

The following information is part of the Oregon Renewable Energy Siting Assessment (ORESAs). The ORESA project is funded through a \$1.1 million U.S. Department of Defense Office of Local Defense Community Cooperation grant awarded to the Oregon Department of Energy, working with the Department of Land Conservation & Development and Oregon State University's Institute for Natural Resources.

More information is available at <https://www.oregon.gov/energy/energy-oregon/Pages/ORESAs.aspx>



# Oregon Renewable Energy Siting Assessment (ORESAs)

## Supporting Materials

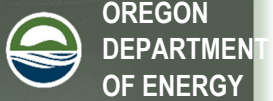
*Please refer to the ORESA Final Report and ORESA Mapping and Reporting Tool for more information and context*

*Final*

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# U.S. Military Mission and Renewable Energy Coordination In Oregon

August 2021



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## Executive Summary

The Oregon Renewable Energy Siting Assessment (ORESAs) project has been funded through a grant from the U.S. Department of Defense (DoD) Office of Local Defense Community Cooperation, administered by the Oregon Department of Energy. Partners in the project include the Oregon Department of Land Conservation and Development and the Oregon State University Institute for Natural Resources.

This document provides the Military Training, Operations, and Compatibility Assessment, with information and guidance to local, regional, and state agencies as well as energy and transmission stakeholders within Oregon, with a specific focus on coordination and consultation with the military present within the state.

The goal of this document is to **foster early coordination** between developers and the military, with the goal of **supporting renewable energy development** while **minimizing impact to the ongoing and future military mission**.

### 1. Foster Early Coordination

Early coordination with the regional military installations is critical in the conceptual planning phase, prior to final selection of the proposed site for a renewable energy generating facility or transmission infrastructure. This will allow the developer and military to discuss options to relocate or reconfigure (i.e., change height or type of structures) in a manner that is cost-effective and would not significantly delay or hamper siting approval of the project.

One of the goals of the Northwest DoD Regional Coordination Team (NW DoD RCT) is to coordinate the review of projects in and around military training areas, discuss/address local, regional, state, and federal challenges and initiatives, and to share information regarding current and future coordination opportunities. The NW DoD RCT should be contacted as early as possible in the renewable energy and transmission planning process (i.e., during the project conceptual planning process prior to site selection).

If a proposed project area is located on or near a DoD installation or training/operating area, a project representative should consult with the appropriate military representative from the installation at or near the proposed site. Two points of contact within the NW DoD RCT are provided in the body of this report.

A detailed plan including a description of the project location, technology, construction activities, infrastructure, and transportation should be prepared prior to consultation with the military representative. This consultation should be conducted early in the project development process, as the military representative has knowledge of the installation activities that may extend well beyond the station boundaries as well as other military groups that may operate in the area. The NW DoD RCT representative can connect renewable energy and transmission project stakeholders with the appropriate Community Planning and Liaison Officer.

Early coordination with the NW DoD RCT represents the first step in an ad hoc consultation process for renewable energy and transmission projects. The NW DoD RCT will provide guidance to stakeholders regarding subsequent coordination and consultations with the military.

## 2. Support Renewable Energy Development

Compatible renewable energy development is critical to preserve military operational capabilities, safeguard the military mission, and protect the overall health, safety, and welfare of the public living near military installations or training and operating areas.

The Oregon Renewable Portfolio Standard requires large utilities to meet at least 50 percent their customer's electricity needs with renewable sources by 2040, and Governor Brown's Executive Order 20-04 establishes a target to reduce greenhouse gas emissions by 80 percent relative to 1990 levels by 2050. These policies along with factors such as voluntary renewable energy demand and declining costs of renewable resources have led to substantial development of renewable energy infrastructure. While development of these resources has led to progress toward meeting state goals, new renewable energy generation plants and transmission lines may pose impacts to the military mission.

Significant concerns relate primarily to the construction of incompatible infrastructure in operating areas, including:

- Renewable energy projects that produce physical and/or visual obstructions within designated flying areas or radar interference;
- Transmission lines, communication towers, or other vertical obstructions that extend into low-level flying areas; and
- Incompatible development that poses a safety risk to residents and military personnel.

DoD recognizes the authority for local land use decisions lies with each permitting agency and seeks to establish a framework for early notification and continued coordination to maintain compatible development throughout Oregon.

## 3. Minimize Impact to Military Mission

Construction and operation of renewable energy generation facilities and transmission infrastructure pose two main categories of conflict with the military mission: physical issues and electromagnetic (EM) spectrum interference. Physical issues arise when renewable energy facilities or infrastructure pose the potential for adverse impacts to military training and operations. EM spectrum interference occurs whenever renewable energy projects disrupt military equipment that utilize radio frequency, infrared, or visual spectra.

Because military installations and military utilized airspace support the complex scope of the DoD mission, the range of interactions between their activities and renewable energy development is also complex and wide-ranging. Certain issues are more prevalent on some installations and off-station operations areas, while others are present at all the military locations. Some conflicts can be mitigated, while others cannot. Each proposed renewable energy facility and its associated transmission infrastructure needs to be evaluated in the context of its specific location in relation to the applicable training and operating areas and the current, and potential future, mission activities occurring in the vicinity of the proposed renewable energy project. The progressive approach of avoidance, reduction, and mitigation to potential impacts to military installations and special use airspace (SUA) operations should be employed in all circumstances. Early identification and communication with appropriate military representatives can result in complete avoidance of adverse impacts early enough in the development process that it can be reasonably accommodated. Even if complete avoidance is not an

option, early identification and communication can result in a development scenario that provides for some degree of the initial project proposal while also sustaining the necessary military training and operating areas. If avoidance and reduction are not feasible options, then specific mitigation concessions by the military and/or the developer may be necessary to ensure the specific mission of the military installation or SUA are not degraded.

#### 4. Lessons Learned

During the ORESA project, lessons learned were gleaned from past renewable energy projects and some that are in development. The information provided draws on overarching lessons in planning for renewable energy projects from collective experiences, common themes, similar lessons learned, and observations that have been repeated in multiple projects. The opinions provided in the lessons learned are the findings of the contractor conducting this review for the ORESA project and do not represent the opinions of the State of Oregon or members of the U.S. military.

- **Communicate project details with the applicable NW DoD RCT representative early in the proposal, and maintain the lines of communication throughout the process.** Through coordination with the NW DoD RCT staff can, if necessary, coordinate with other installations or service commands to participate in reviewing and collaborating on the proposal. The more open and transparent these communications are will lead to greater trust among all parties involved.
- **Be consistent in communications with the DoD entities.** It is important that all stakeholders have access to accurate and current project details (size of structures, location, lighting, etc.). Changes in these details through project development can lead to delays in construction, rejection of some facilities by regulators or stakeholders, and large increases in project costs.
- **Each stakeholder group (local government, project developer, military, etc.) should provide one point of contact for project communications, when possible.** Infrastructure development requires communication with many regulatory agencies, community groups, stakeholder representatives, and military points of contact. Providing one central point of contact for each of the groups involved ensures consistency between all groups and minimizes the chances of not contacting all the needed parties.
- **Stakeholders (including the military) need to provide timely and clear information regarding potential impacts to their missions.** By doing this, all parties involved understand the potential impacts and can have perspective on how planning decisions are made during the project development and operation.

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## Introduction

The Oregon Renewable Energy Siting Assessment (ORESA) project has been funded through a grant from the U.S. Department of Defense (DoD) Office of Local Defense Community Cooperation (OLDCC), administered by the Oregon Department of Energy. Partners in the project include the Oregon Department of Land Conservation and Development and the Oregon State University Institute for Natural Resources.

Key ORESA project objectives are baselining data, information, and perspectives to create a transparent, consistent collection of trusted, accurate information in Oregon, without recommendations or endorsements, and noting where information may be imprecise or uncertain. There are five components to the ORESA project:

1. **Renewable Energy Market and Industry Assessment** – Collect data and model the future opportunity for development of renewable energy generation and transmission infrastructure in Oregon. Develop cost-optimized, renewable energy build-out scenarios for Oregon over the next 15 years. Build an understanding of the challenges and opportunities that exist in the renewable development community in Oregon and identify gaps that could be addressed for Oregon to meet its long-term energy goals.
2. **Military Training, Operations, and Compatibility Assessment** – Collect data and information about current and future military assets, uses, needs, and case studies. Analyze data, protocols, and policies regarding military training and operating areas, including current and anticipated future uses. Note any constraints and opportunities between renewable energy and transmission development and military uses.
3. **Natural Resources, Environment and Development – Opportunities and Constraints Assessment** – Collect data and information regarding the presence of natural, cultural, and environmental resources, as well as, jurisdictional protections, development constraints, and commercial interests. Collect data and information regarding community and economic opportunities with renewable energy development. Build an understanding of renewable energy opportunities and constraints, including regulatory structures and protections vested with Tribal governments and local, state, and federal agencies.
4. **Siting Procedures Review** – Review and analysis of siting regulations, permitting, and project review processes as they relate to notification, identification, and evaluation of potential impacts. Develop summary of siting regulations and process review with feedback from stakeholders. Identify best practices in tools and strategies for engagement and improved coordination.
5. **Mapping and Reporting Tool** – Develop a mapping and reporting tool, housed on Oregon Explorer, with data and information about renewable energy; military training and operational areas; economic development opportunities; land use considerations; natural, cultural, and environmental resources; and other regulatory requirements. The tool should build a more comprehensive understanding of renewable energy and transmission development and support proactive coordination with stakeholders, agencies, local governments, and policymakers in the state. Development of the tool will involve stakeholders to help define use cases and reporting functionality.

This document provides the Military Training, Operations, and Compatibility Assessment, with information and guidance to local, regional, and state agencies as well as energy and transmission stakeholders within Oregon, with a specific focus on coordination and consultation with the military present within the state. To support this effort, this report includes:

- Initial factors and criteria for a decision maker to consider in assessing compatibility;
- Process assessment for DoD stakeholder coordination;
- Root cause analysis of particular areas of concern and interest, including potential mitigation options of constraints for all military assets, and
- Existing military and operational areas.

The goal of this document is to foster early coordination between developers and the military, with the goal of supporting renewable energy development while minimizing impact to the ongoing and future military mission.

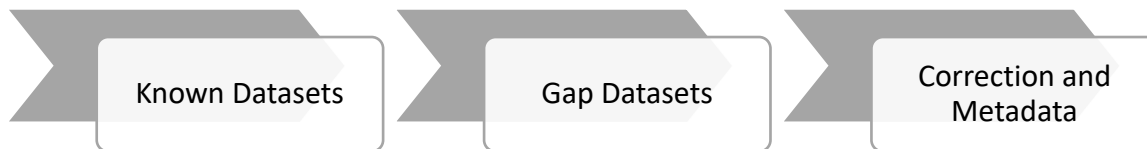
## Data Collection and Assessment Processes

This section provides an overview of the data collection and assessment processes used to develop the military needs and impacts assessment.

To secure a trusted and comprehensive set of key spatial and associated tabular datasets required to evaluate potential conflicts between current and future developments with military mission and DoD areas of concern, military data acquisition and validation was approached in a logical progression from compilation of known authoritative datasets to investigation of potential gaps and/or lesser-known features depicting military activity in Oregon. Known datasets were derived from existing Federal, DoD and military geospatial applications providing planners and operators “Key Installation Planning” (KIP) and/or “Common Operating Picture” (COP) features currently used to manage encroachment and development activities. Potential data gaps were investigated by meeting with active military personnel and DoD civilian representatives within the Northwest DoD Regional Coordination Team (NW DoD RCT) to discover areas of operation, signal analysis, and radar footprints that may not be clearly identified but are just as critical to national security and defense operations.

Prior to collection and aggregation, strict controls were established and acceptable thresholds defined for data quality, integrity, and security. To ensure all analysis, definitions, and information standards necessary for successful delivery were considered, coordination meetings and approach approvals were conducted early on in the collection process with the Oregon Institute for Natural Resources (INR); responsible for the final incorporation of geodata into a comprehensive renewable energy and military notification evaluation tool.

