Appendix G: Biological Resources Technical Report

For Programmatic Environmental Impact Statement on Utility-Scale Solar Energy Facilities in Washington State

By

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For the

Shorelands and Environmental Assistance Program

Washington State Department of Ecology

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Acronyms and Abbreviations List

BESS	battery energy storage system
BMP	best management practice
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DNR	Washington Department of Natural Resources
DPS	distinct population segment
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
ESA	Endangered Species Act
ESU	evolutionarily significant unit
GMA	Growth Management Act
HVAC	heating, ventilation, and air conditioning
IPaC	Information for Planning and Consultation
LiDAR	Light Detection and Ranging
MW	megawatt
NHD	National Hydrography Dataset
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries
NPDES	National Pollutant Discharge Elimination System
NWI	National Wetlands Inventory
PEIS	Programmatic Environmental Impact Statement
PHS	Priority Habitats and Species
RCW	Revised Code of Washington
ROW	right-of-way
SGCN	Species of Greatest Conservation Need
SMA	Shoreline Management Act
SMP	Shoreline Master Program
SWPPP	stormwater pollution prevention plan
USACE	U.S. Army Corps of Engineers
USC	*United States Code*
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSNWCB	Washington State Noxious Weed Control Board
WSRRI	Washington Shrubsteppe Restoration and Resiliency Initiative

Summary

This technical resource report describes the conditions of biological resources in the study area. It also describes the regulatory context, potential impacts, and measures to avoid, reduce, and mitigate impacts.

This technical resource report analyzes the following key features of biological resources in the discussions of the affected environment, potential impacts, and measures to avoid and reduce impacts:

- Terrestrial species and habitats, including the following:
  - Terrestrial species (including waterfowl) listed under the Endangered Species Act (ESA), Washington State species of concern (listed and candidate species), and those listed by county-specific code ordinances identifying species of local importance
  - Unique, priority, and culturally important terrestrial species and habitats
  - Wildlife migration routes
- Aquatic and amphibious species and habitats, including the following:
  - Aquatic and amphibious species listed under the ESA, Washington State species of concern (listed and candidate species), and those listed by county-specific codes or ordinances identifying species of local importance
  - Unique, priority, and culturally important aquatic and amphibious species and habitats
  - Salmonid and other fish migration routes
- Wetland habitats

Findings are summarized as follows:

- Through compliance with laws and permits and with the implementation of measures to avoid
- and reduce impacts, some construction, operation, and decommissioning activities would result in **less than significant impacts** on terrestrial habitats, including special-status habitats. Activities that cause the permanent degradation, loss, or conversion of suitable habitat that is critical to species viability or disrupt habitat continuity along migration routes would result in **potentially significant adverse impacts** on terrestrial habitats.
- Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some construction, operation, and decommissioning would result in **less than significant impacts** to terrestrial vegetation, including special-status plants. Activities that cause the permanent degradation, loss, or conversion of suitable habitat that is critical to species viability would result in **potentially significant adverse impacts** on terrestrial vegetation.
- Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some construction, operation, and decommissioning activities would result in **less than significant impacts** to terrestrial wildlife, including special-

status species. Activities that affect species viability and the mortality of any individual species or disturbance that disrupts successful breeding and rearing behaviors would result in **potentially significant adverse impacts** on terrestrial wildlife.

- Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, facilities would result in **less than significant impacts** to aquatic habitats and species.
- Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, facilities would result in **less than significant impacts** to wetlands.

Construction, operation, and decommissioning may result in **potentially significant and unavoidable adverse impacts** on terrestrial special-status habitats and species if activities cause the permanent degradation, loss, or conversion of suitable habitat that is critical to habitat or species viability; affect the mortality of any individual species or create a disturbance that disrupts successful breeding and rearing behaviors; or disrupt habitat continuity along migration routes. Determining if mitigation options would reduce or eliminate impacts below significance would be dependent on the specific project and site. Mitigation to reduce impacts below significance for terrestrial special-status habitats or species may not be feasible.

Crosswalk with Biological Resources Technical Report for Utility-Scale Onshore Wind Energy

Two Programmatic Environmental Impact Statements (PEISs) are being released at the same time, one for utility-scale solar energy facilities and one for utility-scale onshore wind energy facilities. This crosswalk identifies the areas with substantial differences between the biological resources technical reports for each PEIS.

Utility-Scale Solar Energy PEIS (this document)	**Utility-Scale Onshore Wind Energy PEIS**
• Differences in specific impact drivers associated with facilities • Some differences in measures to avoid and reduce impacts	• Larger study area includes consideration of additional ecoregions, marine and nearshore habitats and species, and estuarine wetlands • Differences in specific impact drivers associated with facilities • Some differences in measures to avoid and reduce impacts

1 Introduction

This technical resource report describes biological resources within the study area and assesses probable impacts associated with the types of facilities (alternatives) and a No Action Alternative. Chapter 2 of the State Environmental Policy Act Programmatic Environmental Impact Statement (PEIS) provides a description of the types of facilities evaluated (alternatives).

1.1 Resource description

Biological resources include both terrestrial and aquatic habitats and species. Each of these is described in the following sections. Wetlands are also discussed as a separate category due to the habitats they provide to terrestrial and aquatic species.

The following resources could have impacts that overlap with impacts to biological resources. Impacts on these resources are reported in their respective technical resource reports:

- **Earth:** Information on soil resources is addressed in the *Earth Resources Technical Report* (Appendix D).
- **Water:** Hydrological wetland functions and values and the potential effects on hydrological and water quality functions are addressed in the *Water Resources Technical Report* (Appendix F).
- **Land use:** Potential changes to environmental conservation value, farmland value, and ranchland value can be found in the *Land Use Technical Resource Report* (Appendix K).

1.1.1 Terrestrial species and habitats

Terrestrial species habitats are places where animals and plants live that are found on land, including forests, grasslands, deserts, shorelines, agricultural lands, and underground habitats like caves and burrow systems. Terrestrial species are the animals and plants that live in those habitats. Terrestrial animals typically include mammals, birds (including waterfowl), reptiles, insects, spiders, and other invertebrates. Terrestrial plants typically include various species of woody trees and shrubs, vines, and non-woody plants (e.g., grasses, sedges, rushes, forbs, and mosses).

The following key features are analyzed in the affected environment, potential impacts, and measures to avoid and reduce impacts discussions:

- Terrestrial species (including waterfowl) listed under the Endangered Species Act (ESA), Birds of Conservation Concern identified as at-risk species by the U.S. Fish and Wildlife Service (USFWS), Washington State species of concern (listed and candidate species), and those listed by county-specific code ordinances identifying species of local importance
- Unique, priority, and culturally important terrestrial species and habitats
- Wildlife migration routes

1.1.2 Aquatic species and habitats

Aquatic and amphibious species habitats are areas that have surface water that may be rain or snowmelt dependent (ephemeral), seasonally intermittent (flowing during certain times of the year), or year-round (perennial) that provide spawning, rearing, foraging, and migration areas for aquatic and amphibious species. They include wetlands, which are often generally described as transitional areas that occur between aquatic and terrestrial habitats.

Aquatic species include fish, mollusks, aquatic invertebrates, and other organisms that live in water for the duration of their life cycle. Amphibious species (i.e., amphibians) are those that use both aquatic and terrestrial habitats in their life cycles and include frogs, toads, newts, and salamanders.

The following key features are analyzed in the affected environment, potential impacts, and measures to avoid and reduce impacts discussions:

- Aquatic and amphibious species listed under the ESA, Washington State species of concern (listed and candidate species), and those listed by county-specific codes or ordinances identifying species of local importance
- Unique, priority, and culturally important freshwater habitat for aquatic and amphibious species, including migration routes for salmonids and other highly migratory species
- Wetlands that provide habitat for aquatic and amphibious species

1.1.3 Wetlands

Wetlands are a specific type of habitat that often occur in transitional areas between terrestrial and aquatic systems. They are typically characterized as areas where the underlying water table is at or near the soil surface or where the ground is covered by shallow water for an extended duration during the growing season. Such conditions result in the development of anaerobic (i.e., low oxygen) conditions in the upper part of the soil column.[1] Soils formed under such conditions are known as hydric soils. Wetlands also typically support vegetation that is specifically adapted to growing in saturated or flooded soil conditions. Such vegetation is known as hydrophytic, or "water-loving" vegetation, and can include various species of forbs and other non-woody plants, as well as shrubs, vines, and trees.

Wetlands in the study area can occur in stream and river channels, on floodplains, in low-lying areas and depressions, around the edges of ponds and lakes, and on slopes. They are typically distinguished from streams and rivers by the presence of rooted hydrophytic vegetation and the lack of a defined channel that conveys flowing water, although some wetlands can include channel-like features such as vegetated swales or drainages. Wetlands are primarily distinguished from deepwater aquatic habitats like lakes and ponds by water depth and the presence of vegetation. Deepwater aquatic habitats are typically permanently inundated with greater than 6.6 feet (2 meters) of water and do not support rooted-emergent or woody

[1] The upper part of the soil column is typically defined as the upper 12 inches.

vegetation (Cowardin et al. 1979; Environmental Laboratory 1987). Estuarine wetlands, found in brackish water in estuaries where freshwater meets saltwater, do not occur in the study area.

Wetlands provide a number of important ecosystem functions, including habitat for terrestrial, aquatic, and amphibious species; water quality improvement; flood protection; shoreline stabilization; groundwater recharge; and stream flow maintenance (Ecology 2023). This technical resource report focuses on those wetland functions associated with the provision of habitat for aquatic and terrestrial species. The regulation and jurisdictional boundaries of wetlands and the potential effects on hydrological (e.g., water storage and delay) and water quality functions are addressed in the *Water Resources Technical Report*.

1.2 Regulatory context

Table 1 provides the federal, state, and local regulations, statutes, and guidelines that potentially apply to the analysis for biological resources.

Table 1. Applicable laws, plans, and policies

Regulation, statute, guideline	Description
Federal	
United States Code (USC) 16.1531 et seq., Endangered Species Act	Provides for the conservation of species listed as threatened or endangered and the habitat upon which they depend. Section 7 requires consultation with USFWS and/or National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) when undertaking a federal action to ensure the conservation of any listed animal species and critical habitat so as not to jeopardize the continued existence of any listed species. NOAA Fisheries manages listed marine species while USFWS manages listed terrestrial and freshwater species.
16 USC 1539, Endangered Species Act	Provides for non-federal entities to obtain a permit for the incidental take of listed species resulting from an otherwise lawful activity, provided they develop and implement a Habitat Conservation Plan that minimizes and mitigates impacts to the species and its habitat. USFWS and/or NOAA Fisheries review and approve the Habitat Conservation Plan and issue the permit. NOAA Fisheries manages listed marine species while USFWS manages listed terrestrial and freshwater species.
16 USC 661, Fish and Wildlife Coordination Act	Requires equal consideration and coordination of wildlife conservation with other water resources development programs and provides authority to USFWS and NOAA Fisheries to evaluate impacts on fish and wildlife from federal actions that result in modifications to waterbodies.
16 USC 668 to 668c, Bald and Golden Eagle Protection Act of 1940, as amended	Prohibits the taking of bald eagles, including their parts, nests, or eggs, without a permit issued by USFWS, and provides criminal penalties for persons who “take, possess, sell, purchase, barter, offer to sell, purchase or barter, transport, export or import, at any time or any manner, any bald eagle... [or any golden eagle], alive or dead, or any part, nest, or egg thereof.”

Regulation, statute, guideline	Description
16 USC 703 to 713, Migratory Bird Treaty Act of 1918, as amended	Makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to federal regulations. Under the regulatory authority of USFWS.
67 *Code of Federal Regulations* 2343, Magnuson-Stevens Fishery Conservation and Management Act Provisions; Essential Fish Habitat (EFH)	Governs marine fisheries management in U.S. federal waters; federal agencies are required to consult with NOAA Fisheries on activities that may affect EFH.
16 USC 2901 et seq., Fish and Wildlife Conservation Act	The federal Fish and Wildlife Conservation Act of 1980 recognized that previous conservation acts focused on game fish and wildlife for commercial and recreational purposes. This act establishes a precedent for federal agencies to provide states with technical and financial assistance to create conservation plans for nongame fish and wildlife as well as those that are not listed species or marine mammals protected by the Marine Mammal Protection Act of 1972.
33 USC 1251 et seq., Clean Water Act (CWA)	The federal Water Pollution Control Act of 1948 was the first major U.S. federal law to address water pollution. The law was amended in 1972 and became commonly known as the CWA. The CWA establishes the basic structure for regulating pollutant discharges into waters of the United States and makes it unlawful to discharge any pollutant from a point source into those waters without a permit.
CWA Section 401 Water Quality Certification	Provides states with the authority to ensure that federal agencies do not issue permits or licenses that violate state water quality standards or other protections of the CWA. An applicant for a federal permit must obtain a Section 401 Water Quality Certification from the state in which the activity would occur. The Washington State Department of Ecology (Ecology), U.S. Environmental Protection Agency (USEPA), and some Tribes administer Section 401 of the CWA in Washington.
CWA Section 404 (Permits for Dredged or Fill Material)	Establishes a program to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. The U.S. Army Corps of Engineers (USACE) issues Section 404 permit decisions.
CWA Section 402 (National Pollutant Discharge Elimination System [NPDES])	Establishes the NPDES program, requiring pollutant discharges to surface waters be authorized by a permit. USEPA issues NPDES permits for federally owned facilities and Tribal lands in Washington. Ecology administers the NPDES permitting program for other facilities and lands in Washington.
Coastal Zone Management Act (CZMA) Federal Consistency	The federal consistency provisions of the CZMA require that federal actions, including federal activities and the issuance of federal licenses and permits, be consistent with the enforceable policies of the Washington Coastal Zone Management Program. This applies to federal actions in Washington's 15 coastal counties that could have reasonably foreseeable impacts on state coastal resources and uses. Administered by Ecology.

Regulation, statute, guideline	Description
16 USC 1271 to 1287, Wild and Scenic Rivers Act, 1968	This act establishes a National Wild and Scenic Rivers System for the protection of rivers that have important scenic, recreational, fish and wildlife, and other resources. The system protects the designated river and an adjacent corridor of land. Wild and scenic river corridors contain both private and public lands. Restrictions associated with the Wild and Scenic Rivers Act apply only to federal lands..
Executive Order 11990, Protection of Wetlands	Provides the overall wetlands policy applicable to all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. Requires federal agencies to follow avoidance, mitigation, and preservation procedures and to obtain public input before new construction in wetlands. Consistency with the overall wetlands policy contained in Executive Order 11990 is achieved through CWA Section 404 compliance requirements.
State	
Chapter 220-610 Washington Administrative Code (WAC), Washington Department of Fish and Wildlife (WDFW) State and Protected Species; WDFW Priority Habitats and Species	Grants WDFW the responsibility to oversee the listing and recovery of state endangered, threatened, or sensitive species to ensure their survival as free-ranging populations in the state.
Washington State Wildlife Action Plan	Provides a comprehensive plan for conserving the state's fish and wildlife and its natural habitats as part of the State and Tribal Wildlife Grants Program. Identifies the Species of Greatest Conservation Need. Many species of uncertain conservation need are listed in the Washington State Wildlife Action Plan. Currently being updated to identify Habitats of Greatest Conservation Need.
Chapter 90.58 Revised Code of Washington (RCW), Washington State Shoreline Management Act (SMA)	Establishes a state-local partnership for managing, accessing, and protecting Washington's shorelines. The law requires local governments to prepare locally tailored policies and regulations for managing shoreline use in their jurisdictions called Shoreline Master Programs (SMPs). Local governments review shoreline development proposals for compliance with SMP standards. Applies to shorelines of the state, including marine waters, streams and rivers with greater than 20-cubic-feet-per-second mean annual flow, lakes 20 acres or larger, upland areas extending 200 feet landward from the edge of these waters, biological wetlands and river deltas connected to these water bodies, and some or all of the 100-year floodplain, including all wetlands.
Chapter 36.70A RCW, Washington State Growth Management Act	Requires all cities and counties in Washington to adopt development regulations, according to the best available science, that protect critical areas as defined in RCW 36.70A.030(5), including fish and wildlife habitat conservation areas.

