Plan
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CZMA	Coastal Zone Management Act
DAHP	Department of Archaeology and Historic Preservation
dBA	A-weighted decibels
DFW	Department of Fish and Wildlife
DNR	Department of Natural Resources
DOD	Department of Defense
DZ	drop zone
EA	Environmental Assessment
EBS	Environmental Baseline Survey
EFH	essential fish habitat
EIAP	Environmental Impact Analysis Process
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FL	flight level
FONSI	Finding of No Significant Impact
GHG	greenhouse gas
HAPC	Habitat Area of Particular Concern
HLZ	helicopter landing zone
LBP	lead-based paint
MBTA	Migratory Bird Treaty Act
mg/m_3	milligrams per cubic meter
MMPA	Marine Mammal Protection Act
MOA	military operations area

MOU	Memorandum of Understanding
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NBC	Naval Base Coronado
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOx	nitrogen oxide
NRHP	National Register of Historic Places
OCMP	Oregon Coastal Management Program
ODLCD	Oregon Department of Land Conservation and Development
OESF	Olympic Experimental State Forest
OSD	Office of the Secretary of Defense
Pb	lead
PCB	polychlorinated biphenyls
PCT	pre-commercial thinning
PM_{10}	particulate matter with an aerodynamic size less than or equal to 10 microns
$PM_{2.5}$	particulate matter with an aerodynamic size less than or equal to 2.5 microns
ppb	parts per billion
ppm	parts per million
ppt	parts per thousand
O_3	Ozone
RCRA	Resource Conservation and Recovery Act
ROI	region of influence
SEL	sound exposure level
SEPA	State Environmental Policy Act
SERE	Survival, Evasion, Resistance, and Escape
SHPO	State Historic Preservation Office
SO_2	sulfur dioxide
SUA	special use airspace
tpy	tons per year
TRG	Training Group
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
U.S.C.	United States Code
USCG	U.S. Coast Guard
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WCMP	Washington Coastal Management Program

Cover Sheet

Draft Environmental Assessment for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment Tillamook, Oregon, and Forks, Washington

Responsible Agencies: U.S. Air Force (USAF); Air Force Civil Engineer Center; Air Education and Training Command; 336th Training Group (TRG); Air Mobility Command; Fairchild Air Force Base.

Affected Location: Tillamook, Oregon, and Forks, Washington.

Report Designation: *Revised* Draft Environmental Assessment (EA).

Abstract: The purpose of the Proposed Action is to conduct coastal, open ocean, and tropical training in appropriate natural terrain areas representing real-world conditions that USAF aircrews might encounter. The Proposed Action is needed in order to continue meeting the 336th TRG's mission to properly train USAF aircrew members in realistic environments in SERE training skills for survival and to avoid capture during times of conflict and high risk of isolation.

In support of 336th TRG requirements, the USAF proposes to conduct the following activities twice per year:

- Transport to and between tropical and coastal and open ocean training areas, including helicopter flight
- SERE Specialist coastal and open ocean training for 6 days on properties currently permitted in Tillamook, Oregon
- SERE Specialist tropical training for 5 days on properties currently permitted in Forks, Washington
- Raft launches within the 5 days of tropical training on the Calawah, Sol Duc, and Hoh rivers in the Forks, Washington area under agreements with the Washington Department of Natural Resources (DNR), Forks.

Under the Proposed Action, there would be no changes to the existing training areas or activities (e.g., no changes in duration, numbers of students/instructors, equipment usage, etc.).

The analysis in the EA considers the Proposed Action and the No Action Alternative and aids in determining whether a Finding of No Significant Impact can be prepared or an Environmental Impact Statement is required.

Written comments and inquiries regarding this document should be directed by mail to 92 ARW Public Affairs, 1 East Bong Street, Suite 228, Fairchild AFB, WA 99011 or by email to 92arw.pa@us.af.mil.

Privacy Notice

Your comments on this document are requested. Letters or other written comments provided may be published in the EA. Comments will normally be addressed in the EA and made available to the public. Any personal information provided will be used only to identify your desire to make a statement during the public comment period or to fulfill requests for copies of the EA or associated documents. Private addresses will be compiled to develop a mailing list for those requesting copies of the EA. However, only the names of the individuals making comments and specific comments will be disclosed; personal home addresses and telephone

Revised Draft

ENVIRONMENTAL ASSESSMENT

FOR THE

COASTAL, OPEN OCEAN, AND TROPICAL SURVIVAL, EVASION, RESISTANCE, AND ESCAPE (SERE) TRAINING

ENVIRONMENTAL ASSESSMENT

TILLAMOOK, OREGON, AND FORKS, WASHINGTON

AIR FORCE CIVIL ENGINEER CENTER

2261 Hughes Avenue, Suite 155

Joint Base San Antonio-Lackland, Texas 78236

FEBRUARY 2019

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Tables

1. Purpose of and Need for the Proposed Action

1.1 Introduction

This Environmental Assessment (EA) has been prepared for Coastal and Open Ocean Survival, Evasion, Resistance, and Escape (SERE) Training at Tillamook, Oregon, and Tropical SERE Training at Forks, Washington. The USAF, which has conducted the SERE training in this area since the 1980s, is renewing permits held with the U.S. Army Corps of Engineers, Portland District (USACE), Tillamook County, and Oregon State Parks and Recreation that will extend the training for an additional 5 years. This EA analyzes the potential for significant environmental impacts associated with the Proposed Action and the No Action Alternative. The environmental documentation process associated with preparing the EA is being carried out in compliance with the National Environmental Policy Act (NEPA); the regulations implementing NEPA (40 Code of Federal Regulations [CFR] Parts 1500–1508); Department of Defense (DOD) Directive 6050.1, Environmental Considerations in DOD Actions; and the U.S. Air Force (USAF) implementing regulation for NEPA, the Environmental Impact Analysis Process (EIAP), Air Force Instruction (AFI) 32-7061, which adopts 32 CFR Part 989, as amended, as the controlling document for the EIAP.

The USAF issued the original Draft EA for Coastal and Open Ocean SERE Training at Tillamook, Oregon, and Tropical SERE Training at Forks, Washington in February 2016. After the public availability period for the Draft EA, it was necessary to include additional elements in the Proposed Action, namely the use of handheld flares during training, which was not described in the original Draft EA. Under USAF EIAP requirements, this new information should be made available to the public for additional review. This Revised Draft EA supports the additional public review requirement. It also incorporates updated information regarding tribal and other consultation under Section 106 of the National Historic Preservation Act (NHPA) and Section 7 of the Endangered Species Act (ESA) that has evolved since the issuance of the original Draft EA in February 2016.

Coastal, open ocean, and tropical SERE training on the properties discussed in this EA would be a continuation of similar training conducted by the 336th Training Group (TRG) SERE Specialist Training Course in these areas since the 1980s. This document updates the NEPA documentation previously developed for coastal and open ocean training and meets NEPA and EIAP requirements for tropical training which has not been previously prepared.

Five (5) permits are currently held by the 336th TRG that allow training on public and private properties that meet the requirements for the coastal, open ocean, and tropical training course syllabus. Three permits are required for coastal training and two (2) permits are required for tropical training, which is conducted in two geographically separated locations. These permits are periodically renewed in 1- to 5-year cycles, with the exception of a 10-year permit issued by the USACE. See **Section 1.4.1** for more information on permit conditions.

1.2 336th Training Group and SERE Training Background

The mission of the 336th TRG at Fairchild Air Force Base (AFB) is to train USAF aircrew members in SERE skills to avoid capture during times of conflict and high risk of isolation. More than 6,000 students take Aircrew Survival Training at Fairchild AFB each year (Fairchild AFB Undated). The 336th TRG SERE Specialist Training Course develops the instructors that will conduct this Aircrew Survival Training for the USAF.

The 336th TRG at Fairchild AFB is the sole technical school conducting SERE Specialist training and the only location awarding 3-level (i.e., apprentice) SERE Specialist training for the USAF. The SERE Specialist course tends to have a high attrition rate due to the physical demands placed on each individual. Graduates of the 336th TRG SERE Specialist training instruct Aircrew Survival Training for at least 3 years at Fairchild AFB. Following at least 3 years as 336th TRG instructors, SERE Specialists are transferred to another assignment. They can remain within the 336th TRG or be assigned to rescue or operations support squadrons around the USAF to conduct SERE refresher training (Fairchild AFB Undated).

SERE Specialist training is accomplished by classroom, laboratory, and environmental field training over a 6-month time frame. The SERE Specialist Training Course is conducted twice annually and consists of approximately 11 phases of training. During each phase of training, SERE Specialists learn techniques for survival and then perform the acquired skills in specialized locations. The Air Education Training Command (AETC) Syllabus S-V81-A, SERE Specialist training directive, requires the use of field training areas that simulate operational locations (AETC 2013). Students must demonstrate navigation using natural land features, procurement of animal and plant life, and the construction of a variety of fires and shelters.

Three of the 11 phases of SERE Specialist training require students to demonstrate proficiency in coastal, open ocean, and tropical environments. Each of these environments represents one type of several possible biomes that could be encountered worldwide. Consequently, SERE Specialist training requires access to the appropriate coastal, open ocean, and tropical terrain environments during the spring and fall months. During these three onsite phases of training, SERE Specialist candidates travel to permitted coastal, open ocean or tropical terrain locations and demonstrate survival in these environments using natural materials and typical equipment available to USAF aircrew members.

1.3 Project Location Description

Coastal and open ocean training is currently conducted over 6 days in Tillamook, Oregon, on the Bayocean Peninsula, followed by a travel day to the tropical training area in Forks, Washington, for another 5 days of training. Upon completion of training in these two regions, candidates return to Fairchild AFB. See **Figure 1-1** for an overview of these locations.

As described in **Section 1.1**, the 336th TRG currently holds five (5) permits that allow training on public and private properties that meet the requirements for the coastal, open ocean, and tropical training course syllabus. The 336th TRG has historically maintained a good working relationship under their permits with land owners and managers at the Tillamook, Oregon, and Forks, Washington, training properties. The 336th TRG has engaged in cleanup efforts and road

maintenance and repair on permitted properties, and the land managers are receptive to continuing the permit process and training use.

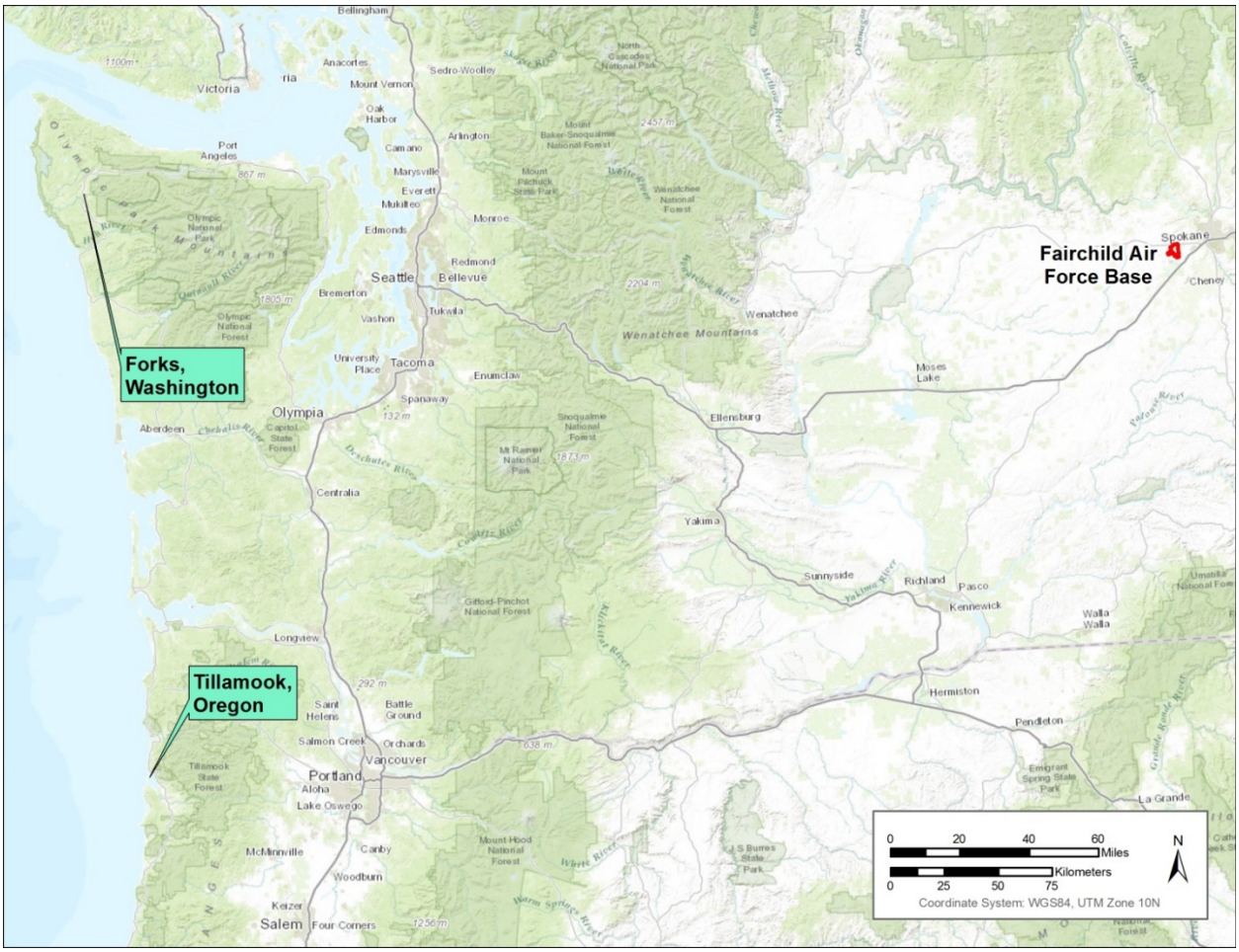

Figure 1-1. Regional Map for SERE Coastal, Open Ocean, and Tropical Training

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1.3.1 Tillamook, Oregon

The coastal and open ocean SERE training area consists of approximately 1,300 acres of the Bayocean Peninsula located on the northwestern coast of Oregon. The peninsula is approximately 4 miles long along the Pacific Ocean and between 0.25 and 0.5 mile wide. Training is accomplished under three existing permits with Tillamook County, the Portland District of the USACE, and Oregon State Parks. Current permits allow the USAF access to the entire area within the boundary show in **Figure 1-2**; however, the USAF only utilizes discrete portions of the peninsula for the coastal training. Open ocean training is conducted offshore of the peninsula. Each training group seeks to reuse camp areas previously used during training to reduce the overall footprint on the peninsula. See **Figure 1-2** for a map of the Bayocean Peninsula coastal training area.

1.3.2 Forks, Washington

The tropical SERE training is currently conducted on approximately 5,500 acres of the Olympic Peninsula, which is along the northeastern coast of Washington and centered in Clallam County, Forks, Washington. The Forks location is within a temperate rainforest and provides tropical-like environmental characteristics and river access for training via the Hoh, Calawah and Sol Duc rivers. The 336th TRG has boat launch use agreements for the Hoh and Sol Duc rivers with the Washington Department of Natural Resources (DNR), Forks. Permits with the Washington DNR and Rayonier Operating Company LLC (Rayonier), a timber management company, are required to conduct this training on their properties. See **Figure 1-3** for current tropical training areas in Forks, Washington, and land managers for these properties. Under current permit conditions, the USAF has access to the entire area within each training area identified in **Figure 1-3,** with the exception of two private land parcels within the Rayonier property adjacent to the Olympic National Forest. These private land parcels are shown as polygons within the Rayonier property in **Figure 1-3**. Despite full access to training permitted properties, the USAF typically reuses specific training areas each year to reduce the overall training footprint within these parcels.

Figure 1-2. Bayocean Peninsula Coastal and Open Ocean SERE Training Area

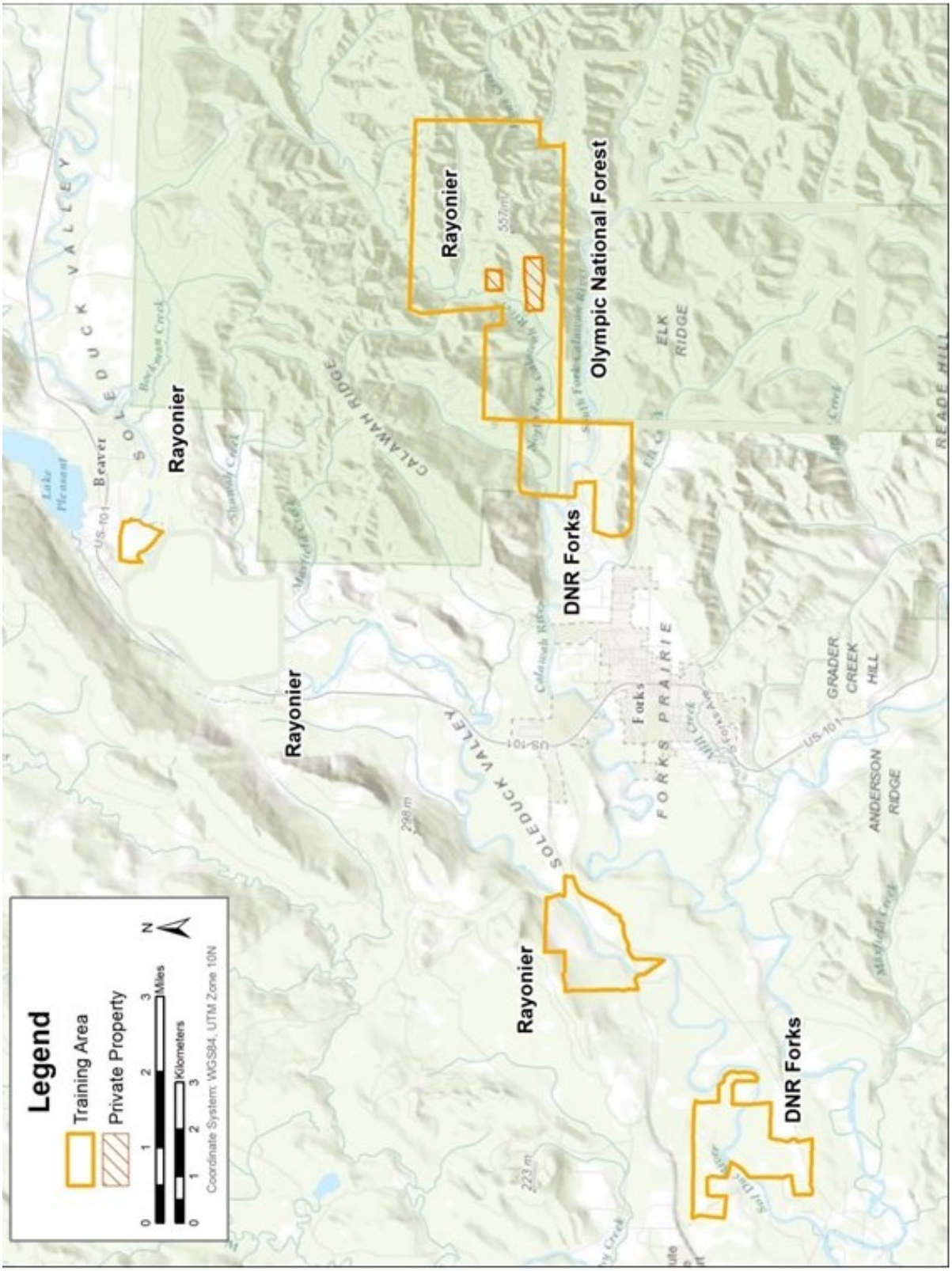

Figure 1-3. Forks, Washington, Area Tropical SERE Training Areas

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1.4 Current Training Operations

The three phases of coastal, open ocean, and tropical training typically occur once during the spring for the January–June course, and once during the fall for the July–December course.

In accordance with the SERE Specialist Career Field Education and Training Plan (CFETP), coastal and open ocean training requires mastering an understanding of the characteristics of and needs in coastal and open ocean environments, including shelter, fire, food, water, sanitation and hygiene, signaling, recovery, personal protection, concealment, and travel (USAF 2010). Current coastal training on the Bayocean Peninsula primarily consists of tent camping by instructors, setting up shelter, campfire construction, navigation training, shellfish gathering, digging water table pits, helicopter flights, and swimming. The coastal and open ocean phases of the training course are conducted over a total of 6 days. During coastal training, the USAF utilizes an area on the eastern side of the peninsula for the instructor camp. Students camp landward of the dune line on the western side of the peninsula. The area by the jetty is only used for gathering shellfish. (See **Appendix C** for photographs of current coastal training areas on the Bayocean Peninsula.) For SERE open ocean training, students practice a variety of open water activities in the Pacific Ocean, up to 7 miles from shore of the Bayocean Peninsula.

In accordance with the SERE Specialist CFETP, tropical training requires mastering an understanding of the characteristics of and needs in tropical environments, including shelter, fire, food, water, sanitation and hygiene, signaling, recovery, and travel (USAF 2010). Current tropical training in the Forks, Washington area mainly consists of tent camping, setting up shelter using natural materials, rafting, helicopter flights and land navigation. The tropical phase of training is conducted over a total of 5 days. The Rayonier and DNR Forks properties are typically used for setting up shelters, raft put-in and take-out, and some land navigation. The 336th TRG also has separate boat (i.e., raft) launch use agreements with the DNR Forks.

1.4.1 Current Training Permits

As noted in **Section 1.1**, the 336th TRG holds five (5) permits that allow SERE Specialist training on public and private properties. The permits specific to each training are provided in the following subsections.

1.4.1.1 COASTAL AND OPEN OCEAN TRAINING

Coastal and open ocean training is accomplished under three existing permits with Tillamook County, the USACE Portland District, and Oregon State Parks. Specific details of each permit are provided in **Table 1-1**.

Table 1-1. Coastal and Open Ocean Training Permits

Permit	Description
Tillamook County	This permit grants the USAF access to the Bayocean Peninsula and Kincheloe Point for SERE Specialist training. The permit requires that the USAF either improve Bayocean Road or reimburse Tillamook County for making improvements to the road to facilitate access to training areas. The road is subject to erosion due to its proximity to the coastline of Tillamook Bay.
USACE Portland	This permit grants the USAF access to the Tillamook Bay South Jetty for use during SERE training events. The permit requires that the USAF minimize

Permit	Description
District	vegetation damage and coordinate with Tillamook County for access road use.
Oregon State Parks	This permit grants the USAF access to the beach and dunes portions of the Bayocean Peninsula, with access being from the ocean. Conditions of the permit require the USAF to abide by the terms of the December 2009 recommendations regarding the western snowy plover and its critical habitat for the Bayocean Spit. The permit also requires the USAF to restrict campfire size; refrain from landing helicopters on the beach except in emergency; and dismantle camps, fill in holes, and clean any sites to pre-existing conditions upon conclusion of each training session.

1.4.1.2 TROPICAL TRAINING

Tropical training is accomplished under two existing permits with the DNR Forks and Rayonier, a private timber management company. Specific details of each permit are provided in **Table 1-2**.

The 336th TRG also has boat launch use agreements with DNR Forks. Additionally, in January 2001, the SERE School was granted a "Survival School Collection Permit" for the State of Washington from the Washington Department of Fish and Wildlife (DFW). This collection permit does not allow for the take of threatened or endangered species. The permit is in effect until cancelled by either party and may be amended by the Washington DFW. The SERE School submits a report to the Washington DFW each year indicating the number of each species taken under the authorization (WDFW 2001).

Table 1-2. Tropical Training Permits

Permit	Description
Washington DNR, Forks	Under the terms of the DNR permit, the USAF is required to minimize damage to natural resources, pack out or properly dispose of garbage, refrain from erecting structures, take precautions to help prevent the spread of noxious weeds, use hazardous substances only to the extent necessary and in accordance with applicable laws, and minimize damage or erosion to soil. Under the DNR permit, the USAF is also required to report to DNR on species identified in the state Habitat Conservation Plan and the DNR Forks incidental take permit.
Rayonier	This permit allows the USAF SERE School access to lands owned by Rayonier for conducting SERE training. The permit requires that the USAF remove all garbage and petroleum products and prevent accumulation and maintain roads in current or better condition. The USAF must also abide by Rayonier Forest Resources ground rules and all appropriate Federal, state, and local laws, rules, and regulations.

1.5 Purpose of and Need for the Proposed Action

The purpose of the Proposed Action is to conduct coastal, open ocean, and tropical training in appropriate natural terrain areas that represent real-world conditions that USAF aircrews might encounter. The Proposed Action is needed in order to continue to meet the 336th TRG's mission to properly train USAF aircrew members in realistic environments in SERE Training skills for survival and to avoid capture during times of conflict and high risk of isolation.

1.6 Summary of NEPA Compliance Requirements

NEPA is a Federal statute requiring the identification and analysis of potential environmental impacts associated with proposed Federal actions before those actions are taken. The intent of NEPA is to help decision makers make well-informed decisions based on an understanding of the potential environmental consequences and take actions to protect, restore, or enhance the environment. NEPA established the Council on Environmental Quality (CEQ) which was charged with the development of implementing regulations and ensuring Federal agency compliance with NEPA.

The CEQ regulations mandate that all Federal agencies use a prescribed structured approach to environmental impact analysis. This approach also requires Federal agencies to use an interdisciplinary and systematic approach in their decision-making process. This process evaluates potential environmental consequences associated with a Proposed Action and considers alternative courses of action.

The process for implementing NEPA is outlined in 40 CFR Parts 1500–1508, Regulations for Implementing the Procedural Provisions of the NEPA. The CEQ was established under NEPA to implement and oversee Federal policy in this process. The CEQ regulations specify that an EA be prepared to provide evidence and analysis for determining whether the preparation of a Finding of No Significant Impact (FONSI) or an Environmental Impact Statement (EIS) is necessary. The EA can aid in an agency's compliance with NEPA when an EIS is unnecessary and facilitate preparation of an EIS when one is required.

The USAF's implementing regulation for NEPA is the EIAP, AFI 32-7061, which adopts 32 CFR Part 989, as amended, as the controlling document for the EIAP.

Upon completion of the EA process, the USAF will determine whether the Proposed Action would result in significant impacts. If such impacts are predicted, then the USAF would need to decide whether to provide mitigation to reduce impacts below the level of significance, undertake the preparation of an EIS, or abandon the Proposed Action. The EA will also be used to guide the USAF in implementing the Proposed Action in a manner consistent with the USAF standards for environmental stewardship should the Proposed Action be approved for implementation.

1.7 Intergovernmental Coordination and Public Involvement

NEPA requirements help ensure that environmental information is made available to the public during the decision-making process and prior to actions being taken. A premise of NEPA is that the quality of Federal decisions will be enhanced if proponents provide information to the public and involve the public in the planning process. The Intergovernmental Coordination Act and Executive Order (EO) 12372, Intergovernmental Review of Federal Programs, require Federal agencies to cooperate with and consider territorial and local views when implementing a Federal proposal. Throughout the EA development process, the USAF will coordinate with Washington DNR, Forks; Rayonier; Tillamook County, Oregon; Oregon State Parks; and the USACE Portland District.

Through the NEPA process, Fairchild AFB and the 336th TRG notifies relevant government agencies and stakeholders about the Proposed Action and alternatives. For this document, the USAF is consulting and coordinating with relevant Federal, state, and local governments and agencies, and other interested parties, including those required for compliance with the Endangered Species Act (ESA) and NHPA. **Appendix A** and **Appendix B** of this document provides all materials, including distribution lists, related to coordination and consultation. This process provides Fairchild AFB and the 336th TRG with the opportunity to cooperate with and consider the views of other agencies and groups associated with implementing the Proposed Action or alternatives. A Notice of Availability announcing the availability of the Revised Draft EA for public review was published in the *Forks Forum* and the *Peninsula Daily News* for the Forks, Washington, area; and the *Tillamook Headlight-Herald* for the Tillamook, Oregon area. Copies of the Revised Draft EA were also sent to the following local libraries: Forks Branch Library, Port Angeles Main Library, South Tillamook County Library, and Tillamook County Library. Public and agency comments on the Revised Draft EA will be considered prior to a decision being made on whether or not to sign a FONSI.

1.7.1 Government to Government Consultations

E.O. 13175, *Consultation and Coordination with Indian Tribal Governments* directs Federal agencies to coordinate and consult with Native American tribal governments whose interests might be directly and substantially affected by activities on federally administered lands. Consistent with that executive order, DoDI 4710.02, *Interactions with Federally-Recognized Tribes*, and AFI 90-2002, *Air Force Interaction with Federally-recognized Tribes*, federally-recognized tribes that are historically affiliated with the Fairchild AFB geographic region were invited to consult on all proposed undertakings that have a potential to affect properties of cultural, historical, or religious significance to the tribes. The tribal consultation process is distinct from NEPA consultation or the interagency coordination process, and it requires separate notification of all relevant tribes. The timelines for tribal consultation are also distinct from those of other consultations. The Fairchild AFB point-of-contact for Native American tribes is the Installation Commander.

The Native American tribal governments that were coordinated or consulted with regarding these actions are listed in **Appendix B**.

2. Description of the Proposed Action and Alternatives

This section provides detailed information on the Proposed Action and alternatives considered, including the No Action Alternative. As discussed in **Section 1.6**, the NEPA process evaluates potential environmental consequences associated with a Proposed Action and considers alternative courses of action. Reasonable alternatives must satisfy the purpose of and need for the Proposed Action, as defined in **Section 1.5**. In addition, CEQ regulations also specify the inclusion of a No Action Alternative against which potential effects can be compared. While the No Action Alternative would not satisfy the purpose of or need for the Proposed Action, it is analyzed in accordance with CEQ regulations.

2.1 Proposed Action

The Proposed Action is to conduct the following activities twice per year:

- Transport to and between training areas, including helicopter flight
- SERE Specialist coastal and open ocean training for 6 days on properties identified in **Figures 2-1** and **2-2** and permitted under permits described in **Section 1.4.1.1**
- SERE Specialist tropical training for 5 days on properties identified in **Figures 2-3** through **2-5** and permitted under permits described in **Section 1.4.1.2**
- Raft launches within the 5 days of tropical training on the Calawah, Sol Duc, and Hoh rivers in the Forks, Washington area under agreements with the Washington DNR, Forks.

Under the Proposed Action, there would be no changes to the existing training areas or activities (e.g., no changes in duration, numbers of students/instructors, equipment usage, etc.). As described in **Section 1.4**, the SERE Specialist training course would continue to be conducted twice per year, with the coastal, open ocean, and tropical phases occurring once in the spring and once in the fall. Each course would consist of up to 50 students and 13 instructors. Training activities would continue to consist mainly of land navigation, camping, and natural materials gathering. Training would not include use of any live-fire weapons or tracked vehicles, but would include the use of handheld flares. Training operations can be closely compared to recreational camping or training done by recreation groups (e.g., Boy Scouts).

A typical training schedule for coastal, open ocean, and tropical training would include the following: Day 1 – transport from Fairchild AFB to Forks, Washington; Days 2–6 – tropical training activities in Forks, Washington; Day 7 – transport from Forks, Washington, to Tillamook, Oregon; Days 8–13 – coastal and open ocean training activities on the Bayocean Peninsula in Tillamook, Oregon; Day 14 – return transport from Tillamook, Oregon, to Fairchild AFB. This schedule could also be executed in reverse depending on weather, tide tables, and location availability, starting with transportation from Fairchild AFB to Tillamook, Oregon.

Figure 2-1. Bayocean Peninsula, Tillamook, Oregon, Coastal and Open Ocean SERE Training Area

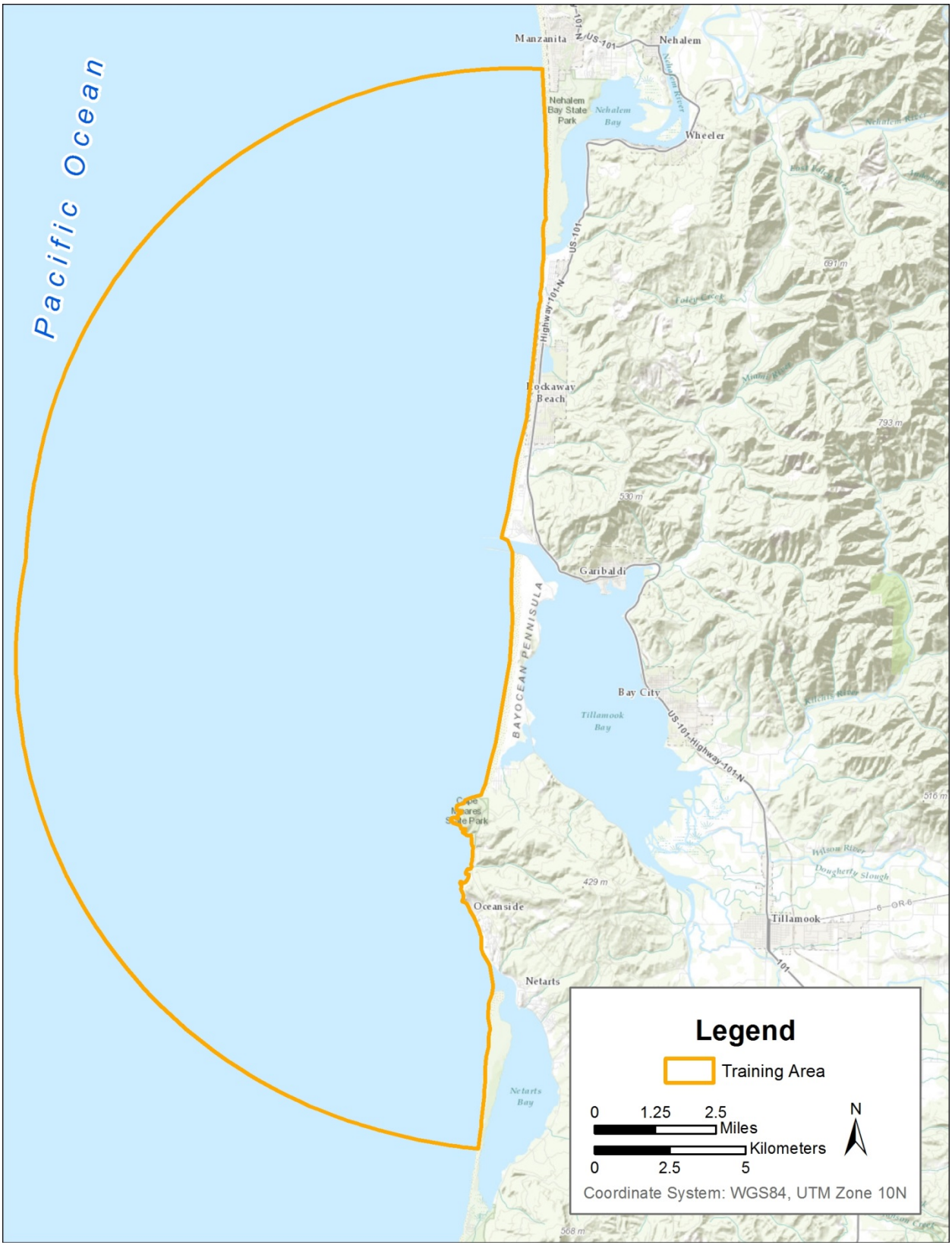

Figure 2-2. Tillamook, Oregon Open Ocean SERE Training Area

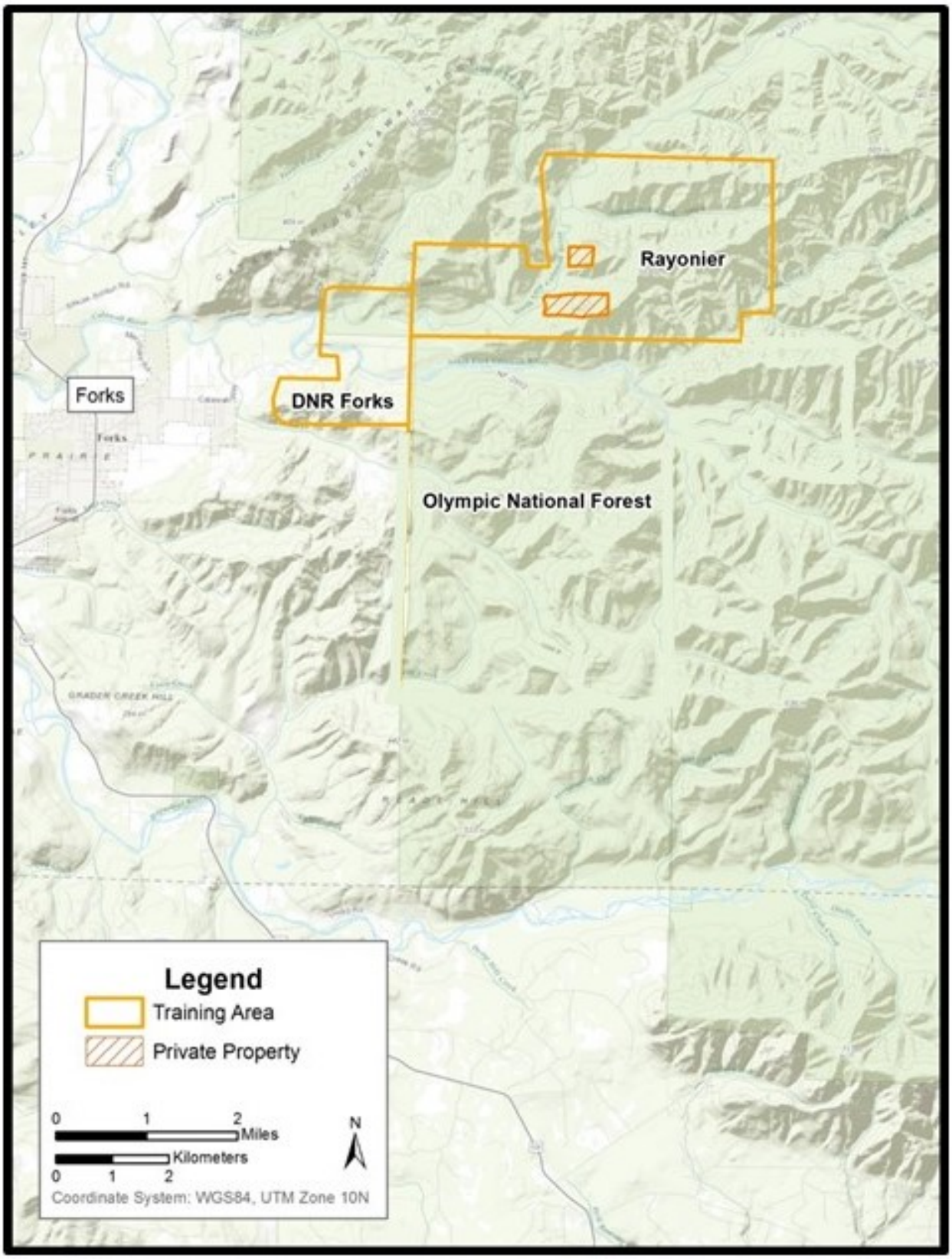

Figure 2-3. DNR, and Rayonier North and South Fork Calawah River Tropical SERE Training Areas

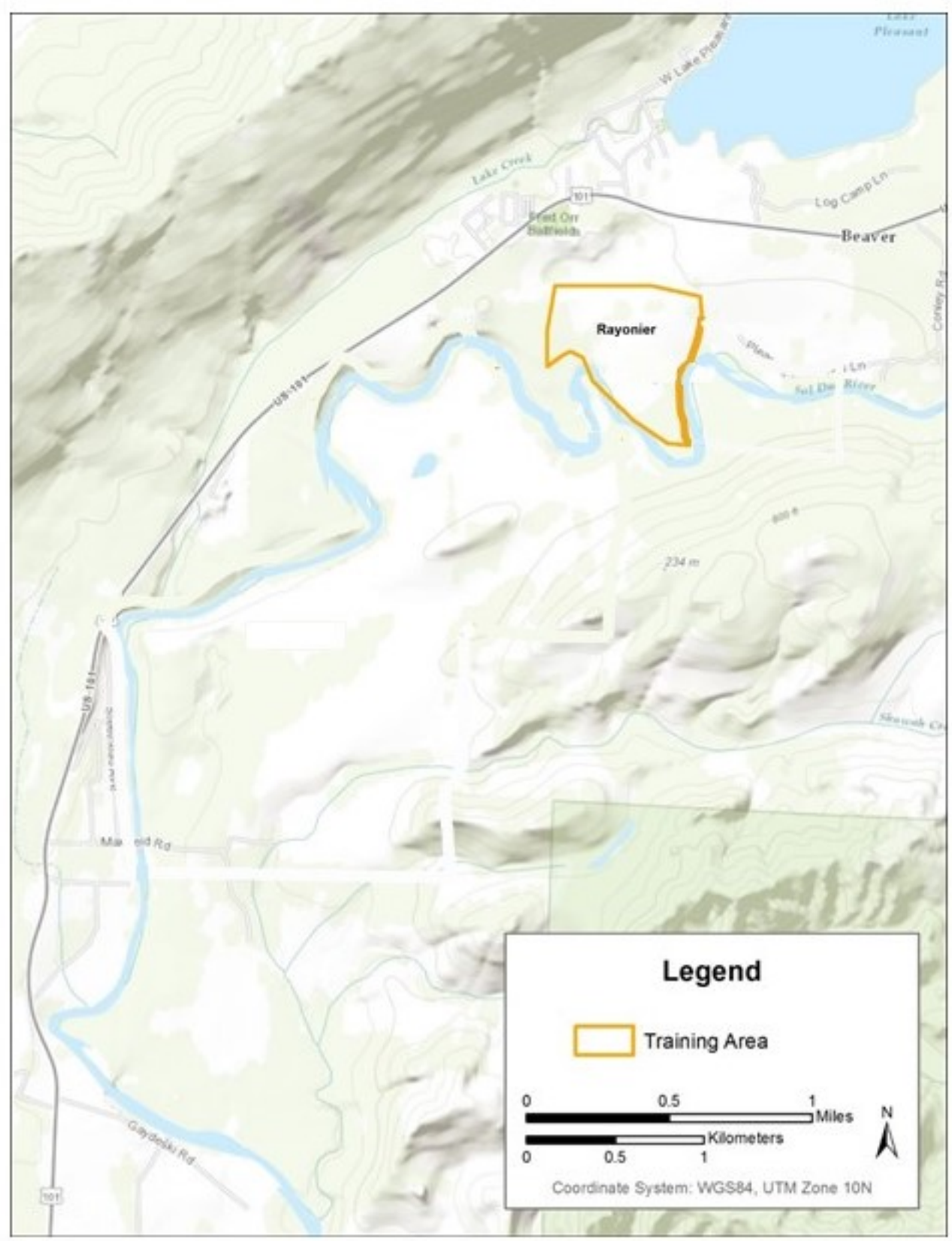

Figure 2-4. Northern Rayonier Sol Duc River Tropical SERE Training Areas

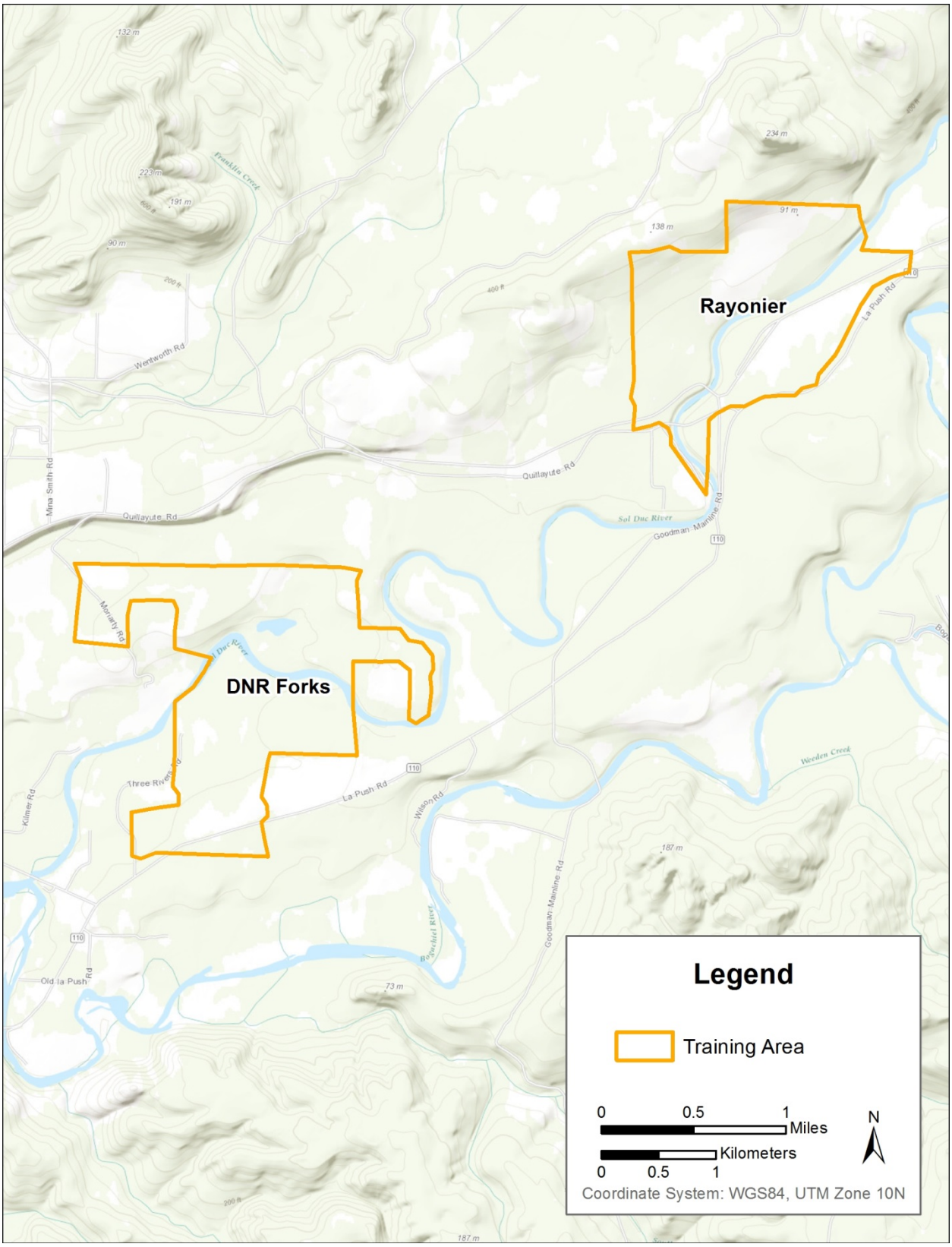

Figure 2-5. DNR and Southern Rayonier Sol Duc River Tropical SERE Training Areas

Transportation is discussed in **Section 2.1.1**. In summary, coastal and open ocean training would take place over 6 days, tropical training would take place over 5 days, and travel to training areas would take place over 3 days, for a total of 14 days per training event.

The USAF is undertaking a NEPA analysis for this training in accordance with USAF EIAP requirements based on the renewal of all existing permits. Permit conditions would allow training on the parcels of property identified in **Figures 2-1** through **2-5**. However, upon future permit renewal and in coordination with the 336th TRG, permit conditions may identify different parcels of property for USAF coastal or tropical training, consistent in terrain and suitability to those properties currently permitted. Despite a change in location, coastal and tropical training requirements and actions would remain consistent with that described in **Sections 2.1.2** and **2.1.3**. Identification of a property for coastal or tropical training beyond those analyzed in this document would require additional NEPA analysis under the USAF EIAP rules.

Coastal, open ocean, and tropical SERE training on the properties shown in **Figures 2-1** through **2-5** would be a continuation of similar training that has been conducted by the 336th TRG SERE Specialist Training Course in these areas since the 1980s. Specific details regarding the proposed continuation of these training activities on the areas identified in **Figures 2-1** through **2-5** are provided in **Sections 2.1.2** and **2.1.3**. SERE training described in **Sections 2.1.2** and **2.1.3** is based on requirements prescribed in the AETC Syllabus S-V81-A, SERE Specialist Training directive, and the CFETP, which require the use of field training areas that simulate operational locations (USAF 2010; AETC 2013). The directive requires students to demonstrate navigation skills using natural land features; procure animal and plant life for food and shelter; construct a variety of fires and shelters; and demonstrate proficiency of these techniques in coastal, open ocean, and tropical environments.

2.1.1 Transport to and between Tillamook, Oregon, and Forks, Washington

Upon the start of coastal, open ocean, and tropical SERE training, the students and instructors would travel to Forks, Washington, or Tillamook, Oregon, from Fairchild AFB, depending on weather and tidal conditions and location availability. Transport time would be approximately the same regardless of where the training begins.

Transport in support of coastal, open ocean, and tropical training would include use of 6 to 11 support vehicles (typically two 2.5-ton cargo trucks, one ambulance, one 45-passenger bus, and up to seven four-wheel drive pickups). These vehicles would conduct the following trips for each training course:

- An approximate 8-hour drive between Fairchild AFB, Washington, and Forks, Washington
- An approximate 6-hour drive between Forks, Washington, and Tillamook, Oregon
- An approximate 8-hour drive between Tillamook, Oregon, and Fairchild AFB, Washington.

In addition to vehicle transport, one USAF helicopter would also support coastal, open ocean, and tropical training as described in **Sections 2.1.2** and **2.1.3**. The helicopter would conduct the following trips for each training course:

- Flight between Fairchild AFB, Washington, and Fairchild Airport, Port Angeles, Washington, the positioned support location for tropical training
- Flight between Fairchild Airport, Port Angeles, Washington, and Astoria Regional Airport, Astoria, Oregon, the positioned support location for coastal and open ocean training
- Flight between Astoria Regional Airport, Astoria, Oregon, and Fairchild AFB, Washington.

During coastal and open ocean training, the helicopter would be used for up to 4 of the 6 training days. To support the training operations, the helicopter would transit along the Oregon coastline from the Astoria Regional Airport in Astoria, Oregon, to Tillamook, Oregon, conduct the training, and return to the Astoria Regional Airport. Occasional helicopter refueling would occur at Tillamook Airport in Tillamook, Oregon, during training operations.

During tropical training, the helicopter would be used for only 1 of the 5 training days. To support the training operations, the helicopter would transit along the Washington coastline from the Fairchild Airport in Port Angeles, Washington, to Twins, Washington, where it would turn south towards Forks, Washington, conduct the training, then return to the Fairchild Airport.

Table 2-1 provides a summary of all helicopter operations under the Proposed Action. This table sums all helicopter operations per year, and accounts for the two cycles of coastal, open ocean, and tropical training that occur each year.

Table 2-1. Annual Helicopter Operations under the Proposed Action

Route Point #1	Route Point #2	Number of Trips/year	Reason
Fairchild AFB, WA	Fairchild Airport, Port Angeles, WA	2	Transit to/from training area region
Fairchild Airport, Port Angeles, WA	Forks, WA	8	Tropical vector training
Fairchild Airport, Port Angeles, WA	Astoria Regional Airport, Astoria, OR	2	Transit to/from training area region
Astoria Regional Airport, Astoria, OR	Bayocean Peninsula, Tillamook, OR	8	Coastal and open ocean hoist, vector, and parachute training
Bayocean Peninsula, Tillamook, OR	Tillamook Airport, Tillamook, OR	16	Refueling during coastal and open ocean training
Astoria Regional Airport, Astoria, OR	Fairchild AFB, WA	2	Transit to/from training area region

2.1.2 Coastal and Open Ocean Training

Coastal training would be conducted on the Bayocean Peninsula under appropriate permits on the bay and ocean sides of the peninsula, and open ocean training would be conducted off-

shore of the Bayocean Peninsula in the Pacific Ocean. In accordance with these permits, recreational activities by the public would be allowed to continue on these properties during training. Prior to training, SERE school personnel may make access road repairs to areas that have been washed out by storms and erosion. Repairs are accomplished using local equipment and materials. These services would be coordinated with and at no cost to the Tillamook County or Oregon State Parks.

During the 6-day training period, students and instructors would only use downed or dead debris and standing dead trees for fire. Training would also avoid use of the invasive scotch-broom plant to ensure sand stability and prevent erosion. Lastly, all personnel would entirely avoid the western snowy plover recreation management area (critical habitat for a threatened species) at the northern end of the spit, as shown in **Figure 2-1**. Coastal training actions specific to the bay and ocean sides of the peninsula are described in **Sections 2.1.2.1** and **2.1.2.2**.

2.1.2.1 BAYOCEAN PENINSULA – BAY SIDE

Instructor Camping and Vehicle Staging. Coastal training would be conducted on the Tillamook Bay side of the Bayocean Peninsula, as shown in **Figure 2-1**. Training use would include access to and occupation of a flat open area on the western side of the access road, within an otherwise vegetated area on the east side of the peninsula, for the instructor camp and vehicle staging. The camp area would be used by the instructors for standard-issue tent set-up of up to 15 tents, and campfires during training. (See **Figure 1** of **Appendix C** for a photograph of this area.)

Gathering. Shellfish (e.g., clams, mussels, and crabs) gathering would occur in Tillamook Bay by each student during low tides. Gathering would be accomplished in compliance with permits issued by the Oregon DFW for each training participant.

Hoist Training and Helicopter Operations. North of the instructor camp area, another large, flat open parcel located on the eastern side of the road adjacent to Tillamook Bay would be used as a helicopter landing zone (HLZ) and hover area (see **Figure 2-1** for location and see **Figure 2** of **Appendix C** for a photograph of this area). This HLZ is located adjacent to an in-water drop zone (DZ) in the bay, where students would practice water evacuation and rescue (hoist training) during 1 day of the 6-day training. During hoist training, students would be evacuated from the open water of Tillamook Bay using a hoist cable from a hovering helicopter, and returned to the HLZ. Each student would participate in hoist training, which would total approximately 2 hours.

Parachute Training and Helicopter Operations. During parachute training**,** each of the instructors would board the helicopter at the HLZ (see **Figure 2-1**) and demonstrate deploying from the helicopter between altitudes of 2,000 and 10,000 feet above ground level (AGL) into the DZ in Tillamook Bay. The helicopter would support parachute training for approximately 2 hours during 1 day of training. The helicopter would land but remain running for approximately 5 minutes per group boarding, assuming six to eight groups of instructors. All parachutes and jumpers would be recovered by watercraft.

2.1.2.2 BAYOCEAN PENINSULA – OCEAN SIDE

Coastal and open ocean training would also be conducted on the ocean side and within nearshore waters of the Bayocean Peninsula, as shown in **Figure 2-1**.

Student Camping. During coastal and open ocean training, all of the students would camp on the western side of the peninsula, landward of the initial dune line. Students would typically set up approximately four camp areas with up to 10 tents per each camp area (see **Figure 3** of **Appendix C** for an example of a student camp area). Campfires would be contained using fire retardant materials to prevent sparks from posing a wildfire danger. Students would scatter any remaining coals or shellfish particles from the campfire. Student "tents" consist of a one-man life raft that is partially buried in the sand and draped with a cloth.

Gathering. Shellfish gathering would occur at the South Jetty, on the west side of the peninsula, as described in **Section 2.1.2.1**.

Vector Training and Helicopter Operations. During vector training, each of the students would stand on the beach on the ocean side of the peninsula and would practice providing verbal navigation cues (i.e., vectors) to an in-flight helicopter overhead. This training would take place over approximately 2 hours during 1 day of training. See **Figure 4** of **Appendix C** for a photograph of the beach area. This training also includes construction of "flags," using beach debris and cloth, to provide visual cues to the helicopter overhead.

During the helicopter vectors, each student would ignite a handheld flare during their vector assessment to mark their position. Vectors occur one of the days of training based on availability of aircraft and weather. In a case where weather precludes helicopter flights, each student would demonstrate use of the flare. Up to 50 handheld flares would be ignited during a 2-hour period during each of the two training events per year.

Water Table Pits. Students would dig 5 to 10 water table pits, inland from the dune lines, within a low-laying vegetated area, and line them with driftwood or sticks to provide freshwater for drinking during training (see **Figure 5** of **Appendix C**). Pits would typically only be dug to 1–2 feet deep, and no greater than 3 feet deep, and would be filled at the end of the training period.

2.1.2.3 BAYOCEAN PENINSULA – OPEN OCEAN TRAINING

For open ocean navigation, vector, and hoist training, students would be transported in vehicles to the Coast Guard Station Tillamook Bay in Garibaldi, Oregon, and then into ocean waters by the U.S. Coast Guard (USCG), between the shoreline and up to 7 miles offshore of the Bayocean Peninsula, as shown in **Figure 2-2**. For safety purposes, the students would be accompanied within response distance by a USCG vessel. Impacts of USCG vessel operations are not discussed in this EA because these operations are considered part of USCG ongoing search, rescue, and training operations.

Ocean Navigation Training. During open ocean navigation training, students would enter the open ocean in 20-person life rafts, up to approximately 7 miles offshore from the Bayocean Peninsula. Students would navigate the life rafts until approximately 3 to 5 miles offshore.

Hoist Training and Helicopter Operations. Upon completion of navigation training, students would conduct hoist training approximately 3 to 5 miles offshore. During open ocean hoist training, students would enter the open ocean from the 20-person life rafts. Once in water, hoist training operations would occur as described in **Section 2.1.2.1**.

Vector Training and Helicopter Operations. Upon completion of navigation training, students would also conduct vector training approximately 3 to 5 miles offshore. During open ocean vector training, each student would practice providing verbal navigation cues (i.e., vectors) from a life raft to an in-flight helicopter overhead. Vector training operations would occur as described in **Section 2.1.2.2**.

During the helicopter vectors, one student in each raft (normally two rafts) would ignite a hand held flare prior to the vector assessment to mark their position. Vectors are completed during the open ocean training day based on availability of aircraft and weather. In a case where weather precludes helicopter flights, each raft would demonstrate the use of the flare. Additionally on the open ocean, each student would demonstrate the use of a pen gun flare. Up to eight flares would be ignited during a 2-hour period during each of the two trainings per year.

Once students have successfully completed ocean navigation, hoist, and vector training, they would board the USCG vessel for return to shore for additional training.

Landfall Training. During landfall training, students would be dropped in life rafts just offshore from the Bayocean Peninsula, in rolling waves. Students would navigate the life raft until they reach the beach (landfall) on the western side of the peninsula. Each student would participate in landfall training in a 1-person life raft, and a 7-person life raft.

2.1.3 Tropical Training

Tropical training would be conducted in the Forks, Washington, area under appropriate permits for the land managed by DNR Forks and Rayonier, as shown in **Figures 2-3** through **2-5,** with the exception of two private property parcels within Rayonier lands. In accordance with these permits, recreational and timber harvest activities conducted by the public and private companies would be allowed to continue on these properties throughout the duration of training. Training actions specific to each land parcel are described in **Sections 2.1.2.1** and **2.1.2.2**.

2.1.3.1 RAYONIER SITES

Camping and Gathering. Tropical training on Rayonier property, shown in **Figure 2-3** along the North Fork Calawah River and adjacent to the Olympic National Forest, would consist of natural material gathering, shelter construction, and camping. When gathering materials for shelter construction, trainees would focus on fallen vegetation, or cut plants above the root to allow for regrowth of the plant. For campfires, the trainees would focus on gathering dead or downed trees and materials. At the conclusion of training, students would deconstruct their shelters by scattering the natural materials and returning larger logs to a pile that can be used for the next class. Additionally, the 336th TRG would coordinate with Rayonier and camp in areas, when available, that are scheduled for pre-commercial thinning (PCT), which is a costly process the lumber company undertakes to thin small trees from the undergrowth to allow the

larger trees more space and resources. By camping in these areas, the tropical training group would gather materials already scheduled for removal.

Rafting. Rayonier properties shown in **Figures 2-4** and **2-5** would also be used as raft put-in and take-out locations along the Sol Duc River. These properties would occasionally be used for basic land navigation and a maximum of 1 night of camping per 5-day training period.

Vector Training and Helicopter Operations. During vector training on Rayonier property, each student would practice providing verbal navigation cues (i.e., vectors) from the ground to the helicopter overhead. Vector training would take place over approximately 2 hours. This training would also include construction of "flags," using ground debris and cloth to provide visual cues to the helicopter.

During helicopter vectors, each student would ignite a handheld flare during their vector assessment to mark their position. Vectors are normally completed at the student camp area on one of the days of training based on availability of aircraft and weather. In a case where weather precludes helicopter flights, each student would demonstrate the use of the flare. Up to 50 flares would be ignited during the 2-hour vector training during each of the two training events per year.

2.1.3.2 DNR FORKS SITES

Camping and Gathering. Tropical training on DNR Forks properties, shown in **Figure 2-3** and **Figure 2-5**, would consist of natural material gathering, shelter construction, and camping (see **Figure 6** of **Appendix C**). A former campfire site is shown in **Figure 7** of **Appendix C**. Camping and gathering would occur as described in **Section 2.1.3.1**.

Land Navigation. Tropical training at the DNR Forks property, which is shown in **Figure 2-3** and is adjacent to the Olympic National Forest and Rayonier properties along the North and South Fork Calawah rivers, would be mainly used for land navigation training.

Rafting. The DNR Forks tropical training site along the Sol Duc River, shown in **Figure 2-5**, would be mainly used as a raft launch and take-out site. Trainees would also occasionally camp on this property for one night, depending on the training schedule. See **Figure 8** in **Appendix C** for an example of a camping location on the DNR Forks property that has undergone PCT.

The 336th TRG also has boat launch use agreements with the DNR Forks for raft launches along the Hoh River. This is the southernmost boat launch use agreement site and would be solely used for raft put-in and take-out (see **Figure 9** in **Appendix C**).

Vector Training and Helicopter Operations. Vector training on DNR Forks property would occur as described in **Section 2.1.3.1**.

2.2 Selection of Alternatives to the Proposed Action

Under NEPA, consideration and analysis of reasonable alternatives to the Proposed Action are required in an EA. Considering alternatives allows for an analysis of reasonable ways to achieve the stated purpose, and can help in identifying unnecessary impacts. To warrant detailed evaluation, an alternative must be reasonable. To be considered reasonable, an alternative

must be suitable for decision making (i.e., any necessary preceding events have taken place), capable of implementation, and sufficiently satisfactory with respect to meeting the purpose of and need for the action. CEQ regulations define reasonable alternatives as those that are economically and technically feasible and show evidence of common sense.

During SERE Specialist training in any biome, candidates are required to demonstrate survival skills including building fires and shelters, conducting ground-to-air signaling, procuring water and food, and executing navigation and evasion skills. Therefore, all training areas for every phase of SERE Specialist training, in accordance with the AETC Syllabus S-V81-A, SERE Specialist Training directive and the CFETP (USAF 2010; AETC 2013), must meet the following basic requirements:

- Provide students available water and suitable naturally existing materials for survival purposes consistent with the biome.
- Allow for evasion and the use of signaling to support personnel recovery.
- Be no more than 1 day of travel from Fairchild AFB to reduce transit time between the installation and the training area and meet syllabus schedule demands. Longer transit time is undesirable in the training program because of the timeline and coordination required to complete the 6-month SERE Specialist training course schedule. Training deviations can throw off arrival and training times in other phases of training. The SERE Specialist Training Syllabus is developed to maximize the number of training events accomplished in the shortest period possible to conserve valuable training funds.
- Make use of existing land agreements/permits in order to avoid the need to apply for an Office of the Secretary of Defense (OSD) waiver to the land moratorium policy. An OSD waiver is required per the OSD *Land Acquisition and Leasing of Office Space in the United States* memo dated 17 November 2000, for any land acquisition exceeding $1 million, or 1,000 acres. Per the memo, land acquisition includes purchase, withdrawal from public domain, lease or permit from individuals or government entities, or any other type of use agreement.

2.2.1 Selection Standards for Coastal and Open Ocean Training Areas

In addition to the basic requirements necessary for all SERE Specialists training areas, specific operational and mission requirements must be present or reasonably attainable to meet the purpose of and need for the Proposed Action to conduct coastal and open ocean training. The selection standards were developed based on USAF and 336th TRG training requirements in accordance with the AETC Syllabus S-V81-A, SERE Specialist Training directive for coastal and open ocean training (AETC 2013). The selection standards were applied to training area alternatives to select any alternatives considered reasonable for implementing the Proposed Action and to be carried forward for detailed analysis in the EA. The following selection standards were applied for the coastal and open ocean training areas:

- Support land and water parachute DZ requirements for helicopter static line and military freefall demonstration jumps
- Include a sheltered bay for training in life raft living

- Provide access to the open ocean
- Allow for life raft landfall training and surf penetration.

2.2.2 Selection Standards for Tropical Training Areas

In addition to the basic requirements necessary for all SERE Specialists training areas, specific operational and mission requirements must be present or reasonably attainable to meet the purpose of and need for the Proposed Action to conduct tropical training. One selection standard was developed based on USAF and 336th TRG training requirements in accordance with the AETC Syllabus S-V81-A, SERE Specialist Training directive for tropical training (AETC 2013). The selection standard was applied to training area alternatives to select any alternatives considered reasonable for implementing the Proposed Action and to be carried forward for detailed analysis in the EA. The following selection standard was applied for the tropical training areas:

- Provide access to a river with a difficulty classification of Class I–III for safety, in order to provide training in river operations and understanding of river hydraulics. Rivers beyond Class III have been determined too hazardous to allow students to effectively execute the requirements to maintain control of the raft and avoid hazards in the river.

2.3 Alternatives Carried Forward for Analysis

Possible alternatives identified by the 336th TRG were evaluated against the alternative selection standards described in **Sections 2.2**, **2.2.1**, and **2.2.2**. Only the Proposed Action meets the operational and technical selection standards and will be carried forward for the analysis in the EA. Alternatives that were evaluated against the selection standards, and the corresponding analyses that determine these alternatives should be eliminated from further analysis in the EA, are described in **Section 2.5**.

2.4 No Action Alternative

CEQ regulations require consideration of the No Action Alternative. The No Action Alternative serves as a baseline against which the impacts of the Proposed Action and other potential action alternatives can be evaluated. Under the No Action Alternative, the 336th TRG would not conduct the activities described under the Proposed Action.

The No Action Alternative would not meet the purpose of and need for the action, as described in **Section 1.5**.

2.5 Alternatives Considered but Eliminated from Detailed Analysis

The alternatives described in **Sections 2.5.1** through **2.5.7** were considered but eliminated from detailed analysis because they do not meet one or more of the selection standards listed in **Sections 2.2**, **2.2.1**, and **2.2.2**, or are not considered reasonable. A summary of the alternatives considered but dismissed in comparison to the selection standards is shown in **Table 2-2**.

Table 2-2. Alternatives Considered but Dismissed

Alternative Description	General: Natural materials suitable to biome	Evasion and signaling	General: One travel day	General: Existing permit, no OSD waiver	Coastal/Open Ocean: In-water Drop Zone	Coastal/Open Ocean: Sheltered Bay	Coastal/Open Ocean: Open Ocean Access	Coastal/Open Ocean: Landfall Training	Tropical: Class I-III River
Fairchild AFB	N	Y	Y	Y	N	N	N	N	N
Additional Permitted Lands	N	Y	Y	Y	N	N	N	N	N
Eglin AFB	Y	Y	N	Y	Y	Y	Y	Y	Y
Naval Base Coronado	Y	Y	N	Y	Y	Y	Y	Y	N
Tillamook State Forest	Y	Y	Y	N	Y	Y	Y	Y	N

2.5.1 Fairchild AFB

Under this potential alternative, the 336th TRG would conduct the required coastal, open ocean, and tropical training on lands available at Fairchild AFB. However, this alternative does not meet the selection standards for the Proposed Action for the following reasons:

- Locations are too small for navigation or evasion training.
- Rivers are not available for tropical training.
- Coastline is not available for coastal or open ocean training.
- Insufficient natural resources and game exist on the installation to demonstrate proficiency in SERE skills.

Therefore, conducting required coastal, open ocean, and tropical training at Fairchild AFB was eliminated from further analysis.

2.5.2 Additional Permitted Lands

Under this potential alternative, the 336th TRG would conduct the required coastal, open ocean, and tropical training on other permitted lands available to Fairchild AFB in northeast Washington. However, these permitted lands are located in the temperate mountain region and do not:

- Provide access to natural materials consistent with the tropical, coastal, and open ocean biomes
- Provide coastline for coastal or open ocean training.

Therefore, this alternative was considered but eliminated from further analysis.

2.5.3 Eglin AFB

Training areas are currently authorized under permits by Eglin AFB in Pensacola, Florida, and could be utilized for coastal, open ocean, and tropical training. These permits cover training areas in the Apalachicola area that would meet the requirements of the SERE Specialist training course for coastal, open ocean, and tropical training. However, this location is not within 1 day of travel of Fairchild AFB, where SERE Specialist training is centralized. The time of travel from Fairchild AFB to Pensacola, Florida, does not meet the selections standards for the Proposed Action. Therefore, training at Eglin AFB was considered but eliminated from further analysis.

2.5.4 Naval Base Coronado

Potential locations outside of USAF control, but within DOD control, were considered for coastal, open ocean, and tropical training. Specifically, Naval Base Coronado (NBC), San Diego, California, would provide the environmental conditions required for coastal and open ocean training. An additional location would need to be identified for tropical training that meets all selection criteria for this training type, including being located within a single travel day of NBC. Additionally, NBC is located within a populated area and doesn't provide the austere survival environment preferred for a survival training experience. Therefore, because NBC does not offer coastal, open ocean, and tropical training within one travel day from Fairchild AFB, and because it does not offer sufficient natural resources and environments for survival training, this alternative was eliminated from further analysis.

2.5.5 Tillamook State Forest

Oregon State Forest land, specifically the Tillamook State Forest, is located within a 2-hour drive of the Bayocean Peninsula and has similar tropical conditions to that of the Forks, Washington, area. The 336th TRG considered conducting the tropical training within Tillamook State Forest, pending permit approval. However, river access within the Tillamook State Forest is via the Wilson River, which is a Class II– IV river and exceeds the safety requirements of a Class III river identified in the selection standards. Rivers beyond the Class III rating are considered too dangerous to effectively and safely demonstrate and execute river raft operations and understanding of river hydraulics. Additionally, the Wilson River is only 16 miles long, which provides much less distance and area for training than the 53 miles of the Sol Duc River available in the Forks, Washington, area (American Whitewater 2014). Lastly, use of this area would require executing new permits and coordination with landowners. Currently, there is a moratorium on land acquisition within the DOD and an OSD waiver would need to be completed prior to evaluation and permitting of new training sites. Therefore, conducting tropical training within the Tillamook State Forest was considered but eliminated from further analysis.

2.5.6 Summary

The potential alternatives discussed in **Sections 2.5.1** through **2.5.5** were eliminated from further consideration and are incompatible with the current syllabus and policy directive to conduct coastal, open ocean, and tropical training per the AETC Syllabus S-V81-A, SERE Specialist Training and the CFETP (USAF 2013; AETC 2013). None of these alternatives provide suitable environments and resources for coastal, open ocean, or tropical training within one travel day from Fairchild AFB, or are considered reasonable and ripe for decision making.

Therefore, only the Proposed Action described in **Section 2.1**, and the No Action Alternative described in **Section 2.4**, will be carried forward for analysis in the EA.

2.6 Identification of the Preferred Alternative

The Preferred Alternative of the 336th TRG is to implement the Proposed Action, as described in **Section 2.1**.

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3. Affected Environmental and Environmental Consequences

All potentially relevant resource areas were initially considered for analysis in this EA. In compliance with NEPA, CEQ, and EIAP 32 CFR Part 989 guidelines, the following discussion of the affected environment and environmental consequences in **Section 3** of this document focuses only on those resource areas potentially subject to impacts from the Proposed Action or No Action Alternative. This section includes noise, air quality, airspace, land use (including recreation and coastal zone management), biological resources, cultural resources, health and safety, hazardous materials and wastes, and socioeconomic resources and environmental justice. Some resource areas would not be affected by the Proposed Action or No Action Alternative. Resource areas that have been eliminated from further detailed study in this document and the rationale for eliminating them are presented below:

- **Water Resources:** Surface and ground water generated by precipitation is only utilized as part of the Proposed Action for drinking, rafting, and food procurement. USAF Group Operating Instruction 60-1 prevents harvesting or ground disturbing activities within 300 feet of open water greater than 1 acre and 150 feet of open water less than 1 acre (336th TRG 2014). Executive Order 11990 *Protection of Wetlands* requires federal *agencies to* prepare a Finding of No Practicable Alternative (FONPA) for actions that would result in destruction, loss, or degradation of wetlands. Executive Order 11998, *Floodplain Management* requires federal agencies to consider alternatives to avoid adverse effects and incompatible development in floodplains. There are floodplains and wetlands present in the Proposed Action Area; however, all activities associated with the Proposed Action would be short-term and would not disrupt, degrade, or change the characteristics of the floodplain or wetlands. Therefore, impacts on water resources from the Proposed Action are not expected.
- **Geological Resources and Soils:** The Proposed Action does not include ground-disturbing activities. Camping would disturb only the ground surface. Students are required to dig drinking water pits. However, these are dug in the same places in sand each training cycle and filled in at the conclusion of training. When gathering materials for shelter construction, students would focus on fallen vegetation, or cut plants above the root to allow for regrowth of the plant, and do not pull live plants from the ground (336th TRG 2014). Therefore, impacts on geological resources and soils are not expected.
- **Socioeconomics:** The Proposed Action would not result in any long-term population changes in the ROI at Tillamook, Oregon or Forks, Washington. Under the Proposed Action, up to 50 students and 13 instructors would temporarily relocate to the area during training activities at each location. However, the training schedule would only last a total of 12 days, or 6 days twice per year at Tillamook and 10 days, or 5 days twice per year at Forks. Given the limited personnel requirement, temporary duration of the activities, and the remote location of the activities, population levels within either ROI would not change. In Tillamook, Oregon, short-term, negligible, beneficial impacts on

revenue to the local economy would result from the purchase of materials for road maintenance and repair on an as-needed basis to repair areas washed out from storm events and erosion. Purchases of local equipment and materials would be sporadic and SERE school personnel would conduct the repairs. Therefore, no additional local wages would be generated and no taxes would be garnered. Additionally, state revenue from fuel tax is shared with Tillamook County based on its population and would not be increased by any additional fuel expenditures in the county under the Proposed Action. Therefore, impacts on socioeconomics are not expected.

- **Environmental Justice and the Protection of Children:** Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations and EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, requires that all federal agencies address the effects of policies on minorities, low-income populations, and children. Due to the short duration and remote locations of proposed training activities, no impacts on populations would be expected regardless of race, age, or poverty status under the Proposed Action. For Tillamook Oregon, proposed training activities would occur within the Bayocean Peninsula and the open water along Oregon's coast and would be limited to two separate 6-day sessions during a calendar year. Any noise associated with road maintenance and repair activities would be in remote areas away from residences. Helicopter flights associated with training sessions would occur off the coast and would not be expected to impact any populations. For Forks, Washington, proposed training activities would occur within remote areas associated with Rayonier sites and DNR Forks sites. Training activities would be limited to two separate 5-day sessions. Noise associated with helicopter flights would be limited to 1 day per training session and would generally occur in remote areas away from residences. Therefore, impacts on environmental justice and the protection of children are not expected.
- **Utilities and Infrastructure:** Permitted training properties in Tillamook, Oregon, and Forks, Washington, are primitive lands, private logging properties, or parks with minimal utilities and little to no infrastructure. The training under the Proposed Action also does not require the use of utilities or infrastructure. Therefore, impacts on utilities and infrastructure are not expected.
- **Transportation:** Transportation associated with the Proposed Action includes up to 10 vehicles, 6 days per year. This activity would not disrupt transportation or exclude transportation use of others. Therefore, impacts on transportation are not expected.

Sections 3.1 through **3.9** present the potential environmental and socioeconomic impacts on the affected environment.

3.1 Noise

3.1.1 Definition of the Resource

Sound is measured with instruments that record instantaneous sound levels in decibels. The terms noise and sound are often used interchangeably. Physically there is no difference between these concepts, although it is an important distinction for the human listener. Noise is

defined as any sound that is unwanted because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Noise can be intermittent or continuous, steady or impulsive, and can involve any number of sources and frequencies. It can be readily identifiable or generally nondescript. Human response to increased sound levels varies according to the source type, characteristics of the sound source, distance between source and receptor, receptor sensitivity, and time of day. Noise metrics addressed in this EA include ambient sound levels and noise from helicopters.

Noise Metrics. A-weighted decibel (dBA) is used to characterize sound levels that can be sensed by the human ear. “A-weighted” denotes the adjustment of the frequency range to what the average human ear can sense when experiencing an audible event. The threshold of audibility is generally within the range of 10 to 25 dBA for normal hearing. DBA is used to evaluate continuous noise sources such as vehicles and aircraft (USACHPPM 2005). Noise-sensitive land uses include areas that are sensitive to noise above ambient levels and can be specific (i.e., schools, churches, or hospitals) or broad (e.g., nature preserves or designated districts).

Ambient Sound Levels. Ambient noise levels vary depending on the locations of major traffic areas or airports and their proximity to sensitive resources such as residential areas, parks, and open space. As shown in **Table 3-1**, sound levels, depending on a person’s distance from the noise generator, can vary greatly in addition to the level of human response to those levels. The noise level in a normal suburban area is approximately 55 dBA day-night sound level, which increases to 60 dBA for an urban residential area, and to 80 dBA in the downtown section of a city (USEPA 1974). Most people are exposed to sound levels of 50 to 55 dBA or higher on a daily basis.

Helicopter Noise Levels. Noise levels resulting from multiple single events are used to characterize noise impacts from aircraft operations. Single sound events for aircraft noise are measured using the sound exposure level (SEL) metric. SEL is a measure of the total sound exposure of an event compressed into a 1-second time interval. Thus, it takes in the sound energy of the event and represents it as a steady noise level that lasts for 1 second. The SEL does not represent the level of sound heard at any specific instant; however, it provides a measure of the total sound energy of a single event and permits comparison of events that differ in both level and duration. The SEL metric represents the sound of an aircraft flyover.

Table 3-1. Sound Levels and Human Response

Noise Level (dBA)	Common Sounds	Effect
10	Just audible	Negligible
30	Soft whisper (15 feet)	Very quiet
50	Light auto traffic (100 feet)	Quiet
60	Air conditioning unit (20 feet)	Intrusive
70	Noisy restaurant or freeway traffic	Telephone use difficult
80	Alarm clock (2 feet)	Annoying
90	Heavy truck (50 feet) or city traffic	Very annoying Hearing damage (8 hours)
100	Garbage truck	Very annoying
110	Pile drivers	Strained vocal effort*
120	Jet takeoff (200 feet) or auto horn (3 feet)	Maximum vocal effort
140	Carrier deck jet operation	Painfully loud

Source: USEPA 1974, USEPA 1981
*HDR extrapolation

3.1.2 Affected Environment

3.1.2.1 TILLAMOOK, OREGON

Existing noise at the Tillamook, Oregon, training area is typical of a rural, outdoor setting. The ambient noise is mostly dominated by the waves and wind from the ocean to the west of the training area. Because the Tillamook, Oregon training area is within an Oregon State Park, there is minimal other noise in the area, with the exception of occasional aircraft flight or USCG activities in Tillamook Bay. There are no other existing military activities at this location.

3.1.2.2 FORKS, WASHINGTON

Existing noise at the Forks, Washington, training areas is also typical of a rural, outdoor setting. Several of the training areas are located within the Washington DNR property, which are used for recreational activities that generate minimal noise, such as hiking. Noise within training areas located on Rayonier property is dominated by tree logging equipment and activities. There are no other existing military activities at this location.

3.1.3 Environmental Consequences

Noise impact analyses evaluate potential changes to the existing noise environment that would result from implementation of a proposed action. Potential changes in the noise environment are beneficial if they reduce the number of sensitive receptors exposed to unacceptable noise levels or reduce the ambient sound level; and are adverse if they result in increased sound exposure to unacceptable noise levels or ultimately increase the ambient sound level.

3.1.3.1 PROPOSED ACTION

Tillamook, Oregon

General Training Activities. Noise generated from coastal and open ocean training activities under the Proposed Action would be short-term, negligible, and adverse. Vehicles would be used to transport personnel to the Bayocean Peninsula for training, which would generate typical vehicle noise (occasional horn, engines, exhaust, etc.). However, vehicle use would be

infrequent and would not be expected to exceed the sound of the existing noise environment. Other potential sounds include noise from specific land- and water-based training activities and verbal commands given by USAF personnel to trainees.

Helicopter Operations. Helicopter operation would result in short-term, negligible to minor, adverse on the noise environment. Noise would be generated from UH-1N helicopters responsible for transiting USAF personnel to, from, and around training areas. Helicopters taking off and landing at the HLZ on the Bayocean Peninsula would generate the highest noise levels; however, these operations would be limited to 2 weeks of training days per year. **Table 3-2** shows the average helicopter SEL values for the UH-1N helicopter. Noise generated from the helicopter taking off and landing would only be slightly more than the noise generated from a garbage truck. However, these events would be infrequent enough to only be considered a minor annoyance to people including recreation users in the nearby state park (USEPA 1974, USARC 2010).

Table 3-2. UH-1N SEL Values

Altitude	UH-1N (SEL (dBA))
100 AGL	106 dBA
200 AGL	102 dBA
500 AGL	96 dBA
1,500 AGL	89 dBA

Source: USARC 2010
Note: Noise values are estimated with the receiver directly underneath the helicopter
Key: AGL = above ground level

Forks, Washington

Noise generated from the Proposed Action at the Forks, Washington, training areas would result in impacts similar to, but less than those at the Tillamook, Oregon, training area because there would be no HLZ at the Forks training areas. Because helicopters would only take-off and land at Fairchild Airport for tropical training, noise impacts to the existing noise environment in the training area would be considerably less than impacts at the Tillamook, Oregon, training area. Noise from helicopter operation at Fairchild Airport would be consistent with existing use. Additionally, vehicles that transport trainees to the training locations would generate some noise; however, this noise would be infrequent and generated on existing roadways; therefore, it would have negligible impacts on the existing noise environment.

3.1.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the 336th TRG would not conduct coastal, open ocean, and tropical training in Tillamook, Oregon, or Forks, Washington. Under the No Action Alternative, USAF training would not occur in Tillamook, Oregon, or Forks, Washington as described in **Section 2.1**. The noise environment would remain the same as described in **Section 3.1.2**. No impacts would be expected on the noise environment from the No Action Alternative.

3.2 Air Quality

3.2.1 Definition of the Resource

Air quality is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result not only of the types and quantities of atmospheric pollutants and pollutant sources in an area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions in that region.

National Ambient Air Quality Standards (NAAQS). The Clean Air Act (CAA), as amended, requires the U.S. Environmental Protection Agency (USEPA) to set NAAQS for pollutants considered harmful to public health and the environment. The USEPA characterizes ambient air quality in terms of compliance with the primary and secondary NAAQS. Primary NAAQS provide public health protection, including protecting the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary NAAQS provide public welfare protection, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings.

The USEPA has established NAAQS for six criteria pollutants:

- Carbon monoxide (CO)
- Lead (Pb)
- Nitrogen dioxide (NO_2)
- Ozone (O_3), which is measured as nitrogen oxides [NO_x] and volatile organic compounds [VOC]
- Sulfur dioxide (SO_2)
- Particulate matter (with an aerodynamic size less than or equal to 10 microns [PM_{10}] and with an aerodynamic size less than or equal to 2.5 microns [$PM_{2.5}$]).

States may either adopt the NAAQS or establish their own more stringent standards. **Table 3-3** provides the primary and secondary NAAQS and the state of Washington and Oregon ambient air quality standards.

Attainment Versus Nonattainment. The USEPA classifies the air quality in a region according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas are therefore designated as either "attainment," "nonattainment," "maintenance," or "unclassified" for each of the six criteria pollutants. Attainment means that the air quality is better than the NAAQS; nonattainment indicates that criteria pollutant levels exceed NAAQS; maintenance indicates that an area was previously designated nonattainment but is now attainment; and an unclassified air quality designation means that there is not enough information to appropriately classify an area, so the area is considered attainment.

Greenhouse Gas (GHG) Emissions. GHGs are gaseous emissions that trap heat in the atmosphere. These emissions occur from natural processes and human activities. Human-caused GHGs are produced primarily by the burning of fossil fuels and through industrial and

biological processes. The most common GHGs emitted from human activities include carbon dioxide (CO_2), methane, and nitrous oxide.

Table 3-3. National, Oregon, and Washington Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard			Secondary Standard
		Federal	Oregon	Washington	
CO	8-hour (1)	9 ppm (10 mg/m^3)	Same as Federal	Same as Federal	None
	1-hour (1)	35 ppm (40 mg/m^3)	Same as Federal	Same as Federal	None
Pb	Rolling 3-Month Average (2)	0.15 µg/m^3 (3)	Same as Federal	Same as Federal	Same as Primary
NO_2	Annual (4)	53 ppb (5)	Same as Federal	Same as Federal	Same as Primary
	1-hour (6)	100 ppb	Same as Federal	Same as Federal	None
PM_{10}	24-hour (7)	150 µg/m^3	Same as Federal	Same as Federal	Same as Primary
$PM_{2.5}$	Annual (8)	12 µg/m^3	Same as Federal	Same as Federal	15 µg/m^3
	24-hour (6)	35 µg/m^3	Same as Federal	Same as Federal	Same as Primary
O_3	8-hour (9)	0.075 ppm (10)	Same as Federal	Same as Federal	Same as Primary
SO_2	1-hour (11)	75 ppb (12)	Same as Federal	Same as Federal	None
	Annual (4)	None	20 ppb	20 ppb	None
	3-hour (1)	None	0.5 ppm	0.5 ppm	0.5 ppm
	24-hour block	None	100 ppb	140 ppb	None

Sources: USEPA 2011, Oregon Administrative Rules Undated, Washington Department of Ecology Undated

Notes: Parenthetical values are approximate equivalent concentrations.

1. Not to be exceeded more than once per year.
2. Not to be exceeded.
3. Final rule signed 15 October 2008. The 1978 standard for Pb (1.5 µg/m^3 as a quarterly average) remains in effect until 1 year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved. The USEPA designated areas for the new 2008 standard on 8 November 2011.
4. Annual mean.
5. The official level of the annual NO_2 standard is 0.053 ppm, equal to 53 ppb, which is shown here for the purpose of cleaner comparison to the 1-hour standard.
6. 98th percentile, averaged over 3 years.
7. Not to be exceeded more than once per year on average over 3 years.
8. Annual mean, averaged over 3 years.
9. Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years.
10. Final rule signed 12 March 2008. The 1997 O_3 standard (0.08 ppm, annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years) and related implementation rules remain in place. In 1997, USEPA revoked the 1-hour O_3 standard (0.12 ppm, not to be exceeded more than once per year) in all areas, although some areas have continued obligations under that standard ("anti-backsliding"). The 1-hour O_3 standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is less than or equal to 1.
11. 99th percentile of 1-hour daily maximum concentrations, averaged over 3 years.
12. Final rule signed 2 June 2010. The 1971 annual (0.3 ppm) and 24-hour (0.14 ppm) SO_2 standards were revoked in that same rulemaking. However, these standards remain in effect until 1 year after an area is designated for the 2010 standard, except in areas designated nonattainment for the 1971 standards, where the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standard are approved.
13. Not to be above this level more than twice in a consecutive 7-day period.

Key: ppm = parts per million; ppb = parts per billion; mg/m^3 = milligrams per cubic meter; µg/m^3 = micrograms per cubic meter

3.2.2 Affected Environment

3.2.2.1 TILLAMOOK, OREGON

Tillamook, Oregon, is located in Tillamook County, which is designated by the USEPA as attainment for all criteria pollutants (USEPA 2015a).

3.2.2.2 FORKS, WASHINGTON

Forks, Washington, is located in Clallam County, which is designated by the USEPA as attainment for all criteria pollutants (USEPA 2015b).

3.2.3 Environmental Consequences

The environmental consequences on local and regional air quality conditions from a proposed Federal action are determined based upon the increases or decreases in regulated air pollutant emissions and upon existing conditions and ambient air quality. The evaluation criteria are dependent on whether the proposed action is located in an attainment, nonattainment, or maintenance area for criteria pollutants.

For attainment areas, a proposed action would be considered significant if the net increases in pollutant emissions would result in any one of the following scenarios:

- Cause or contribute to a violation of any national or state ambient air quality standard
- Expose sensitive receptors to substantially increased pollutant concentrations
- Exceed any evaluation criteria established by a state implementation plan
- Cause an increase of 100 tons per year (tpy) of any attainment criteria pollutant from mobile sources.

Although the fourth bullet above (i.e., cause an increase of 100 tpy of any attainment criteria pollutant from mobile sources) is not a regulatory driven threshold, it is being applied as a conservative measure of significance in attainment areas. This significance indicator is based off of the least severe General Conformity Thresholds for each respective criteria pollutant. Logically, if 100 tpy determines significance for General Conformity, it would be a conservative indicator for attainment areas where General Conformity is not applicable.

Because the General Conformity Rule applies only to significant Federal actions in nonattainment or maintenance areas, it is not applicable to this air quality analysis. Therefore, a conformity determination is not required.

3.2.3.1 PROPOSED ACTION

Tillamook, Oregon, and Forks, Washington

Long-term, negligible, adverse effects on air quality would result from coastal, open ocean, and tropical training. Air emissions would be produced from the following aspects of the Proposed Action:

1. The operation motor vehicle equipment (i.e., seven pickup trucks, two 2.5-ton cargo trucks, an ambulance, and a 45-passenger bus) transiting twice per year between

Fairchild AFB, Washington; Forks, Washington; and Tillamook, Oregon, a distance of approximately 1,300 miles.

2. The operation of a UH-1N helicopter during training and while transiting between Fairchild AFB, Washington; Fairchild Airport, Port Angeles, Washington; Forks, Washington; Astoria Regional Airport, Astoria, Oregon; Bayocean Peninsula, Tillamook Oregon; and Tillamook Airport, Tillamook, Oregon.
3. The use of campfires during each night of camping.

All motor vehicle and some helicopter air emissions would be produced along the route of travel and not exclusively at Tillamook, Oregon; Forks, Washington; or any other location. The location where the most helicopter air emissions would be generated is Tillamook, Oregon, because the majority of helicopter training would occur at this location. All campfire emissions would be produced at Tillamook, Oregon, and Forks, Washington.

Coastal, open ocean, and tropical training would not represent a significant impact on air quality because estimated annual emissions of each criteria air pollutant would be less than 1 tpy, and an increase of 100 tpy of any attainment criteria pollutant represents a significant impact. Additionally, the estimated annual emission of GHGs would be approximately 46 tpy.

Table 3-4 summarizes the potential amount of air emissions that would be produced annually from coastal, open ocean, and tropical training and provides a comparison to the applicable significance thresholds. **Appendix D** contains detailed calculations and the assumptions used to estimate the air emissions.

Coastal, open ocean, and tropical training would require the use of up to 108 small handheld flares (50 at Forks, Washington and 58 at Bayocean Peninsula) during each of the two annual training cycles. Emissions from the flares would be negligible and would quickly dissipate. No construction is involved with the Proposed Action, and no stationary air emission sources (i.e., generators, boilers, and furnaces) would be utilized during training. Coastal, open ocean, and tropical training would not have any air permitting implications.

3.2.3.2 NO ACTION ALTERNATIVE

No effects on air quality would result from the No Action Alternative. Under the No Action Alternative, the 336th TRG would not conduct coastal, open ocean, and tropical training. As a result, the air emissions estimated in **Table 3-4** would not be produced.

Table 3-4. Annual Air Emissions from the Proposed Action

	NO_x (tpy)	SO_x (tpy)	CO (tpy)	VOC (tpy)	PM_{10} (tpy)	$PM_{2.5}$ (tpy)	GHG (tpy)
Motor Vehicle Air Emissions	0.023	<0.001	0.243	0.018	0.001	0.001	19.042
Helicopter Air Emissions	0.021	0.006	0.064	0.018	0.002	0.002	17.509
Campfire Air Emissions	0.007	0.001	0.657	0.595	0.090	see notes	9.082
Total Air Emissions	**0.051**	**0.007**	**0.964**	**0.631**	**0.093**	**0.003**	**45.633**
Threshold of Significance	**100**	**100**	**100**	**100**	**100**	**100**	**N/A**

Notes:

GHG air emissions from motor vehicles are composed of CO_2 emissions only; however, they represent the overwhelming majority of GHG from motor vehicle fuel combustion. GHG emissions from helicopters are a total of CO_2, methane, and nitrous oxide air emissions converted to CO_2-equivalent. GHG emissions from campfires are a total of CO_2 and nitrous oxide emissions converted to CO_2-equivalent.

For campfire air emissions, all particulate matter emissions are assumed to be PM_{10}.

3.3 Airspace

3.3.1 Definition of the Resource

Airspace is defined as the area above the earth surface which is available to or utilized by aircraft. Within U.S. boundaries, the Federal Aviation Administration (FAA) ensures that available airspace is being properly utilized. It is the responsibility of the FAA to ensure aircraft and airports operate safely. FAA is mandated through legislation to establish safety certifications for United States airspace, airports and air carriers.

3.3.2 Affected Environment

3.3.2.1 TILLAMOOK, OREGON, AND FORKS, WASHINGTON

Coastal, open ocean, and tropical training would include helicopter operations; a proposed transition route which will enter Controlled Airspace, Special Use Airspace (SUA); and flight within the vicinity of several airports. The following paragraphs define the controlled airspace, SUA and airports that would be utilized for the proposed helicopter transition route. **Figure 3-1** displays the proposed helicopter transition route which will be flown from 500 feet AGL to 1,000 feet AGL.

Controlled airspace encompasses airspace (Class A, B, C, D, and E) within which the FAA provides air traffic control services. The following controlled airspace lies within the helicopter transition route for the proposed action.

Class B Airspace. Class B Airspace is generally the airspace from the surface to 10,000 feet. This airspace is normally utilized around the busiest airports in terms of aircraft traffic such as Chicago O'Hare or Los Angeles International Airports. Class B airspace is individually designed to meet the needs of the particular airport and consists of a surface area plus two more layers. Most Class B airspace resembles an upside down wedding cake. The proposed transition route enters Seattle-Tacoma International Airport Class B Airspace.

Class D Airspace. Class D Airspace is generally from the surface to 2,500 feet above the airport elevation. Class D airspace only surrounds airports that have an operational control tower. Class D airspace is also tailored to meet the needs of the airport. The proposed transition route enters Fairchild AFB and Yakima/McAllister Field Airports Class D Airspace.

Class E Airspace. Class E Airspace is airspace that is not Class A, B, C, or D. Class E airspace extends upward from either the surface or a designated altitude to the overlying or adjacent controlled airspace. If an aircraft is flying on a Federal airway, it is in Class E airspace.

SUA consists of airspace wherein activities must be confined because of their nature; limitations are imposed upon aircraft operations that are not a part of those activities, or both. Except for controlled firing areas (CFAs), SUA areas are depicted on aeronautical charts. Warning areas, military operations areas (MOAs), alert areas, and CFAs are non-regulatory SUA. SUA descriptions (except CFAs) are contained in FAA Order JO 7400.8W, *Special Use Airspace*. SUAs (except CFAs) are charted on instrument flight rules or visual charts and include the hours of operation, altitudes, and the controlling agency. MOAs are the only type of SUA within the proposed helicopter transition routes.

Military Operations Areas. MOAs consist of airspace designated by defined vertical and lateral limits established for the purpose of separating certain military training activities from instrument flight rules (IFR) traffic. Examples of activities conducted in MOAs include, but are not limited to: air combat tactics, air intercepts, aerobatics, formation training, and low-altitude tactics. **Table 3-5** presents the MOAs within the proposed transition routes.

Table 3-5. MOAs in the Proposed Transition Route

Name	Altitude	Owner
Olympic A MOA	6,000 feet mean sea level (MSL) – flight level (FL)180	FAA, Seattle Air Route Traffic Control Center (ARTCC)
Olympic B MOA	6,000 feet MSL – FL180	FAA, Seattle ARTCC

Source: FAA 2014

There are several public and military airports within the proposed helicopter transition route as depicted in **Table 3-6**.

Table 3-6. Airports along the Proposed Transition Route

Name	Type	Airport Reference Point
Astoria Regional Airport	Public	N46°9.48' / W123°52.72'
Fairchild AFB	Military	N47°36.90' / W117°39.35'
Seattle-Tacoma International Airport	Public	N47°26.99' / W122°18.71'
Tillamook Airport	Public	N45°25.10' / W123°48.86'
Yakima/McAllister Field Airport	Public	N46°34.09' / W120°32.64'

Public Airports. A public airport is an airport owned by a political subdivision of the state or that is otherwise open to the public. Public airports are eligible for Federal funding.

Military Airports. Military airports are also called airbases, airfields, or air stations. They provide basing and support to military aircraft. Some military airports also provide facilities to their civilian counterparts.

3.3.3 Environmental Consequences

3.3.3.1 PROPOSED ACTION

Tillamook, Oregon, and Forks, Washington

The proposed helicopter transition route would result in no impacts on FAA capabilities, no expected decrease in aviation safety, and no adverse impacts on commercial or general aviation activities under the following current FAA procedures:

- Adhere to FAA visual flight rules when transiting through Class E airspace
- Obtain two-way radio communication with the appropriate air traffic control controlling agency when transiting through Seattle-Tacoma International Airport Class B Airspace (Turn Point #3 in **Figure 3-1**), Yakima/McAllister Field Class D Airspace (Turn Point #11 in **Figure 3-1**), and Fairchild AFB Class D Airspace (Turn Point #1 in **Figure 3-1**).
- Obtain permission to enter Olympic MOA from Seattle ARTCC when conducting parachute operations at Tillamook above 6,000 feet MSL.

Parachute training operations would occur in Tillamook, Oregon, during SERE activities. During parachute training**,** instructors would deploy from the helicopter between altitudes of 2,000 and 10,000 feet AGL into the DZ in Tillamook Bay. The helicopter would support parachute training for approximately 2 hours during 1 day of training. All parachutes and jumpers would be recovered by watercraft.

No impacts would be expected on airspace from training activities at Forks, Washington.

Federal Aviation Regulation (FAR) 105 states “No person may conduct a parachute operation, and no pilot in command of an aircraft may allow a parachute operation to be conducted from that aircraft over or within SUA unless the controlling agency of the area concerned has authorized that parachute operation [FAA 2015].” Seattle ARTCC is the controlling agency for Olympic MOA starting at 6,000 feet MSL at the proposed parachute operation location. FAR 105 also states “The FAR does not apply to military operations in uncontrolled airspace.” The airspace below 6,000 feet MSL in the proposed parachute operations area is uncontrolled airspace; therefore, no impact on this airspace would occur.

3.3.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the 336th TRG would not conduct coastal, open ocean, and tropical training in Tillamook, Oregon, or Forks, Washington as described in **Section 2.1**. The existing airspace conditions would remain the same as described in **Section 3.3.2**. No impacts would be expected on airspace from the No Action Alternative.

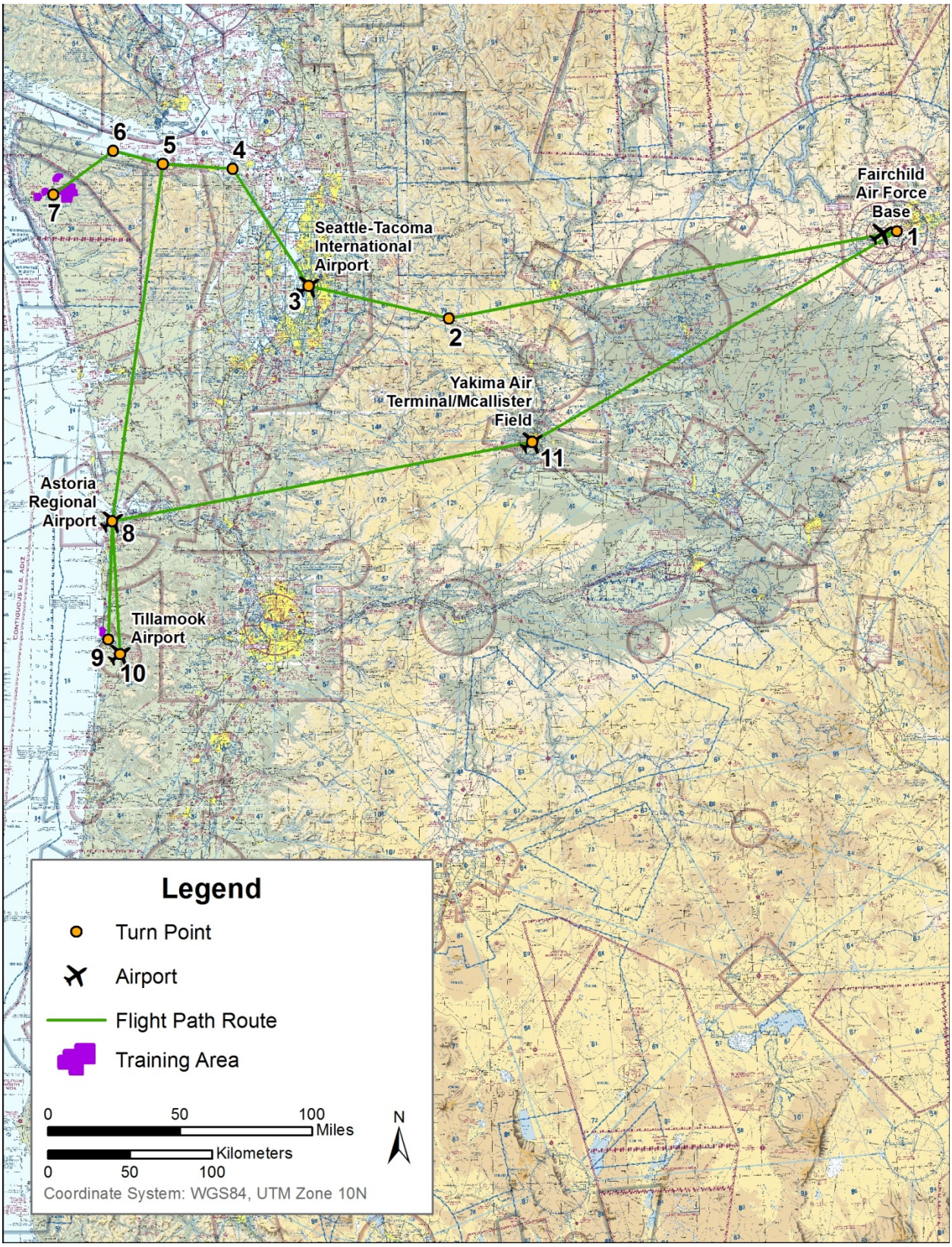

Figure 3-1. Proposed Helicopter Transition Routes

3.4 Land Use

3.4.1 Definition of the Resource

Land Use. The term land use refers to real property classifications that indicate either natural conditions or the types of human activity occurring on a parcel. In many cases, land use descriptions are codified in master planning and local zoning laws. Two main objectives of land use planning are to ensure orderly growth and compatible uses among adjacent property parcels or areas. However, there is no nationally recognized convention or uniform terminology for describing land use categories. As a result, the meanings of various land use descriptions, labels, and definitions vary among jurisdictions. Natural conditions of property can be described or categorized as unimproved, undeveloped, conservation or preservation area, and natural or scenic area. A wide variety of land use categories result from human activity. Descriptive terms for human activity land uses often include residential, commercial, industrial, agricultural, institutional, and recreational.

In appropriate cases, the location and extent of a proposed action needs to be evaluated for its potential effects on a project site and adjacent land uses. The foremost factor affecting a proposed action in terms of land use is its compliance with any applicable land use or zoning regulations. Other relevant factors include matters such as existing land use at the project site, the types of land uses on adjacent properties and their proximity to a proposed action, the duration of a proposed activity, and its permanence.