### Methods Employed



### Known Data Sources

Initial Data collection consisted of identifying and securing accurate geospatial features from Authoritative Data Sources (ADS) and comparing depicted features against source documentation, with additional review by key military personnel, and DoD civilian representatives to ensure selected datasets accurately reflect testing, training, and operation spatial footprints in Oregon on-and-offshore regions. While the vast majority of ADS derived features are accurate, occasionally an installation or land-use boundary has minor deviations or updates that the local installation or responsible entity may provide more current layers for, and after validation, those updates are incorporated, and changes documented in metadata and inner layer attributes to reflect modification.



Many sources were used to identify required layers necessary to define potential military constraints or notification areas established to alert key staff when development activity may interfere with military mission. Existing military and DoD systems such as the Mission Compatibility Analysis Tool (MCAT) and Federal Aviation Administration (FAA) Obstruction Evaluation / Airport Airspace Analysis (OE/AAA) tool, and documentation such as Encroachment Action Plans (EAP)s and Joint Land Use Studies (JLUS), employed for encroachment management and land use planning purposes by military personnel, were a primary reference. A list of features was compiled from COP/KIP tables of content and ultimately included:

#### Airspace and Signal

- Air Accident Potential Zone (APZ from AICUZ/RAICUZ)
- Geographic Area of Concern (GAOC)
- Military Training Route Centerline (MTR)
- MTR Corridor
- Noise Zone (NZ from AICUZ/RAICUZ)
- Special Use Airspace (SUAS)

#### Surface

- DoD Locations (Installation boundaries)
- Restricted Area Military Range
- Automatic Identification System (AIS) traffic routes

These known features were later expanded on during the Gap analysis phase with local military layers but ultimately encompassed roughly 98% of the military areas of concern within Oregon.

Once identified, each layer was researched to catalog official authoritative source and common metadata elements such as spatial accuracy, update frequency, and Geographic Coordinate System (GCS). Certain features such as MTRs are derived from multiple originating sources such as the Flight Information Publications (FLIP) and AP/1B and aggregated by the authoritative agency. When instances were found where we could validate accuracy using the original sources, we compared the authoritative data spatial and attribute assignment against acquired features for any discrepancies. Any data standards compliance issues were identified and addressed. Most known layers including metadata, schema, and format standards were reviewed and accepted in its original format by INR staff. Outliers to this review included translating layers to a consistent geospatial projection, verifying positional accuracy, and incorporating into a single ESRI file geodatabase for delivery. Due to security concerns, some features cannot be exposed to the public and these specific datasets were evaluated to determine if existing publicly available features encompass their footprint. Instances where these footprints extended beyond existing public features were addressed by the military with approved buffered layers such as the Boardman GAOC.

#### Data Gaps

After compilation of known datasets, meetings with key personnel from the NW DoD RCT group were conducted to evaluate the totality of geospatial data coverage and definition. Using electronic maps and online GIS applications/systems to discuss and review the datasets, any commentary was captured for potential gaps in coverage or features that may extend beyond the boundaries already captured. Review also extended to regional encroachment managers and liaisons to provide additional feedback

and recommendations. Outreach to agencies that don't often actively participate in the NW DoD RCT, such as the Coast Guard, was made to ensure all military services had the ability to provide input on constraint definitions and boundaries of military footprints. Ultimately certain features from the National Guard were added to more accurately define operation boundaries that potentially extended beyond already captured features, including:

- Compatibility Use Buffer
- Land Parcel (Utility, Safety, Transportation, and Noise Easements)
- Military Local Flying Area
- Military Landing Zone
- Military Drop Zone
- Installation Use Area
- Noise Zone
- Real Property Site
- Restricted Area Military Range
- Small Arms Range Security Area (SARSA)
- Surface Danger Zone

ADS was researched and documented for each dataset and questions or concerns discussed with providing entities to better understand data sensitivity, layer depiction preferences, and how these features should be assessed as a potential constraint or notification area. Data format, standards execution, and metadata were updated consistent with methods and policy implemented for Known Datasets.



## Military Mission Compatibility

### U.S. Military Background

The DoD is comprised of four Military Departments (MILDEPs) that were created by the National Security Act of 1947: The Department of the Air Force, Department of the Army, and Department of the Navy. Each MILDEP is represented by its own service branch. The fourth MILDEP, the U.S. Marine Corps, falls under the administration of the Department of the Navy.

The U.S. Coast Guard is responsible for maritime security, search and rescue, and law enforcement along American waterways and coastlines. The Coast Guard is a maritime, military, multi-mission service unique among the U.S. military branches for having a maritime law enforcement mission with jurisdiction in both domestic and international waters and a federal regulatory agency mission as part of its duties. It operates under the U.S. Department of Homeland Security during peacetime, and can be transferred to the U.S. Department of the Navy under the DoD by the U.S. President at any time, or by the U.S. Congress during times of war.

### Military Assets

#### Land Assets

The DoD and the MILDEPs maintain distinctive organizational structures, policies, and programs for managing their installations. 10 U.S.C. §2801 defines a military installation as “a base, camp, post, station, yard, center, or other activity under the jurisdiction of the Secretary of a MILDEP or, in the case of an activity in a foreign country, under the operational control of the Secretary of a MILDEP or the Secretary of Defense.” Installations may be situated on a single contiguous site, or as a main installation with associated contiguous or noncontiguous properties (e.g., ranges, auxiliary air fields, annexes, specialized training sites, etc.) that provide direct support to or are supported by that installation.

16 U.S.C. §670 further defines an installation with respect to conservation programs as “any land, or interest in land, owned by the United States and administered by the Secretary of Defense or the Secretary of a MILDEP, except land under the jurisdiction of the Assistant Secretary of the Army having responsibility for civil works.” In general, these definitions include all types of real property—buildings, training ranges, and supporting infrastructure—that reside on a military installation. An installation’s infrastructure often includes multiple radar systems, including but not limited to air traffic control, air defense, and meteorological (weather) systems. These systems can be found on an installation’s main site or its non-contiguous properties.

#### Airspace

The National Airspace System is the airspace, navigation facilities, and airports of the United States, along with their associated information, services, rules, regulations, policies, procedures, personnel, and equipment. It includes components shared jointly with the military.

The primary purpose of the FAA Special Use Airspace (SUA) program is to establish/designate airspace in the interest of national defense, security, and/or welfare. Charted SUA identifies to other airspace users where these activities occur. SUA is airspace of defined dimensions (lateral and vertical) wherein activities must be confined because of their nature, or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. The types of SUA are Prohibited Areas, Restricted

Airspaces (RAs), Military Operations Areas (MOAs), Warning Areas, Alert Areas, Controlled Firing Areas, and National Security Areas.

MOAs are airspaces designated outside of Class A airspace, to separate or segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic and to identify for Visual Flight Rules (VFR) traffic where these activities are conducted. MOAs are designated to contain nonhazardous, military flight activities including, but not limited to, air combat maneuvers, air intercepts, and low-altitude tactics training. Many MOAs extend from ground level up to a defined ceiling (often 60,000 feet above mean sea level [MSL]).

MTRs are not considered SUA but were developed cooperatively by the FAA and the military for the purpose of conducting low-altitude, high speed training. The MTR program was established for flights below 10,000 mean sea level (MSL) for operations more than 250 knots. Flights within MTRs at elevations greater than 1,500 feet above ground level (AGL) are intended for IFR traffic, to the greatest extent possible. MTR flights below 1,500 feet AGL are to be flown under VFR.

Of the 28.4 million acres overlain by military airspace in Oregon, approximately 17.4 million acres (removing overlap) are designated as low-level training routes (i.e., military aircraft operating at altitudes of 1,000 feet AGL or lower). Development of renewable energy and transmission projects within these low-level training routes could impact operations, and coordination with the military should be conducted early in the planning process. Figure 1 provides an overview of the military airspace in Oregon.

Airspace is a limited resource, and restrictions on DoD use of a SUA represents a permanent loss of this important asset.

### Military Presence in Oregon

The Oregon Military Department (OMD) is the first state agency created in Oregon. The department manages and trains the Oregon Army and Air National Guard (ANG and AIRNG, respectively) and responds to the governor's orders during peacetime and during natural disasters. The Oregon Army and Air National Guard can be nationalized in support of federal orders, as directed by the U.S. president.

Oregon plays a vital role in supporting the national defense. There are nearly 13,000 military personnel present in the state, with roughly 9,300 (or 72 percent) of these serving in reserve capacity. Most of these reservists serve the AIRNG or ANG. As an example, the Oregon AIRNG 125<sup>th</sup> Special Tactics Squadron, located at the Portland Air National Guard Base, is an integral part of the U.S. Air Force Special Operations Command. The 125<sup>th</sup> organizes, trains, and equips special tactics forces across the globe and provides long-range operations and logistical planning. The squadron also deploys command and control elements during tactical force employment or deployment.



The Oregon military department administers:

- 39 readiness centers and armories;
- Seven maintenance centers;
- Four training sites;
- Two Army Aviation Support Facilities; and
- Two AIRNG installations.

The OMD also oversees the Oregon Office of Emergency Management and Oregon's Youth Challenge Program.

DoD installations and ranges in Oregon include:

- Kingsley Air National Guard Base in Klamath Falls;
- Portland Air National Guard Base;
- Camp Rilea Armed Forces Training Area in Warrenton;
- Camp Umatilla National Guard Training Center near Hermiston;
- Naval Weapons Systems Training Facility (NWSTF) Boardman; and
- The U.S. Navy Northwest Training Range Complex located onshore and offshore along the Oregon and Washington coast.

U.S. Coast Guard Stations in Oregon include:

- Coast Guard Station Chetco River in Harbor;
- Aids to Navigation Team Coos Bay;
- Coast Guard Station Coquille River in Bandon;
- Coast Guard Station Depoe Bay;
- Coast Guard Station Portland;
- Coast Guard Station Siuslaw River in Florence;
- Coast Guard Station Tillamook Bay in Garibaldi;
- Coast Guard Station Umpqua River in Winchester Bay; and
- Coast Guard Station Yaquina Bay in Newport.

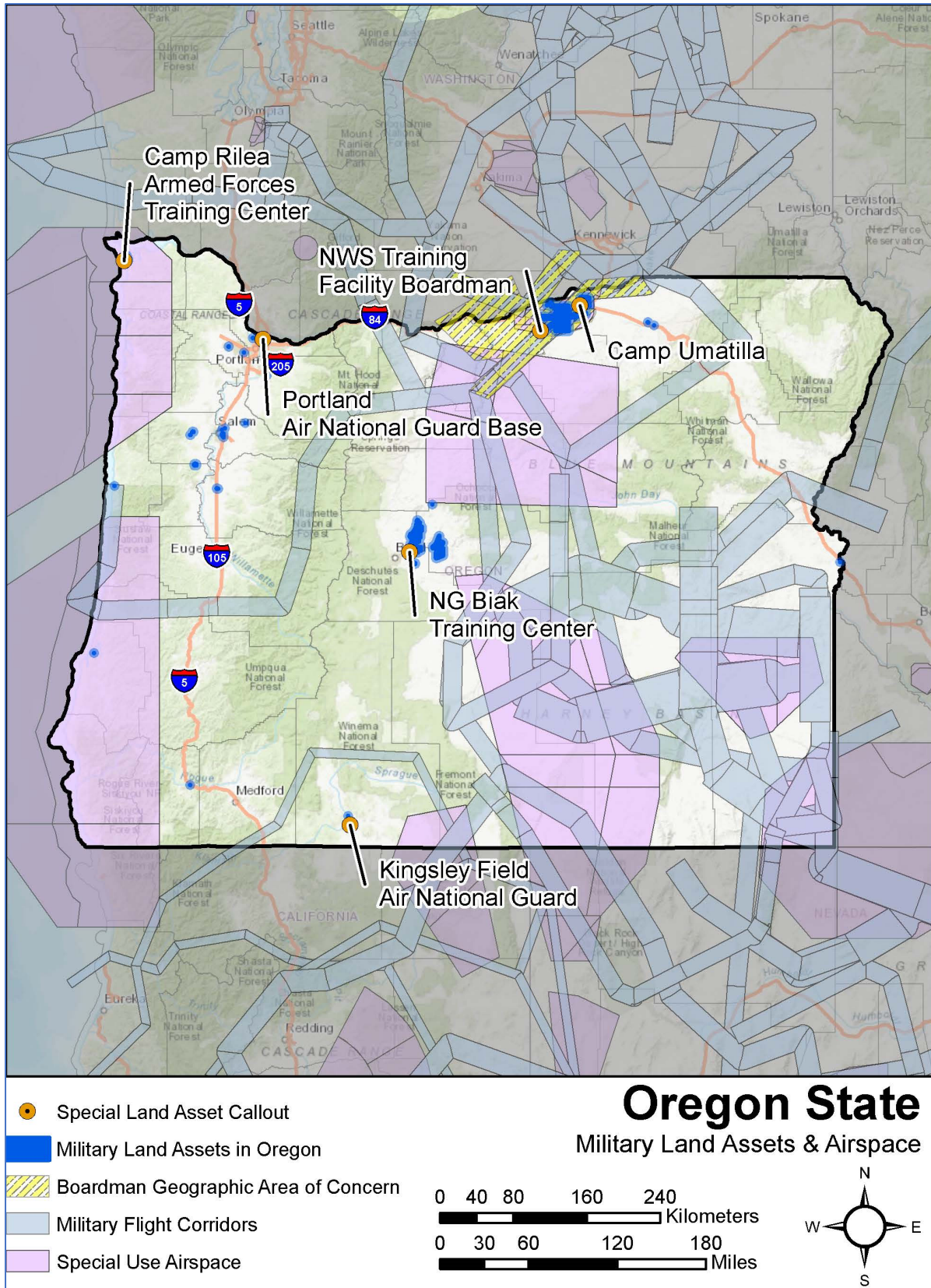
Figure 1 provides an overview of the military airspace and installations in Oregon.