Regulation, statute, guideline	Description
Title 77 RCW, Fish and Wildlife	Authorizes WDFW to regulate fish, shellfish, and wildlife species in the State of Washington. Includes the following chapters that are relevant to impacts on fish species and habitats: 77.44: Warmwater game fish enhancement program 77.55: Construction projects in state waters 77.57: Fishways, flow, and screening 77.85: Salmon recovery 77.95: Salmon enhancement program 77.105: Recreational salmon and marine fish enhancement program 77.110: Salmon and steelhead trout – Management of resources 77.135: Invasive species
Chapter 220-640 WAC, Invasive/Non-Native Species	Classifies prohibited and regulated species and regulates the introduction or possession of non-native and invasive aquatic species.
Chapter 17.10 RCW, Noxious Weeds	Requires owners to eradicate, control, and prevent the spread of noxious weeds within and from their property. Includes the state Noxious Weed List (Class A, B, and C), definitions and descriptions of region boundaries for Class B weeds, and the schedule of monetary penalties.
Washington Department of Natural Resources (DNR) Natural Heritage Program (advisory)	Assigns conservation status to species and habitats to support federal, state, and local land management policies and listing decisions; has no direct regulatory authority and is advisory only.
DNR 2006 Policy for Sustainable Forests and 1997 Habitat Conservation Plan	Guides DNR's long-term sustainable management of forested state trust lands.
Chapter 77.55 RCW; Chapter 220-660 WAC, Washington State Hydraulic Code	Implements Chapter 77.55 RCW (Construction Projects in State Waters), regulating projects that use, divert, obstruct, or change the natural flow or bed of any water of the state. Requires entities who are planning such projects to obtain a Hydraulic Project Approval from WDFW.
Chapter 90.48 RCW, Water Pollution Control Act	The Water Pollution Control Act sets standards to ensure the purity of all waters of the state and to work cooperatively with the federal government where interest overlaps in a joint effort to extinguish the sources of water quality degradation. Grants Ecology the jurisdiction to control and prevent the pollution of streams, lakes, rivers, ponds, inland waters, salt waters, water courses, and other surface and groundwater in the state, including wetlands. Tool Ecology uses to regulate certain activities in non-federally regulated waters, including wetlands, through the issuance of authorizations to work in waters of the state.
Chapter 90.74 RCW, Aquatic Resource Mitigation	Requires state regulatory agencies to consider mitigation proposals for projects that are designed in a manner to provide equal or better biological functions compared to traditional on-site mitigation proposals.

Regulation, statute, guideline	Description
Chapter 90.54 RCW, Water Resources Act of 1971	Provides fundamentals of water resource policy for the state to ensure that waters of the state are protected and fully utilized for the greatest benefit to the people of the State of Washington; provides direction to state and local governments in carrying out water and related resources programs.
Title 173 WAC, Department of Ecology	• Chapter 173-201A WAC: Water Quality Standard for Surface Waters of the State of Washington • Chapter 173-204 WAC: Sediment Management Standards • Chapter 173-22 WAC: Adoption of Designations of Shorelands and Wetlands Associated with Shorelines of the State • Chapter 173-226 WAC: Waste Discharge General Permit Program • Chapter 173-500 WAC: Water Resources Management Program Established Pursuant to the Water Resources Act of 1971
Chapter 76.09 RCW, Washington Forest Practices Act	Forest practices in Washington are regulated by means of the Forest Practices Act. This includes all non-federal and non-Tribal lands within the state. The industry is governed by the Washington Forest Practices Board to protect the state's natural resources, including fisheries and wildlife, and also to maintain a viable timber industry. DNR enforces the rules that are adopted by the board.
Washington State Executive Order 89-10, Protection of Wetlands	Establishes an interim goal to achieve no overall net loss in acreage and function of Washington's remaining wetlands base and a long-term goal to increase the quantity and quality of Washington's wetlands resource base.
Local	
Critical areas ordinances	As required under Washington's Growth Management Act, cities and counties have development regulations to protect critical areas. Critical areas can be related to public health and safety or public welfare (e.g., habitat protection).
Shoreline codes	Local codes regulate development within shorelines of the state in accordance with SMPs and state SMA requirements.

2 Methodology

The purpose of this section is to provide the reader with an overview of the process for evaluating potential impacts to biological resources, and the criteria for determining the occurrence and degree of impact.

2.1 Study area

The study area for biological resources encompasses the overall solar geographic scope of study for the PEIS (Figure 1) and surrounding areas relevant to biological resources. Study areas specific to sub-elements of biological resources are described below.

The PEIS geographic scope of study includes various federal, state, and locally managed lands; however, Tribal reservation lands; national parks, wilderness areas, and wildlife refuges; state parks; and areas within cities and urban growth areas were excluded. Some of these areas adjacent to the PEIS geographic scope of study are considered in the study area if they contain biological resources that may be impacted by projects.

2.1.1 Terrestrial

The study area for the analysis of terrestrial species and habitats includes the following:

- Terrestrial habitat, including USFWS critical habitats; 75 National Audubon Society-defined Important Bird Areas; Washington Department of Fish and Wildlife (WDFW) Priority Habitats and Species (PHS) priority habitats (e.g., Aspen Stands, Riparian, Biodiversity Areas and Corridors, Shrubsteppe); habitat features such as caves, cliffs, snags and logs, and taluses; and other terrestrial habitats that support priority species such as agricultural lands or disturbed areas
- Non-wetland terrestrial and riparian habitat regulatory buffers required by counties and municipalities for the protection of critical areas as required by the Washington Growth Management Act (GMA)
- Vertical air space above ground that is typically used by bird, bat, and other flying species, and vertical depths below ground that may be used by burrowing species

2.1.2 Aquatic

The study area for the analysis of aquatic species and habitats includes the following:

- Freshwater aquatic habitat, including critical habitat determined by National Oceanic and Atmospheric Administration Fisheries (NOAA Fisheries) and by USFWS, and the following PHS priority habitats identified by WDFW: Instream, Freshwater Wetlands, and Fresh Deepwater habitat types
- Waters of the state or the United States and their associated regulatory buffers required by cities and counties for the protection of critical areas under the Washington Shoreline Management Act (SMA) and the GMA

2.1.3 Wetlands

The analysis for impacts on wetland habitats from utility-scale solar energy facilities includes wetlands and their associated regulatory buffers. This includes buffers required by counties and municipalities for the protection of critical areas under the SMA and the GMA.

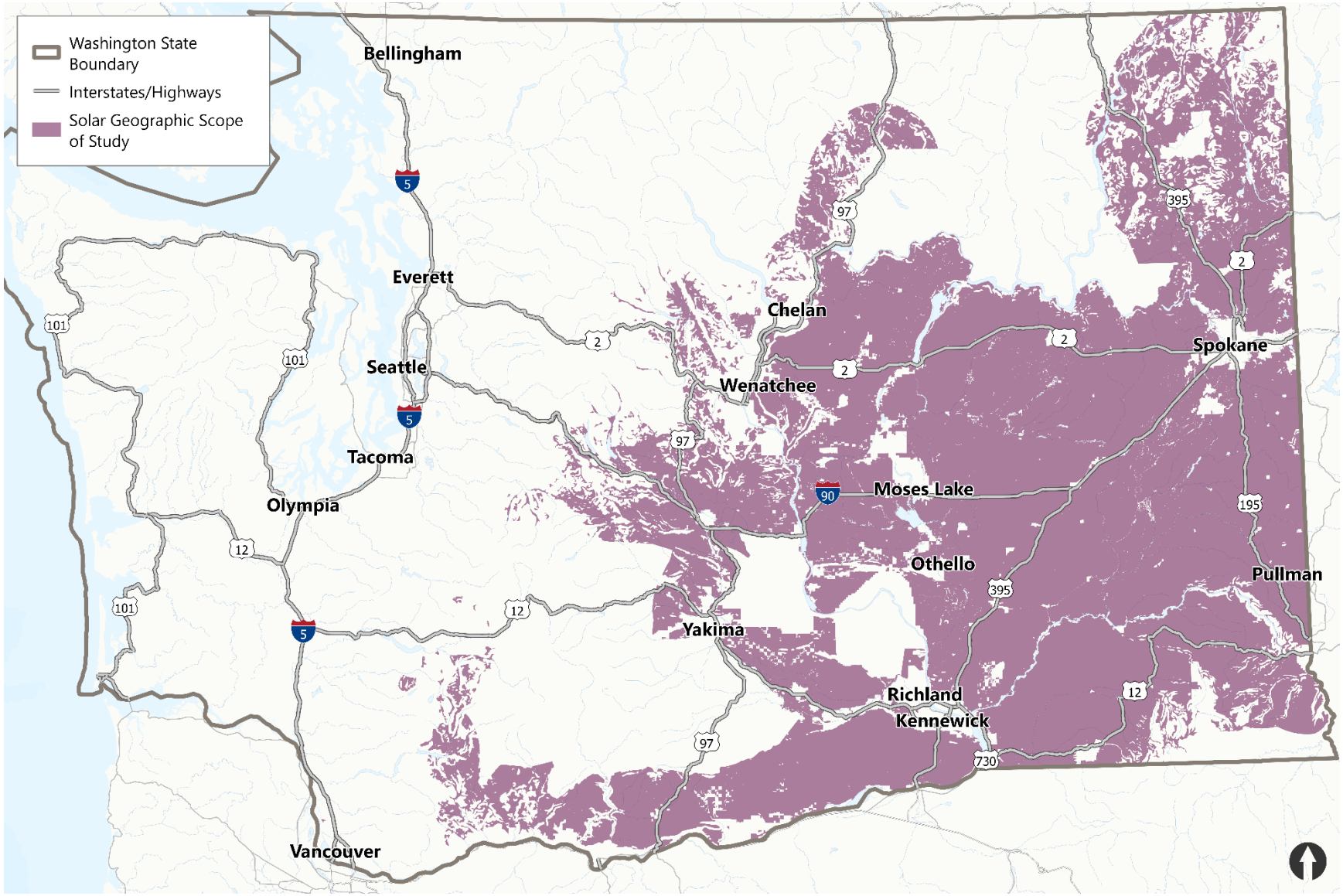

Figure 1. Solar Energy Facilities PEIS – geographic scope of study

2.2 Technical approach

The general approach for analyzing biological resources includes the following steps:

- Use existing data and information from publicly available sources to generally characterize key species and habitat conditions in the study area.
- Qualitatively evaluate biological resource impacts of the types and sizes of utility-scale solar energy projects and range of activities that could be expected relative to baseline and predicted future conditions.
- Evaluate the impacts relative to applicable laws and regulations (e.g., "special-status species and habitats" which include ESA-listed species, Washington State-listed species [including those on the PHS list], Washington Department of Natural Resources [DNR] heritage species, and those defined in county code or ordinance as species of local importance).

The analyses of potential impacts on terrestrial (including waterfowl), aquatic (including amphibious), and wetlands species and habitat, from site characterization, construction, operations, and decommissioning of utility-scale solar energy facilities is qualitative and based on review of available information.

Impacts on biological resources would have a duration. Permanent impacts would result when terrestrial, aquatic, and amphibious species or habitats are removed or impaired to such a degree that they would not return to their pre-construction state. In addition, if wildlife are excluded from a site for an extended period of time, it is uncertain if those species would reoccupy the site after decommissioning and site restoration, resulting in a permanent impact. In recent project-level reviews, WDFW considered fenced areas at solar projects to be a permanent impact because fences limit or prevent wildlife access and alter wildlife corridors. Temporary impacts would result when short-term disturbance of terrestrial, aquatic, and amphibious species or habitats would occur but would not prevent the re-establishment of conditions similar to those before the project in the affected areas. The Washington State Department of Ecology (Ecology) defines short-term temporary wetland impacts as impacts that last for a limited time, and wetland functions return to pre-impact performance within about 1 year or within one growing season of the impact. Long-term temporary wetland impacts are defined by Ecology as impacts that affect wetland functions that would eventually be restored or recover over time, but not within a year or so (Ecology et al. 2021).

Sources analyzed included publicly available habitat and species occurrence mapping; species-specific studies and information; and lists of federal and state threatened, endangered, and other special-status species. Existing literature was used to characterize the affected habitats relative to natural processes, properly functioning habitat, and presence of invasive species. A properly functioning habitat is considered a suitable habitat for a species when it provides all the necessary resources and conditions for a species to survive, thrive, and reproduce, including water, food, shelter, and space. The magnitude of impacts was evaluated in the context of the health and uniqueness of species populations relative to proper habitat functions. Assumptions

about the magnitude of impacts also relied on conclusions from other technical resource reports being prepared for the Draft PEIS (including the *Water Resources Technical Report* and the *Land Use Technical Resource Report* regarding potential changes to water resources and environmental conservation value, farmland value, and ranchland value). The conclusions of those reports define the natural processes that would be affected in the context of expected changes to the broader environment over time.

A project-level environmental review of impacts on terrestrial and aquatic habitats and species (including wetland habitats and regulatory buffers) would consider the most recent and relevant regional and local guidelines, regulations, and site-specific assessments.

2.2.1 Terrestrial

This section describes the methods that were used to analyze the potential impacts on terrestrial habitats and species.

The analysis of impacts on terrestrial species and habitats addresses 1) impacts on terrestrial animals, including mortality due to project activities; 2) impacts on their habitat; and 3) impacts to adjoining habitats or migration routes and wildlife corridors that may occur because of site characterization, construction, operation, and decommissioning activities, including habitat fragmentation of important wildlife migration routes. Habitat impacts may include changes to habitat quantity or habitat function, that is, changes to the natural processes that support that habitat. Impacts from construction and decommissioning were evaluated for their relatively short-term effects, as well as any longer-term effects that persist after the construction or decommissioning activities end. Impacts from operations are evaluated for the presence of the infrastructure and activities for the duration of the assumed operating period (30 years).

Impacts on terrestrial wildlife species consider construction and decommissioning effects, such as noise and vehicle traffic. Impacts on terrestrial plant species consider construction effects such as removal and erosion. Impacts from operations consider the removal, reduction, or alteration of resources (e.g., cover, foraging opportunities, prey). Impacts also consider effects on terrestrial plants and wildlife species in terms of potential long-term habitat changes from operations.

Publicly available information on existing terrestrial species and habitats from local, state, and federal agencies was used to make assumptions about the importance of the affected species and habitats in context of their uniqueness across Washington and the viability of their populations. Impacts to terrestrial species and habitat considered are those that have geographic overlap between the study areas.

2.2.2 Aquatic

This section describes the methods that were used to analyze the potential impacts on aquatic habitats and species.