Coastal Zone. The Federal Coastal Zone Management Program comprehensively addresses the nation’s coastal issues through a voluntary partnership between the federal government and coastal and Great Lakes states and territories. Authorized by the Coastal Zone Management Act (CZMA) of 1972 (16 United States Code [U.S.C.] 1451, et seq., as amended), the program provides the basis for protecting, restoring, and responsibly developing the nation’s diverse coastal communities and resources. The National Oceanic and Atmospheric Administration (NOAA) administers the program.

Currently 34 coastal states participate in the Coastal Zone Management Program. While state partners must follow basic requirements, the program also gives states the flexibility to design unique programs that best address their coastal challenges and regulations. By leveraging both federal and state expertise and resources, the program strengthens the capabilities of each to address coastal issues.

Section 307 of the CZMA, called the "federal consistency" provision, gives a state a strong voice in Federal agency decision making for activities that may affect a state's coastal uses or resources that a state would not otherwise have through other Federal programs.

Generally, Federal consistency requires that Federal actions, within and outside the coastal zone, which have reasonably foreseeable effects on any coastal use (land or water) or natural resource of the coastal zone, be consistent with the enforceable policies of a state's federally approved coastal management program. Federal actions include Federal agency activities, Federal license or permit activities, and Federal financial assistance activities. Federal agency

activities must be consistent to the maximum extent practicable with the enforceable policies of a state's coastal management program.

3.4.2 Affected Environment

3.4.2.1 TILLAMOOK, OREGON

Land Use. Since 1973, Oregon has maintained a statewide program for land use planning that includes 19 Statewide Planning Goals. The goals express the state's policies on land use and related topics, such as citizen involvement, housing, recreational needs, and natural resources.

Oregon's statewide goals are achieved through local comprehensive planning. State law requires each city and county to adopt a comprehensive plan and the zoning and land-division ordinances needed to put the plan into effect. Tillamook County has adopted a comprehensive plan that complies with the state law (Tillamook County 1982).

Land use zoning in the vicinity of the Tillamook Bay SERE training areas consists of parks and open space on the Bayocean Peninsula. To the south of the spit, land use zoning consists of rural residential and prime forest. Parks and open space and prime forest land use zones are found to the north across the inlet. To the west across Tillamook Bay near Garibaldi and Bay City, zoning consists of low and medium density residential, mixed use commercial, commercial; light industrial, and mineral and aggregate. Outside of Garibaldi and Bay City the county is zoned for farming and prime forest (ODLCD 2015). The Bayocean Peninsula is a popular recreation area. Recreation activities include beach-going, bird watching, hiking, horseback riding, and shellfish harvesting.

Coastal Zone. The Oregon Coastal Management Program, (OCMP) approved by NOAA in 1977, consists of a network of agencies with authority in the coastal zone. The Oregon Department of Land Conservation and Development (ODLCD) serves as the lead agency. The primary authority for the OCMP is the Oregon Land Use Planning Act and the 19 Statewide Planning Goals. The Oregon coastal zone includes the state's coastal watersheds and extends inland to the crest of the coast range, with a few minor exceptions. Tillamook County is within Oregon's coastal zone.

The OCMP knits together various state statutes for managing Oregon's coastal lands and waters into a single, coordinated package containing the enforceable policies. A project must be shown to be consistent with the various applicable components of the OCMP. The package administered by the ODLCD, has three basic parts: the 19 Statewide Planning Goals, City and County Comprehensive Land Use Plans, and State Agency and Natural Resource Laws.

Statewide Planning Goals and Tillamook County Comprehensive Plan goals applicable to the Proposed Action include the following:

5. Natural Resources, Scenic and Historic Areas, and Open Spaces – Protect natural resources and conserve scenic and historic areas and open spaces.

6. Air, Water and Land Resources Quality – Protect the quality of air, water, and land resources.

8. Recreational Needs – Satisfy the recreational needs of the citizens of the state and visitors.

16. Estuarine Resources – Recognize and protect the unique environmental, economic, and social values of each estuary and associated wetlands

17. Coastal Shorelands – Conserve, protect, develop (where appropriate) and restore (where appropriate) the resources and benefits of all coastal shorelands.

18. Beaches and Dunes – Conserve, protect, develop (where appropriate), and restore (where appropriate) the resources and benefits of coastal beach and dune areas.

19. Ocean Resources – Conserve marine resources and ecological functions for the purpose of providing long-term ecological, economic, and social value and benefits to future generations.

State agencies and natural resource laws applicable to the Proposed Action include the Oregon Beach Bill which guarantees public access to the state's beaches and establishes a state easement on all beaches between the low water mark and the vegetation line.

The Removal Fill law is not applicable because the Proposed Action would not remove or fill material in waters of the state. The Oregon Territorial Sea Plan is not applicable because the Proposed Action does not seek a license or permit for a renewable energy facility.

3.4.2.2 FORKS, WASHINGTON

Land Use. The *Clallam County Comprehensive Plan* has served as a guide for directing local land use policy and decision making since adoption of the first plan in 1967. The current Plan represents a vision for land use and development for the early twenty-first century, and defines the policies, programs, and actions necessary to attain this vision (Clallam County 2015).

Land use in the vicinity of the Forks, Washington, SERE training areas consists primarily of public forest and private/commercial forest. There are several developed areas along the Sol Duc River and the town of Forks, Washington. Land uses in these areas consist of single unit residential, agricultural, as well as undeveloped land (WDE 2010). Proposed Action areas are also popular for recreation. Recreation activities include camping, hunting, fishing, hiking, off-road vehicle use, mountain-biking, and boating.

Coastal Zone. The Washington Coastal Management Program (WCMP), approved by NOAA in 1976, was the first approved program in the nation. The Washington Department of Ecology serves as the lead coastal management agency. The primary authority for the WCMP is the Shoreline Management Act of 1971. The Washington coastal zone includes the state’s 15 coastal counties that front saltwater, including Clallam.

Under Washington’s program, Federal activities that affect any land use, water use or natural resource of the coastal zone must comply with the enforceable policies within the six laws identified in the program document.

Six laws are identified as enforceable policies identified in the WCMP. Three of these are applicable to the Proposed Action and include the State Environmental Policy Act (SEPA), the Clean Water Act, and the CAA.

Three of the six laws that make up Washington's enforceable policies are not applicable to the Proposed Action. They are the Shoreline Management Act, which applies to development on state shorelines, the Energy Facility Site Evaluation Council which applies to major energy facilities, and the Ocean Management Act, which applies to outer coast in-water oil and gas exploration.

3.4.3 Environmental Consequences

3.4.3.1 PROPOSED ACTION

Tillamook, Oregon

Land Use. No impacts on land use would be expected from the Proposed Action. The Proposed Action would not require a change to or violate current county zoning. Permits would be acquired from the appropriate authorities prior to commencing the Proposed Action. As detailed in **Section 1.4.1**, permits would be acquired from Oregon State Parks, Tillamook County, and the USACE. Obtaining and complying with these permits would demonstrate general compliance with land use regulations.

Coastal Zone. The Proposed Action is reasonably likely to affect a coastal use or resource. Consistency analysis for the applicable policies of the OCMP is provided below.

Statewide Planning and Tillamook County Comprehensive Plan Goals:

5. Natural Resources, Scenic and Historic Areas, and Open Spaces – The Proposed Action has components that would likely affect natural resources and cultural resources; however, effects would be minor to negligible. See **Section 3.5** for a discussion of effects to Biological Resources. See **Section 3.6** for a discussion of effects to Cultural Resources. The Proposed Action is consistent to the maximum extent practicable with this goal.

6. Air, Water and Land Resources Quality – The Proposed Action has components that would likely affect air resources; however effects would be minor to negligible. See **Section 3.2** Air Quality for a discussion of effect to this resource. The Proposed Action would not be expected to have impacts on water or geological resources. The Proposed Action is consistent to the maximum extent practicable with this goal.

8. Recreational Needs – The Proposed Action has components that would likely affect recreation. Proposed Action activities may temporarily discourage recreational activities; however, the area would not be closed off to the public during training. Normal levels of recreation are likely to resume after training ends. The Proposed Action is consistent to the maximum extent practicable with this goal.

16. Estuarine Resources – The Proposed Action has components that would likely affect estuarine resources; however, effects would be minor to negligible. See **Section 3.5**

Biological Resources for a discussion of effects to these resources. The Proposed Action is consistent to the maximum extent practicable with this goal.

17. Coastal Shorelands – The Proposed Action has components that would likely affect coastal resources; however, effects would be minor to negligible. See **Section 3.5** Biological Resources for a discussion of effects to this resource. The Proposed Action is consistent to the maximum extent practicable with this goal.

18. Beaches and Dunes – The Proposed Action has components that occur on the beaches and dunes of Bayocean Peninsula; however, effects would be minor to negligible. See **Section 3.5** Biological Resources for a discussion of effects to these resources. The Proposed Action is consistent to the maximum extent practicable with this goal.

19. Ocean Resources – The Proposed Action has components that occur in the ocean that would likely affect ocean resources; however, effects would be minor to negligible. See **Section 3.5** Biological Resources for a discussion of effects to this resource. The Proposed Action is consistent to the maximum extent practicable with this goal.

State Agencies and Natural Resource Laws.

The Oregon Beach Bill guarantees public access to the state's beaches and establishes a state easement on all beaches between the low water mark and the vegetation line. The Proposed Action would not close off access to the state's beaches. The Proposed Action is consistent with this bill.

Coastal Consistency Determination: The Proposed Action would be consistent to the maximum extent practicable with the enforceable policies of the OCMP.

Forks, Washington

Land Use. No impacts on land use would be expected from the Proposed Action. The Proposed Action would not require a change to or violate current county zoning. Activities associated with the Proposed Action would be permitted by the appropriate authorities prior to commencing. As detailed in **Section 1.4.1**, permits would be acquired from the Washington DNR and Rayonier. Obtaining and complying with these permits would demonstrate compliance with applicable land use regulations.

Coastal Zone. The Proposed Action is reasonably likely to affect a coastal use or resource. Consistency analysis for the applicable policies of the WCMP is provided below.

State Environmental Policy Act. SEPA allows the use of NEPA documents to meet SEPA requirements. This EA meets SEPA requirements. The Proposed Action is consistent with this enforceable policy.

Clean Water Act. The Proposed Action does not require water quality permits or certification. The Proposed Action has a water-based component; however, impacts to water quality would not be expected. The Proposed Action is consistent with this enforceable with this policy.

Clean Air Act. The Proposed Action does not require air quality permits. The Proposed Action would result in air emissions from campfires, helicopters, and vehicles; however, impacts to air quality would be minor. See **Section 3.2** for a discussion on effects to air quality. The Proposed Action is consistent with this enforceable policy.

Coastal Consistency Determination: The Proposed Action would be consistent to the maximum extent practicable with the enforceable policies of the WCMP.

3.4.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the 336th TRG would not conduct coastal, Open Ocean, and tropical training in Tillamook, Oregon, or Forks, Washington, as described in **Section 2.1**. Land Use would remain the same and would be governed by the applicable comprehensive plan as described in **Section 3.4.2**. No impacts would be expected on land use from the No Action Alternative.

3.5 Biological Resources

3.5.1 Definition of the Resource

Biological resources include native or naturalized plants and animals and the habitats (e.g., grasslands, forests, and wetlands) in which they exist. Protected and sensitive biological resources include Endangered Species Act (ESA) listed species (threatened or endangered) and those proposed for ESA listing as designated by the U.S. Fish and Wildlife Service (USFWS) (terrestrial and freshwater organisms) and National Marine Fisheries Service (NMFS) (marine organisms), migratory birds, and bald and golden eagles. Sensitive habitats include those areas designated by the USFWS (or NMFS) as critical habitat protected by the ESA and as sensitive ecological areas designated by state or other Federal rulings. Sensitive habitats also include wetlands, plant communities that are unusual or limited in distribution, and important seasonal use areas for wildlife (e.g., migration routes, breeding areas, crucial summer and winter habitats). Migratory birds are protected species under the Migratory Bird Treaty Act (MBTA) of 1918 (16 U.S.C. 703–712), as amended, and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. Bald (*Haliaeetus leucocephalus)* and golden (*Aquila chrysaetos*) eagles are protected under the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668–668c), as amended.

Endangered Species Act

The ESA (16 U.S.C. 1531 et seq.) establishes a Federal program to protect and recover imperiled species and the ecosystems upon which they depend. The ESA requires Federal agencies, in consultation with the USFWS or NMFS, to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. Under the ESA, “jeopardy” occurs when an action is reasonably expected, directly or indirectly, to diminish the number, reproduction, or distribution of a species so that the likelihood of survival and recovery in the wild is appreciably reduced. An “endangered species” is defined by the ESA as any species in danger of extinction throughout all or a significant portion of its range. A “threatened species” is defined by the ESA as any species likely to become an endangered

species in the foreseeable future. The ESA also prohibits any action that causes a "take" of any listed species. "Take" is defined as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." Federal species of concern are not protected by law; however, these species could become listed and, therefore, are given consideration when addressing impacts from a Proposed Action. Listed plants are not protected from take, although it is illegal to collect or maliciously harm them on Federal land. The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife such as whales and anadromous fish such as salmon.

Critical habitat is designated if the USFWS or NMFS determine that the habitat is essential to the conservation of a threatened or endangered species. In consultation for those species with critical habitat, Federal agencies must ensure that their activities do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery. In many cases, this level of protection is similar to that already provided to species by the "jeopardy standard," as previously discussed. However, areas that are currently unoccupied by the species, but which are needed for the species' recovery, are protected by the prohibition against adverse modification of critical habitat.

Migratory Bird Treaty Act

The MBTA was enacted to protect migratory birds and their parts (i.e., eggs, nest, and feathers). A Memorandum of Understanding (MOU) was executed in July 2006 between the DOD and the USFWS to Promote the Conservation of Migratory Birds. Migratory birds are protected under the MBTA of 1918 (16 U.S.C. 703–712) as amended, and EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*. Military readiness activities are exempt from incidental taking of migratory birds pursuant to Section 315 of the Authorization Act for fiscal year 2003 (Public Law 107-314, 116 Stat. 2458). Military readiness activities, as defined in the Authorization Act (50 CFR 21), includes all training and operations of the Armed Forces that relate to combat, and the adequate and realistic testing of military equipment, vehicles, weapons, and sensors for proper operation and suitability for combat use.

Bald and Golden Eagle Protection Act

Bald and golden eagles are protected under the Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. 668–668c), as amended. The Bald and Golden Eagle Protection Act prohibits the take, possession, or transport of bald eagles; golden eagles; and the parts (e.g., feathers, body parts), nests, or eggs without authorization from the USFWS. This includes inactive and active nests. "Take" according to the Act means to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb. Activities that directly or indirectly lead to a "take" are prohibited without a permit from the USFWS.

Marine Mammal Protection Act

All marine mammals in United States waters are protected by the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1361 et seq.), which requires consultation with NMFS if impacts on marine mammals are unavoidable. The MMPA is administered by NMFS and NOAA to protect and manage marine mammals. The protection of coastal marine mammal species is under the jurisdiction of NMFS.

Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. 1801–1882, as amended) requires the identification and description of essential fish habitat (EFH) by regional fishery management councils, in conjunction with NMFS, in fishery management plans for all federally managed fish species. The Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Actions that occur outside EFH, that might affect the habitat, must also be taken into account. Federal agencies are required to consult with NMFS when any activity proposed to be permitted, funded, or undertaken by a Federal agency may have adverse impacts on designated EFH. The EFH regulations define an adverse effect as "any impact which reduces quality and/or quantity of EFH…[and] may include direct (e.g., contamination or physical disruption), indirect (e.g., loss of prey, reduction in species' fecundity), site-specific or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions." Habitat Areas of Particular Concern (HAPCs) are specific subsets of EFH. HAPCs highlight specific habitat areas with extremely important ecological functions and/or areas especially vulnerable to human-induced degradation.

3.5.2 Affected Environment

3.5.2.1 TILLAMOOK, OREGON

Marine Biological Resources

The Bayocean Peninsula is bordered by the Pacific Ocean to the west and Tillamook Bay to the north and east. Tillamook Bay is the third largest estuary in Oregon, covering approximately 8,330 acres. It is very shallow averaging only about 6.5 feet deep, so that three-quarters of the bays bottom area is exposed by the lowest tides. Mean and extreme tide ranges are 5.6 and 13.5 feet respectively, and tidal flows usually dominate the bay's hydrology. Five rivers (the Miami, Kilchis, Wilson, Trask and Tillamook Rivers) discharge freshwater into the bay. The salinity ranges from around 32 parts per thousand (ppt) in the lower (northern) part of the bay, to around 15 ppt at the upper (southern) end of the bay during summer high tides (Golden et al. 1998; Ellis 2002, as cited in Cohen 2004).

The types of habitats in Tillamook Bay include intertidal and subtidal mudflats and sandflats, rocky substrate, channels, the tidal reaches of rivers and sloughs, salt marshes, eelgrass beds, oyster beds, jetties and harbor or marina structures (Golden et al. 1998; Ellis 2002, as cited in Cohen 2004).

Sixty-seven estuarine, marine, and anadromous species of fish have been reported from Tillamook Bay. The Pacific Fishery Management Council designated the EFH in Tillamook Bay and the Open Ocean SERE training area as follows:

- **Pacific Coastal Pelagic Species (fin fish and market squid):** All marine and estuarine waters from the shoreline along the coasts of California, Oregon, and Washington offshore to the limits of the exclusive economic zone (200 miles) and above the thermocline where sea surface temperatures range between 50 and 79 degrees Fahrenheit (USFWS Undated a).
- **Pacific Highly Migratory Species (thresher shark only):** Epipelagic, neritic and oceanic waters off beaches and open coast bays, in near surface waters from the U.S.-

Mexico exclusive economic zone border north seasonally to Cape Flattery, Washington (PFMC 2003).

- **Groundfish:** All waters and substrates with depths less than or equal to 3,500 meters (1,914 fathoms) to mean higher high water level or the upriver extent of saltwater intrusion, defined as upstream and landward to where ocean-derived salts measure less than 0.5 ppt during the period of average annual low flow (PFMC 2005).

- **West Coast Salmon (all species and stocks):** all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in Washington, Oregon, Idaho, and California. Salmon EFH excludes areas upstream of longstanding naturally impassible barriers (i.e., natural waterfalls in existence for several hundred years) but includes aquatic areas above all artificial barriers except specifically named impassible dams. In the estuarine and marine areas, salmon EFH extends from the nearshore and tidal submerged environments within state territorial waters out to the full extent of the exclusive economic zone offshore of Washington, Oregon, and California north of Point Conception (PFMC 2014).

No HAPCs are designated in the ocean training area. Tillamook Bay and seagrasses within the bay have been designated as HAPCs for groundfish and salmon (NOAA 2015).

Four species of clams (cockles [*Clinocardium nuttallii*], butter clams [*Saxidomus giganteus*], gaper clams [*Tresus capax*] and littleneck clams [*Protothaca staminea*]) support a subtidal commercial fishery that has taken nearly 154,000 pounds of clams per year (primarily cockles), and since the late 1980s has accounted for 70 to 90 percent of Oregon's commercial clam harvest. There is also substantial recreational harvest of intertidal clams. Tillamook Bay has historically been Oregon's largest producer of cultured Pacific oysters (*Crassostrea gigas*), yielding 90 percent of the state's production by the 1970s and an average annual yield of 21,200 gallons of shucked oysters in the 1970s and 1980s. However, production has declined since 1990. Sand shrimp (*Neotrypaea californiensis*) are harvested for sale as bait (Coulton et al. 1996; Golden et al. 1998; Hinzman & Nelson 1998; Ellis 2002, as cited in Cohen 2004).

Harbor seals (*Phoca vitulina*) are present in Tillamook Bay. Peak abundance of harbor seals hauling out in Tillamook Bay generally occurs in June, July and August, coincident with pupping and molting periods. The seals haul out on exposed sand flats during low tides (Brown and Mate 1983).

Aerial surveys conducted by the Bureau of Ocean Energy Management (BOEM) recorded two species of marine mammals in the vicinity of the Oregon Open Ocean SERE training area. Surveys were conducted during summer (June-July), fall (September-October), and winter (January-February) of 2011 and 2012. Species identified during these surveys were the California sea lion (*Zalophus californianus*) and harbor porpoise (*Phocoena phocoena*) (Adams et al. 2014). These animals were recorded between 2011 and 2012 in the summer, fall, and winter.

The BOEM surveys also recorded seabird species density. Twenty species were found in densities of two to four birds per square kilometer or greater in the vicinity of the Oregon Open Ocean SERE training area. These included species such as common murres (*Uria aalge*),

brown pelicans (*Pelecanus occidentalis*), shearwaters (*Puffinus* spp.), gulls (*Larus* spp.), loons (*Gavia* spp.), cormorants (*Phalacrocorax* spp.), and auklets (*Ptychoramphus* spp). No protected or special status species were recorded in densities of two to four birds per square kilometer or greater in the vicinity of the Oregon Open Ocean SERE training area (Adams et al. 2014).

Four species of sea turtles occur in the waters off of Oregon; however, no sea turtles nest in Oregon. These species are the green (*Chelonia mydas*), loggerhead (*Caretta caretta*), leatherback (*Dermochelys coriacea*), and Olive Ridley (*Lepidochelys olivacea*) sea turtles. Listed sea turtle species are discussed in more detail in Threatened and Endangered Species Section below.

Terrestrial Biological Resources

The SERE training area on the Bayocean Peninsula primarily consists of sand and sand dunes, with some grass and low shrubs covering the dunes area. Other dunes in the area have a tree covering consisting mainly of shore pine (*Pinus contorta* Douglas ex. Louden var. *contorta*). Swampy areas exist along the bay side of the Peninsula which contains wetland vegetation. Many dunes have been seeded and covered with non-native grasses to minimize erosion (336th TRG 1997).

A variety of wildlife is found on the Bayocean Peninsula including small rodents, rabbits, Columbia black tailed deer (*Odocoileus hemionus columbianus*), and Roosevelt elk (*Cervus Canadensis roosevelti*) (336th TRG 1997).

Tillamook Bay supports many species of waterfowl including the American wigeon (*Anas americana*), northern pintail (*A. acuta*), surf scoter (*Melanitta perspicillata*), bufflehead (*Bucephala albeola*), brown pelican (*Pelecanus occidentalis*), least sandpiper (*Calidris minutilla*), black-bellied plover (*Pluvialis squatarola*), semipalmated plover (*Charadrius semipalmatus*), whimbrel (*Numenius phaeopus)*, sanderling (*C. alba*), dunlin (C. *alpina*), short-billed dowitcher (*Limnodromus griseus*) and great blue heron (*Ardea herodius*) (PFMC 2003).

Threatened and Endangered Species

Several threatened and endangered species may be present in the Oregon project area. Critical habitat for the western snowy plover (*Charadrius nivosus nivosus)* is located on the Bayocean Peninsula (**Figure 2-1**). A BA was prepared for Tillamook SERE activities occurring from 2010 to 2019 (USACE 2009). For the updated EA, the USAF reviewed the USFWS Information, Planning, and Conservation Online system (http://ecos.fws.gov/ipac/) to determine if any federally-listed species potentially occur in the vicinity of the Proposed Action. The following species are federally listed in the Tillamook Bay area, Tillamook County, Oregon **(Table 3-7)**.

Table 3-7. Federal Threatened and Endangered Species that Potentially Occur in Tillamook, Oregon

Species	Federal Status	State Status	Critical Habitat Present in Training Area	Habitat Present in Training Area
Birds				
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened	Threatened	No	Yes, foraging only, no nesting habitat.
Northern Spotted owl (*Strix occidentalis caurina*)	Threatened	Threatened	No	No
Short-Tailed albatross (*Phoebastria* (=*diomedea*) *albatrus*)	Endangered	Endangered	No	No
Western snowy plover (*Charadrius nivosus nivosus*)	Threatened	Threatened	Yes	Yes
Mammals				
Red tree vole (*Arborimus longicaudus*)	Candidate	Not listed	No	No
Reptiles				
Green sea turtle (*Chelonia mydas*)	Threatened	Endangered	No	Yes, foraging only, no nesting habitat.
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	Endangered	Yes	Yes, foraging only, no nesting habitat.
Loggerhead sea turtle (*Caretta caretta*)	Endangered	Threatened	No	Yes, foraging only, no nesting habitat.
Olive Ridley sea turtle (*Lepidochelys olivacea*)	Threatened	Threatened	No	Yes, foraging only, no nesting habitat.
Fish				
Oregon Coast coho salmon (*Oncorhynchus kisutch*)	Threatened	Not listed	Yes	Yes
North American green surgeon–southern Distinct Population Segment (DPS) (*Acipenser medirostris*)	Threatened	Not listed	No	Yes
Pacific eulachon –southern DPS (*Thaleichthys pacificus*)	Threatened	Not listed	No	Yes
Marine Mammals				
Blue whale (*Balaenoptera musculus*)	Endangered	Endangered	No	Yes
Fin whale (*Balaenoptera physalus*)	Endangered	Endangered	No	No, more offshore distribution
Humpback whale- Mexico DPS (*Megaptera novaengliae*)	Threatened	Endangered	No	Yes
Sei whale (*Balaenoptera borealis*)	Endangered	Endangered	No	No, more offshore distribution

Species	Federal Status	State Status	Critical Habitat Present in Training Area	Habitat Present in Training Area
Sperm whale (*Physeter microcephalus*)	Endangered	Endangered	No	No, more offshore distribution
Southern resident killer whale (*Orcinus orca*)	Endangered	Not listed	No	Yes

Source: USFWS 2018, ODNR 2014, NMFS 2016

Marbled Murrelet

The marbled murrelet is a small, robin-sized, diving seabird which spends the majority of its time on the ocean (> 90 percent), resting and feeding, but flies inland to nest in old growth forest stands. Marbled murrelets nest from April to mid-September (USFWS Undated d).

Marbled murrelets nest inland in forests generally characterized by large trees with large branches or deformities for use as nest platforms. Murrelets nest in stands varying in size from several acres to thousands of acres. However, larger, unfragmented stands of old growth appear to be the highest quality habitat. Nesting stands are dominated by mixed conifer in Oregon and Washington (USFWS Undated d).

Forested land inland from Tillamook Bay has been subject to intensive logging. Additionally, hundreds of thousands of acres of forest lands inland from Tillamook Bay were consumed by wildfire in the various Tillamook burns in the 1920s and 1930s. Consequently, old growth forest inland from Tillamook Bay is limited in extent. Nearshore and bay and waters in the vicinity of the Bayocean Peninsula likely receive minimal use by marbled murrelets due to the absence of old growth forest inland from Tillamook Bay, and likely are used more extensively by wintering birds (USACE 2009). No suitable nesting habitat occurs in the Tillamook Bay training area. Critical habitat for the species occurs east of the Proposed Action Area.

Marbled murrelets usually forage within 5 miles from shore and in water less than 200 feet deep. In general, birds occur closer to shore in exposed coastal areas and farther offshore in protected coastal areas (USFWS Undated d). Foraging habitat is present within the Tillamook training area. Because old growth forest nesting habitat inland from Tillamook Bay is limited, nearshore and bay waters in the vicinity of the Bayocean Peninsula likely receive minimal use by marbled murrelets (USACE 2009). Marbled murrelets were recorded during the BOEM survey; however, in the vicinity of the Proposed Action, recorded densities were less than two birds per square kilometer or greater (Adams et al. 2014).

Northern Spotted Owl

The northern spotted owl is one of three spotted owl subspecies found in North America. A species with dark eyes and no ear tufts (**Appendix C, Figure 1**), the spotted owl is about 18 inches from head to tip of tail and has a wingspan of approximately 41 inches. The spotted owl is distributed from extreme southwestern British Columbia south to central coastal California. Spotted owls are strongly associated with structurally complex forest. Such forests are generally old growth, but the owls also use mature and some younger-aged forests. Spotted owls nest in the tops of trees or in cavities of naturally deformed and/or diseased trees. The breeding season

varies with geographic location and elevation. Nesting generally occurs from February (courtship) to June (fledging), and parental care of the young owlets can extend into September, when young owls begin to disperse from the area (USFWS Undated e). The Tillamook Bay training area does not meet habitat requirements for northern spotted owls.

Short-Tailed Albatross

The short-tailed albatross is the largest of three albatross species found in the North Pacific Ocean. Short-tailed albatrosses are best distinguished by their large, bubblegum-pink bill with bluish tip. There are only two active breeding colonies, Torishima Island and Minami-kojima Island, Japan (USFWS 2001). The short-tailed albatross spends the summer in the north Pacific and returns to its breeding island in winter. Short-tailed albatross forage extensively along continental shelf margins, typically over 200 m deep. Short-tailed albatrosses were not recorded in the Open Ocean SERE training area, located nearshore on the continental shelf in waters approximately 100 m deep, during the BOEM survey (Adams et al. 2014).

Western Snowy Plover

The western snowy plover is a small shorebird that weighs up to 2 ounces and is between 6 and 6.5 inches long. It has a pale gray-brown back, white chest, and black legs and bill (USFWS 2015b). The Bayocean Peninsula is a historic western snowy plover nesting area and is occasionally used by wintering plovers. Wintering plovers were last observed in October and December of 2007. In Oregon, plovers may begin nesting as early as mid-March, but most nests are initiated from mid-April through mid-July. Peak hatching occurs from May through July, and most fledging occurs from June through August. Female plovers may nest multiple times in one season, after nest failure or after a clutch hatches successfully. Typically, three eggs are laid in a nest, and the eggs take approximately 30 days to hatch. The chicks are precocial, and leave the nest within hours to search for food, making them vulnerable to predators, recreational activity, and inclement weather. At the Bayocean Peninsula, western snowy plovers may initiate nesting during the SERE spring training since the peak time for plover nesting is in mid-April to mid-July (USFWS 2009). Critical habitat for the plovers occurs on the peninsula in the recreation management area.

Red Tree Vole

Red tree voles are small, furry rodents less than 8 inches long, weighing up to 2 ounces. Their thick coats range in color from reddish-brown to orange-red. Melanistic (all black) and cream-colored forms of the red tree vole also occur (USFWS 2015a).

The red tree vole is found primarily in late-successional (older, structurally complex) forests in western Oregon and northwestern California. Because of their exclusive diet of conifer needles, red tree voles are restricted to conifer forests. Though they use a variety of tree species, they principally feed on Douglas fir needles and nest in Douglas fir trees. However, red tree voles in a portion of the North Coast Range are associated with Sitka spruce and western hemlock forests. Research indicates they exhibit a strong preference for older trees and complex forested habitats (USFWS 2015a). These habitats are not present on the Bayocean Peninsula; therefore, the red tree vole is unlikely to occur in the project area.

Green Sea Turtle

On April 6, 2016, NMFS and the USFWS published a final rule listing 11 DPSs for the listed green turtle (*Chelonia mydas*) (81 FR 20057) including the eastern Pacific DPS, the population that most likely occurs in the U.S. west coast waters. The green sea turtles use open ocean convergence zones and coastal area for benthic foraging on sea grass, invertebrates, and macroalgae. This DPS commonly occurs south of Point Conception in southern California but has been found as far north as Alaska (NMFS and USFWS 1998). In the U.S., green turtles nest on beaches primarily along the central and southeast coast of Florida.

Leatherback Sea Turtle

The Leatherback sea turtle (*Dermochelys coriacea*) is the largest, deepest diving, and most migratory and wide ranging of all sea turtles (NMFS 2018a). Forging preference includes soft-bodied open ocean prey such as jelly fish. Preferred nesting habitat includes sandy sloped beaches backed with vegetation Primary nesting habitats of the Eastern Pacific leatherback turtle population are in Mexico and Costa Rica, with some isolated nesting in Panama and Nicaragua (NMFS 2018a). No nesting habitat is available for the species in the Proposed Action area. The nearshore waters between Cap Flattery, Washington and Cape Blanco, Oregon extending offshore to the 2000 meter isobaths is the principal Oregon/Washington foraging area 9 (NMFS and USFWS 2013).

Loggerhead Sea Turtle

The North Pacific DPS of loggerhead sea turtle (*Caretta caretta*) in habits continental shelves, bays, lagoons, and estuaries. Along the U.S. west coast, most sightings are of loggerhead turtle are of juveniles in the open ocean and most occur in southern California. Nesting occurs mainly on relatively narrow steeply sloped beaches having course-grained sand. The only known nesting areas for loggerheads in the North Pacific are found in southern Japan (NMFS 2017). Although there is a potential for loggerhead sea turtles to occur along the Oregon coast, they are likely rare in the project vicinity.

Olive Ridley Sea Turtle

Along the west coast, olive ridley sea turtle (*Lepidochelys olivacea*) primarily occur off California and occasionally north the Oregon coast during feed migration. This species has a mostly pelagic distribution. Olive ridleys often migrate great distances between feeding and breeding. This species nests simultaneously in large groups known as an arribada (NMFS 2014). Only a few nesting beaches occur in the eastern Pacific (South America area) and northern Indian oceans. Although there is a potential for olive ridley sea turtles to occur along the Oregon coast, they are likely rare in the project vicinity.

Oregon Coast Coho Salmon

The threatened Oregon Coast coho salmon (Oncorhynchus kisutch) smolts migrate through Tillamook Bay to the ocean, after their second year, with peak migration from mid-April to mid-June. Adult spawners migrate through the action areas from August through February unusually as three-year old adults. Some males that reach sexual maturity after the first summer at sea may return as two-year old “jacks” (ODFW 2015). Smolt and adult presence in the Tillamook Bay area would be transitory as they migrate to the ocean or to spawning

grounds. Oregon is on the southern range of coho production that extends from Point Hope, Alaska to Monterey Bay, California (ODFW 2015).

North America Green Sturgeon

The North American green sturgeon (Acipenser medirostris), like most sturgeon are anadromous, but tend to spend more time in the ocean than most species. Fish that spawn in the Sacramento River in California belong to the federally threatened southern DPS (sDPS). After hatching, larvae and juveniles migrate downstream of the rivers towards estuaries (NMFS 2018b). The hatchlings spend several year in these estuaries before moving to the ocean. As adults, green sturgeons migrate seasonally along the West Coast, congregating in bays and estuaries in Washington, Oregon, and California during the summer and fall months. Green sturgeon may occur off Tillamook Bay in marine waters and they are known to congregate in coastal water and estuaries. Studies in Washington indicate that green sturgeons are present in estuaries from June until October presumably for feeding (Beamis and Kynard 1997; Moser and Lindley 2007).

Pacific Eulachon

The Pacific Eulachon (Thaleichthys pacificus), are an anadromous forage fish and are endemic to the northeastern Pacific Ocean; they range from northern California to southwest and south-central Alaska. The southern DPS of eulachon is comprised of fish that spawn in rivers south of the Nass River in British Columbia to, and including, the Mad River in California (NMFS 2018c). The habitat in the Tillamook Bay and its associated riverine tributaries are similar to other areas known to support eulachon. No known observations of eulachon have been documented in the Tillamook Bay (Gustafson et al. 2010); however, there have also not been intensive survey efforts.

Blue Whale

The U.S. west coast is an important feeding area in summer and fall for blue whales (*Balaenoptera musculus*) of the eastern North Pacific stock. The blue whale, the largest whale species, is a baleen forager of krill. Although they have been found in coastal water, the species generally occurs more offshore. Although the species occurs from the Gulf of Alaska and California south to Costa Rica in the eastern Pacific, they occur primarily south of the Aleutian Islands and the Bering Sea (ODFW 2018). Sightings off the U.S. west coast are concentrated off the California coast but survey data also indicate occasional sightings off the Oregon coast (Carretta et al. 2016). Usually these sightings are greater than 10 miles off the Oregon coast (ODFW 2018). This species migrates from breeding and calving areas off Central America and Mexico to feeding areas along the west coast of the U.S. and Canada.

Fin Whale

The fin whales (Balaenoptera physalus) is the second largest species of whale divided into four stocks for management purposes (NMFS 2018d). The fin whale of the California/Oregon/Washington stock has been detected year round from northern California to Washington. They have also been sighted offshore in Oregon waters (Carretta et al. 2016). The species is a fast swimmer usually found in social groups of two to seven and may feed in larger groups that contain other marine mammal species. In the summer, fin whales forage on small schools of fish, krill and squid filtering food through baleen plates (NMFS 2018d). Fin whales

are found in deep, offshore waters migrating from the Arctic and Antarctic feeding areas in the summer to tropical breeding and calving areas in the winter.

Humpback Whale

On April 2, 2015, NMFS announced a proposed rule to revise the globally listed endangered species of humpback whales (*Megaptera novaengliae*) into 14 distinct population segments (DPSs); 2 DPSs are proposed to be listed as endangered and 2 DPSs are proposed to be listed as threatened (80 FR 22303). Humpback whales in the North Pacific (Mexico DPS) migrate seasonally from northern latitudes in the summer to lower latitudes in the winter (NMFS 2018e). This species is a filter-feeder feeding on small crustaceans, especially krill. Although only one stock is currently recognized off the U.S. west coast, there appears to be two feeding groups, a California and Oregon group, and a northern Washington and southern British Columbia feeding group (Calambokidis et al. 2008, Barlow et al. 2011). Humpback whales have been sighted off the Oregon coast relatively close to shore (Carretta et al. 2016), and have the potential to occur in the project vicinity. The Mexican population breeds along the Pacific coast of Mexico, the Baja California Peninsula, and the Revillagigedos Islands, and feeds across a broad range from California to the Aleutian Islands (NMFS 2018e).

Sei Whale

Sei whales (*Balaenoptera borealis*) fed on plankton (including copepods and krill), small schooling fish, and cephalopods (including squid) by both gulping and skimming (NMFS 2018f). This species has been observed in small social groups and also as solitary individuals. Sei whales have a wide distribution and are typically found in deeper waters far from the coastline (NMFS 2018e). Very little information is known about their seasonal distribution. Sei whales do not appear to be associated with coastal features and sighting locations based on surveys off California, Oregon, and Washington indicate a relatively offshore distribution (Carretta et al. 2016).

Sperm Whale

Sperm whales (*Physeter microcephalus)* are widely distributed in the North Pacific and have been observed in Oregon waters from March through November (ODFW 2018). The surveys off California, Oregon, and Washington from 1991- 2008 indicate that sperm whales are not generally distributed near shore (Carretta et al. 2016). This species is the largest of the toothed whales feeding on fish, giant squid, rays, and sharks. Sperm whales spend most of their time in deep ocean water and their distribution is dependent on their food source and suitable conditions for breeding and may vary with the age and sex composition of the group (NMFS 2018g).

Southern Resident Killer Whale

Killer whales (*Orcinus orca*) are a top marine predator with the widest distribution of all the whale and dolphin species (NMFS 2018h). The southern resident population is one of two populations of killer whales that receive protection under the ESA. This population ranges from central California to southeast Alaska. They spend considerable time in the Georgia Basin from late spring to early autumn, with concentrated activity in the inland waters of Washington State around the San Juan Islands. In the winter and early spring, southern resident killer whales move into the coastal waters along the outer coast from the southeast Alaska south to central

California. They can often be seen off the coast around mid-April off Depoe Bay and Newport (ODFW 2018). The killer whale is highly social living in groups called pods. Their primary diet varies depending on prey availability and by the hunting techniques of the pod (NMFS 2018h). The southern resident population is highly dependent upon salmon.

3.5.2.2 FORKS, WASHINGTON

Aquatic Biological Resources

The launching of rafts and rafting would occur on the Sol Duc, Calawah, and Hoh rivers. These rivers provide habitat to salmonid fish which require cold, well-oxygenated water to complete their lifecycle. The mainstem of the Sol Duc River is accessible to salmonids for almost 60 miles from the mouth of the river to Sol Duc Falls. Species present include Chinook (*Oncorhynchus tshawytscha*), sockeye (*O. nerka*), coho (*O. kisutch*), and steelhead salmon (*O. mykiss*). The Calawah River supports these species as well as chum (*O. keta*), cutthroat trout (*O. clarki*), mountain whitefish (*Prosopium williamsoni*), common sculpins (*Cottid* spp.), and Pacific lampreys (*Entosphenus tridentatus*). Species present in the Hoh river include the above salmon species as well as the threatened bull trout (*Salvelinus confluentus*) and the proposed threatened (by similarity of appearance) Dolly Varden (*S. malma*) (Golder 2005).

The Pacific Fishery Management Council has designated EFH in the Forks project areas for the Chinook and coho salmon. The Sol Duc, Calawah, and Hoh rivers are all designated EFH. The following HAPCs have been designated for salmon: Complex Channels and Floodplain Habitats, and Thermal Refugia and Spawning Habitat (PFMC 2014). These HAPCs may occur in the project area; however, they are unmapped at this time.

Terrestrial Biological Resources

Two SERE tropical training areas are located in DNR Trust Lands. DNR Trust Lands in Clallam County are a part of the Olympic Experimental State Forest (OESF). The OESF is unique among the forested trust lands in both management and purpose. The OESF is a place for applied research and monitoring to learn how to better integrate revenue production and ecosystem values across state trust lands. This is achieved through a strong emphasis on adaptive management – a formal process of improving land management practices in response to new information (WDNR 2015a).

In the OESF, the Sitka Spruce (*Picea sitchensis*) vegetation zone dominates along the coast. The Western Hemlock (*Tsuga heterophylla*) zone comprises a majority of the forest with western redcedar (*Thuja plicata*) found in the wetter areas. The Pacific silver fir (*Abies amabilis*) zone extends higher in elevation. Douglas-fir (*Pseudotsuga menziesii*) is a seral component in all zones; red alder (*Alnus rubra*) is a seral component in lower elevations. The area is characterized by a very high tree growth rate. Old growth forest once dominating the landscape is still available on part of state trust lands in the OESF. About 50 percent of the OESF is dominated by young stands (WDNR 2015b).

The Rayonier properties of the SERE tropical training areas are actively managed for timber harvest. Core species include western hemlock, douglas-fir, and silver, noble (*A. procera*), and white (*A. concolor*) firs (Rayonier 2015).

Many species of wildlife inhabit the Olympic Peninsula, where all tropical training properties are located. Wildlife potentially present in the project areas includes mammals such as the Columbia black-tailed deer, Roosevelt elk, snowshoe hare (*Lepus americanus*), cougar (*Puma concolor*), bobcat (*Lynx rufus*), black bear (*Ursus americanus*), and long-tailed weasel (*Mustela frenata*). Bird species may include the red-tailed hawk (*Buteo jamaicensis*), warbling vireo (*Vireo gilvus*), western tanager (*Piranga ludoviciana*), spotted towhee (*Pipilo maculatus*), and common raven (*Corvus corax*). Reptiles and amphibians may include the northwestern salamander (*Ambystoma gracile*), Pacific tree frog (*Pseudacris regilla*), western toad (*Anaxyrus boreas*), rubber boa (*Charina bottae*), and Puget Sound garter snake (*Thamnophis sirtalis pickeringii*) (WDNR 2013). Bald eagle and golden eagle nests have been recorded in the vicinity of the project vicinity (WDFW 2015a). Breeding season (nesting to fledging) in the Pacific Northwest is from January to August (USFWS 2007).

Threatened and Endangered Species

Several threatened and endangered species may be present in the project area. **Table 3-8** lists these species and their status. Critical habitat for the northern spotted owl and the marbled murrelet is located adjacent to DNR Forks and Rayonier projects areas as shown in **Figure 3-2**.

Table 3-8. Federal Threatened and Endangered Species that May Occur in Forks, Washington

Species	Federal Status	State Status	Critical Habitat Present in Training Area	Habitat Present in Training Area
Birds				
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened	Threatened	Yes	Yes
Northern Spotted owl (*Strix occidentalis caurina*)	Threatened	Endangered	Yes	Yes
Streaked horned lark (*Eremophila alpestris strigata*)	Threatened	Endangered	No	No
Yellow-billed cuckoo (*Coccyzus americanus*)	Threatened	Candidate	No	No
Fish				
Bull Trout (*Salvelinus confluentus*)	Threatened	Candidate	No	Yes
Dolly Varden (*Salvelinus malma*)	Proposed Threatened, Similarity of Appearance	Not listed	No	Yes
Conifers and Cycads				
Whitebark pine (*Pinus albicaulis*)	Candidate	Not listed	NA	Yes

Source: USFWS 2015b, WDFW 2015b

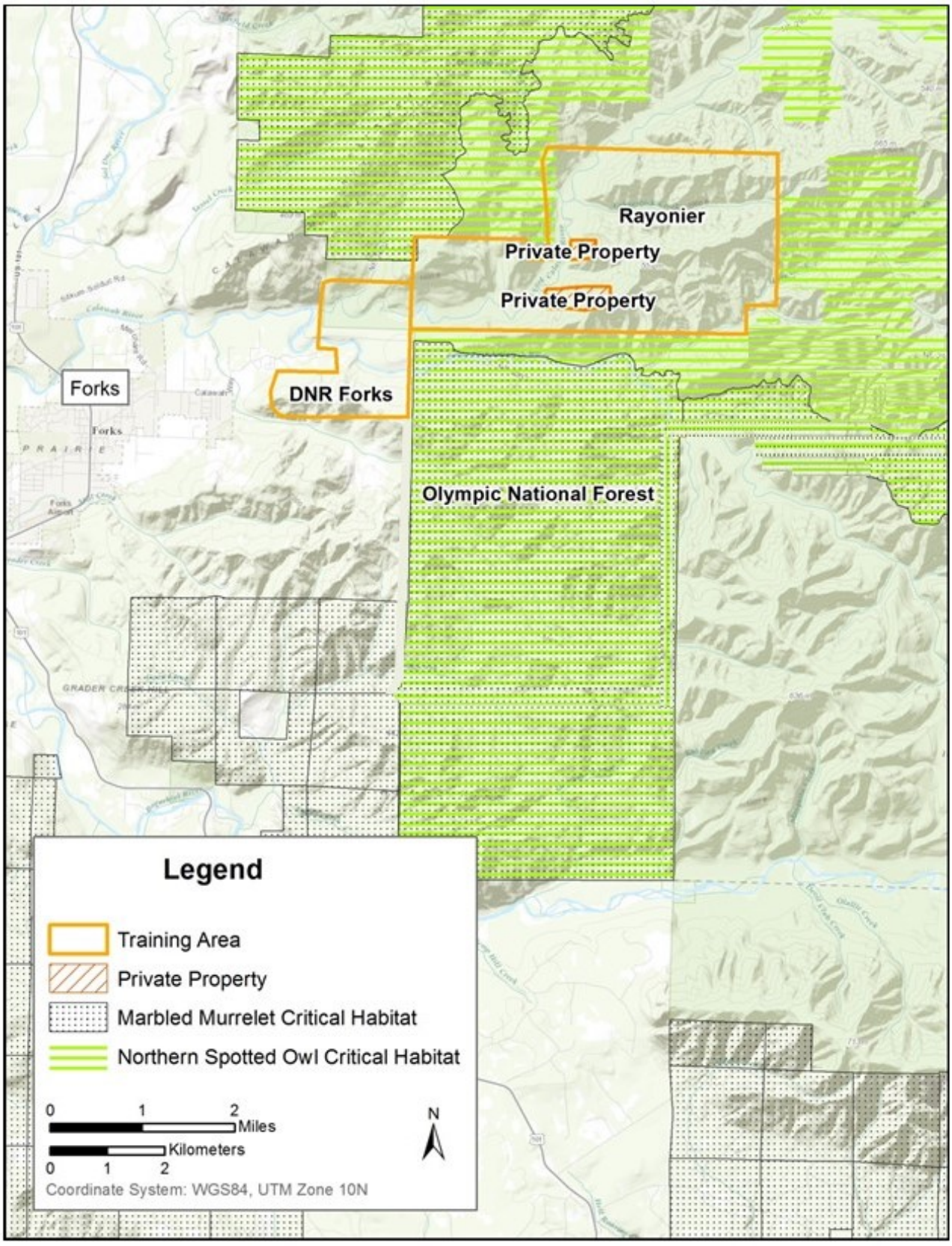

Figure 3-2. Critical Habitat near the Washington SERE Training Areas

Marbled Murrelet

Marbled murrelets are known to occur within the Washington project area, with critical habitat present adjacent to the DNR Forks and Rayonier training areas as well as beneath the proposed flight route from Fairchild Airport to the training areas. Primary constituent elements of the critical habitat include forested stands with trees, generally greater than 32 inches diameter bole height, that have potential nesting platforms at least 33 feet above the forest floor and that the surrounding forest, within 0.5 mile of the aforementioned stand, must have a canopy height of at least one-half the site-potential tree height (USFWS 1996).

Northern Spotted Owl

Northern spotted owls are known to occur within the Washington project area, with critical habitat present adjacent to the DNR Forks and Rayonier training areas as well as beneath the flight route from Fairchild Airport to the training areas. Habitat preference for the species was previously described.

Streaked Horned Lark

The streaked horned lark is a rare endemic subspecies found only in western Washington and Oregon. The streaked horned lark is a small, slender, long-winged bird with distinctive black "horns," which are actually feather tufts. The male's face and throat are yellowish. Adults have a black bib covering the chest and black whisker marks (USFWS Undated b).

Most Washington streaked horned larks over-winter in Oregon and begin to arrive at nesting grounds in late February. Nesting begins in late March and continues into June. The nest consists of a shallow depression built in the open or near a grass clump and lined with fine dead grasses. The female commonly lays four greenish or grayish eggs speckled with brown. Incubation lasts 11 days and the young are able to fly within 9 to 12 days after hatching. Historically, streaked horned larks may have bred in Clallam County; however, the county is not listed by the USFWS as a county where the species is known or believed to occur. The nearest counties where the species is known or believed to occur are Grays Harbor and Mason, more than 15 miles south of Clallam County. The preferred grassland habitat is not present in the Forks SERE training areas.

Yellow-billed cuckoo

Yellow-billed cuckoos have been extirpated as a breeder within Washington and Oregon for the past 90 years. Recent observations of this species in Washington appear to be migrants (50 CFR 17). Yellow-billed cuckoos have only been recorded 15 times between 1950 and 2012 in Washington (WDFW 2012). Yellow-billed cuckoos would not be expected to be encountered in the project vicinity.

Bull Trout and Dolly Varden

Rafts would be launched into the Hoh River where bull trout are known to occur. Bull trout are members of the char subgroup of the salmonid family, which also includes the Dolly Varden, lake trout, and Arctic char. Char have light-colored spots on a darker background, just the opposite of the pattern on salmon and trout, which have dark spots on a light background. The bull trout and Dolly Varden were previously considered a single species, and referred to by the common name Dolly Varden. Now the bull trout and the Dolly Varden are formally recognized

as two separate species based on technical taxonomic characteristics. However, the two species are virtually impossible to tell apart visually, even by specialists (USFWS 1998).

The area of river located in the launch areas is thought to be used as a migratory corridor. Bull trout are thought to spawn in the rear and side channels of the Hoh River. The majority of redds (spawning nests) are located within Olympic National Park, upstream of the training area (Golder 2005). Bull trout that live in streams rarely exceed 4 pounds (USFWS 1998). Bull trout are primarily threatened in the Hoh River by upland/riparian land management practices, e.g., legacy timber harvest and roads (USFWS 2014).

Whitebark Pine

Whitebark pine (*Pinus albicaulis* Engelm.) is a slow-growing, long-lived tree of the high mountains of southwestern Canada and western United States. In the Olympic Mountains it grows primarily on exposed sites near the tree line between 5,800 and 7,000 feet. It is of limited commercial use, but it is valued for watershed protection and esthetics. Concern about the species has arisen because, in some areas, whitebark pine cone crops have diminished as a result of successional replacement and insect and disease epidemics. Threats to whitebark pine include white pine blister rust, mountain pine beetle, fire suppression and catastrophic fire (USFWS Undated c).

3.5.3 Environmental Consequences

3.5.3.1 PROPOSED ACTION

Tillamook, Oregon

Marine Biological Resources. Short-term, direct, negligible to minor adverse impacts to marine resources would be expected under the Proposed Action. In-water activities associated with the Proposed Action include shellfish gathering, rafting, ocean drops, helicopter hoisting operations, and swimming. Other activities that could affect marine biological resources include vector training helicopter flights. USCG vessel operations are managed by the USCG process and permits, and are not discussed further.

Marine mammals and sea turtles may be present in the Open Ocean SERE training area. Helicopter operations during SERE training have the potential to disturb marine mammals and sea turtles. Training (April and September) does not occur in peak haul out periods (June, July and August); however, pinnipeds could still be present in the training areas. Pinnipeds hauled out on land react to airborne sound and/or sight of aircraft by becoming alert and often rushing into the water, with helicopters more disrupting than fixed-wing aircraft. Some pinnipeds become habituated to aircraft noise, and helicopters are frequently operated in the area by the USCG (Richardson et al. 1995). Helicopter noise might affect sea turtles at the surface by eliciting startle responses due to increasing noise of a helicopter as it rapidly approaches, or due to the physical presence of the helicopter in the air (PFMC 2005). Impacts on marine mammals and sea turtles are expected to be negligible and unlikely due to minimal SERE helicopter operations each year and because helicopters are frequently operated in the area by the USCG.

Sea birds may also be present in the Open Ocean SERE training area and are likely to flush from the area during training. These individuals would likely return after the disturbance has ended. Bird-helicopter strikes could potentially occur; however, no bird strikes have occurred

during previous training sessions on site. A strike did occur while in was in transit to the training area and in the vicinity of Portland International Airport. The USAF is authorized for incidental takes of migratory birds provided that they adhere to the regulations set forth in the MBTA (Authorization of take incidental to military readiness activities, 50 CFR 21.15 [authorization] and 21.3 [definitions]). Helicopter flights in support of SERE training are considered military readiness activities.

Shellfish harvest by the trainees during coastal training would not be expected to have impact on shellfish resources. The USAF obtains permits from the DFW for the harvest of shellfish during the training. The USAF harvests minor amounts of shellfish during training, and the Oregon DFW monitors and records of what are taken.

The Proposed Action would not have an adverse effect on EFH or HAPCs. The Proposed Action would not cause direct or indirect physical, chemical, or biological alterations of the waters or substrate. The Proposed Action also would not cause loss of, or injury to species and their habitat, and other ecosystem components, or reduction of the quality and/or quantity of EFH. Shellfish are harvested by hand during low tide, while seagrass usually occurs below the low tide mark (i.e., always submerged) and therefore would not be impacted. All shellfish gathering would be conducted in accordance with Oregon DFW authorization.

Terrestrial Biological Resources. Short-term, direct, negligible adverse impacts on terrestrial biological resources would be expected under the Proposed Action near Tillamook, Oregon. SERE training activities that have the potential to impact wildlife include camping and helicopter operations. No impacts to vegetation would be expected. Training activities would likely disturb resident wildlife species and cause an individual to leave or avoid the area. These species would likely return after the disturbance has ended. Bird-helicopter strikes could potentially occur. However, there is only one known bird strike that has occurred during coastal and open ocean training, which was in transit to the training area and in the vicinity of Portland International Airport. The USAF is authorized for incidental takes of migratory birds provided that they adhere to the regulations set forth in the MBTA (Authorization of take incidental to military readiness activities, 50 CFR § 21.15 [authorization] and 21.3 [definitions]). Helicopter flights in support of SERE training are considered military readiness activities.

Threatened and Endangered Species. This section discusses potential impacts resulting from the Proposed Action to the species listed in Tables 3-7. In general, potential impacts from the Proposed Action in the Tillamook, Oregon, training areas on threatened and endangered species would be no impacts to short-term negligible adverse impacts.

ESA Consultation History. In accordance with permits issued for SERE training on the Bayocean Peninsula, the USACE developed a Biological Assessment (BA), Biological Assessment for Western Snowy Plover, Brown Pelican, Marbled Murrelet, Northern Spotted Owl, Short-Tailed Albatross, and Oregon Silverspot Butterfly for Biannual U. S. Air Force Survival Training (10-Year Coverage) at Bayocean Spit Area, Tillamook County, Oregon, in February 2000 to determine the potential effects of SERE training on listed and proposed species and designated and proposed critical habitat in the action area, in accordance with 50 CFR 402.12. The action area for this effort is defined as the areas permitted for training on the Bayocean Peninsula **(Figure 2-1).**

Based on the findings in the 2000 BA, the USACE concluded that the training may affect, but is not likely to adversely affect, the western snowy plover *(Charadrius alexandrines nivosus)*, brown pelican *(Pelicanus accidentalis)*, and marbled murrelet *(Brachyramphus mannoratus)*; and not affect the northern spotted owl *(Strix occidentalis caurina)*, short-tailed albatross *(Phoebastria albatrus)*, and Oregon silverspot butterfly (*Speyeria zerene Hippolyta)*. The USACE received a letter from the USFWS that stated concurrence with these determinations, dated March 1, 2000 [8330.1944(00)], to cover 10 years of training (2000 through 2009).

On July 2, 2009, the USACE initiated Section 7 informal consultation to evaluate an additional 10 years (2010 through 2019) of SERE training. Since the completion of the BA in 2000, the brown pelican has been delisted. The USACE submitted a revised BA on November 25, 2009, and concluded that the proposed training activities for 2010 to 2019 may affect, but are not likely to adversely affect, the western-snowy plover nor adversely modify western snowy plover critical habitat. The USACE also determined the proposed activities may affect, but are not likely to adversely affect, the brown pelican*,* and marbled murrelet*.* The USACE made no effect determinations for Nelson's checker mallow *(Sidalcea nelsoniana),* northern spotted owl*,* short-tailed albatross and Oregon silverspot butterfly*.*

On December 17, 2009, the USACE received a letter from the USFWS that stated concurrence with the determination that continuation of SERE training activities on the Bayocean Peninsula from 2010 through 2019 may affect, but are not likely to adversely affect, the western snowy plover or adversely modify western snowy plover critical habitat based on the information provided in the revised BA and past survey records. The USFWS also stated no objection to the determination that the SERE training activities will have no effect upon the northern spotted owl, Oregon silverspot butterfly, short-tailed albatross and Nelson's checkermallow because they are not expected to be in the project vicinity, due to a lack of suitable habitat.

The USAF is currently re-initiating consultation with the Oregon USFWS for the training activities occurring after 2019 and to include changes in the littered species considered in the analysis. The USAF determined that the Proposed Action would not affect the Northern spotted owl, shot-tailed albatross, or the red tree vole as habitat for these species was not found in the action area. The USAF determined that the Proposed Action may affect, but is not likely to

adversely affect, the western snowy plover and its critical habitat, and the marbled murrelet. (**Table 3-9**).

In response to their review of the original Draft EA, NMFS sent a letter dated March 11, 2016 to the USAF with review comments. NMFS requested in that letter that the USAF consider marine mammals (whales), and conduct an assessment of impacts of the proposed action on essential behaviors of ESA-listed marine mammals. NMFS also included in its letter various recommendations for USAF to implement during SERE training exercises in order to minimize effects to marine turtles and mammals. USAF followed up with a letter to NMFS dated May 18, 2016 that stated the USAF would implement all recommendations to minimize effects to ESA-listed marine turtles and mammals. The USAF determined that the Proposed Action may effect, but not likely to adversely effect, all ESA-listed species subject to NMFS jurisdiction in the March 11, 2016 letter (**Table 3-9**). NMFS concurred with the USAF determinations in a final letter dated June 28, 2016 (**Appendix A**).

Table 3-9. Federal Threatened and Endangered Species Effects Determination for Tillamook, Oregon

Species	Federal Status	Species Effect Determination	Critical Habitat Effect Determination
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened	May affect, not likely to adversely affect	Not applicable
Northern spotted owl (*Strix occidentalis caurina*)	Threatened	No effect	Not applicable
Short-tailed albatross (*Phoebastria* (=*diomedea*) *albatrus*)	Endangered	No effect	Not applicable
Western snowy plover (*Charadrius nivosus nivosus*)	Threatened	May affect, not likely to adversely affect	May affect, not likely to adversely affect
Red tree vole (*Arborimus longicaudus*)	Candidate	No effect	Not applicable
Oregon Coast coho salmon (*Oncorhynchus kisutch*)	Threatened	May affect, not likely to adversely affect	No effect
North American green surgeon-southern DPS (*Acipenser medirostris*)	Threatened	May affect, not likely to adversely affect	Not applicable
Pacific eulachon –southern DPS (*Thaleichthys pacificus*)	Threatened	May affect, not likely to adversely affect	Not applicable
Leatherback sea turtle (*Dermochelys coriacea*)	Endangered	May affect, not likely to adversely affect	No effect
Loggerhead sea turtle (*Caretta caretta*)	Endangered	May affect, not likely to adversely affect	Not applicable
Olive Ridley sea turtle (*Lepidochelys olivacea*)	Threatened	May affect, not likely to adversely affect	Not applicable
Green sea turtle (*Chelonia mydas*)	Threatened	May affect, not likely to adversely affect	Not applicable
Blue whale (*Balaenoptera musculus*)	Endangered	May affect, not likely to adversely affect	Not applicable
Fin whale	Endangered	May affect, not likely to	Not applicable

(*Balaenoptera physalus*)		adversely affect	
Humpback whale (*Megaptera novaengliae*)	Endangered	May affect, not likely to adversely affect	Not applicable
Sei whale (*Balaenoptera borealis*)	Endangered	May affect, not likely to adversely affect	Not applicable
Sperm whale (*Physeter microcephalus*)	Endangered	May affect, not likely to adversely affect	Not applicable
Southern resident killer whale (*Orcinus orca*)	Endangered	May affect, not likely to adversely affect	Not applicable

Marbled Murrelet

Short-term, negligible, adverse impacts on marbled murrelets from the in-water Open Ocean and Tillamook Bay SERE training activities would be expected. These activities include rafting, ocean drops, helicopter hoisting operations, and swimming. Vector training helicopter flights would also have the potential to disturb marbled murrelets. Disturbance would be more likely to occur during the September training sessions as the bay is more likely to be used by wintering murrelets (USACE 2009). USAF training exercises in the Tillamook Bay and nearshore ocean waters are short-term, entail only a small area for each action, and would occur in waters that receive minimal use by marbled murrelets. Additionally, commercial and sport-fishing activities, plus general boating activities, are relatively intense in these areas (USACE 2009). Impacts from SERE training activities would be negligible relative to these activities.

The 2009 BA determined that occasional disturbance of marbled murrelets on ocean and/or bay waters near Bayocean Peninsula may occur from helicopter and rafting activities, and that the Proposed Action may affect, but would not adversely affect, marbled murrelets. The USFWS concurred on the determination (USFWS 2009). SERE training activities have not changed since the 2009 BA; therefore, the determination for this action is the same as the 2009 determination (USFWS 2009). The Proposed Action may affect, but would not likely adversely, affect marbled murrelets.

Northern Spotted Owl

The 2009 BA determined that the northern spotted owl is not expected to occur in the project vicinity and the SERE training would have no effect on the species (USACE 2009). The USFWS concurred on the determination (USFWS 2009). SERE training activities have not changed since the 2009 BA; therefore, the determination for this action is the same as the 2009 determination (USFWS 2009). The Proposed Action would have no effect northern spotted owls near Tillamook, Oregon.

Short-Tailed Albatross

The 2009 BA determined that the short-tailed albatross is not expected to occur in the project vicinity and the SERE training would have no effect on the species (USACE 2009). The USFWS concurred on the determination (USFWS 2009). SERE training activities have not changed since the 2009 BA; therefore, the determination for this action is the same as the 2009 determination (USFWS 2009). The Proposed Action would have no effect on the short-tailed albatross.

Western Snowy Plover

Short-term, direct, negligible adverse impacts on western snowy plovers would potentially occur from SERE training activities. Human disturbance associated with training activities has the potential to degrade critical habitat quality. Proposed activities that occur on the beach and within times that could adversely modify western snowy plover critical habitat include camping, driftwood collection, fire starting, and signal construction. Specific beach activities including fire pro-check, ground to air signals, and collection of shelter materials could disturb nesting western snowy plovers or degrade the quality of their critical habitats (USFWS 2009).

The USAF, based on consultation with the USFWS, would implement the following measures to avoid and minimize the potential for adverse effects from the Proposed Action upon western snowy plovers and their critical habitat:

1. Air Force personnel will limit beach activities in the spring training session to those areas specifically designated by the USFWS and to the time required to complete the activities. A flag or other visible marker will be established in the field prior to training at approximately the 1.2-mile point south of the jetty. If nesting western snowy plovers are found south of the marker, a buffer area excluding training activities will be established at least 50 m away from the nest. The fall training session would occur after the end of the designated plover breeding season, thus no restrictions are placed on September training activities
2. SERE training participants will access the South Jetty by routes inland of the foredune and well off the beach during training.
3. Helicopter operations will occur at or above the 2,000-foot elevation from the South Jetty to a point approximately 500 yards south of the visible marker. Exceptions would be emergency operations for rescue or evacuation of injured personnel, and operations within Tillamook Bay.
4. The USAF will conduct, or will coordinate with those conducting surveys in the area, western snowy plovers breeding surveys approximately 2 weeks prior to spring training sessions. The surveys will be completed according to the western snowy plovers breeding window survey protocol as identified in the USFWS Monitoring Guidelines for the Western Snowy Plover, Pacific Coast Populations prior to training activities. The number of surveys will be determined in discussion with the USFWS.
5. SERE instructors will be briefed by the USAF on western snowy plover identification, habitat requirements and use, and nesting behavior at the start of survival school. Information obtained from pre-training observations of western snowy plovers on the Bayocean Peninsula will be relayed to instructors so they are aware of the current situation. Instructors are directed to inform the USAF if they believe western snowy plovers are using the area during training exercises.

The 2009 BA determined that the SERE training may affect, but would not likely adversely affect, western snowy plovers and may affect, but would not likely adversely affect, western snowy plover critical habitat on the Bayocean Peninsula. The determinations were based upon the potential for USAF trainees to disturb nesting western snowy plovers during the spring training sessions, and to cause temporary impacts to western snowy plover Critical Habitat.

The USFWS concurred on the 2009 determination and stated that although western snowy plovers could forage in the training area just offshore, the effect of a short-term displacement to other available foraging areas nearby is minimal and not likely to cause harm to them (USFWS 2009). SERE training activities have not changed since the 2009 BA; therefore, the determination for this action is the same as the 2009 determination (USFWS 2009). With the implementation of the conservation measures, the current Proposed Action may affect, but would not adversely affect, the western snowy plover.

Red Tree Vole

No impacts to red tree voles from SERE training would occur. The red tree vole is unlikely to occur in the vicinity of the Tillamook, Oregon training area. The Proposed Action would have no effect on red tree voles.

Sea Turtles

Helicopter operations associated with SERE training activities would potentially have short-term, negligible effects on sea turtles. There is potential for vessels to encounter these BSA-listed sea turtles during the proposed training exercise off the Oregon coast. Disturbance from vessels is likely to be short term and transitory and therefore, extremely unlikely. Impacts are expected to be insignificant and as such, the USAF determined that the Proposed Action may affect, but is not likely to adversely affect, the threatened and endangered sea turtles listed in **Table 3-9**. The NMFS determined that the green sea turtle, loggerhead sea turtle, and olive ridley sea turtle, are unlikely present in the action area (marine waters) and with the short-term and infrequent nature of the activities that the effects to these species would be discountable (NMFS 2016). The leatherback sea turtle may occur in the project area and provided minimization measures to reduce potential disturbance from activities.

The NMFS recommended that is any of the marine mammal or sea turtle species are in the action area during helicopter exercises, that the helicopter would maintain a safe distance of at least 1,000 feet to reduce potential effects to these species. In addition, the USAF would implement measures to minimize potential effects during helicopter and watercraft training operations to include:

- Maintain awareness of the presence or absence of marine mammals or sea turtles in the area during project activities;
- Maintain a safe distances of at least 100 meter/yards between a marine mammal or sea turtle and the operating watercraft;
- Make all attempt to avoid an area if a marine mammal or sea turtle is observed prior or during training activities;
- Avoid circling or entrapping marine mammals or sea turtle between watercraft, or watercraft and shore;
- Avoid separating mother/calf pairs;
- Avoid maneuvering watercraft into the travel path of a marine mammal or sea turtle

- If a marine mammal or sea turtle approaches the watercraft, specifically watercraft under power, put the engine in neutral or reduce speed (without endangering the vessel), and allow the animal to pass and do not engage propellers until the animal is observed at the surface and is clear of the vessel.

The NMFS concurred with the USAF that sea turtles would not be adversely affected (NMFS 2016). The Proposed Action would have no effect on designated critical habitat for the leatherback sea turtle.

Fish Species

The Oregon Coast coho salmon are present as transitory in the Tillamook Bay and are widely distributed throughout the water column. Potential habitat for the eulachon also occurs in the Tillamook Bay and the green sturgeon in the marine waters of the Proposed Action area. Green sturgeon and eulachon are unlikely to be exposed to the proposed action because eulachon are rare in Tillamook Bay and green sturgeon are unlikely to be present at the surface where project activities would take place. The Oregon Coast coho salmon are not likely to be exposed to activities of the Proposed Action because coho salmon presence in the action area will be transitory and the proposed action's occurrence and effects are short-term and infrequent. The NMFS determined that based on the unlikely exposure of these fish species to the proposed action, that the effects of the activities are discountable (NMFS 2016).The Proposed Action would have no effect on designated critical habitat for the Oregon Coast coho salmon.

Whales

Due to the short term and infrequent nature of the proposed action, and the rare occurrence of the blue whale, fin whale, sperm whale, and sei whale in the Proposed Action area, the NMFS determined that the effects of the Proposed Action on these species are discountable (NMFS 2016). Southern resident killer whales and humpback whales may occur in the open waters of the proposed action area. There is potential for vessels to encounter these marine mammals during the proposed training exercise off the Oregon coast: however, any potential disturbances are expected to be short term and transitory in nature. The vessels involved in the activities would not target marine mammals or sea turtles, should be easily detected by the marine mammals when the vessels are in transit, and the vessels would follow conservation measures described above. Thus, the NMFS determined that vessel strikes are extremely unlikely and therefore discountable and these species would not be adversely affected (NMFS 2016).

Forks, Washington

Aquatic Biological Resources. Short-term, direct, negligible adverse impacts on aquatic biological resources would be expected under the Proposed Action. Training activities including launching rafts and wading into and through rivers and waterbodies would cause a negligible increase in sediments (originating from the river bottom) suspended in the water column. Suspended sediment levels would quickly return to normal at the conclusion of the activity. The Proposed Action would not increase sediments entering the rivers. There would be no effect to EFH resultant of these activities. The USAF would provide SERE instructors and students with training on identifying and avoiding salmon redds during river navigation training.

Terrestrial Biological Resources. Impacts to terrestrial biological resources would be similar to those described for Tillamook, Oregon. Bald and golden eagles and their nests have been recorded in the project vicinity. The bald and golden eagle breeding season is from January to August in the Pacific Northwest (USFWS 2007). During the breeding season, eagles are sensitive to a variety of human activities, including aircraft. Bird strikes involving eagles are possible within the project area but are not likely. A best management practice (BMP) to avoid disturbing eagles is having one helicopter crew member visually scan outside of the aircraft for eagles or their nests during helicopter operations. Helicopter crews would continuously scan for birds, including owls and eagles, during flight. If an active eagle nest is observed, then the helicopter should avoid operating within 1,000 feet of the nest during the breeding season to avoid disturbing the eagles per USFWS National Bald Eagle Management Guidelines (Cohen 2004).

Additionally, the SERE School was granted a "Survival School Collection Permit" for the State of Washington from the Washington DFW. Under this permit, the SERE School submits a report to the Washington DFW each year indicating the number of each species taken under the authorization. Species authorized for take only include those taken for survival purposes and do not include any threatened or endangered species (WDFW 2001). The permit is in effect until cancelled by either party and may be amended by the Washington DFW. The SERE School submits a report to the Washington DFW each year indicating the number of each species taken under the authorization (WDFW 2001).

Therefore, short-term, direct, negligible adverse impacts on terrestrial biological resources would be expected under the Proposed Action near Forks, Washington

Threatened and Endangered Species.

This section discusses potential impacts resulting from the Proposed Action to the species listed in **Table 3-10**. In general, potential impacts from the Proposed Action in the Forks, Washington, training areas on threatened and endangered species would be no impacts to short-term negligible adverse impacts.

ESA Consultation History. In response to their review of the original Draft EA and request for concurrence on the USAF determination of effects, the Washington USFWS Office conducted a call on April 1, 2016 with the USAF to clarify vector training. The USAF also provided electronic correspondence on April 5, 2016 answering the USFWS' questions and confirming that the consultation with the Washington USFWS Offices only addresses actions in Washington and the training activities in Oregon are addressed in a separate consultation with the Oregon USFWS Office. In a later dated April 12, 2016 the Washington USFWS Office concurred with the USAF's findings that the proposed action may affect, but is not likely to adversely affect the marbled murrelets and the northern spotted owl. The Service has non regulatory or statutory authority to concur with "no effect" determinations, and no consultation is required.

The analysis of impacts on threatened and endangered species from SERE training activities near Forks, Washington is provided for all permitted properties, in order to not segment the action or the effects. Additionally, the USAF is required under permits from the Washington DNR, to report to DNR on species identified in the state of Washington Habitat Conservation

Plan and the DNR Forks applicable incidental take permit; which includes but is not limited to occupied marbled murrelet habitat and spotted owl nest sites. **Table 3-10** summarizes the Proposed Action's effect determination on these species.

Table 3-10. Federal Threatened and Endangered Species Effects Determination for Forks, Washington

Species	Federal Status	Species Effect Determination	Critical Habitat Effect Determination
Marbled murrelet (*Brachyramphus marmoratus*)	Threatened	May affect, not likely to adversely affect	No effect
Northern Spotted owl (*Strix occidentalis caurina*)	Threatened	May affect, not likely to adversely affect	No effect
Streaked horned lark (*Eremophila alpestris strigata*)	Threatened	No effect	Not applicable
Yellow-billed cuckoo (*Coccyzus americanus*)	Threatened	No effect	Not applicable
Bull Trout (*Salvelinus confluentus*)	Threatened	No effect	Not applicable
Dolly Varden (*Salvelinus malma*)	Proposed Threatened, Similarity of Appearance	No effect	Not applicable
Whitebark pine (*Pinus albicaulis)*	Candidate	No effect	Not applicable

Marbled Murrelet

Short-term negligible adverse impacts would be expected on marbled murrelets from the Forks, Washington helicopter operations associated with SERE training activities. Marbled murrelet critical habitat is located adjacent to the DNR Forks and Rayonier training areas. Although the DNR training area is not designated as marbled murrelet critical habitat, the USAF is required under the DNR permit, to report any encountered occupied marbled murrelet habitat. Marbled murrelet critical habitat is also present beneath the flight route from Fairchild Airport to the training areas. Noise resulting from helicopter operations has the potential to disturb marbled murrelets in the vicinity of the Proposed Action. Approximately, eight flights per year (four in April and four in September) at 300 to 1,000 feet AGL would occur over marbled murrelet habitat.

Noise from the helicopters transiting over marbled murrelet critical habitat were calculated using maximum dBA to determine effects to animals and are different than the SEL noise levels presented in **Section 3.1.** Helicopter noise would not be expected to exceed a maximum of 92 dBA, which is the USFWS threshold for adverse effects to marbled murrelets (USFWS 2012), on a regular basis. The helicopter type (UH-1N Iroquois) used for this training produces a noise level of 91 dBA at 200 feet (DON 2002). Minimum altitude for Proposed Action helicopter operations are 300 feet AGL. Using the Inverse Square Law of noise attenuation noise experienced on the ground below, a UH-1N at 300 feet AGL would be approximately 85 dBA. However, the possibility exists that marbled murrelets in trees at heights of 100 feet or greater AGL could be exposed to noise levels exceeding the 92-dBA threshold if a helicopter flies over at 300 feet AGL. Helicopters would not be expected to fly at minimum altitude while transiting to and from the training areas and would therefore not exceed the noise threshold.

Bird strikes involving marbled murrelets are also possible within the project area, and would be most likely to result from helicopters flying at low altitudes during vector training. No bird strikes have occurred during previous tropical training. Due to the few days per year of vector training and the lack of previous recorded bird strikes, bird strikes are very unlikely and discountable. Helicopter crews would continuously scan for birds, including owls and eagles, during flight.

As described above, disturbances to marbled murrelets associated with helicopter operations are expected to be minor. Land- and water-based components of the Proposed Action for tropical training near Forks, Washington, would not be expected to have an impact on marbled murrelets. Therefore, the Proposed Action may affect, but is not likely to adversely affect, marbled murrelets. The USFWS concurred with this determination on April 12, 2016.

The Proposed Action would have no effect on marbled murrelet critical habitat. Helicopters transiting over critical habitat en-route to the Rayonier and DNR Forks Training areas would not affect Primary Constituent Elements.

Northern Spotted Owls

Land- and water-based components of the Proposed Action would not be expected to have an impact on northern spotted owls. Short-term, direct, negligible adverse impacts on spotted owls would be expected to occur from helicopter operations associated with SERE tropical Training Activities in the Forks, Washington training areas. Spotted owls are not known to fly above tree-top level so the chance of a bird strike is discountable (USFWS 2012). Northern spotted owl critical habitat is present adjacent to DNR Forks and Rayonier training areas. Although the DNR training area is not designated as spotted owl critical habitat, the USAF is required under the DNR permit to report any encountered spotted owl nesting sites. Spotted owl critical habitat is also present beneath the flight route from Fairchild Airport to the training areas. Noise resulting from helicopter operations has the potential to disturb northern spotted owls in the vicinity of the proposed action. Approximately, eight flights per year (four in April and four in September) at 300 to 1,000 feet AGL would occur over northern spotted owl habitat.

Noise from the helicopters transiting over northern spotted owl critical habitat were calculated using maximum dBA to determine effects to animals, and are different than the SEL noise levels presented in **Section 3.1**. Helicopter noise would not be expected to exceed maximum 92 dBA, which is the USFWS threshold for adverse effects to northern spotted owls (USFWS 2012), on a regular basis. The helicopter type (UH-1N Iroquois) used for this training produces a noise level of 91 dBA at 200 feet (DON 2002). The minimum altitude for Proposed Action helicopter operations is 300 feet AGL. Using the Inverse Square Law of noise attenuation noise experienced on the ground below, a UH-1N at 300 feet AGL would be approximately 85 dBA. However, the possibility exists that northern spotted owls in trees at heights of 100 feet or greater AGL could be exposed to noise levels exceeding the 92-dBA threshold if a helicopter flies over at 300 feet AGL. Helicopters would not be expected to fly at minimum altitude while transiting to and from the training areas and would therefore not exceed the noise threshold. Additionally, helicopter crews would continuously scan for birds, including owls and eagles, during flight. As described above, disturbance associated with helicopter operations is expected to be minor. Therefore, the Proposed Action may affect, but is not likely to adversely affect

northern spotted owls near Forks, Washington. The USFWS concurred with this determination on April 12, 2016.

The Proposed Action would have no effect on northern spotted owl critical habitat. Helicopters transiting over critical habitat en-route to the Rayonier and DNR Forks Training areas would not affect Primary Constituent Elements.

Streaked Horned Lark.

The streaked horned lark would not be expected to occur in the vicinity of the Forks, Washington training area. The Proposed Action would have no effect on streaked horned larks.

Yellow-billed Cuckoo

No impacts to yellow-billed cuckoos from SERE training would occur. Yellow-billed cuckoos would not be expected to be encountered in the vicinity of the Forks, Washington, training areas. The Proposed Action would have no effect on the yellow-billed cuckoo.

Bull Trout and Dolly Varden.

No impacts to bull trout from SERE training would be expected to occur. Rafts would be launched into the Hoh River where bull trout are known to occur. The area of river located in the launch areas is thought to be used as a migratory corridor. Bull trout are thought to spawn in the rear and side channels. The majority of redds (spawning nests) are located within Olympic National Park upstream of the training area (Golder 2005). Bull trout are primarily threatened in the Hoh River by upland/riparian land management practices, e.g., legacy timber harvest and roads (USFWS 2014). Under the SERE School “Survival School Collection Permit” from the Washington DFW, bull trout and Dolly Varden must be released if encountered. Students must also be able to identify bull trout and Dolly Varden, to ensure release (WDFW 2001). The Proposed Action does not occur in spawning areas and does not involve land management practices. The Proposed Action would have no effect on bull trout.

Whitebark Pine.

No impacts to whitebark pine from SERE training would be expected to occur. Threats to whitebark pine include white pine blister rust, mountain pine beetle, fire suppression and catastrophic fire (USFWS Undated c). Proposed Action activities would not contribute or exacerbate these threats. In addition the majority of the Proposed Action training is near rivers, outside of whitebark pine habitat. The Proposed Action would have no effect on whitebark pine.

3.5.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the 336th TRG would not conduct coastal, open ocean, and tropical training in Tillamook, Oregon, or Forks, Washington, as described in **Section 2.1**. Biological resources would remain the same as described in **Section 3.5.2**. No impacts would be expected on biological resources from the No Action Alternative.

3.6 Cultural Resources

3.6.1 Definition of the Resource

Cultural resources include prehistoric or historic archaeological sites, buildings, structures, districts, or other places or objects considered important by local or regional communities, and/or that are considered important to the study of prehistory or history. If these resources meet defined significance criteria, they are protected under several Federal laws and EOs. The Federal laws include the NHPA of1966 as amended, the Archaeological and Historic Preservation Act (AHPA) of 1974, the American Indian Religious Freedom Act (AIRFA) of 1978, the Archaeological Resources Protection Act (ARPA) of 1979, and the Native American Graves Protection and Reparation Act (NAGRPA) of 1990. These laws also require the USAF to invite federally recognized tribes for government-to-government consultation, as do EO 13007, *Indian Sacred Sites*; EO 13175, *Consultation and Coordination with Indian Tribal Governments*; AFI 32-7065, *Cultural Resources Management Program*; and AFI 90-2002, *Air Force Interactions with Federally-Recognized Tribes*.

Cultural resources addressed in this EA include known resources determined or recommended eligible for inclusion in the National Register of Historic Places (NRHP) or that are unevaluated for NRHP inclusion.

3.6.2 Affected Environment

3.6.2.1 TILLAMOOK, OREGON

Historic Context

The Oregon Coast is in the Northwest Coast culture area, stretching from Alaska to the Oregon-California border. Native American societies from this region are known for their maritime adaptations, complex sociopolitical organization, distinctive art and technology, and trading networks. Native American habitation along the Oregon Coast began as early as 8000 years before present (BP); however, there are few archaeological sites on the Oregon Coast from this period possibly because of limited use or because early sites were destroyed or buried from sea level rise, subsidence, or coastal erosion. The earliest reliable evidence of settlement is from approximately 3,000 years BP. Early inhabitants of the Oregon Coast focused on a broad resource base that included terrestrial, riverine, and coastal resources. Beginning around 5500 BP, people began incorporating marine resources into their diet, and sea mammals, fish, shellfish, and water birds comprised a substantial portion of the subsistence base. This pattern changed again beginning about 1500 BP, when coastal inhabitants returned to a broad resource base that now incorporated marine, riparian, estuarine, and terrestrial resources. This broad resource base facilitated sedentary and semi-sedentary habitation in coastal villages.

Prior to Euroamerican settlement, the Tillamook Bay area was inhabited by the Killimuck, or Tillamook, people, who occupied the coastal area between Tillamook Head and the Siletz River (Mulligan 2013). The Tillamook Bay area features in several Tillamook oral traditions, including the story of South Wind, a trickster-transformer figure who gave shape to the Tillamook world. The South Wind story recounts the creation of the Bayocean Peninsula, also known as the Tillamook Spit, which is part of South Wind’s genitalia. According to cultural resource staff of the

Confederated Tribes of the Grand Ronde Community of Oregon (Grand Ronde), the spit is also identified by some inland tribes as the genitalia of other figures, such as the trickster Coyote (Grand Ronde 2016). The Tillamook population was decimated by repeated smallpox outbreaks in the late eighteenth and early nineteenth centuries; the estimated population size was only 200 by 1849 (Mulligan 2013). In the early 1850s the Tillamook negotiated and signed a treaty with the United States that was never ratified by the U.S. Congress. As an untreatied tribe, the Tillamook were never officially removed to a reservation; however, many Tillamook ultimately joined the Grand Ronde and others joined the Confederated Tribes of Siletz Indians. Still others refused removal or escaped the reservations and were not included in any federally recognized tribe. Native Americans' use of Tillamook Bay and the surrounding area remained constant throughout the Removal period and continues today.

Euroamerican use of the Tillamook Bay began in the late eighteenth century; during this time, trapping and exploration parties, including Lewis and Clark in 1806, visited the area intermittently. Settlement began in the mid-1800s with a focus on agriculture and specifically dairy ranching, which was successful due to the region's soils and climate (Mulligan 2013). Timber was an important industry in the late nineteenth and early twentieth centuries. Commercial fishing and shellfish industries began in the late nineteenth century and remain important to the local economy today.

The Bayocean Peninsula was the location of a resort town known as Bayocean, 0.75 mile south of the proposed training area. The town was founded in 1906 and by 1914 had more than 2,000 residents. Envisioned as an "Atlantic City of the West," the town had 4 miles of paved roads, city lights, water, a telephone system, and a narrow gauge railroad when the City of Tillamook still had dirt roads. The town raised money to build a jetty, which the USACE completed in 1917, to facilitate transportation between the peninsula and mainland. However, the jetty detrimentally affected winter storm wave patterns, leading to the town's eventual destruction. Erosion began destroying buildings in the 1930s and breached the peninsula in 1952. In 1956 the USACE built a dike and road and reclaimed the town area, demolishing the remaining infrastructure and buildings.

File Search and Cultural Surveys

A file search was conducted to identify known cultural resources and previous cultural resource inventories within 1 mile of the Tillamook SERE training area. The search consulted records on file with the Oregon SHPO and the NRHP. In addition, the USAF contracted a cultural resources survey to address concerns raised during tribal consultation. The survey involved subsurface testing of selected training areas and an ethnographic review. The USAF also communicated with the Tillamook & Bayocean Historian from the Pioneer Museum in Tillamook County. The search identified five surveys and five sites.

The file search identified five cultural resources surveys that were conducted in the Tillamook SERE training areas between 1953 and 2013 (**Table 3-11**). The entire proposed training area was surveyed in 2012 by the USACE in connection with USAF's Coastal and Open Water SERE Training permit application (Mulligan 2013). This survey intensively examined 175 acres of the northern Tillamook Peninsula, which included all proposed training sites. The central part of the peninsula was not intensively surveyed due to dense vegetation, steep slopes, low

potential for intact sites, and no planned development or use (Mulligan 2013). The survey identified one site (35TI00104) but failed to relocate a site (35TI00011) recorded in 1951. Of the remaining four projects identified in the file search, one was commissioned by the USACE for an ocean disposal site, one was commissioned by the Port of Garibaldi for wharf redevelopment, and two were conducted by academic organizations.

Table 3-11. Previous Cultural Inventories Within 1 Mile of Tillamook Training Area

SHPO Survey ID	Year	Authors	Project Title	Proponent	Purpose
870	1953	Collins, Lloyd R.	Archeological Survey of the Oregon Coast 1951-1952.	N/A	Academic
11939	n.d.	Unknown	Side Scan Sonar Survey Tillamook Bay Area (Title assigned by Le Gilsen in SHPO Bibliography)	USACE	Ocean Disposal Site
24278	2008	Lally, Jessica	Analysis of the Chinese Porcelain Associated with the "Beeswax Wreck," Nehalem, Oregon	N/A	Academic
25359	2012	Walker, Cam, Judith Chapman, and Elizabeth O'Brien	Archaeological Survey for the Port of Garibaldi Wharf Redevelopment Project, Tillamook County, Oregon	Port of Garibaldi	Wharf Redevelopment
25808	2013	Mulligan, Daniel	Bayocean Peninsula USAF Survival Training Project Tillamook County, Oregon	USACE	USAF Training Permit

The USAF contracted a cultural resources survey, which addressed training areas where surface use would be most intense and where limited subsurface disturbance could occur, consisting of four student camps, an instructor camp, a medic camp, and the helicopter landing site (**Appendix E**). Shovel test probes were excavated throughout each of these areas. The cultural resources survey also involved an ethnographic review to address tribal concerns about indirect effects on traditional cultural resources in the area around the Bayocean Peninsula with line-of-sight to the training area. The shovel testing did not identify any new archaeological sites; however, archaeologists confirmed the presence of site 35TI00104 adjacent to the proposed medic camp. The ethnographic review resulted in the description and evaluation of the Tillamook Spit Cultural Landscape, which centers on the Bayocean Peninsula and includes 52 known individual tribal resources around Tillamook Bay that are within the peninsula's viewshed. These individual resources include named geographic places, village locations, archaeological sites, burials, story event locations, and faunal resources.

Six cultural resources were identified as a result of the file search and cultural resources survey: three prehistoric shell middens, two shipwrecks, and a cultural landscape (**Table 3-12**). All are unevaluated and potentially eligible for NRHP inclusion. Two of the prehistoric sites (one of which is unverified site 35TI0011, mentioned above) are within the coastal and open water training area. The Tillamook Spit Cultural Landscape encompasses all of the coastal and open water training area and surrounding areas around Tillamook Bay.

Table 3-12. Cultural Resource Sites Within 1 Mile of Tillamook Training Area

Site Number	Site Type	Eligibility Status	Description	General Location	Distance from Training Area
35TI00010	Prehistoric	Unevaluated	Shell midden	T1N R10W Section 31 (unverified)	0.6 mi
35TI00011	Prehistoric	Unevaluated	Shell midden	T1N R10W Section 20 (unverified)	0.0 mi
35TI00104	Prehistoric	Unevaluated	Shell midden	T1N R10W Section 20	0.0 mi
N/A	Historic Shipwreck	Unevaluated	Ida Schnauer Shipwreck (1908, unrecorded)	T1N R10W Section 31	0.7 mi
N/A	Historic Shipwreck	Unevaluated	Argo Shipwreck (1909; unrecorded)	T1N R10W Section 18	0.3 mi
N/A	Cultural Landscape	Unevaluated	Tillamook Spit Cultural Landscape	Multiple Sections in T1N R10W, T1N R9W, T1S R10W, T1S R9W	0.0 mi

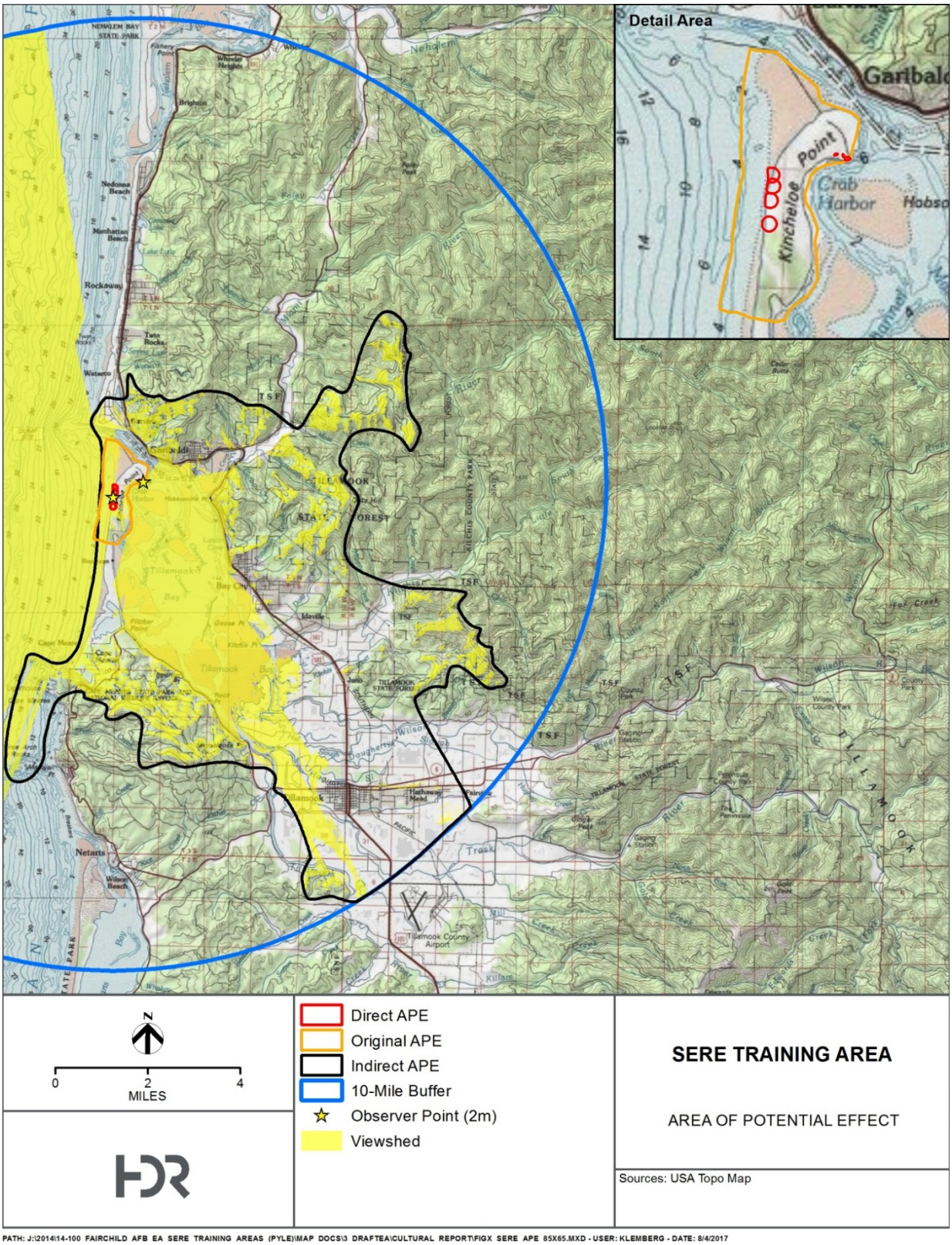

Figure 3-3. Area of Potential Effect for Oregon SERE Training

3.6.2.2 FORKS, WASHINGTON

Historic Context

Archaeological sites document occupation of the Olympic Peninsula as early as 12,000 years ago. However, few sites are known before 5,000 years BP. The archaeological record after this time contains evidence of growing populations that developed increasingly complex societies utilizing a broad resource base with emphasis on marine and riparian resources. Inhabitants were semi-sedentary hunter-gatherers with localized winter villages and semi-dispersed summer residences. The area was inhabited primarily by the Quileute and seasonally by the Makahs (Daugherty 1983). The Calawah River's name is derived from the Quileute name Kalo'wa, meaning "in between" or "in the middle." The river was the middle of three principal watersheds used by the Quileute (Daugherty 1983).

Europeans first visited the Pacific Northwest in the late eighteenth century. However, they did not begin to settle the Olympic Peninsula until the mid-nineteenth century, around the same time the government began to treat with local Indian tribes. In 1855 and 1856, the Quileute, Queets, Hoh, and Quinault tribes signed the Treaty of Olympia, and all but the Quileute and Hoh moved onto a reservation. The Quileute and Hoh later moved onto reservations created by EOs in 1889 at La Push and 1983 on the Hoh River. Although once considered a band of the Quileute, the Hoh and Quileute are recognized today as distinct, sovereign tribes.

Isolated Euroamerican settlements grew quickly in the latter half of the nineteenth century. Most inhabitants supported or worked in logging camps. Logging operations expanded substantially in the 1880s when steam powered "donkey" and "lokey" engines arrived from California (Daugherty 1983). Railroads were built in the early twentieth century and used until the 1950s when replaced by truck logging (Graham and Neil 2010).

File Search and Cultural Surveys

A file search was conducted to identify known cultural resources and previous cultural resource inventories within 1 mile of the Forks training areas. The search consulted records on file with the Washington Department of Archaeology and Historic Preservation (DAHP) and the NRHP. The search identified nine inventories and nine sites within 1 mile of the training areas.

Nine surveys were conducted in the training areas between 1983 and 2013; four of the projects were completed in the last 5 years (**Table 3-13**). Less than 5 percent of the training areas have been surveyed intensively. Three projects were commissioned by WSDOT and one project was commissioned by the USACE. Seven projects were related to infrastructure, including roads and bridges. One project was associated with commercial timber thinning and one project related to land management.

Table 3-13. Previous Cultural Inventories Within 1 Mile of Forks Training Areas

DAHP Survey ID	Year	Authors	Project Title	Proponent	Purpose
1331841	1983	Daugherty, Richard D.	Cultural Resource Survey of Portions of the Duckabush, Calawah, and West Fork of the Humptulips Rivers	Olympic National Forest	Land Management
1344068	1997	Regan, Dennis C.	A Cultural Resources Survey for the Washington State Department of Transportation's Proposed Mora Road Bridge Replacement Project on SR 110 Spur, Clallam County, Washington	WSDOT	Bridge Replacement
1345785	1998	Krier, Robert H. and Craig Holstine	Mora Road Bridge No. 110/25 SP: An Evaluation of Significance	WSDOT	Bridge Evaluation
1350738	2007	Bundy, Barbara	Section 106 Compliance, State Highways Safety Project, XL 2645	WSDOT	Highway safety
1354102	2010	Graham, Tyler and Stephanie Neil	Sitkum Commercial Thinning Project, Olympic National Forest, Cultural Resource Reconnaissance Report, 09-OLY-23	Olympic National Forest	Commercial Thinning
1354242	2010	Neil, Stephanie	Olympic National Forest Road Repair and Culvert Replacement Projects for 2010, Cultural Resource Reconnaissance Report, 10-OLY-09	Olympic National Forest	Road Repair
1682283	2012	Stipe, Frank	A Cultural Resource Survey of the Forest Service Road 2923-060 Project	Olympic National Forest	Road Repair
1684039	2013	Mawhirter, Matthew	Calawah Road Decommissioning Project, Project, Olympic National Forest, Cultural Resource Reconnaissance Report, 13-OLY-03	Olympic National Forest	Road Decom-missioning

In total, five historic sites, three prehistoric sites, and one prehistoric isolated find were identified in the file search (**Table 3-14**). Historic sites consist of logging properties, artifact scatters associated with logging, a foundation associated with the Calawah Work Center, and the Tom Payne Homesite. Prehistoric sites are villages and petroglyphs. All eight sites identified in the file search are unevaluated and potentially eligible for the NRHP. Six of the sites are within the tropical SERE training area boundaries.

Table 3-14. Cultural Resource Sites Within 1 Mile of Forks Training Areas

Site Number	Site Type	Eligibility Status	Description	General Location	Distance from Training Area
45CA00034	Prehistoric	Unevaluated	Small, permanent, inland village	T28N R14W Section 14	0.5 mi
45CA00256	Prehistoric	Unevaluated	Thomas Payne Homesite	T28N R12W Section 6	0.0 mi
45CA00258	Prehistoric	Unevaluated	Hoc'h'al Indian Village	T28N R12W Section 5	0.0 mi
45CA00639	Historic	Unevaluated	Historic logging property	T28N R12W Section 2	0.0 mi
45CA00640	Historic	Unevaluated	Historic logging property	T28N R12W Section 2	0.0 mi
45CA00641	Historic	Unevaluated	Historic logging property	T28N R12W Section 4	0.0 mi
45CA00642	Historic	Unevaluated	Calawah Work Center	T28N R12W Section 6	0.0 mi
45CA00643	Prehistoric	Unevaluated	Isolated Find: Lithic Material	T28N R12W Section 3	0.0 mi
45CA00744	Prehistoric	Unevaluated	Petroglyph, Red Lizard's Lair (xa'laxati—House of Red Lizard)	T28N R14W Section 13	0.9 mi

3.6.3 Environmental Consequences

3.6.3.1 PROPOSED ACTION

Tillamook, Oregon

Minor, adverse, direct impacts on cultural resources could potentially occur from ground disturbing activities associated with camping, shelter construction, and helicopter landing at the coastal and open ocean training area on the Tillamook Peninsula. Moderate, adverse, direct impacts could result from ground disturbing activities associated with road maintenance activities and from the excavation of water table pits and latrines. Road maintenance activities would occur within the existing roadbed. Water pits would measure 3 feet long × 3 feet wide and 1 to 2 feet deep. Latrines would measure 2 feet long × 2 feet wide × 3 feet deep.

Three cultural resources potentially eligible for the NRHP are within the training area:

- Site 35TI00011 is a shell midden recorded in 1951. The site is unverified and was not located during a 2012 survey of the proposed training area (Mulligan 2013). The site description in 1951 notes the site had been impacted by collectors and road building.
- Site 35TI00104 is a shell midden recorded in 2013.
- The Tillamook Spit Cultural Landscape, recorded in 2016, incorporates traditional resources and use areas around Tillamook Bay, many of which are connected to the Bayocean Peninsula by line-of-sight.

Under the Proposed Action, the USAF would avoid the area containing site 35TI00104 as prescribed in their permit with the USACE (DOA 2013). The permit also requires notification of the USACE archaeologist if cultural items are discovered during training activities. Therefore, the Proposed Action would have no impact on the site. Site 35TI00011 was recorded in a heavily forested area outside specific training locations. The site was not identified during the 2012 and 2016 surveys, and there is little potential for adverse, direct impacts to this site. Overall, the coastal and open ocean SERE training would not result in adverse impacts to cultural resources on the Tillamook Peninsula.

Consultation

As part of Section 106 consultation, USAF initially identified the Area of Potential Effect (APE) as the Tillamook, Oregon SERE Coastal and Open Water training area shown in **Figure 1-2**.

Oregon Tribes

The USAF sent letters to two tribes, Grand Ronde and the Confederated Tribes of Siletz Indians of Oregon during the initial draft EA, inviting the parties to government-to-government consultation. The invitations requested the tribes' input on identification of historic properties of religious or cultural significance and how the proposed action may affect them.

USAF received a response from the Grand Ronde expressing concern regarding potential adverse impacts on the Tillamook Spit Cultural Landscape and requesting a cultural resources survey. The Grand Ronde had concerns that some training activities could desecrate culturally important layers and that the training might diminish qualities that the tribe ascribes to the spit as a property of traditional religious and cultural importance.

After this consultation with the Grand Ronde in December 2015 and January 2016, The USAF expanded the APE to encompass land areas (including sea stacks) surrounding the Bayocean Peninsula with direct line of sight to proposed training support areas to a distance of 10 miles. The area was defined using a viewshed analysis in a geographic information system (GIS) by estimating the 10-mile sightline of a 6-foot human observer from observation points at the geographic centers of the helicopter landing site and the student camps. Areas of potential direct impact were termed the "Direct APE" and areas with potential indirect effects were termed the "Indirect APE" (**Figure 3-3**). As discussed above in **Section 3.6.2.1**, "File Search and Cultural Surveys", the USAF's cultural survey identified and described the Tillamook Spit Cultural Landscape. The cultural survey report details how the Bayocean Peninsula is an important cultural resource to the Grand Ronde. As explained by the Grand Ronde during consultation, it is a named place in oral tradition and is related to significant actions of South Wind that gave shape to Tillamook Bay, its floral and faunal resources, and other raw materials. These perspectives were incorporated into the description and evaluation of the Tillamook Spit Cultural Landscape in the cultural resources survey report (**Appendix E**).

During an additional conversation in December 2016 following completion of the cultural resources survey, Grand Ronde cultural resources staff indicated training activities (e.g. camping and gathering local raw materials) would not be inconsistent with traditional uses and would not have an adverse impact on the resource. Further, desecration of culturally important layers would not occur as no cultural layers were identified during shovel testing.

USAF continues to consult with the Grand Ronde, and Confederated Tribes of Siletz Indians of Oregon regarding the results of the cultural resources survey and assessment of effects under Section 106 of the NHPA.