#### Oregon's Contribution to the National Defense

Two main priorities listed in the 2018 National Defense Strategy (NDS) included maintaining long-term strategic competition with China and Russia and sustaining efforts to deter and counter rogue regimes such as North Korea and Iran. Other goals included defeating terrorist threats to the United States and consolidating gains made in Iraq and Afghanistan. To meet these goals, the NDS provides objectives including but not limited to:

- Defending the homeland from attack;
- Sustaining Joint Force military advantages;
- Defending allies from military aggression and bolstering partners against coercion;
- Preventing terrorists from directing or supporting external operations against the United States homeland and our citizens, allies, and partners overseas; and

- Establishing an unmatched twenty-first century National Security Innovation Base that effectively supports DoD operations and sustains security and solvency.



**Figure 1 Military Land and Airspace Assets in Oregon**

Military personnel (active and reserve duties) in Oregon support these objectives through a wide range of mission areas. Some of the military missions supported include:

- Training of active-duty pilots;
- Regional air traffic control;
- Weather, command and control, and combat weather;
- Explosive ordnance disposal;
- Air Combat Command;
- Air-to-ground training and testing;
- Securing our coastline; and
- North American Aerospace Defense Command (NORAD).

In March 2020 soldiers from the Oregon ANG were called in by the state for a two-week mission to provide support to the growing national response to COVID-19. As the effort grew, the team of 14 soldiers grew to 183 over a 79-day period. During the activation soldiers of Task Force Assurance completed over 2,600 missions, delivering at least 46 million pieces of personal protective equipment to each of Oregon's 36 counties, nine tribal nations, and two tribal health agencies. The ANG also assisted in shipping 140 ventilators to New York.

The ANG assisted the COVID-19 response by setting up and providing security of the Oregon Medical Station, outdoor tents for testing at several hospitals, and communications support at unemployment offices and emergency operations centers across the state.

### Potential Mission Constraints Associated with Renewable Energy Proposals

Construction and operation of renewable energy generation facilities and transmission infrastructure pose two main categories of conflict with the military mission: physical issues and electromagnetic (EM) spectrum interference. Physical issues arise when renewable energy facilities or infrastructure pose the potential for adverse impacts to military training and operations.

EM spectrum interference occurs whenever renewable energy projects disrupt military equipment that utilize radio frequency, infrared, or visual spectra. Such military equipment includes:

- Sensors including optical, telescoping sights, electro-optical imaging, threat warning, laser tracking, global positioning systems, and others;
- Weapons components such as missile guidance, fuzing, infrared passive guidance, high energy lasers, high-power microwave systems, electronic attack systems, and anti-radiation missiles; and
- Communications systems including data link, light signals, navigation lights, infrared beacons, voice communications, and other radio systems.

### Windfarm Conflicts with Military Mission

Development of windfarms could have the following impacts on low-level aviation testing and training:

- Turbines associated with windfarms create avoidance areas and require units to abandon the lower altitudes of MTR and SUA. Turbine heights can reach well over 400 feet AGL and windfarms can cover thousands of acres of land, requiring pilots to traverse the farm above the lower limits of the airspace.

- Wind turbines impact airborne radar by causing false returns (via Doppler shift) which could be an impact during training missions.
- This Doppler effect causes significant concerns for the DoD test community, as validating airborne radar system in a cluttered environment is virtually impossible. Siting is a critical component in securing clutter-free airborne radar test areas.
- Wind turbines can affect weapons and communications systems prone to EM interference.
- Large farms could impact helicopter turf routes and other non-published training airspace. Loss of the lower altitudes over thousands of acres may require aircraft to transition at a higher altitude, impacting low level training.
- The larger windfarms with taller turbines can impact low-level night vision training.

Wind turbines impact ground-based radar systems in three ways:

- The large radar cross-section of the reflections from windmills can cause radar receivers to be driven to saturation. Also, other processing functions can exhibit nonlinear behavior. These effects reduce, or even eliminate, the ability of the radar to detect targets near and within the windfarm area and negatively impact test and training.
- The second characteristic of windfarm interference with radar performance is the Doppler shift caused by the turning blades. The velocity of the windmill turbine blade is dependent on the distance from the center of the turbine hub, with an increasing shift moving from the center to the tip of the blades. Thus, the rotating blades produce a continuous spectrum of frequency shift with much of the spectrum falling within the Doppler limits that air surveillance radars are optimized to detect.
- Wind turbines can cause range tracking instrumentation to lose lock on airborne test items by providing a larger, more attractive target than the test item. This could have catastrophic consequences on test integrity and safety.

In most cases, wind turbines must be in the line of sight to impact radar operations. However, there are situations in which turbines can cause problems even if they are out of line of sight. Instrumentation radars and radar cross section measurement systems may be particularly prone to interference.

#### Solar Generating Facility Impacts

Solar generating plants can have multiple impacts on test and training, including:

- Solar thermal plants can have a high thermal signature and may interfere with infrared (IR) sensors. These IR sensors can lock onto the solar plant and should be considered in/around ranges that use IR technologies.
- Large solar farms (thermal and photovoltaic [PV]) using panels can reduce available ground training space.
- Solar thermal projects using towers can reach heights of over 2,000 feet AGL. This type can impact all types of airspace. FAA requires all structures above 199 feet AGL to be sent through the Obstruction Evaluation/Airport Airspace Analysis Office for determinations of impact to aviation.
- Solar energy facilities (thermal and PV) sometimes utilize wireless control systems that can interfere with or be interfered by DoD systems.

- Solar facilities (thermal and PV) cause reflectivity from the sun. This phenomenon is known as glint (instantaneous flash) and glare (continuous blinding) and can be quite severe depending on the type of facility and angle from the sun/ exposure time. Glint/glare from nearby solar facilities should be considered from a safety of flight and eye exposure perspective on DoD ranges.

Solar thermal panels are designed to reflect light towards a central tower and, by definition, pose significant glint/glare potential. However, even solar PV panels which are designed to absorb rather than reflect light can create a glint or glare issue, particularly if the solar array occupies a large surface area.

#### Transmission Line Constraints on Military Mission

Most renewable energy plants require new transmission lines. Since renewable energy sources are often distant from load centers, long haul transmission lines may be needed to facilitate the construction of renewable energy plants. However, there are some renewable energy projects sited at existing retiring fossil fuel generating facilities. These projects require short tie-in lines to existing transmission infrastructure.

Transmission lines can have the following mission impacts:

- Transmission lines and towers can impact SUAs, MTRs, and other low-level aviation missions;
- Transmission lines emit EM energy that can impact range systems, especially where electronic warfare testing or training is conducted;
- Proposed use of electrical transmission lines for broadband wireless may cause additional impacts; and/or
- Fragmentation of habitat and disruption of migratory patterns as well as other adverse impacts on species and habitat.

#### Potential Mission Protection Measures

Because military installations and military utilized airspace support the complex scope of the DoD mission, the range of interactions between their activities and renewable energy development is also complex and wide-ranging. Certain issues are more prevalent on some installations and off-station operations areas, while others are present at all the military locations. Some conflicts can be mitigated, while others cannot. Each proposed renewable energy facility and its associated transmission infrastructure needs to be evaluated in the context of its specific location in relation to the applicable training and operating areas and the current, and potential future, mission activities occurring in the vicinity of the proposed renewable energy project. The progressive approach of avoidance, reduction, and mitigation to potential impacts to military installations and SUA operations should be employed in all circumstances. Early identification and communication with appropriate military representatives can result in complete avoidance of adverse impacts early enough in the development process that it can be reasonably accommodated, potentially leading to a Determination of No Hazard (with or without conditions). Even if complete avoidance is not an option, early identification and communication can result in a development scenario that provides for some degree of the initial project proposal while also sustaining the necessary military training and operating areas. If avoidance and reduction are not feasible options, then specific mitigation concessions by the military and/or the developer may be necessary to ensure the specific mission of the military installation or SUA are not degraded.



## Windfarm Impact Strategies

### *Relocation*

To avoid impacts on low-level airspace, proposed wind turbines or a portion of the proposal could either be relocated to completely outside of the airspace or adjusted to a new location within the airspace based on military input during the planning process, and this has been successful in the past with early engagement.

In some cases, obstructions or avoidance areas may already exist in portions of a route providing, at times, flexibility for the military to offer mitigation. For example, if radio towers are located within an area under an MTR, wind turbines could be installed in close proximity to the radio towers. This may increase the size of the avoidance area but could be smaller in size than two separate avoidance areas (i.e., one avoidance area for the radio towers and one for the windfarm location in another location that could impact the MTR). Before making this type of agreement, the military carefully weighs the long-term implications including future requirements, airframes, and other considerations.

### *Reprogramming and Adding Radar Systems*

In certain cases, following DoD analysis, mitigation to ground-based air traffic control and weather radars may be possible. Existing federal regulations allow developers to contribute financially if this DoD determines this is a viable mitigation.

### *Curtailement*

In some cases, windfarm operators have executed agreements with the military to curtail (shut down) wind turbines during periods in which the spinning blades would impact testing, training, or operations. These agreements include a communication protocol and maximum number of hours per year the military will request curtailment.

### *Night Vision Goggle Compatible Lighting*

Use of light-emitting diode (LED) technologies on wind turbines and other windfarm structures reduces impacts to mission activities that require use of night vision goggles.

## Solar Generating Plant Impact Strategies

### *Proper Siting of a Solar Generating Facility*

Construction and operation of a solar generating facility away from known MOAs, MTRs, and runways can greatly reduce the potential for thermal footprint, physical constraints, and glint and glare impacts on the military mission.

### *Glint/Glare Studies*

Developers and operators of solar generating facilities in the vicinity of airports, SUA, and MTRs should conduct glint/glare studies to assess potential effects to the airspace users. Notification of solar facilities is important to assess if there is glint and glare that the pilot needs to be aware of while flying within low altitude training areas. Through notification and review of a glint/glare analysis for military utilized airspace, at times, pilots can mitigate the impact. Airport control towers do not want a fixed glare, and taking the necessary mitigation measures is advised.

### *Anti-Reflective Coating*

Application of an anti-reflective coating reduces the proportion of light reflected into space, therefore reducing the impacts of glint and glare.

*Altering Tilt and Azimuth Angles*

The tilt angle of a solar panel represents the position about the vertical axis, while the azimuth pertains to the panel's orientation along the compass axis (i.e., direction the panel is facing). Changing the tilt and azimuth angles of a solar panel (or a collection of panels) may reduce the potential impacts to nearby aircraft. However, use of this mitigation measure could reduce the system's efficiency as the solar radiation absorbed is reduced.

Transmission Line Impact Strategies

*Strategic Placement of Transmission Lines*

Underground transmission lines eliminate any hazard to aviation; however, underground installation of power lines is expensive. Placement of suspended power lines within existing corridors will have minimal impact on flight operations. Placement of transmission lines along airspace boundaries and away from MTR entry points onto military reservations will also minimize the impact to operations.