The analysis of impacts on aquatic species and habitats addresses 1) impacts on aquatic animals, including mortality due to project activities; and 2) impacts on their habitat. Habitat impacts may include changes to habitat quantity or habitat function, that is, changes to the natural processes that support that habitat. Impacts from construction and decommissioning were evaluated for their relatively short-term effects, as well as any longer-term effects that persist after the construction or decommissioning activities end. Impacts from operations were evaluated for the presence of the infrastructure and activities for the duration of the assumed operating period (30 years).

Publicly available information on existing aquatic species and habitats from local, state, and federal agencies was used to make assumptions about the importance of the affected species and habitats in context of their uniqueness across Washington and the viability of their populations. Species that were considered are those that have geographic overlap between the study areas and these species' known habitats or their associated riparian or other buffer areas.

2.2.3 Wetlands

The existing conditions of wetlands in the study area were generally characterized using publicly available information on the potential occurrence of wetlands in the landscape including the USFWS National Wetlands Inventory (NWI), Ecology's Modeled Wetland Inventory, the U.S. Geological Survey (USGS) National Hydrography Dataset (NHD), local wetland datasets, and aerial photography. Because there are no comprehensive sources that identify, describe, and map the presence/absence, extent, and conditions of wetlands in Washington, future developers would be expected to provide additional quantitative analyses and site surveys (e.g., wetland determinations/delineations, wetland rating and functions and values assessments, critical area assessments) to determine the amount, type, and category of wetlands and the width and condition of their associated buffers that would be altered, removed, or converted as a result of their projects.

2.3 Impact assessment approach

The PEIS analyzes a time frame of up to 20 years of potential project construction and up to 30 years of potential project operations (totaling up to 50 years into the future). For the purposes of this assessment, a potentially significant impact would occur if a project resulted in the following:

- Construction actions that cause permanent degradation, loss, or conversion of terrestrial habitat function due to changes in habitat quantity, habitat quality, habitat connectivity, prey abundance, interactions with non-native species, or other key functional elements that are critical to species viability.
- Operations that cause ongoing or repeated disturbance of terrestrial habitat function due to changes in habitat quantity, habitat quality, habitat connectivity, prey abundance, interactions with non-native species, or other key functional elements that are critical to species viability.

- Actions like earthwork, or noise and vibration that produce disturbance, stranding, entanglement, permanent injury, or mortality to any species that occurs frequently, or single events affecting any special-status species, or events that increase the need for federal or state listing of a species or increases risk to species viability.
- Construction actions that cause permanent degradation, loss, or conversion of aquatic habitat function or reduction in aquatic habitat, including wetland habitat function, due to changes in surface water quantity or quality, riparian area condition, prey abundance, interactions with non-native species, or other key functional elements that are critical to species viability or are rare or unique in Washington.
- Operations that cause ongoing or repeated disturbance of aquatic habitat, including wetland habitat function, due to changes in surface water quantity or quality, riparian area condition, prey abundance, interactions with non-native species, or other key functional elements that are critical to species viability.

2.3.1 Terrestrial

Impacts include any activities that result in the loss of terrestrial habitat or reduction in terrestrial habitat due to changes in habitat quantity, habitat quality, habitat connectivity, prey abundance, interactions with non-native species, or other key functional elements. Activities that disturb, strand, entangle, injure, or kill terrestrial species resulting from actions like earthwork, or noise and vibration are considered to be impacts. Frequent mortality or injury to any species, or single events affecting any special-status species, or events that increase the need for federal or state listing of a species or increases risk to species viability are considered to be impacts.

Impacts to terrestrial habitats or their regulatory buffers have a duration, affected area, and significance level. Activities that result in impacts to terrestrial habitats and regulatory buffers may include the following:

- Excavation
- Erosion
- Soil compaction
- Grading
- Vegetation removal or alteration
- Establishment of temporary staging and laydown areas
- Installation of foundations for buildings and equipment
- Trenching for installation of underground utility lines
- Road and utility corridor construction
- Road improvements
- Installation of security fencing and road access gates
- Placement of lighting, fencing, and noise-generating structures/activities
- Battery fires

Impacts related to excavation, erosion, or grading can be identified by overlaying the footprint of the proposed project on the resource mapping using geospatial software. Impacts would be further determined using field surveys to gather data and assess the potential effects.

2.3.2 Aquatic and wetlands

Impacts include any activities that result in the loss of aquatic habitat or reduction in aquatic habitat, including wetland habitat function due to changes in surface water quantity, surface water quality, riparian area condition, prey abundance, interactions with non-native species, or other key functional elements. Activities that disturb wetlands or their regulatory buffers, or that affect the continued existence of such a resource in its current form (e.g., hydrologic alteration) are considered to be impacts.

Impacts to aquatic habitats, wetlands, or their regulatory buffers have a duration, affected area, and significance level. Activities that result in impacts to aquatic habitats, wetlands, and regulatory buffers may include the same activities listed for terrestrial habitat as well as the following:

- Draining or dewatering
- Discharging water or redirecting runoff
- Discharge of material to or removal from wetlands or their regulatory buffers
- Discharge of potential pollutants including sediments
- Road crossing, culvert installation, or bridge construction

Impacts related to excavation, grading, or fill placement in wetlands can be determined by overlaying the footprint of the proposed projects and limits of grading/construction on the resource mapping using geospatial software. Any mapped wetlands or regulatory buffers that occur within a project footprint or impact area are considered impacts. Wetland impacts determined through these analyses are quantified by their Cowardin and hydrogeomorphic classification and their state wetland rating, which are determined using either the *Washington State Wetland Rating System for Eastern Washington* (Hruby 2014) or the *Washington State Wetland Rating System for Western Washington: 2014 Update (Version 2)* (Hruby and Yahnke 2023), depending on site location.

Impacts to other types of aquatic habitat can be determined by characterizing waterbody types within the study area (deep freshwater or freshwater instream habitat with ephemeral, intermittent, or perennial flow) and whether those waters are fish-bearing. Fish-bearing waters may be further characterized as spawning and rearing habitat, foraging habitat, or migratory corridors for the species that are present. Essential Fish Habitat (EFH) and critical habitat for special-status species can be identified using geospatial analysis.

If projects are located in wetland areas or adjacent to other waterbodies, their placement would be subject to all applicable statutory requirements and associated regulations, such as Section 404 of the Water Act (CWA) and local critical areas ordinances and Shoreline Master Programs (SMPs).

3 Technical Analysis and Results

3.1 Overview

This section describes the affected environment within the study area and discusses the probable impacts on terrestrial, aquatic, and wetland wildlife species, plant species, and habitats from the utility-scale solar energy facilities analyzed in the PEIS and the No Action Alternative. This section also evaluates measures to avoid, reduce, and mitigate impacts,, along with potential unavoidable significant adverse impacts. Potentially required permits are also addressed.

3.2 Affected environment

The affected environment represents the existing conditions at the time the study was prepared and provides the baseline for evaluating how a specific natural or built environment resource could be affected by proposed projects. Depending on the resource, and because the temporal scope of analysis includes 20 years within which potential projects could be constructed and 30 years of potential project operations (50 years total), the potential for the affected environment to change in that time must also be considered.

The study area is bordered by the Cascade Range to the west, Canada to the north, Idaho to the east, and the Columbia River and Oregon to the south. Due to the size of the utility-scale solar study area, the characterization of the affected environment provided in this technical resource report is relatively general and based on the Level III Ecoregions identified for the state by the U.S. Environmental Protection Agency (USEPA; Table 2). The study area for this analysis includes portions within six ecoregions, as shown in Figure 2. Ecoregions are geographic areas where ecosystems, and the type, quality, and quantity of environmental resources that compose them, are generally similar (USEPA 2023). They are based on a framework derived from Omernik (1987) and were developed by grouping areas using patterns of similarity in the various biotic, abiotic, terrestrial, and aquatic ecosystem components of a landscape. Ecoregions typically include combinations of geology, landforms, soils, vegetation, wildlife, climate, and hydrology. Additional information of the typical landforms, climate, and water resources for each ecoregion in Washington were obtained from multiple sources including Omernik 1987, 2010; Bryce and Woods 2000; and USEPA 2023.

Table 2. Level III Ecoregions within the Solar Energy Facilities PEIS geographic scope of study

Level III Ecoregion	Major habitat type	Description
Cascades	Cascade mountain range, volcanoes, glaciers, coniferous forests, subalpine meadows	Steep ridges and river valleys to the west and high plateau to the east. Mountainous region with active and dormant volcanoes. Rocky alpine zones and subalpine meadows occur at high elevations. Maritime weather brings mild conditions that support coniferous forests of Douglas fir, western hemlock, and western red cedar. Surface water systems typically include reservoirs and medium gradient rivers and streams occurring in u-shaped, glaciated valleys in the lowlands; high to medium gradient streams and glacial rock-basin lakes occurring in montane highlands; sinuous, medium gradient streams, glacial rock-basin lakes, small lakes on collapsed lava flows and wetlands in montane forested areas; and cascading streams and glacial tarns in subalpine/alpine areas. Major river systems in this ecoregion include the upper portions of the Cowlitz, Lewis, East Fork Lewis, Kalama, North Fork Toutle, and Cispus rivers, which flow to the Columbia River; and the Puyallup, Carbon, Green, White, Duwamish, and West Fork White rivers, which all flow toward Puget Sound.
Eastern Cascades Slopes and Foothills	Coniferous forest, sagebrush steppe, grassland	The region is in the rain shadow of the Cascade Range. The dry continental climate creates greater temperature extremes. Vegetation is highly susceptible to wildfire. This region is one of Washington's most heavily forested areas with open ponderosa and lodgepole pine forests. Surface water systems typically include medium to high gradient, permanent and intermittent streams and rivers running through canyons, with springs commonly occurring in the Yakima Plateau and associated slopes; high gradient, permanent streams and rivers with scattered glacial rock-basin lakes in areas dominated by grand fir mixed forests; and permanent and intermittent, mostly medium gradient streams and rivers in the eastern Cascades and Columbia foothills. Major river systems in this ecoregion include the Little White Salmon, White Salmon, and Klickitat rivers, and a small section of the Yakima River, which all flow to the Columbia River.

Level III Ecoregion	Major habitat type	Description
Columbia Plateau	Shrubsteppe, fertile agricultural lands, Palouse Hills	The Columbia Plateau is dominated by arid sagebrush steppe and grassland. The region is located within the rain shadow of the Cascade mountains. Summers are hot and dry with precipitation occurring mainly between late fall and early spring. Surface water systems typically include perennial, intermittent, and ephemeral streams, some of the larger of which flow through steep river canyons and coulees, that are tributary to the Columbia River. Multiple human-created reservoirs are present and primarily used to supply hydroelectric power and irrigation water for the extensive agricultural uses that occur throughout this ecoregion. Extensive emergent wetlands supported by irrigation runoff are present as are riparian wetlands. Major river systems in this ecoregion include a portion of the middle Columbia River, as well as portions of the Yakima, Snake, Clearwater, Spokane, Walla Walla, and Okanogan rivers, all of which flow to the Columbia River. Large human-created reservoirs are also present including multiple impoundments on both the Columbia River (Priest Rapids Lake, Lake Wanapum, Lake Entiat Rock Island Pool, Lake Pateros, Rufus Woods Lake, and part of Franklin Delano Roosevelt Lake) and the Snake River (Lake Sacajawea, Lake Herbert G. West, Lake Bryan). Other reservoirs such as Potholes Reservoir, Banks Lake, and Billy Clapp Lake have been created by flooding potholes and coulees that were originally carved out by multiple cataclysmic floods from Glacial Lake Missoula during the Pleistocene epoch.
Blue Mountains	High plateau, coniferous forest, Palouse prairie, rimrock canyons	Mountain ranges that are volcanic in origin and generally lower and more open than the neighboring Cascades region. Coniferous forests dominate the region consisting of species such as ponderosa pine, Douglas fir, western larch, and Engelmann spruce. Higher reaches of the mountains are cold and wet while lower elevations are hot and dry. Surface water systems include perennial streams and rivers that typically run down relatively steep slopes and through the bottom of moderately steep river valleys. Major river systems in this ecoregion include the Snake, Grande Ronde, and upper portion of the North Fork Touchet rivers, all of which drain to the Columbia River.
Northern Rockies	Boreal forest, alpine meadows, riparian woodlands, grasslands	Mountainous region with thick volcanic ash deposits. Alpine characteristics are found at the highest elevations. Boreal weather patterns influence the north while inland maritime patterns influence the south. Marine-influenced vegetation such as Douglas fir, ponderosa pine, and subalpine fir dominate. Major river systems in this ecoregion include the south-southeast flowing Columbia River, north-flowing Pend Oreille River, south-flowing Kettle River, and the west-northwest flowing Spokane River. Multiple glacial kettle lakes are also present, and a portion of the impounded Columbia River known as Franklin Delano Roosevelt Lake also extends into this ecoregion from the adjacent Columbia Plateau ecoregion.

Level III Ecoregion	Major habitat type	Description
North Cascades	Cascade mountain range, subalpine parklands, coniferous forests, deciduous forests	High rugged mountains with active alpine glaciers. Dry continental climate in the east and mild, maritime rainforest conditions in the west. Coniferous forests of western red cedar, Douglas fir, and western hemlock intermix with riparian areas that support broadleaf trees such as bigleaf maple and red alder. Surface water systems are highly variable and include perennial medium gradient, glacial-fed rivers and streams, reservoirs, and glacial lakes common in lowland forested areas; cascading glacial streams and glacial rock-basin lakes in highland forests; high gradient, sediment laden, glacial meltwater streams and glacial rock-basin lakes in alpine and subalpine areas; small glacial rock-basin lakes and both permanent and intermittent high gradient streams in the highlands around the Pasayten River and Sawtooth Mountain range; medium to high gradient, permanent and intermittent streams and rivers, with some alpine glacial rock-basin lakes and irrigation storage reservoirs in the Okanogan hills; medium to high gradient rivers and streams and glacial rock-basin lakes in the Chelan tephra hills; high gradient streams and rivers, with some glacial rock-basin lakes in the Wenatchee/Chelan highlands; steep gradient perennial and intermittent streams with high sediment loads and a general trellis-shaped drainage pattern in the Chiwaukum Hills and Lowlands region; and cascading glacier-fed streams and glacial rock-basin lakes in the high Olympic Mountain region. Major river systems in this ecoregion include the Skagit, Stillaguamish, Snohomish, and Nooksack rivers. Some drainages have been dammed for hydroelectric power, creating large reservoirs such as Ross and Baker lakes.