Oregon SHPO

The USAF sent letters to the Oregon SHPO for consultation regarding compliance with Section 106 of the NHPA during the initial Draft EA and research design for the cultural resources survey performed in 2016 (**Appendix E**).

The Oregon SHPO responded with comments to the research design for the cultural resources survey in 15 Nov 2017 (**Appendix A**). Following the incorporation of the SHPO comments into the final cultural resources survey report (**Appendix E**), the Oregon SHPO concurred that the Proposed Action would not be likely to adversely effect in a letter dated 10 May 2018 (**Appendix A**).

Forks, Washington

Minor, adverse, direct impacts on cultural resources could potentially occur from ground disturbance activities associated with camping at the Forks training areas. Six sites potentially eligible for NRHP listing are within the training areas:

- Site 45CA00256 is the Thomas Payne Homesite. The site is known from archival documents, oral histories, and interviews. The buildings were destroyed by a fire in 1941. Excavations in 1978 identified subsurface cultural materials, but a survey in 1983 failed to locate the site, which may have been partially buried by a road or destroyed by the river (Graham and Neil 2010; Daugherty 1983).
- Site 45CA00258 is the Hoc'h'al Village. The site was recorded from archival documents and oral histories. No physical remains were found during the 1983 survey (Daugherty 1983).
- Site 45CA00639 is a logging site. The site was recommended not eligible for the NRHP; however, the Washington DAHP identifies the site as unevaluated.
- Site 45CA00640 is a logging site. The site was recommended not eligible for the NRHP; however, the Washington DAHP identifies the site as unevaluated.
- Site 45CA00641 is a logging site. The site was recommended potentially eligible for the NRHP.
- Site 45CA00642 is a foundation associated with the Klahanie Work Center. The work center was destroyed between 1970 and 1972 and has been disturbed by modern recreation. The site was recommended not eligible; however, the Washington DAHP identifies the site as unevaluated.

No historic properties have been identified at Rayonier properties where camping may also occur.

Permit requirements from the DNR and USFS prohibit USAF personnel from disturbing or removing cultural materials (WDNR 2012, USDA 2012). The USFS requires immediate

notification upon discovery of any cultural materials and cessation of activities upon discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony, pursuant to Native American Graves Protection and Repatriation Act (NAGPRA) (SERE 1.38). The USAF will follow chain of command notifications to ensure proper preservation of artifacts or cultural materials if any are found during training activities.

Consultation

Washington Tribes

The USAF sent letters to five Washington tribes during the initial draft EA, inviting the parties to government-to-government consultation. The invitations request input on identification of historic properties of religious or cultural significance and how the proposed action may affect them. The affected tribes are the Hoh Indian Tribe, the Jamestown S'Klallam Tribal Community, the Lower Elwha Tribal Community, the Makah Indian Tribe of the Makah Indian Reservation, and the Quileute Tribe of the Quileute Reservation. None of these tribes identified traditional cultural, religious, or sacred sites that would be affected by the proposed undertaking.

In a letter dated May 22, 2015, the Quileute Tribe requested additional information on the Proposed Action. In a teleconference on June 8, 2015, the USAF and the Quileute Tribe discussed the tribe's concerns related to treaty-reserved rights to hunt, fish, and gather resources on lands outside their reservation in the proposed USAF training areas in and around Forks, Washington. To help prevent interfering in these activities, the USAF would provide the Quileute Tribe with 30 days advance notice of training dates. The USAF would also provide SERE instructors and students with training on identifying and avoiding salmon redds during river navigation training, as requested by the tribe.

USAF continues to consult with the five tribes, Hoh Indian Tribe, the Jamestown S'Klallam Tribal Community, the Lower Elwha Tribal Community, the Makah Indian Tribe of the Makah Indian Reservation, and the Quileute Tribe of the Quileute Reservation, requesting input on the Revised Draft EA. As part of communication with the USAF separate from this proposed action, the Lummi Nation expressed a desire to improve coordination between the Lummi Nation and other governments and agencies that use, manage, and regulate water, land, and other resources in and around the Salish Sea (**Appendix A**). As the proposed action may occur in areas identified as Salish Sea drainage boundary, the USAF is initiating government to government consultation with the Lummi Nation as part of this Revised Draft EA.

Washington DAHP

The USAF sent letters to the Washington DAHP during the initial draft EA for consultation regarding compliance with Section 106 of the NHPA.

The Washington DAHP concurred with the determination of the area of potential effect, defined as the Forks, Washington Tropical SERE training area as shown in **Figure 1-3**, and the USAF finding of No Adverse Effect in a February 16, 2016 letter providing comments on the original Draft EA (**Appendix A**).

3.6.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the 336th TRG would not conduct coastal, open ocean, and tropical training in Tillamook, Oregon, or Forks, Washington, as described in **Section 2.1**. Cultural resources would remain the same as described in **Section 3.6.2**. No impacts would be expected on cultural resources from the No Action Alternative.

3.7 Hazardous Materials and Wastes

3.7.1 Definition of the Resource

Hazardous materials are defined by 49 CFR 171.8 as "hazardous substances, hazardous wastes, marine pollutants, elevated temperature materials, materials designated as hazardous in the Hazardous Materials Table (49 CFR 172.101), and materials that meet the defining criteria for hazard classes and divisions" in 49 CFR 173. Transportation of hazardous materials is regulated by the U.S. Department of Transportation regulations within 49 CFR 105–180.

Hazardous wastes are defined by the Resource Conservation and Recovery Act (RCRA) at 42 U.S.C. 6903(5), as amended by the Hazardous and Solid Waste Amendments, as "a solid waste, or combination of solid wastes, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (A) cause, or significantly contribute to an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (B) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed." Certain types of hazardous wastes are subject to special management provisions intended to ease the management burden and facilitate the recycling of such materials. These are called universal wastes and their associated regulatory requirements are specified in 40 CFR 273. Four types of waste are currently covered under the universal waste regulations: hazardous waste batteries, hazardous waste pesticides that are either recalled or collected in waste pesticide collection programs, hazardous waste thermostats, and hazardous waste lamps.

For the USAF, Air Force Policy Directive (AFPD) 32-70, *Environmental Quality*, and the AFI 32-7000 series incorporate the requirements of all Federal regulations, and other AFIs and DOD Directives for the management of hazardous materials, hazardous wastes, and special hazards. Evaluation extends to generation, storage, transportation, and disposal of hazardous wastes when such activity occurs at or near the project site of the Proposed Action.

3.7.2 Affected Environment

3.7.2.1 TILLAMOOK, OREGON

Review of comprehensive record searches, site inspections, aerial photography and interviews in the 2012 Environmental Baseline Survey (EBS) of the Tillamook training area indicate that there are no underground or aboveground storage tanks or contamination from hazardous or petroleum waste within the Tillamook, Oregon training area. There are no known occurrences of asbestos-containing materials, lead-based paint (LBP), or polychlorinated biphenyls (PCBs) located in the training area. Three small, fishing shipwrecks have occurred along the South Jetty that account for an undetermined amount of Type 2 diesel spilled; however, these shipwrecks are currently being monitored and remediated by the USCG and the USEPA. Additionally, the

USEPA EnviroMapper does not identify any Superfund, hazardous materials or Brownfield sites in the Tillamook, Oregon project area (Fairchild AFB 2012, USEPA 2015c).

3.7.2.2 FORKS, WASHINGTON

Review of comprehensive record searches, site inspections, aerial photography, and interviews in the 2011 Forks training area EBSs indicate that there are no underground or aboveground storage tanks or contamination from hazardous or petroleum waste in the Forks, Washington, training areas. In addition, there are no known occurrences of asbestos-containing materials, LBP, or PCBs within the training areas. Local land managers might use herbicides along roadways or with timber harvest areas to control invasive plants. The USEPA EnviroMapper identified two hazardous waste areas associated with bridges near the Rayonier training areas; however, these locations are not immediately within training areas (Fairchild 2011a, Fairchild AFB 2011b, USEPA 2015c).

3.7.3 Environmental Consequences

Impacts would be considered significant if the Proposed Action resulted in USAF personnel exposure to hazardous materials, or if the action generated quantities of these materials beyond the capability of current management procedures. Impacts on hazardous materials management would be considered significant if the Proposed Action resulted in noncompliance with applicable Federal and state regulations.

3.7.3.1 PROPOSED ACTION

Tillamook, Oregon

Short-term, negligible, adverse impacts on the Tillamook training area from hazardous materials and wastes would be expected. No hazardous materials would be stored or used in the training areas; however, minor quantities of fuel or oils could be released to the environment during a vehicle breakdown. Because refueling of vehicles and helicopters would occur off-site, there would be no anticipated impacts from hazardous materials on the training areas or USAF personnel utilizing the training areas. Refueling for helicopters would occur at the Astoria Regional Airport or the Tillamook Airport, which are within flying distance from the HLZ along Tillamook Bay. It is assumed that the refueling locations (e.g., gasoline stations and airports) have adequate spill containment materials for accidental releases during fueling. Additionally, sea dye marker could be used during open ocean training, but is water soluble and has no known adverse impacts.

Up to 58 small, handheld flares would be used at each of the two training events per year. Flare canisters would each be individually tracked, collected, and returned to Fairchild AFB for proper processing. No impacts would be expected.

Forks, Washington

Impacts on the Forks training areas would be similar to those mentioned under Tillamook, Oregon, except slightly greater. Staged vehicles would be refueled at locations in nearby towns, and refueling for helicopters would occur at Fairchild Airport. USAF personnel could be exposed to herbicides used by other land managers in the area; however, exposure to herbicides would

be minimal and would not be expected to occur in all training areas in the Forks, Washington, area.

Up to 50 small, handheld flares would be used at each of the two training events per year. Flare canisters would each be individually tracked, collected, and returned to Fairchild AFB for proper processing. No impacts would be expected.

3.7.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the 336th TRG would not conduct coastal, open ocean, and tropical training in Tillamook, Oregon, or Forks, Washington, as described in **Section 2.1**. Hazardous materials and wastes conditions would remain the same as described in **Section 3.8.2**. No impacts would be expected on hazardous materials and wastes from the No Action Alternative.

3.8 Health and Safety

3.8.1 Definition of the Resource

A safe environment is one in which there is no, or there is an optimally reduced, potential for death, serious bodily injury or illness, or property damage. Human health and safety addresses the safety of USAF personnel and the general public during training exercises.

Necessary elements for an accident-prone situation or environment include the presence of the hazard itself together with the exposed (and possibly susceptible) population. The degree of exposure depends primarily on the proximity of the hazard to the population. Activities that can be hazardous include transportation, rural training exercises, and the creation of extremely noisy environments. The proper operation, maintenance, and repair of vehicles and equipment carry important safety implications. Extremely noisy environments, such as helicopters, can also mask verbal or mechanical warning signals such as sirens, bells, or horns.

AFPD 90-8, *Environment, Safety and Occupational Health Management and Risk Management*, dated 14 March 2017 establishes AF policy for Environment, Safety and Occupational Health (ESOH) and Risk Management (RM) Programs. This Policy Directive applies to all AF personnel, Reserve, the Air National Guard (ANG), and all AF operations.

3.8.2 Affected Environment

3.8.2.1 TILLAMOOK, OREGON

Military Personnel Safety. Each branch of the military has its own policies and regulations that act to protect its personnel and workers, despite their work location. AFPD 90-8 would apply to USAF personnel involved in the SERE training program in Tillamook, Oregon.

Public Safety. Areas proposed for SERE training exercises are natural areas not closed off to the public. These areas have the potential to be used by recreationalists for camping, hiking, hunting, and other activities.

Existing mechanical hazards (slip, trips and falls), health hazards (dehydration, blisters, etc.), and biological hazards (animal bites and stings) could occur in training areas due to their geographic locations.

3.8.2.2 FORKS, WASHINGTON

Existing safety conditions in the Forks, Washington, area are similar to the Tillamook, Oregon, training area except they also include mechanical hazards related to logging activities.

3.8.3 Environmental Consequences

Any increase in safety risks would be considered an adverse effect on safety. The Proposed Action could have a significant effect with respect to health and safety if the following were to occur:

- Substantially increase risks associated with the safety of USAF personnel, or the local community
- Introduce a new health or safety risk for which the USAF is not prepared or does not have adequate management and response plans in place.

3.8.3.1 PROPOSED ACTION

Tillamook, Oregon

Short-term, minor, adverse and long-term, minor, beneficial impacts on military personnel safety would be expected. Due to the level of training that is required of the SERE program, USAF personnel would be exposed to rural conditions that include increased chances of mechanical, health, and biological hazards. Safety impacts would be minimized through implementation of AFPD 90-8. Training would ultimately result in airmen and trainees that are better prepared for deployment, which would result in a long-term, beneficial impact on safety.

No impacts on public safety would be expected as there would be no live-fire weapons or tracked vehicles associated with the Proposed Action and all training would be related to survival training and recreational in nature. USAF guidelines and protocols, including AFI 13-217, *Drop Zone and Landing Zone Operations*, would be observed for standoff distances during the total of 8 hours of HLZ use per year to ensure safety to the general public. In addition, USAF training activities would be coordinated with recreationalists who may be utilizing the existing training areas to ensure USAF personnel and general public safety. Finally, USAF would comply with any and all permit safety requirements including appropriate fire management and filling in used holes.

Up to 58 small, handheld flares would be used during each of the two training events per year. Flares would be used in a closed, instructor-controlled environment. Flares would not be utilized during times of high winds or dry weather that could pose a fire risk and would, therefore, not pose a threat to human health and safety.

Forks, Washington

Impacts on health and safety at the Forks, Washington, training areas would be the same as the impacts stated under the Tillamook, Oregon, training area.

Up to 50 small, handheld flares would be used during each of the two training events per year. Flares would be used in a closed, instructor-controlled environment. Flares would not be utilized during times of high winds or dry weather that could pose a fire risk and would, therefore, not pose a threat to human health and safety. The SERE training group would coordinate with any recreational shooters to ensure the safety of USAF personnel and not interfere with the recreational users.

3.8.3.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the 336th TRG would not conduct coastal, open ocean, and tropical training in Tillamook, Oregon, or Forks, Washington, as described in **Section 2.1**. Long-term, moderate, adverse impacts would be expected on USAF personnel safety under the No Action Alternative because USAF personnel would not be properly trained in coastal, open ocean, and tropical survival skills.

4. Cumulative

4.1 Cumulative Effects

CEQ regulations for implementing NEPA require that the cumulative impacts of a proposed action be assessed (40 CFR 1500–1508). A cumulative effect is defined as the following (40 CFR 1508.7):

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

Cumulative effects are most likely to arise when a relationship exists between a proposed action and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in proximity to a proposed action would be expected to have more potential for a relationship than those more geographically separated.

CEQ's guidance for considering cumulative effects states that NEPA documents "should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant." The first step in assessing cumulative effects involves identifying and defining the scope of other actions and their interrelationship with a proposed action or alternatives. The scope must consider other projects that coincide with the location and timeline of a proposed action and other actions.

For the purposes of this analysis, the temporal span of consideration is a 5-year permitting period. This cumulative effects analysis focuses on past, present, and reasonably foreseeable future projects taking place near Tillamook, Oregon, and Forks, Washington.

4.1.1 Projects Considered for Potential Cumulative Effects

For the resource areas, the present effects of past actions are now part of the existing environment described in **Section 3**. Identification of projects occurring at and nearby the training areas during the same time as the Proposed Action ensures that all present and reasonably foreseeable future activities that have the potential to result in cumulative effects are taken into account. **Tables 4-1** and **4-2** provide a summary of the present and reasonably foreseeable projects considered for potential cumulative effects near Tillamook, Oregon, and Forks, Washington.

4.1.2 Cumulative Effects on Resources Areas under the Proposed Action

The Proposed Action, when combined with present and reasonably foreseeable future projects, would not result in cumulatively significant effects on any resource area. The resource areas that have the potential to be cumulatively affected are presented in the subsections below, which describe the non-significant cumulative effects that would occur.

Table 4-1. Cumulative Projects in the Tillamook, Oregon, Area

Project Title	Project Description
Bayocean Peninsula Eco-Resort	Construct an eco-resort on a 53-acre, privately owned parcel zoned for recreational management. The site is located north of the Bayocean Peninsula State Park on Bayocean Dike Road with frontage on the Pacific Ocean and Tillamook Bay. Proposed lodging units would consist of 28 tents on wooden platforms. The eco-resort would consist entirely of temporary eco-tents and wooden pads. It would include a publicly accessible marina and floating garden, equestrian and bicycling staging area, restrooms, and maintained beach access. A portion of the site would be dedicated to education and research activities. It would use state-of-the-art sustainable development techniques and practices such as rainwater harvesting and solar energy (Bayocean EcoResort Undated).

Table 4-2. Cumulative Projects in the Forks, Washington, Area

Project Title	Project Description
Pacific Northwest Electronic Warfare Range	As part of the installation and operation of an Electronic Warfare Range, the Navy is proposing the operation of Mobile Electronic Warfare Training System mobile emitters in the Olympic Peninsula on USFS and Washington DNR lands to facilitate current aircraft training activities in the Olympic MOAs and Warning Area W-237. Three Mobile Electronic Warfare Training System mobile emitter trucks, which are utility trucks modified with emitter enclosures, would be used in the Olympic Peninsula to emit electromagnetic signals. On a typical training day, the mobile emitter trucks would depart from Naval Station Everett Annex Pacific Beach and drive on existing roads to 1 of 15 preselected training sites within the Olympic MOAs to set up for the day's activities. When supported aircraft are on-station, either airborne in W-237 or in the Olympic MOAs, the crew within the mobile emitter would energize the emitter in accordance with the training scenario. The mobile emitter would be driven out to one of the 15 sites in the Olympic MOAs approximately 260 times over the course of a year (DON 2014).
Queets Vegetation Management	The USDA proposes to commercially thin second growth forest stands within the Olympic National Forest to accelerate the development of some of the structural and compositional features of late-successional forests and accelerate growth of forest stands in Late-Successional Reserves, Adaptive Management Areas, and Riparian Reserves land management allocations within the Queets River 5th field watershed in Grays Harbor County, Washington. The approximately 44,000-acre planning area includes approximately 5,000 acres proposed for commercial thinning in forest stands that are between 35 and 65 years old. The selected stands would be commercially thinned using variable density thinning. Logging systems would include a combination of ground-based, cable, and helicopter logging. The project seeks to integrate commercial timber harvest with the ecological objective of late-successional habitat by adding structural diversity (USDA 2014).

4.1.2.1 NOISE

Tillamook, Oregon. Long-term, minor, adverse noise impacts would potentially be expected from SERE helicopter operations and eco-resort operational activities. Sensitive noise receptors would not be expected to be affected.

Forks, Washington. Intermittent increases and minor impacts in noise from helicopter and aircraft operations, mobile emitter trucks, and logging trucks would be expected. Sensitive noise receptors would not be expected to be affected.

4.1.2.2 AIR QUALITY

Tillamook, Oregon. Short-term increases in emissions from helicopter and aircraft operations, motor vehicle use, and construction and logging equipment would be expected. Because training activities and construction activities would occur over brief time periods, no long-term impacts on air quality would be expected.

Forks, Washington. Short-term increases in emissions from helicopter and aircraft operations, motor vehicle use, and construction and logging equipment would be expected. Because training activities and construction activities would occur over brief time periods, no long-term impacts on air quality would be expected.

4.1.2.3 AIRSPACE

Tillamook, Oregon. Short-term, minor, impacts would be expected during flight operations; however, the flight operations would be conducted in existing MOAs. Because USAF and USDA helicopter operations and Navy aircraft operations would occur over brief time periods, no long-term impacts on airspace would be expected.

Forks, Washington. Short-term, minor, impacts would be expected during flight operations; however, the flight operations would be conducted in existing MOAs. Because USAF and USDA helicopter operations and Navy aircraft operations would occur over brief time periods, no long-term impacts on airspace would be expected.

4.1.2.4 LAND USE

Tillamook, Oregon. Present and reasonably foreseeable future activities would not require a change to or violate current county zoning. Because permits would be acquired from appropriate authorities prior to commencing training and construction activities, no long-term cumulative impacts on land use would be expected.

Forks, Washington. Present and reasonably foreseeable future activities would not require a change to or violate current county zoning. Because permits would be acquired from appropriate authorities prior to commencing USAF, USDA, and Navy activities, no long-term cumulative impacts on land use would be expected.

4.1.2.5 BIOLOGICAL RESOURCES

Tillamook, Oregon. Short-term, negligible to minor, cumulative impacts on biological resources could occur from training and construction activities; however, these impacts would be temporary in nature.

Forks, Washington. Short-term, negligible to moderate, cumulative impacts on biological resources could occur from training and logging activities, vehicle use, and helicopter and aircraft operations; however, these impacts would be temporary in nature.

4.1.2.6 CULTURAL RESOURCES

Tillamook, Oregon. Because training, construction, and eco-resort operational activities would avoid identified cultural resources sites on the Tillamook Peninsula, no additional cumulative impacts on cultural resources would be expected.

Forks, Washington. Because permit requirements from the Washington DNR and USFS prohibit personnel from disturbing or removing cultural materials and call for immediate notification and cessation of activities should any cultural materials be discovered during training or logging activities, no additional cumulative impacts on cultural resources would be expected.

4.1.2.7 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Tillamook, Oregon. Short-term, negligible, beneficial, cumulative impacts on revenue to the local economy would be generated from the purchase of materials for road maintenance and construction activities and long-term, beneficial impacts could be expected from eco-resort operational activities.

Forks, Washington. Long-term, beneficial impacts could be expected on socioeconomics from USDA logging activities.

4.1.2.8 HAZARDOUS MATERIALS AND WASTES

Tillamook, Oregon. No hazardous materials would be stored or used in the training or eco-resort areas; however, minor quantities of fuel or oils could be released to the environment from a vehicle breakdown or construction equipment. Any spills would be cleaned up and disposed of in accordance with Federal, state, and local regulations. Therefore, no long-term cumulative impacts from hazardous materials and wastes would be expected.

Forks, Washington. Cumulative impacts on the Forks, Washington, area would be similar to those described for the Tillamook, Oregon, area.

4.1.2.9 HEALTH AND SAFETY

Tillamook, Oregon. Because all training activities would be related to survival training and recreational in nature and eco-resort operational activities would be recreational in nature, no additional long-term, cumulative impacts would be expected.

Forks, Washington. Cumulative impacts on health and safety at the Forks, Washington, area would be greater than those described for the Tillamook, Oregon, area. USDA logging activities would result in a minor to moderate, adverse impact on health and safety.

4.2 Unavoidable Adverse Effects

Unavoidable adverse effects would result from implementation of the Proposed Action. None of these impacts would be significant.

The use of nonrenewable resources is an unavoidable occurrence, although not considered significant. The Proposed Action would require the continued use of fossil fuels, a nonrenewable natural resource, during training activities. Energy supplies, although relatively small, would be committed to the Proposed Action.

4.3 Compatibility of Proposed Action with the Objectives of Federal, Regional, State, and Local Land Use Plans, Policies, and Controls

The Proposed Action would occur on government-owned lands operated by the USFS; USACE; Washington DNR; and Rayonier Operating Company, LLC, a timber management company. The USAF has access to the training areas in Tillamook, Oregon, and Forks, Washington, with the exception of two private land parcels within the area operated by Rayonier Operating Company, LLC, adjacent to the Olympic National Forest. The nature of activities for the Proposed Action would not differ from current uses of these areas. The Proposed Action is a continuation of similar training conducted by the USAF in these areas since the 1980s. The Proposed Action would not conflict with any land use ordinances. Five (5) permits are currently held by the USAF that allow the use of these areas for training activities. The USAF would continue to follow all requirements outlined in these permits.

4.4 Relationship between Short-Term Uses of Man's Environment and Maintenance and Enhancement of Long-Term Productivity

Short-term uses of the biophysical components of the human environment include direct, project-related disturbances and direct impacts associated with an increase of population and activity that occurs over a period of less than 5 years. Long-term uses of the human environment include those impacts occurring over a period of more than 5 years, including permanent resource loss.

Implementation of the Proposed Action would not require short-term resource uses that would result in long-term compromises of productivity. Under the Proposed Action, short-term uses of the environment would result in noise from helicopter operations. Noise generated by SERE training activities would be temporary and sporadic in nature and would not be expected to result in long-term, adverse impacts on noise-sensitive receptors or wildlife. The long-term impacts of the SERE training missions would primarily involve use of airspace and government-owned lands. The nature of activities for the Proposed Action would not differ from current uses of these areas.

Therefore, implementation of the Proposed Action would not result in significant impacts on sensitive resources. As a result, it is not anticipated that the Proposed Action would result in any environmental impacts that would permanently narrow the range of beneficial uses of the environment or pose long-term risks to health, safety, or the general welfare of the public.

4.5 Irreversible and Irretrievable Commitment of Resources

Irreversible and irretrievable resource commitments are related to the use of nonrenewable resources and the impacts that the use of these resources would have on future generations. Irreversible impacts primarily result from use or destruction of a specific resource that cannot be replaced within a reasonable timeframe (e.g., energy and minerals). Irreversible and irretrievable commitments of resources usually result from implementation of actions that involve the consumption of material resources used for construction, energy resources, and human labor resources. The use of these resources is considered to be permanent.

Under the Proposed Action, most resource commitments are neither irreversible nor irretrievable. Most of the impacts would be negligible and temporary in nature. No habitat associated with threatened or endangered species would be lost as result of implementation of the Proposed Action.

5. List of Preparers

This EA has been prepared by HDR, Inc. (HDR) under the direction of Air Force Civil Engineer Center, Fairchild AFB, and the 336th TRG. The HDR individuals who contributed to the preparation of this document are listed below:

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Natural and Cultural Resource Consultation Documentation

Appendix A: Natural and Cultural Resource Consultation Documentation

This appendix includes correspondence with the Oregon and Washington State Historic Preservation Offices, Tribes, U.S. Fish and Wildlife Service, and National Oceanic and Atmospheric Administration National Marine Fisheries Service. It does not include the original letters sent from the U.S. Air Force (USAF) to these entities due to the volume of redundant letters that would be included. It only includes responses to USAF initial letters initiating consultation, in addition to USAF or agency follow up replies.

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Washington Fish and Wildlife Office
510 Desmond Dr. SE, Suite 102
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APR 1 2 2016

In Reply Refer To:
01EWFW00-2016-I-0482

Colonel Charles B. McDaniel
Commander
Public Works Officer
1 E. Bong Street, Building 2285
Fairchild Air Force Base, Washington 99011

Dear Colonel McDaniel:

Subject: Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape Training

This is in response to your letter, dated February 8, 2016, requesting consultation for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training near Forks, Washington. Your letter and draft Environmental Assessment were received in our office on February 10, 2016.

The U.S. Air Force (USAF) has requested the U.S. Fish and Wildlife Service's (Service) concurrence with a determination of "may affect, not likely to adversely affect" for the marbled murrelet (*Brachyramphus marmoratus*) and the northern spotted owl (*Strix occidentalis caurina*) (spotted owl). This consultation has been conducted in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(Act). A complete record of this consultation is on file at the Service's Washington Fish and Wildlife Office in Lacey, Washington.

In your request and accompanying draft Environmental Assessment (page 3-28) regarding training near Forks, Washington, you determined that the proposed action will have "no effect" on the streaked horned lark (*Eremophila alpestris strigata*), yellow-billed cuckoo (*Coccyzus americanus*), bull trout (*Salvelinus confluentus*). In addition, you also determined the action will have "no effect" on the proposed threatened Dolly Varden trout (*Salvelinus malma*) and candidate whitebark pine (*Pinus albicaulis*), should they become listed.

You also determined that no designated critical habitat would be affected for any of the species discussed above. Your determination that this project will not affect listed resources rests with USAF. The Service has no regulatory or statutory authority to concur with "no effect" determinations, and no consultation is required. We recommend that you document your analysis of effects and maintain that documentation as part of the project file.

The Service received clarification on vector training during an April 1, conference call with USAF staff and their NEPA consultant. This information was incorporated into our analysis below. We also received an April 5 electronic correspondence documenting the answers to our questions. In that correspondence, USAF also confirmed that this consultation only addresses actions in Washington and that the training activities in Oregon are addressed in a separate consultation with staff from the Service's Oregon State Office.

Project Description

The portion of the training conducted near Forks, Washington, will be the Tropical portion of the SERE training. It will occur on multiple ownerships (private, State, and Federal) with appropriate permissions and permitting for each owner. Vehicle staging will occur at the Klahanie campground, which is a U.S. Forest Service campground adjacent to a former gravel pit used by recreational firearm shooters.

Other activities that may occur in several locations include primitive camping including shelter construction, land navigation, gathering, and rafting. Some of these activities will be precluded on some ownership types. For instance, gathering and vector training will not occur on National Forest lands but will occur on private and State land. Materials gathered for shelter construction would be scattered following use. Use of areas scheduled for pre-commercial thinning would ensure woody material gathered was already scheduled for removal.

Eight flights from Fairchild Airport in Port Angeles to and from the training area would occur per year at 300 feet to 1,000 feet above ground level. Four would be in April and four in September. The helicopter used for this training produces a noise level of 91decibels (A-weighted) (dBA) at 200 feet. At 300 feet the noise would be approximately 85 dBA; however, helicopters are not expected to fly at minimum elevations while transiting to and from the training areas.

During vector training on private and State land, each student would practice providing verbal navigation cues via radio from the ground to the helicopter overhead. Vector training would take place over approximately 2 hours. This training would also include construction of flags, using ground debris and cloth, to provide visual cues to the helicopter. During vector training the helicopter will not be hovering, but would continue a series of flight paths at approximately 500 feet to 2,000 feet above ground level.

The Service conducted a cursory assessment of forest conditions within and surrounding the areas used for vector training on State and private lands which indicated that suitable owl and murrelet habitats were unlikely to be present on those ownerships. Because vector training will be focused on ground personnel deployed on State and private lands, we anticipate very little Federal land would be subject to overflights as part of these exercises.

With respect to activities conducted on Olympic National Forest, we note that military training operations were consulted upon in the programmatic consultation for *Selected Forest Management Activities on the Olympic National Forest* (USFWS 2013). On a project-specific basis, requirements are developed to maintain and protect resource values. These requirements are expected to address the location, time of year, and sanitation measures. Special conservation measures for all species include placing terms and conditions on such special permits as necessary to avoid adverse impacts to listed species or their habitats. These permits also shall also include specific requirements on sanitation and cleanup of affected sites. For instance, for marbled murrelets, it is required that food and garbage shall be stored properly to prevent attraction of corvids.

Effects to Marbled Murrelet

No habitat will be modified. Students engaged in gathering, sheltering, and traveling on foot are unlikely to create substantial disturbance. Bird strikes involving murrelets are possible when helicopters are flying at low altitudes during transit and vector training. However, no bird strikes have occurred during previous tropical trainings and, while theoretically possible, a murrelet strike is extremely unlikely to occur and is therefore considered to be discountable.

The use of helicopters will result in increased levels of aircraft noise in the training areas during the marbled murrelet nesting season, which is defined as April 1 through September 23 in Washington. We have previously completed analyses of the potential for helicopter noise and visual disturbance to marbled murrelets on the Olympic National Forest (USFWS 2013, pp. 101-110). Potential marbled murrelet responses to aircraft disturbance can range from minor behavioral responses, such as scanning or head-turning, or increased vigilance for short periods, to more severe responses such as flushing. Under certain scenarios, exposure to noise or visual disturbance could result in a disruption of normal nesting behaviors. For aircraft overflights, we use the following evaluation criteria to assess potential risk for disturbance to nesting marbled murrelets:

- Aircraft noise exceeding 92 dBA SEL (sound exposure level) at an active nest site, or aircraft approach within a distance of 110 yards of an active nest site.

For this project the helicopters proposed for use by the USAF have a sound contour of approximately 85 dBA SEL at 300 ft. Therefore, helicopter flights at 500 ft or higher above ground level would not expose murrelets to aircraft noise exceeding the disturbance thresholds defined above, and would not be expected to result in disruptions to normal behavior patterns. Distant aircraft noise may result in minor behavioral responses (alerting or orienting), but such responses are considered to be insignificant. Vector training would take place over

approximately 2 hours, but would not occur over any single area for any length of time. During this time, the helicopter will be far enough above habitat that any noise effects would be insignificant. Therefore, we concur with your findings of "may affect, not likely to adversely affect" for marbled murrelets.

Effects to Northern Spotted Owl

No habitat will be modified. Students engaged in gathering, sheltering, and traveling on foot are unlikely to create substantial disturbance. Bird strikes involving spotted owls are possible when helicopters are flying at low altitudes during transit and vector training. However, no bird strikes have occurred during previous tropical trainings and, while theoretically possible, spotted owls seldom fly above tree level and a strike would be extremely unlikely to occur and is therefore considered to be discountable.

As with marbled murrelets, we have previously completed analyses of the potential for helicopter noise and visual disturbance to spotted owls on the Olympic National Forest (USFWS 2013, pp. 74-89). Delaney et al. (1999) evaluated the behavioral responses of both nesting and non-nesting Mexican spotted owls (*Strix occidentalis lucida*) exposed to military helicopter overflights. Helicopter overflights during the nesting season elicited alert responses (i.e., head turning towards the noise source) when helicopters were an average of 0.25 miles (400 m) away, but owls did not flush from their roosts until the aircraft passed within a distance of less than 344 ft (105 m) (Delaney et al. 1999, p. 68). In this study, distance was a better predictor of spotted owl response to helicopter flights than noise levels. The authors noted that short duration, single pass, single aircraft overflights had little effect on spotted owls, and concluded that a 105-m (344-ft) radius protection zone should eliminate all spotted owl flush responses to helicopter overflights (Delaney et al. 1999, p. 74).

For this project, helicopter flights at 500 ft or higher above ground level would have no potential to exceed the distance threshold defined above, and would not be expected to result in disruptions to normal behavior patterns. Distant aircraft noise may result in minor behavioral responses (alerting or orienting), but such responses are considered to be insignificant. Vector training would take place over approximately 2 hours, but would not occur over any single area for any length of time. During this time, the helicopter will be far enough above habitat that any noise effects would be insignificant. Therefore, we concur with your findings of "may affect, not likely to adversely affect" for spotted owls.

Conclusion

This concludes informal consultation pursuant to the regulations implementing the Act (50 CFR 402.13. The USAF should re-analyze this consultation if: (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner, or to an extent, not previously considered; (2) the action is subsequently modified in a manner that causes an effect to a listed species or critical habitat that was not previously considered in this consultation; and/or (3) a new species is listed, or critical habitat designated, that may be affected by the identified action.

If you have any questions about this letter or our joint responsibilities under the Act, please contact Bill Vogel at (360) 753-4367 (email: bill_vogel@fws.gov) or Martha Jensen at (360) 753-9000, of this office.

Sincerely,

Eric V. Rickerson, Supervisor
Washington Fish and Wildlife Office

cc:
AFCED, San Antonio, TX (J. Guerra)

Literature Cited

Delaney, D.K., T.G. Grubb, P. Beier, L.L. Pater, and M.H. Reiser. 1999. Effects of helicopter noise on Mexican spotted owls. Journal of Wildlife Management 63:60-76.

USFWS (U.S. Fish and Wildlife Service). 2013. Biological opinion for effects to northern spotted owls, critical habitat for northern spotted owls, marbled murrelets, critical habitat for marbled murrelets, bull trout, and critical habitat for bull trout from selected programmatic forest management activities March 25, 2013 to December 31, 2023 on the Olympic National Forest, Washington. USFWS Reference: 13410-2009-F-0388. U.S. Fish and Wildlife Service, Washington Fish and Wildlife Office, Lacey, WA. 404 pp.

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From: GUERRA, JUAN M GS-13 USAF HAF AFCEC/CZN
To: Pyle, Stephen G; Smith, Emily
Subject: FW: Endangered Species Act Section 7 Consultation and the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon
Date: Tuesday, March 01, 2016 8:23:59 AM

A little update from our friends at USFW

R,
John
-----Original Message-----
From: Elbert, Daniel [mailto:daniel_elbert@fws.gov]
Sent: Monday, February 29, 2016 5:40 PM
To: GUERRA, JUAN M GS-13 USAF HAF AFCEC/CZN
Cc: Laura Todd
Subject: Re: Endangered Species Act Section 7 Consultation and the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon

Mr. Guerra,

We received your letter enclosing the Draft EA and DRAFT FONSI/FONPA regarding SERE training near Tillamook, Oregon, and request for review on February 16, 2016.

We recommend updating the status of the species information presented for western snowy plover (Charadrius nivosus nivosus) on lines 21 and 22 of page 3-25, to include reference to three snowy plovers that were observed at the Bayocean Spit on January 20, 2016. These three snowy plovers were among at least 28 snowy plovers that were observed in Tillamook County during the 2016 snowy plover Winter Window Survey.

Thank you for the opportunity to review the Draft EA and Draft FONSI/FONPA. We appreciate the opportunity to work with the USAF in conserving threatened and endangered fish and wildlife.

Regards,
Dan

Daniel Elbert

Fish and Wildlife Biologist, Endangered Species Newport Field Office, U.S. Fish & Wildlife Service
2127 SE Marine Science Drive, Newport, OR 97365

541-867-4558 x239 (office) | 541-207-5248 (cell)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
Oregon Coast Branch
2900 Stewart Parkway
ROSEBURG, OREGON 97471

March 11, 2016

Colonel Charles B. McDaniel
Commander
1 E. Bong St. Building 2285
Fairchild AFB, Washington 99011

Re: Comments on Draft Environmental Assessment for United States Air Force Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape Training near Forks, Washington and Tillamook, Oregon

Dear Colonel McDaniel:

On February 12, 2016, the National Marine Fisheries Service (NMFS) received a letter of notification of the preparation of a draft environmental assessment (EA) for the U.S. Air Force (USAF) coastal, open ocean, and tropical survival, evasion, resistance, and escape (SERE) training (proposed action) near Forks, Washington and in Tillamook Bay of Tillamook, Oregon. This letter is written in response to the notification because of the trust resources within NMFS' jurisdiction that may be affected by the proposed action.[1] These trust resources include species listed as threatened or endangered under the Endangered Species Act (ESA), critical habitats designated under the ESA (Table 1), and species with essential fish habitat (EFH) designated under the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (Table 2). Tillamook Bay is also designated critical habitat for Oregon Coast (OC) coho salmon (*Oncorhynchus kisutch*), as is the Pacific Ocean for leatherback turtles (*Dermochelys coriacea*). There are not ESA-listed species that occur in the Forks, Washington training area that fall under NMFS' jurisdiction.

[1] A may affect activity is any activity that may elicit a response from an ESA-listed individual that harms or modifies the normal behavior of the individual.

Table 1. Federal Register notices for final rules that list threatened and endangered species, designate critical habitats, or apply protective regulations to listed species considered in this consultation. Listing status: "T" means listed as threatened under the ESA.

Species	Listing Status	Critical Habitat	Protective Regulations
Marine and Anadromous Fish			
Coho salmon (*Oncorhynchus kisutch*)			
Oregon Coast	T 6/20/11; 76 FR 35755	2/11/08; 73 FR 7816	2/11/08; 73 FR 7816
North American green sturgeon (*Acipenser medirostris*)			
Southern	T 4/07/06; 71 FR 17757	10/09/09; 74 FR 52300	6/02/10; 75 FR 30714
Pacific eulachon (*Thaleichthys pacificus*)			
Southern	T 3/18/10; 75 FR 13012	10/20/11; 76 FR 65324	Not applicable
Marine Mammals			
Blue whale (*Balaenoptera musculus*)	E 12/02/70; 35 FR 18319	Not applicable	ESA section 9 applies
Fin whale (*Balaenoptera physalus*)	E 12/02/70; 35 FR 18319	Not applicable	ESA section 9 applies
Humpback whale (*Megaptera novaengliae*)	E 12/02/70; 35 FR 18319	Not applicable	ESA section 9 applies
Sei whale (*Balaenoptera borealis*)	E 12/02/70; 35 FR 18319	Not applicable	ESA section 9 applies
Sperm whale (*Physeter macrocephalus*)	E 12/02/1970	Not applicable	ESA section 9 applies
Killer Whale (*Orcinus orca*)			
Southern Resident	E 11/18/05; 70 FR 69903	11/29/06; 71 FR 69054	ESA section 9 applies
Marine Turtles			
Green turtle (*Chelonia mydas*)	ET 7/28/78 43 FR 32800	9/02/98; 63 FR 46693	ESA section 9 applies
Leatherback turtle (*Dermochelys coriacea*)	E 6/02/70 ; 39 FR 19320	1/26/12 77 FR 4170	ESA section 9 applies
Loggerhead turtle (*Caretta caretta*)	T 7/28/78; 43 FR 32800	Not applicable	07/28/1978; 32800
Olive Ridley turtle (*Lepidochelys olivacae*)	ET 7/28/78 43 FR 32800	Not applicable	ESA section 9 applies

Table 2. Species with designated EFH found in waters of Oregon and Washington.

Groundfish Species	
Leopard shark (*Triakis semifasciata*)	Chilipepper (*S. goodei*)
Soupfin shark (*Galeorhinus zyopterus*)	China rockfish (*S. nebulosus*)
Spiny dogfish (*Squalus acanthias*)	Copper rockfish (*S. caurinus*)
Big skate (*Raja binoculata*)	Darkblotched rockfish (*S. crameri*)
California skate (*R. inornata*)	Grass rockfish (*S. rastrelliger*)
Longnose skate (*R. rhina*)	Rougheye rockfish (*S. aleutianus*)
Ratfish (*Hydrolagus colliei*)	Sharpchin rockfish (*S. zacentrus*)
Pacific rattail (*Coryphaenoides acrolepsis*)	Shortbelly rockfish (*S. jordani*)
Lingcod (*Ophiodon elongatus*)	Shortraker rockfish (*S. borealis*)
Cabezon (*Scorpaenichthys marmoratus*)	Silvergray rockfish (*S. brevispinus*)
Kelp greenling (*Hexagrammos decagrammus*)	Speckled rockfish (*S. ovalis*)
Pacific cod (*Gadus macrocephalus*)	Splitnose rockfish (*S. diploproa*)
Pacific whiting (Hake) (*Merluccius productus*)	Stripetail rockfish (*S. saxicola*)
Sablefish (*Anoplopoma fimbria*)	Tiger rockfish (*S. nigrocinctus*)
Aurora rockfish (*Sebastes aurora*)	Vermillion rockfish (*S. miniatus*)
Bank Rockfish (*S. rufus*)	Widow Rockfish (*S. entomelas*)
Black rockfish (*S. melanops*)	Yelloweye rockfish (*S. ruberrimus*)
Blackgill rockfish (*S. melanostomus*)	Yellowmouth rockfish (*S. reedi*)
Greenspotted rockfish (*S. chlorostictus*)	Yellowtail rockfish (*S. flavidus*)
Greenstriped rockfish (*S. elongatus*)	Arrowtooth flounder (*Atheresthes stomias*)
Longspine thornyhead (*Sebastolobus altivelis*)	Butter sole (*Isopsetta isolepsis*)
Shortspine thornyhead (*Sebastolobus alascanus*)	Curlfin sole (*Pleuronichthys decurrens*)
Pacific Ocean perch (*S. alutus*)	Dover sole (*Microstomus pacificus*)
Quillback rockfish (*S. maliger*)	English sole (*Parophrys vetulus*)
Redbanded rockfish (*S. babcocki*)	Flathead sole (*Hippoglossoides elassodon*)
Redstripe rockfish (*S. proriger*)	Pacific sanddab (*Citharichthys sordidus*)
Rosethorn rockfish (*S. helvomaculatus*)	Petrale sole (*Eopsetta jordani*)
Rosy rockfish (*S. rosaceus*)	Rex sole (*Glyptocephalus zachirus*)
Blue rockfish (*S. mystinus*)	Rock sole (*Lepidopsetta bilineata*)
Bocaccio (*S. paucispinis*)	Sand sole (*Psettichthys melanostictus*)
Brown rockfish (*S. auriculatus*)	Starry flounder (*Platyichthys stellatus*)
Canary rockfish (*S. pinniger*)	
Coastal Pelagic Species	
Northern anchovy (*Engraulis mordax*)	Jack mackerel (*Trachurus symmetricus*)
Pacific sardine (*Sardinops sagax*)	Market squid (*Loligo opalescens*)
Pacific mackerel (*Scomber japonicus*)	
Pacific Salmon	
Coho salmon (*O. kisutch*)	Chinook salmon (*O. tshawytscha*)

Proposed Action

The proposed action will occur in areas that ESA-listed species and species with designated EFH use as habitat including the Pacific Ocean up to 7 miles offshore from the Bayocean Peninsula near Tillamook, Oregon and in Tillamook Bay near the Bayocean Peninsula. Coastal and open ocean training activities would occur here for 6 days twice a year (spring and fall). Tropical training activities would occur near Forks, Washington. Coastal training activities in Tillamook Bay include instructor camping and vehicle staging, gathering (shellfish), hoist training and helicopter operations, and parachute training and helicopter operations. The activities with the greatest potential to affect ESA-listed species include hoist training and helicopter operations and parachute training and helicopter operations. For hoist training and helicopter operations the helicopter would hover at an unknown low altitude and evacuate students from the open water of Tillamook Bay using a hoist cable and then return to the helicopter landing zone (HLZ). This would occur for 2 hours a day for 2 days per year. During parachute training each of the students would board the helicopter at the HLZ and deploy from the helicopter between altitudes of 2,000 and 10,000 feet above ground level and parachute into the drop zone in Tillamook Bay. All parachutes and students would be recovered from the bay by watercraft. Parachute training and helicopter operations would occur for 2 hours a day for 2 days per year.

Open ocean training would occur up to 7 miles offshore. Open ocean training includes ocean navigation training, hoist training and helicopter operations, vector training and helicopter operations, and landfall training. During open ocean hoist training and helicopter operations the students would enter the ocean from life rafts and helicopter hoist operations would occur as described above. Vector training and helicopter operations would consist of students providing verbal navigation cues from the life rafts to an in-flight helicopter overhead flying at an unknown altitude.

Comments on the Proposed Action

The proposed action overlaps with the distributions and habitats of all ESA-listed species in Table 1. Additionally, the proposed action occurs in designated critical habitat for OC coho salmon in Tillamook Bay and designated critical habitat for leatherback turtles in the Pacific Ocean. With this in mind, we have the following comments:

1. The draft EA for the proposed action considered marine turtles in their assessment, but did not consider the ESA-listed marine mammals (whales) listed in Table 1. Like marine turtles, marine mammals likely use the action area for migration and foraging while in transit to breeding or feeding grounds. Marine mammals, especially whales, are sensitive to both underwater and above water noise, which may affect behavior patterns including, but not limited to, migration, nursing, breeding, or sheltering. Operation of watercraft around marine mammals may also affect their essential behavior patterns.

2. In Table 3-9 of the draft EA the USAF made a "no effect" determination for green, leatherback, loggerhead, and olive ridley sea turtles. In contradiction, on page 3-38 of the draft EA it states "As described above, helicopter operations associated with SERE training activities would potentially have short-term, negligible effects on sea turtles. Impacts are expected to be insignificant. As such, the proposed action may affect, but is not likely to adversely affect the threatened and endangered sea turtles in Table 3-9." We do not disagree with the statement on page 3-38 and ask that the USAF rectify this discrepancy in the final EA.

Recommendations

After review of the draft EA we have the following recommendations to minimize effects to ESA-listed species. We recommend that the USAF:

1. Consider marine mammals (whales) and conduct an assessment of impacts of the proposed action on essential behaviors of the ESA-listed marine mammals in Table 1.

2. Minimize effects to marine turtles and mammals by implementing the following conservation measures related to helicopter operations:
    a. Maintain awareness of the presence or non-presence of marine turtles or mammals in the area during project activities.
    b. Maintain a safe distance of at least 1,000 feet between a present marine turtle or mammal and the helicopter.
    c. Make all attempts to avoid an area if a marine turtle or mammal is observed prior to or during training activities.

3. Minimize effects to marine turtles and mammals by implementing the following conservation measures related to operation of watercraft during training:
    a. Maintain awareness of the presence or non-presence of marine turtles or mammals in the area during project activities.
    b. Maintain a safe distance of at least 100 meters/yards between a present marine turtle or mammal and the operating watercraft.
    c. Avoid circling or entrapping marine turtles or mammals between watercraft, or watercraft and shore.
    d. Avoid separating mother/calf pairs.
    e. Avoid maneuvering watercraft into the travel path of a marine turtle or mammal.
    f. If a marine turtle or mammal approaches the watercraft, specifically watercraft under power, put engine in neutral or reduce speed (without endangering vessel), and allow animal to pass and do not engage propellers until animal is observed at the surface and clear of the vessel (animal is visually observed at a distance from the vessel).

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    b. Maintain a safe distance of at least 1,000 feet between a present marine turtle or mammal and the helicopter.
    c. Make all attempts to avoid an area if a marine turtle or mammal is observed prior to or during training activities.

3. Minimize effects to marine turtles and mammals by implementing the following conservation measures related to operation of watercraft during training:
    a. Maintain awareness of the presence or non-presence of marine turtles or mammals in the area during project activities.
    b. Maintain a safe distance of at least 100 meters/yards between a present marine turtle or mammal and the operating watercraft.
    c. Avoid circling or entrapping marine turtles or mammals between watercraft, or watercraft and shore.
    d. Avoid separating mother/calf pairs.
    e. Avoid maneuvering watercraft into the travel path of a marine turtle or mammal.
    f. If a marine turtle or mammal approaches the watercraft, specifically watercraft under power, put engine in neutral or reduce speed (without endangering vessel), and allow animal to pass and do not engage propellers until animal is observed at the surface and clear of the vessel (animal is visually observed at a distance from the vessel).

This letter does not constitute the completion of section 7 consultation under the ESA. Federal action agencies are required to consult with NMFS under section 7 of the ESA on any action that may affect an individual of our jurisdictional species listed or critical habitat designated under the ESA. Regulations governing the ESA section 7 consultation process can be found in 50 CFR §402.

Thank you for the opportunity to provide comments and recommendations on the proposed action. If you have questions regarding this letter please contact Jeff Young, fish biologist in the Oregon Coast Branch of the Oregon Washington Coastal Area Office at 541.957.3389 or jeff.young@noaa.gov.

Sincerely,

Kenneth W. Phippen
Oregon Coast Branch Chief
Oregon Washington Coastal Area Office
West Coast Region – NMFS

cc: John Guerra, USAF

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

MAY 18 2016

Ronald R. Daniels
Deputy Base Civil Engineer
100 W. Ent Street, Suite 100
Fairchild AFB, WA 99011-9404

Kenneth W. Phippen, Oregon Coast Branch Chief
Oregon Washington Coastal Area Office
West Coast Region – NMFS
2900 Stewart Parkway
Roseburg, Oregon 97471

SUBJECT: Request for Concurrence with Not Likely to Adversely Affect Threatened and Endangered Marine Species Determination for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) training near Tillamook, Oregon

1. The U.S. Air Force (USAF) requests your concurrence, under Section 7 of the Endangered Species Act (ESA) that conducting SERE training on the Bayocean Peninsula, in the Tillamook Bay, and offshore of the Bayocean Peninsula in Oregon may affect, but is not likely to adversely affect the Oregon Coast (OC) coho salmon (Oncorhynchus kisutch), southern distinct population segment (DPS) of North American green sturgeon (*Acipenser medirostris*), southern DPS of Pacific eulachon (*Thaleichthys pacificus*), blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaengliae*), sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), southern resident killer whale DPS (*Orcinus orca*), green turtle (*Chelonia mydas*), leatherback turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), and olive ridley turtle (*Lepidochelys olivacae*). The USAF has also determined that the Proposed Action would have no effect on designated critical habitat for Oregon Coast coho salmon (*Oncorhynchus kisutch*) or leatherback turtles (*Dermochelys coriacea*).

2. In accordance with the National Environmental Policy Act (NEPA), the USAF provided the National Marine Fisheries Service (NMFS) West Coast Region, in February 2016, the opportunity to review and comment on the *Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Draft Environmental Assessment (EA), Forks, Washington and Tillamook, Oregon*. After receipt and review of the Draft EA, NMFS provided a letter to the USAF on March 11, 2016 which stated that the Proposed Action could affect species listed as threatened or endangered under the ESA, critical habitats designated under the ESA, and species with essential fish habitat designated under the Magnuson-Stevens Fishery Conservation and Management Act. NMFS also provided a list of recommendations to minimize effects to ESA-listed species.

3. The USAF is proposing to continue to conduct coastal and open ocean SERE training on the Bayocean Peninsula in Tillamook, OR under permits issued by Tillamook County; Portland District, U.S. Army Corps of Engineers; and Oregon State Parks. We are also proposing to continue tropical training near Forks, Washington under permits issued by Washington Department of Natural Resources, Olympic National Forest, and Rayonier Lumber. As stated in the response received from NMFS on March 11, 2016, there are no ESA-listed species that occur in the Forks, Washington training area that fall under NMFS' jurisdiction. Therefore, actions in Washington are not being considered in this determination.

4. The description of the SERE training to be conducted in Oregon is presented in Section 2.1.2 of the Draft EA provided to NMFS in February 2016. The action area is the Bayocean Peninsula, the Tillamook Bay, and up to 7 miles offshore of the Bayocean Peninsula in the Pacific Ocean. Note that the NMFS stated in their response letter of March 2016, that "During parachute training each of the students would board the helicopter at the HLZ and deploy from the helicopter between altitudes of 2,000 and 10,000 feet above ground level and parachute into the drop zone in Tillamook Bay." This statement is incorrect as only instructors will participate in parachute training; therefore, only up to 13 of these parachute deployments would occur during each of the two trainings per year.

5. As described in the Draft EA in Section 3.5.2.1, the USAF recognized that green, leatherback, loggerhead, and olive ridley sea turtles have the potential to occur within the action area. It was noted by NMFS in their March 2016 response letter, and the USAF agrees, that that Oregon Coast coho salmon, southern DPS of North American green sturgeon, southern DPS of Pacific eulachon, blue whale, fin whale, humpback whale, sei whale, sperm whale, and southern resident killer whale DPS could also occur within the action area and be affected by the Proposed Action. NMFS also noted, and the USAF agrees, that the action area includes designated critical habitat for Oregon Coast coho salmon (*Oncorhynchus kisutch*) and leatherback turtles (*Dermochelys coriacea*).

6. To comply with Section 7(a)(2) of the ESA, the USAF has analyzed the potential effects of the proposed action on species classified or proposed for listing as threatened or endangered. Disturbances to ESA-listed marine species from the Proposed Action could include a small number of helicopter operations, boat operations, and swimming. A summary of these disturbances is provided below:

- Helicopter flights over the Tillamook Bay for up to 8 hours per year
- In accordance with safety protocols, small motorized boat operations by one boat during parachute and hoist training in Tillamook Bay for up to 8 hours per year
- Swimming by up to 50 students in Tillamook Bay during parachute and hoist training for up to 8 hours per year. No more than 20 students would be in the water swimming simultaneously.
- Helicopter flights over the Pacific Ocean for up to 12 hours per year
- Swimming by up to 50 students and the use of up to 4 non-motorized life rafts in the Pacific Ocean up to 32 hours per year. No more than 20 students would be in the water swimming simultaneously.

7. The USAF agrees to implement all recommendations provided by NMFS in their March 2016 letter to minimize potential effects to ESA-listed marine species. These measures include:

A. Minimize effects to marine turtles and mammals by implementing the following conservation measures related to helicopter operations:
   i. Maintain awareness of the presence or non-presence of marine turtles or mammals in the area during project activities.
   ii. Maintain a safe distance of at least 1,000 feet between a present marine turtle or mammal and the helicopter.
   iii. Make all attempts to avoid an area if a marine turtle or mammal is observed prior to or during training activities.

B. Minimize effects to marine turtles and mammals by implementing the following conservation measures related to operation of watercraft during training:
   i. Maintain awareness of the presence or non-presence of marine turtles or mammals in the area during project activities.
   ii. Maintain a safe distance of at least 100 meters/yards between a present marine turtle or mammal and the operating watercraft.
   iii. Avoid circling or entrapping marine turtles or mammals between watercraft, or watercraft and shore.
   iv. Avoid separating mother/calf pairs.
   v. Avoid maneuvering watercraft into the travel path of a marine turtle or mammal.

vi. If a marine turtle or mammal approaches the watercraft, specifically watercraft under power, put engine in neutral or reduce speed (without endangering vessel), and allow animal to pass and do not engage propellers until animal is observed at the surface and clear of the vessel (animal is visually observed at a distance from the vessel).

8. Due to the small spatial scale of helicopter flights, use of boats, and activities by swimmers; infrequent occurrence of activities, as described in Paragraph 6; and adherence to the minimization measures provided in Paragraph 7, it is extremely unlikely that ESA-listed marine species would be encountered in the action area during the Proposed Action. Should individuals of these species be exposed to noise, presence of boats, swimmers, or other stressors resulting from the Proposed Action, any adverse effects would be insignificant because those individuals would be expected to temporarily modify their foraging or movements behavior by moving short distances to avoid project personnel and equipment. Project activities therefore would cause discountable or insignificant adverse effects to listed marine species, and the USAF has determined that the Proposed Action may affect, but is not likely to adversely affect the Oregon Coast coho salmon (Oncorhynchus kisutch), southern DPS of North American green sturgeon (*Acipenser medirostris*), southern DPS of Pacific eulachon (*Thaleichthys pacificus*), blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaengliae*), sei whale (*Balaenoptera borealis*), sperm whale (*Physeter macrocephalus*), southern resident killer whale DPS (*Orcinus orca*), green turtle (*Chelonia mydas*), leatherback turtle (*Dermochelys coriacea*), loggerhead turtle (*Caretta caretta*), and olive ridley turtle (*Lepidochelys olivacae*). In accordance with 50 CFR 402.13, the USAF requests concurrence from NMFS with this determination.

9. The USAF has also determined that the Proposed Action would have no effect on designated critical habitat for Oregon Coast coho salmon (*Oncorhynchus kisutch*) or leatherback turtles (*Dermochelys coriacea*) because the Proposed Action does not include alteration of the marine environment in either Tillamook Bay or the Pacific Ocean.

10. The USAF is currently developing the *Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training FINAL Environmental Assessment (EA), Forks, Washington and Tillamook, Oregon* and will update all information in that document to be consistent with the information provided in this letter.

11. If you have questions, comments, or require additional information please contact: Ms. Tiffany Evans, Chief, Environmental Element, 100 W. Ent St., Suite 155, Fairchild AFB, WA 99011; or by email at: tiffany.evans@us.af.mil. Thank you in advance for your participation.

Sincerely,

Ronald R. Daniels

RONALD R. DANIELS
Deputy Base Civil Engineer

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
West Coast Region
7600 Sand Point Way N.E.
Seattle, Washington 98115

Refer to NMFS No: WCR-206-4962

June 28, 2016

Mr. Ronald R. Daniels
Deputy Base Civil Engineer
100 W. Ent Street, Suite 100
Fairchild AFB, WA 99011-9404

Re: Endangered Species Act Section 7(a)(2) Concurrence Letter for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) training near Tillamook, Oregon

Dear Ronald R. Daniels:

On May 18, 2016, NOAA's National Marine Fisheries Service (NMFS) received your request for a written concurrence that the U.S. Air Force's Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) training near Tillamook, Oregon under Section 7 of the Endangered Species Act (ESA) is not likely to adversely affect (NLAA) species listed as threatened or endangered or critical habitats designated under the ESA. This response to your request was prepared by NMFS pursuant to section 7(a)(2) of the ESA, implementing regulations at 50 CFR 402, and agency guidance for preparation of letters of concurrence.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation Tracking System *https://pcts.nmfs.noaa.gov/pcts-web/homepage.pcts*. A complete record of this consultation is on file at the Protected Resources Division in Seattle, WA.

Proposed Action and Action Area
The proposed action is fully described in the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Draft Environmental Assessment (EA), Forks, Washington and Tillamook, Oregon, and we incorporate that description here by reference (USAF 2016). The action area for the proposed action includes the Bayocean Peninsula, Tillamook Bay, and up to 7 miles offshore of the Bayocean Peninsula in the Pacific Ocean (see figures 2-1 and 2-2 in USAF 2016).

The USAF is proposing to continue to conduct its coastal and open ocean SERE training, which includes helicopter flights over Tillamook Bay for up to 8 hours per year and over the Pacific Ocean offshore of the Bayocean Peninsula for up to 12 hours per year, small motorized boat operations during parachute and hoist training in Tillamook Bay for up to 8 hours per year, approximately 50 students swimming during parachute and hoist training in Tillamook Bay for up to 8 hours per year, and the use of 4 non-motorized life rafts in the Pacific Ocean of Bayocean Peninsula for up to 32 hours per year. The coastal, open ocean, and tropical trainings occur once during the spring for the January – June course, and once during the fall for the July – September course.

In addition to the training exercises, the USAF agreed to minimize the potential for effects by implementing these measures during helicopter and watercraft training operations:

- Maintain awareness of the presence or absence of marine mammals or sea turtles in the area during project activities;
- Maintain a safe distance of at least 1,000 feet between any marine mammals or sea turtles and the helicopter;
- Maintain a safe distance of at least 100 meters/yards between a marine mammal or sea turtle and the operating watercraft;
- Make all attempts to avoid an area if a marine mammal or sea turtle is observed prior to or during training activities;
- Avoid circling or entrapping marine mammals or sea turtles between watercraft, or watercraft and shore;
- Avoid separating mother/calf pairs;
- Avoid maneuvering watercraft into the travel path of a marine mammal or sea turtle
- If a marine mammal or sea turtle approaches the watercraft, specifically watercraft under power, put engine in neutral or reduce speed (without endangering vessel), and allow animal to pass and do not engage propellers until animal is observed at the surface and clear of the vessel.

Action Agency's Effects Determination

The U.S. Air Force (USAF) evaluated the potential impacts of the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) training near Tillamook, Oregon and determined that the proposed project is not likely to adversely affect Oregon Coast coho salmon (*Oncorhynchus kisutch*), southern distinct population segment (DPS) of North American green sturgeon (*Acipenser medirostris*), southern DPS of Pacific eulachon (*Thaleichthys pacificus*), blue whale (*Balaenoptera musculus*), fin whale (*Balaenoptera physalus*), humpback whale (*Megaptera novaengliae*), sei whale (*Balaenoptera borealis*), sperm whale (*Physeter microcephalus*), Southern Resident killer whale (*Orcinus orca*), green sea turtle (*Chelonia mydas*), leatherback sea turtle (*Dermochelys coriacea*), loggerhead sea turtle (*Caretta caretta*), and the olive ridley sea turtle (*Lepidochelys olivacae*). The USAF has also determined that the proposed action would have no effect on designated critical habitat for Oregon Coast coho salmon or leatherback sea turtles.

Consultation History
In February 2016, the USAF provided NMFS West Coast Region, Oregon Washington Coastal Area Office the opportunity to review and comment on the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Draft Environmental Assessment (EA), Forks, Washington and Tillamook, Oregon. On March 11, 2016, NMFS provided a letter to USAF which stated that the proposed action could affect species listed as threatened or endangered under the ESA. NMFS also provided a list of recommendations to minimize effects to ESA-listed species. On May 18, 2016, the USAF requested concurrence under section 7 of the ESA on the proposed action. On June 13, 2016, the NMFS Protected Resources Division received the draft EA and initiated section 7 consultation.

ENDANGERED SPECIES ACT

Effects of the Action
Under the ESA, "effects of the action" means the direct and indirect effects of an action on the listed species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action (50 CFR 402.02). The applicable standard to find that a proposed action is not likely to adversely affect listed species or critical habitat is that all of the effects of the action are expected to be discountable, insignificant, or completely beneficial. Beneficial effects are contemporaneous positive effects without any adverse effects to the species or critical habitat. Insignificant effects relate to the size of the impact and should never reach the scale where take occurs. Discountable effects are those extremely unlikely to occur.

Below, we first discuss the likelihood of occurrence for ESA-listed marine mammals, sea turtles, and anadromous fish in the project vicinity, and second discuss the potential effects of the proposed action.

Blue whales- The U.S. west coast is an important feeding area in summer and fall for blue whales of the eastern North Pacific stock. Sightings off the U.S. west coast are concentrated off the California coast but survey data also indicate occasional sightings off the Oregon coast (Carretta et al. 2016). Although blue whales have the potential to occur in the project vicinity, the available data indicate that occurrences are rare.

Fin whales- Fin whales of the California/Oregon/Washington stock have been detected year round from northern California north to Washington (Moore et al. 1998). Survey data indicates primarily offshore sightings of fin whales in Oregon waters (Carretta et al. 2016). Although there is a potential for fin whales to occur along the Oregon coast, available data indicate that occurrence is likely to be rare in the project vicinity.

Humpback whales- Humpback whales in the North Pacific migrate seasonally from northern latitudes in the summer to lower latitudes in the winter. On April 21, 2015, NMFS announced a proposed rule to revise the globally listed endangered species of humpback whales into 14 distinct population segments (DPSs); 2 DPSs are proposed to be listed as endangered and 2 DPSs are proposed to be listed as threatened (80 FR 22303). The remaining 10 DPSs are not proposed for listing. Although only one stock is currently recognized off the U.S. west coast, there appears to be two feeding groups, a California and Oregon group, and a northern Washington

and southern British Columbia feeding group (Calambokidis et al. 2008, Barlow et al. 2011). Humpback whales have been sighted off the Oregon coast relatively close to shore (Carretta et al. 2016), and have the potential to occur in the project vicinity.

Sei whales- Sei whales do not appear to be associated with coastal features and sighting locations based on surveys off California, Oregon, and Washington indicate a relatively offshore distribution (Carretta et al. 2016). Surveys conducted from 1991-2008 off California, Oregon, and Washington waters confirmed only a few sightings of sei whales (see Carretta et al. 2016). Although there is potential for sei whales to occur along the Oregon coast, available data indicate that occurrence is likely to be rare in the project vicinity.

Southern Resident killer whales- Southern Resident killer whales spend considerable time in the Georgia Basin from late spring to early autumn, with concentrated activity in the inland waters of Washington State around the San Juan Islands. Pods make occasional trips to the outer coast during this season and typically travel along the southern coast of Vancouver Island and are occasionally sighted as far west as Tofino and Barkley Sound. In the winter and early spring, Southern Resident killer whales move into the coastal waters along the outer coast from the southeast Alaska south to central California. Data from satellite tagging and acoustic recorder studies has provided new information about the coastal habitat use of the Southern Residents (Hanson et al. 2013, NWFSC unpubl, data). Based on the available data, Southern Resident killer whales have the potential to occur in the project vicinity.

Sperm whales- Sperm whales are widely distributed in the North Pacific. The California/Oregon/Washington stock is seen in Oregon waters every season except winter (Green et al. 1992). However, the surveys off California, Oregon, and Washington from 1991-2008 indicate that sperm whales are not generally distributed near shore (Carretta et al. 2016) and are therefore likely to be rare in the project vicinity.

Green sea turtles- On April 6, 2016, NMFS and the USFWS published a final rule listing eleven DPSs for the previously globally listed green sea turtle (81 FR 20057). The Eastern Pacific DPS, the population most likely to occur in the U.S. west coast waters, is listed as threatened. Like all green sea turtles, the East Pacific DPS use open ocean convergence zones and coastal areas for benthic foraging on macroalgae, sea grasses, and invertebrates. This DPS commonly occurs south of Point Conception in Southern California, but green sea turtles have been sighted as far north as Alaska (NMFS and USFWS 1998a, Seminoff et al. 2015). Stranding records and research indicate that the green sea turtle appears to be a resident in coastal waters in San Diego Bay and in the Long Beach area (NMFS and USFWS 1998a, Seminoff et al. 2015, Crear et al. 2016). Although there is potential for green sea turtles to occur along the Oregon coast, available data indicate that occurrence is likely to be rare in the project vicinity.

Leatherback sea turtles- The range of leatherback sea turtle populations in the Pacific Ocean includes the U.S. west coast. Off of the U.S. west coast, the nearshore waters between Cape Flattery, Washington, and Cape Blanco, Oregon extending offshore to the 2000 meter isobaths is the principal Oregon/Washington foraging area and includes important habitat associated with the Columbia River Plume and Heceta Bank, Oregon (NMFS and USFWS 2013). The

leatherback sea turtle feeds on jellyfish in the area, but only nests in the tropics. Leatherback sea turtles have the potential to occur in the project vicinity.

Loggerhead sea turtles - On September 22, 2011, NMFS and the USFWS published a final rule listing nine distinct population segments for the previously globally listed loggerhead sea turtle (76 FR 58868). The North Pacific DPS, the population most likely to occur in the U.S. west coast waters, is listed as endangered. Like all loggerheads, the North Pacific DPS inhabits continental shelves, bays, estuaries, and lagoons. The waters off of Baja California, Mexico, are an important foraging area for young loggerheads (Conant et al. 2009). Along the U.S. west coast, most sightings of loggerhead turtles are of juveniles in the open ocean. Most sightings and strandings records are off southern California (unpubl. NMFS stranding data); however there are also a few sightings records from Washington and Alaska (Bane 1992). Although there is potential for loggerhead sea turtles to occur along the Oregon coast, available data indicate that occurrence is likely to be rare in the project vicinity.

Olive ridley sea turtles- Olive ridleys have a mostly pelagic distribution, but they have been observed to inhabit coastal areas. Along the U.S. west coast, they primarily occur off California and occasionally north to the Oregon coast during the feeding migration. Stranding records also indicate olive ridleys have been killed by gillnets and boat collisions in Oregon and Washington waters (NMFS and USFWS 1998b, NMFS and USFWS 2014). Although there is potential for olive ridley sea turtles to occur along the Oregon coast, available data indicate that occurrence is likely to be rare in the project vicinity.

OC coho salmon – OC coho salmon smolts migrate through Tillamook Bay to the ocean year around with peak migration from mid-April to mid-June. Adult spawners migrate through the action area from August through February. Smolt and adult presence in the Tillamook Bay action area would be transitory as they migrate to the ocean or to spawning grounds. Smolts and adult OC coho salmon also occupy the Pacific Ocean action area, however are likely widely distributed throughout the water column.

Green sturgeon – Green sturgeon may occur off Tillamook Bay in marine waters during project activities. Furthermore, green sturgeon are known to congregate in coastal waters and estuaries, including non-natal estuaries. Presumably they enter these estuaries in summer to feed (Beamis and Kynard 1997). Data from studies in Washington indicate that green sturgeon are present in estuaries from June until October (Moser and Lindley 2007). Recent fieldwork indicates that green sturgeon generally inhabit specific areas of coastal estuaries near or within deep channels or holes, moving into the upper reaches of the estuary, but rarely into freshwater (WDFW and ODFW 2012).

Eulachon – There are no known observations of eulachon in Tillamook Bay (Gustafson *et al.* 2010). However, there has not been a focused effort to determine presence either. Eulachon presence is known to be very sporadic in some areas so long-term sampling during the winter is necessary to achieve definitive results for areas that are not frequently used. The habitat in Tillamook Bay and its associated riverine tributaries are similar to other areas known to support eulachon. Therefore, it is possible, although unlikely, that presence would occur during the proposed action.

Effects- Blue whales, fin whales, sei whales, sperm whales, green sea turtles, loggerhead sea turtles, and olive ridley sea turtles are unlikely to be present in the action area, based on the discussion above. Based on rare occurrence in the action area and the short term and infrequent nature of the proposed action, effects to these species are extremely unlikely to occur and are therefore, discountable.

Green sturgeon and eulachon are unlikely to be exposed to the proposed action because green sturgeon are unlikely to be present at the surface where project activities will take place and eulachon are rare in Tillamook Bay. Exposure of OC coho salmon to the effects of the proposed action is unlikely because coho salmon presence in the action area will be transitory and the proposed action's occurrence and effects are short-term and infrequent. Based on the unlikely exposure of OC coho salmon, green sturgeon, and eulachon to the proposed action, the effects to these species are discountable.

Humpback whales, Southern Resident killer whales, and leatherback sea turtles may occur in the action area. There is potential for vessels to encounter these ESA-listed marine mammals and sea turtles during the proposed training exercise off the Oregon coast. Any potential disturbance from vessels are expected to be short term and transitory in nature and therefore insignificant. The vessels involved in the activities will not target marine mammals or sea turtles, should be easily detected by the marine mammals when the vessels are in transit, and the vessels will follow conservation measures described above. Thus, vessel strikes are extremely unlikely and therefore discountable. In the event any of the species are in the action area during helicopter exercises, the conservation measure that the helicopter will maintain a safe distance of at least 1,000 feet is in place to reduce the potential for any effects to ESA-listed marine mammals and turtles. Thus, disturbance from the helicopter exercise is extremely unlikely and therefore discountable.

Due to the small number and infrequent occurrence of training exercises, and adherence to the minimization measures described above, it is extremely unlikely that ESA-listed marine mammals and sea turtles would be encountered during the proposed action. In the event that exposure does occur, we anticipate that the effects would be insignificant because of the short term and transitory nature of the activities.

Conclusion
Based on this analysis, NMFS concurs with USAF that the proposed action is not likely to adversely affect the subject listed species.

Reinitiation of Consultation
Reinitiation of consultation is required and shall be requested by the USAF or by NMFS, where discretionary Federal involvement or control over the action has been retained or is authorized by law and (1) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (2) the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this concurrence letter; or if (3) a new species is listed or critical

habitat designated that may be affected by the identified action (50 CFR 402.16). This concludes the ESA portion of this consultation.

Please direct questions regarding this letter to Teresa Mongillo, Seattle, WA, at 206-526-4749 or Teresa.Mongillo@noaa.gov.

Sincerely,

for William W. Stelle, Jr.
Regional Administrator

cc: Ken Phippen, Oregon Washington Coastal Area Office
Administrative file: 151422WCR2016PR00243

bcc: CHRON File (pdf)
Division- File copy

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

APR 21 2015

Colonel Charles B. McDaniel
Commander
1 E. Bong St., Bldg 2187
Fairchild AFB, WA 99011

Mr. Charles Woodruff, Chairman
Quileute Tribe of the Quileute Reservation
P.O. Box 279
La Push, WA 98350

SUBJECT: Section 106 Consultation Initiation and Description of the Proposed Action and Alternatives (DOPAA) for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon

1. The U.S. Air Force (USAF) has prepared a Description of the Proposed Action and Alternatives (DOPAA) for the *Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA), Forks, Washington and Tillamook, Oregon* in accordance with the National Environmental Policy Act (NEPA). The DOPAA is provided as Attachment 1 to this letter. The environmental impact analysis process for this proposal is being conducted by the USAF in accordance with the Council on Environmental Quality regulations pursuant to requirements of NEPA.

2. The DOPAA will support the subsequent preparation of the EA and describes the USAF's proposal to continue to conduct: coastal and open ocean SERE training on the Bayocean Peninsula in Tillamook, OR under permits issued by Tillamook County, the Portland Corps of Engineers and Oregon State Park; and tropical training near Forks, Washington under permits issued by Washington Department of Natural Resources (DNR), Olympic National Forest, and Rayonier Lumber. The USAF is undertaking a NEPA analysis for this training based on the renewal of all existing permits, in accordance with USAF requirements.

3. This proposal would meet the mission of the 336th Training Group, Fairchild Air Force Base, to properly train USAF Aircrew Members in SERE skills to avoid capture during times of conflict and high risk of isolation. The DOPAA will become Sections 1 and 2 of the Draft EA.

4. The USAF is complying with Section 106 of the National Historic Preservation Act (NHPA) concurrently with development of the EA as recommended by NEPA's implementing regulations, Title 40 Code of Federal Regulations (CFR) Part 1502.25(a). In accordance with 36 CFR Part 800.3(c), this letter initiates our Section 106 consultation for this undertaking and requests your input on the identification of historic properties for the portion of the undertaking that would occur in Washington. The USAF is particularly interested in your input on properties in the project area that may have religious and cultural significance to your tribe, and if such properties exist, to help assess how the project might affect them. Government-to-government consultation between the USAF and your tribe for this effort is also in accordance with Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments;* Air Force Instruction (AFI) 32-7065, *Cultural Resources Management Program;* and AFI 90-2002 *Air Force Interactions with Federally-Recognized Tribes.*

5. In accordance with NEPA and the USAF's implementing regulations, 32 CFR Part 989.14(l), the USAF is also seeking your input on the proposal as described in the attached DOPAA.

6. The proposed undertaking consists of tropical SERE training on properties in the vicinity of Forks, Washington (see Attachment 2), under appropriate permits described in Paragraph 2. These properties include lands adjacent to the Sol Duc, North and South Fork Calawah, and Hoh rivers. The SERE training course would be conducted twice per year, once in the spring and once in the fall. Each course would consist of up to 50 students and 13 instructors. Training activities would continue to consist mainly of land navigation, rafting, camping, and natural materials gathering. Training would not include use of any live-fire weapons or tracked vehicles. In accordance with the permits, recreational activities by the public would be allowed to continue on these properties during training. More details on the proposed undertaking are provided in the attached DOPAA (Attachment 1).

7. The USAF has identified the Area of Potential Effect (APE) of the undertaking to include the properties permitted for SERE training in the Forks, Washington vicinity. The APE includes lands adjacent to the Sol Duc, North and South Fork Calawah, and Hoh rivers. The APE is identified in Attachment 2.

8. The USAF has conducted an Environmental Baseline Survey and search of publicly available records to identify historic properties within the APE and in the broader area surrounding Forks, Washington. This search included a review of the Washington Information System for Architectural and Archaeological Records Data (WISAARD) and the National Register of Historic Places. A record search to identify archaeological sites and previous surveys is also being conducted online through Washington State Historic Preservation Office. The USAF has identified 9 historic sites within 3 miles of the APE. Of these sites, 5 were determined not eligible for National Register of Historic Places (NRHP) listing, the eligibility of 1 site has not been determined, 2 sites are listed on the Washington Heritage Register but not listed on the NRHP, and 1 site is NRHP listed. The sites determined not eligible for NRHP listing are all located approximately 2 to 2.5 miles from the nearest boundary of the APE and include the Hart House, Forks High School (historically known as the Quillayute Union High School), an unnamed home built in 1941, the Willmer A Robbins house, and the Judith Fowler house. One site, Sappho, is located near Beaver, Washington approximately 1.25 miles from the nearest boundary of the APE and the eligibility of this site for NRHP listing has not been determined. The 2 sites listed on the Washington Heritage Register are within 2 to 2.5 miles of APE and are the Copeland Adam House and the Smith-Mansfield house. The Beaver School, site 92001591, is listed on the NRHP and is located approximately 1.3 miles from the nearest boundary of the APE.

9. Pursuant to 36 CFR Part 989.14(l) and 36 CFR 800.4, the USAF is seeking your input on the proposed action as described in the attached DOPAA.

10. Please address questions regarding this consultation by mail to: Mr. John Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you.

Sincerely

CHARLES B. MCDANIEL
Colonel, USAF
Commander

Attachments:
1. Description of the Proposed Action and Alternatives
2. Map of Undertaking and APE

cc: Director of Natural Resources, Quileute Tribe of the Quileute Reservation

QUILEUTE TRIBAL COUNCIL
POST OFFICE BOX 279
LA PUSH, WASHINGTON 98350-0279
TELEPHONE (360) 374-6163
FAX (360) 374-6311

May 22, 2015

Col. Charles B. McDaniel, Cmdr.
Dept. of the Air Force,
Hdqtrs. 92nd Air Refueling Wing
1 E. Bong St., Bldg. 2187
Fairchild AFB, WA 99011

Mr. John Guerra (juan.guerra.6@us.af.mil)
AF Civil Engineer Center (AFCEC/CZN)
JBSA-Lackland, Building 1650
San Antonio, TX 78226

Re: Section 106 Consultation Initiation and Description of Proposed Action and Alternatives (DOPAA) for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon.

Dear Col. McDaniel and Mr. Guerra:

By this letter the Quileute Tribe is responding to your letter date-stamped April 21, 2015 and advising the Air Force that we are seeking consultation regarding the DOPAA for the lands inside the Sol Duc and Calawah watersheds of the Quillayute River Basin. Our concerns are largely technical in nature and it may prove to be satisfactory to have a staff-to-staff consultation regarding our concerns, only followed by government-to-government should the first level prove unsatisfactory.

In order to set up a mutually convenient meeting or conference call, please contact our Director of Natural Resources, Mel Moon, at (360) 374-3133 or mel.moon@quileutetribe.com; or our Deputy Director of Natural Resources, Mr. Frank Geyer, at (360) 374-2027, or frank.geyer@quileutetribe.com, both at Quileute Natural Resources, PO Box 187, La Push, WA 98350.

Your letter came to Charles Woodruff as Chairman; however, that position is now held by me as Chairwoman of the Quileute Tribal Council. The address is the same. The Tribal Council telephone is (360) 374-6163 and my email is naomi.jacobson@quileutetribe.com. The Quileute Tribe has not yet established a Tribal Historic Preservation Officer so it is correct to send matters under the National Historic Preservation Act directly to our tribal council until further notice.

Sincerely,

Vice Chairman

Naomi Jacobson, Chairwoman
Quileute Tribal Council

Leclerc, Elizabeth

From:	GUERRA, JUAN M GS-12 USAF HAF AFCEC/CZN <juan.guerra.6@us.af.mil>
Sent:	Friday, May 22, 2015 3:45 PM
To:	Katie Krueger
Cc:	Smith, Emily; Pyle, Stephen G
Subject:	RE: Quileute request for consultation.
Signed By:	juan.guerra.6@us.af.mil

Ms. Krueger,
Thank you for the response. The Air Force will be in contact with you.

Respectfully,

John Guerra
Program Manager
Air Force NEPA Center (AFCEC/CZN)
210-925-2728
DSN 945-2728

From: Katie Krueger [mailto:katie.krueger@quileutetribe.com]
Sent: Friday, May 22, 2015 2:39 PM
To: GUERRA, JUAN M GS-12 USAF HAF AFCEC/CZN
Subject: Quileute request for consultation.

Mr. Guerra, a hard copy letter went to the Commander and to you as well. Thank you for contacting us.

Katie Krueger, Staff Attorney and Policy Analyst
Quileute Natural Resources
FOR US MAIL: PO Box 187; FOR STREET DELIVERY: 401 Main St.
La Push, Washington, 98350-0187
TEL: (360) 374-2265, CELL: (360) 460-4842, FAX: (360) 374-9250
katie.krueger@quileutetribe.com
Check out our QNR website:
http://www.quileutenation.org/natural-resources

From:	Smith, Emily
To:	Leclerc, Elizabeth
Subject:	FW: call on 6/8/15 re AF training in Sol Duc and Calawah
Date:	Friday, June 19, 2015 10:05:00 AM

Emily Smith

HDR
9781 S Meridian Blvd, Suite 400
Englewood, CO 80112
D 303.754.4295 M 303.588.2564
emily.smith@hdrinc.com

From: Pyle, Stephen G
Sent: Wednesday, June 17, 2015 10:14 AM
To: Smith, Emily
Cc: Edwards, Matthew
Subject: FW: call on 6/8/15 re AF training in Sol Duc and Calawah

The body of this email is from Selser's email that can't forward. Below from Katie Krueger was an email attached to Selser's email. Bottom line, it looks like they already talked to the Quileute tribe.

Here is a write-up from the Teleconference that took place regarding the Quileute Tribe and their Natural Resource concerns with the SERE Training in the Forks, WA area and attached it what was sent by Ms. Katie Krueger- FYSA.

On call for the Quileute Tribe: Mel Moon, Jr., QNR director, Frank Geyer, QNR deputy director, and Katie Krueger, QNR staff attorney/policy analyst.
On AF behalf: Jeffery Johnson, MSG Strategic Advisor, Todd Foster, 336 TRG Training Area Manager, Steven Selser, Natural/Cultural Resources Manager

Todd Foster gave an overview of the training to the group: It happens twice a year for ~5 days, campsites are rotated to minimize impacts of trainees, river navigation is conducted in 9 person life rafts, most food is brought in with the group for this training but some fishing occurs,

Questions from the Quileute representatives were then addressed. Foremost was the concern that treaty rights for Tribal members, to manage resources and harvest from their ancestral land would not be infringed on. We assured the group that tribal access and use will not be restricted by Air Force activities in the area. If interaction between trainees and local area citizens, the trainees are to be courteous and respectful.

Species management includes, but is not limited to, active salmon and steelhead fisheries, who's runs happen from March through December. The paramount concern was that salmon and steelhead "redds" would be disturbed by trainees as they transit these waters. Mr. Foster assured the group that part of the intent of the training is water navigation, so the trainees should not have reason to enter the water. When the river becomes too low to easily navigate, using life rafts, the navigation training is moved to another location. He will also instruct trainees to construct their emergency signals in such a way that will not impede other river traffic. Additionally students will be instructed about steelhead and salmon, to include information on redds and how to identify them. Mr. Selser, who has performed redd counts in the past, will produce a Power Point Presentation regarding salmonids and their spawning habits for 336 TRG training purposes.

The gathering of artifacts that trainees may find, while in the area was another concern. Mr. Foster explained that the standing policy is that if any artifact is found, it's position will be will be marked, the site will be flagged, and the artifact left. Notification to interested parties would then occur. Ms. Krueger stated that if anything is found while training in this area, the Quileute Tribe would be the only tribe that would need to be consulted.

The use of fire was discussed. Mr. Foster discussed that trainees take great care and that the trainees won't build fires when risk is high; they will use propane stoves for cooking. Also, Mr. Foster communicates with Brian Suslisk, Fire Chief, in Forks.

Ms. Krueger stated that the 336 TRG should contact the Tribe's prior to use, so that they can know when the Air Force will be training in the area. Mr. Selser will gather specifics about who to contact.
R/S

Steve Selser
Environmental Impact Analysis Process Coordinator
Natural and Cultural Resources Manager
92nd Civil Engineer Squadron
100 West Ent Street Suite 155
Fairchild AFB, WA 99011
Comm ☎: (509) 247-8116 DSN ☎: 657-8116

Always carry a flagon of whiskey in case of snakebite and furthermore always carry a small snake.
W. C. Fields

Stephen Pyle, Esq.
D 210.253.6524 M 210.602.4926

hdrinc.com/follow-us

From: Katie Krueger [mailto:katie.krueger@quileutetribe.com]
Sent: Monday, June 08, 2015 6:19 PM
To: SELSER, STEVEN D GS-11 USAF AMC 92 CES/CEIE
Cc: Mel Moon; frank.geyer@quileutenation.org; nicole.rasmussen@quileutenation.org; jacob.turner@quileutenation.org; garrett.rasmussen@quileutenation.org
Subject: call on 6/8/15 re AF training in Sol Duc and Calawah

Please forward as necessary. This is just to document some of the things we discussed, in no particular order, to keep of record, relating to the April 2015 Description of the Proposed Action and Alternatives for training (SERE).

Trainees learn to live off land, safely return home. These trainees ultimately become instructors.

You and Todd Foster explained that this is a renewal permit and has gone on for a few decades, beginning in Oregon and as land ownership changed, moving to Hoh and Sol Duc/Calawah river systems (DNR and Rayonier ownership) for the tropical jungle part of the training. As Hoh private foundations took over some ownership, it became more convenient to stick with Rayonier as the permitting would be parallel but the legal land description would be modified.

On call for Quileute: Mel Moon, Jr., QNR director, Frank Geyer, QNR deputy director, and Katie Krueger, QNR staff attorney/policy analyst.

We inquired about previous notice since the process had been going on so long. We don't recall it. There may have inadvertently been unfamiliarity back east with the off-reservation treaty rights in WA and parts of OR, ID. The "Stevens Treaties". They are mindful of it now. We got the NHPA notice because the AF is under instructions to be especially mindful of these concerns. Now that they know about these off-rez reserved treaty rights and our duty to co-manage, they will keep in touch with our Natural Resources Staff. (http://www.quileutenation.org/staff-directory) [FYI, I need to check on the updates to this. Been remiss!]

Frank asked if they do come across an artifact, although one is not expected, can they contact our office? We work with the state archeologist to identify the object and properly store it, as needed. (We don't have our own archeologist at this time.) Recently an ancient spear head was found right out in the field, although that is most uncommon. AF assured us it has a strict protocol to stop work and contact the right person if an artifact is found.

The tropical forest is the last leg of the training and personnel numbers have been winnowed down somewhat but we can still expect up to 40 people (possibly even 60) plus instructors to come out twice a year for about 5 days. Spring and fall.

The AF obtains three permits: Rayonier, DNR, and ONF. They will use the Klahanie campground as a base of operations and their work is within a straight line of radio communication with that site. .

The land usage is rotated to assure good recovery from use for shelter construction, since forbs may be cut close to the ground (but enough left to regenerate).

The team will navigate on rafts through the river system. We discussed their trainees taking care not to inadvertently disturb salmon redds, which can be hard to discern unless one has been given a little instruction. We are particularly concerned in fall about chinook, which have dwindling numbers. We said we would look for pictures. I have come up with the following for now: https://www.youtube.com/watch?v=TKVEoxRgrEg is an east coast video about chinook and coho redds –terrible visual since it never goes below the water, but does explain to look for --well sorted and cleaned-off stones, as a clue. I like the NZ video better for looking a t a fish with subsurface photography. http://fishingmag.co.nz/2015/05/28/chinook-salmon-spawning-redd-canterbury-new-zealand/. *Saved best for last, from nearby Dungeness River*—pink salmon doing their thing. https://www.youtube.com/watch?v=j57Lb5ql488. Surprisingly hard to find good videos of this stuff.

We discussed fire risk and the team won't build fires when risk is high; will use a propane camp stove. Also working closely with Brian Suslisk in Forks.

We mentioned that the Section 106 is repealed. Entire relevant part of NHPA re Indians has been moved to a new section with new set of numbers (no changes) and provided Steven Selser with the information by prior email.

There should be no problem with our field crews "running into" AF folks. If this happens just say hi and share coffee! The AF will see if they can put the parachute plastic orange line a little higher so that our redd crew can go under it easily.

If any of you have something to add or subtract, from the above, let me know. Please do come by if you have the time.

Finally, AF, I am copying Jacob Turner, a field fisheries crew chief, and Nicole and Garrett Rasmussen, water quality and timber fish wildlife biologist, so they have a heads up.

Katie Krueger, Staff Attorney and Policy Analyst
Quileute Natural Resources
FOR US MAIL: PO Box 187; FOR STREET DELIVERY: 401 Main St.
La Push, Washington, 98350-0187
TEL: (360) 374-2265, CELL: (360) 460-4842, FAX: (360) 374-9250
katie.krueger@quileutetribe.com
Check out our QNR website:
http://www.quileutenation.org/natural-resources

Smith, Emily

From: GUERRA, JUAN M GS-12 USAF HAF AFCEC/CZN <juan.guerra.6@us.af.mil>
Sent: Tuesday, May 26, 2015 2:52 PM
To: Smith, Emily; Pyle, Stephen G
Subject: FW: Section 106 Consultation -- DOPAA SERE Training in Tillamook Oregon
Signed By: juan.guerra.6@us.af.mil

Additional comments for the record.

R,
john

From: Jordan Mercier [mailto:Jordan.Mercier@grandronde.org]
Sent: Tuesday, May 26, 2015 3:16 PM
To: GUERRA, JUAN M GS-12 USAF HAF AFCEC/CZN
Subject: Section 106 Consultation -- DOPAA SERE Training in Tillamook Oregon

Good Afternoon,

The Confederated Tribes of the Grand Ronde Community of Oregon Cultural Protection Program would like to thank you for soliciting information with regards to the above mentioned project. As a part of your compliance with Section 106 of the National Historic Preservation Act (NHPA) The Tribe has reviewed the location of this project and have the following comments:

The Tribe considers the proposed project to have a potential for impacting cultural resources. There are documented archeological/cultural sites within the Area of Potential Effect that were recorded in previous cultural resource investigations. Previous archeological studies of the APE are outdated and do not meet current archeological research standards. There is a need to reassess the area and determine present site conditions. The Tribe strongly recommends that a qualified archeologist conduct an archeological study of the area in order to understand how the proposed project will impact cultural resources.

It is also recommended that sufficient time be allowed following the presentation of survey results for the meaningful incorporation of these results into the project plan. In the case of significant discoveries this could include additional planning, the development of project alternatives, and/or a mitigation plan.

Respectfully,

Jordan Mercier
Cultural Protection Coordinator
Tribal Historic Preservation Office
Land and Culture Department
Confederated Tribes of the Grand Ronde Community of Oregon

Jordan.Mercier@grandronde.org
503-879-2185

From:	Pyle, Stephen G
To:	Pyle, Stephen G
Subject:	RE: questions related to 2/12/2016 receipt of AIR FORCE FA8903-08-D-87710204 SERE COOT PublicDraftEA
Date:	Tuesday, October 24, 2017 12:43:05 PM

From: GUERRA, JUAN M GS-13 USAF HAF AFCEC/CZN [mailto:juan.guerra.6@us.af.mil]
Sent: Tuesday, February 16, 2016 9:04 AM
To: Pyle, Stephen G; Smith, Emily
Cc: EVANS, TIFFANY M GS-12 USAF AMC 92 CES/CEIE; FOSTER, TODD A GS-11 USAF AETC 336 TRG/XP
Subject: FW: questions related to 2/12/2016 receipt of AIR FORCE FA8903-08-D-87710204 SERE COOT PublicDraftEA
Importance: High

Everyone,
We need to get this subject and language of this email from the tribes in the next conference call so we can address their issues and ensure our document clear states the tribes wishes/rights and the AF responsibility.

Thanks,
john

From: Katie Krueger [mailto:katie.krueger@quileutetribe.com]
Sent: Friday, February 12, 2016 4:35 PM
To: GUERRA, JUAN M GS-13 USAF HAF AFCEC/CZN
Cc: SCHMIDT, AUSTIN L TSgt USAF AETC 66 TRS/SST; SELSER, STEVEN D GS-11 USAF AMC 92 CES/CEIE; Mel Moon; Frank Geyer
Subject: questions related to 2/12/2016 receipt of AIR FORCE FA8903-08-D-87710204 SERE COOT PublicDraftEA
Importance: High

Dear Mr. Guerra,

I received the document referenced in the subject line as well as the attached DRAFT FONSI (CD ROM). I note from the draft FONSI: "The directive requires students to demonstrate navigation skills using natural land features; procure animal and plant life for food and shelter: construct a variety of fires and shelters; and demonstrate proficiency of these techniques in coastal, open ocean, and tropical environments." This will happen in the Forks area on WDNR and Rayonier Inc. land.

We have been in contact with you, Seven Selser, and Austin Schmidt on this matter before and so the documents did not come as a surprise and we thank the Air Force for sending them. However, I believe we explained in previous contacts that it is not just a question of the trainers/trainees stumbling onto an artifact triggering NHPA work. The tribes in the NW USA have superior treaties to those back east and have reserved (not granted) off-reservation reserved rights to natural resources harvest of fish, game and plants; and the Forks environs lie inside this area for Quileute (Treaty of Olympia). We were given to understand in calls and letters before, that we will get advance notice of the exact time (as close as possible) your operations occur in our area so we don't have any

interference with each other's' activities and can make sure your operations continue smoothly. We hunt and fish and gather right where you will be. Nothing in the larger document or FONSI discusses such notice to us, however. I think that is a necessary improvement. May we hear from you in that regard? This is regarding our treaty rights. We are ok with accommodating to avoid head to head interference, but need the heads up to do that.

I tried to find a place to insert it (after coming up with mutually agreeable language). When I do a search for the quoted part from the FONSI, I don't find it. I don't get help by searching for "fish" or "game" or "elk" or "deer." What would you recommend? We already had informal consultation with the AF and discussed notice and seemingly got concurrence for it.

From page 84 of main document: "The USAF sent letters to the Washington DAHP for consultation regarding compliance with
4 Section 106 of the NHPA. The USAF also sent letters to five tribes, inviting the parties to
5 government-to-government consultation. The invitations request input on identification of
6 historic properties of religious or cultural significance and how the proposed action may affect
7 them. The affected tribes are the Hoh Indian Tribe, the Jamestown S'Klallam Tribal Community,
8 the Lower Elwha Tribal Community, the Makah Indian Tribe of the Makah Indian Reservation,
9 and the Quileute Tribe of the Quileute Reservation. The USAF received a response from both
10 the Washington DAHP and Quileute Tribe of the Quileute Reservation. The Washington DAHP
11 concurred with the determination of the area of potential effect. The Quileute Tribe requested
12 additional information via teleconference, which occurred on June 8, 2015. Section 106
13 consultation is ongoing and will be completed prior to signature of the FONSI."

This is really not going to take care of what I discussed. We both need that notice to happen!

> On another note, from page 82: You did some really great research, **BUT** need to note that the Hoh and Quileute are no longer one tribe and the Reservation at Hoh River is operated by the Hoh Tribe, a sovereign Indian Tribe, federally recognized. The administrative severance happened in 1974. Hohs will be upset if this is not fixed!

Europeans first visited the Pacific Northwest in the late eighteenth century. However,
21 Euroamerican settlement on the Olympic Peninsula did not occur until the mid-nineteenth
22 century. In 1855, the Quileute, Queets, Hoh, and Quinault tribes signed a treaty, and all but the
23 Quileute moved onto a reservation. The Quileute later moved onto reservations created at La
24 Push and Hoh River in 1889 and 1893. Isolated Euroamerican settlements grew quickly in the
25 latter half of the nineteenth century. Most inhabitants supported or worked in logging camps.

26 Logging operations expanded substantially in the 1880s when steam powered "donkey" and
27 "lokey" engines arrived from California (Daugherty 1983). Railroads were built in the early
28 twentieth century and used until the 1950s when replaced by truck logging (Graham and Neil
29 2010).

Katie Krueger, Staff Attorney and Policy Analyst
Quileute Natural Resources
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Check out our QNR website:
http://www.quileutenation.org/natural-resources

Smith, Emily

From: GUERRA, JUAN M GS-12 USAF HAF AFCEC/CZN <juan.guerra.6@us.af.mil>
Sent: Tuesday, May 26, 2015 2:52 PM
To: Smith, Emily; Pyle, Stephen G
Subject: FW: Section 106 Consultation -- DOPAA SERE Training in Tillamook Oregon
Signed By: juan.guerra.6@us.af.mil

Additional comments for the record.

R,
john

From: Jordan Mercier [mailto:Jordan.Mercier@grandronde.org]
Sent: Tuesday, May 26, 2015 3:16 PM
To: GUERRA, JUAN M GS-12 USAF HAF AFCEC/CZN
Subject: Section 106 Consultation -- DOPAA SERE Training in Tillamook Oregon

Good Afternoon,

The Confederated Tribes of the Grand Ronde Community of Oregon Cultural Protection Program would like to thank you for soliciting information with regards to the above mentioned project. As a part of your compliance with Section 106 of the National Historic Preservation Act (NHPA) The Tribe has reviewed the location of this project and have the following comments:

The Tribe considers the proposed project to have a potential for impacting cultural resources. There are documented archeological/cultural sites within the Area of Potential Effect that were recorded in previous cultural resource investigations. Previous archeological studies of the APE are outdated and do not meet current archeological research standards. There is a need to reassess the area and determine present site conditions. The Tribe strongly recommends that a qualified archeologist conduct an archeological study of the area in order to understand how the proposed project will impact cultural resources.

It is also recommended that sufficient time be allowed following the presentation of survey results for the meaningful incorporation of these results into the project plan. In the case of significant discoveries this could include additional planning, the development of project alternatives, and/or a mitigation plan.

Respectfully,

Jordan Mercier
Cultural Protection Coordinator
Tribal Historic Preservation Office
Land and Culture Department
Confederated Tribes of the Grand Ronde Community of Oregon

Jordan.Mercier@grandronde.org
503-879-2185

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LUMMI INDIAN BUSINESS COUNCIL
2665 KWINA ROAD BELLINGHAM, WASHINGTON 98226 (360) 312-2000
DEPARTMENT_____DIRECT NO. _____

MEMORANDUM

From: Lummi Indian Business Council

Subject: Implementing the March 18, 2018 document entitled "The Cultural Significance and Management of the *Xwullemy* (Salish Sea)."

Besides being a critically important environmental and economic asset, the Salish Sea is of great cultural value and concern to the Lummi people.

Desiring to improve coordination between the Lummi Nation and other governments and agencies that use, manage, and regulate water, land, and other resources in and around the Salish Sea, on March 18, 2018 the Lummi Indian Business Council (LIBC) approved the attached two-page document, entitled "The Cultural Significance and Management of the *Xwullemy* (Salish Sea)."

We ask that all recipients of this memorandum and its attachment review them carefully, and contact Anthony Hillaire, Chief of Staff, 360-312-2142 with any questions.

We look forward to working with you to manage and preserve the Salish Sea.

Jeremiah Julius, Chairman
Lummi Indian Business Council

The Cultural Significance and Management
of the
Xwullemy [1](Salish Sea)
Cultural Significance of the Salish Sea

I. The Salish Sea, known in the Lummi language as *Xwullemy* has been the home of the Lummi and other tribes since time immemorial. It defines the identity of the Lummi Nation and sustains our existence. It is intimately associated with virtually all the events and patterns of events in history that have defined the Lummi Nation as a culture.

II. The 1855 Treaty of Point Elliott, which like other treaties executed by tribal governments and the United States government, constitutes the supreme law of the land, guarantees to the people of the Lummi Nation the right to fish in their usual and accustomed places, which comprise the fresh and salt waters of the Salish Sea.

III. The Lummi Nation holds that the Salish Sea is eligible for the National Register of Historic Places (NRHP), for listing as a National Historic Landmark, and for inclusion in the World Heritage List, for its association with the culture, traditions, and history of the Lummi people.

IV. The fish, shellfish, marine mammals, avian life, plant life, water quality and air quality of the Salish Sea all are elements that contribute to its cultural significance, as do the traditions and traditional lifeways of the Lummi people.

Management of the Salish Sea and its Contributing Elements

I. In their compliance with federal and state laws the Lummi Nation expects agencies of the federal, state, and local governments to consult in good faith (i.e., adhere to the principles of full, prior, and informed consent) with the Lummi Nation to avoid adverse effects on the tangible and intangible cultural properties of the Salish Sea, and to adopt such measures as are agreed upon to restore culturally significant aspects of the Salish Sea that have deteriorated or been adversely affected by human activities over the years. Until such time as there is meaningful consultation with the Lummi Nation and it formally agrees with the proposed measures, our position should be construed as opposed to the proposed activity. Any action contrary to this position would be in violation of our treaty, the Supreme Law of the Land.

II. The Lummi Nation expects that such consultation will be carried out with full respect for the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP).

III. While the Lummi Nation does and will cooperate with other tribes and governments to ensure the proper management of the Salish Sea and its contributing elements, no one but the Lummi Nation is authorized to speak for the Lummi Nation without the Lummi Nation's explicit agreement. We expect all agencies to adhere to the protocols of government-to-government relations.

---

[1] ***Xwullemy*** is the language term that historically referred to the glaciers that existed in our area and now refers to the glacial peaks and the waters left behind by the receded glaciers to become the sea and fresh water and includes other bioregion properties. Thus, ***Xwlem'iCh'oSen*** as a language-based term(s) for many if not all aspects of our bioregion. The ***Xwullemy*** or Salish Sea can be viewed as having both the practical side of our ***Lhaqtemish*** people but also have our spiritual and religious significance as yet the another side.