*Reduction of Transmission Tower Height*

In some instances, transmission towers can be installed at heights lower than initially designed or planned. This reduction could increase the viability of low-altitude training, while utilizing portions of an MTR for a transmission line corridor.

*Visual Augmentation*

Visual augmentation of power lines, typically done with brightly colored balls, may be an effective daytime strategy near helicopter landing zones and along MTRs.

## Renewable Energy Project Coordination Process

The most common negative effects of renewable energy projects on the military mission involve impacts to operations within low-altitude training and operations areas. Of particular interest in Oregon are MTRs, which can be used for low-altitude, high-speed flight training.

### Early Coordination with the Military

Early coordination with the regional military installations is critical in the conceptual planning phase, prior to final selection of the proposed site for a renewable energy generating facility or transmission infrastructure. This will allow the developer and military to discuss options to relocate or reconfigure (i.e., change height or type of structures) in a manner that is cost-effective and would not significantly delay or hamper siting approval of the project.

The NW DoD RCT, established in May 2018, brings DoD representatives and the U.S. Coast Guard together to discuss and address various initiatives in support of compatibility of air, land and sea spaces with local, regional, state, and federal stakeholders. One of the goals of the NW DoD RCT is to coordinate the review of projects in and around military training areas, discuss/address local, regional, state, and federal challenges and initiatives, and to share information regarding current and future coordination opportunities. The NW DoD RCT should be contacted as early as possible in the renewable energy and transmission planning process (i.e., during the project conceptual planning process prior to site selection). Contact information for two members of the NW DoD RCT is provided below.

Deputy Director of Installations  
Oregon Military Department  
(503) 584-3596  
[todd.e.farmer.nfg@mail.mil](mailto:todd.e.farmer.nfg@mail.mil)

Northwest Training Range Complex CPLO  
(360) 930-4085  
[kimberly.peacher@navy.mil](mailto:kimberly.peacher@navy.mil)

If a proposed project area is located on or near a DoD installation or training/operating area, a project representative should consult with the appropriate military representative from the installation at or near the proposed site. A detailed plan including a description of the project location, technology, construction activities, infrastructure, and transportation should be prepared prior to consultation with the military representative. This consultation should be conducted early in the project development process, as the military representative has knowledge of the installation activities that may extend well beyond the station boundaries as well as other military groups that may operate in the area. The NW DoD RCT representative can connect renewable energy and transmission project stakeholders with the appropriate Community Planning and Liaison Officer (CPLO).

Early coordination with the NW DoD RCT represents the first step in an ad hoc consultation process for renewable energy and transmission projects. The NW DoD RCT will provide guidance to stakeholders regarding subsequent coordination and consultations with the military, including coordination with the Military Aviation and Installation Assurance Siting Clearinghouse and the FAA Obstruction Evaluation/Airport Airspace Analysis process.

## DoD Siting Clearinghouse

The Secretary of Defense created the Military Aviation and Installation Assurance Siting Clearinghouse (DoD Siting Clearinghouse) in 2010 to address the potential impacts to military testing, training, or operations from renewable energy development. The DoD Siting Clearinghouse works closely with state and local governments, developers, and other federal agencies to provide timely, coordinated reviews of proposed energy projects to prevent or minimize operational impacts through its Mission Compatibility Evaluation (MCE) Process. The DoD Siting Clearinghouse is not a regulatory authority and generally serves an advisory role to the appropriate permitting agency. The Clearinghouse's informal review process, which is most often used by developers to gain early siting information, can also provide mission compatibility information to public entities.

## Lessons Learned Regarding Military Coordination

This section provides lessons learned from past renewable energy projects and some that are in development. The information provided draws on overarching lessons in planning for renewable energy projects from collective experiences, common themes, similar lessons learned, and observations that have been repeated in multiple projects. The opinions provided in the lessons learned are the findings of the contractor conducting this review for the ORESA project and do not represent the opinions of the State of Oregon or members of the U.S. military.

- **Communicate project details with the applicable NW DoD RCT representative early in the proposal, and maintain the lines of communication throughout the process.** Through coordination with the NW DoD RCT staff can, if necessary, coordinate with other installations or service commands to participate in reviewing and collaborating on the proposal. The more open and transparent these communications are will lead to greater trust among all parties involved.
- **Be consistent in communications with the DoD entities.** It is important that all stakeholders have access to accurate and current project details (size of structures, location, lighting, etc.). Changes in these details through project development can lead to delays in construction, rejection of some facilities by regulators or stakeholders, and large increases in project costs.
- **Each stakeholder group (local government, project developer, military, etc.) should provide one point of contact for project communications, when possible.** Infrastructure development requires communication with many regulatory agencies, community groups, stakeholder representatives, and military points of contact. Providing one central point of contact for each of the groups involved ensures consistency between all groups and minimizes the chances of not contacting all the needed parties.
- **Stakeholders (including the military) need to provide timely and clear information regarding potential impacts to their missions.** By doing this, all parties involved understand the potential impacts and can have perspective on how planning decisions are made during the project development and operation.

### FAA Obstruction Evaluation/Airport Airspace Analysis<sup>1</sup>

In addition to the military coordination discussed above, the FAA must be notified of any construction that may affect the National Airspace System under provisions of 49 U.S.C. §44718. A list of construction or alterations requiring FAA notice are provided in 14 CFR 77.9. More information regarding the FAA Obstruction Evaluation/Airport Airspace Analysis (OE/AAA) process can be found at the FAA website, <https://oeaaa.faa.gov>.

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<sup>1</sup> DOD does **not** acknowledge this text as being a full and complete description of the FAA's OE/AAA process.

## State and Local Regulations

In the United States, there are a variety of approaches that individual states take in allocating siting authority of renewable energy facilities. In more than half the states, local governments are solely responsible for regulations that govern the siting of all power-generating facilities, most often using their land-use planning, zoning, and related permitting authorities. Most of the remaining states give local governments substantive roles in small and noncommercial facility siting decisions, or make local government approval necessary but not solely sufficient to meet state requirements. A minority of states confer upon state siting bodies or commissions concurrent, preemptive, or exclusive authority over siting larger generating facilities.

Given the differing levels of state and/or local governments in the siting and permitting of renewable energy facilities across the country, many different approaches have evolved over the years. Other factors affecting state and local siting procedures and regulations include:

- Local and state renewable energy needs;
- Mix of renewable energy facilities present and planned (e.g., windfarms, solar generating facilities, hydroelectric, etc.);
- Community growth and encroachment (e.g., residential, commercial, transportation, infrastructure) near military installations, SUA, and MTRs; and
- Military operations type and tempo performed within SUA and MTRs.

This section provides examples of state ordinances and regulations regarding the siting of renewable energy facilities and transmission lines. Many of the ordinances listed include DoD notification requirements, with the goal to minimize impacts to military mission.

### State of Oregon

The state has permitting jurisdiction through EFSC for certain energy projects based on statute (Oregon Revised Statute 469.300(11)(a)). Most large-scale energy facilities and infrastructure in Oregon are permitted through the Energy Facility Siting Council (EFSC). Projects include most natural gas power plants, storage facilities, and pipelines, utility-scale wind and solar projects, certain high-voltage electric transmission lines, nuclear installations, and production facilities. Hydropower projects, including pumped-storage hydropower projects, are subject to permitting through the Oregon Water Resources Commission, Oregon Water Resources Department, and the Federal Energy Regulatory Commission. Projects located in Oregon's territorial sea are subject to permitting through Oregon Department of State Lands and Oregon Department of Land Conservation and Development.

EFSC review incorporates local government land use permitting decisions and other state agency permits related to water use, wetlands, and waterways. EFSC does remind developers of their compliance obligations with all applicable local, state, and federal regulations as a condition of a site certificate. Developers are asked to contact the NW DoD RCT military representative at the earliest stage when contemplating a new renewable energy project. The EFSC review process involves coordination between the Council and its staff, and other state agencies, local government, Tribal Governments, and military that have specific expertise in potential impacts of a proposed energy project and can support EFSC's review of compliance with applicable standards and rules. It is customary for ODOE to contact the NW DoD RCT military representative to notify them that a new project has been proposed.

Energy projects that are not subject to EFSC jurisdiction must receive land use approvals from city or county governments. Electric distribution lines and natural gas distribution pipelines, and battery storage projects must receive a permit from city and county governments. Larger energy projects typically require a conditional use permit from a local planning department or planning commission. However, counties (and cities) may have zoning regulations that allow the establishment of small energy projects subject only to a zoning permit or other type of review, without requiring a conditional use permit. The military has an ad-hoc process for notification and coordination with local governments, in which early coordination can identify and mitigate impacts to airspace or radar operations. Of note, there has been recent DOD OLDCC funding provided to Wasco County to support a viable notification process.

Prior to January 1, 2020, developers of solar photovoltaic energy generation facilities were required to apply for a site certificate from EFSC if proposed to be located on more than 100 acres of high-value farmland or arable lands, or more than 320 acres on any other land. A site certificate would also be required for transmission line corridors over a certain voltage and length, or which crossed multiple cities or counties. Other smaller facilities or transmission lines would be reviewed and sited by counties.

#### House Bill 2329

House Bill 2329 was signed in August 2019 and went into effect January 1, 2020. The bill changed the definition of energy facilities subject to EFSC site certificate requirements. In relative terms, the bill increased the jurisdictional authority of local governments for renewable projects, and decreased jurisdictional authority for EFSC. However, HB 2329 maintained an option for developers and local governments to defer review to EFSC.

HB 2329 established notification requirements for local governments, which includes the same but not all entities requiring notification by ODOE through the EFSC process, with the exception of DoD. DoD is not an entity requiring notification through the EFSC process and is specific to the local process. A county receiving an application to site any wind facility, any geothermal facility, and some solar facilities shall notify the following:

- Oregon Department of Fish and Wildlife;
- Oregon Department of Energy,
- Oregon State Historic Preservation Office,
- Oregon Department of Aviation,
- DoD, and
- Federally recognized Indian tribes that may be affected by the application.

This notification must include a description of the proposed facility; description of the lots or parcels subject to permit application; dates, times, and locations where public comments or public testimony on the permit application can be submitted.

It should be noted that the bill requires notification during the application phase but does not include pre-application notification and coordination to address impacts to national security.

#### Green Energy Corridor Rulemaking

The purpose of this rulemaking, Oregon Administrative Record (OAR) 660-033-055, is to carry out a recommendation of the Advisory Committee on Energy and Agriculture to consider the impacts of

transmission development on highly valuable irrigated farmland in the Umatilla Basin. The opportunity offered by these revisions seek to provide better farmland protection while offering greater certainty for energy transmission development.

To assist the Oregon Department of Land Conservation and Development, a Rules Advisory Committee (RAC) was formed. Members of the RAC represented a range of stakeholders including local landowners, local and state government agencies, energy developers, non-governmental organizations, Confederated Tribes of the Umatilla Indian Reservation, and the U.S. Department of the Navy. The rulemaking was adopted and became effective in March 2020. Key provisions include:

- Morrow and Umatilla counties should amend their comprehensive plans to include maps with the locations of a corridor or corridors appropriate for transmission lines.
  - The comprehensive plan should provide the findings used to develop these corridors, with the agricultural, natural resources, and developer needs that guided the decisions.
  - Coordination with multiple state agencies and the DoD is required prior to adoption of the Green Energy Corridor(s).
- In addition to the comprehensive plan updates, the counties will need to adopt implementing ordinances. The ordinances will be applied through county zoning codes and will promote proper consideration of agricultural and natural resources.

#### Territorial Sea Plan Amendment

The Oregon Territorial Sea Plan (TSP) was first adopted in 1994 and provides detailed guidance on how federal and state agencies are to manage uses within the state’s territorial sea, which extends from the shore to three nautical miles offshore.