Sources: Omernik 1987, 2010; Bryce and Woods 2000; USEPA 2023

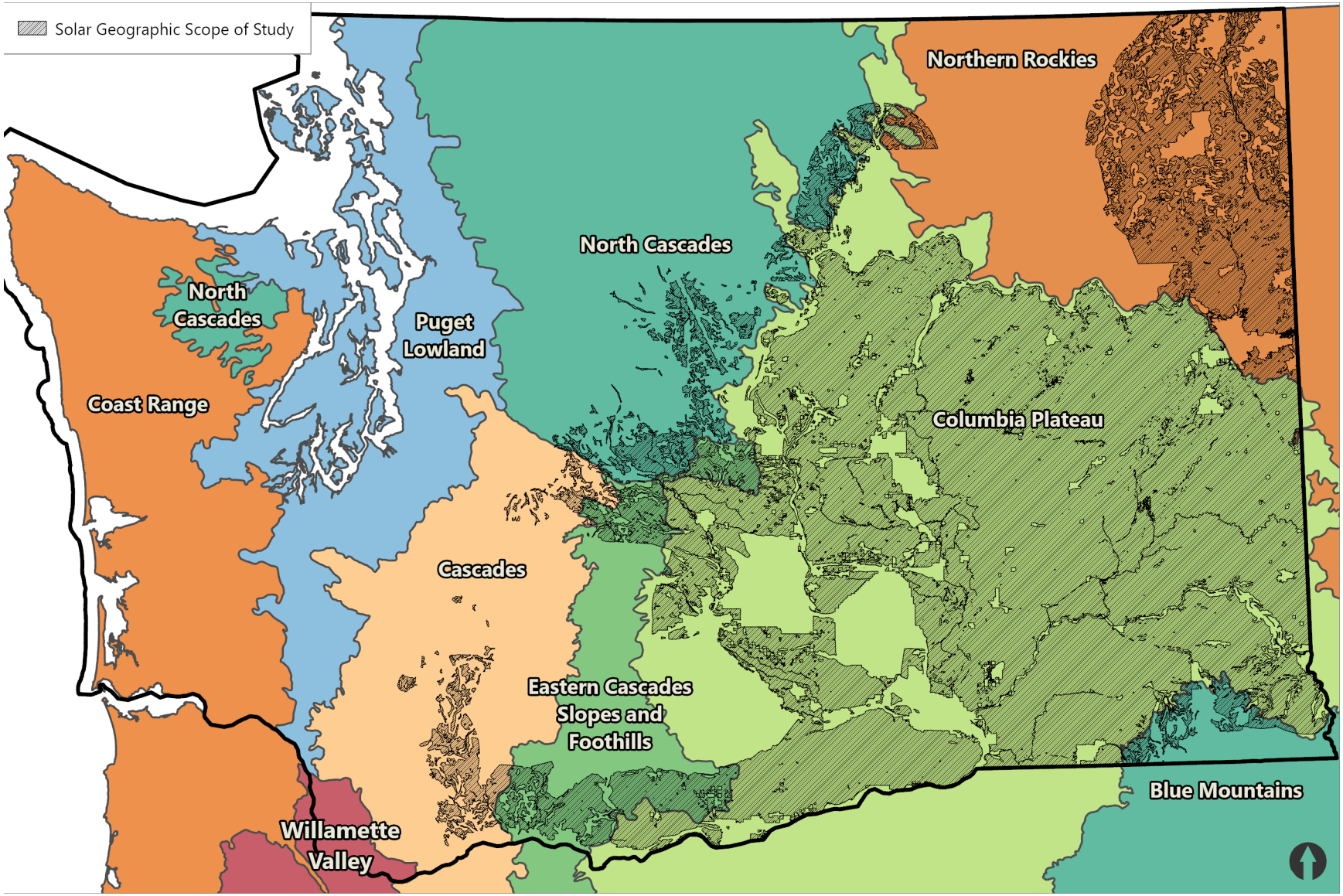

Figure 2. Level III Ecoregions

Source: USEPA 2024

3.2.1 Terrestrial habitats

The solar energy study area for terrestrial habitats occurs within six of the nine Level III Ecoregions of Washington state (Table 2, Figure 2). These Level III Ecoregions are delineated based on a general similarity in ecosystems, and throughout the state they are further characterized by a number of ecological systems or habitat types and vegetation communities (Level IV Ecoregions; Bryce and Woods 2000). Table 2 also provides an overview of typical climatic conditions for each Level III Ecoregion. In more developed areas, vineyards, tree farms, orchards, pastures, croplands, and parks dominate the landscape.

The following sections describe specific terrestrial habitats within the affected environment.

3.2.1.1 Air habitat

The air habitat over the study area is used by bird and bat species for flying behaviors such as soaring, hunting, foraging, breeding, and migrating. The extent at which air habitat is used by birds and bats varies depending on behaviors, flight altitudes, and seasonal activities (e.g., breeding, migration). Air habitat is also important for flying and wind-dispersing invertebrates and for wind seed dispersal. Depending on the species, air habitat is bound by geographical limitations, such as mountain ridges, valleys, waterbodies, forestlands, and existing development. Soaring raptors, such as bald and golden eagles, rely on wind for lift to reduce energetic costs during flight (Johnston et al. 2014). Additionally, existing topographic features of ridgelines create vertically deflected air currents that provide lift for soaring birds. This type of vertical lift is usually strongest within the first thousand feet of the terrain surface (Johnston et al. 2014).

3.2.1.2 Bird habitat

In addition to air habitat, the study area includes a wide variety of bird habitat, including forests and woodlands, such as boreal forests, coniferous or mixed forests, and riparian woodlands; grasslands and open habitats, including grasslands, prairies, shrubsteppe, and open terrain; inland waters, wetlands, and coastal areas, such as marshes, estuaries, and shorelines; arid and high-elevation environments, including deserts, tundra, and mountainous areas; and human-influenced landscapes, such as cities, suburban areas, and agricultural lands. The availability of food, water, shelter, and space drives habitat use depending on the bird species and time of year. The study area also overlaps with 75 National Audubon Society-defined Important Bird Areas (Cullinan 2001). The Important Bird Areas are located in three regions: Western Lowlands, Cascade Mountains, and Columbia Basin.

3.2.1.3 Bat habitat

The study area includes a wide variety of bat habitat, including forests, deserts, canyons, shrubsteppes, dry grasslands, meadows, riparian areas, alpine, agricultural areas, and suburban areas, depending on the species (WDFW 2025a). Bats utilize snags, trees, crevices in rocks, talus, tunnels, buildings, bridges, caves, and mine shafts for roosting or hibernation. Recent,

local bat survey data are available through the North American Bat Monitoring Program (North American Bat Monitoring Program 2025).

3.2.1.4 Ungulate habitat

Ungulate (hooved mammal) species found in Washington state include elk, moose, various types of deer, bighorn sheep, mountain goat, and pronghorn antelope. These species are further discussed in Section 3.2.2.3.2. Ungulates typically require temporally and spatially diverse habitat components to provide food and cover and have large home ranges across entire landscapes rather than isolated patches of habitat (Kie et al. 2003). In general, and with the exception of pronghorn antelope, most ungulates in Washington commonly occur in coniferous forests, including Douglas fir (*Pseudotsuga menziesii*), and Sitka spruce (*Picea sitchensis*). They thrive in forests at early successional stages after disturbance such as wildfire, prescribed burning, or logging (Kie et al. 2003). Many ungulates are considered well-adapted to habitat edges and do not need to travel far if sufficient food and cover are available over a smaller home range with large amounts of edge habitat (Kie et al. 2003). Many species, such as deer and elk, also use areas that are highly managed for forestry and agricultural use, including dryland wheat fields, other types of cultivated fields, and former croplands such as those enrolled in the U.S. Department of Agriculture's Conservation Reserve Program.

Throughout Washington, elk habitat includes productive grasslands, meadows, or clearcuts interspersed with closed-canopy forests (WDFW 2025b). These habitats can be found in coastal ranges, interior mountain ranges, river valleys, and shrubsteppe habitats of eastern Washington. Figure 3 is provided as an example of elk habitats currently mapped by WDFW PHS (WDFW 2025c) and depicts statewide elk breeding areas, migration, and regular concentrations. Resource mapping should be reviewed at the project level during siting and design to avoid impacts to local elk habitats.

Moose habitat includes forests where there are lakes, marshes, and other wetlands, as well as the high desert country of the Columbia Basin (WDFW 2025d). From mountainous locations to lower elevations, deer habitat includes open areas such as meadows and clearcuts to forage in before retreating to more secure areas such as thickets and closed-canopy forests (WDFW 2025e). Deer habitat may also include wooded suburban environments, such as parks, greenbelts, golf courses, and roadsides for habitat. Bighorn sheep habit includes alpine meadows, grassy mountain slopes, canyonlands, and foothill country near rugged rocky cliffs and bluffs in southeast Washington and the eastern slopes of the Cascades (WDFW 2025f). Mountain goat habitat includes steep rocky cliffs, projecting pinnacles, ledges, and talus slides, as well as very wet forested areas in western Washington and some very dry open areas on the eastern side of the state (WDFW 1983). Pronghorn antelope habitat includes open, relatively flat grasslands and shrub lands (WDFW 2025g).

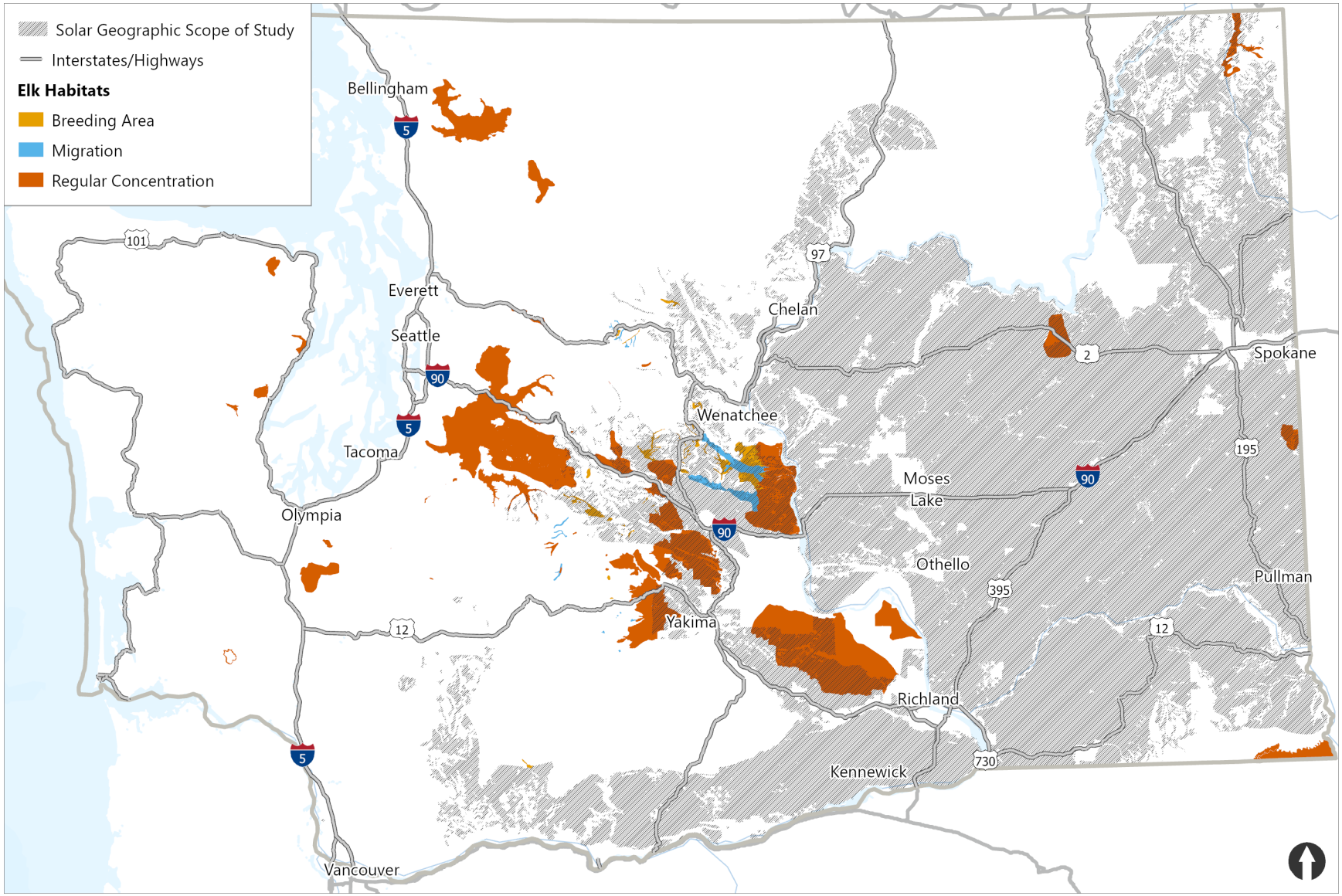

Figure 3. Example PHS elk habitat map

Data source: WDFW 2025c

3.2.1.5 Wildlife migration routes

Migration routes and wildlife corridors could be anywhere from 200 meters to several miles wide depending on the species (USGS 2024a). WDFW designates large, connected areas as Biodiversity Areas and Corridors and recognizes these areas as an agency-wide conservation priority. Further information and maps on Biodiversity Areas and Corridors can be found in *PHS Local Government User Guide: Biodiversity Areas and Corridors Map* published by WDFW (Azerrad et al. 2023).

All of Washington state, including the study area, is located in the Pacific Flyway, one of the four main north-south migratory routes in North America used by a variety of migratory game and nongame bird species. Flyway management plans are developed by the Pacific Flyway Council with an approximately 5-year planning horizon and are adopted to help state and federal agencies cooperatively manage migratory birds under common goals (Pacific Flyway Council 2024). Management plans typically focus on migratory bird species populations and habitat conditions that support those populations.

The Pacific Flyway spans approximately 21,301,891 square kilometers and extends from the arctic regions of Alaska and Canada to South America and is bounded on the west by the Pacific Ocean and on the east by the Rocky Mountains. Many bird species use the Pacific Flyway to migrate between breeding habitat in North America and wintering habitat in the tropics (BirdLife International 2024).

The study area contains broad landscapes that are used for ungulate winter range and migration routes. These areas are becoming increasingly fragmented due to human encroachment from agriculture, fencing, residential development and urban sprawl, roadway expansion, and natural resource extraction (WAFWA 2018). USGS collaborates with state, Tribal, and federal wildlife management agencies to map ungulate migration corridors across the western United States.

Maps and acreage of migration corridors as well as links to the latest and past *Ungulate Migrations of the Western United States* reports can be found on the USGS webpage "Mapping Ungulate Migrations Across the Western U.S." (USGS 2024b). Many ungulate herds migrate on a seasonal basis between distinct summer and winter ranges within their corridors to make the best use of various food sources and to avoid predation risks and adverse seasonal weather conditions such as deep snow (USGS 2024a). USGS utilized GPS technology to analyze the migration patterns of the Chelan mule deer herd, the Klickitat mule deer, the Wenatchee Mountains mule deer herd, the Methow mule deer herd, the Colockum elk herd, the Selkirk white-tailed deer population, and the Pend Oreille elk subherd in Washington; determine their summer, winter, and typical stopover ranges; and map the footprint of their migratory corridors (USGS 2022a, 2022b, 2024b). In the study area, ungulate migration corridors can be found within the Northern Rockies, North Cascades, Eastern Cascades Slopes and Foothills, Cascades, and Columbia Plateau ecoregions (USGS 2022a, 2022b, 2024a).

The Klickitat mule deer herd inhabits the Columbia Hills and surrounding terrain to the north along the Columbia River. The Wenatchee Mountains mule deer herd inhabits a matrix of private and public lands along the eastern slope of the Cascade Range. The Chelan mule deer herd occupies a mix of private and public lands from the Columbia River to the crest of the Cascade Range in central Washington. The Methow mule deer subherd is part of the larger West Okanogan mule herd, the largest migratory mule deer herd in Washington. The Colockum elk herd inhabits a mix of public and private lands northeast of Ellensburg, between Blewett Pass of the Cascade Range and west of the Columbia River. The Selkirk white-tailed deer are located in mostly private land in northeastern Washington. The Pend Oreille elk subherd is part of the larger Selkirk elk herd located in northeast Washington.