LIBC Approved March 13, 2018


Vancouver
Bellingham
Victoria
Seattle
The Salish Sea
See Lummi Nation Statement on The Cultural Significance and Management of the Xwullemy (Salish Sea)
Salish Sea Waters
Salish Sea Drainage Boundary (Excluding the Upper Fraser)
Lummi Reservation Boundary
USA - Canadian Border
Urban Areas
0
100
Miles
2018-03-22-11-17-36
Source: US National Park Service, Copyright:© 2014 Esri

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Allyson Brooks Ph.D., Director
State Historic Preservation Officer

May 5, 2015

Colonel Charles B. McDaniel
Department of the Air Force
Fairchild Air Force Base, Washington

RE: Coastal, Open Ocean, & Tropical SERE Project
Log No: 043015-32-USAF

Dear Colonel McDaniel:

Thank you for contacting our department, pursuant to Section 106 of the National Historic Preservation Act. We have reviewed the information you provided for the proposed Coastal, Open Ocean, & Tropical SERE Project near Forks, Clallam County, Washington.

We concur with the proposed Area of Potential Effect (APE) as detailed in your letter and illustrated in the attached figures and text.

We look forward to receiving the results of your cultural resources review, the results of consultations with the concerned tribes, and your determination of effect.

We would also appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in compliance with the Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations 36CFR800.4. Should additional information become available, our assessment may be revised, including information regarding historic properties that have not yet been identified. Thank you for the opportunity to comment and we look forward to receiving the report on the results of your consultations.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 890-2615
email: *rob.whitlam@dahp.wa.gov*

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

February 16, 2016

Colonel Charles B. McDaniel
Commander
HQ 92d Air Refueling Wing
USAF
Fairchild Air Force Base, Washington

Re: Coastal, Open Ocean, & Tropical SERE Training Project
Log No: 043015-32-USAF

Dear Commander McDaniel:

Thank you for contacting our department. We reviewed the materials you provided for the proposed *Coastal, Open Ocean, & Tropical SERE Training* Project, Forks, Clallam County, Washington.

We concur with your Determination of No Adverse Effect.

We would appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

In the event that archaeological or historic materials are discovered during project activities, work in the immediate vicinity must stop, the area secured, and the concerned tribes and this department notified.

These comments are based on the information available at the time of this review and on the behalf of the State Historic Preservation Officer in conformance with Section 106 of the National Historic Preservation Act and its implementing regulations 36CFR800. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment and a copy of these comments should be included in subsequent environmental documents.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 890-2615
email: *rob.whitlam@dahp.wa.gov*

Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org

November 15, 2017

Mr. Jeffrey Johnson
Department of the Air Force
Fairchild Air Force Base
E. Bong St. Bldg 2285, Room 109
Fairchild AFB, WA 99011

RE: SHPO Case No. 15-1727
USAF, Bayocean Peninusla, SERE Permit Renewal
Renew permit with OPRD
, Tillamook County
Cultural Resources Investigation at the Bayocean Peninsula for USAF SERE Specialist Training

Dear Mr. Johnson:

Our office recently received the report mentioned above. Prior to approving the report I have several comments and questions regarding the document. Oregon State Historic Preservation Office's reporting guidelines presents the procedures for report preparation in Oregon. The report should be submitted to SHPO as unbound, unstapled hard copy with a cover sheet and a single unsecured pdf file on compact disc (CD) (no digital signatures) that includes the report and all site and isolate forms. Include spatial data as separate files on the CD. State of Oregon Archaeological Site Records (Site Forms) should be submitted for each new site recording or update of a known site. Site forms need to be entered online into the Archaeological Sites Database and appended to any reports submitted to SHPO, as appropriate. Site updates typically involve documenting new information (e.g., increased site boundary, previously undocumented feature, or as part of a damage assessment), but may also consist of compiling data from an older form that lacks information consistent with the current Oregon site form.

With that in mind here are some additional comments and questions –

There was no Oregon SHPO cover sheet attached to the report. Please submit one.

There was no CD attached with the report. Please submit one that includes cover sheet, report, update form, and spatial data.

There was no update site form for 35TI104 attached to report or submitted to our data base for review. Please submit one.

Table 2 indicated the previous surveys within one mile of the project's direct APE. The table showed five different surveys in the area of concern. One report in the table has the incorrect SHPO report number. The report lists SHPO Report No. 15359; however the report number is actually 25359. I also found an additional report that was missed during the background research. The additional report dated 2015 is entitled "Archaeological Survey of the US101: Rockaway Beach – Bay City ADA Ramps Project, Tillamook County" by Thomas Connolly (SHPO Report No. 27403). Please include these changes.

Table 3 showed archaeological sites within one mile of the project's direct APE. The table listed five sites in the area. I found an additional site that was missed during the background research. The additional site was an historic ship keel (N/A) found north of the North Jetty. Please add the site to the table.

Table 4 presented Native American sites within the ten mile radius of the project's indirect APE. This table listed eighteen sites in the area. The Chishucks Village (Wilson River site) site number was listed as 35TI002. It appears the site number may have come from Woodward's report which had incorrectly labeled the site as 35TI002. Presently the Chishucks Village site has no number and should be labeled as (N/A). Site 35TI002 is actually located in Neahkahnie Beach just north of Manzanita, Oregon and not in Tillamook Bay. Please change the site number within the table for the Chishucks Village site.

On page 36 the authors again label the Chishucks Village site as 35TI002. The site number should be deleted.

I could find no mention of the Archaeological Permit (#2189) the contractor was working under that is associated with this project. This should be mentioned probably in several places in the report and cover sheet.

The cultural landscape discussion was well thought out and presented. The discussion detailed a variety of data and presented evaluation of the landscape using National Register Criteria. My question is why the decision by the Department of the Air Force not to determine the landscape as eligible; it appears that the contractor presented enough data to opt for that choice and I believe our office would concur.

Please address these comments and questions, resubmit the report unbound, with a cover sheet, cd, and a site update form. Once these documents are received I'll review them again and then if all is approved will concur with your determination of no adverse effect on both the 35TI104 site and the cultural landscape.

Sincerely,

Tom Churchill

Tom Churchill, MAIS, RPA
SHPO Archaeologist
(503) 986-0683
tom.churchill@oregon.gov

Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org

May 10, 2018

Mr. Jeffrey Johnson
Department of the Air Force
Fairchild Air Force Base
E. Bong St. Bldg 2285, Room 109
Fairchild AFB, WA 99011

RE: SHPO Case No. 15-1727
USAF, Bayocean Peninusla, SERE Permit Renewal
Renew permit with OPRD
, Tillamook County

Dear Mr. Johnson:

Our office recently received your report for the project referenced above. We have reviewed your report and given it SHPO Report # 29664 and agree that the project activities, as described in your report, will likely have no adverse effect on site 35TI104 or any other known archaeological sites. Additional archaeological research is not anticipated for this project. In the unlikely event archaeological features or additional sites (i.e., historic or prehistoric) are encountered, all activities should cease immediately and a professional archaeologist should be contacted to evaluate the discovery. Under state law (ORS 358.905-955 & ORS 97.740) archaeological sites, objects and human remains are protected on both public and private land in Oregon. If project impacts and the degree/type of required ground disturbance changes from that outlined in your report, further consultation with our office will be required before proceeding with the proposed activity. If you have any questions regarding any future discovery, or this letter, feel free to contact our office.

Sincerely,

Tom Churchill

Tom Churchill, MAIS, RPA
SHPO Archaeologist
(503) 986-0683
tom.churchill@oregon.gov

cc: Kristin Nester, Department of the Air Force

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B

Coordination for Environmental Planning Correspondence

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Appendix B: Stakeholder and Government Distribution List

Federal Elected Officials

Oregon Congressional Representatives
Oregon Senators

Washington Congressional Representatives
Washington Senators

Federal Agency Contacts

Federal Aviation Administration- Northwest Mountain Region

National Marine Fisheries Service (NMFS)- Portland Regional Office

NMFS- Seattle Regional Office

Natural Resource Conservation Service (NRCS)- Oregon State Office

NRCS- Washington State Office

U.S. Army Corps of Engineers (USACE)- Portland District

USACE- Seattle District

U.S. Coast Guard (USCG) Station- Port Angeles

USCG Station- Tillamook Bay, Garibaldi

U.S. Department of Interior- Office of Environmental Policy and Compliance, Pacific Northwest Region

U.S. Environmental Protection Agency- Region 10

U.S. Forest Service (USFS)- Forks Recreation Manager

USFS- Olympic National Forest Natural Resources Director

USFS- Olympic National Forest Realty Specialist

U.S. Fish and Wildlife Service (USFWS)- Oregon Office

U.S. Fish and Wildlife Service (USFWS)- Washington Office

State Elected Officials

Governor of Oregon

Governor of Washington

Oregon State Senator District 5

Oregon State Senator District 16

Washington State Senator District 24

Oregon State Congressional Representative District 10

Oregon State Congressional Representative District 32

Washington State Congressional Representatives District 24

State Agency Contacts

Oregon Department of Aviation

Oregon Department of Environmental Quality

Oregon Department of Fish and Wildlife

Oregon Department of State Lands

Oregon State Historic Preservation Office

Oregon State Land Board

Oregon State Marine Board

Oregon State Parks and Recreation

Washington Commissioner of Public Lands

Washington Department of Ecology; Environmental Assessment

Washington Department of Fish and Wildlife

Washington Department of Natural Resources- Forks, Property-Acquisition Specialist

Washington Department of Natural Resources- Forks, Coast District Manager

Washington Department of Natural Resources- Forks, Environmental Specialist

Washington Department of Natural Resources- Forks, Natural Resources Technician

Washington Department of Natural Resources Olympia SEPA Center

Washington Forest Practices Board

Washington Recreation and Conservation Office

Washington State Historic Preservation Office

Local Agency Contacts

Clallam County Board of Commissioners

Jefferson County Board of Commissioners

Mayor of Forks

Mayor of Tillamook

Tillamook County Board of Commissioners

Tillamook County Parks

Tribal Contacts

Oregon

Confederated Tribes of the Grand Ronde Community of Oregon

Confederated Tribes of Siletz Indians of Oregon

Washington

Hoh Indian Tribe

Jamestown S'Klallam Tribe

Lower Elwha Tribal Community

Makah Indian Tribe of the Makah Indian Reservation

Quileute Tribe of the Quileute Reservation

Other Interested Parties

American Rivers; Northwest Region

Land Use Consultant

National Coast Trail Association

Oregon Coast Alliance

Private Citizen

Rayonier Timber

C

Site Photographs

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Appendix C: Site Photographs

Bayocean Peninsula; Tillamook, OR
Coastal and Open Ocean Training Site Visit Photos

Figure 1. Instructor Camp and Vehicle Staging; Tillamook Bay Side

Figure 2. HLZ Adjacent to In-water Drop Zone; Tillamook Bay Side

Figure 3. Student Camp Site; Ocean Side

Figure 4. Beach for Navigational (Vector) Training; Ocean Side

Figure 5. Water Table Pit; Inland

Forks, WA Area; Tropical Training Site Visit Photos

Figure 6. Shelter Constructed of Natural Materials; DNR Forks

Figure 7. Former Campfire Site; DNR Forks

Figure 8. Camp Area that has Undergone Pre-Commercial Thinning; DNR Forks

Figure 9. Boat Launch Use Agreement Area on Hoh River; DNR Forks

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D

Air Emissions Calculations

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Appendix D: Air Emissions Calculations

Summary of Annual Air Emissions from SERE Training

	NO_x	SO_x	CO	VOC	PM_{10}	$PM_{2.5}$	GHG
Motor Vehicle Air Emissions	0.023	0.000	0.243	0.018	0.001	0.001	19.042
Helicopter Air Emissions	0.021	0.006	0.064	0.018	0.002	0.002	17.509
Campfire Air Emissions	0.007	0.001	0.657	0.595	0.090	NA	9.082
Total Air Emissions	**0.051**	**0.007**	**0.964**	**0.631**	**0.093**	**0.003**	**45.633**

Greenhouse gas (GHG) air emissions from motor vehicles are composed of CO_2 emissions only; however, they represent the overwhelming majority of GHG from motor vehicle fuel combustion. GHG emissions from the helicopter is a total of CO_2, CH_4, and N_2O emissions converted to CO_2e-equivalent. GHG emissions from campfires are a total of CO_2 and N_2O emissions converted to CO_2-equivalent.

Summary
Estimated Emissions for the SERE Training

Motor Vehicle Air Emissions

Air emissions from driving motor vehicles to the various training locations are calculated in this spreadsheet.

Route Information		
Distance between Fairchild AFB and Forks, WA:	455	miles
Distance between Forks, WA and Tillamock, OR:	246	miles
Distance between Tillamook, OR and Fairchild AFB:	428	miles
Total (assuming most direct route):	1,129	miles
15% buffer (assumes most direct route is not followed):	169	miles
Miles Per Training Exercise:	1,298	miles
Total Miles Per Year	**2,596.70**	**miles**
Source: Google Maps		

Vehicles		
Number	**Type**	**Category**
7	Pickup Trucks	LDGT
2	2.5-ton Cargo Trucks	LDDT
1	Ambulance	LDDT
1	45-passenger Bus	HDDV

Emission Factors (grams per mile)							
Category	**NO_x**	**SO_x**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
LDGT	0.610	0.010	11.780	0.717	0.025	0.011	516.200
LDDT	0.383	0.006	0.614	0.345	0.053	0.038	598.600
HDDV	2.452	0.012	0.724	0.309	0.097	0.071	1,243.400

Assumptions:
The majority of driving would occur in the State of Washington at low altitides.
Calendar year 2015 emission factors used.

Source: U.S. Air Force. 2013. *Air Emissions Guide for Air Force Mobile Sources. Methods for Estimating Emissions of Air Pollutants For Mobile Sources at U.S. Air Force Installations*. August 2013. Table 5-11. On-Road Vehicle Emission Factors -- 2015. Page 218.

Motor Vehicle Emissions (pounds per year)							
Category	**NO_x**	**SO_x**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**CO_2**
LDGT	24.445	0.401	472.063	28.733	1.002	0.441	20,685.805
LDDT	6.578	0.103	10.545	5.925	0.910	0.653	10,280.503
HDDV	14.037	0.069	4.145	1.769	0.555	0.406	7,118.152
Total	**45.059**	**0.572**	**486.752**	**36.427**	**2.467**	**1.500**	**38,084.460**

Motor Vehicle Emissions (tons per year)							
Total	**0.023**	**0.000**	**0.243**	**0.018**	**0.001**	**0.001**	**19.042**

Helicopter Air Emissions

Air emissions from the use of a helicopter are calculated in this spreadsheet.

Assumptions:
The helicopter is a UH-1N, which uses a T400-CP-400 engine.
Cruising speed: 100 knots (nm/hour)

Time for Helicopter to Transit						
Route Point #1	**Route Point #2**	**Reason**	**Distance (nm) per trip**	**Total Hours per trip**	**Number of Trips/year**	**Number of Hours per year**
Fairchild AFB, WA	Fairchild Airport, Port Angeles, WA	Transit to/from training area region	261	2.61	2	5.22
Fairchild Airport, Port Angeles, WA	Forks, WA	Tropical vector training	83	0.83	8	6.64
Fairchild Airport, Port Angeles, WA	Astoria Regional Airport, Astoria, OR	Transit to/from training area region	119	1.19	2	2.38
Astoria Regional Airport, Astoria, OR	Bayocean Peninsula, Tillamook Oregon	Coastal and open ocean hoist, vector, and jump training	39	0.39	8	3.12
Bayocean Peninsula, Tillamook Oregon	Tillamook Airport, Tillamook, Oregon	Refueling during coastal and open	10	0.1	16	1.6
Astoria Regional Airport, Astoria, OR	Fairchild AFB, WA	Transit to/from training area region	274	2.74	2	5.48
Emission Factor:	**Cruise**				**TOTAL**	**24.44**

Time for Helicopter During Training			
Activity	**Length of Training (hours)**	**Number of Training Sessions per year**	**Number of Hours per year**
Hoist Training and Helicopter Operations at Bayocean Peninsula - Bay Side	2	2	4
Jump Training and Helicopter Operations at Bayocean Peninsula - Bay Side	2	2	4
Vector Training and Helicopter Operations at Bayocean Peninsula – Ocean Side	2	2	4
Hoist Training and Helicopter Operations at Bayocean Peninsula – Open Ocean	2	2	4
Vector Training and Helicopter Operations at Bayocean Peninsula – Open Ocean	2	2	4
Vector Training and Helicopter Operations at Rayonier Sites	2	2	4
Vector Training and Helicopter Operations at DNR Forks Sites	2	2	4
Emission Factor: **Flight Idle**		**TOTAL**	**28**

Emission Factors for T400-CP-400 Engine								
	Fuel Flow Rate	NO_x	SO_x	CO	VOC	PM_{10}	$PM_{2.5}$	GHG
	in pounds/hour	in pounds per 1,000 pounds of fuel burned						
Ground Idle	136	2.21	1.10	27.94	10.99	0.44	0.40	3,252.46
Flight Idle	141	2.84	1.10	29.08	8.97	0.44	0.40	3,252.46
Cruise	279	4.66	1.10	1.79	0.00	0.36	0.32	3,252.46
Intermediate	406	5.91	1.10	0.00	0.00	0.25	0.22	3,252.46
Maximum	1,069	11.51	1.10	0.00	0.22	0.28	0.25	3,252.46
Source: USAF Air Force 2013. Air Emissions Guide for Air Force Mobile Sources, Methods for Estimating Emissions of Air Pollutants for *Mobile Sources at U.S. Air Force Installations.* August 2013. Table 2-8. Criteria Pollutants, Ozone Precursors, and Total HAPs. Page 55.								

Helicopter Air Emissions								
	Fuel Consumption (pounds/year)	NO_x	SO_x	CO	VOC	PM_{10}	$PM_{2.5}$	GHG
For Transit	6,818.760	31.775	7.501	12.206	0.000	2.455	2.182	22,177.744
For Training	3,948.000	11.212	4.343	114.808	35.414	1.737	1.579	12,840.712
Total (pounds/year)		42.988	11.843	127.013	35.414	4.192	3.761	35,018.456
Total (tons/year)		**0.021**	**0.006**	**0.064**	**0.018**	**0.002**	**0.002**	**17.509**

Note: The greenhouse gas (GHG) emission factor is a total of CO_2, CH_4, and N_2O with individual emission factors of 9.75 kg/gal, 0.27 g/gal, and 0.31 g/gal, respectively. CH_4 and N_2O were converted to equivalent CO_2 (CO_2e) using a global warming potential value of 21 for CH_4 and 310 for N_2O. These were added to the CO_2 and are presented as the GHG emission factors in units of lb/1000lb fuel. JP-8 with a density of 6.67 lb/gal was used for unit conversion.

Helicopter Air Emissions
Estimated Emissions for the SERE Training

Campfire Air Emissions

Air emissions from campfires are calculated in this spreadsheet.

Assumptions		
Number of nights camping year:	26	
Number of campfires per night camping:	8	
Amount of dry wood burned per campfire per night	50	pounds
Amount of dry wood burned per year (pounds):	10400	pounds
Amount of dry wood burned per year (tons):	5.2	tons

Emission Factors (pounds of pollutant per ton of dry wood burned)						
NO_x	SO_x	CO	VOC	PM_{10}	N_2O	CO_2
2.6	0.4	252.6	229.0	34.6	0.3	3,400.0
Assumptions: Air emissions from a campfire are similar to those from a residential fireplace. All particulate matter emissions are assumed to be PM_{10}. Source: USEPA. 1996. AP-42. Section 1.9. Residential Fireplaces. Table 1.9-1. Page 1.9-4.						

Campfire Emissions (pounds per year)						
NO_x	SO_x	CO	VOC	PM_{10}	N_2O	CO_2
13.52	2.08	1,313.52	1,190.80	179.92	1.56	17,680.00

Campfire Emissions (tons per year)						
NO_x	SO_x	CO	VOC	PM_{10}	N_2O	CO_2
0.007	**0.001**	**0.657**	**0.595**	**0.090**	**0.001**	**8.840**

Conversion factor for N_2O to CO_2-equivalent:	310	
N_2O as CO_2-equivalent:	0.24	tons per year
Total GHG emissions:	**9.08**	**tons per year**

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Cultural Resources Survey Report

December

2017

Cultural Resources Investigation at the Bayocean Peninsula for USAF SERE Specialist Training

Tillamook County, Oregon

State of Oregon Archaeological Permit No. 2189
U.S. Army Corps of Engineers Permit No. DACW57-4-17-002

Cultural Resources Investigation at the Bayocean Peninsula for USAF SERE Specialist Training

United States Air Force

Tillamook County, Oregon

By

Elizabeth Leclerc

Harriet Richardson Seacat, M.A.

Principal Investigator: Wayne Glenny, M.S., RPA,

State of Oregon Archaeological Permit AP-2189

U.S. Army Corps of Engineers Permit No. DACW57-4-17-002

HDR ROLE

Environmental Consultant

LOCATION

Tillamook County, Oregon

TYPE OF WORK

Cultural Resource Investigation

PRIMARY CLIENT

United States Air Force

Executive Summary

HDR was contracted by the United States Air Force (USAF) to conduct a cultural resources investigation in connection with the USAF's Survival, Evasion, Resistance, and Escape (SERE) Specialist Training on the Bayocean Peninsula in Tillamook County, Oregon (Undertaking). The USAF, which has conducted the SERE training in this area since the 1980s, is renewing permits held with the U.S. Army Corps of Engineers, Portland District (Corps), Tillamook County, and Oregon State Parks and Recreation that will extend the training for an additional 5 years. As a federal undertaking, the USAF is required to comply with Section 106 of the National Historic Preservation Act and its implementing regulations at 36 CFR 800.

The cultural resources investigation arose from consultation between the USAF and the Confederated Tribes of the Grand Ronde (Grand Ronde). Although the Corps conducted a pedestrian survey of the training area in 2012 as part of their permitting process for the SERE training, and the State Historic Preservation Office had concurred with a finding of "no adverse effect," the Grand Ronde requested shovel testing of training areas and consideration of tribal resources in the area around the Bayocean Peninsula, also known as the Tillamook Spit. Over the course of consultation, the Area of Potential Effect (APE), which was originally defined as the training area incorporating the northern two-thirds of the spit, was expanded to encompass land areas (including sea stacks) surrounding the Bayocean Peninsula with direct line of sight to proposed training camps and support areas to a distance of 10 miles. Within the APE, the USAF defined the training camps and support areas where direct impacts (from ground disturbance) could occur as the "Direct APE" and the remainder of the APE where impacts would be more indirect as the "Indirect APE."

HDR performed shovel testing in the Direct APE and a record search and ethnographic research to identify tribal resources in the Indirect APE. Field work was conducted between December 6 and December 9, 2016, during which time HDR excavated 86 shovel test probes. Although no new cultural resources were identified during shovel testing, HDR confirmed that previously recorded site 35TI104, an unevaluated site adjacent to the medic camp, does not extend into the camp area. HDR prepared updated site form for 35TI104 based on observations of site condition and site boundaries. All work was conducted in accordance with permits from the State of Oregon (AP-2189) and the Corps (DACW57-4-17-002).

As a result of ethnographic research and discussions with the Grand Ronde, HDR identified the Tillamook Spit cultural landscape, an area that encompasses the spit, Tillamook Bay, and nearby landforms with tribal significance based the interconnectivity of many individual resources including story event locations, known village sites, known archaeological sites, subsistence areas, and other natural resources. These resources endure as important traditional cultural resources today through ongoing associations of the people with the Tillamook Spit vicinity. This report presents a description of identified aspects of the landscape and an analysis of potential eligibility for listing in the National Register of Historic Places (NRHP) under Criteria A, B, C, and D. However, this study is not a formal Cultural Landscape Report and additional research is needed to define, record, and evaluate individual resources in the cultural landscape. For this reason, combined with complexities of scale and land ownership, HDR does not make a formal recommendation of the landscape as a NRHP-eligible property at this time.

HDR recommends the Undertaking would have no adverse effect on site 35TI104 or the Tillamook Spit cultural landscape. These recommendations are provisional and are intended to inform the USAF's decision-making, determinations, and completion of the Section 106 process.

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Abbreviations and Acronyms

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effect
ARPA	Archaeological Resources Protection Act
CFR	Code of Federal Regulations
cm	Centimeter(s)
Corps	U.S. Army Corps of Engineers
CSZ	Cascadia Subduction Zone
DOGAMI	Oregon Department of Geology and Mineral Industries
GIS	Geographic Information System
GPS	Global Positioning System
km	Kilometer(s)
LIDAR	Light Imaging Detection and Ranging
m	Meter(s)
NHPA	National Historic Preservation Act of 1966
NPS	National Park Service
NRB 38	National Register Bulletin 38
NRHP	National Register of Historic Places
OARRA	Oregon Archaeological Records Remote Access
ODFW	Oregon Department of Fish and Wildlife
SERE	Survival, Evasion, Resistance, and Escape
SHPO	State Historic Preservation Office
STP	Shovel Test Probe
TCP	Traditional Cultural Property
UOMNCH	University of Oregon Museum of Natural and Cultural History
USAF	U.S. Air Force
USCGS	U.S. Coastal and Geodetic Survey
USGS	United States Geological Survey

1 Introduction

This report describes the results of a cultural resource investigation conducted by HDR at the Bayocean Peninsula. The U.S. Air Force (USAF) contracted HDR to conduct the investigation in association with the USAF's proposal to renew their permits to conduct Survival, Evasion, Resistance, and Escape (SERE) Specialist Training on the Bayocean Peninsula in Tillamook County, Oregon (Project or Undertaking) (**Figure 1**). The training takes place on public land managed by the U.S. Army Corps of Engineers, Portland District (Corps), Tillamook County, and Oregon State Parks and Recreation.

1.1 Federal Nexus for the Investigation

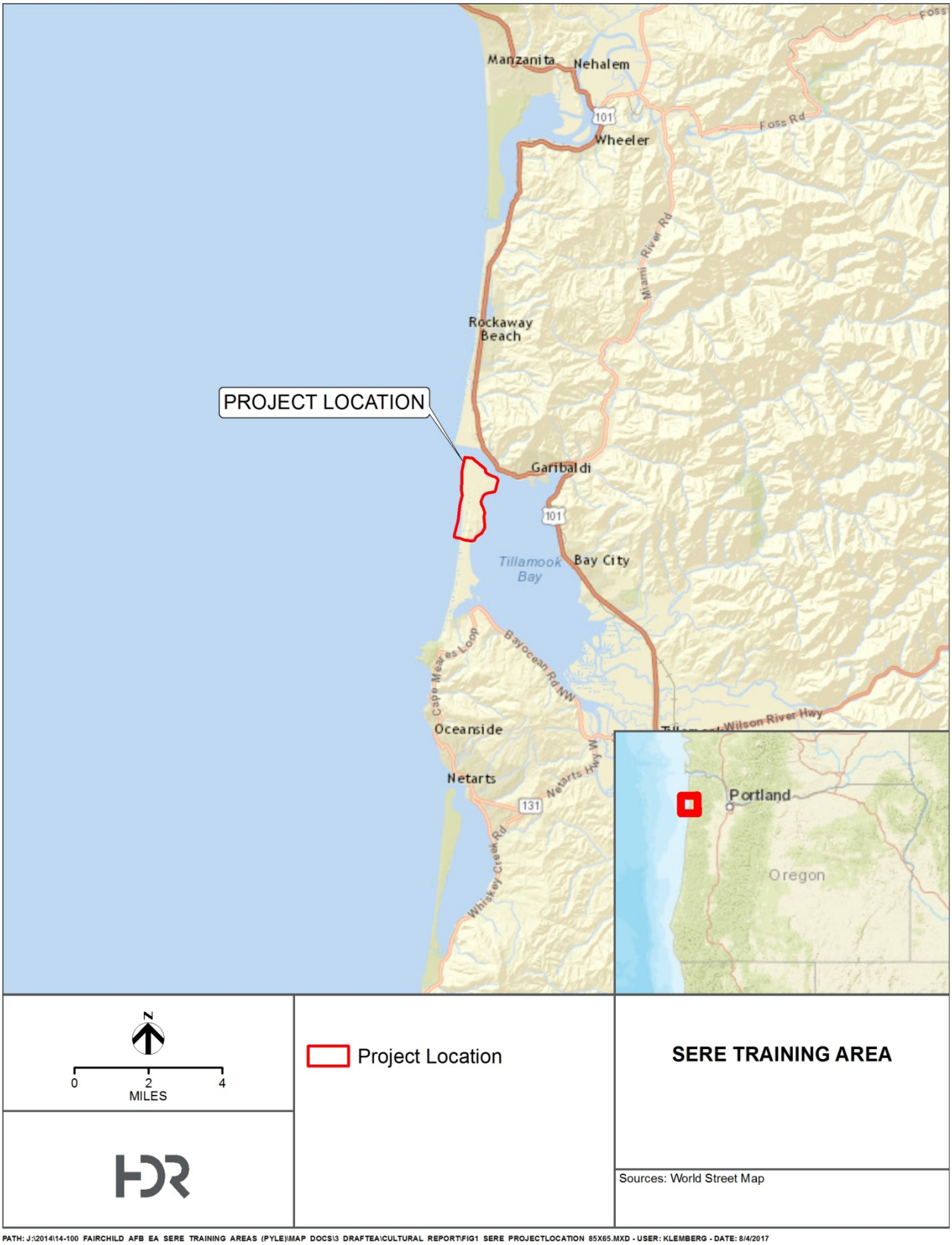
Section 106[1] of the National Historic Preservation Act (NHPA), Title 54 United States Code 306108, and its implementing regulations (36 Code of Federal Regulations [CFR] 800) require federal agencies to consider how an undertaking may affect historic properties, which are cultural resources that are listed in or eligible for listing in the National Register of Historic Places (NRHP). Federal agencies must take actions to avoid, minimize, or mitigate adverse effects if they would occur; and offer the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment. Federal agencies must also consult with the State Historic Preservation Office (SHPO) and Native American tribes as they meet these requirements.

The USAF proposes to continue SERE Specialist Training activities on the Bayocean Peninsula and to renew required permits with the Corps, Tillamook County, and Oregon State Parks and Recreation Department. The training, conducted twice per year, consists of transport to and from the training area, including helicopter flight, and six days of coastal and open ocean training. The training activities involve minor ground disturbance associated with helicopter operations and shallow hand-dug excavations, which have potential to impact historic properties. As such, the training constitutes a federal undertaking per 36 CFR 800.2 and must comply with the NHPA and the Section 106 process.

The Corps performed a cultural resource survey in 2012 to meet their requirements under the NHPA for permitting the SERE training (Mulligan 2013). The survey addressed 175 acres of the northern Bayocean Peninsula with 100 percent surface inspection for all proposed training areas. According to the survey report, the Corps did not intensively survey the central part of the peninsula due to dense vegetation, slope, low potential for intact archaeological sites, and no planned use of the area (Mulligan 2013). The survey identified one archaeological site, 35TI104, but did not locate a previously recorded site from the 1950s, 35TI011. Site 35TI104 was unevaluated for NRHP listing. The Corps concluded there would be no adverse effect on historic properties so long as the SERE training avoided sites 35TI011 and 35TI104. The Corps consulted on these findings with the Oregon SHPO, which concurred, and Native American tribes, who did not raise any objections (Daniel Mulligan, pers. comm. December 14, 2015).

[1] In 2014, Public Law 13-287 moved the NHPA's provisions from Title 16 of the United States Code to Title 54 and re-ordered some of those provisions. What was formerly "Section 106 of the NHPA" (16 CFR 470[f]) is now codified at 54 USC 306108. However, "Section 106" remains in common usage in reference to the requirements of the law and the process outlined at 36 CFR 800.

Figure 1. Project Location Map.



In 2015, the USAF began consulting with the Oregon SHPO, the Confederated Tribes of the Grand Ronde (Grand Ronde), and the Confederated Tribes of the Siletz Reservation about the Project. The USAF considered the Corps' conclusions from their 2012 survey and likewise recommended the Project would not adversely affect historic properties. Although the Corps had formerly consulted with Native American tribes on their findings, the Grand Ronde voiced concerns about the adequacy of the Corps' survey and requested the USAF do further study in the area. Specifically, the Grand Ronde requested a more in-depth historical review of Native American use of the area. The Grand Ronde expressed concern about the potential for unidentified buried deposits that could be disturbed by manual excavation during training exercises. The Grand Ronde also asked that the USAF consider the potential for indirect impacts to traditional cultural properties (TCPs) in the surrounding area. The USAF contracted the cultural resource investigation reported herein to address these concerns.

The purpose of this study is to complete a cultural resources inventory to enable the USAF to propose a sound assessment of adverse effects per 36 CFR 800.5. This report discusses cultural resources identified during the cultural investigation and evaluates the resources for their eligibility for listing in the National Register of Historic Places (NRHP), pursuant to 36 CFR 800.4. The report concludes with recommendations pertinent to subsequent steps in the Section 106 process as well as general recommendations regarding additional research and long term management that do not relate to the Undertaking. The report does not make a determination of effect for the Undertaking (36 CFR 800.5) and is intended to inform the USAF's decision-making, determinations, and completion of Section 106 in consultation with the Oregon SHPO, Native American tribes, and the ACHP.

1.2 Description of the Proposed Undertaking

The 336th Training Group at Fairchild Air Force Base has conducted the SERE coastal and open ocean training at the Bayocean Peninsula in Tillamook County since the 1980s. The coastal and open ocean training requires students to demonstrate navigation skills using natural land features; procure animal and plant life for food and shelter; construct a variety of fires and shelters; and demonstrate proficiency of these techniques in coastal and open ocean environments. The training would be conducted over a 6-day period twice per year with up to 50 students and 13 instructors. The training uses both the bay and ocean sides of the peninsula and open ocean areas off-shore of the peninsula. During the training, students use local materials to build shelters and fires; excavate latrines and water table pits; and gather shellfish for consumption. The training includes navigation, landfall training, and helicopter operations in the open ocean and helicopter operations in the bay. Transportation to the training area involves the use of 6 to 11 support vehicles, typically consisting of two 2.5 ton cargo trucks, one ambulance, one 45-passenger bus, and up to seven four-wheel drive pickups. Training support areas on the Peninsula consist of four student camps, an instructor camp, a medic camp, and a helicopter landing site. All areas are undeveloped except the instructor camp which is a primitive camping site with a fire ring.

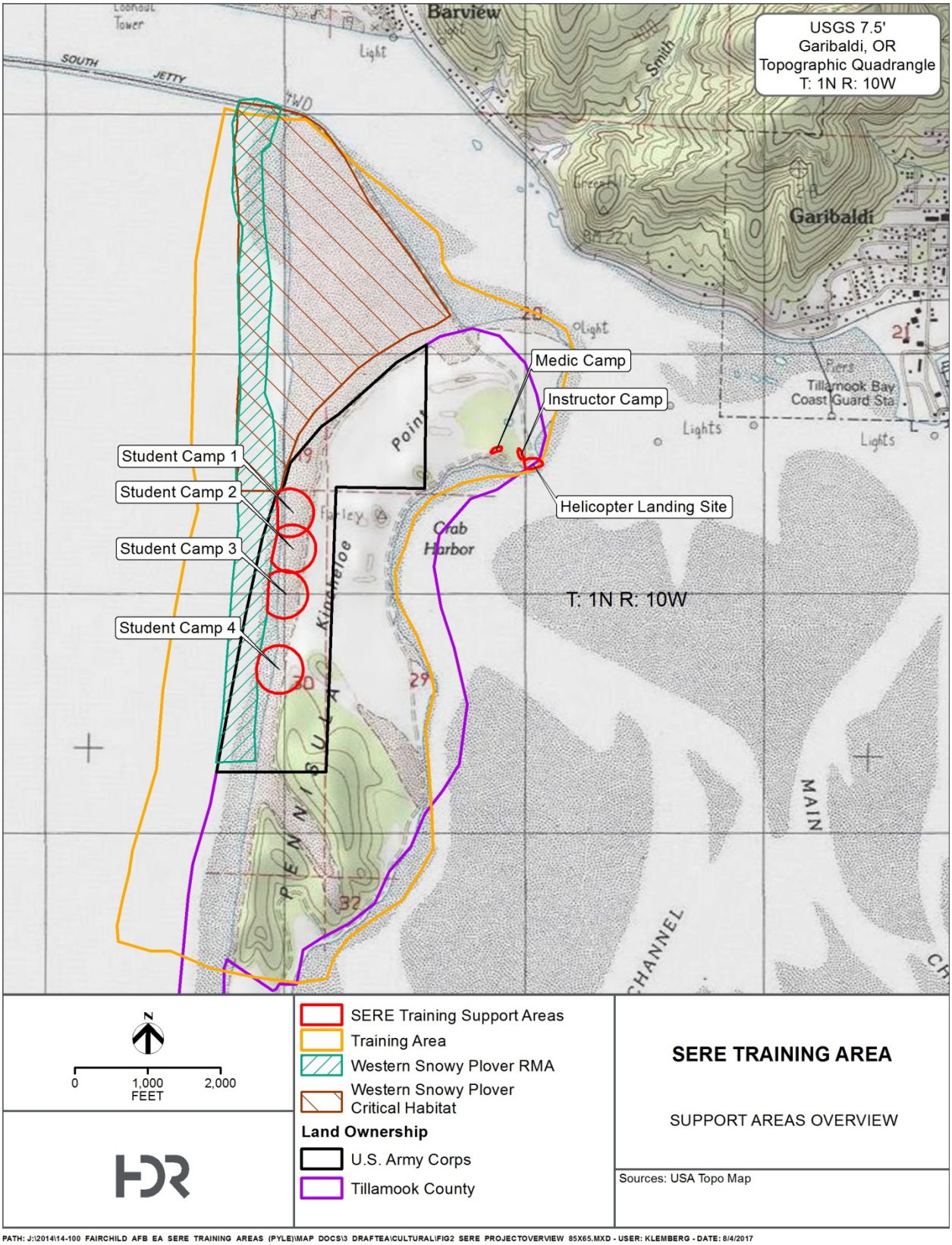
The SERE training occurs on lands and facilities owned by Tillamook County, the Corps Portland District, and Oregon State Parks and Recreation Department, and requires permits from these agencies (see **Table 1, Figure 2**). The permit with Tillamook County allows the USAF to access and use county-owned land in the northeast portion of the peninsula around Kincheloe Point and use of the Bayocean Dike Road, a gated road that provides access to the area. The instructor camp, medic camp, and helicopter landing site are on county land. The permit with the Corps Portland District allows the USAF to access use Corps-managed land in the northwest portion of the peninsula that was withdrawn from the public domain for the Tillamook Bay South Jetty Project. The student camps

are on Corps property. The Corps permit requires the USAF avoid archaeological sites 35TI011 and 35TI104 during the course of permitted activities, although these properties are located on the adjacent Tillamook County land. The permit with the OSPD allows the USAF to access state-owned beach areas during training activities. Student camping activities extend into OSPD lands, including foraging activities. The USAF proposes to renew the above permits to continue the SERE training at the Bayocean Peninsula. Under this proposal, there would be no changes to the existing training areas or activities (e.g., no changes in duration, numbers of students/instructors, equipment usage, etc.). The renewed permits would extend the SERE training at the Bayocean Peninsula for 5 years.

Table 1. SERE Training Permits.

Agency	Tillamook County	Oregon State Parks Department	Corps Portland District
Permit Name/ Number	Bayocean Seashore Survival Training Permit DACA67-9-12-209	Department of the Air Force Air Education Training Command Air Force Desert Survival Training Permit No. DACA67-9-10-1	Permit DACW57-9-12-0036 Air Force Seashore Survival Training, Bayocean Peninsula and Kincheloe Point, Oregon
Applicable Land Ownership	Northeast portion of Bayocean Peninsula and county roads.	Oregon State Parks Department lands between the mean low and mean high tide lines	Withdrawn lands comprising the Tillamook Bay South Jetty Project (jetty and northwest portion of Bayocean Peninsula)
Permit Status	5 year permit, expires July 18, 2017	Expired 2015	Expired 2012 with temporary permits issued in 2012 and 2013
New Permit Duration	5 years	5 years	5 years
Permit Conditions	• The USAF must pay or reimburse the county for improvements to portions of Bayocean Road as mutually agreed upon in advance to facilitate access to training areas. • The USAF must repair or settle for real property damages that may occur.	• Adhere to U.S. Fish and Wildlife Service recommendations regarding the Western Snowy Plover and critical habitat. • No landing of aircraft on ocean shore except in emergency. • Fires must be less than 3 feet in diameter, in open dry sand areas, and of natural, untreated materials. • Campsites must be dismantled, removed, and filled in. • Beach areas must be cleaned and restored to pre-existing conditions.	• The Air Force must avoid the area containing sites 35TI011 and 35TI104. • Damage to vegetative cover must be kept to a minimum. • Use of the Bayocean Dike Road must be coordinated with Tillamook County and road use kept to 6 to 10 vehicles when needed to support the training.

Figure 2. SERE Training Areas and Land Ownership.



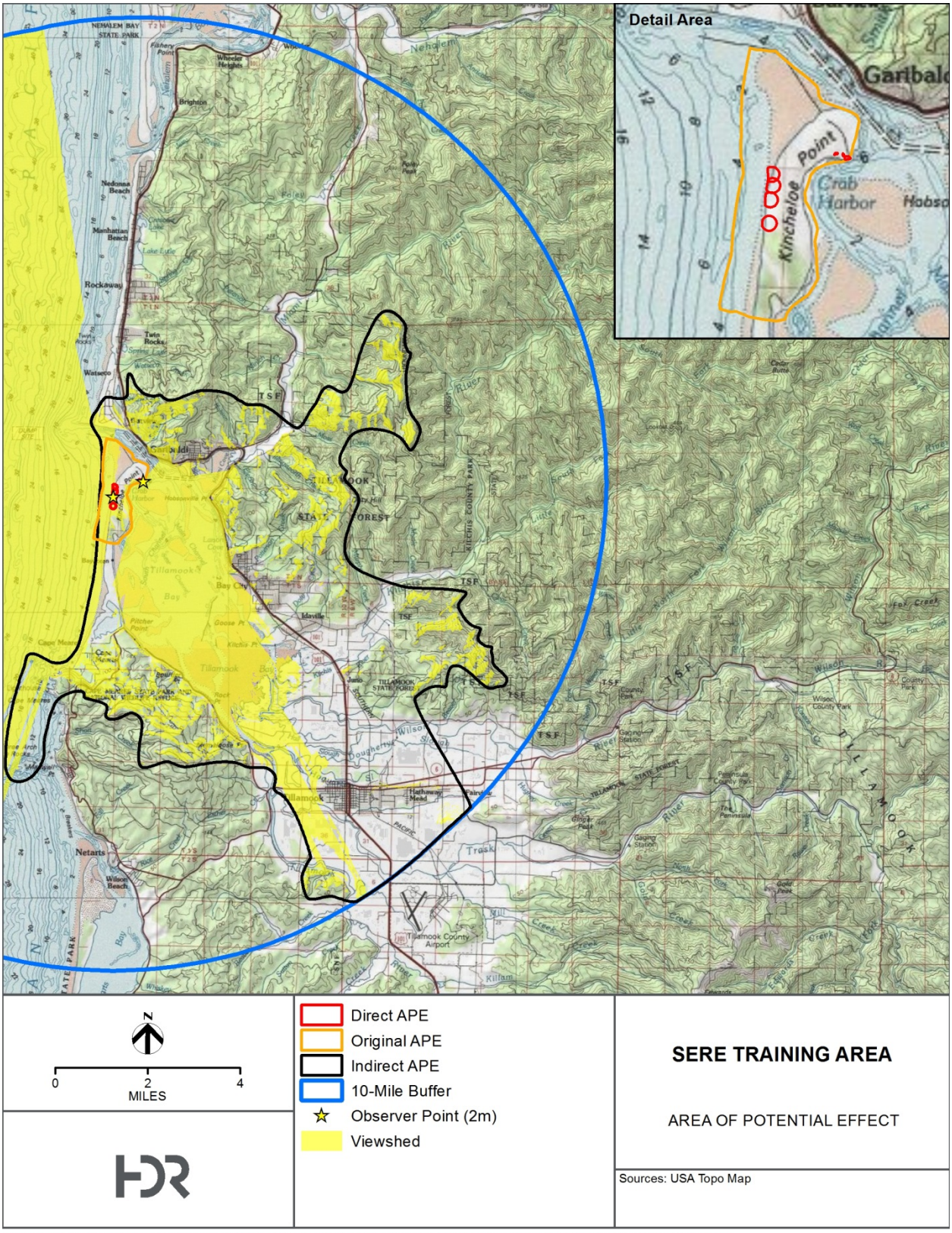
1.3 The Area of Potential Effect

The Area of Potential Effects (APE) is described as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." (36 CFR 800.16(d)). SERE training activities have potential to impact cultural resources through ground-disturbing activities associated with the excavation of water table pits and latrines at student camps. Water pits would measure 3 feet long × 3 feet wide and 1 to 2 feet deep. Latrines would measure 2 feet long × 2 feet wide × 3 feet deep. Surface disturbance support camps and the helicopter landing site also have potential to impact cultural deposits. When the USAF initiated consultation on the Undertaking in April 2015, it defined the APE as the SERE training area (see "Original APE" in **Figure 3**). This APE was consistent with the area investigated during the Corps' 2012 survey.

During consultation with the Grand Ronde, the tribe raised concerns about the potential for direct effects from activities at the Instructor and Medic camps, especially considering proximity to known site 35TI104. The Grand Ronde also raised concern about the potential for indirect effects on a much larger area around Tillamook Bay (Briece Edwards, pers. comm., January 25, 2016). The Grand Ronde's tribal archaeologist explained the Tillamook Bay area is a "storied landscape" highlighted in many oral traditions, particularly those associated with the trickster-transformer figure "South Wind" who gave form to the Tillamook world. Further, he explained, the peninsula is situated with broad views of the Tillamook Bay region and line-of-sight to a large number of tribal resources such as village locations, burial grounds, named geographic features, and resource gathering areas. This line-of-sight connection between resources is an important relationship in the tribal view and influences the relative importance of resources. In consideration of these perspectives, the Grand Ronde asked that the USAF evaluate the potential for indirect impacts on tribal resources in the larger area. The tribe also requested additional cultural resource investigations, specifically shovel testing, within areas of direct impact (i.e. the SERE training support areas).

As a result of consultation with the Grand Ronde, the USAF expanded the APE to encompass land areas (including sea stacks) surrounding the Bayocean Peninsula with direct line of sight to proposed training support areas to a distance of 10 miles (**Figure 3**). The area was defined using a viewshed analysis in a geographic information system (GIS) by estimating the 10-mile sightline of a 6-foot human observer from observation points at the geographic centers of the helicopter landing site and the student camps. A boundary was drawn to encompass all visible areas within the 10-mile distance. Recognizing that the potential for direct impact (through ground disturbance) is specific to the SERE training support areas, the USAF defined these areas as the "Direct APE," which totals 28.9 acres. Other potential impacts from training activities would be indirect and the USAF defined the remainder of the APE as the "Indirect APE." These definitions were developed in the *Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training* (research design) to help direct the research focus for the cultural investigation, consisting of intensive cultural resources survey (shovel testing) in the Direct APE and an ethnographic and research-oriented approach in the Indirect APE. The research design is provided as **Appendix A**. Regardless where in the APE resources are identified, the USAF must consider whether the Undertaking would adversely affect or not adversely affect historic properties.

Figure 3. Area of Potential Effect



1.4 Cultural Resource Investigations

The cultural resource investigation entailed a literature review, shovel testing in the Direct APE, and discussions with the Grand Ronde Cultural Resources Department to identify historic properties and address research questions in the research design. Shovel testing did not result in the identification of any new archaeological sites in the Direct APE; however, HDR made observations at previously recorded site 35TI104, including changes to the site boundary, and prepared an update to the existing site form. Discussions with the Grand Ronde and investigation of the Indirect APE resulted in the identification and documentation of the Tillamook Spit cultural landscape.

Mr. Wayne Glenny was the Principal Investigator for the cultural resources investigation. Dr. Dan Leonard was field director and supervised shovel testing activities. Ms. Harriet Richardson Seacat led the study's ethnographic component and assisted with shovel testing. Ms. Elizabeth Leclerc performed background research and fieldwork. Mr. Glenny and Dr. Leonard meet the Secretary of the Interior's Professional Qualifications Standards for archaeology. Ms. Richardson Seacat meets the professional qualifications for ethnography as detailed in National Register Bulletin 38, *Guidelines for Evaluating and Documenting Traditional Cultural Properties* (National Register Bulletin [NRB] 38; Parker and King 1998:27). Personnel resumes are provided in **Appendix B**.

Field investigations occurred between December 6 and December 9, 2016. The crew, consisting of Dr. Leonard, Ms. Richardson Seacat, and Ms. Leclerc, excavated 86 shovel test probes (STPs) in the instructor camp, medic camp, helicopter landing site, and student camps. No artifacts were observed in the STPs. All work was conducted in accordance with State of Oregon Archaeological Excavation Permit No. AP-2189 and the Corps' Archaeological Resources Protection Act (ARPA) Permit No. DACW57-4-17-002.

On November 8 and December 9, 2016, HDR held discussions with Grand Ronde cultural resources staff to consider potential TCPs in the Direct and Indirect APE and better understand the traditional cultural significance of the Tillamook Spit and surrounding area (see **Appendix C** for meeting minutes). HDR synthesized these findings with background research on tribal environmental and landscape perspectives and the specific stories that document tribal associations with the Project vicinity. This research resulted in the definition and evaluation of the Tillamook Spit cultural landscape and was conducted following guidelines published in NRB 38, cultural landscape and ethnographic resources guidelines found in the National Park Service (NPS) *Cultural Resource Management Guidelines* (NPS 1988), and the ACHP's Forum on Traditional Cultural Landscapes (2011).

Copies of this report will be maintained with the USAF, Corps, and Oregon SHPO. A copy of the report and field data will also be maintained at HDR, 8690 Balboa Ave. Suite 200, San Diego, California.

1.5 Agency and Tribal Coordination

After identifying the need for this cultural resources investigation, the USAF coordinated with the Oregon SHPO and the Grand Ronde on the research design.[2] The USAF provided a draft research

[2] Based on lack of interest in earlier consultation on the project, the USAF did not consult with the Confederated Tribes of the Siletz Reservation during development of the research design or during the course of the investigation. However, results of this inventory and a copy of the report will be provided to the tribe once finalized.

design for comment in November 2015 and began coordinating with the Corps to obtain an ARPA permit to conduct investigations on Corps-managed land in the APE. A revised draft research design was circulated to all parties in March 2016. After a 30-day comment period, the USAF submitted the final research design along with permit applications to the Oregon SHPO and the Corps in May 2016. The Oregon State Permit was issued on June 22, 2016, and the Corps ARPA permit was issued October 17, 2016. Upon receipt of the permits, HDR began coordinating with the Grand Ronde and Tillamook County Public Works to schedule the survey. Briece Edwards at the Grand Ronde Cultural Resources Department expressed interest in observing field investigations and invited HDR to attend a pre-field orientation at the tribal offices. The survey was scheduled for the week of December 6; however, the meeting at Grand Ronde was postponed to the end of the week to accommodate staff schedules. Copies of agency and tribal correspondence are provided in **Appendix C**.

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2 Environmental Setting

Tillamook Bay is an estuary on the northern Oregon Coast in Tillamook County. The bay is the third largest estuary in Oregon, covering approximately 8,330 acres. The bay is also shallow, averaging only 6.5 feet deep (2 m), and three-quarters of the bay's bottom area is exposed during the lowest tides. Five rivers discharge into the bay: the Miami, Kilchis, Wilson, Trask, and Tillamook Rivers. The Miami River discharges into the northeast part of the bay, whereas the remaining rivers enter from the southeast where they form a broad floodplain. The bay is surrounded to the north, east, and south by narrow beaches backed by low, steep hills that climb quickly into the mountains of the Coastal Range. Elevations generally range from sea level to 650 feet above mean sea level (amsl) (198 m); Gold Peak and Edwards Butte southeast of the floodplain reach 966 feet amsl (294 m) and 968 feet amsl (295 m), respectively.

The west side of the bay is mostly enclosed by the Bayocean Peninsula, also known as Tillamook Spit, a sand spit extending north from Cape Meares. A narrow channel north of the peninsula provides access in and out of the bay and is protected by two jetties built by the Corps in 1917 and 1969-1979. The Bayocean Peninsula is 4.0 miles long and ranges from approximately 0.4 mile to 0.7 mile wide. The west, ocean side of the peninsula primarily consists of beach and hummocky active foredunes colonized by European beach grass and, closer inland, shore pine and Sitka spruce (**Figure 4**). Groundwater and rainwater collect in low areas behind the foredunes. The central portion of the peninsula and Kincheloe Point in the northeast are composed of large, steep dunes with a maximum height in the central part of the peninsula of 150 feet (46 m). These dunes have largely stabilized and are densely vegetated with shore pine, Sitka spruce, and an undergrowth of European beach grass, Kinnickkinnick, and Scotch broom (**Figure 5**).

Lowland areas around Tillamook Bay have a 6 foot soil zone with an uppermost horizon of silt nearly 2 feet thick overlying a mottled clay horizon that varies from 3 to 4 feet thick (Terich and Komar 1973). Beneath this soil zone, cross-bedded gravels extend to depths of approximately 200 feet. On the peninsula, soils are predominately medium-coarse sand. A layer of compacted cobble fill overlies soils along most of the access road and in the instructor camp, medic camp, and helicopter landing zone. The cobble surface is only present in disturbance areas and usually appears as a raised platform above the surrounding natural surface (**Figure 6** and **Figure 7**).

2.1 Underlying Geology

Tillamook Bay is on the west flank of the Coastal Range, an uplift of Tertiary volcanic strata interbedded with marine sedimentary strata. The Coastal Range extends from the Klamath Mountains north into southern Washington and is bound on the east by the Puget Trough. The oldest deposits at the core of the uplift are lower Eocene submarine theolitic basalts representing an oceanic basement formed when the area was covered by a shallow sea (Wells et al. 1994). A chain of sea mounts formed during the Eocene are associated with what are collectively termed the Siletz River Volcanics, a group of pillow basalts and breccias within the Coastal Range (Wells et al. 1994). In the Tillamook Highlands surrounding the Project area, the Tillamook River Volcanics of the late Eocene are interpreted as an oceanic island. Although the island appears to have formed in deep water, continent-derived sedimentary rocks interbedded with the volcanic strata indicate the island developed close to the continental margin (Wells 1981 in Wells et al. 1994).

Figure 4. Foredunes on the West Side of the Peninsula.

Figure 5. Vegetation on the East Side of the Peninsula.

Figure 6. Cobble Fill Surface at Entrance to Medic Camp.

Figure 7. Cobble Fill in Profile at Helicopter Landing Site.

The Oregon Coast was subject to alternating periods of submergence and emergence during the Pliocene and Pleistocene. Coastal erosion during periods of high sea level, especially between 350,000 and 100,000 years ago, resulted in platforms and terraces that have also been uplifted and can be seen today high above modern sea levels (Cooper 1958). Beaches and fluvial and estuarine deposits surrounding Tillamook Bay are primarily Holocene deposits resulting from sea level rise, sedimentation, and littoral drift. As discussed below, Holocene sediments in Tillamook Bay are as much as 30 feet deep. Pleistocene-era fluvial deposits are present in elevated terraces around the bay, the floodplain area, and along the Miami, Kilchis, and Tillamook Rivers (Wells et al. 1994). Pleistocene and Holocene-era landslide deposits are prevalent around Cape Meares and the foothills north of Garibaldi.

2.2 Cascadia Subduction Zone and the Tillamook Fault

The Cascadia Subduction Zone (CSZ) is a geologically active region along the Pacific Northwest Coast where the relatively thin oceanic Juan de Fuca and Gorda plates converge with and dive beneath the continental plate. Frictional stress from the plates moving against each other causes them to become “locked,” at which time and strain builds along the locked zone. The strain causes the continental plate at the edge of the subduction zone to subside while coastal areas further east are uplifted (Darienzo 1991). Sudden release of this strain causes megathrust earthquakes with a magnitude greater than 8.0 (Darienzo and Peterson 1995). These earthquakes may be accompanied by underwater landslides, tsunamis, and land subsidence along the coast. The most recent subduction zone earthquake occurred in AD 1700, producing a tsunami that may have reached a height of about 5 m and resulting in land subsidence of about 1 m around Tillamook Bay (Komar et al. 2004; Losey 2002).

Studies have documented multiple episodes of uplift and subsidence in the last 3,000 years, as evidenced in buried marshes capped with tsunami deposits (Darienzo 1991; Darienzo and Peterson 1990, 1995; Darienzo et al. 1994). Darienzo and Peterson (1995) contend that these episodes are evidence of coseismic megathrust earthquakes along the CSZ, which they estimate occur an average of once every 400 years. Others (Goldfinger 1994; McNeill et al. 1998) suggest that active deformation of faults and folds along the continental crust can cause variations in local uplift and subsidence events independent from coseismic events. Such a fault zone is present at Tillamook Bay, where increasing strain along the CSZ may translate into uplift of the adjacent headlands and localized subsidence in the bay (Wells et al. 1994). McNeil et al. (1998) note that evidence for Quaternary deformation along the Tillamook Bay Fault Zone has not been confirmed, but is suggested by buried marsh deposits in the bay.

2.3 Sea Level Change and the Oregon Coast

At the end of the last glacial maximum, sea levels were on average 120 m lower than today. North of Pacific City, the Oregon Coast extended about 20 km west of its current location and appeared as a coastal plain with little topographic variation (Erlandson et al. 2008; ICF International et al. 2013). Rates of eustatic sea level change fluctuated from the terminal Pleistocene through the Holocene. A study by ICF International and others for the Bureau of Ocean Energy Management found that coastal inundation was greatest between 11,000 BP and 8000 BP (ICF International et al. 2013). Sea level rise was 17.5 m between 11,000—9000 BP, 11.9 m between 9000—7000 BP, and 7.7 m between 7000 BP—5000 BP. From 5000 BP to 0 BP global sea level rise slowed considerably to a total of 7.5 m over the 5,000 year period.

As ice melted and drained away from the continent, downward pressure on the continental plate from the weight of the ice lessened, resulting in isostatic rebound (uplift). McDowell (1987, in Lyman 1991) estimated a rate of uplift of 2 m per 1,000 years in northern Oregon and that the rate of eustatic sea level change exceeded uplift until the late Holocene, when the rates have been more equal. Clark et al. (2014) postulated that due to regional variations in ice melt and isostatic rebound, relative sea levels in individual localities may have varied from eustatic sea level change. When the authors applied a model that accounted for both local ice sheet geometry and isostatic rebound along North America's Pacific Coast, the model showed relative sea level along the Oregon Coast about 30 m lower than eustatic sea level between 12,000 BP and 5000 BP (Clark et al. 2014).

2.4 Formation of Tillamook Bay and the Bayocean Peninsula

Before rising sea levels began to inundate the area that is now Tillamook Bay, the region was characterized by two deep river valleys separated by a ridge that extended northwestward from about Sandstone Point (Glenn 1978). The Miami flowed in the north river valley and the Kilchis, Wilson, Trask, and Tillamook Rivers merged together within the southern valley. About 9,000 years ago, rising sea levels drowned the river valleys and brought in an influx of marine sediments (Glenn 1978; Komar 1997; McManus et al. 1998). Sedimentation rates were about the same as sea level rise, resulting in more or less consistent depth to the embayment as it migrated up the river valleys over time. Sea levels and sedimentation both slowed around 6,000 years ago, at which time marine sediment input gave way to riverine sources (Glenn 1978). Sea levels continued to rise, though more slowly, and eventually covered the dividing ridge with water and sediment between 5000 and 3000 BP (Glenn 1978; Peterson and Darienzo 1989).

William Cooper (1958) put forward one of the earliest descriptions for development of the Bayocean Peninsula in a university-based study of coastal sand dunes in Oregon and Washington. Cooper (1958) describes the progression of Oregon coastal dunes from the Pleistocene to the present. According to Cooper, sand dunes formed a continuous belt along the edge of the coastal plain prior to the end of the last glacial maximum. As sea levels rose, the coastal dunes eroded and moved inland. The dunes became fragmented as sea levels reached rocky masses that form today's headlands, and as estuaries formed within submerged river valleys and tributaries. Dunes stabilized along their furthest inland advance prior to sea level stabilization (Cooper 1958).

As Cooper (1958) describes, massive dunes at Tillamook Bay extended from north of the bay to most of the way down what is now the Bayocean Peninsula (Cooper 1958), with the primary channel to the south. This conclusion is echoed in a 1975 study from the U.S. Department of Agriculture Soil Conservation Service, which determined southeast-trending parabolas on the spit would have required a land connection to the north for their development. The massive dunes at the north of the peninsula eventually eroded away entirely, forming the modern channel. However, some stabilized surfaces of the dunes remain preserved in the central part of the peninsula. The southern channel opening eventually filled.

Cooper's analysis did not have the benefit of geological coring, radiocarbon dating, or the breadth of knowledge about isostatic rebound, CSZ earthquakes, and subsidence; therefore, his conclusions may need to be re-evaluated in the context of new information. However, at least some of his findings are echoed in more recent studies and observations. In a discussion of barrier islands and spits along the northern Oregon Coast, J. Dingler and H. Clifton (1994) state it is highly probable that spits existed throughout the period of sea level rise, constantly shifting westward as sea level rise progressed. As evidence, Dingler and Clifton (1994) cite coring data that shows sandspits are

derived from offshore marine sediments that probably began accumulating at lower sea stands. Glenn (1978) demonstrated that such offshore marine sediments were also the primary sedimentary input into Tillamook Bay during rapid sea level rise between 9000 and 6000 BP. As sea level rise slowed, the spit appears to have stabilized and sedimentary input transitioned to predominately riverine sources. Cooper's conclusion that the bay once had a southern channel is consistent with sedimentation and archaeological studies that show the south portion of the spit has cycled through periods of stability and instability (breaching) over at least the past 1,000 years (see **Section 2.6**, **Section 4.2.1**).

2.5 Littoral Drift and Modern Shoreline Development

The Bayocean Peninsula is part of the Rockaway littoral cell, which extends from Cape Meares at the south end of the peninsula to Neahkanie Mountain, 17.5 miles to the north (Allan et al. 2015). Studies of erosion and deposition patterns, longshore currents, and storm patterns have demonstrated that the peninsula is subject to a seasonally reversing littoral cycle with a near net-zero annual sand transport (Terich and Komar 1973; Komar and Terich 1976). Northerly currents predominate in the winter months and are accompanied by strong winter storms from the south with high winds and large waves. During the summer, littoral drift changes to a southerly direction and less powerful storms typically approach from the north to northwest (Terch and Komar 1973).

Severe erosion in the early twentieth century ultimately led to the peninsula's breach in 1952. The erosion stemmed in part from construction of the North Jetty in 1917 and its extension in 1932-1933, which prevented summer-time littoral drift from replenishing sands eroded away by strong winter storms (Terich and Komar 1973). The Corps built a dike in 1956 to seal the breach and constructed the South Jetty 1969–1979 to decrease erosion on the peninsula, sedimentation in Tillamook Bay, and shoaling in the channel. The shoreline of the southern peninsula appears to have since stabilized and the northern third continues to accrete at a rate of 0.7 to 1.0 m per year (Allan et al. 2015). Daniel Mulligan (2013) presents a comparison of historical imagery of the spit between 1939 and 2012, which shows the effects of the breach and subsequent jetty construction on beach development. The progression demonstrates that much of the beach, including the vast majority of the beach northeast of Kincheloe Point has developed in just the last 50 years (Mulligan 2013).

2.6 Sedimentation of Tillamook Bay

With five separate riverine inputs into the bay, sedimentation at Tillamook Bay is more complex than typical estuaries that have a single riverine input (Komar et al 2004). Sedimentation is not uniform, with greatest rates in the southeastern area and along most of the bay's margins (Bernert and Sullivan 1998; Komar et al. 2004; McManus 1998). Bernert and Sullivan's 1998 study of bathymetric data collected in 1867, 1957, and 1994/1995 tentatively concluded that the bay's bathymetry was much more complex in 1867, with deeper channels, sporadic holes, and greater elevation between high and low spots in the bay. In the 1957 and 1994/1995 data, dredged shipping and navigation channels are conspicuous against an otherwise homogenous landscape, including a channel at Crab Harbor on the west side of Kincheloe Point. Bernert and Sullivan (1998) were unable to confidently quantify absolute changes in bathymetry due to variations in the data, including poor sampling in some instances and possible datum changes.

Sedimentation rates in Tillamook over the past 150 years have averaged closer to 50 cm per year than the 20 to 30 cm observed prior to Euroamerican settlement (Komar et al. 2004). Much of this increase has been attributed to extensive wildfires in the 1930s to 1950s known as the Tillamook

Burns, logging, agricultural practices, modifications to the river channels, and a breach of the Bayocean Peninsula. Despite heavy sediment loads from the rivers, the ocean has historically contributed a large proportion of sand into the bay. Komar et al. (2004) found that 60 percent of the surface sand in the bay is derived from marine sediments. This is not surprising, considering the 1952 breach of the peninsula dumped an estimated 1.5 million cubic meters of sand into the bay (Komar and Terich 1976; Komar et al. 2004). Even after the breach was closed by a dike in 1956, littoral transport continued carrying sand around the peninsula and into the bay through the channel until the South Jetty was built in the 1970s (Komar et al. 2004). However, Komar et al. (2004) also found that quantities of marine sand increased over the 500 year span of their sediment cores, with a large spike that corresponded with the timing of the AD 1700 earthquake and tsunami. The authors concluded that coseismic subsidence and the tsunami likely resulted in a breach in the south end of the peninsula and contributed to frequent washover events for the next 150 years.

Although sedimentation rates in the modern bay area are well-established, little research has been done concerning in-filling and development of the floodplain area southeast of the bay. Roulette et al. (2012) postulate that when the bay began filling in the early Holocene, the Tillamook, Trask, and Wilson River mouths were further south and east than today. The floodplain would have been a broad, tidal flat or covered in shallow water. The authors suggest river deltas would have quickly coalesced into landforms that stabilized over time into habitable land. This interpretation is supported by Glenn's (1978) work demonstrating rapid, early sedimentation in the modern floodplain area followed by much slower rates. For their project area east of Tillamook on the Trask River, Roulette et al. (2012) suggest the immediate landform was likely not habitable before 5000 BP. The authors call for studies on aggradation rates related to delta building and earthquake uplift/subsidence that could determine when areas of the floodplain first became habitable.

Today the floodplain is subject to periodic large-scale flooding resulting from a variety of factors, including heavy rain, snowmelt, high tides, and strong winds that drive seawater onshore (Pearson 2002).

2.7 Paleoenvironment

Paleoenvironmental studies and climate reconstructions have been conducted for Pacific Northwest more broadly, and for the Coast Range more specifically (Briles et al. 2005; Long et al. 2007; Whitlock 1992; Worona and Whitlock 1995). These studies suggest that climate variations during the Holocene can be divided into three major stages progressing from warmer and drier conditions following the end of the Pleistocene to cooler and more mesic conditions beginning circa 6500 BP, with modern compositions of forest species established by circa 2000 BP. Exact dates for these stages vary between studies due to variations in latitude and elevation between studies.

The early Holocene along the northern Oregon Coast is characterized by a warming and drying climate until about 6700 BP. Parklands previously dominated by pine (*Pinus* spp.) and fir (*Abies* spp.) in higher elevations transitioned to open forests with a xeric-adapted mix of pine and oak (*Quercus* spp.). In the lower elevations, open forest stands were predominant, characterized by a mix of Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and alder (*Alnus* spp.) Beginning about 6700 BP, the climate became cooler and moister and the forest became more closed. Western hemlock, Sitka spruce (*Picea sitchensis*), and western red-cedar (*Thuja plicata*) were prevalent alongside other shade tolerant and fire-resistant species. Mesic conditions continued up to the present with the establishment of modern forest compositions along the coast by 2500 BP to 2000 BP.

2.8 Modern Flora and Fauna

Tillamook Bay is in a Sitka spruce forest zone characterized by a predominance of Sitka spruce, western hemlock, Douglas fir, western red-cedar, and red alder. Dense understory contains a variety of shrubs, ferns, and herbs, including sword fern (*Polystichum munitum*), red huckleberry (*Vaccinium parvifolium*), evergreen huckleberry (*V. ovatum*), red elderberry (*Sambucus racemosa*), and western rhododendron (*Rhododendron macrophyllum*). Salt marshes contain reed canary grass (*Phalaris arundinacea*), saltgrass (*Distichlis spicata*), rushes and sedges, arrow-grass (*Triglochin maritima*), pickleweed (*Salicornia* spp.), and other water and salt-tolerant species. The low, hummocky fore dunes along the west side of the peninsula are vegetated with sparse grasses and Scotch broom. Stabilized areas of the peninsula are densely vegetated with shore pine, Sitka spruce, and an undergrowth of European beach grass, Kinnickkinnick, and Scotch broom.

The Tillamook Bay area hosts a rich diversity of terrestrial and marine wildlife. Large mammals include deer (*Odocoileus* spp.), elk (*Cervus elaphus*), coyote (*Canis latrans*), black bear (*Ursus americanus*), and mountain lion (*Felis concolor*). Also present are smaller mammals such as bobcat (*Lynx rufus*) beaver (*Castor canadensis*) and raccoon (*Procyon lotor*); a range of species from the weasel family (Mustelidae), including weasels, skunks, and minks; snowshoe hare (*Lepus americanus*), and a variety of rodents, amphibians, and small reptiles. Deer, elk, small rodents, and rabbits are present on the peninsula (336th TRG 1997).

Tillamook Bay supports many species of waterfowl including the American widgeon (*Anas americana*), northern pintail (*A. acuta*), surf scoter (*Melanitta perspicillata*), bufflehead (*Bucephala albeola*), brown pelican (*Pelecanus occidentalis*), least sandpiper (*Calidris minutilla*), black-bellied plover (*Pluvialis squatarola*), semipalmated plover (*Charadrius semipalmatus*), whimbrel (*Numenius phaeopus)*, sanderling (*C. alba*), dunlin (*C. alpina*), short-billed dowitcher (*Limnodromus griseus*) and great blue heron (*Ardea herodius*) (PFMC 2003). Threatened and endangered species in the area include the western snowy plover *(Charadrius alexandrines nivosus)*, brown pelican *(Pelicanus accidentalis)*, marbled murrelet *(Brachyramphus mannoratus),* northern spotted owl *(Strix occidentalis caurina)*, and short-tailed albatross *(Phoebastria albatrus)* (HDR 2015).

Sixty-seven species of estuarine, marine, and anadromous fish have been identified in and around Tillamook Bay, including five species of salmon (Chinook [*Oncorhynchus tshawytscha*], Coho [*O. kisutch*], chum [*O. keta*], steelhead trout [*O. mykiss*], and sea-run cutthroat trout [*O. clarkia*]. Estuarine and marine fauna also include four species of clams (cockles [*Clinocardium nuttallii*], butter clams [*Saxidomus giganteus*], gaper clams [*Tresus capax*] and littleneck clams [*Protothaca staminea*]), Pacific oysters (*Crassostrea gigas*), sand shrimp (*Neotrypaea californiensis*), harbor seals (*Phoca vitulina*), California sea lion (*Zalophus califonianus*), harbor porpoise (*Phocoena phocoena*), and several species of sea turtles. Sturgeon were present in Tillamook Bay historically (Byram 2002).

2.9 Environmental Constraints

2.9.1 Implications for Archaeological Site Potential

No studies were identified regarding the ages of different dunal deposits across the peninsula. It appears the sandspit did not stabilize in its current position until after sea level rise slowed about 6000 BP. The peninsula as a whole has undergone cycles of accretion and erosion on the ocean side, and the south part of the peninsula in particular has gone through cycles of stability and instability with several breaches documented in the last 500 years, the most recent in 1952.

Construction of the north jetty in 1917 accelerated erosion along the southern peninsula and accretion along the northern peninsula until completion of the second, South Jetty in 1979. The eastern, bay side of the peninsula has also experienced sedimentation, with periodic dredging inside Kincheloe Point.

There is a high potential for buried sites on stabilized dunes and on the eastern half of the peninsula. Prehistoric use of the peninsula would have also likely been more intense on the bay side than the ocean side due to the wide range of estuarine resources present. Prehistoric sites are less likely on the western side of the peninsula due to less intensive use and more dynamic cycles of accretion and erosion/deflation. The region has experienced periods of tectonic uplift and abrupt subsidence from tectonic activity, which can also affect site preservation. Sudden subsidence could result in burying of sites and improved preservation if conditions allowed for rapid sedimentation; however, subsidence could also damage or destroy archaeological sites through increased exposure to wave and tidal action.

2.9.2 Implications for Fieldwork

The geologic and environmental history of the project area indicates that archaeological sites are less likely to be present on the ocean side of the peninsula, especially in the active foredune area. Further, any buried deposits in this area would likely be buried beneath meters of accreted sand. Field methods in this area have been designed to focus identification efforts in interdunal areas where buried deposits would be most likely to be encountered. Shovel testing provides the best means for identifying if archaeological sites are present within the potential disturbance zone from shallow pit excavations during the SERE training.

In contrast, archaeological sites are more likely in the western part of the peninsula where conditions are more stable and pre-contact use was more intense. Previously identified sites in and near the project area are concentrated on this side of the peninsula. Increased shovel testing density is warranted in these areas to ensure sites are appropriately identified.

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3 Cultural Setting

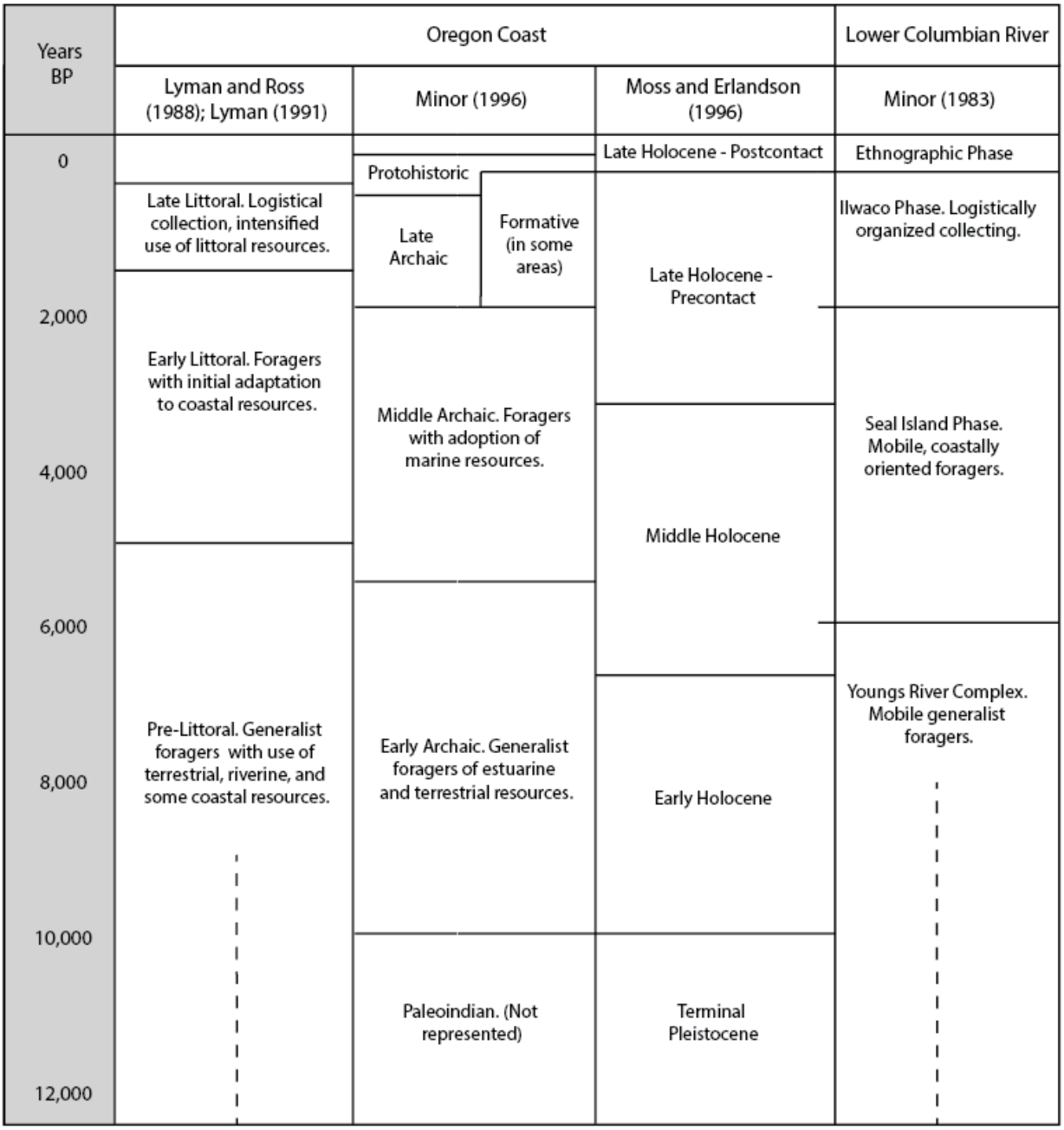
3.1 Prehistoric Archaeological Context

The Oregon Coast is situated within the Northwest Coast culture area, stretching from Alaska to the Oregon-California border. Native American societies from this region are known for their maritime adaptations, sociopolitical complexity and stratification, distinctive art and technology, and trading networks. Broad cultural syntheses for the Northwest Coast and for California have often treated the Oregon Coast as peripheral to cultural developments within these regions (Moss and Erlandson 1996). Despite over 120 years of archaeological work on the Oregon Coast, the region was poorly represented in the literature. This was compounded, if not partially caused, by the lack of early dated sites from the Oregon Coast. Few archaeological sites have been dated earlier than about 3000 BP and the vast majority of radiocarbon dates from coastal archaeological deposits date within the last 1,500 years (Moss and Erlandson 1996). Concerted efforts over the last 25 years to identify and radiocarbon date coastal sites, notably through the Oregon Coast Archaeological Survey out of the University of Oregon, have significantly increased the body of data available on prehistoric use of the coastal zone, including identification of several sites from the early Holocene that have pushed back chronologies for coastal adaptations (Byram 2002, 2009; Erlandson and Moss 2000; Erlandson et al. 2001; Erlandson et al. 2008; Losey 2002; Minor et al. 2001; Moss and Erlandson 1996).

The scarcity of early coastal sites contributed to chronologies for Oregon coastal prehistory that described coastal adaptation as a gradual transition from terrestrially-based subsistence to increasing reliance on marine and estuarine resources (Lyman 1991; Lyman and Ross 1988; Ross 1984, Ross 1990). In their nomination of 89 Native American Oregon coastal sites to the NRHP, Moss and Erlandson (1996) counter that it is unlikely the region's earliest inhabitants would have ignored rich coastal resources. Although they concede the lack of sites may represent less intensive use of the coast, they suggest this scarcity may also reflect a combination of sea level rise, tectonic subsidence, coastal erosion, and dune development (Moss and Erlandson 1996). Three chronologies proposed by Lyman and Ross (1988; Lyman 1991), Minor (1996), and Moss and Erlandson (1996, 1998), are summarized below and in **Figure 8**. Minor also developed a local chronology for the lower Columbia River that is somewhat applicable to Tillamook Bay, which is also summarized.

Lyman and Ross (1988) and Lyman (1991) propose a three-stage cultural chronology for the Oregon Coast as a whole that traces a gradual adaptation toward littoral resources. The Pre-Littoral Stage represents the earliest use of the Oregon Coast from an unspecified time until about 5000 to 6000 BP and is characterized by a "generalist forager" economy with a reliance on terrestrial or upland resources supplemented by riverine, and to some degree, littoral resources. Lyman later clarified that "littoral" was conceived in opposition to "maritime," whereby maritime peoples "focused on the sea as a resource base and [had] the necessary technology to regularly exploit the open sea," (Lyman 1997). The Early Littoral Stage (5-6000 BP to 1500 BP) begins around the stabilization of sea levels and represents an initial adaptation to coastal resources, especially in estuaries and the inter-tidal zone. Fishhooks and harpoons become more common during this period and lithic tools become less prevalent. Reliance on coastal resources intensifies and by the Late Littoral Stage (1500 BP to 300 BP), terrestrial resources are supplemental to a predominately littoral/marine economy. The Pre-Littoral Stage in particular has been criticized for suggesting littoral resources were not used, despite archaeological evidence to the contrary and there have been calls to remove "pre-littoral" from the lexicon of Oregon archaeology (Minor 1997; Moss and Erlandson 1998).

Figure 8. Regional and Local Chronologies of the Oregon Coast.



The later periods have similarly been criticized for marginalizing the importance of marine resources when ethnographic accounts and oral histories indicate groups on the Oregon Coast were indeed "oriented toward the sea," (Minor 1997).

Minor (1996) proposes a chronology reflective of those from other regions, divided into the Paleoindian (12,000 to 10,000 BP), Early Archaic (10,000 to 5500 BP), Middle Archaic (5500 to 2000 BP), and Late Archaic (2000 to 500 BP), with a Formative stage in some areas (2000 to 200 BP), and ending with a Protohistoric period. Minor's conceptualization of "Archaic" emphasizes generalized adaptations during these periods, consistent with Lyman and Ross's pre-littoral and

early littoral stages, but does not specify where subsistence activities took place or the relative importance resource types (Minor 1997). Minor's Early Archaic is inclusive of both estuarine and terrestrial resources but archaeological sites generally do not display large shell middens. Middle Archaic sites evidence the adoption of marine resources into the subsistence base and large shell middens begin to appear. The Late Archaic is marked by a continuation of Middle Archaic subsistence trends and increased site densities. The Formative Stage represents the emergence of ethnographically identifiable cultural patterns. Minor's approach has been critiqued for using the term 'archaic,' which offends some contemporary Native Americans, and for applying the term Formative, usually associated with the development of agriculture, which was not present on the Oregon Coast (Moss and Erlandson 1996, 1998). However, the terminology does allow for broad regional comparisons.

In their NRHP nomination of Oregon coastal sites, Moss and Erlandson (1996) use a chronology with terms derived from the geologic time scale. Their sequence is divided into the Terminal Pleistocene (12,000 to 10,000 BP), Early Holocene (10,000 to 6700 BP), Middle Holocene (6700 to 3300 BP), and Late Holocene (3300 BP to present), with the Late Holocene divided into pre-contact (3300 to ca. 200 BP) and post-contact (200 BP to present) stages. The scheme is intentionally broad without characterizing cultural developments or implying an evolutionary trajectory (Moss and Erlandson 1996). The chronology is helpful for making broad comparisons between local and regional chronologies but has more limited utility in situating individual or undated sites within a cultural context.

In addition to his regional chronology, Minor's (1983) chronology for the Lower Columbia River can be helpful for analyzing sites found on the northern Oregon Coast more generally, including Tillamook Bay. This chronology includes four periods defined primarily by tool morphology. The Youngs River Complex (8000 to 6000 BP) is marked by shouldered lanceolate and leaf-shaped projectile points and stemmed scrapers that are similar to tool-types from dated assemblages elsewhere in the Pacific Northwest. The next period is the Seal Island Phase (6000 to 2000 BP), marked by broad-necked projectile points and cobble flake tools such as knives and scrapers. The Ilwaco Phase follows (circa 2000 to 200 BP) and is defined by a transition to bow-and-arrow technology with narrow-neck projectile points and changes in harpoon styles. The Ethnographic Phase (AD 1775 to 1851) is characterized by the introduction of Euroamerican artifact types and materials.

3.2 Ethnohistorical and Ethnographic Overview

This section synthesizes ethnographic and ethnohistorical literature on the Tillamook, a Coast Salish group that had long been settled on portions of the Oregon Coast, including the Project area, when non-Native people began describing the region in the 1780s. Some Tillamook people remained on the coast indefinitely, while others were removed to the Grand Ronde or Siletz agencies at varying points after 1875 (Lewis 2009). Based on the available literature, attention in this section is largely given to the Tillamook people, in general. Where possible, more detailed information is provided for the Nehalem Tillamook, the group that long occupied lands encompassing and surrounding the Project area.

3.2.1 The Nehalem Tillamook

The Tillamook are one of several ethnolinguistic groups that were located along the coasts of Washington and Oregon when early ethnographers began to describe the area in the nineteenth

century (Seaburg 2003:x). The Tillamook are Northwest Coast peoples and similar in most respects to others in the traditional culture area extending between northwest California and southeastern Alaska. According to Thompson and Egesdal (2008:xix), the inhabitants of this culture area

> …were able seafarers and most notably fishermen. Many were also whalers and hunters of seal, sea lion, and otter. They typically subsisted primarily on fish (especially salmon), were expert woodcrafters living in cedar plank houses, and enjoyed a considerable surplus of the necessities of life. Perhaps the most distinctive characteristics of the area were a great emphasis on the acquisition of material goods to be given away, display on public occasions, emergence of social classes, and the taking and keeping of slaves (including hereditary slavery).

Tribal histories and claims to local shell mounds establish that Tillamook people had occupied the northern coast of Oregon for thousands of years prior to the first non-Native accounts (Lewis 2009:71). A Tillamook story likely recounting pre-contact times (Jacobs 1990:ix) indicates use of "the sandspit" near Bay City (Bayocean Peninsula) as "a summer place for drying clams" (Jacobs 1990:160). Early nineteenth century journals from the Lewis and Clark Expedition document that Native peoples of the area could sketch minute details of the environment and its inhabitants (Lewis 2009:72). Such accounts and intimate geographic knowledge demonstrate the Native peoples' long-term use of the area and, according to Lewis (2009:72), established their ownership by traditional aboriginal law.

As reported by early ethnographers, Tillamook people lived along a 100-mile section of the Oregon Coast from about Tillamook Head south to the Siletz River (Seaburg and Miller 1990:560). The Tillamook spoke the now mostly extinct, southernmost branch of the Salishan language family and were geographically isolated from other Coast Salish people, who generally lived north of the Columbia River in portions of present-day Washington state (Seaburg 2003:3). The Tillamook language consisted of several dialects, including Nehalem, Nestucca, Salmon River, and Siletz (Seaburg 2003:2; Seaburg and Miller 1990:560). Tillamook who spoke the Nehalem dialect, a language known to its speakers as Hutyéyu, lived in the northernmost area occupied by the Tillamook, from about Tillamook Head south to Cape Lookout (Seaburg 2003:2). The Nehalem people centered on Tillamook Bay were known as the Hoquartons (Roulette et al. 2012:31) and occupied numerous villages on the shores surrounding the bay (Seaburg 2003:xii).

Tillamook people made their permanent homes in politically autonomous villages located on principal rivers, where the waters formed estuaries and emptied into bays along the coast (Seaburg 2003:xii, 2; Seaburg and Miller 1990:561). The villages generally consisted of several permanent dwellings, a shared women's structure, sweathouses, and a graveyard, where people were interred in raised canoes (Seaburg and Miller 1990:561). The Tillamook's rectangular permanent dwellings generally housed around three to four families and were built of 3- or 4-foot-wide horizontal cedar planks charred for preservation and fastened with vines or steamed spruce roots (Boas 1923:3-4; Seaburg and Miller 1990:561). Storage structures utilized by the women were sided with grass mats instead of wood planks (Boas 1923:4). Both aboveground and semi-subterranean buildings were constructed (Seaburg and Miller 1990:561).

From data gathered in the 1930s, Jacobs (2003:80) found that the Tillamook recognized seven seasons named after an important subsistence resource available at that time. Telling of a focus on vegetative and coastal resources, the seasons were primarily named for plant foods and fish and not for foods hunted with bows and arrows. The Tillamook gathered a number of berries and roots and

hunted deer, elk, beaver, sea lions, seals, muskrats, and other game. Fish, especially salmon, were a staple resource that could be stored for lean times. Whale meat and oil were harvested when they washed ashore. Durable goods and everyday items made by the Tillamook from local resources included mats and baskets constructed from cedar bark or rush, wood or spruce root buckets, wooden dishes and utensils, wooden mortars, flint knives, bows and arrows, nets, and traps (Jacobs 2003:95).

Obtaining subsistence and other natural resources required movement of the people away from their permanent villages at certain times of the year. Drawing from a variety of ethnographic sources, Roulette et al. (2012:34) explained that the seasonal round began around April, when women and children would leave their winter villages to harvest salmonberry sprouts and, by May or June, their berries. In late June, camas and other roots were harvested in upland meadows. While women and children were performing these plant gathering activities, men may have occupied themselves along the coast in the harvest of seals, sea lions, and eels. In July, women shifted to foraging a range of berries and then processing them for winter storage. Both men and women transitioned to harvesting and preserving salmon from fish camps in late August and continued these activities through approximately November. Small groups of men would participate in short hunting trips in the fall and winter to obtain available land mammal resources, such as elk, deer, bear, beaver, and small mammals such as muskrat.

In addition to the harvest of natural resources, trade between the varied ethnolinguistic groups on the Washington and Oregon Coasts was quite common and an integral part of the economy on this portion of the Northwest Coast (Roulette et al. 2012; Seaburg 2003). To facilitate trade relations with nearby groups, Tillamook individuals learned the languages of their Athabaskan and Alsean neighbors or employed the region's trade language, Chinook Jargon (Seaburg 2003:2-3). Tillamook people offered beaver hides and baskets in exchange for dentalia, dried salmon, and clothing (Seaburg 2003:3). Bison hides and abalone were obtained by the Tillamook via networks that extended outside the region. Slaves, often first raided from other villages or taken in war (Roulette et al. 2012:36), were other commodities in the regional exchange, while also evidencing the stratified society of the Tillamook (Seaburg 2003:3).

Social class among Tillamook people was largely dependent on the acquisition of spirit powers, or guardian kin (Jacobs 2003:96; Roulette et al. 2012:36). Tillamook adolescents were sent by shamans or elders on power quests (Jacobs 2003). Someone with a power spirit was said to "know something" whereas those without power spirits were said to "know nothing" (Jacobs 2003). Shamans and other spirit doctors, both of whom had especially strong powers, were among the highest ranked within the stratified class system and could accumulate wealth by charging fees for their services (Jacobs 2003:96). Other Tillamook with warrior, wealth, and supernatural hunting powers were also considered of the highest class. Slaves were at the bottom of the social system; however, slaves could also acquire spirit powers. Free Tillamook without guardian kin were considered weak and lacking knowledge. Their rank in Tillamook society largely depended on their relationship to others with spirit powers.

People of the high class possessing strong power could be recognized as a chief, according to Clara Pearson, Jacobs' Nehalem consultant (2003:96). From his 1890 data, Boas (1923:4) concluded that there were generally two chiefs for each village. Chiefs were often considered to be people with a spirit power that made them effective orators able to settle disputes. The political power of chiefs,

however, was tempered by a large middle class, who consulted the leader on decisions affecting their villages (Roulette et al. 2012:36).

Intermarriage was a means to achieve political alliances between Tillamook villages or between the villages of Tillamook and other tribal ethnicities (Roulette et al. 2012:36). Such alliances were maximized by polygynous marriage, which was practiced among the Tillamook in the early ethnographic period (Jacobs 2003). Seaburg and Miller (1990:563) report that marriages could be of the special or common variety. Special marriages "required at least one parent have a strong power, that the bride be childless even if she had been married previously, and that it be the first marriage of the groom" (Seaburg and Miller 1990:563). Likely describing common marriages, Boas (1923:7) explains that these were often based on the desires of a prospective groom, who sent a messenger to provide gifts and speak to the family of the potential bride. Upon agreeing to the marriage, the family of the future bride offered a return gift, and gifts of equal value were exchanged between the families at the wedding ceremony held approximately a week later and on a regular basis, thereafter. A married couple could move between their respective villages, generally determining their permanent home based on family obligations or inheritance (Boas 1923:8; Seaburg and Miller 1990:563).

3.2.2 Early Contact and Fur Trade Periods

The first documented Western contact with the Tillamook was described in an account from Captain Robert Gray when his sloop, the *Lady Washington*, entered Tillamook Bay in AD 1788. However, European explorers had been sailing past the Oregon Coast as early as the mid 1550s during exploration of the North American Pacific Coast (Elrandson et al. 2001). One or more trade ships wrecked off the Oregon Coast in the sixteenth and seventeenth centuries. The most well-known of these, the "Beeswax Wreck," was likely a Spanish Manila galleon involved in the trade between the Philippines and New Spain that wrecked near Nehalem in the late seventeenth century (Erlandson et al. 2001; Lally 2008). Inhabitants of the surrounding coastal areas may have scavenged items from these wrecks, as beeswax and porcelains, among other artifacts, are well-known from archaeological contexts. Beeswax, a Chinese coin, colored glass, and a bead, among other artifacts, were recovered from the Chishucks site, a Tillamook village on the lower Wilson River (Sauter and Johnson 1974). Tillamook elder Clara Pearson stated that an "old boat on Manzanita Beach came ashore – loaded with beeswax for ballast. All burned in sand, you can still get it" (Jacobs 1933 in Erlandson et al. 2001). These wrecks also left marooned sailors who interacted and integrated with the local communities. The Tillamook Chief Kelches (also Kilchis) was said to be descended from an African blacksmith who survived the Beeswax wreck.

Lewis and Clark reached the mouth of the Columbia River and wintered at Fort Clatsop between 1805 and 1806. Although they did not visit Tillamook Bay, they learned of the area and its inhabitants from Clatsop informants who also drew them a map (Ronda 1984). The fur trade quickly reached the region after Lewis and Clark's expedition with the Pacific Fur Company's Fort Astor established in 1811 and the Hudson's Bay Trading Company's Fort Vancouver established in 1825. Fort Astor, renamed Fort George under the auspices of the North West Company in 1813, was appropriated by the United States Navy in 1818 for American military interests, constituting the primary American claim to the Oregon territory (Lewis 2009). Early trading interest was primarily in sea otter furs, promoting a coastal, ship-based focus. Upon the decline of sea otters in the 1830s, the focus shifted to inland mammals such as beaver and land-based trade networks (Cole and Darling 1990:131).

Contact with Europeans brought disease as well as trade goods and decimated populations in the Tillamook communities. Robert Haswell, a crew member on Robert Gray's *Lady Washington*, observed individuals scarred from smallpox in 1788, indicating an earlier date for the disease's first appearance among the Tillamook (Elliott 1928). The disease may have been transmitted via intertribal trade networks or through ship crew members from earlier, undocumented contacts with explorers. Smallpox had devastating effects on the population of the Tillamook and left survivors pockmarked and sometimes blind in one eye. Various epidemics of measles, smallpox, malaria, and other diseases periodically ravaged Native American communities over the next century and are thought to have reduced the population of the Tillamook from an estimated 4,320 in the early 1800s to 193 in 1854 (Boyd 1990 in Roulette et al. 2012).

3.2.3 Treaty and Removal Period

Euroamerican settlement in the Oregon territory began in earnest in the 1840s and early 1850s, spurred by the finding of gold and the passage of the Oregon Donation Land Claim Act of 1850 and the Oregon Homestead Act (1850). These laws were established prior to negotiating treaties with Oregon tribes or removing them from the land (Lewis 2009). In 1851 and 1852, Anson Dart, as Superintendent of Indian Affairs in Oregon, negotiated 19 treaties with most of the tribes in Oregon Territory. The initial intent on the part of the federal government was to remove tribes from the prime agricultural areas of western Oregon to eastern Oregon. However, tribes refused to move east and, instead, negotiated reservations within their traditional homelands. These treaties were never ratified by Congress.

Tensions began to mount between increasing populations of white settlers and the tribes, which were motivated to protect their rights to the land under aboriginal law. Territorial legislation allowed citizens to be reimbursed for their efforts in battling Indians, creating financial incentive for volunteer militias to take up arms against indigenous Americans (Lewis 2009). Propaganda and political rhetoric fueled the violence and contributed to several wars in the early 1850s. Although the militias professed to commit only retaliatory campaigns against tribes, their actions went beyond retaliation and could be considered genocidal (Lewis 2009).

Dart's successor, Joel Palmer, began negotiating a second round of treaties in 1853–1855 with a focus on grouping tribes onto one of two reservations either on the Oregon Coast or in eastern Oregon. Dart negotiated seven treaties with the Willamette Valley tribes, Chinook tribes, and the Molalla that were subsequently ratified by Congress. An eighth treaty with the coastal tribes, including the Tillamook, was negotiated in 1855 but never ratified. Tribes were forcibly removed from their homelands to the reservations during what Oregon tribal members refer to as the Oregon Trail of Tears (Lewis 2009). The Coast Reservation was established in 1855 and the Grand Ronde agency, serving the Grand Ronde Valley, was appended to the north end of the reservation later that year. The Grand Ronde Reservation was formally established by Executive Order in 1857. Over the following decades, the Coast Reservation was reduced in size, and in 1875, the remaining reservation areas were split into the Grand Ronde and Siletz reservations (Lewis 2009).

The untreatied coastal tribes were never officially removed to a reservation, though they had relationships with the Indian agencies at the Coast Reservation, particularly the Grand Ronde agency. Many Tillamook, including the Nehalem people, ultimately joined the Confederated Tribes of the Grand Ronde whereas others joined the Confederated Tribes of Siletz Indians (Lewis 2009:97). Others refused removal or escaped the reservations and were not included in any federally recognized tribe. Native Americans' use of Tillamook Bay and the surrounding area remained

constant throughout the Removal period and continues today. In 1890, a group of people of Nehalem, Clatsop, and southern Tillamook descent purchased land at Hobsonville Point, across Tillamook Bay to the east of the Project area, and established a settlement known as “Squawtown” (Deur and Thompson 2008:4; Grand Ronde cultural resources staff, pers. comm. 2016). Native people occupied this location at least into the 1940s (Deur and Thompson 2008:4). In September 2015, Grand Ronde accepted a donation from Tillamook County of land at Kilchis Point, the site of a large Tillamook village, along Tillamook Bay south of Bay City (Rhodes 2015).

3.3 Euroamerican History at Tillamook

3.3.1 Euroamerican Settlement

Although Tillamook became its own county in 1853, the region was geographically remote and had limited white settlement prior to the Civil War. The first census of Tillamook County, conducted in 1854, recorded 80 white settlers (Orcutt 1951). Wagon roads were difficult and expensive to maintain through the rugged mountains surrounding the bay, and irregular shipping was the only means to bring goods in and out of the region. Regular shipping began in the 1880s, spurring settlement and agricultural and industrial development. By 1890 the population of Tillamook County was 2,932 (Porter and Wright 1896 in Hoadley 2001). The railroad arrived in 1911, and shipping into the bay was improved in 1918 with construction of the North Jetty.

3.3.2 Agriculture and Fishing

Dairying was one of the first industries in the Tillamook Bay area, with the first dairy herd present by the late 1860s. Butter, packed in wooden kegs, and cheese were shipped by steamship, packhorses, or wagons to population centers in Oregon and beyond. Tillamook provided a large quantity of cheese up to the Alaska gold rush camps (Orcutt 1951). Irrigation reached the Tillamook valley in the 1930s and several reclamation projects were undertaken to drain tidelands and swamps for agricultural use. Other agricultural products included blackberries, huckleberries, Chittum/Cascara bark, ‘forest greenery’ ferns, and a range of vegetables and nursery plants (Orcutt 1951:177).

The waters in and around Tillamook Bay have been used since settlement for salmon fishing, clamming, and crabbing. Historically, Tillamook Bay supported the largest chum salmon fishery on the Oregon Coast (Coulton et al. 1996). Commercial and sport fishing of salmon conflicted over the availability of salmon, and regulations were introduced as early as 1892 to balance these interests and reduce waste. Commercial fishing shifted out to sea by 1961 (Kruckeberg and Miller 1998). Oysters were introduced to the bay in 1928 to meet demand in the San Francisco market (Coulton et al. 1996). However, contamination from city sewage and sedimentation resulting from wildfires from the 1930s to the 1950s and the breach of the Bayocean Peninsula in 1952 severely damaged the fishery. Oyster production recovered in the following decades but continues to fluctuate based on environmental conditions (Kruckeberg and Miller 1998).

3.3.3 Timber and Shipbuilding

In the earliest years of white settlement, logging in the heavily timbered areas around Tillamook was limited to local needs (Coulton et al. 1996). The timber industry for export began in earnest at the end of the 1800s, with several mills built in the 1880s and 1890s. A mill was built in Tillamook in 1885 that also housed the region’s first light plant. The fully electrified Whitney Mill was built in Garibaldi in 1910 and used cranes rather than donkey or horsepower. These mills processed logs

felled from the surrounding woods and driven down the rivers or down skid roads by donkeys and cables. In 1920, the watersheds tributary to Tillamook Bay were estimated to contain 15 billion board feet of merchantable timber. Trees were 15 to 20 feet or more in circumference and free of limbs up to 150 feet (Orcutt 1951). In 1923 there were 20 mills operating in Tillamook County (Orcutt 1951). A series of four wildfires between 1933 and 1951 collectively burned about 350,000 acres in what is referred to as the Tillamook Burn. An estimated 7.5 billion board feet of timber was salvaged from the Burn between 1933 and 1971 (Hoadley 2001). The successive fires destroyed seed stock and seedlings and the area had to be artificially reseeded (Hoadley 2001).

3.3.4 Bayocean

The peninsula enclosing Tillamook Bay was the location of a resort town known as Bayocean, 0.75 mile south of the proposed training area. The town was founded in 1906 and by 1914 had more than 2,000 residents. Envisioned as an "Atlantic City of the West," the town had 4 miles of paved roads, city lights, water, a phone system, and a narrow gauge railroad at a time when the city of Tillamook still had dirt roads (Sutherland n.d.). Transportation to Bayocean was primarily by steamship and in the 1910s the town petitioned the Corps for a protective jetty. The jetty, completed in 1917, affected winter storm wave patterns that eventually destroyed the town (see **Section 2.5**). Erosion began destroying buildings in the 1930s and breached the peninsula in 1952. The Corps built a dike and road in 1956, at which time they reclaimed the town area, demolishing the remaining infrastructure and buildings.

3.4 Tribal Associations with the Tillamook Bay Area

Coast Salish and, in particular, Tillamook worldviews provide a framework for interpreting tribal associations with the Project area vicinity and for determining how the Project may affect these associations, whether through direct or indirect means. To gain an understanding of such worldviews, HDR held several discussions with Grand Ronde cultural resources staff regarding tribal perspectives of landscapes in general and the Bayocean Peninsula, specifically (see **Appendix C** for meeting minutes). During these discussions, the potential for both direct and indirect Project impacts was explored based on shared tribal views and, following fieldwork, the archaeological findings in the Project area. HDR also conducted background research on tribal environmental and landscape perspectives and the specific stories that document tribal associations with the Project area vicinity. The following section synthesizes the findings from this research.

3.4.1 Tillamook Narratives of the Tillamook Bay Area

Tillamook narratives are set in one of three eras: the Myth Age, the Transformation Era, and the Period of True Happenings. The divisions between the eras are not distinct and overlap each other to some extent (Ramsey 1990). Tales from the Myth Age describe the world when it was "'raw', unfinished, in some respects chaotic, populated by freaks and monsters as well as the prototypes of the people-to-come, who as yet lack[ed] the rituals, customs, and know-how of civilized life," (Ramsey 1990:xxi). Tales from the Transformation Era recount the exploits of transformer figures, especially the Trickster-Transformer South Wind, as they shaped the world into its current reality. In contrast to the previous two eras, stories from the Period of True Happenings describe occurrences in the human world and actual, sometimes known individuals (Jacobs 1990:173; Ramsey 1990:xxi).