In 2019 the state’s Ocean Policy Advisory Council and Land Conservation and Development Commission completed amendments to Part Five of the TSP. Part Five of the TSP provides decision making processes regarding the development of renewable energy facilities in the state’s territorial sea. Any marine renewable energy development proposal will trigger the Department of State Lands (DSL) to convene a Joint Agency Review Team (JART); comprised of state agencies, federal agencies with applicable regulatory or planning authorities, local jurisdictions representing affected communities and port districts, federally recognized coastal tribes in Oregon, and non-governmental groups addressing areas important to fisheries and ecological resources. An August 2019 DSL intraoffice memorandum introduces guidance stating that DSL staff shall invite the DoD to participate in the establishment of all JARTs.

#### Goal 13

The Oregon legislature passed SB 100 in 1973, which established a statewide planning system with 19 goals. Goal 13 deals with energy conservation and requires local governments to consider the effects of its comprehensive planning decision on energy consumption.

Goal 13 encourages communities to look within existing urban neighborhoods for areas of potential redevelopment before looking to expand, to “recycle and re-use vacant land.” The goal also directs cities and counties to have systems and incentives in place for recycling programs.

As Goal 13 requires energy conservation be considered in local comprehensive planning documents, it allows public and stakeholder input during the community outreach and public comment periods.



Through such inclusion of ideas and concerns, planners can make decisions that are beneficial to the community as a whole.

#### State Agency Coordination Programs

Oregon Revised Statutes (ORS) 197.180 provides guidance on how state agencies are to develop state agency coordination (SAC) programs. This regulation has four main objectives:

- Identification of exceptions to the regulation;
- Determination if proposed permitting activities are compatible with the goals of acknowledged comprehensive plans and land use regulations;
- Establishment of rules regarding coordination between state agencies and local governments; and
- Update and improvement of rules regulating the effectiveness and efficiency of state agency coordination programs.

As a state agency, the Oregon Military Department (OMD) has a SAC program, including an implementation plan. In the future the OMD could include an early notification process in their SAC plan with regards to planned projects or activities that may impact their military mission. This would apply to renewable energy generating facilities and transmission lines.

#### HB 2021

Bill 2021 introduces a broad range of targets, programs, and studies to transition Oregon to a clean, resilient, equitable electricity grid, including: 100% clean electricity target and GHG emissions reduction for Oregon's large investor-owned utilities (IOUs) and electricity service suppliers; Restricts EFSC from issuing site certificates for fossil-fueled energy facilities that emit GHGs; Creates a \$50 million grant program at ODOE for community renewable energy projects that promote energy resilience; Directs ODOE to study small-scale renewable energy projects; Permits IOUs to collaborate with local governments to develop PUC-approved green electricity rates; Requires renewable project developers and contractors to document and meet specific labor standards; Increases the RPS to 10% of aggregate electrical capacity by 2030 for Oregon's large IOUs.

HB 2021 is part of the continued expansion of Oregon's clean energy policy and legislation. This bill will result in more renewable energy development in Oregon and across the West, thus intensifying possible impacts and the need for coordination with the military.

#### HB 3375

HB 3375 declares a state goal to plan for the development of up to 3 GW of floating offshore wind in federal waters off Oregon's coast by 2030 and states that this planning must be conducted to maximize state benefits and minimize conflicts across ocean ecosystems and ocean users. It also calls for federal planning and permitting processes to consider the decommissioning of offshore energy facilities and related energy infrastructure after permanent end of use. The bill also directs ODOE to conduct a literature review of the benefits and challenges of this plan, in consultation with other state, regional, and national entities.

Regarding its consultation with stakeholders, ODOE is required to gather input and consult with other interested or appropriate state, regional, and national entities. These entities include, but are not limited to, the Department of Land Conservation and Development, the Oregon Business Development

Department, the State Department of Fish and Wildlife, the Public Utility Commission, the Northwest Power and Conservation Council, the Bonneville Power Administration, the Bureau of Ocean Energy Management, the National Renewable Energy Laboratory, DoD, and the Pacific Northwest National Laboratory. Topics of discussion and consultation could include the effects (i.e., benefits and challenges) of integrating up to 3 GW of floating offshore wind energy on electrical system reliability, state renewable energy goals, jobs, equity, and resilience.

## State of Washington

Written Notice to the U.S. Department of Defense

Under Revised Code of Washington (RCW) 36.01.320, applications for permits to site an energy plant or alternative energy resource that is to be connected to electrical transmission facilities of a nominal voltage of at least 150 kV, the county shall notify the DoD in writing with project specifications (e.g., description of the proposed facility, project location, number and placement of structures, date and time comments are due, and contact information for the county permitting authority and the project applicant). This notification benefits the DoD mission by:

- Allowing military stakeholders the opportunity to review the proposed project; and
- Providing a means to make comments related to potential issues related to the placement and operations of the energy plant or alternative energy resource, prior to county permit approval.

Similar notification requirements are prescribed by RCW 80.50.071. The purpose of the written notification is to provide an opportunity for DoD to review and comment on energy facility site certification applications and to identify potential issues relating to the placement and operations of the energy plant or alternative energy resource. The time period set forth by the EFSC for receipt of such comments shall not extend the time period for the council's processing of the application. To assist local government coordination with DoD, the EFSC shall post on its website the appropriate contact information for DoD stakeholders.

## Land Use Compatibility with Military Installations

The Washington State Growth Management Act contains a provision (RCW 36.70A.530) that guides cities and counties to avoid adverse impacts to a military installation's ability to fulfill its mission requirements. Specific measures include:

- Notification of installation commanders of planned amendments to comprehensive plans or development regulations to ensure that certain lands are protected from incompatible development; and
- The installation commander will have 60 days to provide written response to any review request. If the commander does not provide written response within this period, the local government may presume that implementation of the proposed plan or regulation will not have any adverse effect on the installation.

Washington Administrative Code (WAC) 365-196-475 is the source of implementation guidance for RCW 36.70A.530. It addresses how local and county land use plans and regulations should consider potential impacts to regional military mission requirements. As of 2021, the Washington State Department of Commerce has initiated a rulemaking process for the state's Growth Management Act and is considering offering expanded guidance for the military compatibility provision in Section 530 that would reference

military airspace or training routes and energy-related notification requirement established by RCW 36.01.320.

### State of California

The State of California has three legislative acts requiring that counties consider potential military mission impacts during the siting and permitting of new construction projects in their general plans.

#### Senate Bill 1468

This bill, approved in September 2002, requires a county's general plan to consider the impact of new growth on military readiness activities carried out on military bases, installations, and operating and training areas, when proposing zoning ordinances or designating land uses covered by the general plan for land or other territory adjacent to those military facilities, or underlying designated military aviation routes and airspace. The bill expands the required content of county and general plans in three ways:

- The land use element must consider the impact of new growth on military readiness activities;
- Counties and cities must include the military installations to the list of locations considered in their circulation elements; and
- It prohibits general plans from relying on the military installations' habitat or conservation programs as mitigation measures for endangered or threatened species.

#### Senate Bill 1462

Senate Bill 1462, enacted in 2004, requires cities and counties to deliver copies of significant proposed general plan amendments to the U.S. military with the following requirements:

- Notification must go out to all branches of the military when proposed development projects lie within 1,000 feet of a military installation, within special use airspace, or beneath a low-level flight path; and
- The California Office of Planning and Research (OPR) will review information provided by the DoD to determine whether it is sufficient and in an acceptable scale and format. Following this review, the OPR must inform the cities or counties of the availability of this information from DoD. The cities and counties must comply within 30 days of receiving this notice from OPR.

#### Senate Bill 242

This bill, enacted in 2019, streamlines the communication processes regarding coordinating land use decisions with the military identified in Senate Bill 1462. Specific aspects of Senate Bill 242 include:

- Electronic submission of general plan updates and completed development applications is authorized and preferred over mailing hardcopies; and
- OPR must post on its website summary information on proposed developments; military points of contact; and maps of low-level flight paths, special use airspace, and military installations.

To assist with the implementation of specific requirements of SB 1468 (i.e., inclusion of military readiness activities in general plans) and SB 242 (i.e., military notification process), OPR has developed a number of planning projects or tools. Two examples are described below.

#### California Military Land Use Compatibility Analyst

The California Military Land Use Compatibility Analyst (CMLUCA) is a mapping tool developed by OPR that local governments and developers can use to identify whether proposed planning projects are

located in the vicinity of military bases, military training areas, or military airspace. This mapping tool helps local governments and developers comply with state law, which requires the military to be notified of certain development applications and general plan actions.

#### California Military Energy Opportunity Compatibility Assessment Mapping Project

The California Military Energy Opportunity Compatibility Assessment Mapping Project (CaMEO CAMP) is funded by DoD to promote compatible siting of renewable energy projects in an effort to prevent adverse impacts to DoD's test, training and military operations and achieve shared state and federal goals. The CaMEO CAMP is being managed by OPR, in collaboration with the California Energy Commission.

The overall goal of the CaMEO CAMP is to better understand the potential for renewable energy development and associated facilities within operational military influence areas in order to proactively define where appropriate early consultation with DoD should occur, and also to enable that coordination through an easy-to-use process and tool.

#### State of Arizona

The State of Arizona delegates all renewable energy project siting authority to local governments. Three regulations regarding developing renewable energy projects while preserving the military mission are described below.

##### House Bill 2090

As of October 1, 2020, construction of single wind turbines or energy generating facilities within the State of Arizona that require submission of Form 7460-1 to the FAA may not encroach on or otherwise have adverse effect on the military mission, training or operation of any military installation or branch of the military as determined by the DoD Siting Clearinghouse. The following are required under this bill:

- An active Determination of No Hazard DNH is required from the FAA.
- A determination of no adverse impacts from the DoD is required prior to construction of any such facilities.
- A mission compatibility certification letter or successor form may serve as evidence of adverse impacts being resolved with the DoD.

##### Arizona Revised Statutes §9-499.14

Arizona Revised Statutes (A.R.S.) §9-499.14 allows towns and cities to establish a renewable energy incentive district (within incorporated boundaries of the town or city) if the following three conditions are met:

- The proposed district is vacant or underused and is suitable for housing renewable energy equipment. Portions of land or noncontiguous portions of land may be designated as a renewable energy incentive district.
- Construction and operation of a renewable energy facility would not be incompatible with other uses of the property. This includes compatibility with commercial and military airspace requirements.
- Construction and operation of a renewable energy facility within the proposed district is compatible with the existing general plan and would not represent a major amendment to the general plan.

The benefits of the renewable energy incentive districts include:

- Expedited zoning or rezoning procedures;
- Expedited processing of plans, proposals, and permits;
- Waivers or abatement of zoning fees, processing fees, and improvement district fees and assessments for development activities; and
- Waiver or abatement of development standards and procedural requirements.

A.R.S §11-254.07

A.R.S. §11-254.07 allows a county board of supervisors to establish a renewable energy incentive district within an unincorporated area of the county, if the three conditions listed above for A.R.S. §9-499.14 are met. Additionally, the board of supervisors must:

- Identify the boundaries of the proposed district; and
- Notify owners of private property within the proposed district as well as property managers of state and federal lands within the proposed district.

The benefits of establishing a renewable energy incentive district are the same as those listed for A.R.S. §9-499.14.

## State of North Carolina

Approved in May 2013, North Carolina House Bill 484 provides procedures for coordination with military entities to assess potential mission compatibility impacts of wind turbine projects on military operations and readiness early in the development process. This regulation requires developers to request a pre-application meeting with the North Carolina Department of Environment and Natural Resources (DENR) to identify any potential risks to military air navigation routes, air traffic control areas, military training routes, special use air space, radar, or other military operations. The notification requirements of this bill include:

- The DENR is required to provide written notice to the commanding officers of each major military installation within North Carolina of the proposed renewable energy project and invite them to participate in the review process;
- The DENR shall notify the DoD Siting Clearinghouse of any mitigation actions agreed to by the applicant; and
- The DENR will be notified of any mitigation actions agreed to by the applicant and the DoD Siting Clearinghouse.

## State of Oklahoma

Oklahoma has three statutes that allow the growth of wind energy generation within the state while protecting the military mission. Each build on the previous legislation by adding stipulations or fees.

### House Bill 3561

This bill, passed in March 2018, prohibits the construction or operation of a wind energy facility or facility expansion from encroaching upon or having a significant adverse impact on the military mission, training, or operations of any military installation or branch.

Senate Bill 1576

Senate Bill 1576 was unanimously passed in April 2018 and adds minor changes to House Bill 3561. This regulation requires agreement from DoD on any planned turbine construction or approved DoD Siting Clearinghouse mitigation plan prior to construction or expansion.