3.2.1.6 Special-status habitat

The state of Washington provides a variety of habitats that support many plant and animal species that are federal or state listed as threatened, endangered, proposed for listing (i.e., candidate), or otherwise deemed as species of special concern at the federal, state, and local levels. Special-status habitats include the following:

- Designated critical habitats for plant and animal species listed as endangered or threatened under the ESA
- Priority habitats deemed sensitive by WDFW
- Habitats identified as rare/high-quality ecological communities under the DNR Natural Heritage Program
- Habitats identified in county or municipal codes or associated ordinances as natural areas of local importance

3.2.1.6.1 Critical habitat

Critical habitat is a federal designation that includes geographic areas containing physical and biological features that are essential to the recovery of ESA-listed species. ESA-listed species that also have designated critical habitat in Washington state are summarized in Table 3 (Section 3.2.2.6.1). Attachment 1 includes the USFWS Information for Planning and Consultation (IPaC) resource list for the state of Washington and details the 15 terrestrial critical habitats that are in the terrestrial study area for solar energy. The USFWS Critical Habitat for Threatened and Endangered Species online mapper can also be used to view designated critical habitat for ESA-listed species in Washington (USFWS 2025a).

3.2.1.6.2 Priority habitat

WDFW's PHS on the Web online mapping tool identifies priority habitat types and features for conservation within the state (WDFW 2025c). Not all priority habitats are PHS mapped and may include some wide-ranging habitats such as riparian, instream, and snags and logs. In addition, there may be non-priority designated habitats that support priority species such as agricultural lands and disturbed areas. The PHS list also includes Priority Areas for species that are within known limiting habitats (e.g., breeding areas, foraging areas, haul-outs) or within areas that support a relatively high number of individuals (e.g., migration corridors, regular concentrations) (WDFW 2023). WDFW defines priority habitat as habitat types or elements

with unique or significant value to a large number of species, and has one or more of the following attributes:

- Comparatively high fish and wildlife density or species diversity
- Important fish and wildlife breeding habitat, seasonal ranges, or movement corridors
- Limited availability or high vulnerability to habitat alteration
- Unique or dependent species

WDFW (WDFW 2025c) lists the following 15 types of terrestrial priority habitats and features in the study area:

- Aspen Stands
- Biodiversity Areas and Corridors
- Eastside Steppe
- Herbaceous Balds
- Inland Dunes
- Juniper Savannah
- Old-Growth Mature Forest
- Oregon White Oak Woodlands
- Riparian
- Shrubsteppe
- Westside Prairie
- Caves
- Cliffs
- Snags and Logs
- Talus

3.2.1.6.2.1 Shrubsteppe priority habitat

Washington's shrubsteppe is a terrestrial priority habitat within the Columbia Plateau ecoregion. Figure 4 is provided as an example of shrubsteppe habitat priority areas as currently mapped by WDFW PHS (WDFW 2025c) and depicts locations within the state of Washington. Resource mapping should be reviewed at the project level during siting and design to avoid impacts to shrubsteppe habitat areas.

Shrubsteppe supports unique biological diversity and provides habitat for a wide range of species, including birds, mammals, reptiles, amphibians, insects, and plants (WDFW 2024a). Greater sage grouse in Washington rely partially on shrubsteppe habitat for food, cover, and nesting habitat (Connelly et al. 2011) and also rely on the matrix of fallow and active dryland farming, rangeland, and Conservation Reserve Program lands that are typical of the landscape where sage grouse occur in Washington. Of the 10.4 million acres of shrubsteppe that existed in eastern Washington before European settlers arrived in the mid-nineteenth century, only 20% remains (WDFW 2025i). Invasive plant species, wildfires, and weather and climate change are major influences on sagebrush habitats and present significant challenges to their long-term conservation (Miller et al. 2011). The presence of invasive grasses decreases nutrient availability for wildlife and increases

the frequency and intensity of wildfires, further contributing to the decline of shrubsteppe habitat health (WDFW 2025i). Additional major threats to shrubsteppe habitat identified by WDFW include conversion to cropland, development, wind and solar power, excessive grazing, and roads and transmission lines (WDFW 2025i).

The Washington Shrubsteppe Restoration and Resiliency Initiative (WSRRI) is a collaborative effort between WDFW, DNR, and the Washington State Conservation Commission that was formed to help enhance the health and resiliency of shrubsteppe habitat in Washington to benefit shrubsteppe wildlife (WDFW 2025j). The WSRRI strategy includes five key elements focused on community engagement, habitat protection, habitat restoration, species management, and fire management (WDFW 2024a). To guide where on the landscape WSRRI and its partners should invest proactively and implement specific actions, WSRRI partners mapped habitat quality and connectivity across the landscape. They identified the following:

- **Core areas** have the highest-quality habitat, and actions targeted here should include protection, threat prevention and abatement, and restoration where disturbances occur despite protection measures.
- **Growth opportunity areas** still have significant amounts of habitat but are more degraded than habitat in core areas, and strategic restoration here could increase habitat quality and result in more core areas.
- **Corridors** are relatively free of wildlife movement barriers and connect core areas and growth opportunity areas across the landscape; further barrier development (e.g., road construction or habitat conversion) should be avoided in corridors.
- **Other habitat** is more degraded than the other three categories but is still important to retain and, if resources allow, its condition should be improved over time.

To facilitate a strategic approach for targeting investment, WSRRI mapped core areas of high-quality habitat, growth opportunity areas, corridors, and other habitat across the shrubsteppe landscape. WSRRI's spatial priority map portal provides a view of core areas and areas where cores can be expanded within Washington (WDFW 2025j). The type of spatial priority identifies locations where mitigation may be required, or may not be an option, in the study area. Spatial priority maps were developed for dry (xeric) ecosystems, and wet (mesic) shrubsteppe ecosystems.

Figure 5 is provided as an example of xeric shrubsteppe habitat priority areas as currently mapped by WSRRI (WDFW 2025j) and depicts locations within the state of Washington, including core areas, growth opportunity areas, corridors, and other xeric shrubsteppe habitat areas. Resource mapping should be reviewed at the project level during siting and design to avoid impacts to xeric shrubsteppe habitat areas.

Figure 6 is provided as an example of mesic shrubsteppe habitat priority areas as currently mapped by WSRRI (WDFW 2025j) and depicts locations within the state of Washington, including core areas, growth opportunity areas, corridors, and other mesic shrubsteppe habitat areas. Resource mapping should be reviewed at the project level during siting and design to avoid impacts to mesic shrubsteppe habitat areas.

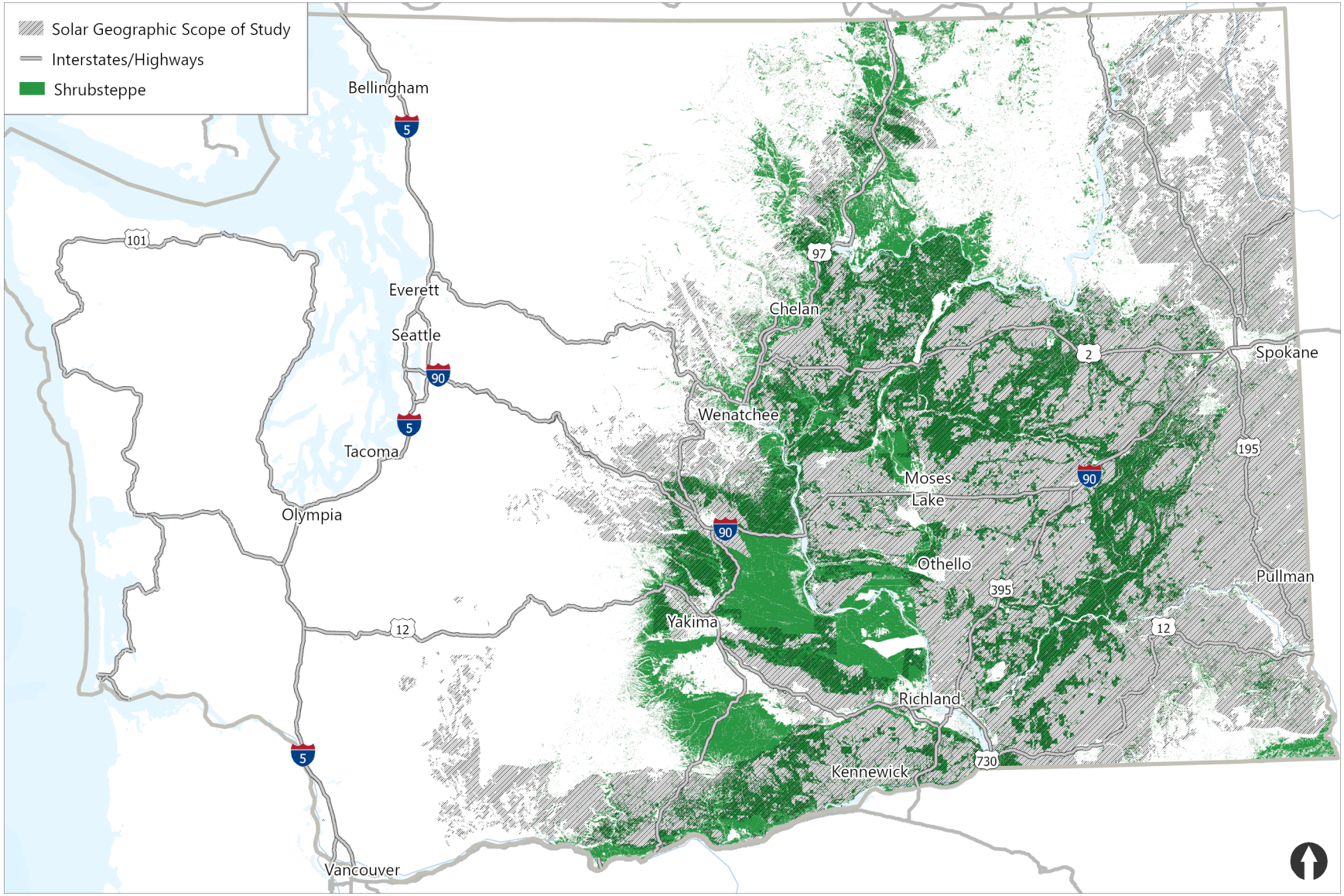

Figure 4. Example PHS shrubsteppe habitat map
Data source: WDFW 2025c

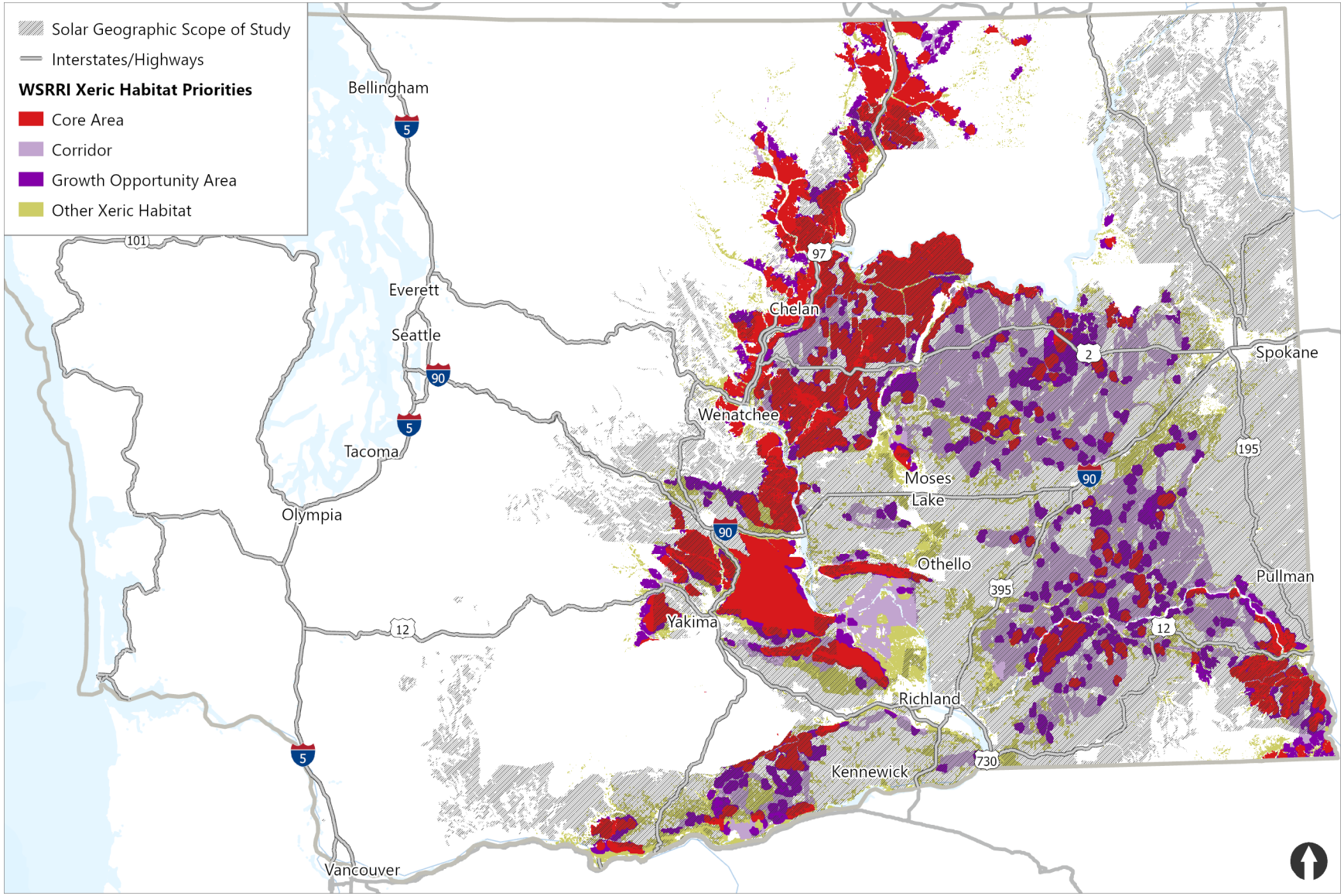

Figure 5. Example WSRRI priority map for a dry (xeric) ecosystem
Data source: WDFW 2025j