Tillamook people view their ancestral landscape as formed during the Transformation Era by South Wind, also known as Everlasting Man and Our Grandfather, who "created and named places and things, readying the world for humans" (Grand Ronde n.d.). South Wind did such things as make

waterways and landforms and cause the ocean to be tumultuous (Beckam at al. 1984:10). As conceptualized by the Tillamook, South Wind is understood to be a Transformer and Trickster (Deur and Thompson 2008:3). His actions "shaped the land, originated customs, and commented—often by negative example—on Tillamook conceptions of morality (Deur and Thompson 2008:3).

Deur and Thompson (2008:6) state that South Wind's "personality and actions are inextricably rooted in the distinctive lands and lifeways of the Tillamook." The researchers suggest that the telling of the South Wind story—always recounted in winter—may have been understood as the Tillamook's part in assisting the start of spring. Jacobs (1990:vii) likewise hints that the very telling of a story could bring on meteorological changes by explaining if Myth Age stories were told at any other time but winter, the people "believed that rain or even more disagreeable consequences would follow." Drawing from story details, Deur and Thompson demonstrate that the story sheds light on pre-contact Tillamook views of the local environment:

> Like the south winds that blow across the coast in winter, South Wind travels from the indistinct southern edges to the indistinct northern edges of the Tillamook World. He topples trees, breaks their branches, crashes through their crowns. South Wind creates ocean surf … . He gets East Wind to stop singing so that the weather will be warm, the ice will melt, and the Tillamook people can find berries, fish, and game. …
>
> These tales were told in winter, when the awesome south winds dominate the lived-in world and constantly rework the land and the sea. They were told in winter-dark longhouses, as south winds rattled the roofboards, howled at the door, caused smoke to back up and fill the room. They were told as south winds toppled nearby trees, and the surf churned into an unnavigable froth … . To the Tillamook people, the telling of South Wind's epic tale would have been, by necessity, intimately interwoven with the experienced winter environment …. (Deur and Thompson 2008:7-9)

In addition to metaphorically acting as the true south wind of winter, South Wind traverses the places Tillamook people traditionally journeyed at various times of year and utilizes the important resources the people sought in these places. The South Wind story pragmatically functions as a line-of-sight narrative of the Oregon Coast that educated young Tillamook in the location of important places and the varied resources they could obtain from their lands (Deur and Thompson 2008).

Within the South Wind epic, the Tillamook Bay vicinity is mentioned several times. The most relevant relates directly to the Project area. Deur and Thompson (2008:17) recount this portion of the South Wind story in a synthesis from three sources: [3]

> [South Wind] got to Tillamook Bay, near Bay Ocean. He couldn't figure out how to get across, because north of Bay City he saw a creek where an adolescent girl was bathing. He thought, *Ohh, that's a nice looking girl. I wish I could get to her.* He said, *Oh, I want to copulate with her.* His penis grew incredibly long, and he carried it in his arms. He waded as far out as he could wade. Then he threw his penis across toward the girl many times. Finally it reached into her. Soon this girl grew cold, for she, too,

[3] The sources recount versions of the story as told to Franz Boas in 1890, May Mandelbaum Edel in 1931, and Elizabeth Derr Jacobs in 1933 (Deur and Thompson 2008:3-4).

> was standing in the water. After a bit he couldn't get it out. The tide came in and they both nearly drowned, fastened there.
>
> Then he called on sharp grass and sent it down to cut him loose. Then he called on three-cornered grass. He called tideland grass, and reeds, all the grasses. Each one drifted down and cut his penis in a different place. He suffered dreadfully. He grew angry. "Oh—you're bad. You didn't cut my penis. You didn't cut my penis!" Nothing could get him loose. Then he called mountain grass. He said, "Come here. Oh, mountain grass, drift down and cut me. I'm nearly drowning and freezing to death." Then mountain grass drifted down and cut it off. South Wind was left with only a piece of his penis. Part of it stayed in the girl, and the rest, which was all cut up, he left lying to form the sandbar. The cuts made the bumps (hilly places) in the sandbar. He said, *In the future there will be nothing but sand there. Tillamook Bay will have just a small mouth from now on. Shot-huckleberry bushes and salal bushes will grow and there will be much berry picking.* And that is how the bay became nearly closed. It used to be wide open before South Wind came.

In the vicinity of Tillamook Bay, South Wind also tricks other females into various sexual acts, fools Flint and Copper into fighting so he can obtain chipped stone to process a beached whale, and transforms an old woman into a grinding stone (Jacobs 1990:124-127). Some of his escapades give shape to the surrounding environment, such as creating camas fields, eliminating salmon from local rivers, and defining the characteristics of clams (Deur and Thompson 2008; Jacobs 1990). His sexual trickery initially results in disapproval by females and eventually in retaliatory acts by them (Jacobs 1990).

3.4.2 Tillamook Bay Area as an Important Place

The fact that so many of South Wind's actions occur along Tillamook Bay is telling of the bay's centrality. Deur and Thompson (2008:7) surmise that the geographic features highlighted in the South Wind epic are those "the Tillamook recognized as important among the potentially infinite range of environmental phenomena." Grand Ronde cultural resources staff echoed this view in conversations with HDR by explaining that the Bayocean Peninsula, often called Tillamook Spit, is important due to being a named place, identified in a central story, and related to significant actions of South Wind in the Transformation Era. Grand Ronde staff especially highlighted the significance of Tillamook Spit in signifying the genitalia of the Transformer figure to the Tillamook and mentioned that inland peoples also interpret the spit as genitalia, that of the Trickster Coyote.[4] That many of South Wind's escapades in the Tillamook Bay area relate to genitalia gives credence to the general area's importance, as well.

Conversations with Grand Ronde staff indicate that local tribal people have ongoing connections with the Tillamook Bay vicinity through the various stories as well as acknowledgement of the area's use from pre-contact times to today. In a comparable assessment, Marker (2011:200) explains that contemporary Coast Salish people "experience the geography of the region based on their connections to traditional ways of life, ceremonies, and cultural relationships to other families and communities across borders and waterways." In Marker's (2011:200) view, these interactions are a

[4] The particular story or tribe were not noted by Grand Ronde staff. One story that generally fits the description is from the Kalapuya peoples and can be found in Jacobs 1945:240-241. The story includes similar elements to those of the South Wind epic, wherein the creation of Tillamook Spit is described.

continuum from earlier times, when Coast Salish villages were connected through such practices as subsistence activities, trade, and marriage. Similarly, Grand Ronde staff evaluate the importance of the Tillamook Bay area based on the interconnectivity of tribal people with the natural and cultural resources the people sought and continue to associate with in the area. Grand Ronde staff emphasized that high points on Tillamook Spit are within line of sight of hundreds of such resources.

Even in considering recent changes to Tillamook Spit, as evident from aerial photography throughout the twentieth century, tribal views, as expressed by Grand Ronde staff, indicate a recognition that landscape features change through time. New formations, such as recently accreted beach on the spit, are considered aspects of a dynamic landscape and do not fundamentally alter tribal associations with that landscape. Similarly, evolving stories and differing Native human interactions related to an important area do not change its importance—the area remains a significant place despite the manner in which tribal people talk about or utilize it. Perspectives of another Coast Salish group, the Stó:lō people located in Washington and British Columbia, likewise recognize landscapes and tribal relationships with them as dynamic:

> The *Stó:lō* have developed relationships with the land, water and air, and these relationships have changed over time. The *Stó:lō* have special family relationships with the animals and plants and certain physical landforms that make up the non-human living component of their territory. They live in a world where transformations are not only accepted, but are essential to their understanding of how the world came into being and how it will unfold in the future. Their world was never been static. The relationship with the spirit world of transformers and ancestor spirits informs all aspects of *Stó:lō* identity. [Carlson 2001:1]

This account corroborates with expressed Tillamook views and indicates that transformations are fundamental to Coast Salish environmental understandings and spirituality. Such transformations include the creation of the human world by South Wind and the environmental and tribal-use changes that have occurred since that time. Transformations by non-Native people, as conveyed by Grand Ronde staff, are also acceptable, as long as they are not vastly different from Native peoples' changing use through time.

4 Literature Review

4.1 Archaeological Study in the Project Area

4.1.1 Direct APE

A file search was conducted to identify known cultural resources and previous cultural resource inventories within 1 mile of the Direct APE. HDR conducted a search of the Oregon Archaeological Records Remote Access (OARRA) database in February 2015 and updated the search results on November 1, 2016. The search identified six archaeological investigations and six previously recorded sites.

One of the earliest, well-known archaeological studies of the Bayocean Peninsula occurred in 1951 during Lloyd Collins' survey of the Oregon Coast for the University of Oregon. Collins identified two archaeological sites on the peninsula, 35TI010 and 35TI011, as well as the much-studied site 35TI001 8 miles south on the Netarts Sandspit (see **Section 4.2.2**). Little archaeological study of the peninsula has taken place since. The Corps performed a side scan sonar survey west of the peninsula at an unknown date and in 2012 conducted their survey in connection with the USAF's permit renewal for SERE training (Corps n.d.; Mulligan 2013). The three remaining studies include a survey associated with the Port of Garibaldi, a survey associated with the Oregon Department of Transportation, and an analysis of Chinese porcelain associated with the "Beeswax Wreck." Archaeological investigations within 1 mile of the APE are summarized in **Table 2.**

Table 2. Archaeological Investigations Within 1 Mile of the Direct APE.

SHPO Survey ID	Report Year	Authors	Project Title	Proponent	Purpose
870	1953	Collins, Lloyd R.	Archeological Survey of the Oregon Coast 1951-1952	N/A	Academic
11939	n.d.	Unknown	Side Scan Sonar Survey Tillamook Bay Area	U.S. Army Corps	Ocean Disposal Site
24278	2008	Lally, Jessica	Analysis of the Chinese Porcelain Associated with the "Beeswax Wreck," Nehalem, Oregon	N/A	Academic
25359	2012	Walker, Cam, Judith Chapman, and Elizabeth O'Brien	Archaeological Survey for the Port of Garibaldi Wharf Redevelopment Project, Tillamook County, Oregon	Port of Garibaldi	Wharf Redevelopment
25808	2013	Mulligan, Daniel	Bayocean Peninsula USAF Survival Training Project Tillamook County, Oregon	U.S. Army Corps	USAF Training Permit
27403	2015	Connolly, Thomas	Archaeological Survey of the US101 Rockaway Beach – Bay City ADA Ramps Project, Tillamook County.	Oregon Department of Transportation	Highway/Sidewalk Ramp Upgrades

The Corps survey in 2012 survey addressed 175 acres of the northern Bayocean Peninsula with 100 percent pedestrian coverage for all proposed training areas. According to the survey report, the Corps did not intensively survey the central part of the peninsula due to dense vegetation, slope, low potential for intact archaeological sites, and no planned use of the area (Mulligan 2013). The survey

identified one site, 35TI104, and failed to relocate one of Collins' earlier recorded sites, 35TI011. Collins' second site was out side the survey area.

Six archaeological sites were identified in the file search: three prehistoric shell middens and three shipwrecks (**Table 3**). All are unevaluated and potentially eligible for NRHP inclusion. Site 35TI104 is adjacent to the SERE training medic camp. The site boundary, as depicted in OARRA, slightly overlaps the medic camp. However, observations during the current survey demonstrated that the medic camp is on a slightly raised, durable surface entirely outside the site boundary and is separated from the site by a shallow swale. HDR has prepared a site update for 35TI104 documenting an adjusted site boundary and observations on the site's condition (see **Section 6.1.1**).

Table 3. Archaeological Sites within 1 Mile of the APE.

Site Number	Site Type	Eligibility Status	Description	General Location	Distance from APE
35TI010	Prehistoric	Unevaluated	Shell midden	T1N R10W Section 31 (unverified)	0.6 mile
35TI011	Prehistoric	Unevaluated	Shell midden	T1N R10W Section 20 (unverified)	0.0 mile
35TI104	Prehistoric	Unevaluated	Shell midden	T1N R10W Section 20	0.0 mile
N/A	Historic shipwreck	Unevaluated	Ida Schnauer shipwreck (1908, unrecorded)	T1N R10W Section 31	0.7 mile
N/A	Historic shipwreck	Unevaluated	Argo shipwreck (1909; unrecorded)	T1N R10W Section 18	0.3 mile
N/A	Historic shipwreck	Unevaluated	Unidentified ship's keel, possibly from the Emily Reed.	T1N R10W Section 18	0.5 mile

4.1.2 Indirect APE

The record search for the Indirect APE was conducted on November 1, 2016, and identified 17 recorded or potential Native American-affiliated archaeological sites and ethnohistorical locations, in addition to those in the Direct APE (**Table 4**). HDR also consulted ethnographic studies, Tillamook narratives, and historical maps and held discussions with Grand Ronde cultural resources staff to identify additional, unrecorded tribal resources. The methods and results of the Indirect APE investigations are discussed in more detail in **Section 5.3** and **Section 6.2.**Archaeological Study of Northern Oregon Estuaries

Because there has been little previous archaeological study on the Bayocean Peninsula, studies of archaeological sites in similar environments in the Nehalem Tillamook homelands may provide comparative information regarding potential Native American use in and around the Project area. Professional archaeological attention to the northern Oregon Coast largely began with Collins' work in 1951 and 1952 recording and testing sites up and down the Oregon Coast. There were elements of salvage archaeology to Collins work, as most of the sites are noted as damaged, destroyed, or looted. Collins described rapid destruction of coastal sites, writing "in a few years the site count and excavatable sites will drop 50 percent" (Collins 1953 in Moss and Erlandson 2006). Collins identified many of the sites that would become focal points in archaeological study of the Oregon Coast. This section focuses on studies at the Chishucks Village in Tillamook Bay, the Netarts Sandspit Village (35TI001), and various archaeological sites at Nehalem Bay.

Table 4. Native American Archaeological Sites in the Indirect APE.

Site Number	Eligibility Status	Description
35TI006	Unevaluated	Tillamook village of Hobsonville
35TI007	Unevaluated	Kil-har-hurst's Town, shell midden
35TI009	Unevaluated	House pits and shell midden
35TI010	Unevaluated	Shell midden
35TI012	Unevaluated	Village
35TI013	Unevaluated	Shell midden
35TI060	Unevaluated	Patterson Creek site, large village with burials; Destroyed
35TI079	Eligible	Cape Meares Lake Site, shell midden
35TI090	Eligible	Lithic scatter and historic debris from homestead
35TI098	Unevaluated	Prehistoric fishing weir
N/A	Unevaluated	Possible location of the Wilson River Site, or Chishucks Village; shell midden
N/A	Unevaluated	Possible location of the village of Kil-har-hurst, as derived from Leland Gilsen's map
N/A	Unevaluated	Human remains found in 2015
N/A	Unevaluated	Possible location of destroyed archaeological site; Location derived from Leland Gilsen's map
N/A	Unevaluated	Isolated lithic flake, cryptocrystalline silicate material
N/A	Unevaluated	Isolated lithic flake, quartz material
N/A	Unevaluated	Possible location of the village of Tow-er-quot-ons as derived from Leland Gilsen's map
N/A	Unevaluated	Human remains

4.1.3 Tillamook Bay

In the 1970s, John Sauter and Bruce Johnson conducted a series of investigations into archaeological sites in the Tillamook Bay area, later producing a book about the Tillamook (Sauter and Johnson 1974). Although their work has been dismissed by some as "uncontrolled" excavations by "relic collectors" (Woodward et al. 1990), others point out that their work was consistent with that of contemporary research in the Pacific Northwest; that is, it is predominately descriptive without overarching research goals (Roulette et al. 2012). Sauter and Johnson identified a number of archaeological sites around Tillamook Bay, many of which correlate with village sites and burial grounds known from historic and tribal accounts. These include:

- Netarts Landing Site on the west bank of the Tillamook River and along a travel route over Cape Meares to Netarts Bay;
- Hobsonville Point, a possible village and canoe burial ground;
- Goose Point, a village site reportedly destroyed during pre-1970s road construction in Bay City;
- Flower Pot Hole, a small village on a cove on the west side of Tillamook Bay;
- Bay Ocean Sand Spit village, near the southern edge of the spit and stretching up to a mile along it; and

- Dam Hole, a popular fishing spot several miles up the Trask River (Sauter and Johnson 1974:62, 140-177).

Sauter and Johnson conducted large excavations at the Chishucks site, also known as the Wilson River Site. The site was a winter village occupied into the nineteenth century. The village was positioned near where the Wilson River formerly drained into Tillamook Bay. In-silting since this period has lengthened the river, which now empties into the bay about 4 km west of the site. The site contains both shell and non-shell midden deposits, with large quantities of stone and bone artifacts representing birds, elk, deer, beaver, sea otter, cougar, salmon, and whale. Bone tools included wedges, awls, digging stick handles, toggling harpoon heads, fishhooks, toggle points, whalebone clubs, scrapers and a bi-pointed knife. Whalebone clubs and antler digging sticks with carved zoomorphic designs were also recovered. Stone tools included nearly 1,000 projectile points (stemmed and unstemmed), scrapers, drills, gravers, a stone bowl, and debitage. Features included tool caches, fire pits, and cedar posts. Later deposits also contained copper, glass, a Chinese coin, beeswax, a blue bead, and a trade button (Sauter and Johnson 1974:147). “Columbia River-style artifacts” were present, indicative of trade with the Tillamook’s northern neighbors.

Woodward et al. conducted additional investigations at the Chishucks site in 1990 after erosion had exposed additional shell and non-shell midden deposits stratigraphically below Sauter and Johnson’s previous investigations. A trench excavation uncovered a vertical series of shell middens representing distinct mollusk assemblages interbedded with non-shell middens that consisted of fire-cracked rock, charcoal, and numerous terrestrial and littoral mammal bones. Of particular note was a shell midden exclusively of sea mussels, as opposed to an overwhelming predominance of clams in two shell middens above and below the mussel shell midden (separated by non-shell midden deposits). The team inferred the exclusive presence of sea mussel indicated an open-coast environment when the sand spit was not present. This layer was radiocarbon-dated to AD 920 +/- 60 (Woodward et al. 1990).

The team concluded that differences among the middens reflected changes to the local ecology, vascillating between an estuarine environment to open-coast and back to estuarine environments (Woodward et al. 1990). Non-shell middens were interpreted to represent transitional periods between the point when existing shellfish species could no longer survive in the new environment and the point when species well-adapted to the changed environment reached sustained reproducing populations. Woodward et al. (1990) also noted that artifact assemblages between the middens were consistent, and that there were no obvious or appreciable gaps in occupation at the site. Rather than abandon or relocate the village, the inhabitants appeared to have tempered significant changes in the shellfish resource base by shifting focus to more intensive use of mammals, especially terrestrial mammals such as deer and elk.

As discussed below, the AD 1700 earthquake affected villages at Netarts and Nehalem Bay, on either side of Tillamook Bay, and yet no evidence for subsidence or tsunami deposits was observed at the Chishucks site. However, changes in midden deposits, particularly the presence and absence of shell or specific species of mollusk indicate significant environmental change over the past 1,000 years (Woodward et al. 1990). This is consistent with geologic studies that suggest the sand spit has experienced periodic breaching and rebuilding over at least the past 500 years, particularly in association with earthquake events and tsunamis.

4.1.4 Netarts Spit

Unlike Tillamook Bay, which is separated to the north by Cape Meares, Netarts Bay is long and narrow with little fresh water input. The bay could be characterized as a lagoon, with a fairly saline, tidally dominated environment (Losey 2002:168). The Netarts spit is equally long, leaving only a narrow channel into the bay at its north end. The spit is relatively flat with a maximum altitude of 15 m. The southern three-quarters of the spit is densely vegetated, whereas the northern portion is only sparsely vegetated. Salt marshes dominate around the head of the bay.

At least 23 verified archaeological sites have been recorded around Netarts Bay. Of these, 16 are on Netarts spit, half of which are listed on the NRHP. These sites are overwhelmingly described as shell middens, some with housepit features. Site 35TI001 is a housepit village and shell midden site located on the spit in a similar geographic context to site 35TI104 near the Project area. Both sites are on the bay side of their respective spit on slightly protected points just south of the present channel opening. Site 35TI001 was occupied between AD 1300 and circa AD 1800. The site contains at least 21, but maybe as many as 30 to 40 house pits divided into two loci (Losey 2002; Moss and Erlandson 1996).

Site 35TI001 has been a focal point of coastal archaeology since the 1940s, beginning with amateur excavations by a physician named W. T. Edmundson. Collins visited the site in the early 1950s and conducted test excavation in several house pits in the summers of 1956 to 1958 under the direction of Luther Cressman at the University of Oregon (Losey 2002:184). Thomas Newman conducted extensive excavations at the site in the summers of 1956, 1957, and 1958 associated with his dissertation research on the relationship between the Tillamook and other groups in the Northwest Coast culture area (Newman 1959). Additional site recording and reconnaissance work has been done intermittently between the 1970s and 1990s (Minor 1986; Moss and Erlandson 1995; Ross 1976) and Robert Losey conducted additional investigations in 1999 in relation to his dissertation on the Tillamook Response to the AD 1700 earthquake and tsunami (2002). Studies have also been conducted on porcelain and beeswax recovered from the site (Beals and Steele 1981; Steele 1989).

Newman's investigations at 35TI001 primarily focused on material culture, including artifact style and structural forms. Newman determined that house structures were semi-subterranean, rectangular rooms with shed roofs supported by large diameter corner posts and slightly smaller posts along the longer exterior walls (1959:23-25). Horizontal cedar planks were fastened exterior to the supporting posts, with indication that the planks may have been as long as the house (Newman 1959:24). The ends of the house were not planked, and Newman suggested grass or mats may have been used in lieu of planks on the ends. A wide range of artifacts were recovered from excavations:

> "Implements made from the long bones and antlers of deer and elk were the most common items, and included wedges, awls, needles, bi-points, and composite harpoon barbs. Three objects of carved bone featuring motifs characteristic of the classic Northwest Coast art style were also found (Newman 1959:26). Stone tools constituted a much smaller proportion of the artifact assemblage, but included projectile points, scrapers, gravers, and used flakes. Historic trade goods were represented at the site in limited numbers, but included several iron objects (possibly knife blades), a copper pendant, and 127 sherds of Chinese porcelain." (Minor 1986:27)

Newman (1959) also identified a waterlogged archaeological deposit at the base of excavations, suggesting potential for preserved organic items such as basketry and wooden artifacts (Moss and Erlandson 1996).

Midden deposits represented a range of terrestrial and littoral resources, including cockle, blue clam, butter clam, and bent-nose clam; marine mammals such as sea otters, sea lions, seals, porpoises, and whales; and land mammals such as deer, elk, and beaver (Newman 1959).

Losey's investigations in 1999 focused on determining whether the AD 1700 earthquake and tsunami caused changes in subsistence and settlement patterns. His research addressed questions about geographic susceptibility, seasonality of use, and ecological changes, Losey (2002) concluded the site was inhabited variously in summer and winter and was perhaps used year round. Based on winter use of the site. Losey (2002) concluded the village was likely inhabited at the time of the earthquake and tsunami. Radiocarbon dating at 35TI001 and other sites around Netarts Bay suggest that the bay was not completely abandoned following the earthquake (Losey 2002:417). Terrestrial resources were used more intensively following AD 1700, and use of seals, sea lions, and whales continued at about the same level as before the earthquake. Small fish appear to have been used more intensively whereas larger fish, including salmon, appeared to decrease in importance (Losey 2002). The use of all shellfish intensified around AD 1700; however, mussels and crabs were apparently more readily available following the earthquake (Losey 2002).

4.1.5 Nehalem Bay

Nehalem Bay, north of Tillamook Bay, is a river-dominated estuary that is most saline in the summer when river output is at its lowest. The bay is bordered to the west by a low sandspit with maximum dunes of 7 to 8 m. Today, the spit is vegetated with European beach grass and shore pine, but the spit was completely unvegetated as recently as the 1950s (Minor 1991). Saltmarshes are found along the shores of the bay east of Fisher's Point. The bay is richer in anadromous fish, compared to Tillamook and Netarts, but has considerably less shellfish (Losey 2002:423).

At least 10 verified archaeological sites have been recorded around Nehalem Bay. Habitation sites around Nehalem Bay concentrate on the north shore of the bay with radiocarbon date evidence for settlement from AD 1300 through the historic period (Losey 2002:453). Notably, there are no recorded sites on the southern two-thirds of the spit, aside from isolated fragments of Asian porcelain. Woodward et al. (1990) posited that the tsunami caused by the AD 1700 earthquake may have washed over and destroyed Nehalem spit. Losey (2002) observed some eastward movement in settlement over the last 300 years, which he suggests could have been related to the earthquake and tsunami, which would have caused subsidence, inundated lower areas to the west, and may have accelerated erosion in the western portions of the bay.

Archaeological sites in the area have two common aspects in which they differ from sites at Tillamook and Netarts. First, subsistence activities reflect ecosystem differences with a focus on salmon fishing and processing, as evidenced by quantities of lithic tools, and significantly less evidence of shellfish gathering. Second, many sites contain porcelain fragments, beeswax, metal implements, and similar historic items originating from seventeenth and eighteenth century shipwrecks. Nehalem is the location of the famed "Beeswax Wreck," likely a Spanish Manila galleon that wrecked near Nehalem in the late seventeenth century (Erlandson et al. 2001; Lally 2008). Many sites around Nehalem Bay were first recorded during archaeological investigations conducted for the purpose of recovering porcelain artifacts (Losey 2002). Three sites at Nehalem Bay are discussed below.

Nehalem Bay Dune Site

Site 35TI057, the Nehalem Bay Dune Site, was first recorded in 1989 by Leland Gilson with subsequent investigations by Minor (1991), Moss and Erlandson (1995), and Tasa et al. (2003). The site consists of "numerous, apparently short-term encampments near the confluence of a small creek with Nehalem Bay" (Minor 1991: 83). The site was occupied intermittently between AD 1300 to about AD 1640 with a focus on salmon fishing and processing (Minor 1991). Minor concluded occupation probably occurred in conjunction with salmon runs up the Nehalem River in summer and fall. Minor recovered over 13,000 artifacts during his excavations, of which 12,000 were flaked stone debitage and tools. Obsidian was among the lithic material represented onsite, indicating involvement in regional trade networks. Minor also recovered over12,000 bone fragments, of which salmon represented 63 percent of all vertebrate specimens. Small quantities of shell were also recovered (Minor 1991).

Nehalem Boat Ramp Midden

Site 35TI062, the Nehalem Boat Ramp Midden, is in the high intertidal zone on the west shore of Nehalem Bay in Nehalem Bay State Park. Moss and Erlandson (1995) recorded the site during an evaluation of sites in Oregon's coastal state parks, describing "the site contains a dense scatter of fire-cracked rock, charcoal concentrations, and chipped stone of black chert, green chert, and basalt. A sea mammal phalange was also present, as well as occasional fragments of mussel and barnacle shell" (Moss and Erlandson 1995:29). In a Multiple Property Nomination for Oregon Coast sites, Moss and Erlandson noted "the site contains more shellfish than most other investigated Nehalem Bay sites, including the remains of California mussels that would have been gathered along rocky shorelines on the outer coast" (Moss and Erlandson 1996:126).

North Trail House Site

Site 35TI076, the North Trail House Site, consists of a midden below at least two house pits built at least 20 feet above the bay on forested dunes. This elevation makes the site somewhat unique, as most habitation sites around Nehalem Bay are within 5 feet of high tide (Losey 2002:541). The site was initially recorded by Collins as part of 35TI004 but was later given its own site number. Woodward conducted limited excavations at the site in the early 1980s and described several house pits, which he numbered 7, 8, and 9. House pits 1 through 6 were not described and house pit 9 was later determined to be natural (Losey 2002; Tasa et al. 2003:26.14). Woodward found midden deposits contained remains of elk, deer, beaver, water fowl, salmon, cockle, littleneck clam, gaper clam, and gray whale, among other species; however, proportions of specimens were not reported (Losey 2002). Based on his excavations Woodward determined the houses were long, rectangular, and subterranean with gabled, mat roofs (Woodward 1986 in Losey 2002). Woodward thought that the post molds he uncovered during excavation were too small diameter to support a plank roof.

In 1999, Losey conducted additional excavations at the North Trail House Site at midden areas and at house pits 7 and 8 for his dissertation. Losey disagreed with Woodward's conclusions about house construction, pointing out that the excavated walls could have supported the weight of plank roofs. Subsistence remains consisted primarily of salmon vertebrae with some mammal bone and limited quantities of estuarine shellfish (Losey 2002:540). Losey also identified trade items in the house pits, including glass beads and a wrought iron nail, indicating occupation after AD 1775. Based on radiocarbon dating, Losey put the most likely date range for site occupation from AD 1756 to 1804.

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5 Research Design

HDR prepared a research design for the current study as part of the Oregon State Archaeological Permit application process. The research design identified research questions, potential methods for addressing the questions, and field methodology. The research design is included in this report as **Appendix A**. This section reviews research goals and topics for the current study, field methods, and methods for the evaluation of TCPs.

5.1 Research Goals and Topics

The cultural resource investigation aimed to assemble historical information about Native American use of the Bayocean Peninsula and determine if significant subsurface deposits are present near proposed training locations where ground-disturbing activities would take place during the SERE training. The study provides an overview of Native American use of this part of the Oregon Coast and the influence of geomorphologic factors on the potential for archaeological deposits. The study also assists the USAF in complying with the NHPA and will help inform future planning and use of the Bayocean Peninsula.

During consultation with the Grand Ronde, the tribe presented the USAF with types of information the tribe would like considered in the current study. Most broadly, the tribe requested discussion regarding Native American use of the area before and after contact with Euroamericans. Specifically, the tribe was interested in the potential for deeply buried or submerged archaeological sites, Native American use of shipwrecks, and how the landscape relates to the tribe's own accounts and history. These concerns, as well as the USAF's obligations under the NHPA, informed the development of five main research topics listed in **Table 5** below with applicable data sources and methods. Many of these questions were investigated through background research and are addressed in **Sections 2**, **3**, and **4**. The research questions are described in more detail in the research design (**Appendix A**), and are also addressed in **Section 7,** Synthesis.

Table 5. Sources and Methods to Address Research Questions.

Research Question/Topic	Sources/Methods Used
Potential Native American use of the Bayocean Peninsula.	• Archaeological reports and site forms • Tribal, ethnohistorical, and ethnographic accounts
Development of the bay and peninsula; geomorphological processes and site potential; potential for deeply buried and submerged sites.	• Bathymetric and geomorphologic studies • Historic aerial imagery
Native American use of shipwrecks.	• Archaeological reports and site forms • Tribal, ethnohistorical, and ethnographic accounts
Presence of significant sites.	• Surface inspection • Shovel test probes • Tribal, ethnohistorical, and ethnographic accounts
Potential for impacts to TCPs	• Tribal, ethnohistorical, and ethnographic accounts • Ethnographic data collection • Archaeological reports and site forms • Consultation with tribes

5.2 Archaeological Research Methods

5.2.1 Expectations

HDR expected subsurface testing during the archaeological survey could identify additional Native American use of the Bayocean Peninsula. The presence of subsurface deposits is virtually unknown at Bayocean except where assessed at three previously recorded sites, all of which were exposed in or along roads. Deposits at these sites are estimated between 2 and 5 m deep. These sites suggest high potential for intact deposits in the central and eastern portions of the north half of the peninsula. Intact subsurface deposits were not expected on the west half of the peninsula due to deep, shifting dunes in the active foredune area and recent accretion of much of the beach and dune area over the last 75 years. Archaeological sites encountered during the shovel testing were expected to reflect site and data types as represented by other coastal properties in the region, including shell middens containing faunal remains and tools and possibly evidence of house pits. Any artifact assemblages and features were expected to reflect the materials and forms evidenced at nearby archaeological sites, including 35TI001 (see **Section 4.2**).

5.2.2 Shovel Testing Strategies

Due to the dynamic, shifting sands and dune environment in the direct APE, the field survey relied primarily on subsurface testing to confirm the presence of cultural deposits. HDR used two different STP testing strategies based on variations in the micro-environment and training activities in different parts of the direct APE. All areas were visually inspected for surficial deposits.

Instructor Camp, Medic Camp, and Helicopter Landing Site

The instructor camp, medic camp, and helicopter landing site are on the bay side of the peninsula, which has less dune development than the ocean side of the peninsula and is more densely vegetated with native species. Upon inspection, all three support areas contain durable surfaces of compacted cobble and gravel fill. Background research indicated intact, pre-contact archaeological sites are more likely to occur on this side of the peninsula. Proposed training activities in these areas would be limited to the surface and would not involve subsurface excavation. As such, HDR excavated STPs in these areas at 20 m intervals along transects spaced 20 m apart. STPs were cylindrical, 30 cm in diameter, and excavated in arbitrary 10 cm levels to a depth of at least 50 cm, terminating after two sterile levels or 100 cm, whichever was first. Steep cut banks along the edge of the helicopter landing site were also inspected for cultural materials.

Soils were screened through 1/8 inch mesh. As discussed in **Section 6**, no cultural materials were identified during shovel testing. Each STP was documented as to its location, setting, soil structure, soil color, and depth. Locations were documented with a Trimble Geo 7x geographic positioning system (GPS) receiver with sub-meter accuracy. Photographs were taken of the survey areas and notable natural or modern features.

Student Camps

Our shovel testing strategy described above was modified for the student camp areas on the ocean side of the peninsula. The student camps are within a field of rolling dunes that range between 2 and 5 m above interdunal spaces and may cover archaeological sites with several meters of sand. Interdunal areas present the greatest chance for encountering sites on the surface or with STPs. These areas are also where student camp activities are likely to concentrate during training.

The testing strategy for the student camps focused on judgmentally placed STPs with a strong preference for interdunal areas and lower dune slopes. Shovel tests were placed at an average spacing of 20 m within interdunal areas. Shovel test locations were chosen in part based on 2-foot elevation contours derived from 2009 light imaging detection and ranging (LIDAR) data from the Oregon Department of Geology and Mineral Industries (DOGAMI). Using an iPad loaded with ArcGIS Collector and the DOGAMI LIDAR data, HDR was able to quickly identify the lowest topographic (i.e., highest archaeological potential) areas in real-time on the ground. Though seven years old, the LIDAR data closely corresponded with on-the-ground observations of dune formation and relative height. Where practical, the crew sought representative horizontal distribution across the APE. Some areas along the western edge of the APE were not sampled due to extremely low probability for archaeological sites. The dunes in this area have developed over the past 30 to 50 years and were of sufficient height to preclude reaching pre-1950s deposits with shovels or hand augurs.

The STPs were cylindrical, 30 cm in diameter, and excavated in arbitrary 10 cm levels. Our goal was to excavate STPs to a depth of 100 cm, slightly greater than the anticipated depth of water table pits or latrines excavated during SERE training. However, the loose sandy matrix presented difficulties in attaining such depths with shovel testing. Therefore, HDR used a 4-inch diameter augur to supplement shovel testing where needed to reach a depth of 100 cm. Although the research design called for screening soils in the student camps through 1/8 inch mesh, this was changed in the field to ¼ inch mesh due in part to low probability for archaeological artifacts. This change was also necessary to compensate for wet soils and poor weather that slowed shovel testing. By increasing the mesh size, HDR was able to gain wider horizontal coverage of the APE within the available field time.

5.3 Ethnographic Research Methods and Consideration of Traditional Cultural Properties and Landscapes

As noted in **Section 3.4**, HDR held several discussions with Grand Ronde cultural resources staff regarding (1) tribal worldviews and landscape perspectives, (2) specific details related to the Bayocean Peninsula, and (3) tribal perspectives on potential impacts from the proposed SERE training (see **Appendix C** for meeting minutes).[5] These discussions were conducted prior to field deployment in January and November 2016 and while in the field in December 2016. The discussions included Grand Ronde cultural resources staff with extensive knowledge of the Project area vicinity and who regularly consult with tribal Elders on cultural matters concerning the tribe.

Together, these data suggested the Tillamook Bay area is important to the Grand Ronde as a landscape of interrelated geographical features, natural resources, and other tribal cultural resources. As such, HDR employed a cultural landscape approach in considering tribal resources identified in the Indirect APE and other areas that may be visible from the Bayocean Peninsula, as a whole. Based on Grand Ronde staffs' emphasis on line of sight in their consultation on the Undertaking, HDR applied this principle to the cultural landscape analysis through the use of a viewshed model that predicts areas surrounding Tillamook Bay that have line of sight to the Bayocean Peninsula. In contrast to the Indirect APE, which is based on a 10-mile sightline to

[5] HDR's ethnographic research focused on the Tillamook and the Grand Ronde. Although the Confederated Tribes of the Siletz Reservation also have cultural association with the area, the study did not include outreach to this tribe due to lack of interest from the tribe during earlier consultation on the Undertaking and as a result the lack of an established consultative relationship.

proposed SERE training areas, this viewshed model depicts visual relationships between any location on the Bayocean Peninsula and surrounding areas. The area was defined using a viewshed analysis in a geographic information system (GIS) by estimating the sightline of a 6-foot human observer from points at the intersections of a 100-meter grid across the Bayocean Peninsula. This model was devised in order to identify all known tribal resources within the cultural landscape, despite whether they are extant within the Indirect APE, and thereby estimate the full extent of the landscape.

To identify known Native American-affiliated cultural resources and other places of tribal importance associated with the Bayocean Peninsula, HDR searched the OARRA database and reviewed ethnographic studies, Tillamook narratives, and historical maps for tribal resources within the Bayocean Peninsula viewshed. Identified tribal resources within the cultural landscape were described as characterized in compiled sources and by employing ethnographic insights gained through discussions with Grand Ronde staff. The cultural landscape, as a whole composed of individual tribal resources, was then evaluated for inclusion on the NRHP, based on documents guiding TCP consideration in federal undertakings.

Background on conceptualizations and guidance regarding Native American landscapes and the process of identifying and evaluating these resources, as employed in this study, are described in more detail in the subsections that follow.

5.3.1 Conceptualizations and Guidance Regarding Native American Landscapes

The depth and complexity of Native American relationships with places were at the center of HDR's consideration of the identified tribal cultural resources. Prominent in the literature on this topic is the term "cultural landscape," which Stapp and Burney (2002:152) define as "geographical areas that possess special meaning to those who have ancestral ties to the area in question." Many other terms convey similar connections of indigenous people with places. For example, the ACHP (2011a) coined the term "traditional cultural landscape" to define "large scale historic properties of religious and cultural significance to Indian tribes or Native Hawaiian organizations." This definition is a modification of the NHPA-coined term for a Native American TCP, "property of traditional religious and cultural importance" (Title 54 United States Code 306108). Others, viewing the various terms as not characteristic of the spiritual and emotional depth of Native American associations with the earth, have suggested alternatives such as "landscapes of the heart, ancestral landscape, aboriginal landscape, sacred geography, [and] usual and accustomed areas" (Stapp and Burney 2002:152).[6]

Specific terminology and conceptualizations regarding Native American landscapes of the Pacific Northwest also exist, and these were reviewed due to the potential to have utility in the present study. In a collaborative publication between the Bureau of Ocean Energy Management (a division of the National Oceanic and Atmospheric Administration) and several Northwest Coast tribes, including the Grand Ronde, the authors coin the term tribal cultural landscape (TCL) and explain,

> Archaeological sites, burial grounds and traditional use areas are imbued with special meaning to past and present indigenous communities. For these places, this

[6] Region-specific terms also exist. A recent initiative by the NPS (2017), for example, defined the term "indigenous cultural landscape" to refer to places in the Chesapeake Bay area that "demonstrate aspects of the natural and cultural resources that supported American Indian lifeways and settlements in the early 17th century" and "may be important to descendant communities today … in the Chesapeake watershed."

> connection is important for, and often inseparable from, a community's cultural identity. Connection to a place is a nearly universal concept held by indigenous groups throughout the United States and its territories, and is embodied in the … [TCL] definition developed during this project: … Any place in which a relationship, past or present, exists between a spatial area, resource, and an associated group of indigenous people whose cultural practices, beliefs, or identity connects them to that place.
>
> Specific relationships may vary from group to group and may be defined temporally or geographically through oral traditions and cultural practices …[and] multiple tribes may hold knowledge and connections to the same place. [Ball et al. 2015:5]

As remarked in the quote above, Northwest Coast connections are not unlike those of many other Native Americans. Indeed, tribal understandings around the country inform that specific geographic locations and particular natural features can be imbued with special meaning (Stapp and Burney 2002:153). Forbes-Boyte (1999:23) explains that certain places are "perceived to be fundamentally different from other places in the environment." These places vary broadly and can include a tribe's place of origin, ceremonial locations, important natural resource areas, water sources, burials and cemeteries, and places where historic events took place (Stapp and Burney 2002:156-157). The special meaning of these places is often multi-faceted and can be represented through oral history accounts and other spoken traditions. Often, ceremonies are conducted at these places that "continue to feed the power of the place" (Forbes-Boyte 1999:26). In addition to their specific meaning, Native American landscapes are characterized by "a precise arrangement of named sites and localities, each of which is distinguished by a set of physical attributes and cultural associations that marks it as unique" (Basso 1988:101). Carroll et al. (2004) further elucidate that these places serve as "the anchors of collective memory" that "may be used repeatedly, are mentioned in narrative, prayer, and song, and may be acknowledged as such even after rituals [and other events] are no longer practiced there."

Due to the nature of indigenous associations with places, many Native American landscapes and other tribal resources can be defined as TCPs, the official NPS term for historic properties possessing traditional cultural significance. Ball et al. (2015) also acknowledge that it is possible to interpret TCLs as TCPs. However, the authors further state that "TCP designation is linked to the National Register, which can limit its use in consultations outside of the NHPA Section 106 process" (Ball et al. 2015:6). As the current study is an aspect of the Section 106 process associated with an Undertaking, the preferred guidance on addressing these resources is through NRB 38 (Parker and King 1998), the NPS guidance for the documentation and evaluation of potential TCPs. Both NRB 38 and Ball et al. (2015) promote steady mindfulness that tribes are the first authorities on their resources and that they should be consulted regarding any resources to which they may ascribe traditional cultural value.

Following from some 20 years of cultural resources work based on the NHPA, the publication of NRB 38 by the NPS was intended to broaden understanding and consideration of cultural resources exhibiting cultural significance that may differ from that of the nation as a whole (King 2003; Parker and King 1998). As defined in NRB 38, such significance derives "from the role the property plays in a community's historically rooted beliefs, customs, and practices" (Parker and King 1998:1). NRB 38 explains that TCPs possess traditional cultural significance due to their "association with cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are

important in maintaining the continuing cultural identity of the community" (Parker and King 1998:1). NRB 38 advises that identification of TCPs should proceed through consultation with those who ascribe cultural significance.

In the broad field of cultural resources management, NRB 38 did not introduce new legal authority for the protection and preservation of cultural resources. Instead, NRB 38 clarified mandates of the NHPA and implementation of the "Protection of Historic Properties" regulations of the ACHP (36 CFR 800), as well as other relevant policies and regulations as they relate to interactions of people, their cultures, and natural and other cultural resources. Since the publication of NRB 38, the practice of identifying TCPs has matured, and some level of sophistication has been reached, particularly due to the issuance of guidance documents written by the NPS, the ACHP, and various federal agencies. However, the expansiveness of Native American landscapes considered TCPs presents challenges to federal agencies in fulfilling their NHPA and NEPA regulatory compliance responsibilities due to a lack of experience as well as difficulties in managing such large resources. As a result, increasing attention has been given to how to best address traditional cultural landscapes as historic properties that must be considered by federal agencies in the Section 106 process (Birnbaum 1994; ACHP 2011a; ACHP 2011b; ACHP 2012a; ACHP 2012b).

To assist with the challenges presented by Native American landscapes, the ACHP has been active since 2009 in "addressing identified hurdles in the Section 106 and [NEPA] processes when proposed projects may impact Native American traditional cultural landscapes" and has labored "to ensure that Native American traditional cultural landscapes are considered early in land management and project planning decisions" (ACHP 2011a:1). The ACHP stresses "that the size of such properties or the potential challenges in the management of them should not be considerations in the evaluation of their significance" (ACHP 2012a:2). The ACHP also maintains a digital repository of information regarding traditional cultural landscapes (ACHP 2016). The repository links federal agencies to a variety of documents that help guide considerations of large TCPs that encompass whole landscapes. These documents are presented in **Table 6**.

In its presentation of various examples, NRB 38 makes evident that TCPs can encompass whole districts and landscapes that exhibit traditional cultural significance. While TCPs are considered eligible for the NRHP, which may distinguish one conceptualization of Native American landscapes from another, this is due to inherently fitting with broad criteria developed for the NRHP. As emphasized in NRB 38, TCPs are often significant first and foremost based on Criterion A, wherein a resource is recognized as being associated with events that have made a significant contribution to the broad pattern of our history.

With these understandings in mind, HDR employed ethnographic methods, as detailed in the introduction to **Section 5.3**, wherein the tribal community is directly consulted and ethnographic insights are gained in order to identify and define tribal resources, along with other approaches and understandings conveyed in NRB 38 and associated NPS and ACHP guidance documents. As such, the identified cultural landscape, as formed from known tribal resources, was evaluated for NRHP eligibility per the guidance established in NRB 38 (Parker and King 1998:11-18) and discussed in the next subsection. HDR followed NPS and ACHP documents to assist the USAF with compliance with Section 106 of the NHPA, as discussed in **Section 1.1**.

Table 6. ACHP Resources Regarding Traditional Cultural Landscapes.

Year	Title	Description	Link
n.d.	The ACHP's Native American Traditional Cultural Landscapes Action Plan	A brief fact sheet regarding the Native American Traditional Cultural Landscapes Action Plan, listed below	http://www.achp.gov/traditional-cultural-landscape.pdf
2011	Forum on Traditional Cultural Landscapes, August 10, 2011, Seattle, Washington	A summary of issues discussed during the forum, primarily pertaining to early and effective tribal consultation in order to preserve traditional cultural landscapes	http://www.achp.gov/docs/Forum%20Summary%20Notes.pdf
2011	Native American Traditional Cultural Landscapes Action Plan	A plan developed in consultation with tribes that details certain action items primarily for ACHP and NPS but also for other federal agencies, one of these being an update to NRB 38 to include more directed attention to traditional cultural landscapes	http://www.achp.gov/docs/Native%20American%20Traditional%20Cultural%20Landscapes%20Action%20Plan%2011-23-2011.pdf
2012	Traditional Cultural Landscapes in the Section 106 Process	An information sheet on ACHP's initiatives regarding traditional cultural landscapes and a few NRHP-listed or eligible examples identified through the Section 106 process	http://www.achp.gov/docs/Tradtional%20CLs%20in%20Section%20106%20background.pdf
2012	Native American Traditional Cultural Landscapes and the Section 106 Process: Questions and Answers	A Q&A document to address key questions regarding traditional cultural landscapes and how they should be addressed in the Section 106 process	http://www.achp.gov/docs/landscapes%20q%20&%20a%207-11-12.pdf
2012	Federal-Tribal Roundtable on Tribal Cultural Landscapes	ACHP staff notes regarding the roundtable meeting held during the 2012 annual meeting of the National Association of Tribal Historic Preservation Officers	http://www.achp.gov/docs/Summary%20Notes%20from%20NATHPO%20Roundtable%209-10-12.pdf
2016	Native American Traditional Cultural Landscapes	The document repository based on the ACHP initiative to assist federal agencies in addressing large scale historic properties of significance to Indian Tribes and Native Hawaiian organizations	http://www.achp.gov/na_culturallandscapes.html
2016	Information Paper on Cultural Landscapes: Understanding and Interpreting Indigenous Places and Landscapes	An information paper on identifying and considering the role of indigenous places and landscapes in both Section 106 and non-Section 106 contexts	http://www.achp.gov/docs/Information%20on%20 Cultural%20Landscapes.pdf

5.3.2 Evaluation and Characterization of Traditional Cultural Properties and Landscapes

The first step in determining the NRHP eligibility of a potential TCP is to confirm that the cultural resource is a tangible property and categorize it as a particular NRHP property type, either a district, site, building, structure, or object. NRB 38 states that "[c]onstruction by human beings is a necessary attribute of buildings and structures, but districts, sites, and objects do not have to be the products of, or contain, the work of human beings in order to be classified as properties" (Parker and King

1998:11). For example, a site may be the location of a significant event where no physical evidence of that event is present. Likewise, an object could be a natural feature such as a prominent rock outcrop or a culturally modified tree. A district could be a concentration of any of the property types, whether human-constructed or of natural origin.

While not an officially designated property type, a cultural landscape is a special type of district that reflects the cultural values and traditions of the cultural group that associates with it (NPS 1998). The NPS recognizes four types of cultural landscapes, any of which may possess traditional cultural significance for cultural groups (NPS 1998:88):

- *Historic designed landscapes*: artistic creations that reflect certain styles and may be associated with important people, cultural trends, or events important to landscape architecture;
- *Historic vernacular landscapes*: rural, suburban, or urban areas reflective of a particular cultural group's land values and settlement patterns;
- *Historic sites*: relatively finite areas associated with important events, activities, or people;
- *Ethnographic landscapes*: geographic areas to which a cultural group ascribes traditional cultural importance or which is used in traditional ways.

Of the various cultural landscape types, ethnographic landscapes differ most markedly given the frequent lack of distinction between natural and cultural resources in their conceptualization by cultural groups and their significance centered almost entirely on traditional cultural values and practices (NPS 1998:160). Ethnographic landscapes, perhaps more so than other types of cultural landscapes, are often further defined as TCPs. As noted in **Section 5.3.1**, Native American ethnographic landscapes considered TCPs are sometimes referred to as traditional cultural landscapes to reflect the traditional significance they hold for the cultural group (ACHP 2011).

After determining the property type, the second step presented in NRB 38 is the consideration of the property's integrity. The integrity of a TCP is related to the property's ongoing association with traditional cultural practices or beliefs (integrity of relationship) and the property's overall condition, with consideration as to how the condition may affect the cultural relationship (integrity of condition). To assess a property's integrity of relationship, a researcher considers whether and how a cultural group continues to associate with the property and whether that association is essential to continuation of the cultural practices or beliefs associated with the property. A property's integrity of condition is also considered in relation to how a cultural group associates with the property. In this case, integrity is assessed through the perspectives of the cultural group and the extent to which those perspectives allow for alterations to the property in regards to its location, setting, design, or materials, as relevant. Traditional cultural values and worldviews are important considerations in assessing whether a property retains integrity of condition. For example, a cultural group's values or worldviews regarding change may influence how that group perceives the effects of change on their association or relationship with that property.

To be listed in or considered eligible for the NRHP, a property must meet at least one of the four following criteria for evaluation:

- The resource is associated with events that have made a significant contribution to the broad pattern of our history (Criterion A).

- The resource is associated with the lives of people significant in our past (Criterion B).
- The resource embodies distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction (Criterion C).
- The resource has yielded, or may be likely to yield, information important in prehistory or history (Criterion D).

When evaluating potential TCPs, interpretation of some aspects of the NRHP eligibility criteria are unique to properties potentially possessing traditional cultural significance. In general, the use of "our" in the criteria can be interpreted as the cultural group associated with the property. When assessing significance in regards to Criterion A, "history" could refer to the cultural group's particular accounts and narratives. "Events" could refer not just to historical events but also to occurrences in the cultural group's narratives or ongoing cultural practices that partly define the cultural group. Regarding Criterion B, "persons" could refer to actual people or important characters in the cultural group's accounts and narratives. Significance pertaining to Criterion C could relate to traditional cultural architectural styles; master craftspeople or artists, whether known or unknown, within the cultural group; traditional cultural art or crafts; or groupings of traditional cultural resources that are more important as a whole than they are individually. In considering significance based on Criterion D, the type of information derived from the property could relate to studies of many varieties, including ethnographic, archaeological, sociological, and folkloric. However, NRB 38 cautions that the property's traditional cultural significance is primary to any information the property might yield.

The fourth and final step in evaluating a potential TCP for listing in the NRHP involves determining whether any NRHP criteria considerations render the property ineligible. This includes the following criteria considerations:

- Consideration A: Ownership by a religious institution or use for religious purposes;
- Consideration B: Relocated properties;
- Consideration C: Birthplaces and graves;
- Consideration D: Cemeteries;
- Consideration E: Reconstruction;
- Consideration F: Commemoration;
- Consideration G: Significance achieved in the past 50 years.

In applying these considerations in evaluating a potential TCP, a researcher must closely consider the traditional cultural values the cultural group ascribes to the property and avoid ethnocentrism in considering their significance to the cultural group. For example, making a distinction between religion and other aspects of culture is centered on Euroamerican values and not necessarily the traditional cultural values of the culture group ascribing significance to the property. The basic consideration is whether a property holds, embodies, or retains traditional cultural significance—as defined by the cultural group—despite fitting one of the criteria considerations.

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6 Results

6.1 Survey of the Direct APE

HDR conducted field investigations of the Direct APE between December 6 and December 9, 2016. Dr. Dan Leonard, Field Director, led the three-person survey crew for the duration of the investigation. The two remaining members of the crew were Harriet Richardson Seacat, M.A., and Elizabeth Leclerc. Weather during the survey ranged from clear and sunny to rain/snow with moderate winds. Temperatures ranged from 20 to 45 degrees Fahrenheit. Soils were generally damp except during final shovel testing in the helicopter landing site on December 9 when soils became saturated in heavy rains. The crew was able to complete shovel testing before weather conditions became prohibitive.

HDR excavated a total of 86 STPs, consisting of 3 STPs in the instructor camp, 3 STPs in the medic camp, 6 STPs in the helicopter landing site, and 74 STPs in the student camps. None of the STPs contained archaeological materials, including STPs excavated in the medic camp adjacent to site 35TI104. Although no shovel testing or survey was conducted within the 35TI104 site boundary, HDR prepared a site update based on observations on site condition and adjustments to the site boundary adjacent to the medic camp. All work was conducted in accordance with HDR's permits with the State of Oregon (AP-2189) and the Corps (DACW57-4-17-002).

6.1.1 Instructor Camp, Medic Camp, and Helicopter Landing Site

The instructor camp, medic camp, and helicopter landing site constitute SERE training support areas on the east side of the peninsula (**Figure 9** and **Figure 10**). Upon arriving at these locations, HDR observed that each is surfaced with gravel and cobble fill that extends an average of 20 to 40 cm below surface, although exposed cuts along the eastern waterfront at the helicopter landing site indicate the fill extends to 100 cm in some areas. The cobble material creates durable surfaces that are 20 to 40 cm above the natural surface. In some areas around the instructor and medic camps, the camp areas are also separated from the surrounding natural surfaces by small swales. The fill material is vegetated with sparse grass. Fragmented shell and modern debris were observed in low quantities on the surface of the camp areas. Observed shell appeared to be modern and/or naturally occurring. HDR inquired with Tillamook County Public Works by email in an attempt to determine when the fill was brought in, where it originated, and any details about ground surface or preparation such as grading or compaction. However, the department was unable to find information about the material and suggested it may have originated from USAF maintenance and repair activities prior to beginning the SERE training in the 1980s (Gregory Cickavage, pers. comm., December 9, 2016). The USAF similarly had no record of maintenance activities from before the SERE training and had no information about the cobble fill (Todd Foster, pers. comm., December 15, 2016).

STPs were excavated at 20 m intervals with three STPs in the instructor camp, three STPs in the medic camp, and six STPs in the helicopter landing site (**Table 7**, **Figure 11**). STPs were excavated to depths of 50 to 60 cm and generally terminated after two culturally sterile levels within the natural stratum beneath the fill. Soil profiles were consistent between the camp areas and helicopter landing site, although fill material tended to extend deeper in the helicopter landing site, with large cobbles sometimes extending well into the natural soil.

Figure 9. Shovel Testing in Medic Camp.

Figure 10. Helicopter Landing Site overlooking Tillamook Bay.

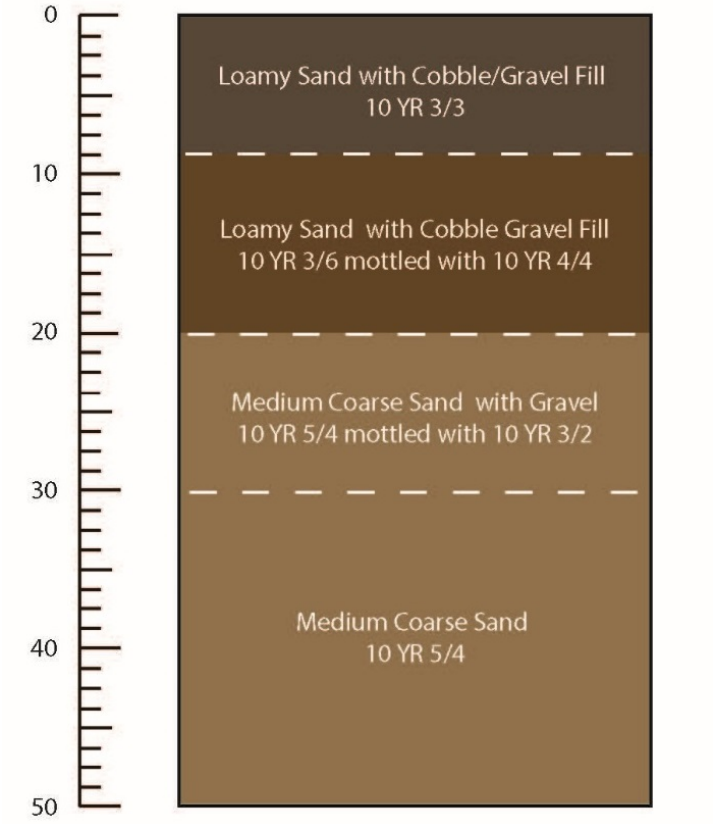
Table 7. Summary of STPs in the Instructor Camp, Medic Camp, and Helicopter Landing Site.

STP Number	Levels	Reason for Termination	Notes
Instructor Camp			
IC-STP-1	5	Three sterile levels beneath fill; terminated at 50 cm.	Compact cobble and gravel fill to 20 cm.
IC-STP-2	5	Three sterile levels beneath fill; terminated at 50 cm.	Compact gravel fill to 20 cm with small gravel continuing to 50 cm.
IC-STP-3	5	Three sterile levels beneath fill; terminated at 50 cm.	Compact gravel fill to 12 cm with small gravel continuing to 50 cm.
Medic Camp			
MC-STP-1	5	Two sterile levels beneath fill; terminated at 55 cm.	Compact cobble and gravel fill to 20 cm.
MC-STP-2	6	Three sterile levels beneath fill; terminated at 58 cm.	Compact cobble and gravel fill to 20 cm with gravel continuing to 30 cm.
MC-STP-3	5	Three sterile levels beneath fill; terminated at 50 cm.	Compact gravel fill to 20 cm with gravel continuing to 50 cm.
Helicopter Landing Site			
HC-STP-1	5	Terminated at 50 cm. Gravel continues.	Compact gravel and large cobble fill throughout unit with some mussel shell mixed in the fill matrix.
HC-STP-2	5	Two sterile levels beneath dense fill; terminated at 50 cm.	Possible old beach surface observed from 30 to 50 cm with water-worn shell fragments and pebbles.
HC-STP-3	6	Terminated at 60 cm. Gravel and cobble fill continues.	Well-mixed rounded and angular cobbles and gravel through-out STP.
HC-STP-4	5	Terminated at 50 cm. Gravel continues.	Compact gravel and large cobble fill throughout unit with some mussel shell mixed in the fill matrix.
HC-STP-5	5	Two sterile levels beneath dense fill; terminated at 50 cm.	Possible old beach surface observed from 30 to 50 cm with water-worn shell fragments and pebbles.
HC-STP-6	5	Three sterile levels beneath dense fill; terminated at 55 cm. Sparse cobbles and gravel continue.	Dense unsorted round and angular cobbles and gravel to 35 cm with sparse cobbles to 55 cm.

Figure 11. STPs in the Medic Camp, Instructor Camp, and Helicopter Landing Site.

A typical profile consisted of two strata (**Figure 12**). Fill material, represented as Stratum I was in a matrix of loamy sand. Stratum Ia was a 4- to 9-cm-thick deposit of dark brown to black loamy sand with moderate organic content. Stratum Ib was a 6 to 25 cm deposit of mottled dark yellowish brown loamy sand. Stratum I contained compact rounded and angular cobbles and gravel, sometimes mixed with small amounts of shell. Rock material included basalt, sandstone, and quartz/quartzite. Stratum II was a brown to yellowish brown medium coarse sand. There was sometimes mixing at the contact between Stratum I and Stratum II, and gravels often continued into Stratum II.

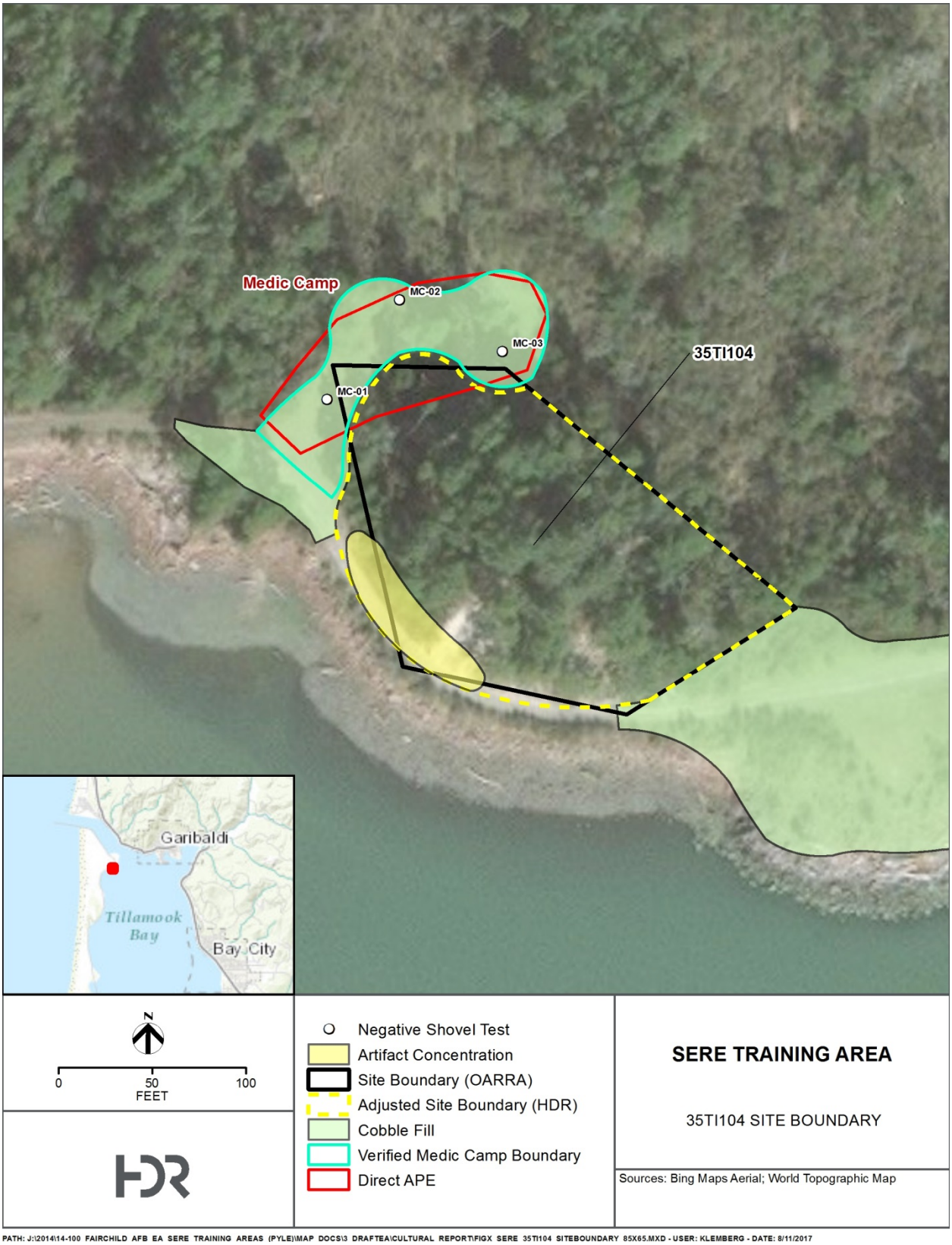
Figure 12. Typical Soil Profile for STPs in Instructor Camp, Medic Camp, and Helicopter Landing Site (MC-01).



Site 35TI104

Site 35TI104 (**Figure 13**) was recorded during the Corps' 2012 survey of the SERE training area associated with their reissuance of a permit to the USAF at that time. The site is a shell midden evidenced by shell and other cultural materials eroding from the side of a hill adjacent to the east side of the medic camp. According to the initial recording, the shell midden deposit is up to 5 m deep. HDR did not enter the site boundary but made observations on the site's condition from the medic camp and the Bayocean Dike Road. From the medic camp, the hill containing the site has loose, sandy soils stabilized by a moderate cover of grass and shrub vegetation with occasional trees. No artifacts were observed exposed on the surface in this area. Along the road, the side of the hill is lightly to moderately vegetated with grasses and shrubs. Artifacts were observed eroding from the soil along this portion of the site, particularly in areas of little to no vegetation. The loose soils are easily disturbed. Faunal use, evidenced by elk tracks up the steep slope, appears to contribute to erosion and site disturbance.

Figure 13. Site 35TI104 and Medic Camp Boundaries.



HDR observed that the site boundary obtained through OARRA was not accurate to the on-the-ground distribution of artifacts in the area of the medic camp. HDR also observed that the medic camp APE as defined in GIS was not accurate to the on-the-ground extent of the cobble-surfaced clearing used for the camp. These discrepancies are likely a result of the map scale or the technique used to draw or digitize the site boundaries. As shown in **Figure 13**, the site boundary digitized from OARRA partially overlaps the APE at the medic camp. However, HDR's observations indicate the medic camp does not overlap any portion of site 35TI104. HDR recorded a new boundary of the medic camp with a GPS, also shown in **Figure 13**. The gravel and cobble surface of the clearing is elevated 20 to 40 cm above the surrounding natural surface and is separated from the hill containing site 35TI104 by a small swale. As mentioned above, no artifacts were observed on the surface of the hillside facing the medic camp. HDR has defined a new boundary along the west half of the site near the site boundary that demarcates the base of the hill as the maximum extent of the site in this direction, reflecting the results of shovel testing in the medic camp. HDR has prepared a site update documenting the revised boundary and observations on site condition.

6.1.2 Student Camps

HDR excavated 74 STPs in the four student training camps on the west side of the peninsula. This area contains steep, tall dunes that range between 3 and 5 m in height above the interdunal areas (**Figure 14**). Most dunes are vegetated with European beach grass and are moderately stable; on the east side of the student camps, dunes are stabilized with growth of shore pine, Sitka spruce, and European beach grass (**Figure 15**). The dune field shows frequent use by deer and elk, with numerous, well-used trails through the dunes.

As discussed in **Section 5.2.2**, testing focused on the lowest inter-dunal areas within the APE with STPs spaced at 20 m intervals within these areas (**Figure 16** and **Figure 17)**. Areas of dense vegetation were not tested, as these areas would preclude camping and training activities. Testing areas consistently overlapped previous training camp sites, as evidenced by hearths and debris residual from past trainings.

Figure 14. Shovel Testing in Sand Dunes in Student Camp 1.

Figure 15. Dense Vegetation on East Side of Student Camp 4.

Figure 16. STPs in Student Camps 1, 2, and 3.

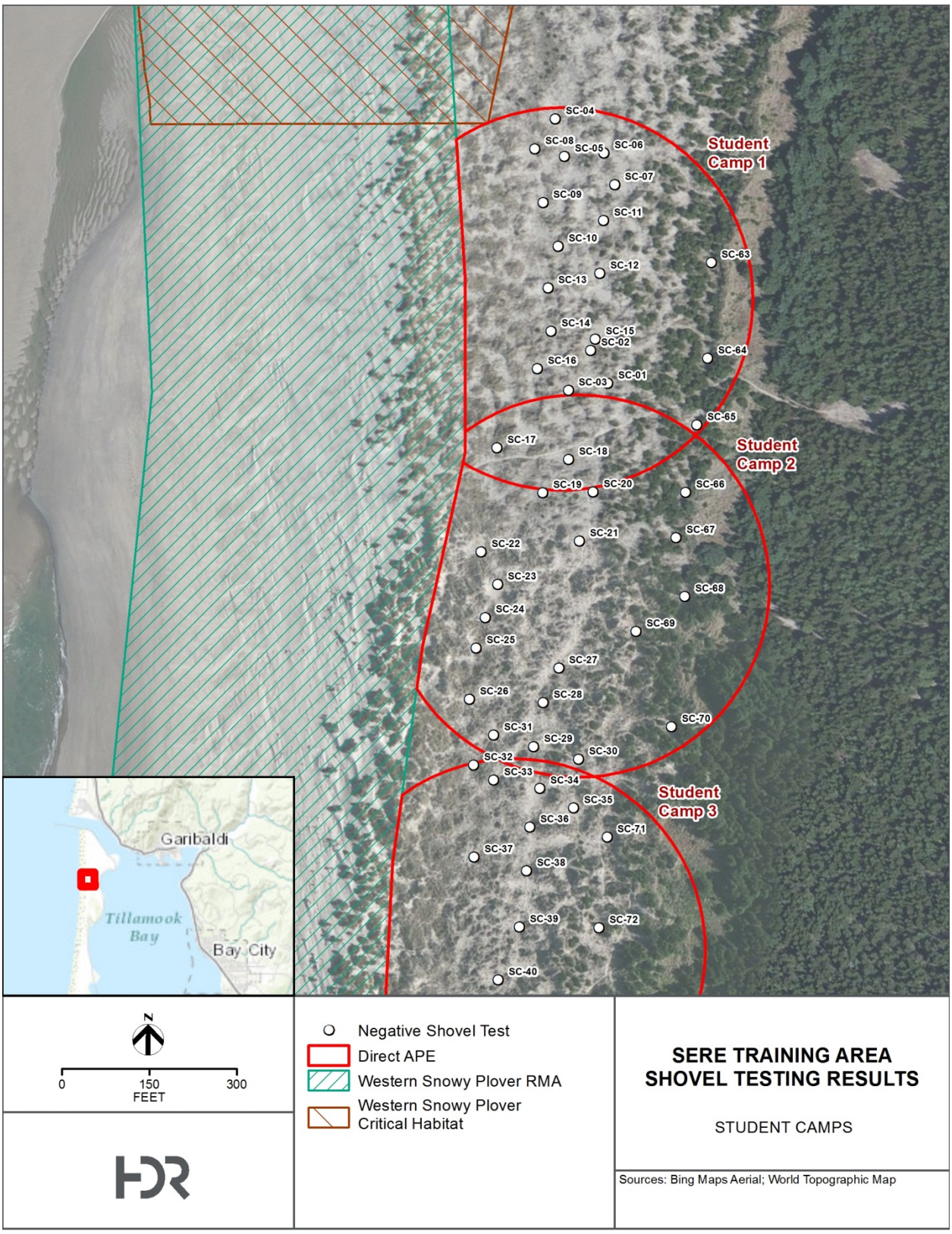
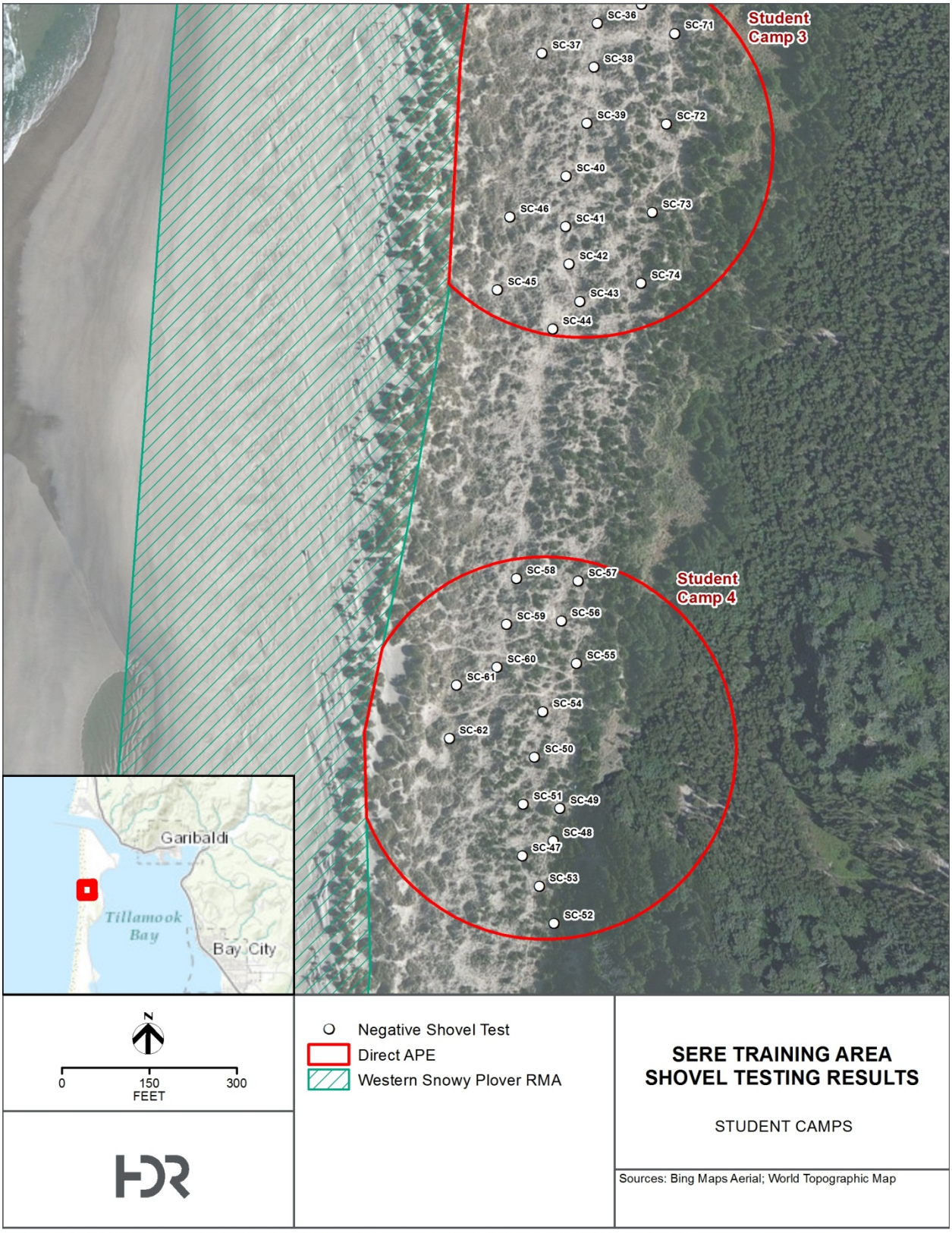


Figure 17. STPs in the Student Camps 3 and 4.



The STPs were excavated into a single stratum (Stratum I) of yellowish-brown, medium-coarse sand. Three STPs encountered the water table between depths of 90 and 100 cm below surface. STPs were generally terminated at 100 cm, as per the research design. None of the STPs contained artifacts. Modern debris, such as batteries, Styrofoam, and nylon cord were observed at depths of up to 100 cm, indicating rapid deposition over the past several decades. Two STPs contained deposits of fragmented and complete mussel, clam, and oyster shells from past training events. **Table 8** summarizes STP results for the student camps.

Table 8. Summary of STPs in the Student Camps.

STP Number	Levels	Location	Notes
SC-STP-01	10	425945 mE 5044503 mN	
SC-STP-02	10	425954 mE 5044486 mN	Augur used from 75 cm to 100 cm.
SC-STP-03	10	425934 mE 5044482 mN	Augur used from 50 cm to 100 cm.
SC-STP-04	10	425952 mE 5044606 mN	Water table at 90 cm below surface.
SC-STP-05	10	425927 mE 5044624 mN	Water table at 90 cm below surface. Mussel shell fragments at 20 cm and 50 cm below surface.
SC-STP-06	10	425932 mE 5044605 mN	
SC-STP-07	10	425958 mE 5044590 mN	
SC-STP-08	10	425916 mE 5044609 mN	Modern foam material at 75 cm below surface, possibly from buoy.
SC-STP-09	10	425921 mE 5044581 mN	Modern debris at surface residual from previous training camp. Opened and unopened clam shells in side wall between 30 cm and 75 cm below surface.
SC-STP-10	11	425928 mE 5044558 mN	Water table at 100 cm below surface.
SC-STP-11	10	425952 mE 5044571 mN	
SC-STP-12	10	425950 mE 5044543 mN	
SC-STP-13	10	425923 mE 5044536 mN	Modern debris recovered at 20 cm below surface.
SC-STP-14	10	425925 mE 5044513 mN	
SC-STP-15	10	425948 mE 5044509 mN	
SC-STP-16	10	425918 mE 5044494 mN	
SC-STP-17	10	425896 mE 5044452 mN	
SC-STP-18	10	425934 mE 5044446 mN	
SC-STP-19	10	425920 mE 5044429 mN	
SC-STP-20	10	425947 mE 5044429 mN	
SC-STP-21	10	425939 mE 5044403 mN	Modern debris recovered at 10 cm, 70 cm, and 100 cm below surface.
SC-STP-22	10	425888 mE 5044398 mN	
SC-STP-23	10	425897 mE 5044381 mN	Near previous training camp with charcoal and oyster shell on surface. Modern debris recovered at 60 cm below surface.
SC-STP-24	10	425890 mE 5044364 mN	
SC-STP-25	10	425886 mE 5044348 mN	
SC-STP-26	10	425882 mE 5044321 mN	
SC-STP-27	10	425929 mE 5044337 mN	Approximately 30 oyster, mussel, and clam shells between 70 cm and 90 cm mixed with modern debris.
SC-STP-28	10	425921 mE 5044319 mN	

Table 8. Summary of STPs in the Student Camps.

STP Number	Levels	Location	Notes
SC-STP-29	10	425916 mE 5044296 mN	Plastic fragments recovered at 100 cm.
SC-STP-30	10	425939 mE 5044289 mN	
SC-STP-31	10	425895 mE 5044302 mN	
SC-STP-32	N/A		Not excavated, outside APE.
SC-STP-33	10	425884 mE 5044286 mN	
SC-STP-34	10	425895 mE 5044278 mN	Evidence of previous training camp at surface, including a fire pit.
SC-STP-35	10	425919 mE 5044274 mN	
SC-STP-36	10	425937 mE 5044264 mN	Modern debris on surface. Foil and plastic fragments recovered at 80 cm.
SC-STP-37	10	425914 mE 5044254 mN	Near previous training camp with charcoal and shell fragments on surface.
SC-STP-38	10	425885 mE 5044238 mN	
SC-STP-39	10	425912 mE 5044231 mN	Nylon cord and mussel shell fragments recovered at 75 cm to 80 cm.
SC-STP-40	10	425908 mE 5044202 mN	
SC-STP-41	10	425897 mE 5044174 mN	
SC-STP-42	10	425897 mE 5044148 mN	Near previous training camp with wood, charcoal, and shell fragments on surface. Modern debris recovered between 50 cm and 100 cm below surface.
SC-STP-43	10	425899 mE 5044128 mN	Near well-utilized camp from previous training.
SC-STP-44	10	425904 mE 5044109 mN	Near previous training camp with evidence of a campfire 5 m north of STP.
SC-STP-45	10	425890 mE 5044094 mN	
SC-STP-46	10	425861 mE 5044114 mN	
SC-STP-47	10	425868 mE 5044153 mN	
SC-STP-48	10	425874 mE 5043819 mN	
SC-STP-49	10	425890 mE 5043826 mN	
SC-STP-50	10	425894 mE 5043844 mN	
SC-STP-51	10	425881 mE 5043870 mN	Foil wrapper fragment recovered at 50 cm.
SC-STP-52	10	425875 mE 5043846 mN	
SC-STP-53	10	425891 mE 5043783 mN	
SC-STP-54	10	425883 mE 5043803 mN	
SC-STP-55	10	425885 mE 5043894 mN	
SC-STP-56	10	425903 mE 5043919 mN	
SC-STP-57	10	425895 mE 5043941 mN	
SC-STP-58	10	425904 mE 5043962 mN	Adjacent to previous training camp with evidence of a campfire
SC-STP-59	10	425871 mE 5043964 mN	
SC-STP-60	10	425866 mE 5043940 mN	
SC-STP-61	10	425861 mE 5043917 mN	Near recently used training camp with residual debris.
SC-STP-62	10	425840 mE 5043908 mN	
SC-STP-63	10	425836 mE 5043880 mN	

Table 8. Summary of STPs in the Student Camps.

STP Number	Levels	Location	Notes
SC-STP-64	10	426008 mE 5044549 mN	
SC-STP-65	10	426007 mE 5044499 mN	
SC-STP-66	10	426001 mE 5044464 mN	
SC-STP-67	10	425995 mE 5044429 mN	
SC-STP-68	10	425990 mE 5044405 mN	
SC-STP-69	10	425995 mE 5044374 mN	
SC-STP-70	10	425969 mE 5044356 mN	
SC-STP-71	10	425988 mE 5044306 mN	
SC-STP-72	10	425954 mE 5044249 mN	
SC-STP-73	10	425950 mE 5044201 mN	
SC-STP-74	10	425942 mE 5044155 mN	
SC-STP-75	10	425936 mE 5044118 mN	

6.2 The Indirect APE and the Tillamook Spit Cultural Landscape

Investigation of the Indirect APE resulted in identification of a cultural landscape associated with the Tillamook that centers on the Bayocean Peninsula and includes tribal resources within its viewshed, as described in **Section 5.3**. Research to identify tribal resources associated with the cultural landscape led to identification of 52 known tribal resources. Shared tribal understandings suggest that the cultural landscape was regularly utilized by Native peoples based on or near the Bayocean Peninsula at various periods of time and with which tribal people continue to maintain associations. The cultural landscape is referred to as the Tillamook Spit cultural landscape, in keeping with more common usage of the geographic term and clearer association with the Tillamook people.

The extent of known tribal resources and associated landforms represents the outer boundary of the Tillamook Spit cultural landscape. In highland areas, the boundary generally follows ridgelines within line-of-sight to the spit or encompasses entire landforms known to be significant through background research. In lowland areas, to account for important marine resources, the boundary includes the lower extent of streams and nearshore portions of the ocean. Based on the line-of-sight tribal perspective discussed in **Section 5.3**, the viewshed surrounding the Bayocean Peninsula, as it occurs beyond the landscape's boundary, is considered a component of the cultural landscape. The viewshed approximates the extent of traditional subsistence and other natural resource use associated with the Tillamook Spit cultural landscape and should be understood as a conceptual component of the cultural landscape and not an extension of its boundary for Section 106 purposes.

In the sections that follow, the Tillamook Spit cultural landscape is described in more detail and evaluated for its eligibility for NRHP listing.

6.2.1 Description of the Tillamook Spit Cultural Landscape

The Tillamook Spit cultural landscape centers on the western edge of Tillamook Bay, an area described by Grand Ronde staff as a "big bowl" with visibility to hundreds of tribal resources. Tribal understandings and associations indicate that the cultural landscape is imbued with many elements of a significant place. When emphasizing that places on a landscape are intertwined and

inseparable, Grand Ronde staff emphatically expressed that "the interconnectivity of [Tillamook Spit] outward is *huge*." From their research, the tribe documents 183 distinct ethnographic locations and 195 floral and faunal resources within the northern spit's viewshed,[7] which the Grand Ronde staff explained indicated the location's value as a prime settlement area. Further evidencing the importance of the area is a culturally modified tree known as the Octopus Tree, located on the Pacific Coast to the south, just outside of the spit's viewshed. According to Grand Ronde staff, the tree could demarcate an important cultural location such as a boundary, burials, or a story waypoint.

As detailed in **Sections 3.4.1** and **3.4.2**, the spit and the Tillamook Bay area, in general, are also important due to their association with several tribal narratives, most significantly the Transformation Era adventures of South Wind, the Trickster-Transformer known by the Tillamook (Grand Ronde cultural resources staff, pers. comm. 2016). Tillamook Spit is understood to be a portion of South Wind's genitalia severed during his epic journey northward along the Oregon Coast. In the tribal view, the spit's prominence and significance is reinforced by its representation of South Wind's genitalia, as opposed to some other part of the body (Grand Ronde cultural resources staff, pers. comm. 2016).

HDR's observations and analysis concluded that many named geographic places along the bay's edge, the Pacific coastline, and nearby portions of the Coast Range are visible from the spit (**Table 9**). From the northeastern portion of the spit, near the helicopter landing site, the settlements of Garibaldi and Hobsonville are distinctly visible (**Figure 18**), and the low hill near Bay City and several historical settlement locations are also in sight. Prominent peaks immediately surrounding Tillamook Bay are in view to the northeast, east, and south. Distant mountain ranges of higher elevations are within sight to the southeast, beyond the low-lying areas surrounding the settlement of Tillamook (**Figure 19**). From the western edge of the spit, near the Pacific Ocean and the Student Camps associated with the Project, lower areas along the bay shores are not visible, while upper portions of the mountain ranges generally are. In addition, portions of the Pacific coastline, including two sea stacks in the ocean known as Pyramid Rock and Pillar Rock, are visible to the south-southwest from the highest points in the Student Camps.

[7] The viewshed is of an unspecified distance. This information was learned during a meeting with Grand Ronde cultural resources staff at their office, when they shared views of the Tillamook Bay area in a GIS database.

Table 9. Geographic Features within the Tillamook Spit Cultural Landscape.

Feature Name	Type	Feature Name	Type
Angora Peak	Summit	Kilchis River	Stream
Barnegat (historical)	Populated Place	Kincheloe Point	Cape
Baxter Creek	Stream	Larson Creek	Stream
Bay City	Populated Place	Lifesaving Creek	Stream
Bay City Channel	Channel	Main Channel	Channel
Bayocean (historical)	Populated Place	McCoys Cove	Bay
Bayocean Dike	Levee	Memaloose Point	Cape
Beaver Point	Summit	Miami Cove	Bay
Bewley Creek	Stream	Miami River	Stream
Blue Ridge	Ridge	Middle Channel Dike	Levee
Boulder Point	Cape	Neilson Slough	Stream
Brimmer Creek	Stream	Nolan Slough	Stream
Cape Falcon	Cape	Onion Peak	Summit
Cape Meares Lake	Lake	Ox Bow Bend	Bend
Coleman Creek	Stream	Patterson Creek	Stream
Crab Harbor	Bay	Pillar Rock	Island
Crab Rock	Island	Pitcher Point	Cape
Dick Point	Cape	Port of Garibaldi	Harbor
Dick Point Dike	Levee	Pyramid Rock	Island
Doty Creek	Stream	Randall Hill	Summit
Dougherty Slough	Stream	Rock Point	Cape
Dry Stocking Island	Island	Sandstone Point	Cape
Eck Creek	Stream	Seal Channel	Channel
Electric Creek	Stream	Sibley Sands	Bar
Fairview	Populated Place	Smith Creek	Stream
Falcon Rock	Island	Smuggler Cove	Bay
Flower Pot (historical)	Pillar	Snag Island	Island
Flower Pot Creek	Stream	South Channel	Channel
Garibaldi	Populated Place	South Prairie	Flat
Ginger Peak	Summit	Sow and Pigs	Island
Gold Peak	Summit	Squeedunk Slough	Gut
Goose Point	Cape	Stanley Peak	Summit
Green Hill	Summit	Stasek Slough	Stream
Grindstone Mountain	Summit	Stillwell Ditch	Stream
Hall Slough	Stream	Stillwell Slough	Stream
Hathaway Mead	Populated Place	Sugarloaf Mountain	Summit
Hathaway Slough	Stream	Sunset Beach	Beach
Hobson Creek	Stream	Three Arch Rocks	Island
Hobsonville	Populated Place	Tillamook	Populated Place
Hoquarten Slough	Stream	Tillamook River	Stream
Idaville	Populated Place	Tomlinson Slough	Stream
Illingsworth Creek	Stream	Twin Rocks	Island
Joe Champion Creek	Stream	Twin Rocks Arch	Arch
Kilchis Flat	Bar	Vaughn Creek	Stream
Kilchis Point	Cape		

Figure 18. Settlements of Garibaldi and Hobsonville from the helicopter landing site, looking east.

Figure 19. Settlements of Garibaldi and Hobsonville from the helicopter landing site, looking southeast.

A broad natural resource use area extends beyond the boundary of the Tillamook Spit cultural landscape and is considered a conceptual component of the landscape. This represents the subsistence and other natural resource use area within the viewshed of Tillamook Spit that would have been utilized by Tillamook residents of the spit and nearby vicinity. Tribal knowledge, as expressed by Grand Ronde cultural resources staff, indicates that people harvested natural resources within sight of their villages due to pragmatic concerns, such as proximity, general safety concerns, and limits in transportation. Specific tribal resources were not identified within this viewshed, as no OARRA resources were previously identified within it and no additional search for natural resources was conducted within its extent. The viewshed is recognized due to tribal knowledge shared by Grand Ronde staff and should be considered a conceptual component of the Tillamook Spit cultural landscape and not an extension of its boundary for Section 106 purposes.

6.2.2 Resources in the Tillamook Spit Cultural Landscape

HDR identified a range of tribal resources that compose the Tillamook Spit cultural landscape. These resources include Tillamook story event locations, known village sites, known archaeological sites, subsistence areas, and other natural resources Tillamook peoples utilized at varying periods of time and that endure as important traditional cultural resources through ongoing associations of the people with the Tillamook Spit vicinity. All of the identified resources are either on the Tillamook Spit, within sight of it, or in near proximity to the spit viewshed.

The identified tribal resources are detailed in the text that follows, where each resource is italicized on first mention and listed in abbreviated form in **Table 10** (see **Appendix D** for a similar table with more detailed notes on each resource). The Map ID column in **Table 10** serves as a key to the locational points found on **Figure 20**, a map depicting the Tillamook Spit cultural landscape and conceptual viewshed component. Point locations are approximations based on available information, which varies in detail and locational accuracy. As needed, historical maps and nautical charts were used to situate resources based on settlement locations around the time of ethnographic reporting.[8] Natural features are demarcated based on modern-day maps and aerial imagery, to be consistent with the tribal perspective that landforms retain tribal associations even as they change through time (see **Section 3.4.2**).

[8] Versions of the South Wind story, for example, were told to ethnographers in 1890, 1931, and 1933 (Deur and Thompson 2008:3-4). Historical maps referenced include the 1887 US Coast and Geodetic Survey (USCGS) nautical chart of Tillamook Bay and the 1937 Nehalem, Oregon 15-minute series topographic quadrangle (USCGS 1887; USGS 1937).

Table 10. Known Tribal Resources in the Tillamook Spit Cultural Landscape.

Map ID	Type	Number/Name	Locational Notes
1	Story Event, Myth Age	Hill above Bay City	The highest and most distinct rise near the settlement, the peak of Doty Hill, is identified as the possible pasturage to which Yeyell was first driven
2a, 2b	Story Event, Transformation Age	Creek This Side [North] of Bay City	Considering that Jacobs' Tillamook consultant spoke from Garibaldi, the modern-day outlets of Patterson Creek (2a) and Larson Creek (2b) are both marked as the possible creek where the girl stood
3	Story Event, Transformation Age	Tillamook Spit (Bayocean Peninsula)	The entire, modern-day spit is demarcated as this story event location
4	Story Event, Transformation Age	Tillamook River	The mouth of the Tillamook River is marked as the approximate location of these two story events
5	Story Event, Transformation Age	Kilchis River	The mouth of the Kilchis River is marked as the approximate location of this story event
6	Story Event, Transformation Age	Rock at Bay City	Following Deur and Thompson (2008:Footnote 26), Sandstone Point is marked as the general location of this story event
7	Story Event, Transformation Age	Camas Field at Bay City	The geographic center of the 1930s settlement concentration at Bay City is marked as the location associated with this story event that falls within the cultural landscape
8	Story Event, Transformation Age	Kilchis Point	Kilchis Point is identified as the location of this story event
9	Story Event, Transformation Age	Bay City	The geographic center of the 1930s settlement concentration at Bay City is identified as the approximate location of this story event
10, 11	Story Event, Transformation Age	Right by Bay City / Halfway between Hobsonville and the Point at Bay City	The shoreline near the mouth of Patterson Creek (10) is marked as the approximate location of the beached whale. The halfway point (11) is approximated as the geographic middle point between Hobsonville Point and Sandstone Point
12	Story Event, Transformation Age	River near Garibaldi	The mouth of the Miami River is marked as the approximate location of this story event
13, 14	Story Event, Transformation Age	Old Garibaldi / In the Water between Garibaldi and Barview	Old Garibaldi (13) is approximated as the 1887 settlement of Garibaldi and the water travel is represented as a line between the 1887 settlement of Garibaldi and Green Hill, near Barview (14)
15	Story Event, Transformation Age	Steep Bluff and Rock Cove at Barview	The western slope of Green Hill (15) is approximated as the location of this story event
16, 17	Story Event, Period of True Happenings	Flower Pot / Tillamook Spit	A general point at Flower Pot (16) and the entire, modern-day spit (17) are marked in association with this story
18	Settlement	Nəsxəwəqᵇan	Location georeferenced from Seaburg (2003:Map 3)
19	Settlement	Kil-har-hurst	Location georeferenced from Seaburg (2003:Map 3)
20	Settlement	Nəsga-ga-ɬ	Location georeferenced from Seaburg (2003:Map 3)
21	Settlement	Nəsxenus	Location georeferenced from Seaburg (2003:Map 3)
22	Settlement	Distənəqs	Location georeferenced from Seaburg (2003:Map 3)
23	Settlement	Kil-har-nar	Location georeferenced from Seaburg (2003:Map 3)
24	Settlement	Cohələʔəqs	Location georeferenced from Seaburg (2003:Map 3)
25	Settlement	Nəxeinəgi	Location georeferenced from Seaburg (2003:Map 3)
26	Settlement	Chish-ucks	Location georeferenced from Seaburg (2003:Map 3)

Table 10. Known Tribal Resources in the Tillamook Spit Cultural Landscape.

Map ID	Type	Number/Name	Locational Notes
27	Settlement	Thu-qa-tən	Location georeferenced from Seaburg (2003:Map 3)
28	Settlement	Chuck-tins	Location georeferenced from Seaburg (2003:Map 3)
29	Settlement	Skənəyiwəs	Location georeferenced from Seaburg (2003:Map 3)
30	Settlement	35TI006	Obtained from Oregon SHPO
31a, 31b	Settlement	35TI007 / Kil-har-hurst	Obtained from Oregon SHPO
32a, 32b	Settlement	35TI009 / Kilchis Point	Obtained from Oregon SHPO
33	Shell Midden	35TI010	Obtained from Oregon SHPO
34	Shell Midden	35TI011	Obtained from Oregon SHPO
35	Lithic	35TI012	Obtained from Oregon SHPO
36	Shell Midden	35TI013	Obtained from Oregon SHPO
37	Settlement	35TI060 / Patterson Creek	Obtained from Oregon SHPO
38	Shell Midden	35TI079 / Cape Meares Lake Site	Obtained from Oregon SHPO
39	Subsistence	35TI090	Obtained from Oregon SHPO
40	Subsistence	35TI098	Obtained from Oregon SHPO
41	Shell Midden	35TI104	Obtained from Oregon SHPO
42	Settlement	Unidentified Site 01[a] /Icil-har-hurst	Obtained from Oregon SHPO
43	Human Remains	Unidentified Site 02[a]	Obtained from Oregon SHPO
44	Settlement, Destroyed	Unidentified Site 03[a]	Obtained from Oregon SHPO
45	Lithic	Unidentified Site 04[a]	Obtained from Oregon SHPO
46	Lithic	Unidentified Site 05[a]	Obtained from Oregon SHPO
47	Settlement	Unidentified Site 06[a] /Chishucks	Obtained from Oregon SHPO
48	Settlement	Unidentified Site 07[a] /Tow-er-quot-ons	Obtained from Oregon SHPO
49	Human Remains	Unidentified Site 08[a]	Obtained from Oregon SHPO
50	Subsistence	Clam and crab resources	Approximated from ODFW 2015
51	Subsistence	Salmon resources	Obtained from ODFW 2014
52	Subsistence/ Transportation	Tillamook Bay	Approximated from USA Topo Map

a - The sites referred to as “Unidentified Site” were not assigned site numbers by the Oregon SHPO.

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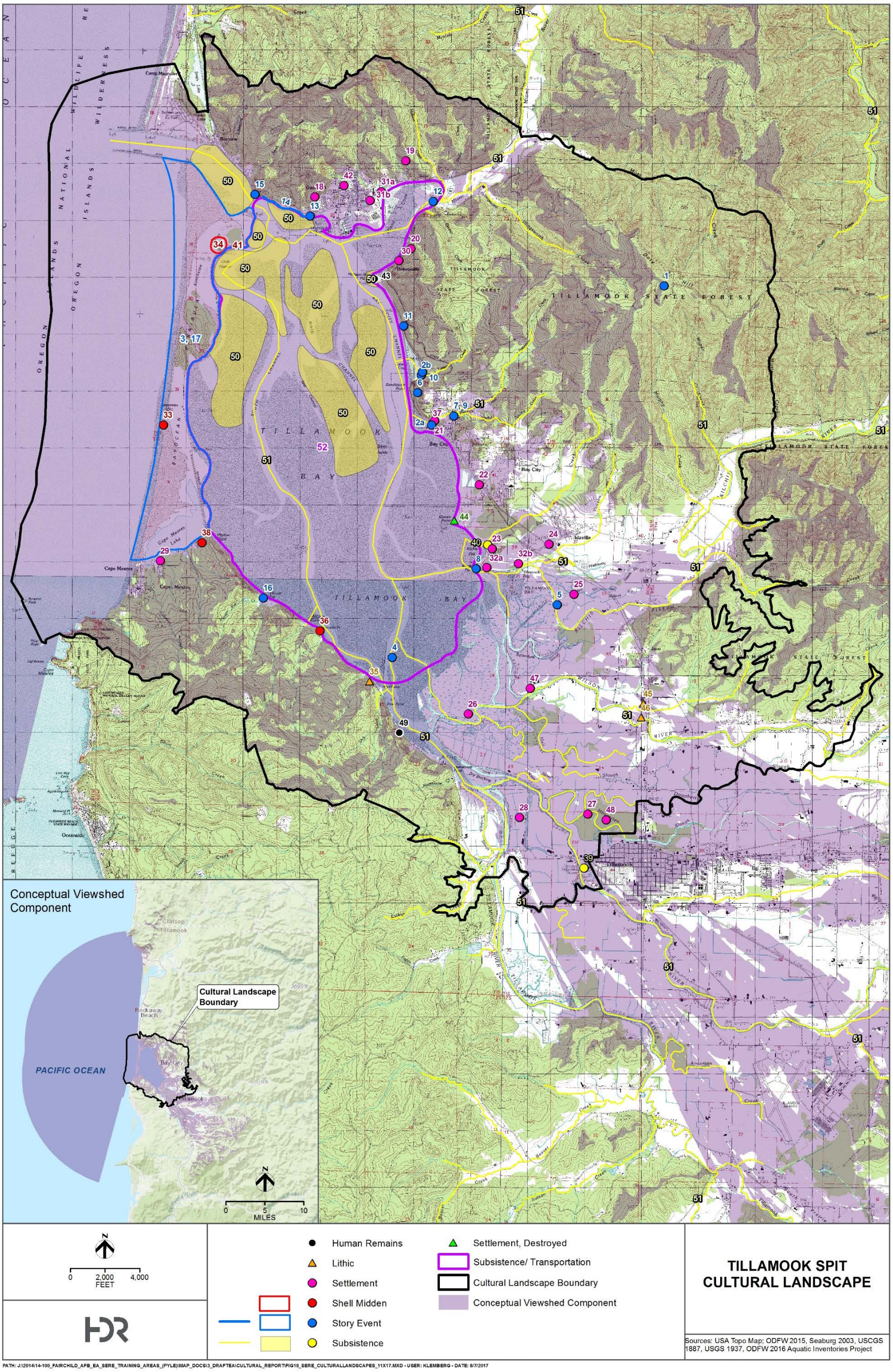
Figure 20. Detail of the Tillamook Spit Cultural Landscape.



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Story Event Locations

Our research identified 17 locations in the Tillamook Spit cultural landscape that are mentioned in various Tillamook narratives, including the epic detailing South Wind's ventures along the Oregon Coast. These locations reflect story events from the Myth Age, the Transformation Age, and the Period of True Happenings (see **Section 3.4.1**).

Myth Age

One Myth Age story event location is noted within sight of Tillamook Spit. The *Hill above Bay City*, concluded to be Doty Hill, is featured in the story titled "Yeyell, the Man Who Became an Elk" (Jacobs 1990:29). In the story, an old man processed the hides of his great-nephews' elk kills and eventually became an elk himself. Trying to get his uncle, the elk, out of the house to a "nice, pretty place" where the animal had pasturage, one of his great-nephews drove him to the "hill above Bay City." When the elk continued to grow upon arriving there, his great-nephew decided the elk needed a "larger place" and relocated the animal to an unidentified place.

Transformation Age

Several Transformation Age story event locations are noted within the Tillamook Spit cultural landscape. Each of these is featured in the South Wind story, as the Transformer-Trickster passes through the Tillamook Bay area, and is detailed below by recounting portions of the story as presented by Jacobs (1990) and Deur and Thompson (2008). The sequence of events follows Deur and Thompson (2008) since this source combines three versions of the South Wind narrative, as told to ethnographers in 1890, 1931, and 1933.

A *Creek This Side [north] of Bay City*, interpreted as either Patterson or Larson Creek, is featured when South Wind entered the Tillamook Bay area and noticed an attractive young girl taking a bath in the creek (quote in Jacobs 1990:124; see also Deur and Thompson 2008:17). From his position near the settlement of Bayocean, South Wind waded out and inserted his penis into the girl. South Wind became stuck, and both he and the girl nearly drowned when the tide rose. Once cut free "South Wind was left with only a piece of his penis. Part of it stayed in the girl, and the rest, which was all cut up, he left lying to form the sandbar [*Tillamook Spit*]. South Wind declared that "nothing but sand" would exist in this location, the mouth of Tillamook Bay would be very small, and shot-huckleberry and salal bushes would thrive on the spit.

Moving on to the south end of Tillamook Bay, South Wind removed a salmon from the *Tillamook River* and then stomped on the fish to flatten it (Deur and Thompson 2008:18). According to the story, this action led to flounders becoming more prevalent in the river than salmon. While on the Tillamook River, South Wind also eliminated camas roots near its headwaters and, at its mouth, declared that women he encountered would gather clams there only at the ebb tide. South Wind then gave the women the Tillamook language. South Wind also transformed the "wide" mouth of the Tillamook River into one with "quantities of sand," perhaps referring to sandbars at the river's outlet into the bay.

Upon reaching the *Kilchis River*, South Wind caught and roasted some salmon (Deur and Thompson 2008:18). He then relaxed, covered his eyes, and began humming a song while keeping rhythm on his breast. When he looked up, the salmon was dancing. Looking away, he continued humming the song in the same manner as before. When he looked up again, the salmon had vanished, and he admonished himself for behaving "foolishly."