House Bill 2118

This bill, passed in April 2019, requires that wind turbine developers receive approval from the DoD and FAA, ensuring that any new construction “will not encroach upon or otherwise have a significant adverse impact on the mission, training or operations of any military installation or branch of military as determined by the Military Aviation and Installation Assurance Siting Clearinghouse and the FAA.”

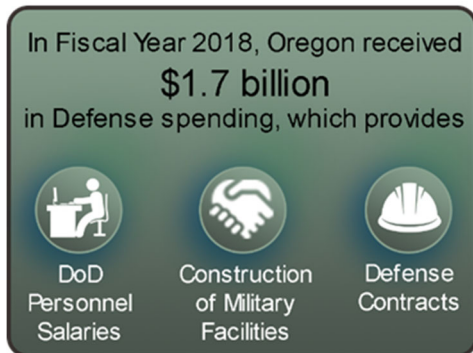
Furthermore, this bill requires that a DNH and mitigation plan for any adverse impacts to military airspace must be submitted to the state Corporation Commission and the Oklahoma Aeronautics Commission before construction is initiated.

The bill specifies a \$1,500 penalty per day, per turbine, for any construction that does not meet the guidelines of the legislation and sets administrative rules for resolving disputes over wind turbine projects.

## U.S. Military Economic Benefits to Oregon

Oregon received \$1.7 billion in Defense spending in FY2018, which provides direct funding for DoD personnel salaries, defense contracts, construction of military facilities in the state, and infrastructure needed to support members of the military and their families. Spending by DoD personnel, contractors, and their families creates significant economic activity, attracts related industries and investment, and generates important state and local government tax revenues.

### Oregon National Guard Expenditures in Oregon



Oregon benefits financially through its relationship with the DoD. By contributing a relatively small amount of state matching funds, federal dollars flow into the state allowing the Oregon National Guard (ORNG) to operate within the state while supporting the national defense.

The ORNG expended \$426.5 million during FY2018, with 94 percent of the funding from the federal government and 6 percent in state funds. Most of these funds were spent within the state which generated direct and indirect employment, business income, and state income tax

revenue. In addition to the direct federal funds received, \$22.4 million of state employee payroll expenditures were federally reimbursed through a Master Cooperative Agreement that required a \$1.5 million state match.

Payroll activities reflect employment generated within Oregon which provides taxable income and private wealth. Federally Reimbursed Employees are hired by the State of Oregon to perform a function which is reimbursable by the federal government. State-funded employees are permanent employees of the State of Oregon, paid by state funds. In FY2018, the ORNG expended \$311.1 million on payroll activities which amounts to 73 percent of total expenditures.

Non-payroll expenditures create tangible and intangible benefits through acquisition, maintenance, and improvement of real property, along with value-added activities and local purchasing. Construction refers to large construction projects or projects funded through the federal Military Construction (MILCON) appropriation. Minor construction projects do not rise to the dollar threshold of MILCON projects and may be funded through Operations and Maintenance funds. Utilities/Facilities maintenance includes expenses traditionally associated with the continuing operation of federal and state facilities. Community service expenses fund outreach projects to maintain relationships with various groups within the community, such as veterans, youth, and employers. Counter drug expenses relate to ORNG activities in support of drug testing and interdiction. Supplies and services represent spending on all other materials and support necessary to conduct federal and state missions, to include travel and services contracts. Contractors are temporary personnel hired to perform a specifically negotiated service or function; they may be funded by federal or state resources as pertains to the contract terms.

In FY2018, ORNG expended \$115.4 million on non-payroll activities which account for 27 percent of total expenditures. Most non-payroll expenditures were incurred for the procurement of supplies and

services (35 percent), construction (25 percent), utilities/facility maintenance (16 percent), and community service/youth challenge program (15 percent). The remaining was spent on contractors and counter-drug activities.

Table 1 provides a summary of the payroll and non-payroll ORNG expenditures for FY2018. The table reflects the substantial federal influx of funds received compared to the State of Oregon commitments.

**Table 1. ORNG Expenditures for Fiscal Year 2018**

	Army Guard	Air Guard	Master Cooperative Agreement	State of Oregon	ORNG Total
Payroll	\$150,644,834	\$129,663,374	\$22,376,681	\$8,407,688	\$311,092,557
<i>Non-Payroll Expenditures</i>					
Construction	--	\$8,152,357	\$13,463,051	\$7,583,188	\$29,198,596
Minor Construction	--	--	\$5,041,848	\$99,640	\$5,141,488
Utilities/Facility Maintenance	--	\$3,808,772	\$12,975,621	\$1,399,630	\$18,184,023
Counter Drug	\$751,000	\$813,582	--	--	\$1,564,582
Community Service/ Youth Challenge Program	\$9,793,000	\$1,210,000	\$5,011,835	\$1,408,746	\$17,423,581
Supplies and Services	\$12,652,123	\$14,789,175	\$5,343,554	\$7,436,794	\$40,221,646
State Active-Duty Supplies and Services	--	--	--	\$453,022	\$453,022
Contractors	--	\$452,046	\$2,671,771	\$99,953	\$3,223,770
Total Non-Payroll	\$23,196,123	\$29,225,932	\$44,507,680	\$18,480,973	115,410,708
<b>Total Expenditures</b>	<b>\$173,840,957</b>	<b>\$158,889,306</b>	<b>\$66,884,361</b>	<b>\$26,888,641</b>	<b>\$426,503,265</b>

Source: ORNG FY18 Economic Impact Report

Over the past five years the ORNG has completed \$145.1 million in construction across the state, providing significant economic benefits to the local communities. Future MILCON projects within the Oregon include:

- FY2021 – Enlisted barracks at Camp Umatilla National Guard Training Center – \$9.3 million;
- FY2021 – Enlisted barracks at Camp Umatilla National Guard Training Center – \$15.7 ; million
- FY2024 – Construction of a new National Guard Readiness Center in Hillsboro – \$22.0 million;
- FY2025 – Construction of a Multipurpose Machine Gun Range at NWSTF Boardman – \$16.5 million; and
- FY2025 – Construction of a National Guard Readiness Center in Lebanon – \$25.0 million.



## Military Partnerships with Government and Private Conservation Groups

Encroachment is defined as any non-military activity planned or executed which inhibits, curtails, or possesses the potential to impede the performance of military activities. The DoD collaborates with federal, local, and state governments as well as businesses to allow for growth while maintaining military mission. Two DoD encroachment management programs are described below.

### DoD Readiness and Environmental Protection Integration Program

The DoD Readiness and Environmental Protection Integration (REPI) Program's main purpose is to combat encroachment that can limit or restrict military training and testing operations. The REPI Program protects military missions by helping remove or avoid land-use conflicts near installations and addressing regulatory restrictions that inhibit military activities.

A key component of the REPI Program is the use of buffer partnerships among the Military Services, private conservation groups, and state and local governments as authorized by Congress at 10 U.S.C. § 2684a. The program strives to develop win-win partnerships that share the cost of acquisition of easements or other interests in land from willing sellers to preserve compatible land uses and natural habitats near installations and ranges. By doing so, the REPI Program helps sustain critical, at-risk military mission capabilities.

The Sikes Act Improvement Act (16 U.S.C. § 670a-670o, [SAIA or Sikes Act]), which authorizes the Secretary of Defense to carry out a program to provide for the authorization and rehabilitation of natural resources (lands, waters, airspace, and coastal resources) on military installations while allowing the military lands to continue to meet the needs of military operations. The Sikes Act requires the DoD to develop and implement Integrated Natural Resources Management Plans (INRMPs) when appropriate, for military installations across the United States. INRMPs are prepared in cooperation with the US Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration – National Marine Fisheries Service (if applicable), and state fish and wildlife agencies and should reflect the mutual agreement of the parties concerning conservation, protection, and management of fish and wildlife resources. Finally, the Sikes Act ensures, to the extent feasible, that sufficient number of professionally trained natural resources management personnel and natural resources law enforcement personnel are available and assigned responsibility to carry out all of 16 USC §670.

Often military installations will incorporate activities associated with the REPI Program buffer partnerships into goals and objectives described in their INRMP documents.

### Boardman REPI Program

NWSTF Boardman provides a combination of land and airspace that is a strategically important venue for training with the EA-18G airborne electronic attack aircraft. With the airspace extending vertically from the ground up, it is the only safe low-altitude training area available for junior naval aviators from Naval Air Station Whidbey Island, Washington.

Development of tall structures, particularly wind turbines and transmission lines, under the restricted airspace presents a significant threat to the safety and combat readiness of airborne electronic attack crews. Therefore, the Navy's goal is to protect working farmlands and ranches adjacent to NWSTF Boardman and under the restricted airspace from development to sustain the low-altitude tactical training mission.

### *Water Rights Development and Working Agricultural Lands*

In 2019 the U.S. Navy, Trust for Public Land, and Northwest Rangeland reached an agreement with large local landowner near NWSTF Boardman. The agreement allowed the Navy to obtain an easement to perform low-level test flights without obstruction over 3,300 acres of farmland.

The farmer has used the funds to secure ownership in a large community water development project, allowing increased irrigation over the farmland and enhance crop rotation. This REPI project is the first of its kind in Oregon, removing land use conflicts while promoting conservation and benefitting the regional and state economy.

### *Habitat Preservation*

Lands near NWSTF Boardman are bisected by the Oregon Trail which is a valuable historic resource that supports habitat for the Washington ground squirrel, a candidate for listing under the Endangered Species Act. At this time, a total of \$7.9 million have been expended in three transactions, preserving 4,250 acres of land. This action protects habitat for the Washington ground squirrel, maintains existing agricultural land use, preserves cultural and historic resources, and protects the military mission. Key partners in this project include the Northwest Rangeland Trust and the Trust for Public Lands.

### *Army Compatible Use Buffer Program*

In parallel to the REPI Program, the Army Compatible Use Buffer (ACUB) Program allows installations to work with partners to encumber off-post land to protect habitat and buffer training without acquiring any new land for Army ownership. Through ACUB, the Army reaches out to partners to identify mutual objectives of land conservation and to prevent development of critical open areas. The Army can contribute funds to the partner's purchase of easements or properties from willing landowners. These partnerships preserve high-value habitat and limit incompatible development in the vicinity of military installations. Establishing buffer areas around Army installations limits the effects of encroachment and maximizes land inside the installation that can be used to support the installation's mission.

### *Camp Rilea*

Camp Rilea is on the northwest coast of Oregon, near the Washington state line. The base is home to a variety of ecological zones including beaches, sand dunes, coastal plains, and mountains. Camp Rilea hosts the Oregon Army and Air National Guard units as well as soldiers from Joint Base Lewis McChord in Washington state.

On base, 68 acres of land was restricted from use due to the presence of critical habitat for the Oregon silverspot butterfly, which is listed as a threatened species under the federal Endangered Species Act. Prior to species protection action, the Clatsop Plains had only one other four-acre plot of viable habitat as the butterfly lost much of its historic range due to coastal development, changes in fire control measures, and introduction of invasive species.

Through an agreement with U.S. Fish and Wildlife Service, the REPI Program was able to utilize ACUB and other partner funds to purchase 124 acres of nearby land as a preserve for the butterfly. The first parcel purchased was the 109-acre Reed Ranch, which is the largest undeveloped meadow habitat on the Clatsop Plains.

Once the parcel deal was completed, Camp Rilea moved habitat management responsibilities for the Oregon silverspot butterfly onto the reserve parcels. When the proposal was submitted, the USFWS removed the no-disturbance restrictions on post allowing for foot traffic and ground maneuvers. Upon completion of the purchase, and formal consultation, the habitat management plan was incrementally lifted.

To this date, 124 acres have been preserved from future development through two transactions totaling \$2.1 million. Partners in this project include the Nature Conservancy and the North Coast Land Conservancy.

## Military/Renewable Energy Compatibility

This section provides a summary of issues and concerns encountered during the siting of renewable energy generating facilities and associated transmission lines. Particular focus is given to concerns regarding compatibility with neighboring military installations.