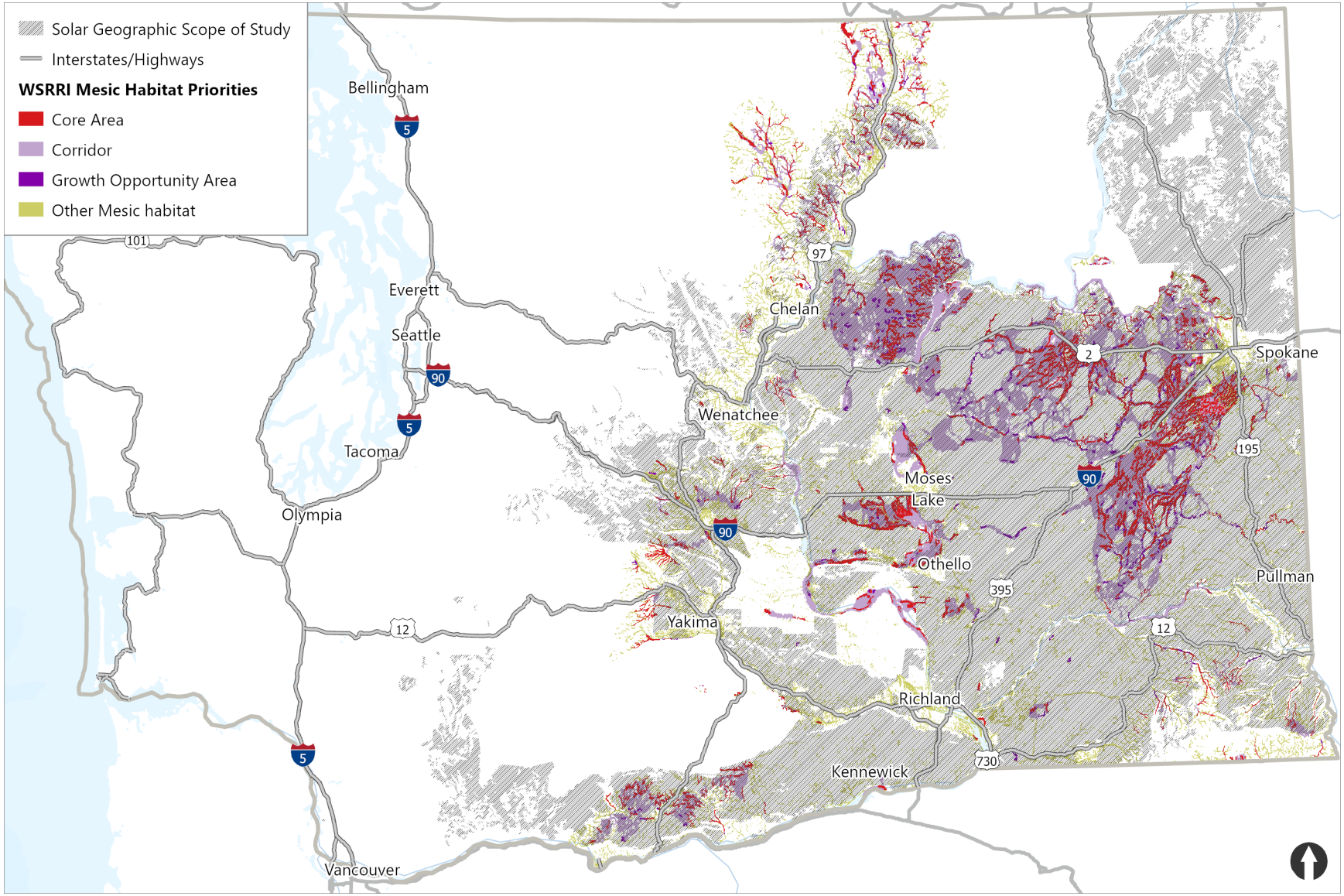

Figure 6. Example WSRRI priority map for a wet (mesic) ecosystem
Data source: WDFW 2025j

3.2.2 Terrestrial species

3.2.2.1 Vegetation

The six Level III Ecoregions within the study area (Table 2; Figure 2) support a variety of upland plant community types that are further characterized by Level IV Ecoregions (USEPA 2023). The North Cascade and Cascade ecoregions primarily support coniferous forests of Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), and western red cedar (*Thuja plicata*), along with Pacific silver fir (*Abies amabilis*), mountain hemlock (*Tsuga mertensiana*), noble fir (*Abies procera*), subalpine fir (*Abies lasiocarpa*), silver fir (*Abies amabilis*), Sitka alder (*Alnus viridis*), and whitebark pine (*Pinus albicaulis*). Subalpine meadows and rocky alpine zones support species such as blueberries (*Vaccinium* spp.), common juniper (*Juniperus communis*), Sitka mountain-ash (*Sorbus sitchensis*), white rhododendron (*Rhododendron albiflorum*), along with a variety of wildflowers such as avalanche lily (*Erythronium montanum*), beargrass (*Xerophyllum tenax*), and broadleaf lupine (*Lupinus latifolius*).

The forests and open woodlands in the Eastern Cascades Slopes and Foothill ecoregion are dominated by ponderosa pine (*Pinus ponderosa*) and lodgepole pine (*Pinus contorta*), species that are adapted to wildfires which help shape this ecosystem. Grand fir (*Abies grandis*) mixed with Douglas fir and ponderosa pine are also common. Oregon white oak (*Quercus garryana*) mixed with Douglas fir/ponderosa pine forests, and western hemlock/Douglas fir forests create a mosaic with grasslands.

Dominant vegetation in the Columbia Plateau ecoregion is largely limited by precipitation and generally too dry to support trees. Sagebrush and grassland associations typify the landscape outside of agricultural and grazed areas. Common sagebrush species include big sagebrush (*Artemisia tridentata*) and threetip sagebrush (*Artemisia tripartita*). Common grassland species include Sandberg's bluegrass (*Poa secunda sandbergii*), bluebunch wheatgrass (*Pseudoroegneria spicata*), and Idaho fescue (*Festuca idahoensis*). Non-irrigated portions of the Columbia Plateau ecoregion are extensively cultivated for wheat. At higher elevations with increasing moisture on the northeastern slopes of the Blue Mountains, shrubs such as rose (*Rosa* spp.) and common snowberry (*Symphoricarpos albus*) occur.

The Northern Rockies ecoregion vegetation varies greatly by elevation, slope aspect, and moisture regime, as well as by livestock grazing. Typical tree species found across these strata in varying combinations include Douglas fir, subalpine fir, Englemann spruce, ponderosa pine, lodgepole pine, grand fir, whitebark pine, western white pine (*Pinus monticola*), white pine (*Pinus strobus*), mountain hemlock, western larch (*Larix occidentalis*), alpine larch (*Larix lyallii*), western red cedar, western hemlock, paper birch (*Betula papyrifera*), quaking aspen (*Populus tremuloides*), and black cottonwood (*Populus trichocarpa*). Common shrub species in some stands include ninebark (*Physocarpus* spp.), oceanspray (*Holodiscus discolor*), common snowberry, and in more limited areas, antelope bitterbrush (*Purshia tridentata*). In grasslands, common species include Idaho fescue, rough fescue (*Festuca altaica*), bluebunch wheatgrass (*Pseudoroegneria spicata*), or needlegrasses (*Nassella* spp.).

Vegetation in the Blue Mountains ecoregion is influenced by marine weather systems moving east through the break in the Cascades at the Columbia River Gorge, as well as by grazing cattle. At lower elevations where moisture availability supports forests, ponderosa pine and Douglas fir dominate, along with a dense and diverse shrub layer. At higher elevations where moisture availability supports forests, subalpine fir, Engelmann spruce (*Picea engelmannii*), and whitebark pine (*Pinus albicaulis*) are common. Where moisture is more limited, grasslands dominate and include species such as bluebunch wheatgrass and Sandberg's bluegrass, along with the shrub spiny greenbush (*Grayia spinosa*). Vegetation in cattle grazed areas has reverted to seral or exotic species.

3.2.2.1.1 Noxious weeds

The Washington State Department of Agriculture works closely with the Washington State Noxious Weed Control Board (WSNWCB) and is responsible for noxious weed control in counties without weed boards (WSDA 2024). Through its actions and policy decisions, the WSNWCB coordinates and supports control activities of the 38 county weed districts, county weed boards, and state and federal agencies, as well as provides educational materials to local weed boards, districts, and the public (WSNWCB 2024).

There are over 150 plant species that are considered invasive in Washington state, and the presence of these invasive species varies by county (WSNWCB 2024). Some terrestrial invasive species in the study area include purple loosestrife (*Lythrum salicaria*), herb-robert (*Geranium robertianum*), Canada thistle (*Cirsium arvense*), yellow starthistle (*Centaurea solstitialis*), cheatgrass (*Bromus tectorum*), reed canarygrass (*Phalaris arundinacea*), Japanese knotweed (*Polygonum cuspidatum*), English ivy (*Hedera helix*), Himalayan blackberry (*Rubus armeniacus*), butterfly bush (*Buddleja davidii*), and tree-of-heaven (*Ailanthus altissima*).

3.2.2.2 Birds

There are over 500 species of birds living in the diverse habitats in Washington, as described in Section 3.2.1. Washington's birds belong to 18 orders, which are large groupings of related families and species (Audubon Washington 2024; BirdWeb 2025; Cornell Lab of Ornithology 2025; WDFW 2025k).

Many bird species found within Washington, including waterfowl, waterbirds, shorebirds, and landbirds, are seasonal residents and migrate elsewhere for wintering or breeding. As noted in Section 3.2.1.2, the Pacific Flyway is a major migration route. Birds that migrate north in the spring are flying to breeding areas, and birds that migrate south in the fall are flying to wintering areas. During migration and nesting season, all habitat types in Washington can be used by hundreds of bird species. The following subsections describe important groups of bird species and management plans that address bird conservation within the study area. Threatened, endangered, and other special-status bird species are addressed in Section 3.2.2.6.

3.2.2.2.1 Waterfowl

Waterfowl include ducks, geese, and swans. Waterfowl habitats are typically associated with aquatic areas such as lakes, ponds, and wetlands, but many waterfowl also forage in flocks on

the ground. Most waterfowl nest on the ground, but several species found in Washington are tree-nesting, including wood duck (*Aix sponsa*), hooded merganser (*Lophodytes cucullatus*), common goldeneye (*Bucephala clangula*), Barrow's goldeneye (*Bucephala islandica*), and bufflehead (*Bucephala albeola*). Most waterfowl feed while on the water by submerging their heads to forage for vegetation and aquatic invertebrates and may also forage on agricultural lands. Newly hatched waterfowl are precocial, meaning they are able to swim and eat independently almost immediately after hatching. Most waterfowl are highly migratory and often use established flyways for seasonal movements (USFWS 2025b; BirdWeb 2025; Cornell Lab of Ornithology 2025).

The North American Waterfowl Management Plan is a long-term strategy developed by USFWS to improve waterfowl populations and to conserve waterfowl habitat (USFWS 2025b) and provides additional information about waterfowl species.

3.2.2.2.2 Waterbirds

Waterbirds are a diverse group of birds associated with aquatic habitats but not classified as waterfowl that includes auks, cormorants, gulls, herons, jaegers, murres, loons, pelicans, skuas, and terns. Most waterbirds are predators or scavengers and feed using a wide array of foraging techniques adapted to their habitats in or near aquatic environments. Waterbirds typically nest on the ground, and some species nest in large colonies. Waterbirds are generally altricial, meaning that newly hatched young are naked, blind, and dependent on parental care. Migratory patterns are highly variable among Washington waterbirds; some are year-round residents, while others migrate from breeding and nesting areas to warmer areas in the winter (DNR 1997; Kushlan et al. 2002; BirdWeb 2025; Cornell Lab of Ornithology 2025).

The Washington State Trust Lands Habitat Conservation Plan is a long-term, multispecies, forest management plan developed for DNR to help protect habitat for at-risk species such as the marbled murrelet (DNR 1997). The North American Waterbird Conservation Plan is a continent-wide strategy developed by USFWS to improve waterbird populations and to conserve waterbird habitat (Kushlan et al. 2002) and provides additional information about water bird species.

3.2.2.2.3 Shorebirds

Shorebirds are a diverse group of birds associated with coastal and inland aquatic habitats that includes avocets, curlews and, dowitchers, godwits, oystercatchers, phalaropes, plovers, sandpipers, snipe, stilts, turnstones, whimbrels, and woodcock. Most shorebirds are insectivores or mollusk feeders, using specialized foraging techniques such as probing, pecking, or scything to capture prey along beaches, mudflats, and in shallow waters. Shorebirds typically nest on the ground, with many species breeding in the Arctic and migrating long distances to wintering grounds in Central and South America. Shorebirds are generally precocial. Migratory patterns are highly variable among Washington shorebirds; some are seasonal visitors, while others make brief stopovers during long migrations (BirdWeb 2025; Cornell Lab of Ornithology 2025).

The U.S. Shorebird Conservation Plan, developed by the USFWS, provides a continent-wide strategy to improve shorebird populations and conserve critical shorebird habitats (Brown et al. 2001).

3.2.2.2.4 Landbirds

Landbirds are highly diverse and can be categorized into several major subgroupings, including cuckoos, doves and pigeons, gamebirds (gallinaceous), hummingbirds and swifts, kingfishers, songbirds (passerines), raptors (birds of prey and vultures), and woodpeckers and their allies. Landbirds are primarily associated with terrestrial habitats, including forests, grasslands, shrublands, and urban areas, although some species forage in wetlands or along shorelines. Most landbirds are insectivores, granivores, or omnivores, employing various foraging strategies such as gleaning, hawking, and ground scratching to find food in foliage on the ground or in the air. Landbirds exhibit an array of nesting behaviors, with some species building intricate cup nests in trees and shrubs, while others nest in cavities or on the ground. Landbird offspring are generally altricial, requiring parental care after hatching. Many landbirds are migratory, with species breeding in Washington and traveling to wintering grounds in the southern United States and Central and South America. Migration patterns vary widely; some landbirds are year-round residents, while others make seasonal or long-distance movements, often using established flyways for navigation (Rosenberg et al. 2024; BirdWeb 2025; Cornell Lab of Ornithology 2025).

The *Partners in Flight Landbird Conservation Plan* is a comprehensive strategy developed to support landbird populations and to conserve critical landbird habitats. This plan provides additional information on conservation efforts, monitoring programs, and habitat management strategies for landbirds (Rosenberg et al. 2024).

3.2.2.2.4.1 Songbirds

Songbirds, also referred to as passerines, are the largest and most diverse group of birds. In Washington there are 28 songbird families, including species such as accentors, blackbirds, buntings, bushtits, chickadees, chat, creepers, crossbills, crows, cowbirds, dippers, finches, gnatcatchers, grosbeaks, jays, kinglets, larks, longspurs, magpies, mockingbirds, nuthatches, Old World sparrows, phoebes, pipits, shrikes, silky-flycatchers, sparrows, starlings, swallows, tanagers, thrashers, thrushes, towhees, tyrant flycatchers, vireos, wagtails, warblers, waxwings, and wrens (BirdWeb 2025; Cornell Lab of Ornithology 2025). Passerine habitats are diverse and include residential areas, riparian zones, mixed forests, boreal forests, grasslands, shrubsteppe, oak woodlands, prairies, dunes, agricultural lands, wetlands, coniferous forests, deciduous forests, near mountain streams, ponds, and lake edges. Passerines forage for a wide variety of food, including insects, arthropods, rodents and other small mammals, small birds, seeds, nuts, berries, fruit, carrion, aquatic macroinvertebrates, fish eggs, and small fish (BirdWeb 2025; Cornell Lab of Ornithology 2025).

3.2.2.2.4.2 Terrestrial game birds

Washington's terrestrial game birds, also referred to as gallinaceous birds, include two families: *Odontophoridae* (quail) and *Phasinaidae* (chukar, grouse, partridges, pheasants, ptarmigan, and

wild turkeys). Gallinaceous birds in Washington occupy a variety of terrestrial habitats, including forests, grasslands, shrubsteppe, and agricultural lands. These birds are primarily ground dwelling and mostly nonmigratory. Gallinaceous birds are omnivorous, typically foraging on plants in the winter and insects in the summer. Gallinaceous bird nests are usually built on the ground, and their young are precocial, allowing them to lay large clutches of eggs. Trees may be used by some species for foraging or roosting, particularly in winter (BirdWeb 2025; Cornell Lab of Ornithology 2025).

3.2.2.2.4.3 Birds of prey and vultures

Birds of prey and vultures in Washington include raptors such as eagles (*Accipitridae*) and falcons (*Falconidae*), goshawks (*Accipitridae*), harriers (*Accipitridae*), hawks (*Accipitridae*), kestrels (*Falconidae*), kites (*Accipitridae*), and osprey (*Pandionidae*); new world vultures (*Cathartidae*); and owls, such as barn owls (*Tytonidae*) and typical owls (*Strigidae*).These species often act as top avian predators, occupying the highest trophic levels in many ecosystems (BirdWeb 2025; Cornell Lab of Ornithology 2025).