South Wind created the *Rock at Bay City*, interpreted to be the outcrop at Sandstone Point, from an old woman he encountered during his journey (Deur and Thompson 2008:18-19; Jacobs 1990:125-126). South Wind met the woman as she was heading toward Kilchis Point to visit her sick granddaughter. After giving South Wind cooked camas roots, the woman tried to leave; however, South Wind put a spell on her so that when she walked she would never get anywhere. Afterward, he cut his penis into three pieces, each of which became a dog, and again approached the woman. The dogs begged for the woman's camas roots, which she thought was strange since dogs did not typically like them. Suspecting the man was South Wind, the woman gave him a pack of roots and told him to go eat them where there was no wind. When he sat down to eat, bumblebees escaped the pack and stung him. South Wind found the old woman and turned her into the "rock right there at Bay City," on which people would thereafter "sharpen their knives" (Jacobs 1990:125-126). After eating his fill of the roots, South Wind tossed out the remainder, creating a *Camas Field at Bay City*, within the Tillamook Spit cultural landscape, as well as camas fields at Grand Ronde, Tillamook, Wilson River, Kilchis River, Bay City, and Onion Peak (Deur and Thompson 2008:19; Jacobs 1990:126).

After tossing the roots, South Wind proceeded to *Kilchis Point*, where he found the old woman's sick granddaughter (Deur and Thompson 2008:20-21; Jacobs 1990:126-127). South Wind realized this was the girl who still had a portion of his penis inside of her, and he concluded that was what caused her illness. Posing as a doctor, he copulated with the girl and rejoined the portion inside of her with the portion still attached to him. The girl rapidly improved and tried to pay him in elk skins. South Wind refused, saying that thereafter only women would be paid for intercourse and not men.

Bay City is featured in the epic again when South Wind visited several houses there (Deur and Thompson 2008:21; Jacobs 1990:127). At one house, he ate very oily cockles. As he did, he poured out the oil and thought to himself that clams should have only water and they should be lean in the spring. Afterward, South Wind approached another house[9] and, before going in, removed his penis and transformed it into a wooden clam digger. When he entered the house, he told a woman that she could have his digging stick and the woman went outside to see it. South Wind suggested she rub the stick to feel how smooth it was. As she did, the stick slowly transformed back into flesh and, realizing the stick was actually South Wind's penis, she threw it into the fire. South Wind quickly retrieved and reattached it, saying, "It's a fine thing when a woman will play with the penis of a stranger the first time he comes to her house."

From Bay City, South Wind "went downstream"[10] and came upon a whale *Right by Bay City* (Deur and Thompson 2008:22; Jacobs 1990:124-125). He wanted to process the whale but had no way to do so. He decided to trick Flint, who resided at Hobsonville, and Copper, who lived at the Point at Bay City, into fighting so he could obtain flakes from Flint with which to process the whale. South Wind traveled to the home of each to say that the other had spoken badly of him and wanted to fight. At South Wind's prompting, the two met *Halfway between Hobsonville and the Point at Bay City*,

[9] In Jacobs (1990:127), both the oily clam event and the clam digger event occur at the same house.

[10] In Jacobs (1990:124), this event occurs immediately after Tillamook Spit is formed from South Wind's penis. Based on historical maps, going downstream from Bay City would have placed South Wind near the outlet of Patterson Creek.

interpreted as Sandstone Point. During their fight, South Wind collected the flakes and then exclaimed that they should stop fighting, as there was a whale on the beach to cut up.[11]

After meeting another woman north of Bay City and sending her to the location of the beached whale, South Wind had three encounters with females near Garibaldi (Deur and Thompson 2008:23; Jacobs 1990:128). At the *River near Garibaldi*, approximated at the mouth of the Miami River, he sees a family coming downriver in a canoe. Feeling attracted to the young woman aboard, he transformed himself into a crying baby on a rock in the river. The family retrieved him from the rock, but the baby would not stop crying until he was handed to the young woman. South Wind felt inside her skirt to her genitalia. The young woman flung the baby into the water, saying he was bad, and South Wind became himself and fled. At *Old Garibaldi,* two women observed South Wind and made plans to seduce him and cast a spell to make him impotent. Suspecting their intent, South Wind declared that they were stinkbugs and the women gave up. Westward from there, South Wind noticed two pretty girls and decided to "tackle them." They made love with him, pulling him into and under the water, where they lived, and nearly causing him to drown. Eventually, South Wind asked to be freed and they let him go. He emerged from the water at Barview.[12] During this event, South Wind presumably traveled *In the Water between Garibaldi and Barview*.

Once he climbed up onto the beach, South Wind formed the *Steep Bluff and Rock Cove at Barview*, interpreted as the western slope of Green Hill and large rocks in the surrounding water (Deur and Thompson 2008:23; Jacobs 1990:128-130).[13] Very cold from the wind but warmed by the sun, South Wind wished a bluff and rocks would surround him to form a sheltered cove, and they suddenly appeared. He soon fell asleep in the sheltered warmth. When he awakened, he was completely surrounded by rocks. Trapped, South Wind called Woodpecker and subsequently Yellowhammer to peck a hole in the rock and free him. South Wind noticed Yellowhammer was a woman and reached up and felt her leg, which angered Yellowhammer and prompted her to leave. South Wind escaped the rocks by dislocating parts of himself, including his eyeballs, and pushing them through the hole in the rock. Once free and reforming himself, he could not find his eyes, for Seagull and Raven had eaten them. He felt along the bank, found snowberries to place in his sockets to appear like eyes, and afterward encountered Bald Eagle, who said he could see halfway across the ocean. South Wind declared that he could see across the whole ocean. To experience the other's vision, the two exchanged eyes and South Wind quickly ran away, continuing his ventures northward beyond Tillamook Bay.

Period of True Happenings

Two Period of True Happenings story event locations are noted within the Tillamook Spit cultural landscape.[14] Both locations are featured in the story titled "Wild Woman," wherein several families

[11] The whale obtained from Bay City is also featured in the Period of True Happenings story titled "The Man who Visited South Wind." In the story, South Wind is said to consume this whale eternally and share it with the man from the Tillamook Bay area who visits him.

[12] Deur and Thompson (2008:23) specify Barview, whereas Jacobs (1990:128) does not mention a specific locale.

[13] Deur and Thompson (2008:52n39) note that the bluff and cove are still located at Barview and are featured in other Tillamook stories as "supernatural beings turned to stone."

[14] The villages around Tillamook Bay are mentioned in the Period of True Happenings story titled "The Man who Visited South Wind." In the story, a man regularly visited South Wind by traveling through a tunnel. The man would bring South Wind news of "what had been happening up around Tillamook Bay, what people had been doing and how they had been behaving." If people were being mean, South Wind would reply that he would punish them, and then the Transformer-Trickster would send a sickness to the mean people (Jacobs 1990:155). This is not included as

based at *Flower Pot* taught their children not to eat when adults were not present (Jacobs 1990:158-160). One day, the children were alone, and all but the oldest and youngest consumed some salmon eggs. Soon afterward, Wild Woman burst into the house, tossing in sharp stakes before her. After smelling the mouths of the children, Wild Woman made mute those who had not been eating and staked and began to roast those who had. The adults, within view of the house as they dug clams, noticed smoke coming from the house and decided to investigate. Wild Woman saw them coming and vanished. When they saw what was happening inside, the adults knew it was the work of Wild Woman. Afterward, the father of the family that lost the most children had his family relocate to houses on the nearby sandspit [*Tillamook Spit*], said to be "a summer place for drying clams." The father stayed behind and waited for Wild Woman to return. When she appeared, he stabbed her eyes, clubbed her, and burned her and all of the house lumber on top of her. Then, he joined his family on the spit. According to the story, from that time, no one lived in the settlement at Flower Pot again.

Village and Archaeological Site Locations

HDR identified a total of 12 permanent village locations and twenty known archaeological sites within the Tillamook Spit cultural landscape. These are grouped based on function and described in some detail below. More detailed information on these cultural resources is available in **Table 10** and **Appendix D**.

Village locations represent known pre-contact to historical period settlement areas where local Native people based their families, found security, and sought alliances to help ensure the collective well-being of local inhabitants. All 12 identified villages are shown on a map of mid-nineteenth century village locations presented in Seaburg (2003:Map 3). Seven archaeological sites documented by the Oregon SHPO are interpreted as archaeological remains of six of the villages reported by Seaburg. Moving in a clockwise direction around Tillamook Bay, from its northernmost point, these consist of the Nehalem Tillamook villages of Nəsxəwəqᵇan, Kil-har-hurst (35TI007, Unidentified Site 01), Nəsga-ga-ɬ (35TI006), Nəsxenus (35TI060), Distənəqs, Kil-har-nar (35TI009), Cohələʔəqs, Nəxeinəgi, Chish-ucks (Unidentified Site 06), Thu-qa-tən (Unidentified Site 07), Chuck-tins, and Skənəyiwəs. Seaburg (2003:2) reports that these are the locations of "historically attested Nehalem villages" of the mid-nineteenth century. Associated archaeological remains attest to their use in the pre-contact period as well. A thirteenth village site (Unidentified Site 03) may have once been extant in the cultural landscape; however, the Oregon SHPO reports this site as destroyed. The existence of villages supporting centuries-old human settlement in the Tillamook Spit cultural landscape underscores the quantity and variety of natural and cultural resources available in the vicinity.

Nine archaeological sites identified in the Tillamook Spit cultural landscape contain shell middens or lenses, including those determined to be permanent villages or other resource types. Four of these are situated on or near Tillamook Spit (35TI010, 35TI011, 35TI079, and 35TI104), and the remaining five are located along the shores of Tillamook Bay (35TI007, 35TI009, 35TI013, 35TI060, and Unidentified Site 08). While three are definitively associated with historical Tillamook villages (35TI007, 35TI009, and 35TI060), most of the shell midden sites represent seasonal camps that people likely utilized for subsistence purposes at varying times of year. In the narrative of Wild Woman, Clara Pearson describes use of Tillamook Spit by local inhabitants as "a summer place for

a resource in the cultural landscape due to not being the location of the event but rather a reference to a location, only.

drying clams" (Jacobs 1990:160). Such cultural patterns undoubtedly characterize some human activities in the Tillamook Bay cultural landscape.

The remaining archaeological sites consist of three lithic scatters (35TI012) or lithic isolates (Unidentified Sites 04 and 05), two locations where human remains were documented (Unidentified Sites 02 and 08), one seasonal subsistence-related camp not identified as a shell midden (35TI090), and one site containing the remnants of a fish weir (35TI098). Considering their locations near permanent villages reported by Seaburg, these archaeological sites could be associated with long-term settlements. Based on ethnographic accounts (see **Section 3.2.1**), permanent villages were likely several hundred meters in length and conceivably had discrete locations where cultural materials were deposited. The archaeological sites could also represent the activities of settlement inhabitants in the immediate vicinity.

Subsistence Locations and Other Natural Resources

Countless subsistence locations are within the Tillamook Spit cultural landscape. The numerous archaeological sites evidencing local subsistence activities (35TI009, 35TI010, 35TI011, 35TI012, 35TI013, 35TI060, 35TI079, 35TI090, 35TI098, 35TI104, Unidentified Site 01, Unidentified Site 06, Unidentified Site 07, and Unidentified Site 08) along with HDR observations of elk, bird, and human subsistence and commercial fishing activities on and surrounding Tillamook Spit highlight the natural resources available to subsistence harvesters at varying times of year. In a report inventorying coastal Oregon sites between the Columbia and Coquille Rivers, Collins (1953:5) specifically highlighted the vast and varied natural resources available in and around Tillamook Bay:

> The shelter of Tillamook Bay provided excellent facilities for aboriginal survival. The sites in Garibaldi, Kilchis Point, Mamaloose Point, and along Bay Ocean Spit are excellent examples that habitation was dependent upon the bay's resources. The streams that feed into Tillamook Bay afforded excellent salmon reservoirs, and the rocks as well as the mud and sand banks are teeming with barnacles and marine mollusks (clam, Pecten, cockle, mussels, and chitons). The low, flat, rolling terrain afforded easy transportation by land; or if sea transportation was desired, the relatively calm Tillamook Bay was accessible for canoe travel.

The Oregon Department of Fish and Wildlife (ODFW) and the Tillamook Bay National Estuary Project document several areas in the Tillamook Spit cultural landscape where clams and crabs are abundant and salmon thrive. These locations are shown on **Figure 20** and represent the approximate vicinity of these resources historically. The ODFW also regulates elk hunting within the Tillamook Spit cultural landscape, specifically surrounding Cape Meares; however, this resource area is not mapped given the abundance of elk activity observed on Tillamook Spit and the animals' apparent availability across a broad portion of the Tillamook Spit cultural landscape. Given its diverse topography, abundant waterways, and niche ecosystems associated with these geographic features, the Tillamook Spit cultural landscape supports many other subsistence resources, including additional land mammals, a variety of plant resources, and sea mammals. To account for sea mammal use areas and based on Roulette et al. (2012:34), nearshore (within 20-foot depth of water) portions of the Pacific Ocean are included in the bounds of the cultural landscape. The cultural landscape also encompasses the cultural history-shaping waterway of Tillamook Bay.

6.2.3 Evaluation of the Tillamook Spit Cultural Landscape

HDR evaluated the Tillamook Spit cultural landscape for NRHP eligibility following the steps provided in NRB 38, as detailed in **Section 5.3.1**. To summarize, the four-step process of evaluating potential TCPs involves (1) confirming that the cultural resource is a tangible property and categorizing it as a particular NRHP property type, (2) assessing whether the cultural resource retains integrity of relationship and condition, (3) evaluating the cultural resource in relation to the four NRHP criteria, and (4) making any necessary criteria considerations based on attributes that may deem the cultural resource ineligible for the NRHP. The last three steps require close consideration of how the cultural group that ascribes value, in this case the Tillamook, associates with the cultural resource. Our analysis for each step in this process is described below.

Step 1: Tillamook Spit Cultural Landscape as a Tangible Place

The Tillamook Spit cultural landscape is a tangible place encompassing a natural landform (the spit) and natural and cultural resources within view of the spit. The cultural landscape as a whole is a type of district composed of sites and natural objects. Of the four cultural landscape types defined by the NPS, the Tillamook Spit cultural landscape fits the description of an ethnographic landscape. According to the NPS (1998:160), ethnographic landscapes are "associated with contemporary groups and typically are used or valued in traditional ways," such as through imbuing spiritual meaning or in representing an integral relationship of a cultural group with natural resources. Ethnographic landscapes are further defined as "areas containing diverse natural and cultural resources that associated people define as heritage resources" (NPS 1998:161). The Tillamook Spit cultural landscape is composed of natural objects, such as rocks and hills formed through story events, and sites, including many story event locations, archaeological sites, settlements, subsistence locations, and portions of or whole waterways.

Step 2: Assessing Integrity of the Tillamook Spit Cultural Landscape

The Tillamook Spit cultural landscape retains integrity of relationship and condition. Cultural associations regarding the Tillamook Spit cultural landscape largely center on its cultural history- and identity-shaping functions as a central settlement place for Tillamook people and its significance as a landscape intimately shaped by the Trickster-Transformer South Wind. Tillamook people maintain relationships with the cultural landscape through the featuring of the story of South Wind, ongoing use of the area, shared cultural memories of the area as a central settlement place for Tillamook people, and active participation in development decisions regarding it. Changes to the cultural landscape have not fundamentally altered these relationships, primarily because change and other transformations are integral to Tillamook people's pragmatic and spiritual understandings of the world. Evidence that the Tillamook Spit cultural landscape retains integrity of relationship and condition for Tillamook people is explored in more detail below.

Attesting to its centrality to the Grand Ronde, the story of South Wind is one of four narratives prominently featured in interpretive displays at the Grand Ronde's Chachalu Tribal Museum & Cultural Center, one of which pictures Tillamook Bay (**Figure 21**). In 2016, the Grand Ronde created an ArcGIS Story Map of South Wind's epic journey (Merrill 2016). ArcGIS Story Maps are interactive maps that use maps, pictures, figures, and narrative to guide a viewer through a particular story, and the use of this application demonstrates an intent focus on understanding how South Wind's actions transformed portions of the Oregon Coast, including the Tillamook Bay area. These tribal initiatives suggest that the South Wind story is considered integral to Grand Ronde tribal members and their cultural understandings of the world. In the tale, the Trickster-Transformer gave form to the natural

Figure 21. An Interpretive Display Featuring the South Wind Epic at the Chachalu Tribal Museum & Cultural Center.

world eventually inhabited by humans and defined cultural practices and beliefs that would assure human well-being in the transformed world (Beckam et al. 1984; Deur and Thompson 2008; Grand Ronde n.d.). In very real ways, the tale of South Wind signifies Tillamook understandings of and interactions with the natural environment. The telling of the story, reenacted during the true south winds of winter, may be understood by the Tillamook to bring on seasonal changes and, as such, fulfills the human role in triggering the start of spring (Deur and Thompson 2008; Jacobs 1990). The story embodies the Tillamook worldview by depicting transformations as a functional aspect of life—the acceptance of which is rooted in Coast Salish spiritual understandings and relationships with the world (Carlson 2001; Grand Ronde cultural resources staff, pers. comm. 2016).

The Grand Ronde continues to reinforce physical, cultural, and legal ties to the Tillamook Spit and Tillamook Bay vicinity. In September 2015, the Grand Ronde celebrated the receipt of 14 acres at Kilchis Point from Tillamook County and, at that time, announced plans to hold events and possibly construct a canoe landing on the property (Rhodes 2015). The Chairman of the Grand Ronde Tribal Council made the following remarks at the ceremonial exchange of land at Kilchis Point, demonstrating continued cultural attachment and alluding to the area as an important part of Tillamook cultural history and identities:

> This is a very historic day for Grand Ronde. … It looks like we have gone in a circle now to be able to actually own land here at Tillamook, near an old village site [Kil-har-nar]. … We are actually walking in the footprints of our ancestors. … I think it is a real honor to have a piece of land back at Tillamook. … This establishes a cultural foothold in Tillamook County. … You can talk about history and you can read about history, but when you actually own land … now we have a piece of our history. It completes the circle for us." [Rhodes 2015]

At the event, Grand Ronde tribal members shared traditional knowledge regarding the subsistence resources available in the Tillamook Bay area and recounted living there as children. The tribal newspaper reported that such recollections "reflect longstanding Tribal connections to the area" (Rhodes 2015). Tillamook people occupied the area at least into the 1940s (Deur and Thompson 2008:4), and clearly, many maintain knowledge and attachments to the area that contribute to their sense of identity.

Corroborating these ongoing associations, Grand Ronde staff emphasized the continued significance of the Tillamook Bay area to tribal Elders and their serious concern for the military activities conducted there. Elders perceive some camp activities to be potentially disrespectful to a place as significant as Tillamook Spit. For example, if latrines were dug to Tillamook living surfaces, their use may be considered a desecration of that culturally important layer. The Elders' concerns demonstrate ongoing sensitivities to human treatment of Tillamook Spit and a desire for modern-day users to show reverence for it. Evidently, Tillamook Elders maintain a cultural relationship with the Tillamook Spit area and perceive it as an important place worthy of concern and comment when proposed human activities seem incompatible with the veneration they hold for it.

Tillamook Spit and other resources in the cultural landscape have changed to varying degrees over time, particularly due to environmental changes as described in detail in **Section 2**. Tillamook Spit and many resources on the bay shores have been impacted by coastal erosion, sediment redistribution, and tectonic action, including subsidence and impacts from tsunamis. As discussed in **Section 2**, Tillamook Spit is a dynamic environment that has experienced cycles of erosion and accretion, even in modern times. Erosional processes led to a breach in Tillamook Spit in 1952, as

described in **Section 2.5**. Historical nautical charts, topographic maps, and aerials document subtle changes to the overall shape and width of the spit throughout the twentieth century (USCGS 1887, 1928, 1948; USGS 1937, 1985). Rather than signaling potential effects to Tillamook associations with the area, however, such transformations are an integral part of environmental understandings for the Tillamook and other Coast Salish people, as detailed in **Section 3.4.2** (Carlson 2001; Grand Ronde cultural resources staff, pers. comm. 2016). Tillamook people affirm that landscapes are dynamic—even landscapes that were created in the Transformation Era by South Wind. The creation of geographic features, even by powerful beings such as South Wind, does not imply a static quality or immunity to natural forces. Rather, to the Coast Salish, transformations are essential to the tribal worldview and spiritual understandings. Subtle or even dramatic environmental changes as well as culturally compatible human-use changes have not fundamentally altered Tillamook associations with the Tillamook Spit cultural landscape.

Step 3: Evaluating the Tillamook Spit Cultural Landscape for NRHP Eligibility

The Tillamook Spit cultural landscape is significant for several reasons. The cultural landscape is associated with aspects of Tillamook history that are integral to the people's cultural history—both in the lived-in, human realm, and in that of its creation—and that contribute to the people's sense of identity. Many parts of the cultural landscape were created or transformed by the Trickster-Transformer South Wind, also known as Our Grandfather, who readied the world for humans and defined many cultural practices through his actions. While several individual resources within the cultural landscape have transcendent importance to Tillamook people, the Tillamook Spit cultural landscape has more significance as a whole, due to the quantity of resources within its bounds, than each resource has individually. Growing knowledge about the relationship of the natural and cultural resources within the landscape could contribute to our broad understanding of Tillamook cultural traditions, lifeways, and worldview in the long-ago to recent past. Each of these aspects of importance is discussed below in relation to the four NRHP-eligibility criteria.

Importance as Central Settlement Place with Abundant Resources

Grand Ronde staff explained that the Tillamook Bay area is of utmost importance due to the long-range viewsheds of the area, its abundant natural resources, and its support of numerous Tillamook settlements and other uses from the pre-contact to late historical periods. Ethnohistorical and ethnographic accounts, beginning in the 1780s, attest to the centrality of Tillamook Bay for settlement and subsistence purposes. The bay and its resources so abundantly supplied Tillamook people with necessary resources that 12 permanent Nehalem Tillamook villages, some of which were first occupied early in the pre-contact period, clustered around the shores of Tillamook Bay in the nineteenth century (Seaburg 2003: Map 3). No other waterway occupied by Nehalem Tillamook people supported as many villages. The unique geographic and natural resources of the Tillamook Spit cultural landscape—including the many river mouths along Tillamook Bay, the spit, and other areas along the bay shore, and the abundant water and land resources within sight of these places—helped shape and sustain broad Coast Salish cultural patterns and suggest that the cultural landscape is eligible for listing in the NRHP under Criterion A.

Importance Due to Associations with South Wind and His Epic Tale

Tillamook Bay's close association with the Trickster-Transformer South Wind emphasizes the bay's centrality to all Tillamook people. South Wind is a central cultural figure due to his actions that shaped the human world and cultural patterns pertaining to it and that encouraged and continue to encourage Tillamook people to reflect on morals and help attune their own behaviors to that

perceived morally right (Deur and Thompson 2008:3; Grand Ronde cultural resources staff, pers. comm. 2016). While he visited many places, South Wind spent extended time in the Tillamook Bay area, where the Trickster-Transformer's actions frequently related to sexual escapades and often pertained to South Wind's penis. In the tribal view, the focus on genitalia and sexual acts sets the Tillamook Bay area apart and makes it more significant (Grand Ronde cultural resources staff, pers. comm. 2016). Grand Ronde staff offered that Tillamook Bay may have represented a place of moral reflection due to its connections with South Wind's morally questionable escapades. In addition to offering negative behavioral examples, South Wind shaped or otherwise influenced many places in the Tillamook Bay area. The geographic features and settlement places South Wind visited were those recognized by the Tillamook as the most important among a broad range of possible foci (Deur and Thompson 2008:7; Grand Ronde cultural resources staff, pers. comm. 2016). Its very specific and unique associations with South Wind—a figure that has deeply influenced Tillamook belief systems and identities and has, through remembered events, given depth and meaning to their daily practices and the geographic areas and natural resources they use—suggest that the Tillamook Spit cultural landscape is eligible for listing in the NRHP under Criteria A and B.

Importance in Embodying Distinctive Construction Methods and Representing a Distinguishable Entity

The association of the Tillamook Spit cultural landscape with the central cultural figure South Wind also relates to its very formation. Many geographic features and environmental characteristics within the cultural landscape were designed by the Transformer of the Tillamook human world. The particular method of construction used by South Wind closely followed Tillamook experiences. The Trickster-Transformer traveled from south to north as the actual south wind does in winter on the Oregon coast and gave form to the particular places and natural resources of central importance to Tillamook people (Deur and Thompson 2008). The methods he used and the very pattern, or design, he followed is very particular to the Tillamook worldview. As such, the Tillamook Spit cultural landscape embodies distinctive characteristics of a method of construction and, as a whole more than its parts individually, represents a distinguishable entity figuring prominently in traditional cultural beliefs. These characteristics suggest that the Tillamook Spit cultural landscape may be eligible for listing in the NRHP based on Criterion C.

Importance as a Source of Information

Much is known about human use of the Tillamook Bay area through ethnohistorical, ethnographic, and archaeological sources, as detailed in various sections above. However, the Tillamook Spit cultural landscape provides an opportunity to use a landscape approach in understanding more about the interrelationship of the tribal resources present and the myriad ways that Tillamook people maintain associations with the landscape. As such, the Tillamook Spit cultural landscape could contribute to our understanding of Tillamook cultural traditions, lifeways, and worldview in the pre-contact to late historical periods. This potential to yield important information about the past suggests that the Tillamook Spit cultural landscape may be eligible for listing in the NRHP under Criterion D.

Step 4: Determining Whether Any Criteria Considerations Deem the Tillamook Spit Cultural Landscape Ineligible

Consideration D, Cemeteries is the only criteria consideration applicable to the Tillamook Spit cultural landscape. As discussed in Step 1 above, the Tillamook Spit cultural landscape is composed of sites and natural objects. This includes two known sites where human remains have been reported (Unidentified Sites 02 and 08) and one site that may be associated with a nearby cemetery

(35TI060). The existence of burials and cemeteries in portions of the cultural landscape does not render the overall landscape ineligible for listing in the NRHP. Rather, their existence contributes to the importance of the Tillamook Spit cultural landscape by reflecting qualities of the area as a long-term, central settlement place of Tillamook people.

Summary of the Tillamook Spit Cultural Landscape Evaluation

In summary, the Tillamook Spit cultural landscape is an ethnographic landscape, a type of cultural landscape that can be defined as a district. Sites and natural objects compose the cultural landscape. Cultural associations regarding the Tillamook Spit cultural landscape largely center on its importance as a central settlement place for Tillamook people and physical connection to the Trickster-Transformer South Wind. The Tillamook Spit cultural landscape retains integrity of relationship through the featuring of the story of South Wind, ongoing use, shared cultural memories, and active participation in decisions regarding the landscape. Changes to the cultural landscape have not fundamentally altered these relationships because transformations are integral to Tillamook people's pragmatic and spiritual understandings of the world. The unique geographic and natural resources of the Tillamook Spit cultural landscape and the meaning imbued through the actions of South Wind helped shape and sustain broad Coast Salish cultural patterns and beliefs. The landscape is intimately associated with the Trickster-Transformer South Wind, the central cultural figure who readied the world for humans and shaped cultural patterns through his actions. The landscape's formation by South Wind is representative of the unique Tillamook worldview and a particular traditional cultural method of construction, and these aspects distinguish it, as a whole, in Tillamook understandings. Understanding more about the interrelationship of the tribal resources in the cultural landscape and the myriad ways Tillamook people maintain associations with it could yield information important to the pre-contact to late historical periods. Together, these characteristics suggest that the Tillamook Spit cultural landscape may be eligible for listing in the NRHP under Criteria A, B, C, and D.

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7 Synthesis

This section revisits the research questions described in the research design (**Appendix A**) and summarizes HDRs findings as explored through **Sections 2** through **6**.

7.1 Native American Use of the Bayocean Peninsula

Research Questions: *What is currently known about Native American use of the Bayocean Peninsula and surrounding coastal areas? What kinds of activities would be expected on the Bayocean Peninsula, based on known site types and activities from nearby locations?*

Section 4 presents details on several archaeological sites studied at Tillamook Bay, Netarts Bay, and Nehalem Bay. Based upon this literature review and field investigations on the Bayocean Peninsula, several inferences can be made regarding Native American use of the peninsula and surrounding coastal areas.

The Tillamook used sandspits for the same range of activities that are represented at archaeological sites on landward margins of estuaries, including hunting of sea and terrestrial mammals, shellfish gathering, and fishing. One oral narrative from the Tillamook describes “a summer place for drying clams” on the Bayocean Peninsula during prehistoric times (Jacobs 1990:160). Archaeological sites at Netarts, Bayocean, and Nehalem are almost exclusively found on the bay sides of sandspits. Ethnohistorical and archaeological data indicate winter villages were typically located along the coast (Boas 1923; Jacobs 2003). The bay-side environment on sandspits are typically better sheltered than exposed western areas and would have provided relief from harsh winter storms. Ocean-side areas were also likely used in the summer and winter; however, evidence of any such use would be expected to quickly erode away from high energy waves and storms.

Ethnohistorical details and ethnographic discussions with the Grand Ronde demonstrate the Bayocean Peninsula is seen as an integral part of the bay environment. Although the bay has a large circumference, villages were connected by line of sight and were easily reached by canoe across the bay. Hobsonville, directly opposite Tillamook Bay from the helicopter landing site at Kincheloe Point, would have been about a 45-minute canoe ride from the point (Grand Ronde cultural resources staff, pers. comm., 2016). The spit has increased importance within the Tillamook Bay landscape because of high visibility to and from resource areas throughout much of the watershed.

Sandspits, and particular the Bayocean Peninsula, are dynamic environments. Geological and archaeological studies indicate the Bayocean Peninsula has experienced periodic breaches and washovers over at least the past 1,000 years. Given the cyclic nature of CSZ earthquakes, it is reasonable to conclude such events occurred regularly even further back in time. However, as Losey (2002) demonstrates, catastrophic events such as earthquakes and tsunamis did not necessarily cause prehistoric peoples to abandon coastal areas, although ecological shifts did sometimes cause changes to subsistence strategies.

7.2 Geomorphological Development of the Peninsula

Research Questions: *How have geomorphological processes influenced the development and environments of Tillamook Bay and the Bayocean Peninsula? How has the coastline changed over time in relation to the Bayocean Peninsula? What are the implications for archaeological site preservation and the potential for deeply buried or submerged sites?*

As discussed in **Section 2**, geologic and geomorphologic studies demonstrate the Tillamook area was extremely dynamic between 9000 BP and 6000 BP as river valleys became inundated and transitioned into an estuary. As sea levels began to stabilize around 6000 BP, the bay began to represent its current form. However, tectonic uplift and subsidence along the CSZ and potentially along local faults continued to influence the bay's environment by exposing then abruptly subsiding potential living surfaces immediately along the coast (Darienzo 1991; Darienzo and Peterson 1995; Goldfinger 1994; McNeill et al. 1998). Tsunamis have likely affected the integrity of the Bayocean Peninsula, at times causing breaches through the bay's protective barrier (Komar et al. 2004). Breaching could also result from particularly powerful storms or from landslides on adjacent headlands that could have changed wave patterns and littoral drift. As discussed in **Section 4.2.1**, these types of events may explain ecological transitions in the estuary, especially in the types of shellfish that might have been available to prehistoric populations (Woodward et al. 1990).

Sediment cores from Tillamook Bay indicate rapid sedimentation that approximated the rate of sea level rise between 9000 BP and 6000 BP (Glenn 1978). Prior to Holocene in-filling, the Miami and Kilchis-Wilson-Trask-Tillamook River valleys were deep, with evidence of 30 m or more of sedimentation in some areas (Glenn 1978). Oregon's archaeological record is scant for the Early Holocene/Early Archaic periods between about 10,000 BP and 5500 BP and coastal erosion has been cited as one possible cause for this paucity of sites. However, it seems probable that remains of prehistoric use and occupation in the ancient river valleys could be deeply buried within the bay or even west of Tillamook Bay. On the other hand, intact archaeological sites older than one or two thousand years would generally not be expected on the Bayocean Peninsula. Although hypotheses for the timing and development of the spit vary, it is clear the spit did not exist in its present location until some time after 6000 BP. Since its development, it appears the spit has gone through cycles of accretion and depletion with at least some portions of the spit eroding away entirely over at least the last 1,000 years (Komar and Terich 1974; Komar et al. 2004; Woodward et al. 1990). Cooper's analysis of sand dune formations indicates some continuity over time in the north-central portion of the spit, where intact sites would be most likely.

7.3 Prehistoric Use of Shipwrecks

Research Questions: *What archaeological evidence exists at the Bayocean Peninsula for Native American use of shipwrecks? What is the potential for such use?*

This study did not identify any evidence for Native American use of shipwrecks on the Bayocean Peninsula. However, such use is well documented at a number of archaeological sites along the northern Oregon Coast, including 35TI001 at Netarts Bay and several archaeological sites at Nehalem Bay. Known archaeological sites on the Bayocean Peninsula have not been tested or excavated; therefore, it is possible that these sites do contain evidence of shipwreck use that has not been identified to date.

7.4 Presence of Significant Archaeological Sites

Research Questions: *Are significant archaeological sites present that could be adversely affected by proposed training activities? In particular, are significant subsurface deposits present?*

The field survey did not identify archaeological materials or sites in the APE. Previously recorded site 35TI104 is adjacent to the medic camp and is unevaluated for NRHP eligibility. The site has not been tested, but contains a shell midden that is exposed 5 m up the slope of a small hill. The midden contains faunal remains, charcoal, lithic debris, a fragment of cobalt glass, fire-cracked rock, and a hearth. Shovel testing adjacent to the site did not identify any deposits extending beneath fill material into the medic and instructor camp areas or the helicopter landing site. HDR was unable to determine the source of the fill material or what ground work may have occurred to prepare the site for fill and it is unknown if portions of the site were destroyed.

Archaeological sites were not expected at the student camps on the west side of the spit given the extent of beach erosion and development over the last 75 years. It was unclear from aerial imagery whether any of the camps included portions of beach that were extant prior to rapid accretion in the twentieth century. Far eastern areas of the camps are densely vegetated and likely include some older surfaces; however, as reported in **Section 6.1.2**, these areas were excluded from shovel testing as camp activities would be limited to the foredunes. Shovel testing in the dunes identified modern materials at depths of up to 1 m below the surface, indicating recent deposition.

7.5 Traditional Cultural Properties

Research Question: *What Traditional Cultural Properties (TCPs) may be connected to this landform and may be adversely impacted by this undertaking*?

As detailed in **Section 6.2**, this study identified the Tillamook Spit cultural landscape, consisting of Tillamook Spit and numerous natural and cultural resources proximal to the spit. Natural objects, story event locations, archaeological sites, settlements, subsistence locations, and portions of or whole waterways are the various resources that compose the cultural landscape. Cultural associations regarding the Tillamook Spit cultural landscape largely center on its importance as a central settlement place for Tillamook people from the pre-contact to late historical periods and its intimate formation by the Trickster-Transformer South Wind. The Tillamook Spit cultural landscape may be eligible for listing in the NRHP under Criteria A, B, C, and D.

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8 Conclusions

The field investigation completed as part of this study did not identify any archaeological sites within the Direct APE. However, previously recorded site 35TI104 is adjacent to the medic camp and is also near the instructor camp. Site 35TI104 is unevaluated for NRHP listing and is considered eligible for the purposes of considering the Undertaking's potential to cause adverse effects. Consultation with the Grand Ronde and a literature review for known and potential resources in the indirect APE resulted in the definition of the Tillamook Spit cultural landscape. The landscape was evaluated as potentially eligible for NRHP listing under Criteria A, B, C, and D. The landscape is recommended as "potentially eligible" rather than "eligible" due to complexities of scale, land ownership, and the need for more detailed recording and evaluation of the individual resources within the landscape, which was outside the scope of this investigation. As with site 35TI104, the Tillamook Spit cultural landscape is considered eligible for NRHP listing for the purposes of assessing the potential for the Undertaking to cause adverse effects.

8.1 Potential for Adverse Effects

The following recommendations are provisional and relate specifically to the two resources identified during this inventory: site 35TI104 and the Tillamook Spit cultural landscape. The USAF has yet to make a determination under 36 CFR 800.5 as to whether the Undertaking would affect historic properties.[15]

HDR recommends the Undertaking would have no adverse effect on either site 35TI104 or the Tillamook Spit cultural landscape. Shovel testing at the medic camp, instructor camp, and helicopter landing site indicated site 35TI104 does not extend into training support areas. Further, the camp areas are clearly defined by a border of dense vegetation and are covered with 20 to 40 cm of cobble and gravel fill that creates a durable surface. The site is flagged for avoidance and marked on maps used by trainers during the biannual SERE training. The site is exposed on a hill slope above the two-track Bayocean Dike road and artifacts were observed in the roadbed. This erosion appears to be natural, as the exposed slope is steep and animal tracks indicate deer and elk appear to traverse the slope periodically. Training vehicles are restricted to the existing road bed. Although the USAF sometimes conducts road maintenance of the Bayocean Dike Road, this maintenance is directed at erosion caused by wave action much further south of the training areas. The USAF's permit with the Corps prohibits grading or road maintenance activities in vicinity of the site.

The Project is not expected to adversely affect the Tillamook Spit cultural landscape. The landscape's significance centers on being a central settlement place for Tillamook people from the pre-contact to late historical periods and due to being shaped by the transformative actions of South Wind. As related by Grand Ronde staff during discussions over the course of this investigation, tribal Elders had serious concern that some training activities could constitute desecration of culturally important layers; however, shovel testing on the spit indicates that all activities would occur on modern soil and fill deposits and would not have potential to encounter cultural layers. As discussed in **Section 3.4.2**, the Grand Ronde staff indicated that non-Native uses of a traditional Tillamook area are acceptable as long as they are not substantially different from Native peoples' changing use through time. The Grand Ronde staff agreed that Project activities, which largely consist of human groups gathering or utilizing natural materials and subsistence foods from the surrounding area and

[15] Readers interested in the final outcome of the Section 106 consultation for the Undertaking should contact Environmental Element Chief, Fairchild Air Force Base, Washington.

slightly modifying natural areas for camping activities, are not incompatible with traditional uses and therefore will not diminish the qualities that the tribes ascribe to the spit as a property of traditional religious and cultural importance.

8.2 Recommendations

Based on the analysis in this report, The USAF seeks concurrence from the Oregon SHPO on the recommendation that the Undertaking will have “no adverse effect” on 35TI104 or the Tillamook Spit cultural landscape for the 5-year permitted duration of the SERE training. HDR makes the following recommendations regarding training activities that will further reduce potential for cultural resource impacts and encourage continued partnership with the Grand Ronde and other interested tribes. Many of these measures are already incorporated into the SERE Undertaking or reflect existing USAF procedures and do not require a formal agreement with the SHPO or Grand Ronde.

- Limit vehicle use of the road adjacent to site 35TI104 by parking vehicles at the medic camp whenever possible.
- Continue to maintain avoidance flagging of site 35TI104 during training activities. Continue to mark the site for avoidance on training maps.
- Do not conduct road maintenance activities adjacent to the site boundary.
- Continue to provide cultural sensitivity training to SERE training participants and, in consultation with the Grand Ronde, include discussion of the cultural significance of the Tillamook Spit cultural landscape.
- Continue meaningful consultation with the Grand Ronde and other interested tribes, to include the Confederated Tribes of the Siletz Reservation, about SERE training activities and potential tribal partnerships. The Grand Ronde have suggested the possibility of trainers taking advantage of their time on the spit to collect data, such as taking regular photographs of the changing environment.

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Appendix A. SERE Research Design

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Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training

Tillamook County, Oregon

March 2016

HDR ROLE
Environmental Consultant

LOCATION
Tillamook County, Oregon

TYPE OF WORK
Cultural Resource Investigation

PRIMARY CLIENT
United States Air Force

Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training

United States Air Force

Tillamook County, Oregon

By

Elizabeth Leclerc

Principal Investigator: Wayne Glenny, M.A., RPA,

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Abbreviations and Acronyms

APE	Area of Potential Effect
CFR	Code of Federal Regulations
ft	foot/feet
GPS	Global Positioning System
m	meter
MNI	minimum number of individuals
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NISP	number of individual species present
NRHP	National Register of Historic Places
SERE	Survival, Evasion, Resistance, and Escape
SHPO	State Historic Preservation Office
STP	Shovel Test Probe
UOMNCH	University of Oregon Museum of Natural and Cultural History
USACE	U.S. Army Corps of Engineers
USAF	U.S. Air Force
USC	United States Code

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1 Introduction

The U.S. Air Force (USAF) seeks to renew their permits for Survival, Evasion, Resistance, and Escape (SERE) Specialist Training on the Bayocean Peninsula in Tillamook County, Oregon (Project). The training would take place on public land managed by the U.S. Army Corps of Engineers (USACE), Tillamook County, and Oregon State Parks and Recreation. As part of this permit renewal, and in accordance with the National Historic Preservation Act (NHPA), Title 54 United States Code (USC) 306108, and the National Park Service's implementing regulations (36 Code of Federal Regulations [CFR] 800), the USAF must determine if the training activities would adversely affect historic properties, which refers to cultural resources listed on or eligible for listing on the National Register of Historic Properties (NRHP). Archaeological, architectural, and Native American resources are also protected by a variety of state and federal laws and their implementing regulations including the Archeological and Historic Preservation Act of 1974; the Archaeological Resources Protection Act of 1979; the American Indian Religious Freedom Act of 1978; the Native American Graves Protection and Repatriation Act of 1990; Oregon Revised Statutes (ORS) 97.740 to 97.760, Indian Graves and Protected Objects; and ORS 358.905 to 358.961, Archaeological Objects and Sites.

The USACE performed an archaeological study in 2012 for the purposes of identifying historic properties in the proposed training areas. Although the Oregon SHPO concurred with the findings of the USACE's survey, the Confederated Tribes of Grand Ronde (Grand Ronde) have voiced concerns over the previous work and has asked the USAF to do further study. Specifically, the tribe would like a more in-depth historical review of Native American use of the Bayocean Peninsula than was presented in the USACE report. Further, the tribe is concerned about potential for unidentified buried deposits that could be disturbed by manual excavation during training exercises. The USAF contracted HDR Inc. (HDR) to perform cultural resources investigations to satisfy the Grand Ronde's concerns and USAF's responsibilities under the NHPA.

This research design defines the research goals and methodological techniques that will guide a historical review of the Bayocean Peninsula and archaeological investigation to identify surface and subsurface sites in the Project area. The rest of this introduction describes the USAF's proposal and the area of potential effect (APE). Chapter 2 describes the environment, previous archaeological investigations in the Project area, and a historical overview. Chapter 3 outlines the study's goals, research questions, and expectations. Chapter 4 discusses the methods and techniques that will be employed to achieve the research goals and the dissemination of final results. Chapter 5 presents the project team that will execute the proposed study.

1.1 Description of the Proposed Undertaking

The USAF proposes to renew three permits that would allow the 336th Training Group at Fairchild Air Force Base to continue SERE Specialist coastal and open ocean training at the Bayocean Peninsula in Tillamook County. The 336th Training Group has conducted biannual training in this area since the 1980s. The USAF holds permits with Tillamook County, Oregon State Parks, and the USACE Portland District, which allow the USAF to access Bayocean Peninsula, Kincheloe Point, and the Tillamook Bay South Jetty for SERE Specialist training. The permits require USAF to improve roads or reimburse the county for improvements, minimize vegetation damage, and abide by recommendations for the western snowy plover and its critical habitat on the peninsula. The Oregon State Parks permit also requires the USAF to restrict campfire size; refrain from landing helicopters on the beach except in an emergency; and

dismantle camps, fill in holes, and clean any sites to pre-existing conditions upon conclusion of each training session. The USACE permit requires USAF avoid previously recorded archaeological sites 35-TI-11 and 35-TI-104.

The coastal and open ocean training requires students to demonstrate navigation skills using natural land features; procure animal and plant life for food and shelter; construct a variety of fires and shelters; and demonstrate proficiency of these techniques in coastal and open ocean environments. The training would be conducted over a 6 day period twice per year with up to 50 students and 13 instructors. The training uses both the bay and ocean sides of the peninsula and open ocean areas off-shore of the peninsula in the Pacific Ocean. During the training, students use local materials to build shelters and fires; excavate latrines and water table pits; and gather shellfish for consumption. The training includes navigation, landfall training, and helicopter operations in the open ocean and helicopter operations in the bay. Transportation to the training area involves the use of 6 to 11 support vehicles, typically consisting of two 2.5 ton cargo trucks, one ambulance, one 45-passenger bus, and up to seven four-wheel drive pickups.

1.2 The Area of Potential Effect

SERE Specialist training activities have potential to impact cultural resources through ground disturbing activities associated with the excavation of water table pits and latrines at student camps. Water pits would measure 3 feet (ft) long by 3 ft wide and 1 to 2 ft deep. Latrines would measure 2 ft long by 2 ft wide by 3 ft deep. Surface disturbance at support camps and the helicopter landing site also have potential to impact cultural deposits.

The area of potential effects (APE) is described as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.” (36 CFR 800.16(d)). The APE may be different for different types of effects. The direct effects APE for the SERE training is defined as the areas on the peninsula where training activities could cause direct, physical disturbance to a historic property. This area consists of the instructor camp, medic camp, helicopter landing zone, and each of the student camps (Figure 1). The APE at the student camps includes a 100 m radius around a central point at each camp but excludes areas that are within the Snowy Plover Recreation Management Area (RMA), which SERE training activities must avoid (Figure 1). The USAF would use an existing road to access the SERE training areas. This road is not included in the APE since its use is consistent with present conditions.

We have assigned an indirect APE to address potential, non-physical, and indirect impacts to Traditional Cultural Properties (TCPs) that may be connected to the Bayocean Peninsula (see Research Question 5 under Section 3.2). The indirect APE is defined as those areas surrounding Tillamook Bay with direct line of site to at least one of the proposed camps or helicopter landing zone, to a distance of 10 miles.

1.3 Permit Requirements

The direct effects APE includes public lands managed by the USACE and Tillamook County. The direct effects APE does not include areas below the high water mark, which are state-owned. HDR is consulting with the USACE to determine if they require an ARPA permit for this investigation. HDR would ensure the survey meets the permit requirements. HDR is also applying to the Oregon State Historic Preservation Office (SHPO) to obtain a state permit for archaeological investigations, pursuant to ORS 358.905 to 358.961, and has an agreement with UOMNCH for curation of archaeological and project materials (Appendix B).

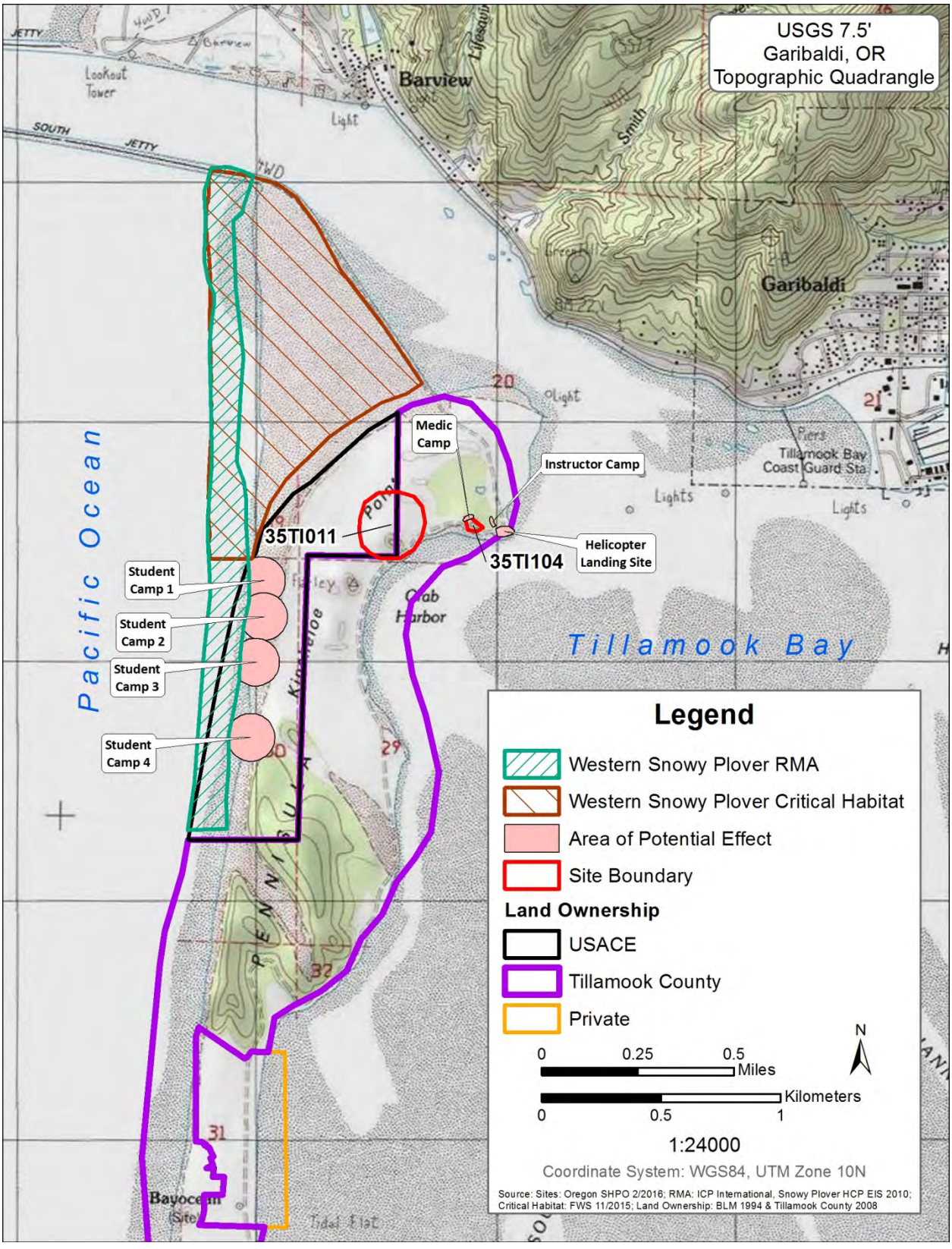

Figure 1. Area of Potential Effect

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2 Background Research

2.1 Environment

Bayocean Peninsula is a sand spit that extends north from Cape Meares and encloses much of Tillamook Bay, with a channel into the bay north of the spit. The sand spit is 4.0 miles long and ranges from approximately 0.4 mi to 0.7 mi wide. The west, ocean-side of the peninsula primarily consists of beach and low, hummocky active foredunes. The central portion of the peninsula and Kincheloe Point in the northeast are composed of large, steep dunes with a maximum height in the central part of the peninsula of 150 ft (46 m).

Climate along the Oregon coast is characterized by mild temperatures with wet winters and comparatively dry summers. Coastal areas receive annual precipitation between 65 and 90 inches, although the western slopes of the Coastal Range may receive up to 200 inches per year. Average high temperatures in Tillamook County range between 49 degrees in the winter and 68 degrees in late summer. Average low temperatures vary from 36 degrees to 50 degrees.

Bayocean Peninsula is part of the Rockaway littoral cell, which extends from Cape Meares at the south end of the peninsula to Neahkanie Mountain, 17.5 mi to the north. Severe erosion in the early twentieth century ultimately led to the peninsula's breach in 1952. The erosion stemmed in part from construction of the North Jetty in 1917 and its extension in 1932-1933, which prevented summer-time littoral drift from replenishing sands eroded away by strong winter storms (Terich and Komar 1973). The Corps built a dike in 1956 to seal the breach and constructed the South Jetty 1969-1979 to decrease erosion on the peninsula, sedimentation in Tillamook Bay, and shoaling in the channel. The shoreline of the southern peninsula appears to have since stabilized and the northern third continues to accrete at a rate of 0.7 to 1.0 m per year (Allan et al. 2015).

Bayocean Peninsula is near the Cascadia Subduction Zone, a geologically active area of the Oregon and Washington coasts where the thin, oceanic Juan de Fuca Plate is converging with and sliding beneath the continental North American Plate. Frictional stress along the subduction zone can lead to earthquakes and associated tsunamis and land subsidence along the coast. The most recent subduction zone earthquake occurred in AD 1700, producing a tsunami that may have reached a height of about 5 m and resulting in land subsidence of about 1 m around Tillamook Bay (Komar et al. 2004; Losey 2002).

Tillamook Bay is the third largest estuary in Oregon, covering approximately 8,330 acres. It is also shallow, averaging 6.5 feet deep, and three-quarters of the bay's bottom area is exposed at the lowest tides. The bay's hydrology is dominated by semidiurnal tidal flows, with a mean tide of 5.6 ft and extreme tides of 13.5 ft. Five rivers discharge into Tillamook Bay: the Miami, Kilchis, Wilson, Trask, and Tillamook Rivers. Habitat types within the bay include intertidal and subtidal mudflats and sandflats, rocky substrate, channels, salt marshes, eelgrass beds, and oyster beds).

The bay supports numerous species of estuarine, marine, and anadromous species of fish, including salmon (*Oncorhynchus spp.*). The bay also supports four species of clams (cockles [*Clinocardium nuttallii*], butter clams [*Saxidomus giganteus*], gaper clams [*Tresus capax*], and littleneck clams [*Protothaca staminea*]) as well as pacific oysters (*Crassostrea gigas*). Harbor seals (*Phoca vitulina*) are present in Tillamook Bay; California sea lions (*Zalophus californianus*) and harbor porpoise (*Phocoena phocoena*) have been recorded in ocean areas near Bayocean Peninsula (Adams et al. 2014).

The low, hummocky fore dunes along the west side of the peninsula are vegetated with sparse grasses and Scotch broom. Stabilized areas of the peninsula are densely vegetated with Shore pine, Sitka spruce, and an undergrowth of European beach grass, Kinnickkinnick, and Scotch broom. The peninsula supports small rodents, rabbits, Columbia black tailed deer (*Odocoileus hemionus columbianus*), and Roosevelt elk (*Cervus Canadensis roosevelti*) (336th TRG 1997).

The peninsula and Tillamook Bay also support many species of waterbirds, including common murres (*Uria aalge*), brown pelicans (*Pelecanus occidentalis*), shearwaters (*Puffinus* spp.), gulls (*Larus* spp.), loons (*Gavia* spp.), cormorants (*Phalacrocorax* spp.), auklets (*Ptychoramphus* spp), the American widgeon (Anas Americana), northern pintail (*A. acuta*), bufflehead (*Bucephala albeola*), least sandpiper (*Calidris minutilla*), black-bellied plover (*Pluvialis squatarola*), semipalmated plover (*Charadrius semipalmatus*), whimbrel, (*Numenius phaeopus*) sanderling (*C. alba),* and great blue heron (*Ardea herodius*) (PFMC 2003). The peninsula also contains critical habitat for the western snowy plover (*Charadrius nivosus nivosus).* The Corps has designated a recreation management area for snowy plover critical habitat on the peninsula.

2.2 Previous Archaeological Study

One of the earliest, well-known archaeological studies of the Bayocean Peninsula occurred in 1951 during Lloyd Collins' survey of the Oregon Coast for the University of Oregon. Collins identified two sites on the peninsula, as well as the much-studied site 35-TI-1 eight miles south on the Netarts Spit. Little archaeological study of the peninsula has taken place since. The USACE performed a side scan sonar survey west of the peninsula at an unknown date and in 2012 conducted a Phase I survey in connection with the USAF's permit renewal for SERE Specialist training (USACE n.d. 2013) Table 1 summarizes archaeological studies within one mile of the SERE Specialist training area.

Table 1. Previous Cultural Inventories Within 1 Mile of SERE Training Area

SHPO Survey ID	Report Year	Authors	Project Title	Proponent	Purpose
870	1953	Collins, Lloyd R.	Archeological Survey of the Oregon Coast 1951-1952.	N/A	Academic
11939	n.d.	Unknown	Side Scan Sonar Survey Tillamook Bay Area (Title assigned by Le Gilsen in SHPO Bibliography)	USACE	Ocean Disposal Site
25359	2012	Walker, Cam, Judith Chapman, and Elizabeth O'Brien	Archaeological Survey for the Port of Garibaldi Wharf Redevelopment Project, Tillamook County, Oregon	Port of Garibaldi	Wharf Redevelop-ment
25808	2013	Mulligan, Daniel	Bayocean Peninsula USAF Survival Training Project Tillamook County, Oregon	USACE	USAF Training Permit
27403	2015	Connolly, Thomas	Archaeological Survey of the US 101 Rockaway Beach – Bay City ADA Ramps Project, Tillamook County.	Oregon Department of Transportation	Highway/ Sidewalk Ramp Upgrades

The USACE 2012 survey addressed 175 acres of the northern Bayocean Peninsula with 100 percent pedestrian coverage for all proposed training areas. According to the survey report, the USACE did not intensively survey the central part of the peninsula due to dense vegetation, slope, low potential for intact sites, and no planned use of the area (USACE 2013). The survey identified one site, 35-TI-104, and failed to relocate one of Collins' earlier recorded sites, 35-TI-11. Collins' second site was outside the survey area. Table 2 summarizes sites and shipwrecks within 1 mi of the training area.

Table 2. Archaeological Sites Within 1 Mile of SERE Training Area

Site Number	Site Type	Eligibility Status	Description	General Location	Distance from Training Area
35-TI-10	Precontact	Unevaluated	Shell midden	T1N R10W Section 31 (unverified)	0.6 mi
35-TI-11	Precontact	Unevaluated	Shell midden	T1N R10W Section 20 (unverified)	0.0 mi
35-TI-104	Precontact	Unevaluated	Shell midden	T1N R10W Section 20	0.0 mi
N/A	Historic Shipwreck	Unevaluated	Ida Schnauer Shipwreck (1908, unrecorded)	T1N R10W Section 31	0.7 mi
N/A	Historic Shipwreck	Unevaluated	Argo Shipwreck (1909; unrecorded)	T1N R10W Section 18	0.3 mi
N/A	Historic Shipwreck	Unevaluated	Unidentified ship's keel, possibly from the Emily Reed.	T1N R10W Section 18	0.5 mile

2.3 Historic Background

Early evidence for Native American habitation of the Oregon coast dates to around 8,600 years before present (B.P.) during the Early Holocene (Moss and Erlandson 1996). However, few archaeological sites have been dated to the Early and Middle Holocene (6,700 to 10,000 B.P. and 3,300 to 6,700 B.P., respectively). The vast majority of radiocarbon dates from coastal archaeological deposits date within the last 1500 years (Moss and Erlandson 1996). The scarcity of early coastal sites contributed to chronologies for Oregon coastal prehistory that described coastal adaptation as a gradual transition from terrestrially-based subsistence to increasing reliance on marine and estuarine resources (Lyman 1991; Ross 1990). In their nomination of 89 Native American Oregon coastal sites to the NRHP, Moss and Erlandson (1996) counter that it is unlikely the region's earliest inhabitants would have ignored rich coastal resources. Although they concede the lack of sites may represent less intensive use of the coast, they suggest this scarcity may also reflect a combination of sea level rise, tectonic subsidence, coastal erosion, and dune development (Moss and Erlandson 1996).

Early Native American use of the Oregon coast remains largely unknown. However, it is clear that by 3,000 B.P. Native American groups lived on the northern Oregon coast and took advantage of many coastal resources, including sea mammals, fish, shellfish, and water birds. By 1500 B.P., use of a broad resource base incorporating marine, riparian, estuarine, and

terrestrial resources facilitated sedentary and semi-sedentary habitation in coastal villages. Prior to Euroamerican settlement, the area was inhabited by the Killimuck, or Tillimook people, who occupied the coastal area between Tillamook Head and the Siletz River (Seaburg and Miller 1990; Taylor 1974). The Tillamook population was decimated by repeated smallpox outbreaks in the late eighteenth and early nineteenth centuries.

In the 1850s, the United States government signed treaties with numerous Native American tribes in western Oregon, under which the tribes were removed to temporary reservations and ultimately to the Coast Reservation, established in 1855. The Grande Ronde agency, serving in the Grand Ronde Valley, was appended to the north end of the Coast Reservation in 1855 and the Grande Ronde Reservation was formally established by Executive Order in 1857. Over the following decades, the Coastal Reservation was reduced in size and in 1875 the remaining reservation areas were split into the Grand Ronde and Siletz reservations (Lewis 2009).

Tribes and bands along the Oregon's north coast, including the Tillamook, signed a treaty in 1855 that was never ratified. These untreatied tribes had relationships with the Indian agencies at the Coast Reservation, particularly the Grand Ronde agency, and some joined the other tribes on the reservation. Many Tillamook ultimately joined the Confederated Tribes of the Grand Ronde whereas others joined the Confederated Tribes of Siletz Indians. Others refused removal or escaped the reservations and remained unaffiliated with recognized tribes. Native Americans continued to use the Tillamook Bay region through the nineteenth and twentieth centuries, and that use continues today. In September, 2015, the Grand Ronde accepted a donation of land at Kilchis Point from Tillamook County, which was once the site of a large Tillamook village (Rhodes 2015).

Euroamerican use of the Tillamook Bay began in the late eighteenth century with the intermittent trapping and exploration parties visiting the area, including Lewis and Clark in 1806. Settlement began in the mid-1800s with a focus on agriculture and specifically dairy, which was very successful due to the region's combination of soils and climate (USACE 2013). Timber was an important industry in the late nineteenth and early twentieth centuries. Commercial fishing and shellfish industries similarly began in the late nineteenth century and remain important to the local economy today.

The peninsula was the location of a resort town known as Bayocean, 0.75 mi south of the proposed training area. The town was founded in 1906 and by 1914 had more than 2,000 residents. Envisioned as an "Atlantic City of the West," the town had 4 miles of paved roads, city lights, water, a phone system, and a narrow gauge railroad at a time when the City of Tillamook still had dirt roads (Sutherland n.d.). Transportation to Bayocean was primarily by steamship and in the 1910s the town petitioned the USACE for a protective jetty. The jetty, completed in 1917, affected winter storm wave patterns that eventually destroyed the town. Erosion began destroying buildings in the 1930s and breached the peninsula in 1952. The USACE built a dike and road in 1956, at which time they reclaimed the town area, demolishing the remaining infrastructure and buildings.

3 Research Parameters

3.1 Research Goals

The cultural resources study presented here aims to assemble historical information about Native American use of the Bayocean Peninsula and determine if significant subsurface deposits are present near proposed training locations where ground disturbing activities would take place. A detailed literature review combined with a Phase I archaeological survey using surface and subsurface techniques will achieve these objectives. The study will provide archaeological and Native American communities with a helpful overview of Native American use of this part of the Oregon coast and will assist the USAF in complying with 54 USC 306108 . The study will also inform future planning and use of the Bayocean Peninsula.

3.2 Research Questions

During consultation, the Grand Ronde presented the USAF with types of information the tribe would like to learn from cultural resources investigations at Bayocean. Most broadly, the tribe would like to know how Native Americans used the area before and after contact with Euroamericans. Specifically, the tribe is interested in the potential for deeply buried or submerged archaeological sites, Native American use of shipwrecks, and how the landscape relates to the tribe's oral traditions and history. These concerns, as well as the USAF's obligations under Section 106 of the NHPA, informed the development of the following research questions for this investigation, listed below. Table 3 presents data sources and methods that will be used to address these questions.

Table 3. Sources and Methods to Address Research Questions

Research Question/Topic	Possible Sources/Methods
1. Existing knowledge about Native American use of Bayocean Peninsula.	• Archaeological reports and site forms • Oral tradition and historical accounts
2. Geomorphological processes and site potential; potential for deeply buried and submerged sites.	• Bathymetric and geomorphologic studies • Aerial imagery
3. Native American use of shipwrecks.	• Archaeological reports and site forms • Shipwreck database • Oral tradition and historical accounts • Private collections • Artifact analysis
4. Presence of significant sites.	• Surface inspection • Shovel test probes • Artifact and feature analyses
5. Potential for impacts to TCPs	• Viewshed analysis • Oral history and historical accounts • Ethnographic studies • Archaeological reports and site forms • Consultation with tribes

1) *What is currently known about Native American use of the Bayocean Peninsula and surrounding coastal areas? What kinds of activities would be expected on the Bayocean Peninsula, based on known site types and activities from nearby locations?*

A cursory review of archaeological investigations at and near the Bayocean Peninsula indicates little research has been undertaken on the Bayocean Peninsula proper, unlike the much-studied Tillamook Site on the Netarts Spit to the south (35-TI-1) and the Nehalem Bay area to the north. This research topic will focus on identifying what is known or can be inferred about Native American use of this part of the Oregon coast and what can be inferred about such use of the Bayocean Peninsula.

2) *How have geomorphological processes influenced the development and environments of Tillamook Bay and the Bayocean Peninsula? How has the coastline changed over time in relation to the Bayocean Peninsula? What are the implications for archaeological site preservation and the potential for deeply buried or submerged sites?*

A review of bathymetric, geomorphologic, paleoenvironmental, and oral tradition information will help characterize the changing environment at Bayocean Peninsula. Furthermore, studies of recent geomorphological processes and aerial imagery will help determine to what extent precontact sites may be preserved on the peninsula, given extensive erosion and sand accretion over the last 75 years (see Section 2.3).

3) *What archaeological evidence exists at the Bayocean Peninsula for Native American use of shipwrecks? What is the potential for such use?*

Native American use of shipwrecks in the vicinity of Tillamook Bay is evidenced at archaeological sites and collections from Nehalem to Netarts, particularly of Chinese porcelain and metal objects. A review of existing literature on Native American use of shipwrecks and shipwreck databases will help characterize potential use at Bayocean. The field survey also provides an opportunity to address this research question.

4) *Are significant archaeological sites present that could be adversely affected by proposed training activities? In particular, are significant subsurface deposits present?*

Field investigations will focus on determining the presence or absence of archaeological sites and subsurface deposits in the direct APE. Shovel test probes (STPs) will be employed to determine if ground-disturbing activities associated with SERE training would disturb intact, subsurface deposits. STPs would also be used as needed to determine site boundaries. Evaluations of site significance and integrity will be made where sufficient data is obtained, following the parameters of precontact coastal site significance as discussed in Moss and Erlandson (1996). Where available, data will be analyzed to address research questions identified by Moss and Erlandson (1996). At a minimum, the analysis will attempt to establish chronology, site function, and ethnic affiliation. Specific questions guiding this analysis include:

- When was the site occupied? Can more than one occupational episode be documented?
- Are ethnic indicators present? If so, are they ascribable to a specific group?
- What technologies are represented in the artifact assemblage?
- How did occupants employ local and exotic materials?
- Can the site be characterized as to function?
- How does the site fit into an overall use pattern for the region?

5) *What Traditional Cultural Properties (TCPs) may be connected to this landform and may be adversely impacted by this undertaking?*

The Bayocean Peninsula features in Tillamook stories and oral traditions. The peninsula also has direct line of site to much of the Tillamook Bay area, an important factor in the identification of TCPs and relationships among TCPs (Briece Edwards, personal communication, January 25, 2016). A viewshed analysis combined with a literature review of known and potential ethnographic locales with line-of-site to Project areas on the peninsula will help determine what TCPs may be connected to the landform. Consultation with the Grand Ronde will further refine this analysis and provide tribal perspectives on potential impacts from the proposed undertaking.

3.3 Expectations

Given the paucity of archaeological studies and previously recorded sites on the Bayocean Peninsula, little archaeological data is expected to be available characterizing Native American use of the peninsula. However, sites on similar peninsulas and spits along the Oregon coast may provide analogous data for characterizing such use. Furthermore, subsurface testing during the archaeological survey may provide new information. The presence of subsurface deposits is virtually unknown at Bayocean except where assessed at three previously recorded sites, all of which were exposed in or along roads. Deposits at these sites are estimated between 2 and 5 m deep. These sites suggest high potential for intact deposits in the central and eastern portions of the north half of the peninsula. Intact subsurface deposits are not expected on the west half of the peninsula, which has built up from sand deposits over the last 75 years. Sites on the Bayocean Peninsula would be expected to reflect site and data types as represented by other coastal properties in the region, discussed below. Artifact assemblages and features would also be expected to reflect the materials and forms evidenced at 35-TI-1.

3.3.1 Site Types

Moss and Erlandson (1996) classify precontact resources of the Oregon Coast into eight site types: shell middens, lithic sites, villages, ethnographic/ethnohistorical places, burial sites, intertidal fishing structures, quarries, and rock art sites. In their nomination of precontact period coastal sites to the NRHP, Moss and Erlandson (1996) identified shell middens as the most common site type, represented at 80 of the 89 properties in the nomination. Shell middens are also the most likely site type on the Bayocean Peninsula, where three such sites have been previously recorded. Intertidal fishing structures are also possible along the shoreline on the bay side of the peninsula. Lithic sites, defined primarily by the absence of shell middens, are less likely due to the high potential for the latter. Quarries and rock art sites are also unlikely in the Project area, which is composed primarily of sandy deposits and lacks necessary lithic material. Table 4 summarizes defining characteristics of likely site types in the Project area, as described by Moss and Erlandson (1996). Multiple site types can be represented at a single site.

As mentioned previously, three shell middens have been previously recorded on the Bayocean peninsula with two inside the Project area. Collins (1953) described two of the shell middens, 35TI10 and 35TI11, as extending 200 yards by 100 yards with deposits approximately 6 ft deep. The USACE recorded the third site, 35TI104, as a deposit 25 m long, 7 m wide, and 5 m deep with artifacts eroding out of a moderately steep slope. This data suggests potential for large shell middens with substantial subsurface deposits.

Table 4. Characteristics of Potential Site Types in the Project Area

Site Type	Characteristics
Shell Middens	• Dense shell deposits • Often contain dark organic soils, charcoal, burned rock, faunal remains, and wide range of artifact types • Alkaline environment enhances preservation of organic materials such as bone and fibers • With extensive excavation, can indicate site function (e.g. processing station, short-term campsite, village)
Villages	• Contain evidence of residential structures or ethnohistoric evidence that residential structures once existed • Often contain rich, diverse archaeological assemblages • May contain discrete activity areas
Intertidal Fishing Structures	• Represent remnants of weirs, traps, or other features designed to catch fish • Often appear as linear alignments of wood stakes and related features • Warrant special consideration for investigation and excavation, including alternative techniques and stabilization of perishable materials
Ethnographic and Ethnohistorical Places	• Sites that can be linked to specific ethnographic and ethnohistorical data • Combination of ethnographic/ethnohistoric and archaeological data may enable more refined analysis • Often of special significance to contemporary Native Americans
Burial Sites	• Can include individual internments or large cemeteries • Usually lack surface indications; often exposed by erosion or disturbance • May contain cobble cairns, sand lenses, redwood planks, beads, or other objects • Sensitive treatment of particular concern to Native Americans

3.3.2 Data Types

Shell middens, potentially representing short-term or seasonal camps, and villages are the two most likely site types possible in the APE, and both site types often contain a broad range of data types, including shellfish and faunal remains, lithic artifacts, bone and antler implements, and carved bone objects. Historic trade goods, including iron objects and Chinese porcelain retrieved from historic shipwrecks, are also possible. All of the materials described above have been identified at site 35TI01, eight miles south of the direct APE. Here, shellfish remains consist primarily of cockle and blue clam and faunal remains include both terrestrial and marine mammal bones. Faunal remains present opportunities for assessing chronology, seasonality, past climates, and subsistence patterns. Feature construction, artifact forms, and material types may provide insight into ethnic affiliation, function, and chronology. Deposits are also possible representing historic or modern use by Native Americans or Euroamericans and may include lithic, shell, glass, metal, and ceramic artifact types.

4 Methods

4.1 Literature Review

The literature review will assemble existing archaeological and ethnographic information on Native American use of the Bayocean Peninsula, the surrounding Tillamook Bay area, and similar environments such as the Netarts Spit and Nehalem Bay. A review of bathymetric and geomorphological data will help characterize past environments of the Bayocean Peninsula and determine the potential for deeply buried or submerged sites in the surrounding area. Oral traditions may also provide insights on geological processes influencing the landform over time.

The literature review will provide a holistic overview of what is currently known, what data gaps exist, and the potential for additional sites and data in the area. The review will also inform the field survey and subsequent evaluation of identified sites. The review will focus on the following data sources in addressing research questions presented in Section 3.2: archaeological monographs, reports, and site forms; historical and ethnographic accounts; existing oral histories; bathymetric, geomorphologic, and geoarchaeological data; historic aerial imagery; and shipwreck data. The results of the literature review will accompany the results of the field investigations in a technical report.

As part of the literature review, we will use a viewshed model to predict areas surrounding Tillamook Bay that have line-of-site to the Project area. This model will help predict what TCPs in the surrounding area may be connected to the Bayocean Peninsula that could be affected by the proposal. We will review known archaeological sites, ethnographic literature, and oral tradition and consult with the Grand Ronde to determine what TCPs are in the viewshed area and how the proposal may affect them.

4.2 Field Methods

A Phase I archaeological field survey will determine the presence or absence of archaeological sites in the direct APE, using visual inspection and subsurface shovel test probes (STPs). We will evaluate site eligibility where possible from data gathered during the field inventory and in consultation with the Oregon SHPO and Native American tribes. We will make recommendations for further investigation where data is not sufficient to evaluate site significance. All field methods will comply with the Oregon SHPO's guidelines for conducting field archaeology (Oregon SHPO 2013).

4.2.1 Survey

Due to the dynamic, shifting sands and dune environment in the direct APE, the field survey will primarily rely on subsurface testing to confirm the presence of cultural deposits. We will employ two different STP testing strategies based on variations in the micro-environment and proposed uses in different parts of the direct APE. The proposed student camps on the ocean side of the peninsula are within a field of rolling dunes that vary in height and may cover archaeological sites with several meters of sand. Inter-dunal areas present the greatest chance for encountering sites on the surface or with STPs. These areas are also where student camp activities are likely to concentrate during training. The testing strategy for the student camps will focus on judgmentally placed STPs with a strong preference for inter-dunal areas and lower dune slopes. STPs will be placed at 20 m spacing within inter-dunal areas. STPs will be cylindrical, 30 cm in diameter, and excavated in arbitrary 10 cm levels. STPs would ideally reach a depth of 100 cm, slightly greater than the anticipated depth of water table pits or latrines

excavated during SERE training. However, the loose sandy matrix is likely to prevent attaining such depths with shovel testing. Therefore, STPs will be excavated to the greatest depth possible, up to 100 cm, and a 4-inch (in.) diameter augur will be used to continue the excavation to a depth of 100 cm.

We will use a separate testing strategy for the instructor camp, medic camp, and helicopter landing zone. These locales are on the bay-side of the peninsula where there is less dune development. Preliminary research indicates intact, pre-contact sites are more likely to occur on this side of the peninsula. Proposed activities in these areas would be limited to the surface and would not involve subsurface excavation. Here, STPs will be excavated at 20 m intervals along transects spaced 20 m apart. STPs will be cylindrical, 30 cm in diameter, and excavated in arbitrary 10 cm levels to a depth of at least 50 cm, terminating after two sterile levels or 100 cm, whichever is first. A 4-in. diameter augur may be used to supplement the STPs if needed to reach these depths.

The medic camp is located adjacent to known site 35-TI-104. The field survey and the proposed training will avoid this site; however, STPs will be excavated within the medic camp to confirm subsurface deposits do not extend into the area. STPs will begin on the opposite side of the camp and be excavated toward the site boundary.

Regardless of the strategy, soils from STPs will be screened through 1/8th inch mesh. If cultural materials are recovered from an STP, STPs will be excavated in the cardinal directions at least 40 m away, beyond the expected site boundary. If the STP is positive, another STP will be placed another 40 m away. If the STP is negative, the crew will continue to excavate STPs on these axes back toward the site at 10 m intervals until cultural materials are encountered. When cultural materials are discovered in this manner, the next STP will be placed half the distance to the previous negative STP so as to define the boundary more precisely. The subsurface boundary will be the closer of two consecutive negative STPs.

The crew will visually inspect surfaces before excavating STPs. In the event materials are exposed on the surface, the crew will identify and record the extent of the surface deposit prior to excavating STPs in that area. Artifacts and features will be flagged and documented. After defining the horizontal extent of exposed deposits, the crew will excavate STPs to define the horizontal extent of the buried deposit following the procedures outlined above.

Once boundaries are determined, the crew will document the resource following Oregon SHPO definitions for sites and isolated finds.[1] Resources will be documented using an iPad and transferred to the appropriate Oregon SHPO inventory forms. Documentation will include information on the location, environment, character, and defining attributes of the site and all features and diagnostic artifacts. Site boundaries, features, artifact concentrations, diagnostic or unique artifacts, and STP locations will be recorded using a GPS unit with sub-meter accuracy. Sketch maps will be drawn and photographs will be taken of the site area, features, and diagnostic artifacts. No collection of surface artifacts will take place.

All STPs excavated during the field survey will be documented as to their location, setting, soil structure, soil color, and any recovered artifacts. Artifacts recovered from STPs will be collected as required by the Oregon SHPO or the USACE and their provenience recorded according to unit and level. STP locations and artifacts will be mapped with a GPS unit with sub-meter accuracy. Collected artifacts will be curated as described in Section 4.3.

[1] Per SHPO definitions, ten or more artifacts or the presence of a cultural feature indicates a site. Resources with less than ten artifacts are considered isolated finds.

4.2.2 Unanticipated Discovery of Human Remains

Should human remains be identified during surface or subsurface investigations, the crew will follow procedures outlined in the Oregon SHPO's *Guidelines for Conducting Field Archaeology* (2013). The crew will immediately stop all work within 100 m of the discovery. The crew will notify the USAF, Oregon State Police, Commission on Indian Services, SHPO, and appropriate tribes as directed by the Commission. The crew will take steps to protect the discovery from further disturbance. Work will not resume within 100 m of the discovery until the USAF, HDR, the SHPO, USACE (as appropriate), and interested tribes have agreed upon a course of action. An inadvertent discoveries plan is included as Appendix A.

4.3 Laboratory Methods

Site and artifact data and artifacts collected during the field survey will be analyzed in the laboratory and prepared for curation. Artifact analyses will focus on addressing research questions identified in Section 3.2 with the goal of establishing whether sites are significant; that is, if they have potential to yield the types of data that could address broad research themes pertaining to Native American archaeology on Oregon coast (see Moss and Erlandson 1996). Analysis of site significance and eligibility for the NRHP will follow the Oregon SHPO's guidance on site evaluations (Oregon SHPO 2013) and National Register Bulletin 15, *How to Apply the National Register Criteria for Evaluation* (National Park Service 1991).

Site data such as environmental setting, soil structure, stratigraphy, and the presence of artifact concentrations or features will be documented during site recording. Artifact collection will follow the Oregon SHPO's policy (Oregon SHPO 2013). Artifacts will not be collected from the surface survey unless they are threatened, rare, or worthy of further, immediate study. All artifacts recovered during subsurface testing will be collected. Shell will be collected from STPs if it is associated with a cultural deposit. Four categories of artifact data are likely to be collected during the archaeological study: stone artifacts; modified bone, antler, and shell; faunal remains; and historic artifacts.

Stone artifacts include flaked stone, ground stone, and fire-cracked rock (FCR), and decorative or artistic items such as beads or pipes. These artifacts can be chronologically, functionally, and culturally diagnostic. Formal tool types and manufacturing techniques may be identifiable to a specific time period or cultural affiliation. The range and frequency of stone artifact types may provide insight into site function and spatial organization. Material types provide insight into patterns of land use or trade. The goal is to analyze all stone tools and collected stone artifacts. Analytical procedures will consist of examining artifacts individually and recording specific attributes, according to artifact type. Minimum attributes include type, raw material, condition, and quantity. Other attributes include size, edge characteristics, amount of cortex, and number of grinding facets.

Bone, antler, and shell artifacts are usually poorly preserved in archaeological contexts; however, alkaline shell middens provide favorable conditions for preservation. Types of modified bone, antler, and shell artifacts include harpoons, wedges, awls, needles, fish hooks, and beads. Stylistic variations may allow artifacts to be assigned to specific periods or cultural affiliations. Frequency and form may provide insight into site function. Analysis of modified bone, antler, and shell artifacts will record attributes such as raw material, type, size, condition, and quantity.

Faunal remains provide information on subsistence, environment, and chronology. Shellfish in particular are sensitive environmental indicators. The faunal analysis will aim to identify faunal

remains and determine taxonomic abundance within the sample, anatomical part representation, modification, and, when possible, seasonality. Results will include the minimum number of individuals (MNI) and number of individual species present (NISP).

Historic artifacts are possible on contact-period sites and can yield chronological and source information. Analysis of historic artifacts would record such attributes as material type, form, size, and distinctive markings with the goal of establishing date and place of manufacture.

HDR will curate any collected artifacts and documents with UOMNCH. Artifacts, documents, and any other collections will be prepared according to the museum's specifications. Artifacts will be cleaned as appropriate and labelled with the curation accession number and catalog number. Artifacts will be placed in labelled polypropylene bags. Bulk items such as debitage or shell will be grouped together in a labelled bag, enclosed with an acid free tag. HDR will curate photographs, site forms, reports, and field notes according to UOMNCH requirements.

4.4 Synthesis and Dissemination

The methods, data, analysis, and results of the literature review and archaeological work will be synthesized into a technical report and submitted to the USAF, and subsequently to the SHPO and tribes for review. Site forms and accompanying maps will be prepared and submitted with the technical report. These documents will remain on file with these agencies and with HDR. A public document presenting the research and analysis but precluding site locations may also be made available.

5 Project Team

Wayne Glenny, M.S., RPA, will serve as the Principal Investigator and Field Director for the archaeological study. Mr. Glenny will oversee the research, fieldwork, analysis, and synthesis, and will strategize with the team regarding artifact analysis, data interpretation, and report synthesis. Mr. Glenny's resume is provided in Appendix C. Sarah Page, RPA, and Elizabeth Leclerc will serve as crew members for the project.

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6 References

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2002 *Communities and Catastrophe: Tillamook Response to the AD 1700 Earthquake and Tsunami, Northern Oregon Coast.* Ph.D. dissertation, Department of Anthropology, University of Oregon, Eugene.

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Appendix A: Inadvertent Discoveries Plan

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Inadvertent Discovery Plan for Human Remains

This Inadvertent Discovery Plan (IDP) outlines the procedures that will be followed if human remains are encountered during cultural resource investigations on the Bayocean Peninsula for the USAF SERE Training Proposal.

- ☐ In the event of an inadvertent discovery of human remains, all work will stop immediately within 100 m of the find.
- ☐ The area will be secured and protected from further disturbance.
- ☐ The field supervisor will notify the U.S. Air Force (USAF) of the find.
  - o If the remains are clearly modern, the USAF will notify the Oregon State Police.
  - o If the remains are not clearly modern, the USAF will notify the Oregon State Police, the State Historic Preservation Office, the Confederated Tribes of the Grand Ronde, and the Confederated Tribes of Siletz Indians of Oregon. The USAF will contact the U.S. Army Corps of Engineers if the find is located on Corps land. The Air Force will also contact the Commission on Indian Services to determine if additional tribes should be notified of the discovery. Contact names and phone numbers are provided below.
  - o The USAF will consult with the SHPOs and involved tribes to develop and implement a culturally sensitive plan for reburial and determine when work in vicinity of the find may resume.
- ☐ No work shall take place in the area of the find (within 100 m) until HDR is notified by the USAF that work may proceed.

Contact Information

Agency/Tribe	Name	Phone Number(s)
USAF	Todd Foster	Comm: (509) 247-7483 DSN: (509) 710-4906
	Tiffany Evans	Comm: (509) 247-8133 DSN: (509) 657-8133
State Historic Preservation Office	Dennis Griffin (Primary)	Office: 503-986-0674 Cell: 503-881-5038
	John Pouley (Secondary)	Office: 503-986-0675 Cell: 503-480-9164
Commission on Indian Services	Karen Quigley	Office: 503-986-1067
Confederated Tribes of the Grand Ronde	Jordan Mercier	Office: 503-879-2185
Confederated Tribes of Siletz Indians of Oregon	Robert Kentta	Office: 541-444-2532

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Appendix B: Curation Agreement with MNCH

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UNIVERSITY OF OREGON

February 18, 2016

TO: Wayne Glenny, M.S., RPA; HDR Inc., 8690 Balboa Ave. Ste. 200, San Diego, CA, 92123

FR: Pam Endzweig, Director of Collections, UO Museum of Natural and Cultural History

RE: Curation of cultural material from cultural resource investigations for the U.S. Air Force's Survival, Evasion, Resistance, Escape (SERE) Specialist Training Permit Renewals project on Bayocean Peninsula, Tillamook County.

On behalf of the University of Oregon Museum of Natural and Cultural History (MNCH), I hereby agree to accept for curation archaeological collections recovered by HDR Inc. in conjunction with Cultural Resource Investigations for the U.S. Air Force's Survival, Evasion, Resistance, Escape (SERE) Specialist Training Permit Renewals project on Bayocean Peninsula, Tillamook County. The investigations will assist the U.S. Air Force in meeting their obligations under the NHPA and Title 54 USC 306108.

The cultural survey will take place on public and federal lands managed by Tillamook County and the U.S. Army Corps of Engineers, respectively. Artifact collections could occur from both parts of the project area and will consist of archaeological materials recovered from shovel test probes performed during the investigations. Field work is tentatively scheduled for April 2016, with the final report complete by June, 2016. Collections, including artifacts and associated documentation, will be submitted in accordance with MNCH curation guidelines and fees. It is understood that collections from federal lands remain the property of the U.S. government.

For questions, please feel free to contact Pam Endzweig, Director of Collections at 541-346-5120 or by email at endzweig@uoregon.edu.

Sincerely,

Pam Endzweig
Director of Anthropological Collections

MUSEUM OF NATURAL & CULTURAL HISTORY
& Oregon State Museum of Anthropology · 1224 University of Oregon · Eugene, OR 97403-1224
Collections (541) 346-5120 · Public Programs (541) 346-3024 · Research (541) 346-3031

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Appendix C: Project Team Resumes

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Wayne Glenny

Archaeology Program Manager

Mr. Glenny has over 16 years of experience in cultural resource management and specializes in the design, implementation, and direction of projects for federal clients, utility companies, and state agencies. He has successfully initiated and conducted field research and managed projects reviewed under guidelines of the California Environmental Quality Act (CEQA) as well as those specified in Section 106 and 110 of the National Historic Preservation Act (NHPA) and the National Heritage Resources Act (NHRA) of South Africa. Specific duties include archival research, field preparation, research design development, proposal and budget development, project design and management, staff management, eligibility determinations for the National Register of Historic Places (NRHP), field evaluations, survey and excavations, and report writing in a wide range of regulatory and geographic settings. Mitigation program duties include archaeological data recovery programs and historic data recovery programs. Mr. Glenny's training is in biological anthropology and his specialized skills include human osteology, primate/human evolution, and faunal analysis; isotopic, lithic, and ceramic analyses; and archaeological resource identification. Mr. Glenny has complemented his work by publishing the results of his research in regional forums; presenting papers at academic conferences; and participating in a number of public outreach efforts relating to cultural resources in South Africa.

RELEVANT EXPERIENCE

SANBAG-Federal Communications Commission (FCC)-PTC, San Bernadino County. Archaeological Survey and Monitoring. California, 2015-2016. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review.

RCTC- Perris Valley Line Project, Riverside County Transportation Corporation. Archaeological Monitoring, Perris Valley, Riverside County, California, 2015-2016. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support for the PVL project in Perris Valley. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $145,000.

RCTC- Perris Valley Line Project Positive Train Control, Riverside County Transportation Corporation. Archaeological Monitoring, Perris Valley, Riverside County, California, 2015-2016. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring

EDUCATION
Master of Science, Biological Anthropology (Anthropology and Archaeology), University of the Witwatersrand, South Africa, 2005

Bachelor of Arts, Anthropology (Anthropology and Archaeology), University of Cape Town, South Africa, 2003

REGISTRATIONS
Register of Professional Archaeologists, (RPA)

OSHA 30 Hour Construction Safety, California, United States, No. 34-600744012

Pilot License, Rotorcraft – Helicopter, California, United States, No. 3557787

Commercial Diver Class IV

PROFESSIONAL MEMBERSHIPS
South African Archaeological Society

Society for California Archaeology

Association of Southern African Professional Archaeologists

INDUSTRY TENURE
16 years

HDR TENURE
0 years

OFFICE LOCATION
San Diego, CA

PUBLICATIONS
Report on the Micromammal Assemblage Analysis from Sibudu Cave, KwaZulu-Natal. South African

Humanities 18:279-288, 2006
Pacifist and Fascist views of World War I: A Comparative Study of 'All Quiet on the Western Front' and 'The Storm of Steel'. Historical Approaches Vol: 1: 71-82, 2002

Results of M.Sc. research, SASQUA Conference, 2007

Poster presentation of Honors project, SAA Conference, 2003

AWARDS

and field support for the PVL-PTC project in Perris Valley. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $150,000.

NAVFAC SW, Archaeological Site Recordation, San Clemente Island, San Diego County, California, 2015. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement, organize, conduct, and complete the relocation, identification, and recordation of over 700 archaeological sites on San Clemente Island. Task also includes records review and analysis. Value: $123,000.

NAVFAC SW, Archaeological Monitoring to Support the P-1048 Project MCB Camp Pendleton, San Diego County, California. 2015. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support for the P-1048 project on Camp Pendleton. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $864,934

NAVFAC SW, Archaeological Monitoring to Support the P-1014 Project MCB Camp Pendleton, San Diego County, California. 2015. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support for the P-1014 project on Camp Pendleton. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $497,019

Sempra Energy/SDG&E, On Call Cultural Resources, San Diego County, 2015- 2018. Contract/Project Manager. Supported the undertakings of SDG&E for new construction, on-going maintenance, and repair projects by conducting cultural resources inventories for various projects throughout the company service territory. Coordinated with other cultural resources staff, clients, and their subcontractors to implement, organize, conduct, and complete numerous small- to large-scale projects with overlapping schedules for Sempra Energy/SDG&E. Examples of projects include: Value: $1,250,000

• Wood to Steel Pole Conversion TL 6910, San Diego County

• Wood to Steel Pole Conversion TL 6914, Marine Corps Base, Camp Pendleton

• Navy Hospital Primary Feed, Boring and Replacement of Transmission structures, Marine Corps Base, Camp Pendleton

• Los Coches Substation Expansion, Lakeside, San Diego County

• 4 Camp Pendleton Helicopter Platforms, Marine Corps Base, Camp Pendleton

• TCM Access Road Grading, San Diego County

• Pala Energy Storage Battery (500kW), Pala Substation, San Diego County

• Intrusive Inspections, 4206 Poles, SANT Subarea, San Diego County

Sempra Energy/SDG&E, On-Call Cultural Resources, San Diego and Imperial Counties, California. 2012-2015. Senior Archaeologist. Supported SDG&E for new construction, on-going maintenance, and repair projects by conducting cultural resources inventories and services for numerous projects throughout San Diego and Imperial counties on both private and public lands. Coordinated with other cultural resources staff, clients and other subcontractors to implement, organize and complete these projects. Value: $1,231,452

Riverside County Transportation Commission,Perris Valley Line, Cultural Resources, Riverside County, California. 2015. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support for the PVL project in Perris Valley. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. $146, 272

NAVFAC SW, Archaeological Monitoring to Support the P-1019 Project MCB Camp Pendleton, San Diego County, California. 2012-2014. Project Manager/Senior Archaeologist. Provided monitoring and field support for the P-1019 project on Camp Pendleton. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $398,896

NAVFAC SW, Archaeological Monitoring to Support the Lake O'Neil Project, MCB Camp Pendleton, San Diego County, California. 2012-2014. Project Manager/Senior Archaeologist/Native American Liaison. Provided monitoring and field support for the Lake O'Neil project on Camp Pendleton. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review.

NAVFAC SW, Archaeological Testing and Mitigation of Numerous Archaeological Sites in Support of the Basewide Infrastructure Project, MCB Camp Pendleton, San Diego County, California. 2013-2015. Project Manager/Senior Archaeologist/Field Director for long-term excavations of numerous sites as part of the P-1043 project on Camp Pendleton. Responsibilities included project management, field excavations, laboratory analysis, and preparation of report and treatment plan. Value: $1,850,452

NAVFAC SW, Archaeological Testing and Mitigation of the P-1043 Project, MCB Camp Pendleton, San Diego County, California. 2010-2013. Project Manager/Senior Archaeologist/Field Director/Native American Liaison for cultural excavations on Guacamole Road and STP 11. Responsibilities included project and budget development, project management, work plans/research design, field excavations, preparation of final report, and recommendations for site protection and National Register

eligibility.

NAVFAC SW, Archaeological Testing and Mitigation of the Piedra de Lumbre Quarry Site, MCB Camp Pendleton, San Diego County, California. 2011-2012-2013. Project Manager responsibilities included budget management, field coordination, work plans/research design, field excavations, preparation of final report, and recommendations for site protection.

NAVFAC SW, Archaeological Testing and Mitigation of Archaeological Sites in the San Mateo/Ysidora Basin, MCB Camp Pendleton, San Diego County, California. 2011. Project Manager/Senior Archaeologist responsibilities included budget management, field coordination, work plans, field excavations, and preparation of final report.

Confidential Project, Blythe, Riverside County, California. 2011-2012-2013. Senior Archaeologist/Field Director/Native American Liaison for cultural survey and excavation of cultural sites in an area west of Blythe for proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, coordination with California Energy Commission (CEC), and excavation of cultural resources.

NAVFAC SW, Survey and Archaeological Testing in Support of 3P EIS Project, MCB Camp Pendleton, San Diego County, California. 2010. Project Manager/Senior Archaeologist/Field Director for a long-term, multi-phase cultural survey and excavation of numerous sites on Camp Pendleton in support of 3P EIS Project. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew and native monitors, excavation, evaluation and laboratory analysis, and final report.

Topanga Library, Topanga, Los Angeles County, California. 2010-2011. Staff Archaeologist/Field Director for the excavation of a single site in Topanga Canyon. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew and native monitors, excavation, and technical document review. **NAVFAC SW, Survey and Archaeological Testing in Support of Grow the Force Project, MCB Camp Pendleton, San Diego County, California. 2009-2010.** Project Manager/Senior Archaeologist/Field Director for a long-term, multi-phase cultural survey and excavation of numerous sites on Camp Pendleton in support of Grow the Force Project. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew and native monitors, excavation, evaluation and laboratory analysis, and final report.

Confidential Project, Palen, Riverside County, California. 2009. Senior Archaeologist/Field Director/Native American Liaison for a large cultural survey and site recordation of an area west of Blythe for proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, coordination with California Energy Commission (CEC), and recordation of cultural resources.

Confidential Project, Blythe, Riverside County, California. 2009-2010-2011. Senior Archaeologist/Field Director/Native American Liaison for the

continuation of a large cultural survey and site recordation of an area west of Blythe for proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, coordination with California Energy Commission (CEC), and recordation of cultural resources.

Camp Billy Machen, Imperial County, California. 2009. Staff Archaeologist for a large cultural survey at Camp Billy Machen, Chocolate Mountain Aerial Gunnery Range for proposed geothermal testing. Responsibilities included survey, field survey supervisor, and final technical report.

NAVFAC SW, Survey and Archaeological Testing in Support of Base Utilities Infrastructure, MCB Camp Pendleton, San Diego County, California. 2008-2009. Senior Archaeologist/Field Director/Native American Liaison for a long-term, multi-phase cultural survey and excavation of numerous sites on Camp Pendleton in support of Base Utilities Infrastructure Project. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew and native monitors, excavation, evaluation and laboratory analysis, and final report.

Imperial Irrigation District, Dixieland Transmission Line, Imperial County, California. 2008. Staff Archaeologist for a cultural survey and site recordation in the Yuha Basin area of Imperial Valley. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, and recordation of cultural resources.

Confidential Project, Blythe, Riverside County, California. 2008. Senior Archaeologist/Field Director/Native American Liaison for a large cultural survey and site recordation of an area west of Blythe for proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, coordination with California Energy Commission (CEC), and recordation of cultural resources.

Confidential Project, Ridgecrest, Kern County, California. 2007-2008-2009. Staff Archaeologist for a cultural survey, site recordation and testing of numerous sites in the Ridgecrest area for a proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, recordation of cultural resources, excavation, evaluation and laboratory analysis, and final report.

SOUTH AFRICAN EXPERIENCE

Institute of Cultural Resource Management, South Africa. 2005-2007. Division Leader/Contract/Project Manager/Heritage Agency Liaison in the Institute of Cultural Resource Management at the Natal Museum. Responsibilities included contract and budget development, project management, work plan/research design and development, field excavations, laboratory analysis, and preparation of final technical reports and treatment plans of numerous CRM contracts throughout KwaZulu-Natal.

Ladysmith Municipality: Ladysmith KwaZulu-Natal, South Africa. 2005-

2006. Contract/Project Manager for a cultural survey and site recordation of an Anglo-Boer War (1900-1903) site around the city of Ladysmith. Responsibilities included project and budget development, project management, work plans/research design, field recordation, preparation of final report, and recommendations for site protection and National Register eligibility.

Department of Transportation KwaZulu-Natal DOT (KZN) Richmond KwaZulu-Natal, South Africa. 2005. Contract/Project Manager/Heritage Agency Liaison for a cultural survey and monitoring the construction of bridge footprints. Responsibilities included project and budget development, project management, field logistical support, work plans/research design, preparation of final report.

Charlestown Burial Relocation, Charlestown Zululand, South Africa. 2004. Project Manager/Senior Archaeologist/Heritage Agency Liaison. Contracted for the emergency excavation and relocation of five historical burials discovered during road construction. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew, excavation, evaluation and laboratory analysis, and final report.

Steam Rail Project: KwaZulu-Natal, South Africa. 2003-2004. Project Manager/Senior Archaeologist/Heritage Agency Liaison. Contracted to document the historic steam-train rail lines between numerous historic towns in the province of KwaZulu-Natal. Responsibilities included project and budget development, project management, work plans/research design, field recordation, preparation of final report, and recommendations for site protection.

The University of Cape Town Prestwich Place, Cape Town, South Africa. 2003-2004. Staff Archaeologist for a long-term excavation of over 600 historic burials for a construction project in Cape Town. Responsibilities included field support, excavation, reinterring the remains, conducting osteological and isotopic analyses of selected remains, preparation of final report, and recommendations for site protection.

Holbaai: Vredenburg Peninsula, Western Cape, South Africa. 2003. Staff Archaeologist for a project that involved an extensive survey and recordation of cultural resources on Private Property. Responsibilities included survey, surface collection, mapping of the site with EDM, site recordation, statistical analysis of shell remains from middens, an analysis of Khoisan ceramics (hunter-gatherer), and a spatial analysis and interpretation of several sites and their landscape distribution.

Ottosdal: North-West Province, South Africa. 2003. Staff Archaeologist for a project that involved an extensive survey and recordation of several hundred petroglyphs on privately owned land. Responsibilities included survey, mapping of the site with EDM, site recordation, spatial analysis and interpretation of several petroglyph sites, their landscape distribution, and final report.

Steelpoort: Messina, Northern Province, South Africa. 2002-2003. Staff Archaeologist for a long-term, multi-phase cultural resource project that included cultural survey, recordation and excavation of numerous Iron Age

sites. Responsibilities included survey, mapping of the site with EDM, site recordation, spatial analysis, and excavation of early Bantu Iron Age sites, final report and recommendations for site protection.

Klipriviersburg: Gauteng Province, South Africa. 2002. Staff Archaeologist for a long-term, multi-phase cultural resource project that included cultural survey, recordation and excavation of numerous Iron Age sites. Responsibilities included survey, mapping of the site with EDM, site recordation, spatial analysis, and excavation of early Bantu Iron Age sites, final report and recommendations for site protection.

Thabazimbi: Thabazimbi, Northern Province, South Africa. 2002-2003. Staff Archaeologist for a long-term, multi-phase cultural resource project that included cultural survey, recordation and excavation of numerous Iron Age sites. Responsibilities included survey, mapping of the site with EDM, site recordation, spatial analysis, and excavation of early Bantu Iron Age sites, final report and recommendations for site protection.

DOT (KZN), Zululand/KwaZulu-Natal, South Africa. 2002. Staff Archaeologist for a long-term, multi-phase cultural resource project that included cultural survey and recordation of numerous historic roads for the Department of Transport. Responsibilities included project and budget development, project management, work plans/research design, field survey and recordation, preparation of final report, and recommendations for site protection.

TEACHING EXPERIENCE

San Diego Community College 2007-2008.

University of the Witwatersrand, South Africa. 2006-2007.

University of Cape Town, South Africa. 2004-2006.

MILITARY

South African National Defense Force, South Africa. 1994-1999. Officer/Instructor. Held the rank of Lieutenant in the South African Armored Corps. Instructor of junior candidate officers on various armored weapon systems. Honorably discharged in January 1999.

ACHIEVEMENTS AND HONORS

Graduated with Honors, University of Cape Town, South Africa.

OUTREACH EFFORTS

Field Schools: Various Locations, South Africa

Participated in numerous public outreach programs. These programs were mostly funded by tertiary educational institutions and were geared towards raising awareness of South Africa’s rich heritage amongst economically disadvantaged youth groups. Responsibilities included presentations, teaching, anthropological field schools, coordination and field support,

staffing and travel logistics. Field schools: Cederburg (2000), Eastern Cape (2002), Makapansgat (UCT/Arizona State Univ., 2003), Sibudu (Wits, 2004), and Limpopo Valley (2004).

PUBLICATIONS AND PRESENTATIONS

Academic

Report on the Micromammal Assemblage Analysis from Sibudu Cave, KwaZulu-Natal. South African Humanities 18:279-288, 2006

Pacifist and Fascist views of World War I: A Comparative Study of ‘All Quiet on the Western Front’ and ‘The Storm of Steel’. Historical Approaches Vol: 1: 71-82, 2002

Results of M.Sc. research, SASQUA Conference, 2007

Poster presentation of Honors project, SAA Conference, 2003

Appendix B. Resumes

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Wayne Glenny

Archaeology Program Manager

Mr. Glenny has over 16 years of experience in cultural resource management and specializes in the design, implementation, and direction of projects for federal clients, utility companies, and state agencies. He has successfully initiated and conducted field research and managed projects reviewed under guidelines of the California Environmental Quality Act (CEQA) as well as those specified in Section 106 and 110 of the National Historic Preservation Act (NHPA) and the National Heritage Resources Act (NHRA) of South Africa. Specific duties include archival research, field preparation, research design development, proposal and budget development, project design and management, staff management, eligibility determinations for the National Register of Historic Places (NRHP), field evaluations, survey and excavations, and report writing in a wide range of regulatory and geographic settings. Mitigation program duties include archaeological data recovery programs and historic data recovery programs. Mr. Glenny's training is in biological anthropology and his specialized skills include human osteology, primate/human evolution, and faunal analysis; isotopic, lithic, and ceramic analyses; and archaeological resource identification. Mr. Glenny has complemented his work by publishing the results of his research in regional forums; presenting papers at academic conferences; and participating in a number of public outreach efforts relating to cultural resources in South Africa.

RELEVANT EXPERIENCE

SANBAG-Federal Communications Commission (FCC)-PTC, San Bernadino County. Archaeological Survey and Monitoring. California, 2015-2016. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review.

RCTC- Perris Valley Line Project, Riverside County Transportation Corporation. Archaeological Monitoring, Perris Valley, Riverside County, California, 2015-2016. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support for the PVL project in Perris Valley. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $145,000.