The primary lesson learned is that early consultation with DoD is key to avoiding delays, curtailment, or other impediments to renewable energy generation and transmission. Issues identified early in the planning process can identify mitigations that are amenable to all parties involved. Coordination with DoD after site selection could lead to costly changes to facility design (i.e., placement of wind turbines, number of allowable turbines, turbine height, etc.) or even denial to proceed.

### Encroachment

Encroachment on U.S. military installations and test and training ranges is a serious and growing problem for DoD. Encroachment -- a term used by the DoD to refer to incompatible uses of land, air, water, and other resources -- is the cumulative impact of uncontrolled development, including renewable energy sites, that hampers the military's ability to carry out its testing and training mission.

Military installations, ranges, and other training and testing spaces are a significant platform for achieving the readiness of our military forces. These assets are used for training and testing purposes to rigorously expose our troops to all the realistic threats and tactics of war. They are necessary for conducting daily operations, realistic live-fire training, and effective weapon system testing.

Incompatible land uses and habitat loss near and adjacent to installations, ranges, and operating areas threaten the ability to provide our military services with realistic training. If warfighters or their units receive restricted or inadequate training, they are less likely to fully understand combat strategies and tactics, leading to insufficient skills or unnecessarily risky practices on the battlefield. Partnering to limit incompatible development and preserve habitat is vital to avoiding costly training workarounds and higher future military expenses that strain budgets and risk readiness for our nation's defense.

DoD officials and staff have described four main ways that encroachment affects military operations:

1. Imposes testing, training, and other operational restrictions.
2. Increases operational costs, especially for testing and training exercises.
3. Fosters community complaints and damage claims.
4. Degrades military readiness.

Essentially, reduced capability and availability of existing land, air, water access, and EM spectrum put military readiness at risk.

### Encroachment – Military Considerations

Following are examples of encroachment types recognized by the Office of Secretary of Defense (OSD) and military liaison that may be affected by On- or Offshore Renewable Energy development:

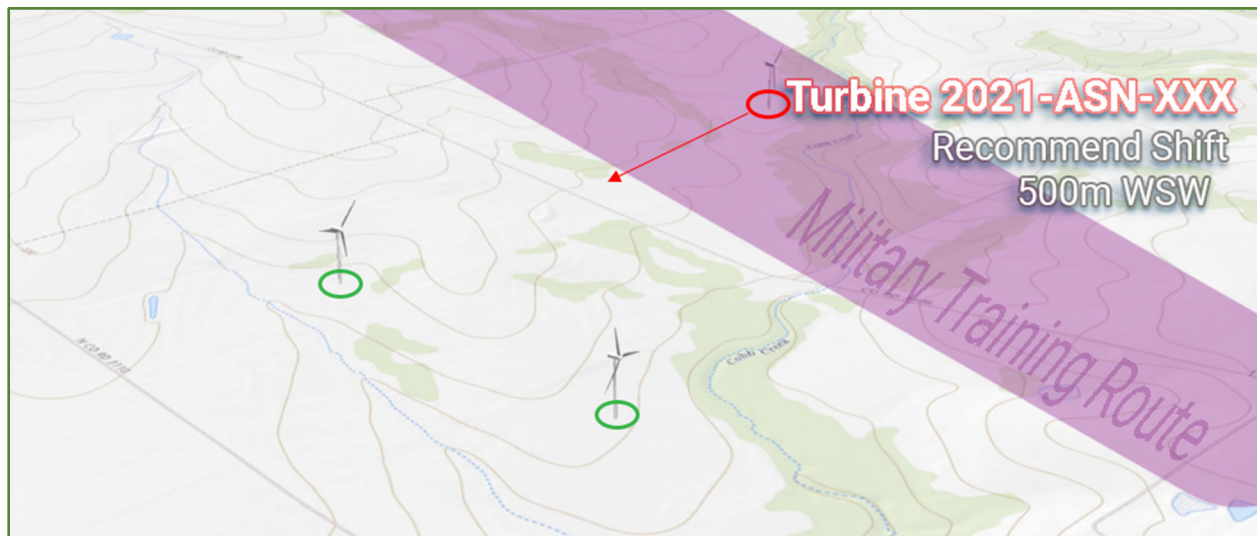
#### Airborne Noise

Military testing and training operations, both air and ground, are noisy. People who live and work near such operations, whether under a low-level flying training route or next to an artillery range, complain

about the noise. Training with more powerful and noisy weapons and increased urban and suburban sprawl near installations have resulted in more noise complaints.

#### Airspace Restriction

Besides the obvious obstacle a wind turbine can make to obstruct operations within airspace, various renewable energy sites may have towers or raised lighting elements that also can obstruct activities under low-level flight routes and operating areas. Figure 2 demonstrates an example where movement of a planned wind turbine location could mitigate potential impacts to MTR usage.



**Figure 2** Wind Turbine Potentially Obstructing an MTR

#### Competition for Air, Land, and Sea Space

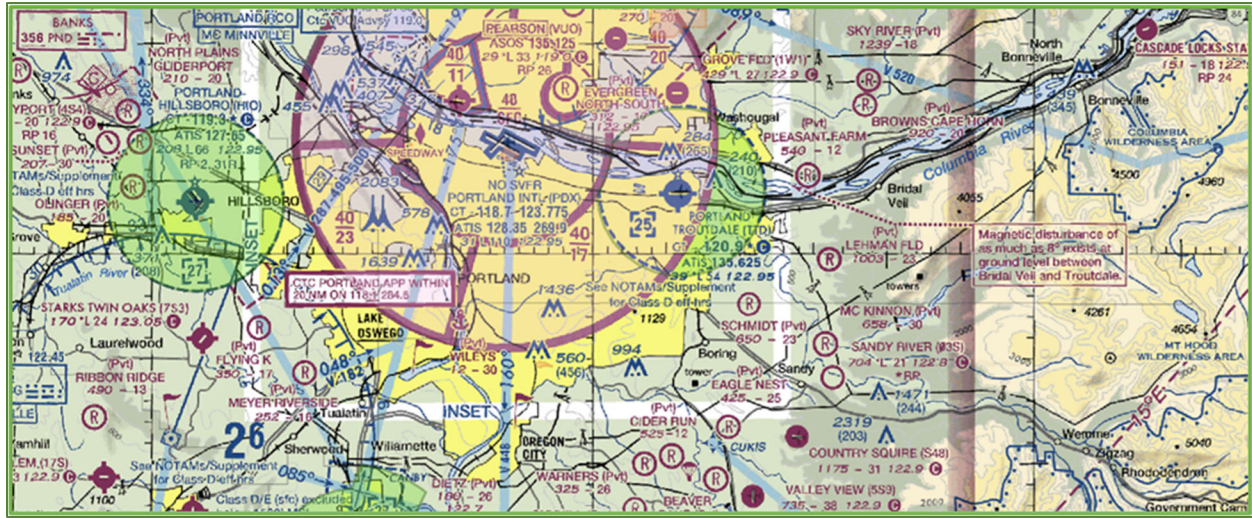
Commercial air traffic competes with the military for airspace. U.S. airspace is becoming more congested. Commercial air traffic continues to grow, which increases the commercial demand for airspace volume. Military training use of airspace has also been increasing and will continue to increase to accommodate the next generation of high-performance weapon systems, standoff munitions, and unmanned aerial vehicles. Such competition means that military air testing and training may be altered or restricted to meet nonmilitary demands. Figure 3 illustrates how commercial and military airspace often overlaps, leading to potential impacts to civilian and military flight activities.

#### Competition for Radiofrequency Spectrum

Communities pressure to gain access to these resources can decrease availability. A common resource is frequency spectrum. The commercial communications industry has over the years acquired more parts of the frequency spectrum and is using more frequencies in more areas. This can cause communications interference with military testing and training operations presenting a safety issue problem because the interference can affect data links to weapon systems.

#### Foreign Proximity

Foreign interests, mergers, and acquisitions, and development in or around installation and ranges. Renewable energy projects funded or managed by foreign entities may require additional review to maintain military and operational security.



**Figure 3** Portion of FAA Sectional Chart for Oregon Illustrating Commercial and Military Airspace

### Maritime

Maritime testing and training operations face encroachment from competition for water space by humans and wildlife. First, increased competition from commercial and recreational boating and other activities can cause restrictions on installation testing and training, for example by restricting hours of training because of commercial boating needs. Similarly, approval of new offshore wind turbines or wind/wave projects can potentially limit the amount of training space that is available. Figure 4 provides an overview of vessel traffic off the central coast of Oregon tracked in the National Oceanic and Atmospheric Administration Automatic Identification System (AIS).

Second, federally and state-protected species also compete for water space. Wildlife protection laws and requirements also can restrict testing and training in oceans, bays, and other waterways. For example, at certain times of day or year or when rare and wide-ranging marine mammals are present, such as endangered whales, certain testing and training operations must stop.

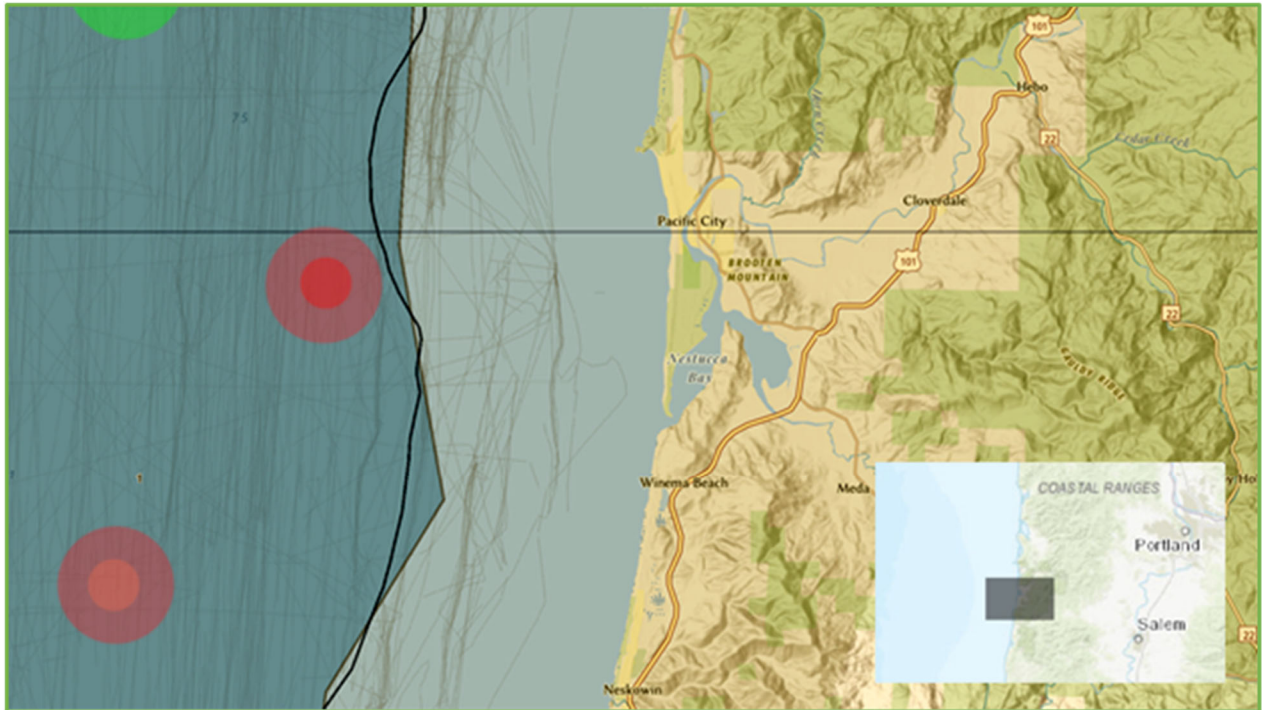
### Radar Line of Sight

Wind turbines located in radar line of sight of air defense radars can adversely impact the ability of the military to detect and track, by primary radar return, any aircraft or other aerial object. The magnitude of the impact will depend upon the number and locations of the wind turbines. Should the impact prove sufficient to degrade the ability of the radar to unambiguously detect and track objects of interest by primary radar alone this will negatively impact the readiness of U.S. forces to perform the air defense mission.

The mitigations that exist at present to preclude adverse impacts on air defense radars are limited to those methods that avoid locating the wind turbines in radar line of sight. These mitigations may be achieved by distance, terrain masking, or terrain relief and requires case-by-case analysis.