Raptors in Washington are split into two families: *Falconidae*, which includes true falcons and kestrels, and *Accipitridae* which includes eagles, goshawks, harriers, hawks, and kites (BirdWeb 2025; Cornell Lab of Ornithology 2025). Falcons are some of the fastest flying birds in Washington, aided by their long tails and pointed wings. Falcon habitats are diverse, ranging from open areas, cliffs, suburban towns, agricultural lands, riparian areas, boreal forests, and mountainous areas. Falcon prey includes other avian species that they catch in air, small mammals, ground-dwelling birds, and insects. Falcons are typically monogamous, and the females are larger than the males. Their young are altricial, so extended parental care is common.

Other raptors found in Washington (eagles, goshawks, harriers, hawks, kites, and osprey) are diurnal hunters that catch their prey with their feet (BirdWeb 2025). Like falcons, the females are larger than the males and they form long-term monogamous pairs that take care of their young for extended periods of time. Many species in this family are migratory, and they generally follow ridgelines to take advantage of updrafts when flying south. Their habitats are diverse, ranging from open areas, mature sloped coniferous forests, estuaries, marshes, lakes, rivers, grasslands, agricultural lands, deciduous forests, urban and suburban areas, prairies, sagebrush desert, shrubsteppe, tundra, boreal forest, and rocky cliffs. Raptor use of an area is higher in locations containing high prey species density (WEST 2006).

Turkey vultures (*Cathartes aura*) are the only vulture species to regularly occur in Washington (BirdWeb 2025). They utilize a wide variety of habitats, including open areas for foraging and rocky outcroppings, cliffs, and forests for nesting. Their nests are typically located far from human disturbance in sheltered areas. They are scavengers that prefer fresh carrion and typically feed on smaller species, though they can gather communally at night to feed on large carcasses.

Barn owls are the only member of *Tytonidae* to occur in Washington (Cornell Lab of Ornithology 2025). They can typically be found in open habitats, particularly agricultural lands or basalt cliffs, as well as forests and wetlands. The other 14 species of owls found in Washington belong to *Strigidae*. These owls occupy a diverse range of habitats, including forests and woodlands, such as boreal forests, coniferous or mixed forests, and streamside woodlands; grasslands and open habitats, including grasslands, prairies, shrubsteppe, and open terrain; wetlands and coastal areas, such as marshes and shorelines; arid and high-elevation environments, including deserts, tundra, and mountainous areas; and human-influenced landscapes, such as agricultural lands and suburban areas. Additionally, snags (standing dead trees) provide important nesting and perching sites for many owl species.(BirdWeb 2025). Owl diets typically consist of small mammals, small birds, amphibians, reptiles, and large invertebrates.

The Washington State Trust Lands Habitat Conservation Plan also addresses conservation strategies that provide protection for northern spotted owls (DNR 1997).

3.2.2.2.4.4 Other non-passerine birds

Other non-passerine birds in Washington include cuckoos, doves, hummingbirds, kingfishers, pigeons, swifts, and woodpeckers and their allies. (BirdWeb 2025; Cornell Lab of Ornithology 2025).

There are two cuckoo species that may be found in Washington: the yellow-billed cuckoo (*Coccyzus americanus*) and the black-billed cuckoo (*Coccyzus erythropthalmus*). Yellow-billed cuckoos are considered extirpated in Washington, though there have only been 20 sightings in Washington since the 1950s (Wiles and Kalasz 2017). Yellow-billed cuckoo habitat consists of large, continuous, deciduous riparian zones and the species forages on large invertebrates (WDFW 2025l). Because there are areas of remaining habitat in Washington, the possibility remains that breeding pairs of yellow-billed cuckoos exist but have not been seen. The black-billed cuckoo is a close relative of the yellow-billed cuckoo, and they have a similar habitat of deciduous woodlands. They have been rarely documented in Washington and are unlikely to be regularly present in Washington (Cornell Lab of Ornithology 2025).

Pigeons and doves both belong to the *Columbidae* family, and two native species can be commonly found in Washington, the mourning dove (*Zenaida macroura*) and band-tailed pigeon (*Patagioenas fasciata*). The rock pigeon (*Columba livia*) is an introduced species and the Eurasian collared-dove (*Steptopelia decaocto*) is noted as an invasive species that has been found in Washington. The white-winged dove (*Zenaida asiatica*) is a rarer visitor that primarily lives in the Southwest of the United States (BirdWeb 2025; Cornell Lab of Ornithology 2025). Pigeons and doves typically eat seeds, berries, nuts, acorns, fruit, and human food in urban areas. Their habitats include suburban areas, urban cities, agricultural lands, cliffs, mixed forests, tidal flats, and mineral springs (BirdWeb 2025).

The order Apodiformes has two family representatives in Washington: swifts (*Apodidae*) and hummingbirds (*Trochilidae*) (BirdWeb 2025; Cornell Lab of Ornithology 2025). Both families have birds with similar wing structures evolved for rapid movement, and they only have 10 tail

feathers, whereas most other birds have 12 tail feathers. There are three swift species found in Washington; black swift (*Cypseloides niger*), Vaux's swift (*Chaetura vauxi*), and the white-throated swift (*Aeronautes saxatalis*), and they are all common (BirdWeb 2025; Cornell Lab of Ornithology 2025). Nesting and breeding grounds can range from forested areas near rivers (particularly on damp cliffs or behind waterfalls), snags found in old-growth forests, and sea cliffs (BirdWeb 2025). They tend to nest in cavities and crevices that are not easily disturbed, and they build nests that stick to their preferred location with their saliva. They typically forage for insects in the air and nest in groups. Swifts can fly long distances from their breeding grounds to forage. Foraging habitat can range from the open air over shrubsteppe, grasslands, wetlands, ponderosa pines near cliffs, lakes, rivers, forests, and mountainous areas.

There are eight species of hummingbirds found in Washington, though four of those species have very infrequent sightings and are not commonly found. Common species include the black-chinned hummingbird (*Archilochus alexandri*), Anna's hummingbird (*Calypte anna*), Calliope hummingbird (*Stellula calliope*), and rufous hummingbird (*Selasphorus rufus*). Hummingbirds have a unique flight style that allows them to hover in one spot, fly backwards, or fly forwards. The Anna's hummingbird can be found year-round, and the other three Washington hummingbird species migrate south for the winter (BirdWeb 2025; Cornell Lab of Ornithology 2025). Their habitats include forest edges, subalpine shrubby habitats, ponderosa pine zones, near wetlands, and riparian zones (BirdWeb 2025). Hummingbirds feed on insects, arthropods, nectar, sap, and sugar water from human-provided hummingbird feeders.

The belted kingfisher (*Megaceryle alcyon*) is the only kingfisher species is found in Washington. Their foraging and nesting habitat consists of shorelines and wetlands in both salt and freshwater environments, and they predominantly eat fish, amphibians, and crayfish. They create their nests in burrows within sandy banks (BirdWeb 2025).

There are 13 woodpecker species found in Washington, though one of those (the yellow-bellied sapsucker [*Sphyrapicus varius*]) is not regularly observed and is considered to be an accidental visitor to the state (BirdWeb 2025; Cornell Lab of Ornithology 2025). Woodpecker habitat ranges from forested riversides, ponderosa pine forests, Garry oak stands, mixed forests, mountainous areas, old-growth forests, and residential areas (BirdWeb 2025). Woodpeckers typically eat insects, but they also eat acorns, nuts, seeds, sap, nectar, berries, and fruits. Many woodpecker species are monogamous, and they create their nests by excavating nest cavities that are then lined with woodchips.

3.2.2.3 Mammals

There are over 100 mammal species that live in Washington state and the study area. The more common mammals include bats, squirrels, raccoons, rabbits, skunks, moles, voles, mice, rats, nutria, opossums, muskrats, pocket gophers, beavers, river otters, bobcats, cougars, coyotes, black bears, deer, elk, moose, mountain goat, and pronghorn antelope.

The following discussion emphasizes species that have habitats that could be affected by solar energy projects and/or are representative of other species that share important habitats.

Threatened, endangered, and other special-status mammal species are addressed in Section 3.2.2.6.

3.2.2.3.1 Bats

Fifteen species of bats reside in Washington and may occur within or adjacent to the study area. Bats are flying mammals that hibernate during the winter in a variety of locations, including caves, tunnels, attics, old wells, mine shafts, and cavities in large trees (WDFW 2025a). During hibernation, temperatures must be cool enough for bats to maintain a low body temperature but refrain from freezing, and humidity must be high and constant (WDFW 2025a). Bats typically enter their hibernation sites from late September to October, and they may hibernate either alone or in groups (WDFW 2025a). Most bats in Washington also breed at their hibernation sites from late fall to winter, and fertilization occurs in the spring after the females waken from hibernation. Bats in Washington go into hibernation because there is a dearth of flying insects available for them to eat in the winter, so in order to survive, bats hibernate or migrate to regions with more insects, or a combination of both strategies (WDFW 2025a). If bats are disturbed during hibernation, they expend weeks' worth of energy to increase their body temperatures out of the hibernation state. Hibernating bats can starve to death before the spring or abandon their young if they are disturbed multiple times.

Of the fifteen species found in Washington, the species most commonly found around humans include the little brown bat (*Myotis lucifugus*), Yuma myotis (*Myotis yumanensis*), big brown bat (*Eptesicus fuscus*), pallid bat (*Antrozous pallidus*), and California myotis (*Myotis californicus*) (WDFW 2025a). Washington bats can range in size from 2.5 inches long (the canyon bat [*Parastrellus hesperus*]) to 6 inches long (the hoary bat [*Lasiurus cinereus*]). Bats can be found in a variety of habitats, including forests, shrubsteppe, deserts, canyons, arid grasslands, riparian zones, and urban areas, and can be found from sea level to more mountainous areas. Foraging for a variety of insects tends to occur from dusk to dawn in a variety of habitats.

3.2.2.3.2 Ungulates

Ungulates are mammals with hooves, and all ungulates found in Washington are even-toed, meaning that they walk on two of their five toes, and are all ruminants, meaning they have stomachs that are divided into compartments, allowing for easier and more productive digestion of plant matter (WDFW 2025m). Ungulate species found in Washington state that may occur within or adjacent to the study area include elk, moose, deer, bighorn sheep, mountain goats, and pronghorn antelope.

WDFW formally recognizes 10 elk herds in Washington including both native subspecies of Rocky Mountain elk (*Cervus canadensis nelsoni*) and Roosevelt elk (*Cervus elaphus roosevelti*). Rocky Mountain elk can be primarily found in the mountain ranges and shrublands east of the Cascades, though small herds can also be found throughout parts of western Washington (WDFW 2025n). Bull Rocky Mountain elk can weigh up to 800 pounds and can run up to 35 miles an hour. The typical lifespan of an elk is 12 to 16 years. During the spring and summer months, elk tend to eat non-woody plants such as grasses, sedges, and flowering plants. In the fall, elk spend more time browsing on the sprouts and branches of trees and shrubs, though

they continue to eat grasses when available (WDFW 2025n). Roosevelt elk are typically found west of Interstate 5 and not in the study area.

Moose (*Alces alces*) in Washington are primarily found in the Northern Rockies and Columbia Plateau ecoregions, and their secondary range can be located in the Blue Mountains and North Cascades ecoregions. They can be as tall as 6 feet at the shoulder, and bulls can weigh up to 1,100 pounds. Moose are herbivorous, and they eat aquatic vegetation as well as the leaves, bark, and twigs from trees and shrubs (WDFW 2025d). Males are solitary, though females stay with their calves. Moose typically live 8 to 12 years.

According to WDFW, there are four subspecies of deer in Washington state: Rocky Mountain mule deer (*Odocoileus hemionus hemionus*), white-tailed deer (*O. virginianus*), Columbian white-tailed deer (*O. virginianus leucurus*), and Columbian black-tailed deer (*O. h. columbianus*) (WDFW 2025e). White-tailed deer primarily occur in the eastern third of Washington, mule deer primarily occur east of the Cascades, and black-tailed deer primarily occur west of the Cascades. Columbian white-tailed deer occur within a very defined area in extreme southeastern Washington. Black-tailed deer are the most common species of deer in Washington. Mule deer are the largest species of deer in Washington. Like elk, deer eat a variety of vegetation, ranging from grasses and other non-woody species to browsing trees and shrubs. Male deer can weigh up to 250 pounds.

WDFW recognizes and manages 17 identified herds of bighorn sheep (*Ovis canadensis*) across central and eastern Washington. Male bighorn sheep can weigh over 250 pounds, and they can be identified by their large brown horns that curl back over their ears. Bighorn sheep have an average lifespan of 9 to 14 years, and they are the largest wild sheep in North America. They tend to be found in rugged terrain, and their hooves are adapted for that habitat.

Mountain goats (*Oreamnos americanus*) can weigh up to 180 pounds and can only be found in northwestern North America. They are native to the Cascade Range and have been introduced to the Blue Mountains and the Olympic Peninsula. As of 2008, anywhere between 2,400 and 3,200 mountain goats are estimated to live in Washington (WDFW 2025o). Breeding season occurs from mid-November to early December. Mountain goats eat alpine vegetation and supplement minerals through natural mineral licks and human-related minerals.

Pronghorn antelope (*Antilocapra americana*) can weigh up to 155 pounds and are smaller than most other ungulates found in Washington, measuring up to 3 feet at shoulder height (WDFW 2025g). Their habitat consists of open grasslands, where they graze on shrubs and grasses, and they can run over 55 miles an hour to escape predators. They have an average lifespan of 7 to 10 years.

Ecoregion 15y includes the largest contiguous old-growth cedar–hemlock forest in the interior U.S., extensive peatlands, and important lynx and grizzly bear habitat. It once supported the only woodland caribou (*Rangifer tarandus*) herd in the conterminous U.S. They are now considered extirpated in Washington.

3.2.2.4 Reptiles

Reptiles found in Washington include lizards and snakes. Turtles and amphibians are discussed in Section 3.2.5.4. Washington habitats support snakes in the boa (*Boidae*), colubrid (*Colubridae*), and viper (*Viperidae*) families, totaling 12 species. Lizard families supported in Washington include the alligator lizard (*Anguidae*) family, iguanids (*Iguanidae*), and skinks (*Scincidae*) (WDFW 2025p).

The northern rubber boa is the only snake in the boa family to occur in Washington and can be found statewide. In the colubrid family, in Washington, the California mountain kingsnake (*Lampropeltis zonata*) has only been documented in southernmost areas of eastern Skamania County and western Klickitat County, which is isolated from the rest of the species' range by approximately 200 miles (WDFW 2025p). Other rarer snake species based on limited and patchy distributions include the common sharp-tailed snake (*Contia tenuis*), the desert striped whipsnake (*Coluber taeniatus taeniatus*), the northern desert nightsnake (*Hypsiglena chlorophaea deserticola*), and the ring-necked snake (*Diadophis punctatus*). Commonly found colubrid snake species, many of which are semiaquatic, include the common gartersnake (*Thamnophis sirtalis*), the gophersnake (*Pituophis catenifer*), the northwestern gartersnake (*Thamnophis ordinoides*), the terrestrial gartersnake (*Thamnophis elegans*), and the western racer (*Coluber constrictor*). The only viper snake found in Washington is the western rattlesnake (*Crotalus oreganus*), a widespread species in eastern Washington. Some snakes are exclusively found on either side of the Cascade crest, and others are more widespread throughout the state. Habitats can range from riparian zones, wetlands, lakes, shrubsteppe, desert, prairies, grasslands, and forests. They typically eat small mammals, amphibians, slugs, earthworms, crayfish, small fish, and lizards.