RCTC- Perris Valley Line Project Positive Train Control, Riverside County Transportation Corporation. Archaeological Monitoring, Perris Valley, Riverside County, California, 2015-2016. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring

EDUCATION
Master of Science, Biological Anthropology (Anthropology and Archaeology), University of the Witwatersrand, South Africa, 2005

Bachelor of Arts, Anthropology (Anthropology and Archaeology), University of Cape Town, South Africa, 2003

REGISTRATIONS
Register of Professional Archaeologists, (RPA)

OSHA 30 Hour Construction Safety, California, United States, No. 34-600744012

Pilot License, Rotorcraft – Helicopter, California, United States, No. 3557787

Commercial Diver Class IV

PROFESSIONAL MEMBERSHIPS
South African Archaeological Society

Society for California Archaeology

Association of Southern African Professional Archaeologists

INDUSTRY TENURE
16 years

HDR TENURE
0 years

OFFICE LOCATION
San Diego, CA

PUBLICATIONS
Report on the Micromammal Assemblage Analysis from Sibudu Cave, KwaZulu-Natal. South African

Humanities 18:279-288, 2006
Pacifist and Fascist views of World War I: A Comparative Study of 'All Quiet on the Western Front' and 'The Storm of Steel'. Historical Approaches Vol: 1: 71-82, 2002

Results of M.Sc. research, SASQUA Conference, 2007

Poster presentation of Honors project, SAA Conference, 2003

AWARDS

and field support for the PVL-PTC project in Perris Valley. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $150,000.

NAVFAC SW, Archaeological Site Recordation, San Clemente Island, San Diego County, California, 2015. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement, organize, conduct, and complete the relocation, identification, and recordation of over 700 archaeological sites on San Clemente Island. Task also includes records review and analysis. Value: $123,000.

NAVFAC SW, Archaeological Monitoring to Support the P-1048 Project MCB Camp Pendleton, San Diego County, California. 2015. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support for the P-1048 project on Camp Pendleton. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $864,934

NAVFAC SW, Archaeological Monitoring to Support the P-1014 Project MCB Camp Pendleton, San Diego County, California. 2015. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support for the P-1014 project on Camp Pendleton. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $497,019

Sempra Energy/SDG&E, On Call Cultural Resources, San Diego County, 2015- 2018. Contract/Project Manager. Supported the undertakings of SDG&E for new construction, on-going maintenance, and repair projects by conducting cultural resources inventories for various projects throughout the company service territory. Coordinated with other cultural resources staff, clients, and their subcontractors to implement, organize, conduct, and complete numerous small- to large-scale projects with overlapping schedules for Sempra Energy/SDG&E. Examples of projects include: Value: $1,250,000

• Wood to Steel Pole Conversion TL 6910, San Diego County

• Wood to Steel Pole Conversion TL 6914, Marine Corps Base, Camp Pendleton

• Navy Hospital Primary Feed, Boring and Replacement of Transmission structures, Marine Corps Base, Camp Pendleton

• Los Coches Substation Expansion, Lakeside, San Diego County

• 4 Camp Pendleton Helicopter Platforms, Marine Corps Base, Camp Pendleton

• TCM Access Road Grading, San Diego County

• Pala Energy Storage Battery (500kW), Pala Substation, San Diego County

• Intrusive Inspections, 4206 Poles, SANT Subarea, San Diego County

Sempra Energy/SDG&E, On-Call Cultural Resources, San Diego and Imperial Counties, California. 2012-2015. Senior Archaeologist. Supported SDG&E for new construction, on-going maintenance, and repair projects by conducting cultural resources inventories and services for numerous projects throughout San Diego and Imperial counties on both private and public lands. Coordinated with other cultural resources staff, clients and other subcontractors to implement, organize and complete these projects. Value: $1,231,452

Riverside County Transportation Commission,Perris Valley Line, Cultural Resources, Riverside County, California. 2015. Contract/Project Manager. Supported the undertakings. Coordinated with other cultural resources staff, clients, and their subcontractors to implement monitoring and field support for the PVL project in Perris Valley. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. $146, 272

NAVFAC SW, Archaeological Monitoring to Support the P-1019 Project MCB Camp Pendleton, San Diego County, California. 2012-2014. Project Manager/Senior Archaeologist. Provided monitoring and field support for the P-1019 project on Camp Pendleton. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review. Value: $398,896

NAVFAC SW, Archaeological Monitoring to Support the Lake O'Neil Project, MCB Camp Pendleton, San Diego County, California. 2012-2014. Project Manager/Senior Archaeologist/Native American Liaison. Provided monitoring and field support for the Lake O'Neil project on Camp Pendleton. Responsibilities included contract and budget management, monitoring coordination for both archaeology and native monitoring, and quality assurance for project and technical report review.

NAVFAC SW, Archaeological Testing and Mitigation of Numerous Archaeological Sites in Support of the Basewide Infrastructure Project, MCB Camp Pendleton, San Diego County, California. 2013-2015. Project Manager/Senior Archaeologist/Field Director for long-term excavations of numerous sites as part of the P-1043 project on Camp Pendleton. Responsibilities included project management, field excavations, laboratory analysis, and preparation of report and treatment plan. Value: $1,850,452

NAVFAC SW, Archaeological Testing and Mitigation of the P-1043 Project, MCB Camp Pendleton, San Diego County, California. 2010-2013. Project Manager/Senior Archaeologist/Field Director/Native American Liaison for cultural excavations on Guacamole Road and STP 11. Responsibilities included project and budget development, project management, work plans/research design, field excavations, preparation of final report, and recommendations for site protection and National Register

eligibility.

NAVFAC SW, Archaeological Testing and Mitigation of the Piedra de Lumbre Quarry Site, MCB Camp Pendleton, San Diego County, California. 2011-2012-2013. Project Manager responsibilities included budget management, field coordination, work plans/research design, field excavations, preparation of final report, and recommendations for site protection.

NAVFAC SW, Archaeological Testing and Mitigation of Archaeological Sites in the San Mateo/Ysidora Basin, MCB Camp Pendleton, San Diego County, California. 2011. Project Manager/Senior Archaeologist responsibilities included budget management, field coordination, work plans, field excavations, and preparation of final report.

Confidential Project, Blythe, Riverside County, California. 2011-2012-2013. Senior Archaeologist/Field Director/Native American Liaison for cultural survey and excavation of cultural sites in an area west of Blythe for proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, coordination with California Energy Commission (CEC), and excavation of cultural resources.

NAVFAC SW, Survey and Archaeological Testing in Support of 3P EIS Project, MCB Camp Pendleton, San Diego County, California. 2010. Project Manager/Senior Archaeologist/Field Director for a long-term, multi-phase cultural survey and excavation of numerous sites on Camp Pendleton in support of 3P EIS Project. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew and native monitors, excavation, evaluation and laboratory analysis, and final report.

Topanga Library, Topanga, Los Angeles County, California. 2010-2011. Staff Archaeologist/Field Director for the excavation of a single site in Topanga Canyon. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew and native monitors, excavation, and technical document review. **NAVFAC SW, Survey and Archaeological Testing in Support of Grow the Force Project, MCB Camp Pendleton, San Diego County, California. 2009-2010.** Project Manager/Senior Archaeologist/Field Director for a long-term, multi-phase cultural survey and excavation of numerous sites on Camp Pendleton in support of Grow the Force Project. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew and native monitors, excavation, evaluation and laboratory analysis, and final report.

Confidential Project, Palen, Riverside County, California. 2009. Senior Archaeologist/Field Director/Native American Liaison for a large cultural survey and site recordation of an area west of Blythe for proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, coordination with California Energy Commission (CEC), and recordation of cultural resources.

Confidential Project, Blythe, Riverside County, California. 2009-2010-2011. Senior Archaeologist/Field Director/Native American Liaison for the

continuation of a large cultural survey and site recordation of an area west of Blythe for proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, coordination with California Energy Commission (CEC), and recordation of cultural resources.

Camp Billy Machen, Imperial County, California. 2009. Staff Archaeologist for a large cultural survey at Camp Billy Machen, Chocolate Mountain Aerial Gunnery Range for proposed geothermal testing. Responsibilities included survey, field survey supervisor, and final technical report.

NAVFAC SW, Survey and Archaeological Testing in Support of Base Utilities Infrastructure, MCB Camp Pendleton, San Diego County, California. 2008-2009. Senior Archaeologist/Field Director/Native American Liaison for a long-term, multi-phase cultural survey and excavation of numerous sites on Camp Pendleton in support of Base Utilities Infrastructure Project. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew and native monitors, excavation, evaluation and laboratory analysis, and final report.

Imperial Irrigation District, Dixieland Transmission Line, Imperial County, California. 2008. Staff Archaeologist for a cultural survey and site recordation in the Yuha Basin area of Imperial Valley. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, and recordation of cultural resources.

Confidential Project, Blythe, Riverside County, California. 2008. Senior Archaeologist/Field Director/Native American Liaison for a large cultural survey and site recordation of an area west of Blythe for proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, coordination with California Energy Commission (CEC), and recordation of cultural resources.

Confidential Project, Ridgecrest, Kern County, California. 2007-2008-2009. Staff Archaeologist for a cultural survey, site recordation and testing of numerous sites in the Ridgecrest area for a proposed solar farm. Responsibilities included field support, staffing and travel logistics, coordination of both archaeological crew and native monitors, recordation of cultural resources, excavation, evaluation and laboratory analysis, and final report.

SOUTH AFRICAN EXPERIENCE

Institute of Cultural Resource Management, South Africa. 2005-2007. Division Leader/Contract/Project Manager/Heritage Agency Liaison in the Institute of Cultural Resource Management at the Natal Museum. Responsibilities included contract and budget development, project management, work plan/research design and development, field excavations, laboratory analysis, and preparation of final technical reports and treatment plans of numerous CRM contracts throughout KwaZulu-Natal.

Ladysmith Municipality: Ladysmith KwaZulu-Natal, South Africa. 2005-

2006. Contract/Project Manager for a cultural survey and site recordation of an Anglo-Boer War (1900-1903) site around the city of Ladysmith. Responsibilities included project and budget development, project management, work plans/research design, field recordation, preparation of final report, and recommendations for site protection and National Register eligibility.

Department of Transportation KwaZulu-Natal DOT (KZN) Richmond KwaZulu-Natal, South Africa. 2005. Contract/Project Manager/Heritage Agency Liaison for a cultural survey and monitoring the construction of bridge footprints. Responsibilities included project and budget development, project management, field logistical support, work plans/research design, preparation of final report.

Charlestown Burial Relocation, Charlestown Zululand, South Africa. 2004. Project Manager/Senior Archaeologist/Heritage Agency Liaison. Contracted for the emergency excavation and relocation of five historical burials discovered during road construction. Responsibilities included field support, staffing and travel logistics, coordination of archaeological crew, excavation, evaluation and laboratory analysis, and final report.

Steam Rail Project: KwaZulu-Natal, South Africa. 2003-2004. Project Manager/Senior Archaeologist/Heritage Agency Liaison. Contracted to document the historic steam-train rail lines between numerous historic towns in the province of KwaZulu-Natal. Responsibilities included project and budget development, project management, work plans/research design, field recordation, preparation of final report, and recommendations for site protection.

The University of Cape Town Prestwich Place, Cape Town, South Africa. 2003-2004. Staff Archaeologist for a long-term excavation of over 600 historic burials for a construction project in Cape Town. Responsibilities included field support, excavation, reinterring the remains, conducting osteological and isotopic analyses of selected remains, preparation of final report, and recommendations for site protection.

Holbaai: Vredenburg Peninsula, Western Cape, South Africa. 2003. Staff Archaeologist for a project that involved an extensive survey and recordation of cultural resources on Private Property. Responsibilities included survey, surface collection, mapping of the site with EDM, site recordation, statistical analysis of shell remains from middens, an analysis of Khoisan ceramics (hunter-gatherer), and a spatial analysis and interpretation of several sites and their landscape distribution.

Ottosdal: North-West Province, South Africa. 2003. Staff Archaeologist for a project that involved an extensive survey and recordation of several hundred petroglyphs on privately owned land. Responsibilities included survey, mapping of the site with EDM, site recordation, spatial analysis and interpretation of several petroglyph sites, their landscape distribution, and final report.

Steelpoort: Messina, Northern Province, South Africa. 2002-2003. Staff Archaeologist for a long-term, multi-phase cultural resource project that included cultural survey, recordation and excavation of numerous Iron Age

sites. Responsibilities included survey, mapping of the site with EDM, site recordation, spatial analysis, and excavation of early Bantu Iron Age sites, final report and recommendations for site protection.

Klipriviersburg: Gauteng Province, South Africa. 2002. Staff Archaeologist for a long-term, multi-phase cultural resource project that included cultural survey, recordation and excavation of numerous Iron Age sites. Responsibilities included survey, mapping of the site with EDM, site recordation, spatial analysis, and excavation of early Bantu Iron Age sites, final report and recommendations for site protection.

Thabazimbi: Thabazimbi, Northern Province, South Africa. 2002-2003. Staff Archaeologist for a long-term, multi-phase cultural resource project that included cultural survey, recordation and excavation of numerous Iron Age sites. Responsibilities included survey, mapping of the site with EDM, site recordation, spatial analysis, and excavation of early Bantu Iron Age sites, final report and recommendations for site protection.

DOT (KZN), Zululand/KwaZulu-Natal, South Africa. 2002. Staff Archaeologist for a long-term, multi-phase cultural resource project that included cultural survey and recordation of numerous historic roads for the Department of Transport. Responsibilities included project and budget development, project management, work plans/research design, field survey and recordation, preparation of final report, and recommendations for site protection.

TEACHING EXPERIENCE

San Diego Community College 2007-2008.

University of the Witwatersrand, South Africa. 2006-2007.

University of Cape Town, South Africa. 2004-2006.

MILITARY

South African National Defense Force, South Africa. 1994-1999. Officer/Instructor. Held the rank of Lieutenant in the South African Armored Corps. Instructor of junior candidate officers on various armored weapon systems. Honorably discharged in January 1999.

ACHIEVEMENTS AND HONORS

Graduated with Honors, University of Cape Town, South Africa.

OUTREACH EFFORTS

Field Schools: Various Locations, South Africa

Participated in numerous public outreach programs. These programs were mostly funded by tertiary educational institutions and were geared towards raising awareness of South Africa’s rich heritage amongst economically disadvantaged youth groups. Responsibilities included presentations, teaching, anthropological field schools, coordination and field support,

staffing and travel logistics. Field schools: Cederburg (2000), Eastern Cape (2002), Makapansgat (UCT/Arizona State Univ., 2003), Sibudu (Wits, 2004), and Limpopo Valley (2004).

PUBLICATIONS AND PRESENTATIONS

Academic

Report on the Micromammal Assemblage Analysis from Sibudu Cave, KwaZulu-Natal. South African Humanities 18:279-288, 2006

Pacifist and Fascist views of World War I: A Comparative Study of ‘All Quiet on the Western Front’ and ‘The Storm of Steel’. Historical Approaches Vol: 1: 71-82, 2002

Results of M.Sc. research, SASQUA Conference, 2007

Poster presentation of Honors project, SAA Conference, 2003

Daniel Leonard

Archaeologist

Mr. Leonard has over 10 years of experience in professional and academic archaeology. Dissertation research in Mexico involved an environmental archaeology project investingating ancient Maya agricultural features in freshwater wetlands in Quintana Roo. For this project, Mr. Leonard coordinated with local archaeology officials and town leaders, and collaborated with specialists including botanists and soil scientists to study vegetation communities and paleoenvironmental changes in wetlands. In the United States, Mr. Leonard has worked in cultural resource management in Pennsylvania, New Jersey, New York, Montana, Utah, and California. Projects have included surveying 120 miles on the Crow Reservation in MT for a coalbed methane piepeline, testing Late Woodland lithic and FAR scatters on Hendricks island in PA, excavating and relocating 4000 burials at a potters field in NJ for the Seacacus interchange project, and data recovery excavation of numerous Pueblo III pit houses in southern Utah for a propopsed reservoir. In California, responsibilities have included record searches, archival research, surveys, and report writing. These projects have supported private developers and local government agencies for compliance with CEQA and various city and county requirements, and have supported federal agencies (Army Corp, FCC) for compliance with Section 106 and Section 110 of the National Historic Preservation Act. Most recently with HDR, Mr. Leonard has worked on the San Clemente Island Archaeological Site Documentation Project, recording shell midden sites, creating detailed site maps, and conducting a GIS analysis of site types on the island.

EDUCATION
PhD Anthropology/Archaeology, UC Riverside, 2013

MA Anthropology/Archaeology, UC Riverside, 2006

BA Archaeology, Boston University, 2002

REGISTRATIONS
Register of Professional Archaeologists, Expires 12/31/2016

Metrolink Roadway Worker Protection Training, Expires 12/31/2016

PROFESSIONAL MEMBERSHIPS
Society for American Archaeology

INDUSTRY TENURE
13 years

HDR TENURE
2 years

OFFICE LOCATION
San Diego, CA

RELEVANT EXPERIENCE

SANDAG, Downtown Bus Stopover and Multi-use Facility, *San Diego County, CA* (01/2016 – 06/2016). Staff Archaeologist. The proposed project, involving HDR engineering, consists of construction of a stopover complex that would facilitate opertation of local and rapid transit bus routes that terminate in the core area of downtown San Diego. HDR EOC provided services including a cultural and historic resources survey and a technical report to assist SANDAG in meeting its regulatory obligations pursuant to CEQA and City of San Diego guidelines. Responsibilities included a one-day field survey, archival research at the San Diego History Center, and assistance with prepration of the technical report.

Riverside County Transportation Commission, Perris Valley Line Positive Train Control Project, *Riverside County, CA* (11/2015 – 02/2016). Staff Archaeologist. This project, involving HDR engineering, consisted of the installation of 15 PTC telecommunication antennas along a 21 mile stretch of the PVL railway. HDR EOC provided cultural resources monitoring to assist RCTC in meeting its regulatory obligations pursuant to section 106 of the National Historic Preservation Act. Responsibilities including two weeks of monitoring construction activities at 10 tower locations deemed archaeological sensitive, and assisting with report preparation.

Riverside County Transportation Commission, Perris Valley Line Project, *Riverside County, CA* (07/2014 – 02/2016). Staff Archaeologist. This project, involving HDR engineering, consisted of extending 24 miles of commuter rail service from the existing Riverside Downtown Station to the Cities of Moreno Valley and Perris in western Riverside County. HDR EOC provided cultural resources monitoring

to support RCTC for compliance with section 106 of the National Historic Preservation Act. Monitoring concentrated on five environmentally sensitive areas of greater archaeological sensitivity that were established along the PVL ROW. Responsibilities for this project included compilation of field notes and assistance with report preparation.

NAVFAC SW TO-30/31, Archaeological Site Documentation Project on San Clemente Island, ***San Clemente Island, CA*** **(09/2014 – 10/2015). Crew Chief.** This project involves the survey of un-surveyed and re-survey of inadequately surveyed portions of the Project Area, primary documentation of undocumented and known-but-undocumented sites, evaluation of documentation for previously recorded site records and redocumentation of inadequately recorded sites. The Project supports the Naval Base Coronado/SCI Cultural Resources Management Program (CRMP) for compliance with Section 110 of the National Historic Preservation Act through completing documentation of identified prehistoric archaeological properties.

Pre-Fieldwork responsibilities involved review of records search data and preparing GIS field maps. Fieldwork involved working in teams of two to update records for 717 sites spread over 4500 acres of project areas. Site location information loaded onto Trimble GeoXT 8 units was used to relocate sites in the field. Artifacts, features, and site boundaries were mapped in detail with the Trimble units and photographed. DPR forms loaded onto IPads were completed in the field. Sites were predominantly prehistoric in age, with constituents including dark midden soil, marine shell, sea mammal and fish bone, housepits, rock rings, lots of groundstone, some chipped stone, and specialty finds such as fish hooks, pendants, pottery, and projectile points. Office post-processing included cleaning up and editing the Trimble data in ArcGIS 10.3 (redrawing shapes, updating attribute information) and reviewing the DPR forms for quality assurance. A site typology analysis was conducted for the 717 recorded sites. Three previously defined site types were translated into quantitative categories using midden size and artifact diversity as criteria. The GIS was used to apply the criteria to the dataset, thereby automating the process of assigning types to sites. The analysis also involved evaluating the suitability of the existing typology and establishing a site classification process better tailored to the unique archaeology of SCI. Fieldwork results and the site typology analysis were written up for the report.

City of Los Angeles Sidewalk Repair Program, Los Angeles, CA (9/4/2015 – 9/17/2015). Field Archaeologist. HDR provided cultural resources monitoring to support the City of Los Angeles for compliance with CEQA. Responsibilities included monitoring fence replacement, tree removal, and sidewalk removal and replacement surrounding parking lot 2 at 615 North Main Street at El Pueblo de Los Angeles Historical Monument. Several historic brick foundations were uncovered, including that of the cemetery wall connected to the 19th century La Placita church. Features were described, sketched, and photographed, and the cemetery DPR site record was updated.

City of Highland, 3rd and 5th Street Improvements, ***Highland, CA*** **(11/26/2014 – 12/5/2014). Field Archaeologist.** HDR is providing professional services to perform environmental, right-of-way engineering, and a PS&E package to the City of Highland to improve 3rd Street and 5th Street.

Key components of the improvements are reconstruction/rehabilitation of existing pavement, roadway widening, new curb and gutter, new sidewalks, retaining walls, street lighting, new traffic signals and modifying existing signals, roadway drainage systems, and landscaping.

Responsibilities included a field survey and recordation of the 5th street bridge and

City Creek Bypass Channel culvert. A records search was conducted at the San Bernardino Archaeological Information Center. Archival research into the relationship between the Channel and the historic Cram and Van Leuven Ditch was conducted at the Heritage Room at the A.K. Smiley Public Library in Redlands and the San Bernardino County Archives. Conversations were initiated with Tom Atschel of the Redlands Area Historical Society and Robin Laska at SBAIC. Historic aerial photographs and USGS topographic maps were reviewed online, and several sections of the technical report were written.

San Diego Gas & Electric (SDG&E) On-Call Cultural Resources, San Diego County (2014-Present). Field Archaeologist. HDR is supporting the undertakings of SDG&E for new construction, ongoing maintenance, and repair projects by conducting cultural resources oversight for various small to large scale projects throughout the company service territory. Primary responsibilities include monitoring construction activities (excavations associated with new power poles/towers, removal of old poles, installation and modification of underground utilities, and access road grading) within and adjacent to archaeological resources. Secondary tasks include occasional surveys, report writing, and participation in construction meetings. Examples of projects include:

- APEX Pio Pico Power Plant gas line extension, Otay Mesa, San Diego County
- TL 695 Reconductor Geotech Boring, Camp Pendleton, San Diego County
- Wood to Steel Pole Conversion TL 6914, Dehesa, San Diego County
- Wood to Steel Pole Conversion TL 649, Chula Vista, San Diego County
- C1202 New 12 kV Circuit, San Ysidro, San Diego County
- Access Road Grading, Camp Pendleton, San Diego County
- TCM Access Road Grading, Orange County
- Install Cathodic Protection L-3010, Fallbrook, San Diego County
- CMP Pole Replacement, 2 poles, Ramona, San Diego County

NON-HDR EXPERIENCE

BCR Consulting LLC, Claremont CA, 2013-2014. Field Supervisor and Staff Archaeologist. Responsibilities: Conducting records searches, fieldwork, artifact analysis, preparation of DPR 523 forms, and assisting with report writing. Projects included three months of monitoring in the City of San Diego, a 180-acre survey in Poway, a 1500-acre survey in Lancaster, and dozens of cell tower surveys in San Diego, Los Angeles, and San Bernardino counties.

Eastern Information Center, UC Riverside, Riverside CA, 2012-2013. Information Officer. Responsibilities: processed incoming archaeological site records and reports (assigned primary numbers and report numbers, plotted sites and surveys on 1:24,000 7.5' series USGS topographic maps, entered record and report data into our database, and filed hard copies of records and reports in our archives); conducted record searches for clients (generated a map of sites and surveys in the project area and 1-mile radius, checked historic 15' and 30' series maps, consulted the National Register of Historic Places and the Historic Properties Database for additional historic resources falling within the project search radius, prepared records search letters for clients detailing the results of the search and including any requested site records or reports).

BCR Consulting LLC, Claremont CA, 2012. Archaeological Field Technician. Responsibilities: conducted several record searches at the San Juaquin Valley Information Center at CSUB, and carried out occasional one to two-day projects including ~3 acre oil derrick surveys near Buttonwillow and McKittrick, 100 acre

survey of a property east of Apple Valley slated for solar development, trench-excavating at three small sites in Murrieta, monitoring a large-scale grading operation for a school in Otay Mesa, monitoring sub-street excavation for water line replacement in Marina del Rey, and monitoring over-excavation for a Target in Little Armenia.

Statistical Research, Inc., Redlands CA, 10/1/2011 – 10/15/2011. GIS and Archaeological Field Technician. Responsibilities: spent one week in the GIS lab familiarizing myself with project data, symbolizing features, and preparing preliminary site maps. Spent a second week surveying a transmission line, part of a larger solar project outside of Lancaster, CA. Ran the Trimble to record historic and prehistoric isolates and sites.

Tierra Environmental, Inc., San Diego CA, 6/1/2011 – 8/31/2011. Archaeological Field Technician. Responsibilities: Survey and site recording on 15,000 acres of BLM land for the Ocotillo Wind Farm project. Assisted with artifact (scrapers, choppers, bifaces, cores, knapping stations, ceramic scatters, hammerstones, groundstones), and feature (agave roasting pits, hearths, pecked boulders, roads, sleeping circles) identification, description, and photography on approximately 30 sites located near Ocotillo, CA.

Bighorn Archaeological Consultants, Santa Clara UT, 1/10/2010 – 3/31/2010. Archaeological Field Technician. Responsibilities: Phase II excavation of pithouses and associated features dating to Basketmaker II through Pueblo III periods. Detailed plan and profile drawings were made of pithouse features (hearths, benches, plastered surfaces, slab-lined storage pits, postholes, burned roof beams) and artifacts. Samples were collected for radiocarbon dating, pollen analysis, and flotation. This project was conducted just outside of the town of Kanab, UT at the site of a planned reservoir.

BCR Consulting, Claremont CA, 7/1/2010 – 8/31/2010. Map Production Assistant Responsibilities: Created site, location, and vicinity maps (using Photoshop) for sites recorded during an 8000 acre surface survey near California City in the Mojave Desert. The survey fulfilled CEQA requirements for a planned solar development project.

Public Service Electric and Gas, Elizabeth NJ, 10/1/2008 – 1/10/2009. GIS Assistant for Asset Information and System Policy. Responsibilities: Updating the company's ArcGIS geodatabase with new monthly land data from TeleAtlas; extensive geoprocessing was carried out to make the source data conform to our table structures. Field maps were produced for gas and electric service territories throughout New Jersey. Also created annotation feature classes and cartways from street centerline data for street maps used by PSEG engineers.

Statistical Research, Inc., Redlands, CA, 2007-2008. GIS Technician and Assistant Cartographer. Responsibilities: Mapping excavation units and cultural features for the Cajon Pass Project and the Loyola Marymount University Project, using a Sokkia SET530R Total Station, Trimble ProXH GPS, and Recon Data Collector with ArcPad 7.0 and TDS Survey Pro software. GIS lab work involved downloading mapping data into ArcGIS 9.2 personal geodatabases and using ArcInfo to generate site maps for Section 106 compliance reports.

Stantec Consulting Inc., Irvine CA, 6/1/2006 – 8/31/2006. Archaeological Field and

Lab Technician. Responsibilities: Excavation, data recovery, and artifact identification at a prehistoric Gabrielino/Juaneno site for Tomato Springs housing development in Irvine, CA. Sorted and counted lithic artifacts according to stone type and size at the lab in Ontario, CA

American Museum of Natural History, New York NY, 9/1/2004 – 12/20/2004. Paid Intern for Collections Management. Responsibilities: Measuring, photographing, and describing the condition of artifacts in the Mexican Archaeology collection; entering artifact data into the museum's online database.

Kise, Straw, and Kolodner, Inc., Philadelphia PA, 2004. Archaeological Field Technician. Responsibilities: Excavation and relocation of burials from a 19th century cemetery in Montgomeryville, PA.

R. Christopher Goodwin and Associates, Frederick MD, 2003. Archaeological Field Technician. Responsibilities: Phase 2 testing (shovel tests, 1x1 hand units, and backhoe trenches) of Prehistoric sites for the proposed Columbia Gas pipeline in East Stroudsburg, PA.

Louis Berger Group, East Orange NJ, 2003. Archaeological Field Technician Responsibilities: Excavation and Relocation of burials from the historic Potter's Field Cemetery in Secaucus, NJ.

Kise, Straw, and Kolodner, Inc., Philadelphia, PA, 2003. Archaeological Field Technician. Responsibilities: Excavation and age/sex analysis of burials from a 19th century. cemetery near Oley, PA.

Ethnoscience, Inc., Billings MT, 9/1/2002 – 12/20/2002. Archaeological Field Technician. Responsibilities: Highway surveys for Montana DOT, Phase I site testing for the Northern Grasslands Pipeline, and Phase I Survey of 10,000 acres for the Crow Tribe Coalbed Methane Project.

PUBLICATIONS

Glenny, Wayne, Ann Keen, and Daniel Leonard
2016 Downtown Bus Stopover and Multi-use Facility: Cultural Resources Technical Report. Prepared for SANDAG, June 2016

Glenny, Wayne and Daniel Leonard
2016 Perris Valley Line Archaeological Monitoring Report. Prepared for Riverside County Transportation Commission, February 2016.

Glenny, Wayne and Daniel Leonard
2016 Perris Valley Line Project Archaeological Monitoring Report for Positive Train Control. Prepared for Riverside County Transportation Commission, February 2016.

Gusick, Amy E., Michael Connolly, Margaret Diss, and Dan Leonard
2015 Site Documentation Report: Site Recording Only of Archaeological Sites on San Clemente Island. Prepared for Environmental Core – Archaeologist, Naval Facilities Engineering Command Southwest, December 2015.

Harriet Richardson Seacat

Senior Ethnographer | Archaeologist

Into each project opportunity, Harriet brings professional insights gained over 16 years of conducting anthropological research centered on ethnography, ethnohistory, archaeology, architectural history, and NHPA and NEPA regulatory compliance. Her unique strengths include customizing data collection strategies to document all cultural resources that may be affected by a project—including archaeological, ethnographic, and built resources; developing a deep understanding of historic contexts, traditional use, and living cultural values by conducting in-depth research to gather prior knowledge of an area and its people and collaborating with communities to consider their particular histories, cultural values and practices, and important cultural resources; and using gathered information to anticipate all possible effects to cultural resources and communities. Harriet's research has been the focus of countless regulatory compliance reports, several media productions, and a variety of professional presentations. She is based in the Southeast, alternating between her homes in Mobile, Alabama, and the Asheville area of North Carolina.

EDUCATION
Master of Arts, Anthropology, Western Washington University, 2003

Bachelor of Arts, Anthropology, University of Nebraska at Lincoln, 1999

PROFESSIONAL MEMBERSHIPS
Plains Anthropological Society, 2013-present

Association of American Geographers, 2011-present

Southern Anthropological Society, 2005-present

American Anthropological Association, 2001-present

INDUSTRY TENURE
16.5 years

HDR TENURE
6 years

OFFICE LOCATION
Marshall, NC

PUBLICATIONS
2017 Environmental and Cultural Context sections, Phase I Archaeological Survey for the NICTD West Lake Project, Lake County, Indiana

2017 Historic Context and Summary and Recommendations sections, Phase II Archaeological Evaluation of Site 21KC0137 for the Great Northern Transmission Line Project, Segment 2, Koochiching County, Minnesota

2017 Technical Memorandum: TCP/TCL Inventory Efforts with the Arapaho Tribe, Crow Tribe, Northern Cheyenne Tribe, Three Affiliated Tribes, and Numerous

RELEVANT EXPERIENCE

Charleston County, Cultural Landscape Documentation and Effects Assessment, NEPA Services, SC 41 Improvement Project, Mount Pleasant, Charleston County, South Carolina (07/2017-Present). Senior Ethnographer. This NHPA and NEPA cultural resources investigation documents and assesses adverse effects to a National Register-eligible Gullah cultural landscape possessing traditional cultural significance. Responsibilities include conducting background research pertaining to Gullah communities' cultural history, practices, and identity; performing community outreach to develop a collaborative fieldwork strategy; leading ethnographic fieldwork pertaining to traditional cultural significance of places in the community through field interviews; analyzing and creating geospatial data; and authoring preliminary and final reports. This analysis will also help inform community characterization and any associated community impact analysis.

Hurlburt Field, Cultural Resources Identification and Effects Assessment, NEPA Services, Interim CV-22 Landing Zone Project, Okaloosa County, Florida (05/2017-Present). Cultural Resources Subject Matter Expert. This NEPA investigation analyzes environmental effects of proposed facilities construction and operations changes at Hurlburt Field and summarizes findings in an Environmental Assessment (EA) document. Responsibilities include identifying federally recognized tribes for tribal consultation purposes, conducting background research and coordinating GIS efforts to identify known or potential cultural resources near the proposed project location, and authoring the cultural resources sections of the EA based on findings.

Hurlburt Field, Cultural Resources Identification and Effects Assessment, NEPA Services, AC-130J Project, Okaloosa County, Florida (02/2017-Present). Cultural Resources Subject Matter Expert. This

Tribes of the Očhéthi Šakówiŋ (Sioux), Great Northern Transmission Line Project, Minnesota

2017 Cultural Resources sections, Environmental Assessment for AC-130J Recapitalization, Hurlburt Field, Okaloosa County, Florida

2017 Cultural Resources sections, Environmental Assessment for Defense Logistics Agency Disposition Services Complex, Red River Army Depot, Bowie County, Texas

2017 Ethnohistorical and Ethnographic Overview and related sections. Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training report, Tillamook County, Oregon

2016 Limited English Proficiency section, Rail Safety Action Plan report, Broward, Indian River, Martin, Palm Beach, and St. Lucie Counties, Florida

2016 Cultural Resources sections, Environmental Assessment for the Authorization of CV-22 Military Training Routes, Hurlburt Field, Okaloosa County, Florida

2016 Cultural Resources sections, Critical Issues Analysis: Biggersville Solar Project, Alcorn County, Mississippi

2016 Phase I Cultural Resources Assessment for the Lookout Shoals Embankment Seismic Stabilization Improvements Project, West of Sharon, Catawba County, North Carolina

2016 Community Characteristics Report, I-85 North Bridge Project, Charlotte, Mecklenburg County, North Carolina

2016 Phase I Archaeological Assessment for the I-85 North Bridge Project, Charlotte, Mecklenburg County, North Carolina

2016 Cultural Resources sections, Critical Issues Analysis: Hampton Solar Project, Limestone County, Alabama

2016 Cultural Resources sections, NEPA investigation analyzes environmental effects of proposed facilities construction and operations changes at Hurlburt Field and summarizes findings in an Environmental Assessment (EA) document. Responsibilities include identifying federally recognized tribes for tribal consultation purposes, conducting background research and coordinating GIS efforts to identify known or potential cultural resources near the proposed project location, and authoring the cultural resources sections of the EA based on findings.

Defense Logistics Agency, Cultural Resources Identification and Effects Assessment, NEPA Services, Red River Army Depot, Bowie County, Texas (01/2017-Present). Cultural Resources Subject Matter Expert. This NEPA investigation analyzes environmental effects of a proposed Disposition Services Complex on Red River Army Depot and summarizes findings in an Environmental Assessment (EA) document. Responsibilities include conducting background research and coordinating GIS efforts to identify known or potential cultural resources near the proposed project location, authoring the cultural resources sections of the EA based on findings, identifying federally recognized tribes for tribal consultation purposes, and developing consultation letters for tribes and TX SHPO.

AGEISS, Archaeological Monitoring near NRHP-listed Fort McIntosh, Laredo Aquatic Ecosystem Restoration Project, Laredo, Webb County, Texas (01/2017-Present). Archaeologist/Cultural Monitor. This archaeological investigation monitors project activities near NRHP-listed Fort McIntosh (41WB11) to ensure no impacts to the site are sustained. Responsibilities include conducting archaeological monitoring, processing archaeological field data, and authoring monthly monitoring reports.

United States Air Force, Cultural Resources Assessment, Survival, Evasion, Resistance, and Escape (SERE) Specialist Training, Bayocean Peninsula, Tillamook County, Oregon (12/2016-Present). Ethnographer/Archaeologist/Report Coauthor. This NHPA and NEPA cultural resources investigation identifies and evaluates archaeological resources for National Register eligibility and considers Project effects to identified tribal cultural resources. Responsibilities include conducting background research on tribal histories and cultural resources in the project area and nearby region; as part of the collaborative field team, devising and employing archaeological pedestrian and subsurface survey methods to identify, delineate, and record cultural resources; synthesizing research findings; analyzing field results; and coauthoring the report.

Florida Department of Transportation, Limited English Proficiency Analysis, Rail Safety Action Plan Development, Broward, Indian River, Martin, Palm Beach, and St. Lucie Counties, Florida (12/2016-Present). Limited English Proficiency (LEP) Subject Matter Expert. This LEP analysis involves gathering and synthesizing census data in order to present the information and make recommendations on the provision of language services during implementation of the Rail Safety Action Plan. Responsibilities include gathering the census data, synthesizing the data, drawing conclusions from the data, and authoring a summary of findings.

Hurlburt Field, Cultural Resources Identification and Effects Assessment, DOPAA Services, Slow Routes Project, Okaloosa County, Florida (07/2016-Present). Cultural Resources Subject Matter Expert. This NEPA investigation analyzes environmental effects of a proposed flight

Harbor River Bridge Replacement Environmental Assessment, St. Helena Island, Beaufort County, South Carolina

2016 Cultural Resources Existing Environment and Environmental Consequences sections, Purchase of Power Generated at Brownsville, Tennessee Solar Facility, Haywood County, Tennessee: Environmental Assessment

2016 Cultural Resources Affected Environment and Environmental Consequences sections, Selmer II Solar Project, McNairy County, Tennessee: Draft Environmental Assessment

2015 Potential Navajo Traditional Cultural Property Site Types for the Kayenta Mine Complex Traditional Cultural Property/Traditional Cultural Landscape Inventory, Kayenta, Arizona

2015 Lexington and Richland Counties History sections, Community Characterization, Carolina Crossroads, I-20/26/126 Corridor Project, Lexington and Richland Counties, South Carolina.

2015 Subsistence Affected Environment and Environmental

Consequences Chapters, Environmental Evaluation Document for Confidential Oil and Gas Client, North Slope, Alaska.

2015 Nanushuk Project: Cultural Resources and Subsistence Technical Report. Nuiqsut, North Slope Borough, Alaska

2015 TCP/TCL Mapping, MC252 Response Traditional Cultural Properties Inventory: State of Mississippi

2015 TCP/TCL Mapping, MC252 Response Traditional Cultural Properties Inventory: State of Louisiana

2015 Several Community Profiles and TCP/TCL Mapping, MC252 Response Traditional Cultural Properties Inventory: State of Florida

2015 Fishing Community Profiles and TCP/TCL Mapping, MC252 Response Traditional Cultural

pattern in several FL, AL, MS, GA, SC, NC, and TN counties and summarized findings in an Environmental Assessment (EA) document. Responsibilities include identifying federally recognized tribes for tribal consultation purposes, conducting background research and coordinating GIS efforts to identify known or potential cultural resources near the proposed project location, and authoring the cultural resources sections of the EA based on findings.

Invenergy LLC, NEPA Services, Biggersville Solar Project, Alcorn County, Mississippi (05/2016-Present). Cultural Resources Subject Matter Expert. This NEPA investigation analyzes environmental constraints of a proposed solar facility and summarizes findings in a Critical Issues Analysis (CIA) document. Responsibilities include conducting background research to identify known or potential cultural resources near the proposed project location and authoring the cultural resources sections of the CIA based on findings.

Minnesota Power, Traditional Cultural Places and Landscape Study, Great Northern Transmission Line Project Environmental Permitting, Minnesota (04/2016-Present). Senior Ethnographer/Ethnohistorian/Report Coauthor. This NHPA and NEPA investigation identifies traditional cultural places (TCPs) and traditional cultural landscapes (TCLs) in the Great Northern Transmission Line Project in northern Minnesota and evaluates identified TCPs/TCLs for National Register eligibility. Responsibilities include conducting ethnohistorical background research pertaining to historical contexts in the project area; performing tribal outreach to develop a collaborative fieldwork strategy; leading ethnographic fieldwork pertaining to traditional cultural significance of places in the project area through both off- and on-site interviews; analyzing and creating geospatial data; and co-authoring preliminary and final reports.

Duke Energy Carolinas, Cultural Resources Assessment, Lookout Shoals Embankment Seismic Stability Improvement, Catawba County, North Carolina (03/2016-Present). Cultural Resources Project Director/Report Coauthor. This NHPA and NEPA cultural resources investigation identifies and evaluates archaeological and historical architectural resources for National Register eligibility. Responsibilities include conducting background research on area history and known cultural resources in the project area and nearby region; devising archaeological pedestrian and subsurface survey methods as well as historical architectural resources recordation methods to identify, delineate, and record cultural resources; analyzing field results; coauthoring the report; and coordinating with the NC SHPO.

SCDOT, Harbor River Bridge Replacement, NEPA Services, St. Helena Island, Beaufort County, South Carolina (02/2016-Present). Cultural Resources Subject Matter Expert. This NEPA investigation evaluates the environmental effects of a proposed bridge replacement project and summarizes results in an Environmental Assessment (EA) document. Responsibilities include conducting QC review of the technical report detailing the results of a subconsultant-performed cultural resources assessment; authoring the cultural resources sections of the associated EA based on the technical report; and helping develop and implement a mitigation plan for loss of the historic Harbor River Bridge.

City of Charlotte, Cultural Resources Identification and Effects

Properties Inventory: State of Alabama

2015 Phase I Cultural Resources Survey of a 90-Acre Parcel Associated with the Kings Mountain Energy Center Project, Kings Mountain, Cleveland County, North Carolina

2014 “Our Collective Heritage” : Plains Tribal Perspectives and Oral History Concerning the Killdeer Mountains and Historic Battlefield

2014 Post-Contact History section, Results of a Class III Cultural Resource Inventory for the Proposed Killdeer Truck Bypass, Dunn County, North Dakota

2013 Negotiating Middle Ground: An Ethnography of Tribal Consultation Practices in the Plains

2013 Ethnographic Investigations at Camp Guernsey’s Gray Rocks Ranch, South Training Area, and Smith Ranch Parcel in the North Training Area, Wyoming Army National Guard. Submitted to Wyoming Army National Guard

2012 These Shimmering Waters are NOT for Sale: Contentions of Waterway Use Along the Gulf

Coast

2008 The Bayou before Katrina: A Historical, Archaeological, and Architectural Overview of Bayou La Batre, Mobile County, Alabama

2008 Chapter 3: Site Formation Processes. Archaeology at Madison Park: Phase III Data Recovery at 1MT318, the Madison Park Site, Associated with ALDOT Project BRF-153(11) & NHF-507(4), Montgomery County, Alabama

2007 Surges in ‘the Bayou’: Twentieth-Century Economic and Social Development in Bayou La Batre, Alabama

2007 Phase II Archaeological Testing at 22ST826, Stone County, MIssissippi

2006 Snow Birds and Storm Surge: Exploring Affluence and Its Impacts to Living Fishing Communities along the North American Gulf

Assessment/Community Characterization and Impact Analysis, I-85 North Bridge Design-Build and NEPA Services, City of Charlotte, North Carolina (12/2015-Present). Human Environment and Cultural Resources Lead. This NEPA investigation identifies environmental effects in the I-85 North Bridge study area. Responsibilities include community identification and characterization in the study area through background research and field visits involving stakeholder interviews; conducting background research and fieldwork to identify archaeological sites in the direct impact area; assessing impacts to identified communities and archaeological sites; and authoring associated reports and impact assessments for the EA.

SCDOT, Community Impact Assessment, Carolina Crossroads EIS, Columbia, South Carolina (6/2014-Present). Human Environment Team Member/Applied Anthropologist. This NEPA investigation identifies communities in the I-20/I-26/I-126 corridor and assesses potential impacts to these from proposed SCDOT activities. Responsibilities include providing anthropological insights and perspectives to the collaborative human environment team; conducting anthropologically oriented background research; assisting with fieldwork involving preparing for and attending community meetings, designing and conducting surveys and interviews, and holding special interest community meetings and focus groups; and co-authoring and providing QA/QC review for community profiles and the community impact assessment for the EIS.

BNSF and CSX, Cultural Resources Identification and Effects Assessment, Positive Train Control Tower Installations, Various Counties, Alabama, Georgia, Louisiana, Maryland, North Carolina, and Tennessee (10/2013-Present). Archaeologist. This investigation identifies previous cultural resource surveys, previously recorded archaeological sites, and previously identified NRHP-listed or -eligible historical properties in proposed tower locations and surrounding areas. Responsibilities include researching and reporting on cultural resources at tower locations.

Northern Indiana Commuter Transportation District, Cultural Resources Assessment, West Lake Corridor Project, Hammond, Lake County, Indiana (07/2017). Cultural Resources Specialist/Report Coauthor. This NHPA cultural resources investigation identified and evaluated archaeological resources for National Register eligibility. Responsibilities included conducting background research on the local environmental and cultural context and co-authoring the report.

Oncor Electric Delivery, Cultural Resources Identification and Effects Assessment, Transmission Line Improvement Projects, Various Counties, Texas (05/2017-06/2017). Archaeologist/Cultural Resources Specialist. This investigation identified previous cultural resource surveys, previously recorded archaeological sites, and previously identified aboveground resources in existing transmission line corridors and nearby vicinities. Responsibilities included researching, evaluating, and reporting on cultural resources that may have been affected by the proposed improvement projects.

Minnesota Power, Phase II Archaeological Evaluation of Site 21KC0137, Great Northern Transmission Line Project Environmental Permitting, Minnesota (05/2017). Cultural Resources Specialist/Report Co-author. This NHPA investigation evaluated Site 21KC0137 for National Register eligibility to assess effects from the proposed project. Responsibilities include

Coast

2006 Mobile's Riverfront Development during the Twentieth Century section. Phase II Cultural Resources Assessment for the Proposed I-10 Bridge, ALDOT, Mobile, Alabama

2003 Spilled Sewage and Ransacked Remains: An Analysis of Two Cultural Resource Management Policy Periods and Their Outcomes in Blaine, Washington

2000 Land-Stealing and Double-Dealing: The Various Attempts of the Americanization of the Mdewakanton and Wahpekute Dakotas

1999 The Oral Tradition: An Ancient Discipline as Source

1999 The Santee Sioux Tribe of Nebraska: A Description of the Reservation Life in the Late Twentieth Century

AWARDS

2013 Pathfinder Award of Excellence presented to the MC252 Oil Spill Response Cultural Resources Team, HDR

2001 Chosen for first- and second-year Teaching Assistant position, Dept. of Anthropology, Western Washington University, Bellingham

2000 Chosen for academic scholarship by Dept. of Anthropology chair, Western Washington University, Bellingham

1999 Bachelor's degree with High Distinction

1999 Phi Beta Kappa Honor Society member

1999 Golden Key National Honor Society member

1998 Chosen for undergraduate special research training, University of Nebraska, Lincoln

conducting background research pertaining to historical and cultural contexts in relation to the site and co-authoring the report.

Otter Tail Power Company, Cultural Resources Assessment, Big Stone South to Ellendale 345kV Transmission Line Project, Grant, Day, and Brown Counties, South Dakota and Dickey County, North Dakota (05/2017). Cultural Resources Specialist. This NHPA cultural resources investigation identified and evaluated archaeological and traditional cultural resources for National Register eligibility. Responsibilities included compiling and entering data on South Dakota Archaeological Research Center site forms.

Cannon Air Force Base, NEPA Services, Curry and Roosevelt Counties, New Mexico (02/2017). Tribal Consultation Expert. Responsibilities included assisting project managers in identifying federally recognized tribes for tribal consultation purposes.

Duke Energy Carolinas, Cultural Resources Assessment, Mountain Island Embankment Seismic Stability Improvement, Gaston County, North Carolina (07/2016-10/2016). Cultural Resources Co-Project Director/Report Coauthor. This NHPA and NEPA cultural resources investigation identified and evaluated archaeological and historical architectural resources for National Register eligibility. Responsibilities included conducting background research on area history and known cultural resources in the project area and nearby region; devising a strategy for archaeological pedestrian and subsurface survey methods as well as historical architectural resources recordation methods to identify, delineate, and record cultural resources; and co-authoring the report.

Silicon Ranch Corporation, Cultural Resources Identification and Effects Assessment, NEPA Services, Brownsville Solar Farm Site, Selmer, McNairy County, Tennessee (02/2016-05/2016). Cultural Resources Subject Matter Expert. This NEPA investigation evaluated the environmental effects of a proposed solar farm site and summarized results in an Environmental Assessment (EA) document. Responsibilities included conducting QC review of the technical report detailing the results of a subconsultant-performed cultural resources assessment and authoring the cultural resources sections of the associated EA based on the technical report.

Silicon Ranch Corporation, Cultural Resources Identification and Effects Assessment, NEPA Services, Hampton Solar Project, Limestone County, Alabama (02/2016-03/2016). Cultural Resources Subject Matter Expert. This NEPA investigation analyzed environmental constraints of a proposed solar facility and summarized findings in a Critical Issues Analysis (CIA) document. Responsibilities included conducting background research to identify known or potential cultural resources near the proposed project location and authoring the cultural resources sections of the CIA based on findings.

Palmetto Railways, Community Engagement and Awareness/Community Mitigation Plan, Intermodal Container Transfer Facility, North Charleston, Charleston County, South Carolina (02/2016). Cultural Resources Advisor. This public involvement and community mitigation effort involved the public in the NEPA process for a proposed railway planned for construction through a historic district, the EIS for which

is being led by another firm. Responsibilities included providing the project team advice on public relations regarding cultural resources in the study area.

Silicon Ranch Corporation, Cultural Resources Identification and Effects Assessment, NEPA Services, Selmer Solar Farm Sites, Selmer, McNairy County, Tennessee (01/2016-02/2016). Cultural Resources Subject Matter Expert. This NEPA investigation evaluated the environmental effects of two proposed solar farm sites and summarizes results in two separate Environmental Assessment (EA) documents. Responsibilities included conducting QC review of the technical report detailing the results of two subconsultant-performed cultural resources assessments and authoring the cultural resources sections of the associated EAs based on the technical report.

Salt River Project Agricultural Improvement and Power District, TCP and TCL Survey of the Navajo Generating Station and Kayenta Mine Complex, Northern Black Mesa, Arizona (7/2015-09/2016). Ethnoarchaeologist. This NHPA, NEPA, and Navajo Nation Cultural Resources Protection Act investigation identified and evaluated traditional cultural properties and traditional cultural landscapes on Peabody Western Coal Company leaseholds in northern Arizona for National Register eligibility. Responsibilities included categorizing and identifying archaeological structures, features, and artifacts that may deem archaeological sites of traditional cultural importance; authoring site type descriptions based on the archaeological, ethnographic, and historical record; and coordinating with the GIS team to map sites and archaeologically or ethnoarchaeologically defined cultural landscapes.

Confidential Oil and Gas Client, Subsistence and Traditional Knowledge Studies of Certain North Slope Communities in the Impact Zone of Proposed Oil Activities, NEPA Services, North Slope, Alaska (9/2013-11/2015). Subsistence Team Lead/Ethnographer/Ethnohistorian. This NEPA investigation identified subsistence locations and traditional cultural properties and assessed potential impacts to these from proposed oil activities. Responsibilities included ethnohistorical research; background research and ethnographic fieldwork pertaining to subsistence resources, activities, and use areas; analyzing and creating geospatial data; coordinating mapmaking; stakeholder outreach and consultation; and co-authoring technical memorandums as well as preliminary and final reports. Also provided support and QA/QC review for cultural resources project documents.

BP, Deepwater Horizon Oil Spill MC 252 Incident and Response: Traditional Cultural Properties Inventory Study, Gulf Coast US (6/2011-5/2015). Ethnographer. In consultation with multiple federal and state agencies, SHPOs, THPOs, and a combined total of over a hundred ethnic, tribal, and fishing communities, this ethnohistorical and ethnographic study identified and evaluated traditional cultural properties of coastal Louisiana, Mississippi, Alabama and Florida for National Register eligibility. This project is considered to be the largest TCP study ever conducted in the United States. Responsibilities included ethnographic fieldwork, ethnohistorical research, authoring individual community profiles, analyzing and creating geospatial data, coordinating mapmaking, designing TCP site forms, and co-authoring final report.

NTE Carolinas, Cultural Resources Assessment, Kings Mountain Energy Center, Kings Mountain, North Carolina (11/2014-2/2015). Archaeology Project Director. This cultural resources investigation identified and evaluated archaeological and historical architectural resources for National Register eligibility. Responsibilities included client contact; researching cultural resources records held by the state; employing archaeological pedestrian and subsurface survey methods as well as historical architectural resources recordation methods to identify, delineate, and record cultural resources; devising a strategy for and supervising field work; analyzing field results; conducting archaeological and historical research; and being the main author for the final report.

NDDOT, Tribal Perspectives and Oral History Concerning the Killdeer Mountains, Killdeer, North Dakota (4/2014-11/2014). Project Co-manager/Ethnographer/Ethnohistorian. This ethnographic investigation documented oral history and cultural associations pertaining to the Killdeer Battlefield and the Killdeer Mountains. Data collection was conducted at the bi-annual Tribal Consultation Committee meeting in Bismarck, North Dakota. Responsibilities included client interaction, project management, ethnographic interviews and analysis, ethnohistorical research, and being the main author of the report.

BP, Middle R MC 252 Incident and Response: Archaeological Monitoring of Response Activities, Gulf Coast US (3/2014-5/2014). Archaeologist. This archaeological investigation identified, recorded, and monitored archaeological sites where Middle R Response activities were taking place. Responsibilities included conducting archaeological monitoring missions to identify and/or revisit archaeological sites, processing archaeological field data, and authoring mission and/or site visit reports.

BP, Archaeological Monitoring of NRDA Natural Resource Monitoring Activities, Alabama and Louisiana (10/2013-5/2014). Archaeologist. This archaeological investigation identified, recorded, and monitored archaeological sites where NRDA Natural Resource Monitoring activities were taking place. Responsibilities included conducting archaeological monitoring missions to identify and/or revisit archaeological sites, processing archaeological field data, and authoring mission summaries.

BP, Deepwater Horizon Oil Spill MC 252 Incident and Response: Archaeological Monitoring of Response Activities, Gulf Coast US (4/2013-4/2014). Archaeologist. This archaeological investigation identified, recorded, and monitored archaeological sites where MC252 Response activities were taking place. Responsibilities included conducting archaeological monitoring missions to identify and/or revisit archaeological sites, processing archaeological field data, and authoring mission and/or site visit reports.

NDDOT, Archaeological Survey for a Truck Bypass, Killdeer, North Dakota (8/2013-2/2014). Archaeologist/Ethnoarchaeologist/Ethnohistorian. This archaeological investigation identified and evaluated archaeological and Native American sites for National Register eligibility. Responsibilities included employing archaeological pedestrian and subsurface survey methods to identify, delineate, and record archaeological sites, utilizing ethnoarchaeological methods in the recordation of Native American sites identified by tribal monitors, conducting ethnohistorical research, and co-

authoring historical context chapter for final report.

Wyoming Army National Guard, Ethnographic Investigations at Camp Guernsey's Gray Rocks Ranch, South Training Area, and Smith Ranch, Guernsey Wyoming (1/2012-6/2013). Ethnographer. In consultation with the Wyoming National Guard's cultural resource director and 16 American Indian tribal representatives, this ethnohistorical and ethnographic investigation identified and evaluated traditional cultural properties and traditional cultural landscapes in the study areas for National Register eligibility. Responsibilities included ethnographic fieldwork, historical and ethnohistorical research, and co-authoring final report.

Fort Wingate Depot Activity, Properties of Traditional Religious and Cultural Importance Inventory Fort Wingate Depot Activity, Gallup, New Mexico (1/2013). Ethnoarchaeologist. In consultation with the Fort Wingate Depot Activity (FWDA) cultural resource manager, NM SHPO, and Pueblo of Zuni and Navajo Nation THPOs and representatives, this ethnohistorical and ethnographic investigation identified and evaluated properties of traditional religious and cultural importance and ethnographic landscapes on Fort Wingate Depot for National Register eligibility. Responsibilities included assistance in categorizing and identifying archaeological features and artifacts of cultural importance and table creation for final report.

Wyoming Army National Guard, Wyoming Army National Guard 9th Annual Native American Consultation Meeting, Camp Guernsey, Wyoming (6/2012-10/2012). Applied Anthropologist/Cultural Broker. HDR planned the logistics and facilitation for the annual Wyoming Army National Guard (WYARNG) four day consultation meeting. The annual meetings are based on a strong government to government relationship between the WYARNG and consulting Tribes that HDR has helped foster over the past ten years. Planning included communication with WYARNG staff and 19 tribes regarding meeting dates, location, and meeting activities and agenda. Responsibilities included nurturing relationships between meeting participants and helping negotiate meeting activities related to cultural resources.

NON-HDR RELEVANT EXPERIENCE

Mississippi-Alabama Sea Grant Consortium, Preserving Oral Histories of Waterfront-Related Pursuits, Bayou La Batre/Bon Secour, Alabama (4/2008-1/2009). Project Manager/Ethnographer. Sought and obtained this grant for oral history interviewing on waterfront pursuits in fishing communities of coastal Alabama. Coordinated with a professional cinematographer on filming the interviews. Led consultant contact for this project. Directed other ethngraphers in content focus and interview methods.

City of Bayou La Batre, CDBG Project DR-06-005, Bayou La Batre, Alabama (1/2007-1/2009). Project Manager/Archaeologist/Ethnographer. Led assessment of the architectural, archaeological, and historical significance of properties severely damaged by Hurricane Katrina of August 2005. Conducted interviews to ascertain structure significance. Surmised the unique archaeology of fishermen's yards. Wrote an overall history of Bayou La Batre based on archival documents and interviews with longtime residents.

Delchamps Archaeology Museum, Handing Down History, Mobile and Baldwin counties, Alabama (2007-2008). Project Manager/Ethnographer.

Designed and implemented this educational project with area high schools that resulted in high school students collecting oral history for use in an interactive video exhibit for the University of South Alabama Delchamps Archaeology Museum. Trained students in interviewing tactics and directed student efforts with consultants. Worked with historical turpentining and present-day fishing communities.

Portersville Revival Group, Coden Area Katrina Effects and Recovery Efforts, Coden, Alabama (3/2007-9/2007). Principal Investigator. Conducted ethnographic research to ascertain the effects of both Hurricane Katrina and the subsequent recovery efforts on residents of the 36523(Coden, Alabama) zip code. Authored a report documenting and analyzing the effects of recovery efforts, making recommendations on future efforts of this kind.

Phase II Archaeological Testing at 22ST826, Stone County, Mississippi (2007). Historical Researcher/Report Author. Conducted courthouse and archival research on this historical period rural residential site. Synthesized field data with the historical record to author a report on Phase II work at the site.

ALDOT, Malbis Plantation NR Listing, Malbis, Alabama (2007). Historical Researcher/Ethnographer. Conducted interviews with former and present Malbis Plantation residents or otherwise connected individuals. Researched the history of Malbis Plantation. Co-led architectural fieldwork for this project. Co-authored the National Register of Historic Places nomination application write-up.

ALDOT, I-10 Mobile River Bridge Project, Mobile River, Downtown Mobile, Alabama (2006). Historical Researcher/Ethnographer. Researched the history of waterfront activities and settlements along the south half of the City of Mobile's riverfront developments. Conducted interviews with residents and business owners within the APE. Co-authored the project report.

ALDOT, Phase III Archaeological Mitigation of 1MT318, Montgomery County, Alabama (2003-2006). Archaeologist. Assisted archaeological analysis of excavations and artifacts at this Woodland to Mississippian period site. Co-authored the report for this project.

Mobile County, Phase III Archaeological Mitigation of 1MB387, Downtown Mobile, Alabama (2005). Archaeologist/Ethnographer. Assisted and helped supervise archaeological investigations and analysis of excavations at this historical courthouse site. Conducted an interview with a person who had early experiences at the site.

Local Developer, Phase III Archaeological Mitigation of 1BA21, Orange Beach, Alabama (2004). Archaeologist. Assisted and helped supervise archaeological investigations and analysis of excavations at this prehistoric black earth and shell midden site.

University of South Alabama, Colonial Period Investigations on the Eastern Shore of Mobile Bay, Daphne and Montrose, Alabama (2003). Archaeologist/Ethnographer. Archaeological and historical research on the location of forts and towns of the Colonial period on the Eastern Shore of Mobile Bay, Baldwin County. Interviewed local residents on their knowledge of the area.

Retirement Systems of Alabama, Phase III Archaeological Mitigation of

the RSA Tower Site, Downtown Mobile, Alabama (2002). Archaeologist. Assisted archaeological investigations and analysis of excavations at this historical period commercial site.

Spring Hill College, Phase III Archaeological Mitigation of 1MB356, Mobile, Alabama (2002). Archaeologist. Assisted archaeological investigations and analysis of excavations at this historical period Jesuit college site.

ALDOT, Phase I Archaeological and Architectural Assessment of Proposed Highway Project, Fowl River area, Mobile County, Alabama (2002). Archaeologist/Historical Researcher/Ethnographer. Assisted in the archaeological identification survey and conducted historical research and interviews with local residents concerning local history and pending changes in the area. Co-authored the report for this project.

Elizabeth Leclerc

Archaeologist

EDUCATION
B.A., Anthropology, University of Colorado, Colorado Springs, 2008

PROFESSIONAL MEMBERSHIPS
American Anthropological Association

INDUSTRY TENURE
9 years

HDR TENURE
6 years

OFFICE LOCATION
Portland, ME

PUBLICATIONS
Historic Contexts

Lights in the Valley: Electrification of the San Luis Valley, Colorado. HDR 2015.

Technical Reports

Research Design for a Cultural Resources Investigation for the Divert Activities and Exercises Proposal [DRAFT]. HDR 2017. (Co-author)

Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training, Tillamook County, Oregon [DRAFT]. HDR 2017 (Co-author).

A Class III Cultural Resource Inventory for IREA's Lost Valley to Cheesman 7.2 kV Rebuild Project, Jefferson County, Colorado. HDR 2014 (Contributor).

A Class III Cultural Resource Inventory for Public Service Company of Colorado's 6920 Transmission Line Capacity Increase, Saguache County,

Ms. Leclerc is an archaeologist with eight years of experience with cultural resource management, National Historic Preservation Act (NHPA) compliance, and the preparation and review of environmental documents prepared under the National Environmental Policy Act (NEPA). She has particular expertise in the coordination of Section 106 review with the NEPA process. Ms. Leclerc's work often entails the identification, documentation, and evaluation of archaeological resources and assisting clients with Section 106 compliance, including the preparation of materials for consultation with Native American tribes, Native Hawaiian Organizations, State Historic Preservation Officers, and other parties involved in the Section 106 process. She has worked in a range of geographic and cultural areas in Colorado, Maine, Nevada, New Mexico, New Jersey, North Dakota, Virginia, Texas, and Wyoming. Ms. Leclerc is also practiced in visual impact assessment on historic and modern cultural resources and landscapes.

Ms. Leclerc also contributes regularly to the development of Environmental Assessments and Environmental Impact Statements under NEPA, including analysis of impacts on cultural, visual, and geological resources as well as document compliation and review for projects including energy, transportation, and military projects.

RELEVANT EXPERIENCE

U.S. Air Force, KC-46A Main Operating Base #4 Environmental Impact Statement, Air Mobility Command (10/2016-Present). Archaeologist. HDR is preparing an EIS for the beddown of the new KC-46A tanker aircraft. The EIS examins potential environmental impacts associated with the beddown at one of four candidate locations: Fairchild Air Force Base (AFB), Grand Forks AFB, Joint Base McGuire-Dix-Lakehurst, and Travis AFB. Ms. Leclerc is supporting the USAF's Section 106 consultation and is preparing the cultural resources section of the EIS.

U.S. Air Force, Installation Improvements and Maintenance at Bellows Air Force Station, Hawaii (01/2016-Present). Archaeologist. HDR is preparing an EA for a combination of installation improvement and maintenance activities at Bellows Air Force Station. Ms. Leclerc is supporting the USAF's Section 106 consultation and is preparing the cultural resources section of the EA.

U.S. Air Force, Divert Activities and Exercises Proposal, Commonwealth of the Northern Mariana Islands (05/2015-Present). Archaeologist. HDR prepared an Environmental Impact Statement (EIS) for the USAF's proposal to improve infrastructure at one or more airports in the Commonwealth of the Northern Mariana Islands to support divert activities and exercises. HDR is also supporting the USAF's Section 106 compliance efforts, including cultural resource surveys and consultation support. Ms. Leclerc was a co-author of the cultural resource section of the EIS, assisted Section 106 compliance, including development of a programmatic

Colorado. HDR 2014.

A Class III Cultural Resource Inventory for the Asbury to Fruita 4-inch Compressor Station Lateral Replacement Project, Mesa County, Colorado. HDR 2014 (Contributor).

A Class III Intensive Cultural Resources Inventory for the Peregrine Four Mile Pipeline Temporary Use Area, Uinta County, Wyoming. HDR 2014.

A Class III Intensive Cultural Resource Inventory for the Peregrine Four Mile Pipeline, Uinta County, Wyoming. HDR 2014.

A Class III Inventory for the Jasper 29-1H, 29-2H, 29-3H, 29-4H, 29-5H, and 29-6H Well Pad, Pump Station, Waterline, and Access Road, Niobrara County, Wyoming. HDR 2014.

A Class III Inventory for the Ecila 29-1H, 29-2H, 29-3H, and 29-4H Well Pad, Waterline, and Access Road, Niobrara County, Wyoming. HDR 2014.

A Cultural Resource Inventory for IREA's Buffalo Creek to Foxton Road 7.2 kV Distribution Line Rebuild Project, Jefferson County, Colorado. HDR 2014 (Contributor).

A Cultural Resource Inventory for Public Service Company of Colorado's 6905, 6920, and 9811 Transmission Lines, Alamosa, Chaffee, Rio Grande, and Saguache Counties, Colorado. HDR 2014.

Cultural Resource Inventory of 32.94 acres for IREA's West Creek to Trout Creek 7.2 kV Distribution Line Rebuild Project, Douglas County, Colorado. HDR 2014 (Contributor).

Preconstruction Inspection Report for Cultural Resources Survey of the Proposed Clarks Creek Office Permanent EOG Communication Tower, McKenzie County, North Dakota. HDR 2014.

Preconstruction Inspection Report for Cultural Resources Survey of the Proposed Fertile 23-19H Permanent EOG Communication Tower, Mountrail County, North Dakota. HDR 2014.

Preconstruction Inspection Report

agreement, and is assisting with a cultural resource inventory of the historic West Field on Tinian Island.

U.S. Air Force, Angel Thunder Environmental Assessment, Arizona, California, and New Mexico (04/2015-Present). Archaeologist. HDR is preparing an EA for the proposed expansion of the annual Angel Thunder personnel recovery training exercise at Davis-Monthan AFB. Ms. Leclerc is authoring the cultural resources section of the EA and assisting with Section 106 consultation and compliance.

American Wind Energy Association, Great Plains Wind Energy Environmental Impact Statement (04/2015-Present). Archaeologist. The Wind Energy Whooping Crane Action Group and the American Wind Energy Association have partnered to create a Habitat Conservation Plan to address potential take of whooping cranes resulting from wind generation facilities. HDR is preparing a third party EIS for the U.S. Fish and Wildlife Service (USFWS) and National Park Service regarding implementation of the proposed plan. Ms. Leclerc is assisting with development of the visual resource section of the EIS.

U.S. Air Force, Coastal, Open Ocean, and Tropical SERE Training, Tillamook, Oregon and Forks, Washington (02/2015-Present). Archaeologist. HDR is preparing an Environmental Assessment for the USAF's proposal to continue conducting coastal and open ocean SERE training on the Bayocean Peninsula in Tillamook, Oregon and tropical SERE training near Forks, Washington. Ms. Leclerc's responsibilities include preparation of the cultural resource section of the EA and assistance with Section 106 consultation and compliance, including Phase I archaeological survey in Oregon and preparation of a technical report.

SEARCH, Inc., Cultural Resource Emergency Response Guidebook. (03/2015-03/2017). Archaeologist. HDR has contracted with SEARCH, Inc. to prepare a Cultural Resource Emergency Response Guidebook for the Naval Facilities Engineering Command Southeast, a Department of Defense Legacy Program project. The project interviewed cultural resource and emergency management professionals to identify the procedures and resources needed to effectively manage cultural resources during emergencies, and assembled the information and recommendations into a guidebook, digital resource library, and accompanying report. Ms. Leclerc is assisting with development of the materials.

Power Company of Wyoming, Chokecherry-Sierra Madre Wind Energy Project, Carbon County, Wyoming. Archaeologist. (12/2014-03/2017). HDR is preparing a third-party EIS for the USFWS regarding issuance of an Eagle Take Permit for Power Company of Wyoming's proposed Chokecherry-Sierra Madre wind energy project in Wyoming. If constructed, the facility would be the largest terrestrial wind facility in the country. Ms. Leclerc is providing tribal consultation support and evaluating impacts of eagle takes on Native American tribes. The USFWS has invited over 76 tribes to consult on the proposal.

Xcel Energy, 23 & L Road Pipeline Replacement Project, Fruita, Colorado (04/2016-02/2017). Assistant NEPA project lead. HDR prepared a third party EA for the BLM for Xcel Energy's 23 & L Road Pipeline Replacement Project and performed associated cultural and natural resource surveys. Ms. Leclerc coordinated development of the EA.

for Cultural Resources Survey of the Proposed Mandaree 5-16H Permanent EOG Communication Tower, McKenzie County, North Dakota. HDR 2014.

Preconstruction Inspection Report for Cultural Resources Survey of the Proposed Stanley Office EOG Communication Tower Antenna Collocation, Mountrail County, North Dakota. HDR 2014.

A Class III Intensive Cultural Resource Inventory for the Fiddleback 34-1, 34-2H, 34-3H, 34-4H, and 34-5H Well Pad, Niobrara County, Wyoming. HDR 2013.

A Class III Intensive Cultural Resource Inventory for the North Lance Creek Prospect Project: Alcibiades 1-1H and 1-2H Well Pad and Access Road, Niobrara County, Wyoming. HDR 2013.

A Class III Intensive Cultural Resource Inventory for the North Lance Creek Prospect Project: Alternate Access Roads for the Ross 20-1H and 20-2H Wells and/or Karen 9-44-1H and 9-44-2H Wells, Niobrara County, Wyoming. HDR 2013.

A Class III Intensive Cultural Resource Inventory for the North Lance Creek Prospect Project: Stuart 26-1H and 34-1H Access Roads, Niobrara County, Wyoming. HDR 2013.

Dickinson Bypass Project Class III Intensive Cultural Resource Inventory, Stark County, North Dakota. Prepared for North Dakota Department of Transportation. HDR 2012 (Contributor).

Cultural Resource Investigation of the 9,205 Acre Osburn Land Acquisition, Platte County, Wyoming. HDR 2013 (Contributor).

Trails of the West: A Review and Evaluation of Historic Trails in Wyoming and Idaho Along the Proposed Gateway West Transmission Line Project. Tetra Tech/URS. 2011 (Contributor).

AWARDS

Local Pathfinder Team, Customs and Border Protection Cultural

Kinder Morgan, Environmental Assessment for the Tennessee Gas Abandonment and Capacity Restoration Project, Louisiana, Arkansas, Mississippi, Tennessee, Kentucky, Illinois, and Ohio (09/2015-12/2016). Archaeologist. HDR is preparing a third party EA for the Federal Energy Regulatory Commission (FERC) for the Tennessee Gas proposal to abandon by sale over 950 miles of pipeline between Ohio and Texas. Ms. Leclerc is authoring the cultural resources section of the EA.

Minnesota Power, Great Northern Transmission Line, Minnesota (05/2016-11/2016). Archaeologist. HDR prepared a third-party EIS for the Department of Energy for Minnesota Power's Great Northern Transmission Line Project and provided cultural and natural resource studies in support of the project. Ms. Leclerc assisted with archaeological surveys and contributed to a Traditional Cultural Landscape/Traditional Cultural Properties study based on background research and ethnographic interviews with tribes historically affiliated with the region.

Kinder Morgan, Environmental Assessment for the Tennessee Gas Broad Run Expansion Project, Kentucky, Tennessee, and West Virginia (09/2015-09/2016). Archaeologist. HDR prepared a third party EA for FERC for the Tennessee Gas proposal to build two new compressor stations and modify two existing compressor stations. Ms. Leclerc assisted with the cultural resources section of the EA.

U.S. Air Force, KC-135 Bed-down at MacDill AFB, Florida (08/2016). Archaeologist. HDR is preparing an EA for the bed-down of additional KC-135 aircraft at MacDill Air Force Base (AFB). Ms. Leclerc prepared the geology, land use, and cultural resources sections and is supporting Section 106 consultation with the Florida SHPO and Native American Tribes.

U.S. Air Force, Eglin Air Force Base Environmental Assessments, Florida 03/2016-08/2016). Archaeologist. Ms. Leclerc prepared cultural and geological resource sections for two EAs for Eglin Air Force Base assessing changes in baseline activities at various ranges on the installation.

Defense Logistics Agency, Environmental Assessment for the Construction of a Fiscal Year 2019 General Purpose Warehouse, Red River Army Depot, Texas, (05/2016-07/2016). Archaeologist. HDR is preparing an EA assessing potential environmental consequences of Defense Logistic Agency's (DLA) proposal to construct a new warehouse at Red River Army Depot. Ms. Leclerc assisted with preparing the cultural resources section and supporting Section 106 consultation.

Defense Logistics Agency, Environmental Assessment Addressing Disposition Services Relocation and Expansion at Defense Supply Center Richmond, Virginia (01/2016-03/2016). Project Scientist. HDR prepared an EA assessing potential environmental consequences of expanding and relocating DLA disposition services at DSCR, Virginia. Ms. Leclerc prepared the geological and land use sections of the EA.

U.S. Air Force, JB MDL MAG 49 Operational Enhancements, Joint Base McGuire-Dix-Lakehurst, New Jersey (08/2015-03/2016). Archaeologist. HDR prepared an EA for the USAF regarding proposed operational enhancements at the Marine Aircraft Group 49, Joint Base McGuire-Dix-Lakehurst. Ms. Leclerc authored the cultural resources and geological resources sections and assisted with Section 106 consultation.

Resources Compliance Support (2014)

Local Pathfinder Team, White Sands Cultural Resource Team (2013)

Local Pathfinder Team, Osburn Cultural Resources Team (2012)

Local Pathfinder Team, ON LINE FIELD MANAGEMENT TEAM (2011)

U.S. Air Force, Helicopter Refueling Program at Minot AFB, North Dakota (10/2015). Archaeologist. HDR prepared an EA for the USAF's proposal to construct helicopter refueling infrastructure at the missile fields of Minot Air Force Base (AFB). Ms. Leclerc authored the cultural resources and geological resources sections of the EA.

Xcel Energy, 6905, 6920, and 9811 Transmission Lines, Alamosa, Chaffee, Rio Grande, and Saguache Counties, Colorado (06/2013-10/2015). Crew Chief. HDR was contracted by Xcel Energy to provide cultural and natural resource support and assist the Bureau of Land Management (BLM) in development of an Environmental Assessment for Xcel's proposed rebuild of their 6905, 6920, and 9811 transmission lines. Ms. Leclerc directed Class III archaeological surveys, performed visual resource analysis, prepared a cultural resource report, contributed to cultural and visual resource discussions in the Environmental Assessment, and prepared a historic context of the electrification of the San Luis Valley.

Klondex, Fire Creek Waste Rock Site, Lander County, Nevada (08/2015). Archaeologist. HDR is providing Section 106 and NEPA support to the BLM for Klondex Gold & Silver Mining Company's proposed waste rock site at the Fire Creek Mine. Ms. Leclerc is assisting with Section 106 consultation and preparation of the cultural resources section for an EA.

ARB Midstream, Niobrara Connection Road Improvements Project, Weld County, Colorado, (10/2014-12/2014). Crew chief. HDR has been contracted by ARB Midstream to perform a Class III archaeological survey for proposed road improvements associated with their proposed Niobrara Connection facility in Weld County. The project requires a Section 404 permit from the USACE and the survey was undertaken to assist the USACE with their compliance with Section 106.

IREA, Transmission Line Surveys in Douglas and Jefferson Counties, Colorado, (04/2014-12/2014). Technical writer and field technician. HDR performed Class III archaeological surveys for four IREA distribution line rebuild projects in Colorado to satisfy USFS Section 106 permitting requirements. Responsibilities included cultural survey, extensive viewshed analysis for historic resources, including the North Fork Historic District, and report preparation.

EOG, Communication Tower Surveys in Mountrail and McKenzie Counties, North Dakota, (07/2014-09/2014). Technical writer. HDR performed Class III surveys and visual analysis for four communication tower sites in Mountrail and McKenzie Counties, North Dakota. The surveys were undertaken to assist EOG and the FCC with permitting requirements and compliance with Section 106 of the NHPA. Ms. Leclerc prepared reports of the Class III surveys and visual analysis.

Defense Logistics Agency, Phase II Archaeological Testing at the Bellwood Manor at the Defense Supply Center Richmond, Chesterfield County, Virginia (06/2014). Field technician. HDR performed Phase II testing at the NRHP-listed Bellwood Manor to satisfy Section 206 requirements for planned renovations and historic preservation measures. Responsibilities included excavation and assistance with report preparation.

U.S. Army Corps of Engineers, Cultural Surveys and Site Protection at White Sands Missile Range, New Mexico (11/2012-07/2013). Crew Chief. HDR performed biological and cultural surveys for U.S. Army Corps of

Engineers on three maneuver areas on the North Range of White Sands Missile Range, New Mexico. The survey areas exceeded 100,000 acres in a region known for diverse cultural influences and high site densities in a presently challenging environment. Ms. Leclerc initially provided training to field technicians and performed data management, transitioning to a crew chief position leading four-person crews in survey and site recording.

Cinco Resources, Inc., North Lance Creek Prospect Project, Wyoming (11/2012-8/2014). Technical Writer and Field Technician. HDR performed Class III Intensive Cultural Resources Inventory of proposed oil and gas well pads, pipeline right-of-ways, and access roads to satisfy Section 106 BLM permitting requirements for Cinco Resources, Inc. (Cinco) in Niobrara County, Wyoming. Ms. Leclerc performed file searches and research in association with these projects, assisted with field work, and prepared technical reports.

New Jersey Army National Guard, Phase II Archeological Evaluation at the Sea Girt National Guard Training Center, Monmouth County, New Jersey (12/2012). Archaeologist. HDR performed a Phase II evaluation of an early eighteenth through mid twentieth century archaeological site for the New Jersey Army National Guard. Ms. Leclerc's duties included shovel testing, test unit excavation, artifact collection, and site documentation.

Wyoming Army National Guard, Osburn Ranch Land Acquisition Cultural Resources Inventory, Wyoming (05/2012-02/2013). Assistant Field Director. HDR performed a Class III survey of 9,205 acres for the Wyoming Army National Guard (WYARNG) at the Camp Guernsey Joint Training Center. Ms. Leclerc was involved in pre-field organization, field work, visual analysis, and report writing. Ms. Leclerc also helped direct the field and report efforts and trained new crew members in field survey and recording techniques.

NV Energy, ON Line Environmental Monitoring Project, Nevada (03/2011-04/2012). Archaeology Logistics Coordinator/Assistant Crew Chief. HDR was contracted by NV Energy to provide environmental monitoring for the construction of a single-circuit, overhead, 500 kilovolt (kV) transmission line crossing portions of White Pine, Nye, Lincoln, and Clark counties. Ms. Leclerc's duties included scheduling, training, and supervising a rotating crew of 7 to 15 archaeologists; coordination between the client, contractors, and monitoring personnel; monitoring; and limited site recording. All monitoring and reporting was performed within the standards and requirements of the BLM, the lead agency for the project. Ely and Las Vegas Field Offices, Nevada.

U.S. Army Corps of Engineers, Archeological Testing at the Brulay Plantation, Texas (02/2011). Archaeological Technician. HDR conducted archaeological testing for subsurface finds discovered along the water control levee at the Brulay Plantation (RGV-21-041) in Cameron County, Texas for the U.S. Army Corps of Engineers (USACE). HDR also developed a treatment plan to assess the subsurface finds as contributing elements of the Brulay Plantation Historic District. Duties included excavation and site documentation. $310,000

Center to Grand Forks Transmission Line Survey, North Dakota and Minnesota (10/2010). Field Technician. HDR completed a Class III cultural survey to assist with compliance with Section 106 of the National Historic

Preservation Act. Duties included shovel testing high potential areas and site documentation.

Defense Logistics Agency, Phase II Archaeological Evaluation of Sites 44CF615, 44CF647, and 44CF649 at the Defense Supply Center Richmond, Chesterfield County, Virginia (12/2010). Archaeology Technician. HDR provided Phase II evaluations to assist the DLA with compliance with Section 106 of the National Historic Preservation Act. HDR tested one prehistoric lithic scatter and two historic sites associated with the Bellwood Manor, a historic property listed on the National Register of Historic Places. Duties included shovel testing, excavation, and site documentation.

Wyoming Army National Guard, Class III Cultural Resources Inventory and Native American Monitoring of 4,500 Acres at Gray Rock Ranch, Camp Guernsey, Wyoming (09/2010). Field Technician. HDR completed the Class III cultural survey of 4,500 acres while collaborating with Native American monitors to identify Traditional Cultural Properties. Tasks included pedestrian block survey of the area and identification and documentation of sites.

NON-HDR EXPERIENCE

A Cultural Resource Inventory for the Comanche National Grassland, Colorado (05/08-11/08). Carried out a class III survey along access roads throughout the grassland to determine the presence and extent of resources. Tasks included record searches, pedestrian survey, and data archival.

A Historical Survey for the 2009 Prescribed Fire for the Cimarron National Grassland/ USDA Forest Service, 2008. Conducted cultural inventories on parcels of the Cimarron National Forest marked for prescribed burns the following year. Tasks included identifying potential historic sites within the parcels, conducting survey to verify their existence, and documenting the confirmed resources.

Fargo-Moorhead Metro Flood Risk Management Project, North Dakota and Minnesota, 07/2010-11/2010. Performed investigations of proposed route for flood diversion channels around the Cities of Fargo and Moorhead. Goals first centered on a sample survey along river crossings and later involved complete pedestrian survey along the proposed route.

Gateway West Transmission Line Project, Wyoming, 03/2009-10/2009. Conducted class III cultural resource inventory with pedestrian linear surveys along transmission corridor. Tasks included locating and documenting cultural resources and performing shovel tests as needed.

NON-HDR TRAINING

ADULT CPR/AED, 2016

Appendix C. SHPO and Tribal Correspondence

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DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

Colonel Charles B. McDaniel
Commander
1 E. Bong St., Bldg 2285
Fairchild AFB, WA 99011

Oregon SHPO Compliance
ATTN: Susan Haylock
725 Summer St NE, Suite C
Salem, OR 97301

SUBJECT: Section 106 Consultation Initiation and Description of the Proposed Action and Alternatives (DOPAA) for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon

1. The U.S. Air Force (USAF) has prepared a Description of the Proposed Action and Alternatives (DOPAA) for the *Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA), Forks, Washington and Tillamook, Oregon* in accordance with the National Environmental Policy Act (NEPA). The DOPAA is provided as Attachment 1 to this letter. The environmental impact analysis process for this proposal is being conducted by the USAF in accordance with the Council on Environmental Quality regulations pursuant to requirements of NEPA.

2. The DOPAA will support the subsequent preparation of the EA and describes the USAF's proposal to continue to conduct: coastal and open ocean SERE training on the Bayocean Peninsula in Tillamook, OR under permits issued by Tillamook County, the Portland Corps of Engineers and Oregon State Park; and tropical training near Forks, Washington under permits issued by Washington Department of Natural Resources (DNR), Olympic National Forest, and Rayonier Lumber. The USAF is undertaking a NEPA analysis for this training based on the renewal of all existing permits, in accordance with USAF requirements.

3. This proposal would meet the mission of the 336th Training Group, Fairchild Air Force Base, to properly train USAF Aircrew Members in SERE skills to avoid capture during times of conflict and high risk of isolation. The DOPAA will become Sections 1 and 2 of the Draft EA.

4. The USAF is complying with Section 106 of the National Historic Preservation Act (NHPA) concurrently with development of the EA as recommended by NEPA's implementing regulations, Title 40 Code of Federal Regulations (CFR) Part 1502.25(a). In accordance with 36 CFR Part 800.3(c), this letter initiates our Section 106 consultation for this undertaking and requests your input on the Area of Potential Effect (APE) and the identification of historic properties for the portion of the undertaking that would occur in Oregon.

5. In accordance with NEPA and the USAF's implementing regulations, 32 CFR Part 989.14(l), the USAF is also seeking your input on the proposal as described in the attached DOPAA.

6. The proposed undertaking consists of coastal and open ocean SERE training on the bay and ocean sides of the Bayocean Peninsula, Tillamook, OR (see Attachment 2), under appropriate permits described in Paragraph 2, and open ocean training off-shore of the Bayocean Peninsula in the Pacific Ocean. The SERE training course would be conducted twice per year, once in the spring and once in the fall. Each course would consist of up to 50 students and 13 instructors. Training activities would continue to consist mainly of land

navigation, rafting, camping, and natural materials gathering. Training would not include use of any live-fire weapons or tracked vehicles. In accordance with the permits, recreational activities by the public would be allowed to continue on these properties during training. Prior to training, SERE school personnel may make access road repairs to areas that have been washed out by storms and erosion. More details on the proposed undertaking are provided in the attached DOPAA (Attachment 1).

7. The USAF has identified the APE of the undertaking to include the properties permitted for SERE coastal and open ocean training on the Bayocean Peninsula. The APE is identified in Attachment 2.

8. The USAF has conducted an Environmental Baseline Survey and search of publicly available records to identify historic properties within the APE and in the broader area surrounding the Bayocean Peninsula. This effort included a search of the Oregon Historic Sites Database and contact with the Tillamook & Bayocean Historian from the Pioneer Museum in Tillamook County. A record search to identify archaeological sites and previous surveys will also be conducted online through the Oregon State Historic Preservation Office.

a. Archeological records and artifacts indicate that the Bayocean Peninsula was a summer camp for Native Americans until the mid 18th century. Additionally, the peninsula was the location of a resort area known as Bayocean City in the early 1900s until the city was destroyed by a storm in 1960. Despite previous occupation of the peninsula, the present record search has not yet identified any cultural or archeological sites within the APE.

b. Seven historic sites were identified in the general area of the undertaking, in Tillamook County, the City of Netarts, and the Cape Meares area. Sites within Tillamook County are located across Tillamook Bay from the Bayocean Peninsula. Sites in Netarts are located approximately 5 miles south of the Peninsula. Sites in Cape Meares are located approximately 2 miles from the APE at the entrance to the Bayocean Peninsula. The Cape Meares Lighthouse is considered eligible for National Register of Historic Places (NRHP) listing, and is located approximately 3.5 miles from the APE.

c. The USAF has not yet identified any other previously recorded historical sites within approximately 0.5 miles (500 meters) of the APE. The USAF is concurrently seeking additional information regarding historic properties within or near the APE from the State of Oregon Department of Parks and nationally-recognized tribes regarding the properties of interest or concern to them.

9. Pursuant to 36 CFR Part 989.14(l), the USAF is seeking your input on the proposed action as described in the attached DOPAA.

10. Pursuant to 36 CFR 800.4, the USAF is also seeking review of the identification of the APE and historic properties that could be affected by the proposed undertaking. Please provide a written response to this request within 30 days of the receipt of this letter. No response would be considered an implied concurrence with the APE and identification of historic properties as provided in this letter.

11. Please address questions regarding this consultation by mail to: Mr. John Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you.

Sincerely

CHARLES B., MCDANIEL, Colonel, USAF

Attachment: 1. Description of the Proposed Action and Alternatives
2. Map of Undertaking and APE

Attachment 2

Bayocean Peninsula SERE Training Undertaking and Area of Potential Effect

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

Colonel Charles B. McDaniel
Commander
1 E. Bong St., Bldg 2285
Fairchild AFB, WA 99011

Mr. Reyn Leno, Chair
Confederated Tribes of the Grand Ronde Community of Oregon
9615 Grand Ronde Road
Grand Ronde, OR 97347

SUBJECT: Section 106 Consultation Initiation and Description of the Proposed Action and Alternatives (DOPAA) for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon

1. The U.S. Air Force (USAF) has prepared a Description of the Proposed Action and Alternatives (DOPAA) for the *Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA), Forks, Washington and Tillamook, Oregon* in accordance with the National Environmental Policy Act (NEPA). The DOPAA is provided as Attachment 1 to this letter. The environmental impact analysis process for this proposal is being conducted by the USAF in accordance with the Council on Environmental Quality regulations pursuant to requirements of NEPA.

2. The DOPAA will support the subsequent preparation of the EA and describes the USAF's proposal to continue to conduct: coastal and open ocean SERE training on the Bayocean Peninsula in Tillamook, OR under permits issued by Tillamook County, the Portland Corps of Engineers and Oregon State Park; and tropical training near Forks, Washington under permits issued by Washington Department of Natural Resources (DNR), Olympic National Forest, and Rayonier Lumber. The USAF is undertaking a NEPA analysis for this training based on the renewal of all existing permits, in accordance with USAF requirements.

3. This proposal would meet the mission of the 336th Training Group, Fairchild Air Force Base, to properly train USAF Aircrew Members in SERE skills to avoid capture during times of conflict and high risk of isolation. The DOPAA will become Sections 1 and 2 of the Draft EA.

4. The USAF is complying with Section 106 of the National Historic Preservation Act (NHPA) concurrently with development of the EA as recommended by NEPA's implementing regulations, Title 40 Code of Federal Regulations (CFR) Part 1502.25(a). In accordance with 36 CFR Part 800.3(c), this letter initiates our Section 106 consultation for this undertaking and requests your input on the identification of historic properties for the portion of the undertaking that would occur in Oregon. The USAF is particularly interested in your input on properties in the project area that may have religious and cultural significance to your tribe, and if such properties exist, to help assess how the project might affect them. Government-to-government consultation between the USAF and your tribe for this effort is also in accordance with Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments;* Air Force Instruction (AFI) 32-7065, *Cultural Resources Management Program;* and AFI 90-2002 *Air Force Interactions with Federally-Recognized Tribes*.

5. In accordance with NEPA and the USAF's implementing regulations, 32 CFR Part 989.14(l), the USAF is also seeking your input on the proposal as described in the attached DOPAA.

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a. Seven archeological sites have been identified in the general project area in Tillamook County, the City of Netarts, and Cape Meares area. Sites within Tillamook County are located across Tillamook Bay from the Bayocean Peninsula. Sites in Netarts are located approximately 5 miles south of the Peninsula. Sites in Cape Meares are located approximately 2 miles from the APE at the entrance to the Bayocean Peninsula. The Cape Meares Lighthouse is considered eligible for National Register Historic Places (NRHP) listing, and is located approximately 3.5 miles from the APE.

b. The USAF has not yet identified any other previously recorded historical sites within approximately 0.5 miles (500 meters) of the APE.

9. Pursuant to 36 CFR Part 989.14(l) and 36 CFR 800.4, the USAF is seeking your input on the proposed action as described in the attached DOPAA.

10. Please address questions regarding this consultation by mail to: Mr. John Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you.

Sincerely

CHARLES B., MCDANIEL, Colonel, USAF

Attachment: 1. Description of the Proposed Action and Alternatives
2. Map of Undertaking and APE

cc: Program Manager and THPO, Confederated Tribes of the Grand Ronde Community of Oregon

Attachment 2

Bayocean Peninsula SERE Training Undertaking and Area of Potential Effect

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

Colonel Charles B. McDaniel
Commander
1 E. Bong St., Bldg 2285
Fairchild AFB, WA 99011

Ms. Delores Pigsley, Tribal Chairman
Confederated Tribes of Siletz Indians of Oregon
1322 N. Larchwood
Salem, OR 97303

SUBJECT: Section 106 Consultation Initiation and Description of the Proposed Action and Alternatives (DOPAA) for the Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon

1. The U.S. Air Force (USAF) has prepared a Description of the Proposed Action and Alternatives (DOPAA) for the *Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA), Forks, Washington and Tillamook, Oregon* in accordance with the National Environmental Policy Act (NEPA). The DOPAA is provided as Attachment 1 to this letter. The environmental impact analysis process for this proposal is being conducted by the USAF in accordance with the Council on Environmental Quality regulations pursuant to requirements of NEPA.

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9. Pursuant to 36 CFR Part 989.14(l) and 36 CFR 800.4, the USAF is seeking your input on the proposed action as described in the attached DOPAA.

10. Please address questions regarding this consultation by mail to: Mr. John Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you.

Sincerely

CHARLES B., MCDANIEL, Colonel, USAF

Attachment: 1. Description of the Proposed Action and Alternatives
2. Map of Undertaking and APE

cc: Natural Resources Manager, Confederated Tribes of Siletz Indians of Oregon

Attachment 2

Bayocean Peninsula SERE Training Undertaking and Area of Potential Effect

Smith, Emily

From: GUERRA, JUAN M GS-12 USAF HAF AFCEC/CZN <juan.guerra.6@us.af.mil>
Sent: Tuesday, May 26, 2015 2:52 PM
To: Smith, Emily; Pyle, Stephen G
Subject: FW: Section 106 Consultation -- DOPAA SERE Training in Tillamook Oregon
Signed By: juan.guerra.6@us.af.mil

Additional comments for the record.

R,
john

From: Jordan Mercier [mailto:Jordan.Mercier@grandronde.org]
Sent: Tuesday, May 26, 2015 3:16 PM
To: GUERRA, JUAN M GS-12 USAF HAF AFCEC/CZN
Subject: Section 106 Consultation -- DOPAA SERE Training in Tillamook Oregon

Good Afternoon,

The Confederated Tribes of the Grand Ronde Community of Oregon Cultural Protection Program would like to thank you for soliciting information with regards to the above mentioned project. As a part of your compliance with Section 106 of the National Historic Preservation Act (NHPA) The Tribe has reviewed the location of this project and have the following comments:

The Tribe considers the proposed project to have a potential for impacting cultural resources. There are documented archeological/cultural sites within the Area of Potential Effect that were recorded in previous cultural resource investigations. Previous archeological studies of the APE are outdated and do not meet current archeological research standards. There is a need to reassess the area and determine present site conditions. The Tribe strongly recommends that a qualified archeologist conduct an archeological study of the area in order to understand how the proposed project will impact cultural resources.

It is also recommended that sufficient time be allowed following the presentation of survey results for the meaningful incorporation of these results into the project plan. In the case of significant discoveries this could include additional planning, the development of project alternatives, and/or a mitigation plan.

Respectfully,

Jordan Mercier
Cultural Protection Coordinator
Tribal Historic Preservation Office
Land and Culture Department
Confederated Tribes of the Grand Ronde Community of Oregon

Jordan.Mercier@grandronde.org
503-879-2185

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

Colonel Charles B. McDaniel
Commander
1 E. Bong St., Bldg 2285
Fairchild AFB, WA 99011

Oregon SHPO Compliance
ATTN: Susan Haylock
725 Summer St NE, Suite C
Salem, OR 97301

SUBJECT: Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon and Section 106 Consultation

1. The U.S. Air Force (USAF) has prepared the *Coastal, Open Ocean, and Tropical SERE Training Draft EA, Forks, Washington and Tillamook, Oregon* in accordance with the National Environmental Policy Act (NEPA). The environmental impact analysis process for this proposal is being conducted by the USAF in accordance with the Council on Environmental Quality regulations pursuant to requirements of NEPA.

2. The Draft EA describes the USAF proposal to continue to conduct: coastal and open ocean SERE training on the Bayocean Peninsula in Tillamook, OR under permits issued by Tillamook County, Portland District, U.S. Army Corps of Engineers (USACE) and Oregon State Park; and tropical training near Forks, Washington under permits issued by Washington Department of Natural Resources (DNR), Olympic National Forest, and Rayonier Lumber. The Draft EA evaluates potential impacts on the environment from the Proposed Action and the No Action Alternative. The Draft EA demonstrates that the Proposed Action would not significantly impact the environment. Based on this analysis, the USAF has prepared a Draft Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA).

3. The USAF is in the process of completing our responsibilities under Section 106 of the National Historic Preservation Act and will continue to consult with the Oregon State Historic Preservation Office (SHPO) to identify and resolve adverse effects to historic properties, in accordance with the Advisory Council on Historic Preservation's regulations at 36 CFR 800. The USAF initiated consultation with the Oregon SHPO on this proposal in a letter dated April 21, 2015 at which time we requested input regarding the identification of the Area of Potential Effect (APE) for Tillamook, Oregon; historic properties within the APE; and the proposal. We also invited several Oregon tribes to consult on the proposal and we are actively engaged with the Confederated Tribes of the Grand Ronde Community of Oregon.

4. Since the USAF's initial letter, a record search of the Oregon State Historic Preservation Office was conducted for the APE. This new record search identified five previous studies within 1 mile of the APE and two archaeological sites within the APE. The APE was previously surveyed by the USACE in 2012 in connection with issuing their permit for the SERE training. This survey identified one new site (35TI104) and failed to relocate a second, previously recorded site from the 1950s (35TI11). The USACE's permit requires the USAF to avoid these two sites during SERE training.

5. The Confederated Tribes of the Grande Ronde Community of Oregon have requested the USAF undertake additional archaeological study to determine the potential for cultural resources to occur within the APE,

particularly where ground disturbing activities (primarily excavation of water table pits and latrines) could adversely affect buried sites. The USAF is in the process of preparing a research design to guide the study. The USAF will continue to consult with the Oregon SHPO and Grande Ronde on the research design and results of the archaeological study.

6. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs,* we request your participation in the NEPA process by reviewing the Draft EA and Draft FONSI/FONPA and providing your feedback. Government-to-government consultation between the USAF and the Oregon SHPO for this effort is also in accordance with Air Force Instruction (AFI) 32-7065, *Cultural Resources Management Program.* Government-to-government consultation between the USAF and Native American tribes is being conducted in accordance with Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments* and AFI 90-2002 *Air Force Interactions with Federally-Recognized Tribes*. Please provide written comments or information regarding the action at your earliest convenience, but no later than 30 days from receipt of this letter. Any questions or comments on the Draft EA or Draft FONSI/FONPA or questions regarding this consultation should be directed by mail to: Mr. John Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you in advance for your participation.

Sincerely

CHARLES B. MCDANIEL, Colonel, USAF

Attachments:
1. Coastal, Open Ocean, and Tropical SERE Training Draft EA, Forks, Washington and Tillamook, Oregon
2. Draft FONSI/FONPA for the Coastal, Open Ocean, and Tropical SERE Training EA, Forks, Washington and Tillamook, Oregon

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

Colonel Charles B. McDaniel
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1 E. Bong St., Bldg 2285
Fairchild AFB, WA 99011

Mr. Reyn Leno, Chair
Confederated Tribes of the Grand Ronde Community of Oregon
9615 Grand Ronde Road
Grand Ronde, OR 97347

SUBJECT: Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, and Escape (SERE) Training Environmental Assessment (EA) near Forks, Washington and Tillamook, Oregon and Section 106 Consultation

1. Thank you for your interest and your tribe's previous comments on the U.S. Air Force's (USAF) Coastal, Open Ocean, and Tropical SERE Training, Forks, Washington and Tillamook, Oregon. The USAF has prepared a Draft Environmental Assessment (EA) for this proposal in accordance with the Council on Environmental Quality regulations pursuant to the requirements of the National Environmental Policy Act (NEPA).

2. The Draft EA describes the USAF proposal to continue to conduct: coastal and open ocean SERE training on the Bayocean Peninsula in Tillamook, OR under permits issued by Tillamook County, Portland District, U.S. Army Corps of Engineers (USACE) and Oregon State Park; and tropical training near Forks, Washington under permits issued by Washington Department of Natural Resources (DNR), Olympic National Forest, and Rayonier Lumber. The Draft EA evaluates potential impacts on the environment from the Proposed Action and the No Action Alternative. The Draft EA demonstrates that the Proposed Action would not significantly impact the environment. Based on this analysis, the USAF has prepared a Draft Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA).

3. The USAF is in the process of completing our responsibilities under Section 106 of the National Historic Preservation Act and will continue to consult with the Confederated Tribes of the Grand Ronde Community of Oregon and the Oregon State Historic Preservation Office (SHPO) to identify and resolve adverse effects to historic properties, in accordance with the Advisory Council on Historic Preservation's regulations at 36 CFR 800. As requested by your tribe, the USAF is preparing to undertake additional archaeological study of the Area of Potential Effect (APE) in Tillamook, Oregon to determine the potential for cultural resources to occur within the APE, particularly where ground disturbing activities (primarily excavation of water table pits and latrines) could adversely affect buried sites. The USAF is in the process of preparing a research design to guide the study. The USAF will continue to consult with the Grande Ronde on the research design and results of the archaeological study.

4. In accordance with Executive Order 12372, *Intergovernmental Review of Federal Programs*, we request your participation in the NEPA process by reviewing the Draft EA and Draft FONSI/FONPA and providing your feedback. Government-to-government consultation between the USAF and Native American tribes is being conducted in accordance with Executive Order 13175, *Consultation and Coordination with Indian Tribal Governments* and AFI 90-2002 *Air Force Interactions with Federally-Recognized Tribes*. Please provide written comments or information regarding the action at your earliest convenience, but no later than

30 days from receipt of this letter. Any questions or comments on the Draft EA or Draft FONSI/FONPA or questions regarding this consultation should be directed by mail to: Mr. John Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you in advance for your participation.

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cc: Program Manager and THPO, Confederated Tribes of the Grand Ronde Community of Oregon

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Fairchild AFB, WA 99011

Ms. Delores Pigsley, Tribal Chairman
Confederated Tribes of Siletz Indians of Oregon
1322 N. Larchwood
Salem, OR 97303

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Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org

December 3, 2015

Mr. Jeffrey Johnson
Department of the Air Force
Fairchild Air Force Base
E. Bong St. Bldg 2285, Room 109
Fairchild AFB, WA 99011

RE: SHPO Case No. 15-1727
USAF, Bayocean Peninusla, SERE Permit Renewal
Renew permit with OPRD
, Tillamook County

Dear Mr. Johnson:

We have recently received a request to review a research design for a proposed cultural resource survey on Bayocean Peninsula in Tillamook County, Oregon. In looking through the research design I have several questions for your archaeologist that are in need of clarification. The authors of the report are not from Oregon and may not be aware of Oregon State's cultural resource laws so I thought it best to contact them now before any work is done in the field. My comments and questions regarding the proposed research design include:

1). Land Management: The authors states that the lands within the proposed project area are managed by Oregon State Parks and Recreation. This is not correct. A portion of the lands are indeed under State Parks management under their authorization of Oceanshore Recreation Areas (i.e., approximate lands from beach vegetation line to low water). The remainder of the project is not under state management, as far as I can tell. It will be important to determine who actually manages all lands that are to bew surveyed, prior to conducting the survey.

2) Land ownership - It is important that the author determine the ownership of all lands that are to be surveyed, particularly those where subsurface probes will be excavated. I look at my GIS layer for public land ownership suggests that area land ownership includes multiple land owners including a large percentage by Tillamook County, some federal ownership, as well as private. Oregon State law (ORS 390.235) requires a state archaeology permit be issued before any subsurface investigation can occur on any non-federal public lands in Oregon. A permit is needed not just to conduct testing within a known site but to even look and see if a site is present. Non-federal public lands in Oregon would include all state, county and city lands. Permits are tied to landownership so if more than one public entity owns land where subsurface testing is to be conducted, multiple permits will be needed.