### Transportation

Inadequate highway or arterial networks in the installation environs as well as new construction could impede ingress. Development of new transportation routes to access development site and increased traffic resulting from onsite workers etc., may be considerations.



**Figure 4 Marine Vessel Traffic Data with Offshore Military Activity and Boundaries**

#### Urban Development

Housing and Industrial development events near the installation boundary. Many installations have also seen urban and suburban communities grow up all around them, often right up to the fence line. The result is more people in the community nearby who are affected by some of the products of testing and training operations, such as noise and smoke. This leads to more noise complaints and environmental concerns, such as air and water quality problems, affecting the installation. In fact, it can contribute to increases in all the encroachment problems mentioned above.

#### Explosives Safety Quantity Distance (ESQD)/Unexploded Ordnance (UXO)

Explosive safety arcs and footprints provide protection criteria to minimize serious injury, loss of life, damage to property and loss of mission and explosives. Developments near these arcs may limit military ability to store and handle necessary munitions.

Another encroachment concern comes from environmental laws and requirements regarding unexploded ordnance (UXO) and munitions constituents use and cleanup. In some cases, such environmental concerns could potentially limit the use of live fire or could stop training because UXO areas need to be cleaned up to address ground water pollution problems.

#### Environmental Concerns

The following encroachment types do not affect military mission directly but rather represent regulatory roadblocks to conducting operations. These same environmental concerns do apply to renewable energy facilities and transmission line corridors and must be considered in throughout the project lifecycle. Additionally, each of the topics below have their own consultation and permitting requirements.

### Air Pollution and Quality

Because of the effects on human and environmental health, the Clean Air Act restricts activities that pollute the air. In some parts of the country, because local and regional air quality does not meet national air quality standards, state or local regulatory agencies implement strict emissions requirements on businesses and installations. Because of such requirements, installations in these areas may need to change or restrict certain testing and training operations, for example, by not conducting training exercises that produce smoke on bad air quality days.

### Cultural Resources

U.S. military installations must follow U.S. regulations and laws to help preserve cultural resources, such as cemeteries, archaeological sites, and historic buildings. Regulatory requirements for cultural resource management are found in the National Historic Preservation Act, the American Indian Religious Freedom Act, the Archaeological Resources Protection Act, and the Native American Graves Protection and Repatriation Act. Such requirements have also caused restrictions and forced changes in operations on testing and training ranges. For example, installations may not be able to use certain parts of a training range because of archaeological sites located there.

### Endangered Species

Presence of threatened and endangered species on or within Installation and Range areas.

With the loss of habitat, pollution, and other problems, more species are threatened and endangered (T&ES). The federal Endangered Species Act (ESA) protects such species and can restrict federal activities that affect them. For example, the ESA requires that the FWS designate critical habitat for endangered species, which can restrict testing and training operations on installations. Many military installations are becoming the islands of habitat protection for such species, which has meant increasing restrictions on military use of land. The oceans, coastal areas, and other waterways also face significant pressures from the need to protect federally protected species, resulting in water space restrictions. Oregon also has T&ES or species of concern laws and requirements, which also affect installations.

### Lessons Learned

The following are some suggested practices identified from past experiences and coordination with the military, including the *Military Mission and Compatibility with Renewable Energy in Oregon* webinar, held on May 26, 2021.

- Developers should meet with the appropriate local military representative to discuss the possibility of learning more about the installation mission and operations, identify areas of mutual interest, foster a viable early notification process, and discuss if there is need for a Compatible Use Plan.
- Share key information early in the project development process. Military representatives can then evaluate mission capabilities at risk from encroachment, analyze the threat, and develop potential solutions for inclusion in comprehensive planning and proposal development. Early consultation enables partners to be involved and provide input early and often. To meet these goals, partnerships should work to:
  - Prepare and provide maps in support of transparency.
  - Understand the military's mission footprint.
  - Identify common land-use goals and partnerships.



- Identify state and regional goals.
- Inventory surrounding land uses and current zoning.
- Agree on a long-term strategy and work together in support of compatible land uses.
- Establish contacts between installation, regional military representative, and local community stakeholders—stable points of contact improve the process and communication.
- Keep communication open and provide updates on a regular basis.
- Take time to build trust with other agencies and stakeholders.
- Notify stakeholders, including the military, as early as possible in the planning stages to foster compatible solutions.

Incorporation of these lessons learned during the planning stages of a renewable energy project can result in fewer delays in project approval, resulting in a “win-win” situation for the project proponent and involved stakeholder agencies.

## Glossary/Acronyms and Abbreviations

### Glossary of Terms

**Community Planning and Liaison Officer (CPLO)** – Expert counsel to the base commander as well as installation agency directors, on a broad range of community planning issues and matters of relations with outside agencies. The CPLO represents the interests of the military installation and/or military department in meetings, conferences and information exchanges with civilian officials (elected or appointed), agencies or planning bodies at the local, state or federal level. The CPLO presents the military installation information and views regarding various planning actions, considering economic, social, and defense considerations. The CPLO represents the base commander and speaks on behalf of the command to planners for various outside agencies, local communities, state and federal governmental officials, citizen groups, or professional business organizations.

**Curtailement** – Weather curtailement represents the temporary cessation of wind turbine operations when all the wind turbine blades are in a fully feathered position. For national security or defense purposes, curtailement occurs when all of the wind turbine blades are stopped and completely precluded from rotation about the rotor hub.

**FAA Obstruction Evaluation/Airport Airspace Analysis (OE/AAA)**<sup>2</sup>– Notification and analysis requirements under 49 U.S.C. §44718 that must be taken should construction affect the National Airspace System. Preliminary project review may be requested from the FAA (14 CFR 77). If a proposed development is more than 200 feet tall or less than 200 feet tall but near an airport, a Notice of Proposed Construction or Alteration form (FAA 7460-1) must be completed and submitted to the appropriate office at least 6 months prior to beginning construction. The form may be submitted via the FAA OE/AAA website or manually with the FAA. Following receipt of this notice, the FAA conducts a study to determine whether the project would create a hazard to navigable airspace. An ASN is assigned to each structure included in the project. Each ASN is analyzed for its potential to affect the military mission.

**Geographic Area of Concern (GAOC)** – Geographical Areas of Concern (GAOC) maps show specific mission areas where wind development would present a high risk of impact to military operations. Other military installations and areas may be located near the GAOC, so any project contemplated within or in the vicinity of a specific GAOC should also seek an informal review via the DoD Siting Clearinghouse as soon as possible. NWSTF Boardman has an approved GAOC.

**High Risk of Adverse Impact Zone (HRAIZ)** – A zone or area where there is a high likelihood of impact to mission requirements by renewable energy technology. Impacts may include radio frequency, wind, solar, geothermal and electrical transmission siting interference.

**Instrument Flight Rules (IFR)** – Rules and regulations established by the FAA to govern flight under conditions in which flight by outside visual reference is not safe. IFR flight depends upon flying by reference to instruments in the flight deck, and navigation is accomplished by reference to electronic signals.

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<sup>2</sup> DOD does **not** acknowledge this text as being a full and complete description of the FAA's OE/AAA process.

**Military Operating Area (MOA)** – Airspace to separate or segregate certain nonhazardous military activities from Instrument Flight Rules (IFR) traffic and to identify for Visual Flight Rules (VFR) traffic where these activities are conducted. MOAs are designated to contain nonhazardous military flight activities including, but not limited to, air combat maneuvers, air intercepts, low-altitude tactics, etc.

**Military Training Route (MTR)** – Mutually developed air traffic route for use by the military for the purpose of conducting low-altitude, high-speed training. The routes above 1,500 feet AGL are developed to be flown, to the maximum extent possible, under IFR. The routes at 1,500 feet AGL and below are generally developed to be flown under VFR. Generally, MTRs are established below 10,000 feet MSL for operations at speeds in excess of 250 knots. However, route segments may be defined at higher altitudes for purposes of route continuity. For example, route segments may be defined for descent, climb out, and mountainous terrain.

**Restricted Area (RA)** – Type of special use airspace established under 14 CFR Part 73 provisions, within which the flight of aircraft, while not wholly prohibited, is subject to restriction. Penetration of RAs by nonparticipating aircraft without authorization from the using or controlling agency may be extremely hazardous to the aircraft and its occupants and is prohibited. RAs are established when deemed necessary to confine or segregate activities considered hazardous to nonparticipating aircraft.

**Special Use Airspace (SUA)** – Airspace of defined dimensions wherein activities must be confined because of their nature, or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. Types of SUA include Prohibited Areas, Restricted Areas, Military Operations Areas, Warning Areas, Alert Areas, Controlled Firing Areas, and National Security Areas.

**Visual Flight Rules (VFR)** – Set of regulations under which a pilot operates an aircraft in weather conditions generally clear enough to allow the pilot to see where the aircraft is going. Specifically, the weather must be better than basic VFR weather minima (i.e. in visual meteorological conditions), as specified in the rules of the relevant aviation authority. The pilot must be able to operate the aircraft with visual reference to the ground, and by visually avoiding obstructions and other aircraft.

## Acronyms and Abbreviations

<b>AAA</b>	Airport Airspace Analysis
<b>ACUB</b>	Army Compatible Use Buffer
<b>ADS</b>	Authoritative Data Sources
<b>AGL</b>	above ground level
<b>AICUZ</b>	Air Installations Compatible Use Zones
<b>AIRNG</b>	Air National Guard
<b>AIS</b>	Automatic Identification System
<b>ANG</b>	Army National Guard
<b>APZ</b>	Accident Potential Zone
<b>A.R.S.</b>	Arizona Revised Statute
<b>ASN</b>	Aeronautical Study Number
<b>CaMEO CAMP</b>	California Military Energy Opportunity Compatibility Assessment Mapping Project
<b>CARSR</b>	Common Air Route Surveillance Radar
<b>CMLUCA</b>	California Military Land Use Compatibility Analyst
<b>COP</b>	Common Operating Picture
<b>CPLO</b>	Community Planning and Liaison Officer
<b>DENR</b>	Department of Environment and Natural Resources
<b>DNH</b>	Determination of No Hazard
<b>DoD</b>	Department of Defense
<b>EAP</b>	Encroachment Action Plan
<b>EFSC</b>	Energy Facility Siting Council
<b>FAA</b>	Federal Aviation Administration
<b>FLIP</b>	Flight Information Publication
<b>GAOC</b>	Geographic Area of Concern
<b>GCS</b>	Geographic Coordinate System
<b>HRAIZ</b>	High Risk of Adverse Impact Zone
<b>IFR</b>	Instrument Flight Rules
<b>INR</b>	Installation for Natural Resources
<b>INRMP</b>	Integrated Natural Resources Management Plan
<b>JART</b>	Joint Agency Review Team
<b>JLUS</b>	Joint Land Use Studies
<b>KIP</b>	Key Installation Planning
<b>MCAT</b>	Mission Compatibility Analysis Tool
<b>MILCON</b>	Federal Military Construction
<b>MILDEP</b>	Military Department
<b>MSL</b>	mean sea level
<b>MTR</b>	military training route
<b>NDS</b>	National Defense Strategy
<b>NW DoD RCT</b>	Northwest DoD Regional Coordination Team
<b>NWSTF</b>	Naval Weapons Systems Training Facility
<b>NZ</b>	Noise Zone
<b>OAR</b>	Oregon Administrative Record
<b>ODOE</b>	Oregon Department of Energy
<b>OE</b>	Obstruction Evaluation
<b>OLDCC</b>	Office of Local Defense Community Cooperation
<b>OMD</b>	Oregon Military Department
<b>OPR</b>	Office of Planning and Research
<b>ORESA</b>	Oregon Renewable Energy Siting Assessment
<b>ORNG</b>	Oregon National Guard
<b>ORS</b>	Oregon Revised Statutes
<b>RAC</b>	Rules Advisory Committee
<b>RAICUZ</b>	Range Air Installations Compatible Use Zones
<b>RCW</b>	Revised Code of Washington
<b>REPI</b>	Readiness and Environmental Protection Integration

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<b>SAC</b>	state agency coordination
<b>SUA</b>	special use airspace
<b>TSP</b>	Territorial Sea Plan
<b>UXO</b>	unexploded ordnance
<b>VFR</b>	Visual Flight Rules
<b>WAC</b>	Washington Administrative Code