3) Field Survey Methodology: Our office concurs with the proposed use of 20m transects across the proposed project area. The use of subsurface probes to determine the boundaries, composition and integrity of any identified sites is also good. In areas of high probability and low visibility, which would likely include areas where sand is easily transported across the landscape hiding and exposing artifacts, subsurface probes should also be conducted to determine the presence or absence of any sites. Your archaeologist will need to have state archaeological permits for any testing, whether in seeking to determine if a site is present, determining boundaries of a known site, or eligibility testing of sites that are discovered. I recommend that your archaeologist check our webpage (www.oregonheritage.org) under archaeological services, for an archaeological bulletin and Frequently Asked Question brochure that we have dealing with the state's

archaeological permit process.

4) There is at least one known site (35TI104) within the project area. Investigations in this area should seek to determine the boundaries, integrity and composition so that is eligibility can be assessed or the area avoided during future maneuvers. A state archaeology permit will certainly be needed in order to accomplish this.

5) Curation: Our office concurs with your policy to not collect surface artifacts. However, if a state archaeology permit is required (which they would for any shovel probes on non-federal public lands and testing or data recovery on private and non-federal public lands in Oregon), final curation is based on landownership. Under state laws, if the lands are owned by a federal agency, the federal agecny often has their own policies as to where artifacts will be curated. If landownership belongs to a non-federal public agency, the Museum of Natural and Cultural History in Eugene is the state's steward of all artifacts from such lands. For private land, the artifacts, except for human remains, funerary objects, sacred objects and objects of cultural patrimony, generally remain the property of the landowner. While we encourage landowners to have such collections curated, we are unable to require this. Perhaps under federal laws and the policies of your agency, you are able to make this stipulation. The curation policy to be used should be clarified in your research design.

6. Upon completion of the project and final report, please be sure and submit both a hard copy and electronic copy (on CD) of the final report so that it can be reviewed and added to our state's library and GIS database. If you have created shape files for your survey area or identified sites and isolates, we would appreciate you sending copies of these along on your CD so that we can assure the greatest accuracy in plotting the results of your projects.

The remainder of the research design looks very good and we look forward to hearing back from you with a revised copy of the design. Upon receipt of an revised research design, we will try to get our review comments back to you I a timely manner. If you have not already done so, be sure to consult with all appropriate Indian tribes regarding your proposed project. In order to help us track your project accurately, please be sure to reference the SHPO case number above in all correspondence.

Sincerely,

Dennis Griffin, Ph.D., RPA
State Archaeologist
(503) 986-0674
dennis.griffin@oregon.gov

cc:

From:	Leclerc, Elizabeth
To:	Mulligan, Daniel M NWP
Subject:	RE: HDR Archaeology Project on Bayocean Spit, Tillamook County (UNCLASSIFIED)
Date:	Monday, December 14, 2015 5:42:00 PM

Dear Mr. Mulligan,

I am emailing to see if you are able to answer a few questions I mistakenly addressed to Chris Page regarding an ARPA permit to perform an archaeological survey on USACE-managed land on the Bayocean Spit in Tillamook County. My original email is included below. Specifically, I am looking to confirm we do indeed need an ARPA permit from the Corps for this survey and to learn if the Corps has any specific survey, collection, or curation requirements that should be addressed in our research design.

Thank you,

Elizabeth Leclerc,

Archaeologist

HDR
530 Front Ridge Road
Penobscot, ME 04476
D 207.479.5601 M 720.633.7088
elizabeth.leclerc@hdrinc.com

hdrinc.com/follow-us

-----Original Message-----
From: Leclerc, Elizabeth [mailto:Elizabeth.Leclerc@hdrinc.com]
Sent: Tuesday, December 08, 2015 10:48 AM
To: Page, Christopher NWP
Subject: [EXTERNAL] HDR Archaeology Project on Bayocean Spit, Tillamook County

Dear Mr. Page,

I am emailing to enquire about obtaining an ARPA permit from the USACE to perform an archaeological survey on USACE-managed land on the Bayocean Spit in Tillamook County. My firm is under contract to the U.S. Air Force to perform the survey in connection with the Air Force's proposal to renew various state and federal permits to continue Survival, Evasion, Resistance and Escape (SERE) Training at that location. The USACE performed a survey of the area in 2012 in connection with their approval of the USAF's permit; however, during consultation with the Confederated Tribes of Grand Ronde, the USAF agreed to perform additional background research, survey, and, in particular, shovel testing of certain project areas to meet some of their concerns.

We are currently finalizing our research design and at this time I am just trying to gather information about the permits we will need as well as any permit conditions that may factor into our research design, such as collection and curation requirements. Would you please confirm we need to obtain an ARPA permit from the USACE to perform this survey, and, if so, provide a copy of the application and any pertinent permit requirements?

Thank you,

Elizabeth Leclerc,

Archaeologist

From:	Leclerc, Elizabeth
To:	Mulligan, Daniel M NWP
Subject:	RE: HDR Archaeology Project on Bayocean Spit, Tillamook County (UNCLASSIFIED)
Date:	Tuesday, December 15, 2015 9:26:00 AM
Attachments:	SERE_Section106_Survey_Map_Bayocean_Peninsula.jpg

Hi Dan,

Thank you for providing the Corps' 2012 report. Incidentally, we did have a copy, but it is always good to make sure we are looking at the same thing. I have attached a map of our intended survey areas to help illustrate our planned field effort. Even though, as you noted, the Corps thoroughly surveyed the area and the SHPO concurred with the report's findings, the Air Force has agreed to do some additional work by request of the Grand Ronde. From my understanding, the tribe isn't necessarily opposed to the Corps' previous survey and findings, but had hoped to learn more about Native American historical use of the peninsula as a result of the survey. To that end, the Air Force agreed to produce a historical overview of Native American use of the Tillamook Bay area coupled with an assessment of the potential for deeply buried or submerged sites.

The tribe also expressed specific concerns about the potential for activities at the student camps (digging water table pits and latrines) to disturb subsurface deposits, and this is where the field component comes in. We acknowledge that, as illustrated in the Corps report, the western beaches and dunes have changed significantly over the past 75 years and have little potential to contain intact deposits. However, the Air Force agreed to do additional shovel testing at the student camps in a good faith effort to meet the tribe's concerns and, while we are out there, to take another look at the other activity areas to ensure nothing has changed there. I am not sure why the tribe chose to bring up their concerns now rather than in response to the Corps report, except that the Air Force's NEPA and Section 106 process has given them a second opportunity to look at the area. The Air Force training activities are unchanged from what was described in the Corps report.

So in response to your questions about the shovel testing, the Grand Ronde did specifically request testing in the student camps, and those are the only areas we are proposing to test.

If you have any other questions, I'd be happy to discuss this more with you. You can reach me by email or phone.

Thank you,

Elizabeth

Elizabeth Leclerc,
D 207.479.5601 M 720.633.7088

-----Original Message-----
From: Mulligan, Daniel M NWP [mailto:Daniel.M.Mulligan@usace.army.mil]
Sent: Monday, December 14, 2015 6:47 PM
To: Leclerc, Elizabeth
Subject: RE: HDR Archaeology Project on Bayocean Spit, Tillamook County (UNCLASSIFIED)

Hi Elizabeth,
Thanks for your message - tell me a little more about where you're looking to survey (and how) so we can figure out whether you'll need an ARPA permit. Can you send me a map of the intended survey area? The Corps did a pretty thorough inspection of the use areas back in 2012, consulted with SHPO and Tribes, and ultimately received concurrence from SHPO and no concerns expressed by the Tribes. So I'm curious where/what Grand Ronde has requested you check out? They didn't provide us with any

comments or concerns, so I'm not sure if something has changed.

Tell me which areas you're recommending shovel testing and, in particular, if this is a particular area that Grand Ronde is requesting shovel testing. Based on that, I can tell you whether or not you'll need to obtain an ARPA permit. (If you ultimately do, it's a fairly straight forward process that I'll tell you about).

Do you have a copy of the Corps' 2012 survey and findings report? If not, I've attached a copy, hopefully it'll give you some additional background on what's already been done.

Thanks,

- Dan

Daniel M. Mulligan
Archaeologist/NAGPRA Coordinator
US Army Corps of Engineers, Portland District Environmental Resources Branch P.O. Box 2946 (CENWP-PM-E) Portland, OR 97208-2946
(503) 808-4768 daniel.m.mulligan@usace.army.mil

-----Original Message-----
From: Leclerc, Elizabeth [mailto:Elizabeth.Leclerc@hdrinc.com]
Sent: Monday, December 14, 2015 2:42 PM
To: Mulligan, Daniel M NWP
Subject: [EXTERNAL] RE: HDR Archaeology Project on Bayocean Spit, Tillamook County (UNCLASSIFIED)

Dear Mr. Mulligan,

I am emailing to see if you are able to answer a few questions I mistakenly addressed to Chris Page regarding an ARPA permit to perform an archaeological survey on USACE-managed land on the Bayocean Spit in Tillamook County. My original email is included below. Specifically, I am looking to confirm we do indeed need an ARPA permit from the Corps for this survey and to learn if the Corps has any specific survey, collection, or curation requirements that should be addressed in our research design.

Thank you,

Elizabeth Leclerc,

Archaeologist

HDR
530 Front Ridge Road
Penobscot, ME 04476
D 207.479.5601 M 720.633.7088
elizabeth.leclerc@hdrinc.com

hdrinc.com/follow-us

-----Original Message-----
From: Leclerc, Elizabeth [mailto:Elizabeth.Leclerc@hdrinc.com]
Sent: Tuesday, December 08, 2015 10:48 AM
To: Page, Christopher NWP
Subject: [EXTERNAL] HDR Archaeology Project on Bayocean Spit, Tillamook County

Dear Mr. Page,

Comment Response Matrix

Draft Cultural Resource Survey Design
Coastal, Open Ocean, and Tropical
Survival, Evasion, Resistance and Escape (SERE) Training,
Tillamook, Oregon

#	Location			Comment	Reviewer	HDR's Response
	Page	Line	Section			
21	11		3.1	Historic Sources, ~~and~~ refer to tribal use		
22				of Area. Oral Tradions also refer to		
23				the creation of the land form.		
24	11		3.2	Who determines Site Eligability?		
25				will tribal perspective be included?		
26				TCP consideration?		
27	11		3.2.1	Visual Surface Inspection is		
28				not sufficient on Dynamic Sand landform		
29				Condition. STPs will be necessary		
30				reccomend 20m intervals along		
31				Transects 20m apart.		
32	12		3.2.2	See above. Testing at Base/Support Camp as well.		
33	12		3.2.2.1	Double check OR SHPO methods.		
34	12		3.2.2.1	50cm may not be sufficient.		
35				May require Auger to check deep stratigraphy.		
36	12		3.2.3	Need to Develop TDP. and have		
37				Training for Field crew as well as SERE personelle		
38	[redacted]					
39				[redacted]		
40						
41						

Comment Response Matrix

Draft Cultural Resource Survey Design
Coastal, Open Ocean, and Tropical
Survival, Evasion, Resistance and Escape (SERE) Training,
Tillamook, Oregon

#	Location			Comment	Reviewer	HDR's Response
	Page	Line	Section			
0	*1-5*	*17*	*1.3.1*	*Example Comment.*	*BH*	
1	1		1.1	Also Present in TI011		
2	3		1.1	Road use and Support Camp have potential		
3				to Adversly Impact Cultural Resources.		
4	5		1.3	The 'un treated' tribes of North Oregon		
5				Coast had a strong connection to the		
6				North Unit of the Coast Reservation		
7				and Administrative Agent of		
8				the Grand Ronde Reservation prior		
9				to the Creation of the Siletz Reservation		
10				in 1875.		
11	7		2.2	What TCP's may be connected to		
12				this landform and therefore, may		
13				be adversly impacted by this		
14				undertaking? To be added as		
15				research question.		
16	9		2.3.1	Bay side submerged sites and features		
17				~~are~~ likly to be present: eg. Fish weirs		
18				~~are~~ platform posts, etc.		
19	10		2.3.2	Data Types: Historic Period Tribal		
20				Connection should be included.		

There was a localized community of Tribal members in residence at Garibaldi, Hobbsonville, and Tillamook, Bay City up to

Comment Response Matrix

Draft Cultural Resource Survey Design
Coastal, Open Ocean, and Tropical
Survival, Evasion, Resistance and Escape (SERE) Training,
Tillamook, Oregon

#	Location			Comment	Reviewer	HDR's Response
	Page	Line	Section			
42	General Comment			Our office would appreciate the opportunity to discuss these points in further detail and answer any questions you may have.		
43						
44						

Reviewer: Please provide your name, title, commercial phone number, email address, and date of comments

- *Example: BH – Brian Hoppy, Vice President, HDR, (610) 397-1744 ex. 101, brian.hoppy@hdrinc.com, 23 March 2010.*

Briece Edwards
Senior Archaeologist
Historic Preservation Dpt.
Confederated Tribes of Grand Ronde.
503/879-2084
briece.edwards@grandronde.org

From: Leclerc, Elizabeth
To: "briece.edwards@grandronde.org"
Subject: Tillamook SERE Training Area Research Design
Date: Monday, January 18, 2016 1:42:00 PM

Dear Mr. Edwards,

I am working with Dr. Matt Edwards on the USAF's Tillamook SERE Training proposal and was hoping to set up a conversation with you to discuss your comments on the research design for the cultural resources investigations. Matt is out on vacation right now and asked me to coordinate with you in his absence. I've been working on incorporating your comments into the research design but would appreciate the opportunity to go over some of them with you in a little more detail, answer any questions you may have, and ask a few questions myself. Please let me know if you would be interested in setting up a time to talk and, if so, when the best time would be to contact you.

Thank you,

Elizabeth

Elizabeth Leclerc,
Archaeologist

HDR
530 Front Ridge Road
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Telephone Record

Date:	Monday, January 25, 2016		
Project:	SERE Training, Tillamook, Oregon		
Call to:	Briece Edwards, Confederated Tribes of the Grand Ronde Reservation, Archaeologist	Phone No:	503-879-2084
Call from:	Elizabeth Leclerc, HDR, archaeologist	Phone No:	720-633-7088
Subject:	Research Design for the SERE Training Cultural Resources Survey		

Discussion, Agreement, and/or Action:

Mr. Edwards and I discussed his comments on the draft research design. Mr. Edwards discussed the APE, recognizing that it was defined with discrete boundaries due to the nature of the proposal, but suggested the proposal takes place within a dynamic cultural and geological landscape that is tied to areas beyond what is currently defined as the APE. The tribe is very interested in how the landscape relates to some of the tribe's oral traditions and history. The peninsula is described in some of the tribe's creation stories. Mr. Edwards is interested in how these creation stories and oral histories document the peninsula's geologic past (subsidence, uplift, tsunamis, etc). That is, the Oregon coast has been defined and redefined over the same time period that humans have lived in the area. People were around to witness the creation of those landscapes and may have recorded their formation through oral tradition. The tribe wants the Air Force to recognize, consider, and understand the landscape they are working in and Mr. Edwards suggested the APE is too narrow to look into all these aspects.

As mentioned above, Mr. Edwards stated the peninsula features in one or more creation stories and has traditional significance. He said that any given part of the peninsula could be connected to a dozen or more traditional cultural properties (TCPs). Line of sight is very important for TCPs on the coast. Also, there may be TCPs that are only visible from the peninsula, giving it further significance. Mr. Edwards suggested the concern is not necessarily that TCPs are listed, but that they at least be recognized/ considered as TCPs. He would like the Air Force to at least ask the question, even if the answer is no. If a potential TCP is identified, he would like tribal perspectives to be considered. If a site is grounded in line of sight, and if it provides line of sight to other areas (that may only be visible from that location), that could be significant.

Mr. Edwards expressed concerned about the field work strategy and the possible depth of deposits. He recommended a different sort of strategy rather than a set grid of STPs—that is, a judgmental strategy that focuses on low points in and around the dunes. He stated shovel testing should take place in all training locations and mentioned possibly surveying the road. Mr. Edwards also suggested that within sites it may be

better to perform 1x1 tests rather than shovel tests because of depth and the sandy matrix. Mr. Edwards strongly recommended including team members with coastal Oregon experience. He also requested the Air Force have an Inadvertent Discoveries Plan in place before the survey with active contact information and procedures. Mr. Edwards offered to come out to the project site during the survey and give points of reference and also invited the crew to visit at Grand Ronde ahead of the project to meet and answer questions.

Mr. Edwards stated the tribe's goal is in no way to inhibit the proposal but to ensure cultural resources are given due consideration and protection. He discussed the potential for a long-term, productive relationship with the USAF. He suggested the SERE students and trainers are well-placed to provide observations on conditions, etc, and be part of a long term recording and monitoring strategy in the area which would almost solely be under their use.

Telephone Record

Date:	Monday, February 08, 2016, 5:00 PM EST to 5:45 EST		
Project:	Coastal, Open Ocean, and Tropical SERE Training EA	Project No:	227-238664
Call to:	Elizabeth Leclerc, HDR	Phone No:	720-633-7088
Call from:	Dennis Griffin, Oregon State Historic Preservation Office	Phone No:	503-986-0674
Subject:	Section 106 Cultural Resource Survey Research Design		

Discussion, Agreement, and/or Action:

1. Mr. Griffin and I discussed landownership in the project area. The APE is on land managed/owned by the USACE and Tillamook County. Mr. Griffin stated that beach areas below the high water mark are state-owned. I told Mr. Griffin I did not believe any of the survey areas extended below the high water mark. Survey and shovel testing on county and state land would fall under the state permit issued by the SHPO.
2. I described changes we are considering to field methods, beginning with changes from a shovel testing grid in the student camps to a judgmental strategy focusing on interdunal areas. Mr. Griffin agreed this strategy would be more productive. I explained that in conversations with the Grand Ronde, the tribe suggested 20 m spacing may be excessive, and 30 m may be adequate. Mr. Griffin disagreed with this, stating that in high probability areas (and he considers the spit a high probability area), they recommend 20 m or even 10 m spacing. Mr. Griffin agreed that a judgmental strategy with a shovel-test density of not less than 1 per 40 m^2 (or a 20 m grid) would be acceptable for the student camps. He agreed with our proposal to excavate STPs as deep as possible (up to 1 m) and using an augur to continue the depth to 1 m. He said the augur diameter should be no less than 4 inches and suggested we consider alternative tools/methods (such as coring) given the loose sands.
3. Regarding the instructor camp, medic camp, and helicopter landing zone on the bay-side of the peninsula, I explained that we are considering a change from surface inspection of these areas to shovel testing. Mr. Griffin approved of this approach using a 20 m grid for shovel tests. Mr. Griffin made note of the medic camp's proximity to site 35TI104 and asked that we ensure the medic camp is located outside of areas with cultural deposits. He asked why they aren't digging latrines in the instructor and medic camps.

4. Mr. Griffin and I reviewed information from the USACE's 2012 survey and discussed beach development over the last century. Although much of the beach developed over the last century, at least some portions of the student camps appear to be on older deposits. We also reviewed previously recorded sites in the area and notes from Lloyd Collins' 1951-1952 survey of the Oregon Coast. Mr. Griffin said early site forms were generated by the Oregon State Museum from field notes and suggested reviewing the field notes to see if they had additional information (we have this document). He said he would contact the Oregon State Museum and ask them to rescan pages of the field notes that were not very clear.

1. Aerial images and beach development
2. Previous survey and sites
3. Field notes from Collins survey

From: Leclerc, Elizabeth
To: Degarlais, Jereme R NWP (Jereme.R.Degarlais@usace.army.mil)
Subject: USAF SERE Training Cultural Survey
Date: Wednesday, February 17, 2016 3:33:00 PM

Hi Jereme,

Thank you for your time on the phone yesterday. I believe the USAF has reached out to you about a proposed cultural resource survey on the Bayocean Peninsula related to the SERE Training there, but I am not sure how much they have shared with you to this point. In brief, during Section 106 consultation related to USAF's permit renewals for the SERE Training, the Confederated Tribes of the Grand Ronde requested (and the USAF agreed to) additional cultural resource investigations on the Bayocean Peninsula. After additional consultation with the tribe and the Oregon SHPO, it was determined this investigation would include shovel testing in the training areas. Dan Mulligan (Corps Environmental) suggested this would require a change to the USAF's permit/lease with the Corps RE that they currently hold for the training activities.

As I mentioned yesterday, we would like to have a conference call to discuss the cultural survey and begin the ARPA permit application process. Based on guidance Dan Mulligan provided, we will not be including him in these discussions at this time. I will be sending a conference call invitation shortly. If the time and day do not work for you, please let me know and suggest an alternate schedule. Most of us are free any day/time except Wednesdays.

Regards,

Elizabeth

Elizabeth Leclerc,
Archaeologist

HDR
530 Front Ridge Road
Penobscot, ME 04476]
D 720.633.7088 **M** 207.479.5601
Elizabeth.Leclerc@hdrinc.com

hdrinc.com/follow-us

Telephone Record

Date:	Thursday, March 17, 2016		
Project:	SERE Training, Tillamook, Oregon		
Call to:	Briece Edwards, Confederated Tribes of the Grand Ronde Archaeologist	Phone No:	503-879-2084
Call from:	Elizabeth Leclerc, HDR archaeologist	Phone No:	720-633-7088
Subject:	SERE Training in April 2016 and Cultural Resources Survey Schedule		

Discussion, Agreement, and/or Action:

I called Mr. Edwards to discuss the scheduled April 2016 training, which would occur under existing permits. The cultural resources survey is still in the planning stage with the research design under revision. Mr. Edwards expressed disappointment that the survey had not yet been completed and is concerned this could turn into a pattern (that is, additional trainings before a survey and evaluations are complete). I asked Mr. Edwards if the Confederated Tribes of the Grand Ronde Reservation (Grand Ronde) would like to have a monitor present at the April 2016 training, as was done for the September 2015 training. Mr. Edwards responded that the tribe is prepared to forego monitoring with assurance from the U.S. Air Force that no disturbance will occur in or around the known site and that trainers and students are aware they must avoid the area. The tribe also plans to send someone out during or immediately after the training to inspect the area. The tribe wishes to show trust and good faith that the Air Force will not disturb sensitive areas, but also want to impress they have a continued interest in the area and concerns about potential disturbance. Mr. Edwards asked for a signed letter detailing the procedures in place to protect the known site and prevent impacts on any unidentified sites.

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

Mr. Jeffrey R. Johnson
Installation Tribal Liaison Officer
1 E. Bong Street, Suite 103
Fairchild AFB, WA 99011

Mr. Jordan Mercier
Historic Preservation Department
Confederated Tribes of the Grand Ronde
8720 Grand Ronde Road
Grand Ronde, OR 97347

SUBJECT: Coastal and Open Ocean SERE Training at the Bayocean Peninsula, April 12-17, 2016

Dear Mr. Mercier,

The 336th Training Group at Fairchild Air Force Base will hold its biannual Coastal and Open Ocean Survival, Evasion, Resistance, and Escape (SERE) Training at the Bayocean Peninsula, Tillamook County from April 12 - 17, 2016. We understand that Mr. Briece Edwards in your office discussed the training with our contractor, HDR, on March 17, 2016 and that the Confederated Tribes of the Grand Ronde remain concerned about potential impacts to known and unknown archaeological or traditional resources on the peninsula. We also understand you are not requesting a cultural monitor be present for the training at this time. We are providing this letter to outline the procedures in place to avoid impacts on sensitive cultural resources.

1. *Cultural Sensitivity Briefing.* Prior to beginning the Tropical, Coastal and Open Ocean SERE training in Washington and Oregon, the instructors and students are briefed on procedures to follow if cultural materials are encountered during the course of training. We will ensure this training includes identification of likely materials on the Bayocean Peninsula such as shell middens.

2. *Avoidance of Known Site 35TI00104.* We are aware of known site 35TI00104 near the instructor camps and have protocols to ensure the site is avoided. The area is marked for avoidance on maps provided to training participants. Site avoidance is also a condition of our permit with the U.S. Army Corps of Engineers.

3. *Inadvertent Discoveries.* Participants in the SERE Training are prohibited from disturbing or removing cultural materials if any are encountered during the training. If participants encounter cultural materials, they are required to follow chain-of-command notifications to ensure the materials are protected from further disturbance. The USAF will note the location of the find and notify the landowner. If materials are discovered during excavation of latrines or water table pits, the pit will be flagged for future work and backfilled, and the student will move to excavate their pit in another location. If bone is found that may be human, the USAF will immediately stop activity in that area, protect the area from further disturbance, and notify the landowner. The USAF will ensure the proper authorities are notified, including the Oregon State Historic Preservation Office, the Oregon State Police, and Native American tribes.

As demonstrated above, the 336th Training Group is committed to protecting historic properties and avoiding impacts on sensitive cultural resources during the SERE training. If you have any questions on the training or these protocols, please contact Mr. Todd Foster, AF SERE Training Area Manager, at (509) 247-7483 or by email at: Todd.Foster.2@us.af.mil. Comments or questions may also be addressed to 336 TRG/XP, Attn: Todd Foster, 1015 W. Survival Loop Suite 217, Fairchild AFB WA 99011. Thank you for your continued coordination with the USAF on this matter.

Sincerely,

Jeffrey R. Johnson

JEFFREY R. JOHNSON
Installation Tribal Liaison Officer

Cc: Briece Edwards, Senior Archaeologist

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

Jeffrey R. Johnson
Installation Tribal Liaison Officer
Fairchild Air Force Base
1 E. Bong Street, Suite 103
Fairchild AFB, WA 99011

Briece Edwards
Senior Archaeologist
Archaeology and Research Program
Historic Preservation Department
Confederated Tribes of the Grand Ronde
8720 Grand Ronde Road
Grand Ronde, OR 97347

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2. *Avoidance of Known Site 35TI00104.* We are aware of known site 35TI00104 near the instructor camps and have protocols to ensure the site is avoided. The area is marked for avoidance on maps provided to training participants. Site avoidance is also a condition of our permit with the U.S. Army Corps of Engineers.

3. *Inadvertent Discoveries.* Participants in the SERE Training are prohibited from disturbing or removing cultural materials if any are encountered during the training. If participants encounter cultural materials, they are required to follow chain-of-command notifications to ensure the materials are protected from further disturbance. The USAF will note the location of the find and notify the landowner. If materials are discovered during excavation of latrines or water table pits, the pit will be flagged for future work and backfilled, and the student will move to excavate their pit in another location. If bone is found that may be human, the USAF will immediately stop activity in that area,

protect the area from further disturbance, and notify the landowner. The USAF will ensure the proper authorities are notified, including the Oregon State Historic Preservation Office, the Oregon State Police, and Native American tribes.

As demonstrated above, the 336th Training Group is committed to protecting historic properties and avoiding impacts on sensitive cultural resources during the SERE training. If you have any questions on the training or these protocols, please contact Mr. Todd Foster, AF SERE Training Area Manager, at (509) 247-7483 or by email at: Todd.Foster.2@us.af.mil. Comments or questions may also be addressed to 336 TRG/XP, Attn: Todd Foster, 1015 W. Survival Loop Suite 217, Fairchild AFB WA 99011. Thank you for your continued coordination with the USAF on this matter.

Sincerely

Jeffrey R. Johnson

JEFFREY R. JOHNSON
Installation Tribal Liaison Officer

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

MAR 23 2016

Mr. Jeffrey R. Johnson
Installation Tribal Liaison Officer
1 E. Bong Street, Suite 103
Fairchild AFB WA 99011

Dr. Dennis Griffin
State Archaeologist
Oregon State Historic Preservation Office
725 Summer St NE, Suite C
Salem, OR 97301

SUBJECT: SHPO Case No. 15-1727, Revised Research Design for the Cultural Investigations Related to the USAF's SERE Permit Renewal on Bayocean Peninsula

Dear Dr. Griffin,

The U.S. Air Force is pleased to provide a revised research design for cultural investigations associated with our Coastal, Open Ocean, and Tropical SERE Environmental Assessment, Forks, Washington and Tillamook, Oregon and concurrent Section 106 consultation. The Oregon State Historic Preservation Office (SHPO) provided comment on the draft research design in a letter dated December 3, 2015. Our contractor, HDR, also discussed the SHPO's comments and proposed changes to the research design with Mr. Dennis Griffin on February 8, 2016. The revised research design incorporates these comments and changes, as well as input from the Confederated Tribes of the Grand Ronde.

We request your concurrence with the revised research design so that we may implement the proposed study. After we receive your concurrence, our contractor will apply for a permit from the SHPO and proceed with the study as described. We request your review and concurrence no later than 30 days from receipt of this letter. Any comments or questions may be directed to: Mr. Juan Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you for your timely support of this effort.

Sincerely,

Jeffrey R. Johnson

JEFFREY R. JOHNSON
Installation Tribal Liaison Officer

Attachment:
Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training, Tillamook County, Oregon (dated Feb 2016)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

MAR 23 2016

Mr. Jeffrey R. Johnson
Installation Tribal Liaison Officer
1 E. Bong Street, Suite 103
Fairchild AFB WA 99011

Mr. Briece Edwards
Historic Preservation Department
Confederated Tribes of the Grand Ronde
8720 Grand Ronde Road
Grand Ronde, OR 97347

SUBJECT: Revised Research Design for the Cultural Investigations Related to the USAF's SERE Permit Renewal on Bayocean Peninsula

Dear Mr. Edwards,

The U.S. Air Force is pleased to provide a revised research design for cultural investigations associated with our Coastal, Open Ocean, and Tropical SERE Environmental Assessment, Forks, Washington and Tillamook, Oregon and concurrent Section 106 consultation. We have incorporated changes based on input you provided in your email dated December 15, 2015 and your telephone call with our contractor, HDR, on January 25, 2016. We have also made changes as a result of consultation with the Oregon State Historic Preservation Office.

We request your review of the revised research design so that we may implement the proposed study. We request any comments on the document no later than 30 days from receipt of this letter. Any comments or questions may be directed to: Mr. Juan Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you for your timely support of this effort.

Sincerely,

Jeffrey R. Johnson

JEFFREY R. JOHNSON
Installation Tribal Liaison Officer

Attachment:
Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training, Tillamook County, Oregon (dated Feb 2016)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

MAR 23 2016

Jeffrey R. Johnson
Department of the Air Force
Fairchild Air Force Base
1 E. Bong Street, Suite 103
Fairchild AFB, WA 99011

Jordan Mercier
Cultural Protection Coordinator
Historic Preservation Department
Confederated Tribes of the Grand Ronde
8720 Grand Ronde Road
Grand Ronde, OR 97347

SUBJECT: Revised Research Design for the Cultural Investigations Related to the USAF's SERE Permit Renewal on Bayocean Peninsula

Dear Mr. Mercier,

The U.S. Air Force is pleased to provide a revised research design for cultural investigations associated with our Coastal, Open Ocean, and Tropical SERE Environmental Assessment, Forks, Washington and Tillamook, Oregon and concurrent Section 106 consultation. We have incorporated changes based on input provided by Mr. Briece Edwards in an email dated December 15, 2015 and a telephone call with our contractor, HDR, on January 25, 2016. We have also made changes as a result of consultation with the Oregon State Historic Preservation Office.

We request your review of the revised research design so that we may implement the proposed study. We request any comments on the document no later than 30 days from receipt of this letter. Any comments or questions may be directed to: Mr. Juan Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you.

Sincerely,

Jeffrey R. Johnson

JEFFREY R. JOHNSON
Installation Tribal Liaison Officer

Attachment:
Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training, Tillamook County, Oregon (dated Feb 2016)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

MAR 23 2016

Mr. Jeffrey R. Johnson
Installation Tribal Liaison Officer
1 E. Bong Street, Suite 103
Fairchild AFB WA 99011

Mr. Jereme DeGarlais
Realty Specialist, Team Lead
U.S. Army Corps of Engineers
Portland District
26275 Clear Lake Road
Junction City, Oregon 97448

SUBJECT: Research Design for the Cultural Investigations Related to the USAF's SERE Permit Renewal on Bayocean Peninsula

Dear Mr. DeGarlais,

The U.S. Air Force (USAF) is pleased to provide a research design for proposed cultural investigations on the Bayocean Peninsula associated with our Coastal, Open Ocean, and Tropical SERE Environmental Assessment, Forks, Washington and Tillamook, Oregon and concurrent Section 106 consultation. The cultural survey is being proposed in response to requests we received from the Confederated Tribes of the Grand Ronde for additional studies of the area. Portions of the study area are on federal land managed by the U.S. Army Corps of Engineers.

We are providing this research design in advance of our ARPA permit application to aid in your office's review. We have also provided the research design to the Oregon State Historic Preservation Office and the Confederated Tribes of the Grand Ronde for their concurrence and comment. We request your comments on the research design within 30 days of receipt of this letter. Any comments or questions may be directed to: Mr. Juan Guerra, AF Civil Engineer Center (AFCEC/CZN), JBSA-Lackland, Building 1650, San Antonio, TX 78226; or by email at: juan.guerra.6@us.af.mil. Thank you for your timely support of this effort.

Sincerely,

Jeffrey R. Johnson

JEFFREY R. JOHNSON
Installation Tribal Liaison Officer

Attachment:
Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training, Tillamook County, Oregon (dated Feb 2016)

From:	Leclerc, Elizabeth
To:	"GRIFFIN Dennis * OPRD"
Subject:	SHPO Case No. 15-1727 USAF Bayocean Peninsula SERE Permit Renewal
Date:	Friday, March 25, 2016 12:55:17 PM
Attachments:	SERE Cutural Research Design_revised draft.pdf

Good morning Dennis,

You should be receiving a hard copy of the revised research design for the USAF's Bayocean Peninsula SERE Permit Renewal sent to your attention via Fedex, although I'm afraid the package does not reference the SHPO case number for this project. I have attached an electronic copy of the research design for your convenience. Although the letter accompanying the package provides contact information for the USAF for providing comments, please let me know if you have any questions I can assist with.

Thank you,

Elizabeth

Elizabeth Leclerc,
Archaeologist

HDR
530 Front Ridge Road
Penobscot, ME 04476]
D 720.633.7088 **M** 207.479.5601
Elizabeth.Leclerc@hdrinc.com

hdrinc.com/follow-us

From:	Leclerc, Elizabeth
To:	Degarlais, Jereme R NWP (Jereme.R.Degarlais@usace.army.mil)
Subject:	USAF SERE Training at Bayocean Peninsula - Revised Research Design
Date:	Friday, March 25, 2016 1:29:40 PM
Attachments:	SERE Cutural Research Design_revised draft.pdf

Hello Jereme,

On behalf of the U.S. Air Force, my office has sent you a research design for the cultural survey we discussed last month for the USAF's permit renewal for SERE training at the Bayocean Peninsula, Tillamook County. The package should arrive at your attention today via Fedex. We are sending the research desing to you for review ahead of our ARPA permit application, which we anticipate submitting next month. I have attached an electronic copy of the document here for your convenience. The letter accompanying the package provides contact information for the USAF for submitting comments on the research design; however, please let me know if you have any questions I can answer.

Thank you,

Elizabeth

Elizabeth Leclerc,
Archaeologist

HDR
530 Front Ridge Road
Penobscot, ME 04476]
D 720.633.7088 **M** 207.479.5601
Elizabeth.Leclerc@hdrinc.com

hdrinc.com/follow-us

From: Leclerc, Elizabeth
To: "jordan.mercier@grandronde.org"
Subject: USAF SERE Training at Bayocean Peninsula - Revised Research Design
Date: Friday, March 25, 2016 1:06:35 PM
Attachments: SERE Cutural Research Design_revised draft.pdf

Mr. Mercier,

On behalf of the U.S. Air Force, my office has sent you a revised research design for the USAF's Bayocean Peninsula SERE Permit Renewal, which should arrive in the next few days via Fedex. The revised design incorporates input provided by Mr. Briece Edwards in your office and the Oregon SHPO. The letter accompanying the package provides contact information for the USAF for submitting comments on the revised research design.

I have attached an electronic copy of the document here and a comment-response matrix for your convenience. We have also provided a copy of the research design to Mr. Edwards for his comment.

Thank you,

Elizabeth

Elizabeth Leclerc,
Archaeologist

HDR
530 Front Ridge Road
Penobscot, ME 04476]
D 720.633.7088 **M** 207.479.5601
Elizabeth.Leclerc@hdrinc.com

hdrinc.com/follow-us

From:	Leclerc, Elizabeth
To:	briece.edwards@grandronde.org
Subject:	FW: USAF SERE Training at Bayocean Peninsula - Revised Research Design
Date:	Friday, March 25, 2016 1:16:53 PM
Attachments:	SERE Cutural Research Design_revised draft.pdf CRM_Draft Survey Design for Bayocean Peninsula.doc

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Hi Briece,

We have sent you and Mr. Mercier hard copies of the revised research design for the USAF's Bayocean Peninsula SERE Permit Renewal, which should arrive in the next few days via Fedex. I have attached an electronic copy of the document and a comment-response matrix here for your convenience. The letter accompanying the package provides contact information for the USAF for submitting comments on the revised research design; however, please feel free to contact me if you have any questions I can help with.

Best regards,

Elizabeth

Elizabeth Leclerc,
Archaeologist

HDR
530 Front Ridge Road
Penobscot, ME 04476]
D 720.633.7088 **M** 207.479.5601
Elizabeth.Leclerc@hdrinc.com

hdrinc.com/follow-us

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

13 MAY 2016

Ronald R. Daniels
Deputy Base Civil Engineer
100 W. Ent Street, Suite 100
Fairchild AFB, WA 99011-9404

Oregon SHPO
725 Summer Street NE, Suite C
Salem, Oregon 97301

SUBJECT: SHPO Case No. 15-1727, State of Oregon Archaeological Permit Application for Cultural Investigations Related to the USAF's SERE Permit Renewal on the Bayocean Peninsula

The U.S. Air Force (USAF) is pleased to submit our permit application under the Archeological Resources Protection Act for proposed cultural investigations on the Bayocean Peninsula associated with our Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, Escape (SERE) Training Environmental Assessment and concurrent Section 106 consultation. Our contractor, HDR, Inc., will execute the permitted study as outlined in the permit application (Atch 1) and enclosed research design (Atch 2). HDR's Principal Investigator for this project, Mr. Wayne Glenny, meets the Secretary of the Interior's standards pursuant to 36 C.F.R. 61 and is listed as a "Qualified Archaeologist" with the Oregon State Historic Preservation Office.

The project will take place on lands owned by the U.S. Army Corps of Engineers (Corps) and Tillamook County. We have attached separate applications for each of these landowners. In addition to the Oregon archaeological permit, the USAF will need to obtain a permit from the Corps under the Archeological Resources Protection Act (ARPA). We are coordinating our ARPA permit with the Corps separate from and concurrent to our permit from your office. Please let us know if we can provide anything further to facilitate your review. We look forward to coordinating with you and the U.S. Army Corps of Engineers on this project. Any comments or inquiries may be directed to: Ms. Tiffany Evans, Chief, Environmental Element, 100 W. Ent St., Suite 155, Fairchild AFB, WA 99011; or by email at: tiffany.evans@us.af.mil. Thank you.

Sincerely,

Ronald R. Daniels, GS-13, DAFC
Deputy Base Civil Engineer

Attachments:
1. Application for a Federal Permit under the Archeological Resources Protection Act
2. Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training, Tillamook County, Oregon

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 92D AIR REFUELING WING (AMC)
FAIRCHILD AIR FORCE BASE WASHINGTON

13 MAY 2016

Ronald R. Daniels
Deputy Base Civil Engineer
100 W. Ent Street, Suite 100
Fairchild AFB, WA 99011-9404

Jereme DeGarlais
Realty Specialist, Team Lead
U.S. Army Corps of Engineers
Portland District
26275 Clear Lake Road
Junction City, Oregon 97448

SUBJECT: ARPA Permit Application for Cultural Investigations Related to the USAF's SERE Permit Renewal on the Bayocean Peninsula

Dear Mr. DeGarlais,

The U.S. Air Force is pleased to submit our permit application under the Archeological Resources Protection Act for proposed cultural investigations on the Bayocean Peninsula associated with our Coastal, Open Ocean, and Tropical Survival, Evasion, Resistance, Escape (SERE) Training Environmental Assessment and concurrent Section 106 consultation. Our contractor, HDR, Inc., will execute the permitted study as outlined in the permit application (Atch 1) and enclosed research design (Atch 2). HDR's Principal Investigator for this project, Mr. Wayne Glenny, meets the Secretary of the Interior's standards pursuant to 36 C.F.R. 61 and is listed as a "Qualified Archaeologist" with the Oregon State Historic Preservation Office.

It is our desire to complete field work by the end of the July 2016 to allow sufficient time to prepare a report of our survey results prior to the next SERE training in mid-September. However, we also understand your office requires 90 days to review and process the permit application. Please let us know if we can provide anything to facilitate your review. We look forward to coordinating with you and the U.S. Army Corps of Engineers on this project. Any comments or inquiries may be directed to: Ms. Tiffany Evans, Chief, Environmental Element, 100 W. Ent St., Suite 155, Fairchild AFB, WA 99011; or by email at: tiffany.evans@us.af.mil. Thank you.

Sincerely,

Ronald R. Daniels

Ronald R. Daniels, GS-13, DAFC
Deputy Base Civil Engineer

Attachments:
1. Application for a Federal Permit under the Archeological Resources Protection Act
2. Research Design for Cultural Resources Investigations at the Bayocean Peninsula for USAF SERE Specialist Training, Tillamook County, Oregon

From: Permits Arch * OPRD
To: Leclerc, Elizabeth
Cc: Glenny, Wayne
Subject: RE: SHPO Case No. 15-1727 Permit Application
Date: Monday, May 23, 2016 11:32:11 AM

CONFIRMATION OF RECEIPT…..OREGON ARCHEAOLGY PERMIT APPLICATION

We have received your application for a State of Oregon Archaeological Permit. Your application has been assigned Archaeological Permit (AP) # 2189 and has been forwarded to the appropriate SHPO staff for review.

Upon completion of the SHPO review, the application will be sent to the Legislative Commission on Indian Services (LCIS) for designation of most appropriate tribes. Once that information is received from LCIS (generally within two days), your application will be distributed, beginning the 30 day review process. You will receive notice through the US Postal Service of the review period initiation.

Do Not Reply to This E-Mail

From: Leclerc, Elizabeth [mailto:Elizabeth.Leclerc@hdrinc.com]
Sent: Thursday, May 19, 2016 10:50 AM
To: Permits Arch * OPRD
Subject: SHPO Case No. 15-1727 Permit Application

Hello,

On behalf of the U.S. Air Force, please accept the attached transmittal letter and application for a State of Oregon Archaeological Permit for proposed cultural resource investigations related to the Air Force's SERE Permit Renewal on the Bayocean Peninsula. We have been consulting with Dr. Dennis Griffin on this project and development of our research design, which is enclosed with the permit application.

The application contains separate applications for U.S. Army Corps and Tillamook County landowners, proof of funding for the cultural survey, and a research design that contains maps of the project area and a curation agreement with the University of Oregon Museum of Natural and Cultural History. If you have any questions, please do not hesitate to reach out to myself or to Ms. Tiffany Evans, Chief, Environmental Element, U.S. Air Force, whose contact information is enclosed in the attached package.

Thank you,

Elizabeth

Elizabeth Leclerc,
Archaeologist

HDR
530 Front Ridge Road
Penobscot, ME 04476]
D 720.633.7088 **M** 207.479.5601

Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org

June 22, 2016

Wayne Glenny
HDR
8690 Balboa Ave. Ste, 200
San Diego, CA 92123

RE: Archaeological Permit No. 2189

Dear Mr. Glenny:

Enclosed is your archaeological permit for the following project: USAF Coastal, Open Ocean, and Tropical SERE Training in Tillamook County. It was sent to CIS for the most appropriate tribe(s):

Confederated Tribes of Siletz
Confederated Tribes of Grand Ronde

Copies were also sent to the landowner, the Tillamook County planning department and OSMA. Replies were received from (attached).

Exploration shall consist of the following:

STPs will be excavated at 20 m intervals along transects spaced 20 m apart. STPs will be cylindrical, 30 cm in diameter, and excavated in arbitrary 10 cm levels to a depth of at least 50 cm, terminating after two sterile levels or 100 cm, whichever is first. A 4-in. diameter augur may be used to supplement the STPs if needed to reach these depths. The medic camp is located adjacent to known site 35-TI-104. The field survey and the proposed training will avoid this site; however, STPs will be excavated within the medic camp to confirm subsurface deposits do not extend into the area. STPs will begin on the opposite side of the camp and be excavated toward the site boundary. Regardless of the strategy, soils from STPs will be screened through 1/8th inch mesh. If cultural materials are recovered from an STP, STPs will be excavated in the cardinal directions at least 40 m away, beyond the expected site boundary. If the STP is positive, another STP will be placed another 40 m away. If the STP is negative, the crew will continue to excavate STPs on these axes back toward the site at 10 m intervals until cultural materials are encountered. When cultural materials are discovered in this manner, the next STP will be placed half the distance to the previous negative STP so as to define the boundary more precisely. The subsurface boundary will be the closer of two consecutive negative STPs.

Please contact me if you have any questions.

Sincerely,

John O. Pouley

John Pouley, M.A., RPA
Assistant State Archaeologist
(503) 986-0675
john.pouley@oregon.gov

cc: Jon Erlandson (OSMA)
Gregory Cickavage (Landowner)
Confederated Tribes of Siletz
Confederated Tribes of Grand Ronde
Karen Quigley CIS

Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org

STATE OF OREGON
ARCHAEOLOGICAL EXCAVATION PERMIT NO. AP-2189

The State of Oregon, acting by and through its Parks and Recreation Department, hereinafter called STATE, under authority of ORS 390.235, hereby grants to Wayne Glenny, hereinafter called PERMITTEE, a permit for purposes of excavation and removal of archaeological, historical, prehistoric, or anthropological materials. This permit is granted subject to the following terms and conditions.

1. Term
PERMITTEE may conduct survey, excavation, and collection work from 6/22/2016 to 6/23/2017 provided that reasonable supervision, as provided hereinafter, is exercised.

2. Location.
This permit shall apply to lands owned by the State of Oregon, a city, county, district, or municipal corporation in Oregon, or private property, more particularly described as follows:

USAF Coastal, Open Ocean, and Tropical SERE Training
1N, 10W, 19, 20, 29 and 30, Tillamook County

3. Supervision
The design and work in connection with the survey or excavation, including exploratory excavation and collection, shall be personally supervised by Wayne Glenny.

4. Compliance
PERMITTEE shall comply with all applicable federal, state, and local laws, rules, regulations, and ordinances.

5. Exploration shall consist
STPs will be excavated at 20 m intervals along transects spaced 20 m apart. STPs will be cylindrical, 30 cm in diameter, and excavated in arbitrary 10 cm levels to a depth of at least 50 cm, terminating after two sterile levels or 100 cm, whichever is first. A 4-in. diameter augur may be used to supplement the STPs if needed to reach these depths. The medic camp is located adjacent to known site 35-TI-104. The field survey and the proposed training will avoid this site; however, STPs will be excavated within the medic camp to confirm subsurface deposits do not extend into the area. STPs will begin on the opposite side of the camp and be excavated toward the site boundary. Regardless of the strategy, soils from STPs will be screened through 1/8th inch mesh. If cultural materials are recovered from an STP, STPs will be excavated in the cardinal directions at least 40 m away, beyond the expected site boundary. If the STP is positive, another STP will be placed another 40 m away. If the STP is negative, the crew will continue to excavate STPs on these axes back toward the site at 10 m intervals until cultural materials are encountered. When cultural materials are discovered in this manner, the next STP will be placed half the distance to the previous negative STP so as to define the boundary more precisely. The subsurface boundary will be the closer of two consecutive negative STPs.

6. Indemnification
PERMITTEE agrees to defend and hold STATE, its officers, agents, and employees harmless, and shall require its contractors to do the same, from any and all claims, damages, or expenses of any kind suffered or alleged to be suffered on the lands described in paragraph 2 or arising out of or in connection with the activities of PERMITTEE or its contractors pursuant to this Permit.

7. Insurance.

PERMITTEE shall obtain at PERMITTEE's expense, and keep in effect during the term of the Permit, comprehensive or commercial general liability insurance covering personal injury and property damage. This insurance shall include contractual liability coverage for the indemnification provided under this Permit. Coverage limits shall not be less than the limits of liability set forth in the provisions of ORS 30.270(1) as now in effect or as hereinafter amended. Such provisions now require that the coverage limits not less than $500,000 combined single limit per occurrence. The insurance shall be in a form and with compliance acceptable to STATE. Such insurance may be evidenced by certificates or copies of policies. Such evidence shall be provided to STATE prior to the commencement of any operations or activities under this Permit.

8. Records.

PERMITTEE shall submit a final excavation report by 6/23/2018 to the State Historic Preservation Office and the Oregon State Museum of Anthropology. If PERMITTEE is conducting an excavation associated with a prehistoric or historic American Indian archaeological site, then PERMITTEE shall also submit copies of the Final Report to the Commission on Indian Services and the following tribe(s):

Confederated Tribes of Siletz

Confederated Tribes of Grand Ronde

9. Custody.

All archaeological, historical, prehistoric, or anthropological materials recovered under this permit shall remain under the stewardship of the State of Oregon and shall be curated by Oregon State Museum of Anthropology. Any change in custody must be approved by the Oregon State Museum of Anthropology in accordance with ORS 390.235. Prior to submitting the materials to the permanent curation facility, the appropriate tribe(s) must be given 30 days to view all archaeological materials to ensure that funerary objects, sacred objects, and objects of cultural patrimony are returned to tribal ownership per state law (ORS 97.740).

10. Notification

a. If PERMITTEE is conducting an excavation associated with a prehistoric or historic American Indian archaeological site, PERMITTEE shall notify in writing the most appropriate Indian tribe. The notification shall include:

   i. The location and schedule of the forthcoming excavation;

   ii. A description of the nature of the of the investigation; and

b. Upon discovery of an archaeological object which is demonstrably revered by any ethnic group, religious group, or Indian tribe as holy, which object was or is used in connection with a religious or spiritual service or worship of a deity or spirit power, i.e., a "sacred object", PERMITTEE shall notify in writing:

   i. The State Historic Preservation Office; and

   ii. The appropriate ethnic group, religious group, or Indian tribe with which the sacred object is associated.

11. Consultation

If PERMITTEE is conducting an excavation associated with a prehistoric or historic American Indian archaeological site, PERMITTEE shall consult with a representative of the appropriate tribe to establish a procedure for handling sacred objects recovered during the excavation.

12. Conditions.

Confederated Tribes of the Grand Ronde: 1) A notification is sent to our office via email at least a week prior to field work start date. 2) If requested by our office, we are provided access to the site and opportunity to observe field work. 3) If requested by our office, The Tribe will be granted access to view all archaeological material before returning to curation facility to ensure that funerary objects, sacred objects, and objects of cultural patrimony are returned to Tribal ownershop as per State Law.

13. Revocation.

Failure to comply with all terms of this Permit, in addition to any agreed upon conditions, may lead to its immediate revocation.

OREGON PARKS AND RECREATION DEPARTMENT

for Jon P. Jen

Christine Curran
Deputy State Historic Preservation Officer

Date: 6/22/2016

Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org

May 23, 2016

Dr. Jon Erlandson
OMNCH
1224 University of Oregon
Eugene, OR 97403-1224

RE: Archaeological Permit No. 2189

Dear Dr. Erlandson:

Enclosed is an archaeological permit application submitted to State Parks by Wayne Glenny.
It is the responsibility of our department to forward all such applications to those parties described under ORS 390.235. Landowners should have been contacted by the applicant for access and disposition of artifacts (private lands).

Please review this application, mark your evaluation below, and return it to us with any comments. If we do not receive a response within thirty (30) days from the date of this notification, we will assume you have no objection to this permit.

Please note: information relating to the location of archaeological sites or objects needs to be kept confidential.

Thank you for your cooperation. Please contact me if you have any questions.

Sincerely,

John O. Pouley

John Pouley, M.A., RPA
Assistant State Archaeologist
(503) 986-0675
john.pouley@oregon.gov

Reviewer Evaluation

__✓__ I approve of the permit

____ I request conditions (attach)

____ I object to the permit (attach explanation)

Signature: Karen Quigley for Jon Erlandson

Date: 5/25/2016

cc: Karen Quigley (CIS)
Tillamook Co Planning Dept
Gregory Cickavage (Landowner)
Confederated Tribes of Siletz
Confederated Tribes of Grand Ronde

→ TO: JOHN POULEY

Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org

May 23, 2016

Ms. Karen Quigley
Commission on Indian Services
167 State Capitol
Salem, OR 97301-1347

RE: Archaeological Permit No. 2189

Dear Karen:

Enclosed is an archaeological permit application submitted to State Parks by Wayne Glenny.
It is the responsibility of our department to forward all such applications to those parties described under ORS 390.235. Landowners should have been contacted by the applicant for access and disposition of artifacts (private lands).

Please review this application, mark your evaluation below, and return it to us with any comments. If we do not receive a response within thirty (30) days from the date of this notification, we will assume you have no objection to this permit.

Please note: information relating to the location of archaeological sites or objects needs to be kept confidential.

Thank you for your cooperation. Please contact me if you have any questions.

Sincerely,

John O. Pouley

John Pouley, M.A., RPA
Assistant State Archaeologist
(503) 986-0675
john.pouley@oregon.gov

Reviewer Evaluation

✓ I approve of the permit

____ I request conditions (attach)

____ I object to the permit (attach explanation)

Signature: [signature]

Date: 5/24/2016

cc: Dr. Jon Erlandson (OSMA)
Tillamook Co Planning Dept
Gregory Cicksvage (Landowner)
Confederated Tribes of Siletz
Confederated Tribes of Grand Ronde

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, PORTLAND DISTRICT
PO BOX 2946
PORTLAND OR 97208-2946

OCT 17 2016

Real Estate Division

Wayne Glenny, M.S., RPA
HDR, Inc.
8690 Balboa Ave. Suite 200
San Diego, CA 92123

Dear Mr. Glenny:

Enclosed is an executed copy of Archaeological Resources Protection Act Permit No. DACW57-4-17-0002, for the United States Air Force Bayocean Peninsula SERE Specialist Training area, Tillamook South Jetty Project, Tillamook County, Oregon.

A copy of this correspondence is being provided to Ms. Katharine Groth, Tillamook South Jetty Project Manager and Ronald R. Daniels, Deputy Base Engineer, Fairchild Air Force Base, Washington.

Prior to commencement of permitted work, please contact Ms. Katharine Groth, Project Manager at 541-269-2556 and notify her that you will be on site.

If you have additional questions or require assistance regarding this matter, please contact Realty Specialist Mr. Benjamin Hier of my staff at 503-808-4669.

Sincerely,

Amanda Dethman

Amanda J. Dethman
District Chief of Real Estate
Real Estate Contracting Officer

Enclosure

DEPARTMENT OF THE ARMY

ARCHAEOLOGICAL RESOURCES PROTECTION ACT PERMIT

NAME OF PROJECT OR INSTALLATION: **BAYOCEAN PENINSULA UNITED STATES AIR FORCE SERE SPECIALIST TRAINING PROJECT DACW57-4-17-0002**

(Please use this number when referring to this permit.).

NO. DACW57-4-17-0002

To conduct work upon public lands owned or controlled by the Department of the Army under the Archaeological Resources Protection Act (93 Stat. 721, 16 U.S.C. 470aa-1 1) approved October 31, 1979 and the regulations thereunder (32 CFR 229).

1. PERMIT ISSUED TO: DATE: 1 October 2016

Wayne Glenny, M.S., RPA

2. NAME, ADDRESS AND OFFICIAL STATUS OF PERSON:
Wayne Glenny, M.S., RPA
HDR, Inc.
8690 Balboa Ave. Suite 200
San Diego, California, 92123

a. In general charge: **Wayne Glenny**

b. In actual direct charge: **Same**

3. UNDER APPLICATION DATE: October 2016 –October 2017

4. AUTHORIZES: HDR, Inc. (HDR) to conduct subsurface testing on Corp of Engineers (Corps) property permitted to the U.S. Air Force (USAF) for Survival Evasion, Resistance, Escape (SERE) Training at Bayocean Peninsula, Tillamook County, Oregon (Exhibit A). The project was inventoried for cultural resources by the Corps in 2012. This inventory identified one precontact site 35TI011. The Corps recommended avoidance of the site and a finding of No Effect (Oregon SHPO concurred 7/29/13, SHPO Case No. 13-1075). The Confederated Tribes of the Grand Ronde Community of Oregon did not concur and requested that additional subsurface work be conducted. The USAF has contracted with HDR to conduct additional assessment. The proposed subsurface testing will consist of shovel test probes (STPs) excavated in four student camps, one instructor camp, one medic camp and one helicopter landing pad (Exhibit A). The attached Research Design (Exhibit A) discusses in detail the testing and sampling strategy. **Only the four student camps are located on Corps property and covered within the scope of this ARPA permit.**

At the four student camps, located in sand dune areas on the east side of the peninsula, HDR will excavate judgmentally placed STP with a strong preference for inter-dunal areas and lower dune slopes; these areas provide the greatest probability for locating buried deposits and will also be the focus of student activities during training. Within these areas, STPs will be placed at a density not less than 1 per 400 square meters (or a 20 x 20 meter grid). The shovel tests will be cylindrical, 30 centimeters (cm) in diameter and excavated in arbitrary 10 cm levels. The STPs would ideally reach a depth of 100 cm, slightly greater than the anticipated depth of water table pits or latrines excavated during SERE training. However, the loose, sandy matrix is likely to prevent attaining such depths with shovel testing. Therefore STPs will be excavated to the greatest depth possible, up to 100 cm, and a 4-inch diameter auger will be used to continue the excavation to a depth of 100 cm. Sediments will be screened through 1/8th inch mesh hardware cloth.

If cultural materials are recovered from an STP, additional STPs will be excavated in the cardinal directions at least 40 m away, beyond the expected site boundary. If the STP is positive, another STP

would be placed another 40 m away. If the STP is negative, the crew will continue to excavate STPs on these axes back toward the site at 10 m intervals until cultural materials are encountered. When cultural materials are discovered in this manner, the next STP will be pace half the distance to the previous negative STP so as to define the boundary more precisely. The subsurface boundary will be the closer of two consecutive negative STPs. All STPs will be backfilled upon completion.

All data collected will be recorded on appropriate Oregon SHPO inventory forms. Each unit location will be recorded using a global positioning system (GPS). Any artifacts recovered will be bagged and labeled with their provenience, including depth below surface and shovel test number. Diagnostic artifacts will be photographed and included in site documentation.

Prior to collection of surface artifacts based on HDR's perception that the artifact is "threatened, rare or worthy of further immediate study" (Research Design, Page 15), HDR will coordinate with the Corps District Archeologist.

Any artifacts identified during testing will be collected, prepared for curation per guidelines set forth by the University of Oregon, Natural Museum of Anthropology (MNCH) and will remain the property of the Corps. The USAF will be responsible for all necessary curation costs.

Upon completion of the fieldwork, a standard survey report following Secretary of Interior and Oregon SHPO guidelines will be submitted, and if sites are encountered, an Oregon SHPO online site form will be completed. The report will include background information, and summarize methods and results, and make recommendations for any further archeological work. A draft version of the report will be provided to the District Archeologist to review and comment. The Permittee will incorporate all Corps comments and submit 5-hard copies of the final report (1 unbound with SHPO cover page, 4 bound) and two copies of the report and spatial data on CD (one for Oregon SHPO and one for the Corps). The CD for the Oregon SHPO will include a collated PDF of the report with SHPO cover page to include all appendices and site forms and final project spatial data to include project area, location of all STPs, site datum and site boundaries. The CD for the Corps shall include the same materials as the OR SHPO CD along with all field notes, project photos and raw spatial data.

Should any evidence of human remains and/or burials be encountered, all excavation in the vicinity of the find must be halted immediately and HDR shall promptly notify the Corps to ensure compliance with 43 CFR 10.4. HDR shall also coordinate with the USAF and the Corps to protect the discovery location from further exposure or disturbance. No ground-disturbing activity will be allowed to resume in the vicinity of the discovery until authorized by the Corps.

5. ON LANDS DESCRIBED AS FOLLOWS: Corps, Portland District, Bayocean Peninsula, Tillamook County. Township 1 North Range 10 West Sections 19, 20, 29 and 30 as depicted in Exhibit "A".

6. FOR PERIOD: October 15, 2016 to October 15, 2017

7. MATERIALS COLLECTED UNDER THIS PERMIT WILL BE DEPOSITED FOR PERMANENT PRESERVATION IN THE **UNIVERSITY OF OREGON MUSEUM OF NATURAL AND CULTURAL HISTORY** OR IN OTHER ACCREDITED INSTITUTIONS UNDER SUITABLE LOAN AGREEMENTS. A COPY OF A CURRENT, VALID CURATION AGREEMENT MUST BE KEPT ON FILE WITH DISTRICT COMMANDER.

8. CONDITIONS

Bayocean Spit is one of three "Designated but Unmanaged Shorebird Conservation Areas" for western snowy plover. The Spit is also habitat for many other shorebirds, herons, seabirds, waterfowl and other species. If archeological field work takes place in spring (between March 1 and July 31) the entire area will be surveyed by a qualified biologist for nesting activities prior to field work. If archeological field work is conducted between August and September a qualified biologist should walk through the area to determine whether any active nests remain in the area for western snowy plover.

This permit is subject to the provisions of the Archaeological Resources Protection Act approved October 31, 1979, and the regulations, thereunder, including 32 CFR 229.7 as to Indian lands, and the following conditions:

a. Archaeological resources shall be analyzed and recorded in the field as much as possible. Collection of cultural resource material solely for later laboratory analysis is discouraged. The grantee will specify in the application when laboratory analysis is anticipated.

b. Artifacts, non-human bone or other cultural materials which are exposed by the shovel test probes in clearly in-situ context will be recovered and curated

c. Collections of archaeological resources, artifacts and other material removed from public lands under the provisions of this permit remain the property of the United States Government and may be recalled at any time for use of the Department of the Army or other agencies of the Federal Government.

d. The following individual(s) are authorized to be in direct charge of field work conducted under this permit:

(1) Wayne Glenny, M.S., RPA

(2) _____

e. The person(s) in direct charge of fieldwork shall be on-site at all times when work is in progress. Failure to comply with permit stipulations will result in removal of subject's name(s) from the approved list of persons-in-direct charge.

f. During the course of the activities conducted under this permit, the District Commander, or his representative shall have access to the study area of this permit, and during or after completion of this work shall have the right to inspect

g. At least three copies of all published journal articles (reprints) and other published or unpublished reports and manuscripts resulting from work conducted under this permit shall be filed with the Department of the Army, Portland District, ATTN: Chief of Real Estate, PO Box 2946, Portland, Oregon 97208-2946.

h. All field notes, records, photographs, and other data related to this permit will be provided to the Corps District Archeologist with the Final Report.

i. Temporary stakes and/or flagging used to identify sites shall be removed upon completion of the project unless otherwise authorized.

j. Vehicular activity shall be restricted to existing roads and trails unless otherwise authorized. Care shall be exercised to avoid directly or indirectly increasing access or potential vandalism to cultural resource sites.

k. Disturbed areas shall be kept to a minimum size consistent with the purpose of the study.

l. Permittee shall take adequate precautions to prevent livestock, wildlife, and the public from injury in any pit or trench.

m. All test holes shall be backfilled.

n. Living trees shall not be cut or otherwise damaged, unless authorized by the District Commander.

o. Proper precaution shall be taken at all times to prevent and suppress fires. The permittee shall be held responsible for suppression costs for any fires on public lands caused through negligence of the permittee or his authorized representatives. No burning shall be allowed without specific permission.

p. Improvements such as fencing, reservoirs, or other improvements within the permit area shall not be disturbed unless prior written approval is obtained from the District Commander. Any improvement disturbed shall be left in its original condition, as determined by the District Commander.

q. The permittee shall be responsible for cleaning up all camp and work sites before leaving the area. Caution shall be taken to prevent littering and pollution on public lands or on adjoining properties. Refuse shall be carried out and deposited in approved disposal areas.

r. In the event that the land in question is under lease or outgrant to a third party, the permittee shall obtain approval and permission from the third party and shall fully compensate the third party for damages caused by the activities of the permittee.

s. The District Commander reserves the right to terminate this permit at any time.

t. Possession or use of firearms on the permit area is prohibited.

u. The United States shall not be responsible for damages to property or injuries to persons which may arise from or be incident to the use and occupation of the said premises, or for damages to the property of the permittee, or for injuries to the person of the permittee (if an individual), or for damages to the property or injuries to the person of the permittee's officers, agents, servants, or employees, or others who may be on said premises at the invitation of any one of them, arising from governmental activities, and the permittee shall hold the United States harmless from any and all such claims except for claims arising out of the negligence or willful misconduct of the Government.

v. **SPECIAL CONDITIONS**, as marked X in appropriate box on attached sheet.

9. PRELIMINARY REPORT: Within approximately 10 weeks of the conclusion of field work a preliminary report illustrated with representative photographs and listing new and significant collected materials should be furnished to the District Commander.

IN WITNESS WHEREOF: I have hereunto set my hand by the authority of the Secretary of the Army.

Date OCT 17 2016

Amanda Dethman

AMANDA DETHMAN
DISTRICT CHIEF OF REAL ESTATE
REAL ESTATE CONTRACTING OFFICE

SPECIAL CONDITIONS

☒ A. This permit shall not be exclusive in character, and there is hereby reserved unto the Government the right to use, lease or permit the use of said land or any part thereof for any purpose.

☒ B. Other institutions may be engaged in archaeological research in the general area covered by this permit, and in case there should be conflict with respect to a site not specifically designated in a permit, the parties concerned shall reach agreement between themselves as to which shall work the site.

☒ C. Transportation in Department of the Army vehicles cannot be furnished, except in cases where no extra expense to the Department is involved.

☒ D. All costs shall be borne by the permittee.

☒ E. The exploration or excavation of any Indian grave or burial ground on lands under the jurisdiction of the Department of the Army is restricted solely to qualified archaeologists.

☒ F. All excavated areas shall be restored by filling in the excavation and otherwise leaving the area in a near to original condition as practicable.

☒ G. The permittee shall conduct all operations in such a manner as to prevent the erosion of the land, pollution of the water resources, and damage to the watershed, and to do all things necessary to prevent or reduce to the fullest extent the scarring of the lands.

☒ H. Any findings of mined or processed precious metals or other treasure trove in the area covered by this permit are the exclusive property of the Government and shall not be removed from the site without specific written permission from the Department of the Army.

☒ I. Copies of the final report, accompanied by a completed Defense Technical Information Center (DTIC) report, SF Form 298, will be submitted to the District Commander

☒ J. Before undertaking any work on lands administered by the Department of the Army, clearances should be obtained from the official in charge of the area

☒ K. Before undertaking any work on Indian tribal lands or any individually owned trust or restricted Indian lands, clearance should be obtained from the Bureau of Indian Affairs official having immediate jurisdiction over the property.

From: Hier, Benjamin F NWP
To: Leclerc, Elizabeth
Subject: Fw: USAF SERE Survey ARPA Permit
Date: Friday, October 28, 2016 6:28:20 PM

Sent from my BlackBerry 10 smartphone on the Verizon Wireless 4G LTE network.
Original Message
From: Gauthier, Tara R NWP <Tara.R.Gauthier@usace.army.mil>
Sent: Friday, October 28, 2016 2:48 PM
To: Hier, Benjamin F NWP
Subject: RE: USAF SERE Survey ARPA Permit

Ben,

Consider the amendment to the ARPA permit approved.
You can use this e-mail as confirmation.

Tara R. Gauthier
Archeologist
US Army Corps of Engineers, Portland District
Planning, Programs and Project Mgt. Division
333 SW First Avenue
Portland, OR 97204
(office) 503-808-4754

-----Original Message-----
From: Hier, Benjamin F NWP
Sent: Friday, October 28, 2016 1:54 PM
To: Gauthier, Tara R NWP <Tara.R.Gauthier@usace.army.mil>
Subject: FW: USAF SERE Survey ARPA Permit

Best Regards,

Ben Hier
Realty Specialist, U.S. Army Corps of Engineers
Chief Steward/Executive Vice President, NFFE FL 7/IAMAW
Portland District
503-808-4669

-----Original Message-----
From: Leclerc, Elizabeth [mailto:Elizabeth.Leclerc@hdrinc.com]
Sent: Friday, October 28, 2016 10:13 AM
To: Hier, Benjamin F NWP <Benjamin.F.Hier@usace.army.mil>
Cc: Degarlais, Jereme R NWP <Jereme.R.Degarlais@usace.army.mil>
Subject: [EXTERNAL] RE: USAF SERE Survey ARPA Permit

Thank you Ben,

Dan Leonard's curriculum vitae is attached. I've also attached an email from the Oregon SHPO adding Mr. Leonard to our state permit for this project. Do I understand correctly that, with approval from the environmental and cultural office, this change can be made effective immediately? Or will we still need the Chief of Real Estate to sign off?

Regards,

Elizabeth Leclerc,
D 720.633.7088 M 207-479-5601
hdrinc.com/follow-us

-----Original Message-----
From: Hier, Benjamin F NWP [mailto:Benjamin.F.Hier@usace.army.mil]
Sent: Friday, October 28, 2016 9:28 AM
To: Leclerc, Elizabeth
Cc: Degarlais, Jeremie R NWP
Subject: RE: USAF SERE Survey ARPA Permit

Liz,

Here is what I received from our environmental and cultural office:

The person mentioned below was not included in the submittal.

If the applicant could provide us with Dan Leonard's vita, demonstrating that he is a qualified archeologist that meets Secretary of Interior Standards, we can add that to our files. I don't think we need to re-consult or re-issue the permit. We could just send them an e-mail to the effect that we've been notified of the staff change and that the new person meets standards.

Best Regards,

Ben Hier
Realty Specialist, U.S. Army Corps of Engineers Chief Steward/Executive Vice President, NFFE FL 7/IAMAW Portland District
503-808-4669

-----Original Message-----
From: Leclerc, Elizabeth [mailto:Elizabeth.Leclerc@hdrinc.com]
Sent: Thursday, October 27, 2016 11:15 AM
To: Hier, Benjamin F NWP <Benjamin.F.Hier@usace.army.mil>
Subject: [EXTERNAL] RE: USAF SERE Survey ARPA Permit

Mr. Hier,

Thank you for looking into this. Please let me know what information we need to provide. If possible, we'd like to have everything lined up so that the Chief of Real Estate can review and approve the addition when she returns, so that we can do our field work as soon as possible at the end of November or early December.

Regards,

Elizabeth Leclerc,
D 720.633.7088 M 207-479-5601
hdrinc.com/follow-us

-----Original Message-----
From: Hier, Benjamin F NWP [mailto:Benjamin.F.Hier@usace.army.mil]
Sent: Thursday, October 27, 2016 12:28 PM
To: Leclerc, Elizabeth
Subject: RE: USAF SERE Survey ARPA Permit

I am not sure. Have to check with our environmental and cultural people. Please be aware, the Chief of Real Estate is out of the office for a few weeks and we would have to wait until she returns in order for her to review the new one and then re-send. So, to answer your question if we can it may be several weeks before we can issue a new ARPA Permit.

Best Regards,

Ben Hier
Realty Specialist, U.S. Army Corps of Engineers Chief Steward/Executive Vice President, NFFE FL 7/IAMAW Portland District
503-808-4669

-----Original Message-----
From: Leclerc, Elizabeth [mailto:Elizabeth.Leclerc@hdrinc.com]
Sent: Wednesday, October 26, 2016 12:33 PM
To: Hier, Benjamin F NWP <Benjamin.F.Hier@usace.army.mil>
Subject: [EXTERNAL] USAF SERE Survey ARPA Permit

Mr. Hier,

We received the ARPA permit for the USAF's SERE training cultural resources survey in the mail earlier this week. Thank you for working to conclude that part of the process. Due to some scheduling constraints, we may need to add another of our project managers, Dan Leonard, to the permit as field director. Wayne Glenny, the Principal Investigator, is currently the only individual listed on the permit and he may not be able to direct the fieldwork himself. What is the process for adding someone to the ARPA permit, and about how long would you expect it to take? We would like to do fieldwork in the middle of November if possible.

Thank you,

Elizabeth

Elizabeth Leclerc,

Archaeologist

HDR

530 Front Ridge Road
Penobscot, ME 04476]
D 720.633.7088 M 207.479.5601
Elizabeth.Leclerc@hdrinc.com

hdrinc.com/follow-us <BlockedBlockedhttp://hdrinc.com/follow-us>

Meeting Minutes

Project:	SERE Training EA, Tillamook, OR and Forks, WA
Subject:	Field schedule and scope of studies
Date:	Tuesday, November 08, 2016
Location:	Conference call

Attendees:	HDR	Grand Ronde
	Wayne Glenny (Principal Investigator)	Briece Edwards
	Elizabeth Leclerc	Chris Bailey
	Harriet Seacat	Jessica Curteman

	Topic
1	Introductions. Mr. Edwards invited a couple staff from his office, Chris Bailey and Jessica Kurdeman, who could become involved in review of the project. Ms. Leclerc introduced Mr. Glenny, who took over as Principal Investigator after Dr. Edwards left HDR. (Ms. Seacat joined the call later).
2	Background. Ms. Leclerc called Mr. Edwards the previous week regarding the field schedule and to arrange a time for the team to come to Grand Ronde for an orientation and to review the Grand Ronde's site data for the region. At that time, Mr. Edwards indicated that due to the delay in getting the field work accomplished, he would be looking for additional studies in regards to TCPs. Ms. Leclerc mentioned the research design had already been finalized, but it did include consideration of the potential for impacts on TCPs in the surrounding Bay Area, per the Grand Ronde's comments on the draft research design. Mr. Edwards did not have time to go into this further and requested to talk further the following week.
3	Mr. Edwards discussed how the landform is a storied landscape and is featured in several oral traditions and stories. He described it as a place where people would be sent to contemplate the world. He also discussed that the landform is in a "viewshed hotzone" with line-of-sight to many other TCPs in the area. This line-of-sight gives the landform additional significance. At this time, Ms. Seacat from HDR joined the call. Mr. Edwards elaborated that the spit is a dynamic landform and that geoarchaeological understanding is needed regarding its development and change over time. Geological coring is needed to anchor this "storied landscape" in real time—in other words, to provide chronological context for the oral traditions that reference the creation and instances of change to this landscape. This type of work is being done elsewhere in Oregon, such as the Willamette Valley.
4	Ms. Leclerc summarized the aspects of the research design that currently address TCPs, including viewshed

analysis and expanded background research to identify potential TCPs or sacred areas around the bay that have line of sight to the project areas. She also discussed how geomorphology of the Bayocean Peninsula is being addressed as a research question in the current study, with background research establishing development of the peninsula and changes over the last several centuries. Through this research HDR has been able to establish general dates for the development of the spit. Mr. Edwards stated most of this research was done before scientific understanding of the regular and ongoing tectonic and isostatic influences on the Oregon coast and is out of date or not applicable. New research is needed. He mentioned the work of Connelly and that he could put us in touch with Loren Davis, a geologist familiar with this kind of work. Ms. Seacat asked whether the stories about the landscape were well documented or whether some of these may need to be collected. Mr. Edwards then discussed the collection of Tillamook myths, *Tillamook Tales,* which is unique because a Tillamook elder woman shared them with a female ethnographer, and as such would have shared details that would not have been shared with a male. However, the tales were also sanitized when they were presented in the published collection. The Grand Ronde have recently completed a "story map" tracing the geography of the story of South Wind, who created the Bayocean Peninsula during his journey up the Oregon coast.

5 Mr. Glenny discussed that what Mr. Edwards is suggesting is outside the scope of the study and that he does not believe it is needed in order to meet the identification and evaluation requirements under Section 106. Mr. Edwards stated that if we want to get into the regulations, we can talk about mitigation—that is, that mitigation would be needed for future impacts as well as impacts over previous years of activity. This type of study would fulfill that need. Ms. Leclerc agreed this type of study would be more appropriate in the context of mitigation than in the context of identification and assessment, but that no adverse impacts have yet been established. If the present survey determines there would be adverse effects and mitigation would be needed, then perhaps this could be an avenue explored at that time in consultation with the Air Force. Mr. Edwards agreed with this. Ms. Seacat asked whether, from the tribal viewpoint, older sites have more significance.

6 Mr. Edwards shared some additional information related to the study. Place is part of the significance of a site, but so is the length of time. Sites that have survived time, including struggles such as disease vectors and relocation, have a perceived weight to them, or a greater significance. Mr. Edwards expressed concern about archaeologists not having prior experience on the Oregon coast, especially regarding the identification of grave goods where human remains may no longer be present. He would like to ensure archaeologists are familiar with such items as dentalium, mollusks, blue beads, and funerary objects. He also expressed concern about archaeologists including Native American perspectives in their reports and giving justice to those perspectives. Ms. Leclerc briefly discussed HDR's ethnography program and experience with doing the type of writing that Mr. Edwards was referring to. The research team has copies of the Tillamook ethnography and *Tillamook Tales*. Ms. Leclerc introduced Ms. Seacat, new to the team, who explained her experience in ethnohistory, ethnography, and archaeology in regards to Northwest Coast tribes on the Washington coast, which included aspects related to burials. Mr. Edwards was glad to learn of her experience and inclusion in the team. He also expressed that he was glad that the team seems to be recognizing the spit as an important place.

7 The group discussed scheduling so that HDR could view the story map and other GIS data the tribe has about the area, receive an orientation about the area and human remains, and discuss places around the bay that are connected to the peninsula and how they might be affected. The group decided on a meeting time and place during the field work. (Note, this schedule was later changed based on schedule conflicts).

Meeting Minutes

Project:	SERE Training EA, Tillamook, OR and Forks, WA
Subject:	Field work results at Bayocean Spit and Grand Ronde tribal perspectives
Date:	Friday, December 09, 2016, 4:00 pm to 5:30 pm
Location:	Grand Ronde archaeology office

Attendees:

HDR
Daniel Leonard, Field Director
Elizabeth Leclerc
Harriet Richardson Seacat

Grand Ronde
Briece Edwards, Cultural Resources Director
Chris Bailey, Cultural Resources Protection
Jessica Curteman, Senior Archaeologist

	Topic
1	Greetings and introductions between Briece Edwards of Grand Ronde and HDR representatives Daniel Leonard, Elizabeth Leclerc, and Harriet Richardson Seacat. Mr. Edwards started the conversation by showing HDR archaeology staff a map demonstrating sea level rise over the last 20,000 years. Mr. Edwards emphasized that the Tillamook Bay area would have been in the interior rather than along the coastline for most of this time and said this would factor into the rest of the conversation.
2	Mr. Edwards and HDR staff joined Grand Ronde staff Chris Bailey and Jessica Curteman. Mr. Edwards inquired about HDR's field results. HDR staff summarized that no historical or prehistoric cultural materials were located in the APE during the survey. No evidence of the previously identified shell mound [31TI104] was found extending into the APE. HDR staff explained that a cobble fill was evident at the Helicopter Landing Site and nearby camp areas and that no cultural layers were found beneath. Mr. Edwards indicated that the construction of landing and camping pads was logical. He also conveyed that tsunamis have been known to bring in cobble fill.
3	Mr. Edwards discussed beeswax and porcelain points as unique cultural artifacts that could be found in shell midden sites such 31TI104. He explained that the wax was recovered from shipwrecks and transported via overland routes. The wax was a commodity for tribes, as tribal people knew where to obtain the wax, and they traded it with Euroamerican visitors and settlers. Mr. Edwards informed HDR staff that Scott Williams of the Washington Department of Transportation has researched the transportation of the wax in the area. Mr. Edwards also indicated that he is aware of the remnants of fish weirs on the bay side of Tillamook Spit, near the Helicopter Landing Site. He suggested the cobble fill might have been brought in to protect those features.
4	Mr. Edwards explained that the Tillamook Spit [Bayocean Spit; Bayocean Peninsula] is important to

both coastal and inland tribes. He stated that, for coastal tribes, it represents South Wind's and for inland tribes, Coyote's penis. Mr. Edwards pointed out the significance of a landscape known as the genitalia of prominent characters in tribal stories. He further indicated that the South Wind story implies punishment for South Wind's actions and encourages reflection on those deeds. He emphasized the spit as an important place—because of being named and identified and due to the actions related to the place.

5 Referencing a geospatial database and map created in ArcMap, Mr. Edwards discussed the viewsheds and spatial relationships in the area surrounding Tillamook Bay, which he described as a "big bowl." He related that two villages were located at Garibaldi on a historical map. He also pointed out the location of nineteenth-century settlement areas recorded by surveyors, including a winter camp in an inland location southeast of the bay and a summer camp on the bay's edge. Mr. Edwards explained that people hunted where they could see their village and vice versa. He elaborated that the higher the numbers of resources (e.g. hunting areas, gathering areas, named places) visible from a location, the more probable a site exists there and the more significant that site is. He took for example a ridge south of the bay, explaining that it had all the elements of a significant place due to its long-range views. Mr. Leonard summarized by stating that the viewsheds are very important in predicting sites, to which Mr. Edwards agreed.

6 In regards to the spit, Mr. Edwards mentioned that two sites are recorded in the northern portion. Ms. Seacat explained that there were two mounds recorded in the state site files but on-the-ground observations indicated there may be a third mound. Mr. Edwards explained that when a person died, the family would abandon the immediate area and relocate a few hundred feet, implying that a new mound nearby would then be created. Eventually, after a few generations, the family might return to the first mound location because it was usually more favorable. Mr. Edwards pointed out on the GIS map that from the location of the mounds on Tillamook Spit, 183 ethnographic places and 195 faunal resources are visible. These numbers indicate the favorability of these locations as settlements. Mr. Edwards stated, "The interconnectivity of this landform outward is *huge*." He then mentioned the Octopus Tree at Cape Meares south of Tillamook Spit. He explained that octopus trees are culturally modified trees that can be directional markers, indication of burials, or story waypoints. He also related that the tree at Cape Meares could also be a demarcation between two groups of people belonging to different language groups (Nehalem and Nestucca).

7 Mr. Edwards conveyed that Tillamook Bay was one of the last places where northern Oregon coast tribes came together. These tribes were "untreatied" (they signed treaties that were never ratified by the U.S. Congress). He explained that the safest thing for the tribes to do, given the influx of settlers and other changes in the settlement period, was to convene together for protection. These tribes, including among their numbers the daughter of Chief Kilchis, scraped money together to buy Hobsonville Point. The point, Mr. Edwards continued, was an important place even before the purchase. Emphasizing its proximity to the SERE project area, he stated that it is a 45-minute canoe ride between Hobsonville Point and the Helicopter Landing Site (less at an outgoing tide). Mr. Edwards then summarized the long-term human habitation of the area, saying first there was the midden, then the 1850 village, then Hobsonville Point [ca. 1870s to 1910s], and then Bayocean.

8 Mr. Edwards indicated that human habitation is not just indicated in the immediate cultural materials in an area but is also evidenced by use of resources in a broader area. These resources were not just hunted and gathered--they were managed. He referenced the management of cedar trees for their bark and described that such use is like farming: seasonal work with lots of labor and appropriate timing. He emphasized that it was a “large operation” and listed the various activities that might occur in an area: cedar bark harvesting, use of hunting and gathering areas, modification of trees such as the Octopus Tree, and use of game drives such as one on Onion Peak. He explained that in this way, places on a landscape are intertwined and inseparable.

9 Returning to the field results, HDR staff explained to Grand Ronde staff that on the beach, modern cultural materials such as plastic combined with wood were documented to 100 cm below surface. Ms. Curteman then cautioned against using wood as diagnostic of a time period, since wood does not decompose as readily on the Oregon coast as in other areas. Ms. Seacat clarified that the wood was found in combination with plastic, and Mr. Edwards said he would interpret that as diagnostic (of modern deposition).

HDR staff then related the identification of some bits of shell within the cobble “fill” at the Helicopter Landing Site. Mr. Leonard explained that no anthropogenic soils or deep concentrations were identified in those tests, however, and that the HDR field team surmised the shell to be associated with the filling episodes. Mr. Edwards asked whether it was clam or oyster shell; HDR staff returned that it was clam. Mr. Edwards conveyed that the type of shell is important and, if related to a site, can indicate status. He explained that oyster was a slave food, while clams were a higher status food.

Returning more directly to discussion of the cobble fill, Mr. Edwards went on to explain that the Oregon coast, including Tillamook Spit, has been formed from multiple, overlapping processes, such as beach formation along the water’s edge, erosion, flooding, dredging, subsidence, uplift/rebound, and tsunami deposits. He reasoned that cobble fill at the Helicopter Landing Site could be a result of the depositing of dredge spoil or of uplift caused by fault activity. He mentioned that Tom Connelly’s geomorphological work at Seaside could be analogous—not necessarily directly so but in terms of the nature of geologic complexity.

10 Returning to the subject of sea level rise over time, Mr. Edwards related that the stories associated with Tillamook Spit might have originated westward from the present spit location. He explained that Oregon has some of the earliest examples of human habitation in North America, citing evidence at Paisley Cave that dates to 14,500 years before present. He related that Paisley Cave was occupied at the same time the Willamette Valley was filling in. The Valley experienced multiple episodes of flooding and in-filling, related to the breaching of an ice dam at Missoula. Mr. Edwards explained that the breaching of the ice dam was signified in the story of Beaver’s dam breaking apart. The Willamette Valley, he summarized, as with the coast, is a layered landscape.

Going back to Tillamook Bay, Mr. Edwards indicated that the bay was an interior valley 20,000 years ago. At 14,500 years before present, the sea level was about 15 miles west of the spit. The group conjectured on what the landscape may have been at that time. Mr. Edwards indicated the spit was formed about 4,000 years before present, as sea level rise inundated the river valley. To

view more recent changes to the area, Mr. Edwards and Ms. Curteman recommended HDR staff examine aerials stored at Oregon Department of Transportation and the University of Oregon at Eugene, some of which are cataloged digitally.

11 Ms. Seacat asked if the cobble fill would be considered protective of buried cultural materials, if they were to exist buried beneath the fill. Mr. Edwards responded that the fill could be seen as a protective layer; it meets the immediate needs for protection of the site area, if USAF activities were to intrude on it. This could protect against direct impacts. He also expressed that the fact the beach area is modern to at least 100 cm below surface is great to hear; the Elders concerned with activities in this area will likely be heartened to know this.

Mr. Edwards stated he does have concerns related to the impact of road maintenance on the shell midden [Site 35TI104]. Ms. Leclerc mentioned that artifacts were visible eroding from the midden into the road. Mr. Edwards stated the Grand Ronde plans on discussing this issue with Tillamook County.

12 Ms. Leclerc asked what Mr. Edwards thought regarding indirect impacts from the Air Force activities. Mr. Edwards explained that even though the spit has changed over time and partially consists of newly accreted beach and other areas that may not have existed for a long period of time, the new areas are still part of the important landscape known as Tillamook Spit. It's still the same place in the tribal view. [This relates to a point made by Mr. Edwards earlier in the meeting, that stories and interactions with landscapes can change over time—but the places remain significant.] He indicated he would need to discuss the possibility of indirect impacts with Elders. He said such a discussion would be difficult in part because of the nature of certain activities (digging and using latrines in a culturally significant landscape) but also because the activities have been going on for years and, during that time, impacts have not been assessed. Mr. Edwards was interested in exploring how USAF personnel might be engaged in documenting impacts on the area, documenting changing conditions over time, or other similar projects while they are on-site but not directly engaged in supporting training efforts.

Ms. Seacat summarized visible evidence the survey team noted from previous training events, such as fire pits, burnable and non-burnable debris relocated to the camp areas from the surrounding beaches, and the oyster and clam caches located at some camp areas. Mr. Edwards characterized such impacts as light, explaining that all of the noted materials are biodegradable. He further reasoned that the Air Force activities, including latrine-digging, were very similar to those that have gone on there for all the years humans have utilized the area. Tribal concerns, he explained, would relate more to the identification of inadvertent discoveries, such as long bones, long houses, etc.

13 Returning briefly to the fish weir discussion, Ms. Seacat and Mr. Leonard both indicated they noted posts going out a fair distance into the bay. Mr. Edwards related that there are only two natural channels in the bay, one near the southern beachline and one a bit north of center. He conveyed that plank walks were built into the bay in order to launch boats into those channels.

14 The meeting concluded at 5:30 PM.

Appendix D. Resources in the Tillamook Spit Cultural Landscape

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Table C-1. Tribal Resources in the Tillamook Spit Cultural Landscape. Note that the Map ID column serves as a key to the locational points found on **Figure 20**, in **Section 6.2.2** of the report.

Map ID	Type	Number/Name	Description and Locational Notes
1	Story Event, Myth Age	Hill above Bay City	Featured in "Yeyell, the Man Who Became an Elk," an old man became an elk and was driven to the "hill above Bay City" (Jacobs 1990:29); The highest and most distinct rise near the settlement, the peak of Doty Hill, is identified as the possible pasturage to which Yeyell was first driven
2a, 2b	Story Event, Transformation Age	Creek This Side [North] of Bay City	South Wind saw a girl taking a bath in the "creek this side of Bay City" (Deur and Thompson 2008:17; Jacobs 1990:124); Considering that Jacobs' Tillamook consultant spoke from Garibaldi, the modern-day outlets of Patterson Creek (2a) and Larson Creek (2b) are both marked as the possible creek where the girl stood
3	Story Event, Transformation Age	Tillamook Spit (Bayocean Peninsula)	South Wind's penis, which had been inserted into the girl in the creek north of Bay City, was "left lying to form the sandbar" (quote in Deur and Thompson 2008:18; see also Jacobs 1990:124); The entire, modern-day spit is demarcated as this story event location
4	Story Event, Transformation Age	Tillamook River	South Wind made flounders more prevalent in the Tillamook River than salmon and created sandbars at the river's mouth (Deur and Thompson 2008:18); The mouth of the Tillamook River is marked as the approximate location of these two story events
5	Story Event, Transformation Age	Kilchis River	When roasting salmon he caught in the Kilchis River, South Wind began to hum a song with his eyes closed (Deur and Thompson 2008:18); Upon opening them, the salmon was dancing, but when he hummed again and reopened his eyes, the salmon was gone; The mouth of the Kilchis River is marked as the approximate location of this story event
6	Story Event, Transformation Age	Rock at Bay City	South Wind transformed an old woman into the "rock right there at Bay City," on which people would "sharpen their knives" (Deur and Thompson 2008:18-19; Jacobs 1990:125-126); Following Deur and Thompson (2008:n26), Sandstone Point is marked as the general location of this story event
7	Story Event, Transformation Age	Camas Field at Bay City	South Wind tossed uneaten camas received from the old woman to Bay City, among other places, to form a camas field (Deur and Thompson 2008:19; Jacobs 1990:126); The geographic center of the 1930s settlement concentration at Bay City is marked as the location associated with this story event that falls within the cultural landscape
8	Story Event, Transformation Age	Kilchis Point	At Kilchis Point, South Wind copulated with the girl who had a portion of his penis inside of her (Deur and Thompson 2008:20-21; Jacobs 1990:126-127); Kilchis Point is identified as the location of this story event
9	Story Event, Transformation Age	Bay City	In Bay City, South Wind poured oil out of a cockle and thought clams should have water and be lean in the spring and then tricked a woman into rubbing a clam digger made from his transformed penis (Deur and Thompson 2008:21; Jacobs 1990:127); The geographic center of the 1930s settlement concentration at Bay City is identified as the approximate location of this story event

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Map ID	Type	Number/Name	Description and Locational Notes
10, 11	Story Event, Transformation Age	Right by Bay City / Halfway between Hobsonville and the Point at Bay City	South Wind tricked Flint and Copper into fighting at the halfway point between Hobsonville and the Point at Bay City so South Wind could obtain flakes to process a whale he found "right by Bay City" (Deur and Thompson 2008:22; Jacobs 1990:124-125); The shoreline near the mouth of Patterson Creek (10) is marked as the approximate location of the beached whale; The halfway point (11) is approximated as the geographic middle point between Hobsonville Point and Sandstone Point
12	Story Event, Transformation Age	River near Garibaldi	South Wind tricked a family by turning into a crying baby (Deur and Thompson 2008:22-23; Jacobs 1990:127); Once held by the young woman of the family, he felt inside her skirt to her genitalia; When she dropped him into the water in disgust, he became himself again and fled; The mouth of the Miami River is marked as the approximate location of this story event
13, 14	Story Event, Transformation Age	Old Garibaldi / In the Water between Garibaldi and Barview	South Wind encountered two sets of females near Garibaldi: In Old Garibaldi, two women intended to make him impotent through a spell, but South Wind suspected them and they gave up; Further on, South Wind made love to two girls, who pulled him underwater and nearly drowned him before freeing him near Barview (Deur and Thompson 2008:23; Jacobs 1990:128); Old Garibaldi (13) is approximated at the 1887 settlement of Garibaldi and the water travel is represented as a line between the 1887 settlement of Garibaldi and Green Hill, near Barview (14)
15	Story Event, Transformation Age	Steep Bluff and Rock Cove at Barview	South Wind freed himself from a rock cove he wished into creation at Barview (Deur and Thompson 2008:23-25; Jacobs 1990:128-130); Deur and Thompson (2008:Footnote 39) note that the bluff and cove are still located at Barview and are featured in other Tillamook stories as "supernatural beings turned to stone"; The western slope of Green Hill (15) is approximated as the location of this story event
16, 17	Story Event, Period of True Happenings	Flower Pot / Tillamook Spit	Featured in the story titled "Wild Woman," in which the children of several families living at Flower Pot are staked and roasted by Wild Woman; Some relocated to Tillamook Spit, "a summer place for drying clams" (Jacobs 1990:158-160), while one of the fathers waited for Wild Woman; When she appeared, he burned her and joined his family on the spit; Afterward, Flower Pot was abandoned (Jacobs 1990:158-160); A general point at Flower Pot (16) and the entire, modern-day spit (17) are marked in association with this story
18	Settlement	Nəsxəwəqᵇan	Approximate location of the mid-nineteenth century village of Nəsxəwəqᵇan (approximately Garibaldi) (Seaburg 2003:Map 3)
19	Settlement	Kil-har-hurst	Approximate location of the mid-nineteenth century village of Kil-har-hurst (approximately East Garibaldi) (Seaburg 2003:Map 3)
20	Settlement	Nəsga-ga-ɬ	Approximate location of the mid-nineteenth century village of Nəsga-ga-ɬ (approximately Hobsonville) (Seaburg 2003:Map 3)
21	Settlement	Nəsxenus	Approximate location of the mid-nineteenth century village of Nəsxenus (approximately Bay City) (Seaburg 2003:Map 3)
22	Settlement	Distənəqs	Approximate location of the mid-nineteenth century village of Distənəqs (north of Goose Point) (Seaburg 2003:Map 3)
23	Settlement	Kil-har-nar	Approximate location of the mid-nineteenth century village of Kil-har-nar (approximately Kilchis Point) (Seaburg 2003:Map 3)

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Map ID	Type	Number/Name	Description and Locational Notes
24	Settlement	Cohələʔəqs	Approximate location of the mid-nineteenth century village of Cohələʔəqs (possibly inland of Kilchis Point) (Seaburg 2003:Map 3)
25	Settlement	Nəxeinəgi	Approximate location of the mid-nineteenth century village of Nəxeinəgi (approximately mouth of Kilchis River) (Seaburg 2003:Map 3)
26	Settlement	Chish-ucks	Approximate location of the mid-nineteenth century village of Chish-ucks (approximately east side of Tillamook River at mouth) (Seaburg 2003:Map 3)
27	Settlement	Thu-qa-tən	Approximate location of the mid-nineteenth century village of Thu-qa-tən (inland from mouth of Hoquarton Slough) (Seaburg 2003:Map 3)
28	Settlement	Chuck-tins	Approximate location of the mid-nineteenth century village of Chuck-tins (inland from mouth of Tillamook River) (Seaburg 2003:Map 3)
29	Settlement	Skənəyiwəs	Approximate location of the mid-nineteenth century village of Skənəyiwəs (approximately Cape Meares) (Seaburg 2003:Map 3)
30	Settlement	35TI006	Three houses documented as affiliated with the last group of Nehalem Tillamook families in Garibaldi; One lithic flake and one obsidian point found in association; No future work recommended (site form mostly legible) (Oregon SHPO, Recorded by Lloyd R. Collins, 1951); Located in Hobsonville, at approximate location of Nəsga-ga-ɬ
31a, 31b	Settlement	35TI007 / Kil-har-hurst	Tillamook-affiliated archaeological site consisting of the remains of Kil-har-hurst's town of Kil-a-mox, including a shell midden and lithic scatter; Noted as disturbed by railroad construction at the time of original recordation in 1951; In a 2015 update, site was threatened by road improvements; Unevaluated NRHP status; Village of Kil-har-hurst (Oregon SHPO files)
32a, 32b	Settlement	35TI009 / Kilchis Point	Tillamook-affiliated archaeological site composed of shell midden and at least one house pit; Site destruction pending at time of recordation and excavation recommended (site form nearly illegible) (Oregon SHPO, Recorded by Lloyd R. Collins, 1951); Noted as one of three major sites recorded by Collins (1953:59) in Tillamook County, where he recorded a total of 30 sites; Possibly the village of Kil-har-nar, as derived from Seaburg (2003:Map 3)
33	Shell Midden	35TI010	Tillamook-affiliated archaeological site composed of shell midden; Charcoal, fire-cracked rock, burnt sand, animal faunal remains, firepits, and lithic flakes and scraper(s) recovered in association; Site disturbed by collectors and road construction (site form barely legible) (Collins 1953; Oregon SHPO, Recorded by Lloyd R. Collins, 1951)
34	Shell Midden	35TI011	Tillamook-affiliated archaeological site described as a shell midden with animal faunal remains and fire-cracked rock in association; Site disturbed by collectors and road construction; Excavation not recommended (Collins 1953; Oregon SHPO, Recorded by Lloyd R. Collins, 1951)
35	Lithic	35TI012	Tillamook-affiliated archaeological site composed of midden (no reference to shell) and lithics; Disturbed by road construction; Unevaluated NRHP status (site form barely legible) (Oregon SHPO, Recorded by Lloyd R. Collins, 1951)

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Map ID	Type	Number/Name	Description and Locational Notes
36	Shell Midden	35TI013	Tillamook-affiliated archaeological site composed of "moderately packed" shell midden with lithic flakes in association; Excavation recommended (site form mostly legible) (Oregon SHPO, Recorded by Lloyd R. Collins, 1951)
37	Settlement	35TI060 / Patterson Creek	Tillamook-affiliated archaeological site described as a large permanent village site, situated along Tillamook Bay on both sides of Patterson Creek composed of shell lenses and with stemmed and leaf-shaped projectile points, a pestle, and "flat stone with polished surface" (possible mortar) in association; Diagnostic artifacts and features date to the Late Archaic and Early Historic; Graveyard dating ca. 1850 to 1880 and on a hill above the village site possibly in association; Site covered with fill and endangered by proposed development at the time of recordation; Reported by collectors/Insufficient data collected to surmise NRHP status (Oregon SHPO, Recorded by John Woodward, 1994); Possibly the village of Nəsxenus, as derived from Seaburg (2003:Map 3)
38	Shell Midden	35TI079 / Cape Meares Lake Site	Native American-affiliated archaeological site of an unknown time period described as a large shell midden along the southern shores of Cape Meares Lake with evidence of shellfish gathering, mammal hunting, lithic tool creation, and food processing; Fire-cracked rock, animal faunal remains, green and other chert flakes, charcoal, and cockle, gaper clam, butter clam, and bay mussel shell were noted on the ground surface and eroded areas of the site; Considered NRHP-eligible (Oregon SHPO, Recorded by Robert Losey and Jon Erlandson, 1999)
39	Subsistence	35TI090	Pre-contact archaeological site consisting of an abundance of lithics, fire-cracked rock, and animal faunal remains; Domestic historical artifacts, such as glass, ceramics, metal, and structural materials, were dumped at the site after abandonment; Test excavations performed between 2007 and 2009 determined that the site functioned as a long-used subsistence base camp abandoned following a tsunami around 1700 and found the site NRHP-eligible (Oregon SHPO, Recorded and updated by Becker, 2007 and 2009)
40	Subsistence	35TI098	Pre-contact fishing weir (Oregon SHPO files)
41	Shell Midden	35TI104	Pre-contact archaeological site described as a camp and shell midden approximately 25.35 m east-west, 6.9 m north-south, and 5 m high with animal faunal remains, a hearth feature, a basalt thinning flake, and cobalt glass in association; Disturbance from weathering, erosion, bioturbation, collectors, and road construction noted; Unevaluated NRHP status (Oregon SHPO, Recorded by Daniel Mulligan, Amy Holmes, and Vanessa van der Borg, Corps, 2012)
42	Settlement	Unidentified Site 01[a] / Icil-har-hurst	Reported archaeological site described as a village known as Icil-har-horst in the vicinity of Garibaldi; Exact location unknown and NRHP status unevaluated (Oregon SHPO files); Possibly the village of Kil-har-hurst, as derived from Seaburg (2003:Map 3)
43	Human Remains	Unidentified Site 02[a]	Location of human remains (found in 2015); Unevaluated NRHP status (Oregon SHPO files)
44	Settlement, Destroyed	Unidentified Site 03[a]	Possible location of destroyed archaeological site described by Sauter and Johnson (1974) as a village site; Location derived from Leland Gilsen's map; Unevaluated NRHP status (Oregon SHPO files)

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Map ID	Type	Number/Name	Description and Locational Notes
45	Lithic	Unidentified Site 04[a]	Isolated find of a cryptocrystalline silicates (CCS) flake; Located during an archaeological survey (Bibliography No. 24740); Considered NRHP-ineligible (Oregon SHPO files)
46	Lithic	Unidentified Site 05[a]	Isolated find of a quartz flake; Located during an archaeological survey (Bibliography No. 18660); Unevaluated NRHP status (Oregon SHPO files)
47	Settlement	Unidentified Site 06[a] / Chishucks	Possible location of a village known as Chishucks; Location derived from Leland Gilsen's map; Unevaluated NRHP status (Oregon SHPO files); Possibly the village of Chish-ucks, as derived from Seaburg (2003:Map 3)
48	Settlement	Unidentified Site 07[a] / Tow-er-quot-ons	Possible location of a village known as Tow-er-quot-ons; Location derived from Leland Gilsen's map; Unevaluated NRHP status (Oregon SHPO files); Possibly the village of Thu-qa-tən, as derived from Seaburg (2003:Map 3)
49	Human Remains	Unidentified Site 08[a]	Location of human remains in shell midden matrix identified from a tree fall; Unevaluated NRHP status (Oregon SHPO files); According to Orcutt (1951:18), a burial ground is extant "on the southwestern shore of Tillamook Bay known as Memaloose Point – Memaloose means place of the dead – where Indian remains have been found. Memaloose has been washed away, near the place known as the "Shipyard;" One informant said it means boat of the dead, and the Pioneer Museum states it was the scene of a battle between the Tillamook and Siletz tribes (Orcutt 1951:247)
50	Subsistence	Clam and crab resources	Current Tillamook Bay locations of harvestable clams and crabs, evidencing likely vicinity of these resources historically; Approximated from ODFW 2015
51	Subsistence	Salmon resources	Current Tillamook Bay area locations of salmon habitat, evidencing likely vicinity of these resources historically; Approximated from ODFW 2014
52	Subsistence/ Transportation	Tillamook Bay	The entirety of Tillamook Bay has long served as a base for settlement, a source for subsistence foods, and a mode of transportation; Approximated from USA Topo Map

a The sites referred to as "Unidentified Site" were not assigned site numbers by the Oregon SHPO.

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