There are seven species of lizards noted by WDFW as being found in Washington (WDFW 2025p). The northern alligator lizard (*Elgaria coerulea*), western fence lizard (*Sceloporus occidentalis*), and western skink (*Plestiodon skiltonianus*) are widespread throughout the state, and the southern alligator lizard's (*Elgaria multicarinata*) range is more limited to south-central Washington. The northern sagebrush lizard (*Sceloporus graciosus*), pygmy short-horned lizard (*Phrynosoma douglasii*), and side-blotched lizard (*Uta stansburiana*) are considered to have "of concern" statuses in Washington, either because they are rarer or their habitat is being threatened. Typical habitats can range from dry open forests, shrubsteppe, grasslands, shorelines, rocky canyons, sand dunes, or near creeks.

3.2.2.5 Invertebrates

Invertebrate groups include insects, mites, spiders, collembola (phylum *Arthropoda*), land snails and slugs (class *Gastropoda*), and worm (phylum *Annelid*) species. Invertebrates can be found in a variety of habitats, they provide a food source for other wildlife, and perform a variety of functional roles that are important for habitat health including carbon and nutrient cycling, pollination, microclimate control, decomposition, and plant biomass control (Niwa et al. 2001).

3.2.2.6 Special-status terrestrial species

The state of Washington provides a variety of habitats that support many plant and animal species that are listed as threatened, endangered, proposed for listing (i.e., candidate), or otherwise deemed as species of special concern at the federal and state levels. County or municipal regulations also determine species of local importance under codes and associated ordinances. While specific species of local importance are not included in the following description of special-status species, their animal and plant groups are considered in this analysis.

Special-status species include the following:

- Species listed as endangered, threatened, or proposed for listing by USFWS under the Endangered Species Act (ESA)
- Species listed as endangered, threatened, or sensitive in Washington by WDFW, as designated in Washington Administrative Code (WAC) 220-200-100
- Species designated as candidates for listing as endangered, threatened, or sensitive in Washington by WDFW following procedures in WAC 220-610-110
- Priority species identified by the WDFW Priority Habitats and Species Program
- Species of Greatest Conservation Need identified in the State Wildlife Action Plan

3.2.2.6.1 Threatened and endangered species

ESA-listed and state-listed terrestrial species that may occur in Washington are summarized in Table 3. These species may also occur in the terrestrial study area for solar energy. Attachment 1 includes the USFWS IPaC resource list for the state of Washington and details the 32 ESA-listed terrestrial species located in Washington (USFWS 2025c). The USFWS Critical Habitat for Threatened and Endangered Species online mapper can also be used to view designated critical habitat for ESA-listed species in Washington (USFWS 2025a).

3.2.2.6.2 State priority species

WDFW has a total of 111 terrestrial species on their statewide PHS list, including snails, slugs, beetles, dragonflies, bees, butterflies, snakes, lizards, birds, and mammals (WDFW 2023). Many of these PHS-listed species occur within the study area. The WDFW PHS on the Web online mapper can be used to view species on the PHS list within Washington (WDFW 2025c). The PHS list includes all state-listed species and species from Washington's State Wildlife Action Plan's list of Species of Greatest Conservation Need (SGCN) (WDFW 2015). The SGCN list includes species already listed threatened, endangered, or sensitive, as well as additional species thought to need conservation attention. For the ESA-listed species and state-listed species summarized in Table 3, their SGCN listing status is also included.

Table 3. State and federally listed terrestrial species

Species name	State status[1]	Federal status[2]	Critical habitat[3]	List[4]
Mammals				
Black-tailed jackrabbit (*Lepus californicus*)	Candidate	None	Not Designated	PHS, SGCN
Canada lynx (*Lynx canadensis*)	Endangered	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN,
Cascade red fox (*Vulpes vulpes cascadensis*)	Endangered	None	Not Designated	PHS, SGCN
Columbian white-tailed deer (*Odocoileus virginianus*)	Threatened	Threatened	Not Designated	ESA, PHS, SGCN
Fisher (*Pekania pennanti*)	Endangered	None	Not Designated	PHS, SGCN
Gray wolf (*Canis lupis*)	Endangered	Endangered	Designated/Does Not Occur Within Study Area	ESA, PHS, SGCN
Grizzly bear (*Ursus arctos horribilis*)	Endangered	Threatened	Not Designated	ESA, PHS, SGCN
Keen's Myotis bat (*Myotis keenii*)	Candidate	None	Not Designated	PHS, SGCN
Mazama pocket Gopher (*Thomomys mazama*) -Olympia pocket gopher (*T. m. pugetensis*) -Tenino pocket gopher (*T. m. tumuli*) -Yelm pocket gopher (*T. m. yelmensis*)	Threatened	Threatened	Designated/ Does Not Occur Within Study Area	ESA, PHS, SGCN
Mazama Pocket Gopher (*Thomomys mazama*) -Black-Faced pocket gopher (*T. m. melanops*) -Couch's pocket gopher (*T. m. couchi)* -Louie's pocket gopher (*T. m. louiei*) -Roy prairie pocket gopher (*T. m. glacoais*)	Threatened	None	Not designated	PHS, SGCN
North American wolverine (*Gulo gulo luscus*)	Candidate	Threatened	Not Designated	ESA, PHS, SGCN
Olympic Marmot (*Marmota olympus*)	Candidate	None	Not Designated	PHS, SGCN
Pygmy rabbit (*Brachylogies idahoensis*)	Endangered	Endangered	Not Designated	ESA, PHS, SGCN
Townsend's big-eared bat (*Corynorhinus townsendii*)	Candidate	None	Not Designated	PHS, SGCN
Townsend's ground squirrel (*Urocitellus townsendii*)	Candidate	None	Not Designated	PHS, SGCN
Washington ground squirrel (*Urocitellus washingtoni*)	Candidate	None	Not Designated	PHS, SGCN
Western gray squirrel (*Sciurus griseus*)	Endangered	None	Not Designated	PHS, SGCN
White-tailed jackrabbit (*Lepus townsendii*)	Candidate	None	Not Designated	PHS, SGCN

Species name	State status[1]	Federal status[2]	Critical habitat[3]	List[4]
Woodland caribou (*Rangifer tarandus* ssp. *caribou*) Southern Mountain DPS	Endangered	Endangered	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Birds				
American white pelican (*Pelecanus erythrorhynchos*)	Sensitive	None	Not Designated	PHS, SGCN
Black-backed woodpecker (*Picoides arcticus*)	Candidate	None	Not Designated	PHS
Burrowing owl (*Athene cunicularia*)	Candidate	None	Not Designated	PHS, SGCN
California condor (*Gymnogyps californianus*)	None	Experimental Population, Non-Essential[5]	Not Designated	ESA
Cassin's auklet (*Ptychoramphus aleuticus*)	Candidate	None	Not Designated	PHS
Clark's grebe (*Aechmophorus clarkii*)	Candidate	None	Not Designated	PHS, SGCN
Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*)	Endangered	None	Not Designated	PHS, SGCN
Common loon (*Gavia immer*)	Sensitive	None	Not Designated	PHS, SGCN
Ferruginous hawk (*Buteo regalis*)	Endangered	None	Not Designated	PHS, SGCN
Flammulated owl (*Psiloscops flammeolus*)	Candidate	None	Not Designated	PHS, SGCN
Golden eagle (*Aquila chrysaetos*)	Candidate	None	Not Designated	PHS, SGCN
Greater sage-grouse (*Centrocercus urophasianus*)	Endangered	None	Not Designated	PHS, SGCN
Hawaiian petrel (*Pterodroma sandwichensis*)	None	Endangered	Not Designated	ESA
Loggerhead shrike (*Lanius ludovicianus*)	Candidate	None	Not Designated	PHS, SGCN
Marbled murrelet (*Brachyramphus marmoratus*)	Endangered	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Mount Rainier white-tailed ptarmigan (*Lagopus leucura*)	None	Threatened	Not Designated	ESA, SGCN
Northern goshawk (*Accipiter gentilis*)	Candidate	None	Not Designated	PHS
Northern spotted owl (*Strix occidentalis caurina*)	Endangered	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Oregon vesper sparrow (*Pooecetes gramineus affinis*)	Endangered	Proposed Threatened	Not Designated	ESA, PHS, SGCN
Sagebrush sparrow (*Artemisiospiza nevadensis*)	Candidate	None	Not Designated	PHS, SGCN
Sage thrasher (*Oreoscoptes montanus*)	Candidate	None	Not Designated	PHS, SGCN

Species name	State status[1]	Federal status[2]	Critical habitat[3]	List[4]
Sandhill crane (*Antigone canadensis*)	Endangered	None	Not designated	PHS, SGCN
Short-tailed albatross (*Phoebastria albatrus*)	Candidate	Endangered	Not Designated	ESA, PHS, SGCN
Slender-billed white-breasted nuthatch (*Sitta carolinensis aculeata*)	Candidate	None	Not Designated	PHS, SGCN
Streaked horned lark (*Eremophila alpestris strigata*)	Endangered	Threatened	Designated/Does Not Occur Within Study Area	ESA, PHS, SGCN
Tufted puffin (*Fratercula cirrhata*)	Endangered	None	Not Designated	PHS, SGCN
Upland sandpiper (*Bartramia longicauda*)	Endangered	None	Not Designated	PHS, SGCN
Western grebe (*Aechmophorus occidentalis*)	Candidate	None	Not Designated	PHS, SGCN
Western snowy plover (*Charadrius nivosus nivosus*)	Endangered	Threatened	Designated/Does Not Occur Within Study Area	ESA, PHS, SGCN
White-headed woodpecker (*Picoides albolarvatus*)	Candidate	None	Not Designated	PHS, SGCN
Yellow-billed cuckoo (*Coccyzus americanus*)	Endangered	Threatened	Designated/Does Not Occur Within Study Area	ESA, PHS, SGCN
Reptiles				
California mountain kingsnake (*Lampropeltis zonata*)	Candidate	None	Not Designated	PHS, SGCN
Common sharp-tailed snake (*Contia tenuis*)	Candidate	None	Not Designated	PHS, SGCN
Sagebrush lizard (*Sceloporus graciosus*)	Candidate	None	Not Designated	PHS, SGCN
Striped whipsnake (*Masticophis taeniatus*)	Candidate	None	Not Designated	PHS, SGCN
Insects				
Beller's ground beetle (*Agonum belleri*)	Candidate	None	Not Designated	PHS, SGCN
Chinquapin hairstreak (*Callophrys mossii bayensis*)	Candidate	None	Not Designated	PHS, SGCN
Columbia clubtail (*Gomphurus lynnae*)	Candidate	None	Not Designated	PHS, SGCN
Columbia River tiger beetle (*Cicindela columbica*)	Candidate	None	Not Designated	PHS, SGCN
Great Arctic (*Oeneis nevadensis*)	Candidate	None	Not Designated	PHS, SGCN
Hatch's click beetle (*Limonius hatchi*)	Candidate	None	Not Designated	PHS, SGCN

Species name	State status[1]	Federal status[2]	Critical habitat[3]	List[4]
Island marble butterfly (*Euchloe ausonides insulanus*)	Candidate	Endangered	Designated/Does Not Occur Within Study Area	ESA, PHS, SGCN
Johnson's hairstreak (*Callophrys johnsoni*)	Candidate	None	Not Designated	PHS, SGCN
Juniper hairstreak (*Callophrys gryneus*)	Candidate	None	Not Designated	PHS, SGCN
Makah copper (*Lycaena mariposa*)	Candidate	None	Not Designated	PHS, SGCN
Mardon skipper (*Polites mardon*)	Sensitive	None	Not Designated	PHS, SGCN
Mann's mollusk-eating ground beetle (*Scaphinotus manni*)	Candidate	None	Not Designated	PHS, SGCN
Monarch (*Danaus plexippus*)	Candidate	Proposed Threatened	Not Designated	ESA, PHS, SGCN
Oregon silverspot butterfly (*Speyeria zerene hippolyta*)	Endangered	Threatened	Designated/Does Not Occur Within Study Area	ESA, PHS, SGCN
Pacific clubtail (*Gomphurus kurilis*)	Candidate	None	Not Designated	PHS, SGCN
Puget blue (*Plebejus icarioides blackmorei*)	Candidate	None	Not Designated	PHS, SGCN
Sand-verbena moth (*Copablepharon fuscum*)	Candidate	None	Not Designated	PHS, SGCN
Silver-bordered fritillary (*Boloria selene*)	Candidate	None	Not Designated	PHS, SGCN
Suckley's cuckoo bumblebee (*Bombus suckleyi*)	None	Proposed Threatened	Not Designated	ESA, SGCN
Taylor's checkerspot (*Euphydryas editha taylori*)	Endangered	Endangered	Designated/Does Not Occur Within Study Area	ESA, PHS, SGCN
Valley silverspot (*Speyeria nokomis*)	Candidate	None	Not Designated	PHS, SGCN
Western bumble bee (*Bombus occidentalis*)	Candidate	Under Review	Not Designated	ESA, PHS, SGCN
Yuma skipper (*Ochlodes yuma*)	Candidate	None	Not Designated	PHS, SGCN
Mollusks				
Ashy pebblesnail (*Fluminicola fuscus*)	Candidate	None	Not Designated	PHS, SGCN
Blue-gray taildropper slug (*Prophysaon coeruleum*)	Candidate	None	Not Designated	PHS, SGCN
Columbia Oregonian snail (*Cryptomastix hendersoni*)	Candidate	None	Not Designated	PHS, SGCN
Dalles sideband snail (*Monadenia fidelis minor*)	Candidate	None	Not Designated	PHS, SGCN

Species name	State status[1]	Federal status[2]	Critical habitat[3]	List[4]
Poplar Oregonian snail (*Cryptomastix magnidentata*)	Candidate	None	Not Designated	PHS, SGCN
Flowering Plants				
Bradshaw's lomatium (*Lomatium bradshawii*)	Endangered	Delisted	Not designated	ESA, WNHP
Golden paintbrush (*Castilleja levisecta*)	Threatened	Delisted	Not Designated	ESA, WNHP
Kincaid's lupine (*Lupinus sulphureus* ssp. *kincaidii*)	Endangered	Threatened	Designated/Does Not Occur Within Study Area	ESA, WNHP
Showy stickseed (*Hackelia venusta*)	Endangered	Endangered	Not Designated	ESA, WNHP
Spalding's catchfly (*Silene spaldingii*)	Threatened	Threatened	Not Designated	ESA, WNHP
Umtanum desert buckwheat (*Eriogonum codium*)	Endangered	Threatened	Designated/Does Not Occur Within Study Area	ESA, WNHP
Ute ladies'-tresses (*Spiranthes diluvialis*)	Endangered	Threatened[6]	Not Designated	ESA, WNHP
Wenatchee Mountains checkermallow (*Sidalcea oregana* var. *calva*)	Endangered	Endangered	Designated/Occurs Within Study Area	ESA, WNHP
White Bluffs bladderpod (*Physaria douglasii* spp. *tuplashensis*)	Threatened	Threatened	Designated/Occurs Within Study Area	ESA, WNHP
Conifers and Cycads				
Whitebark pine (*Pinus albicaulis*)	Sensitive	Threatened	Not Designated	ESA, WNHP

Notes

1. DNR 2025; WDFW 2024b
2. NOAA Fisheries 2025a; USFWS 2025d
3. NOAA Fisheries 2025a; USFWS 2025d
4. ESA: Endangered Species Act; PHS: Priority Habitats and Species List (WDFW 2024b); SGCN: Species of Greatest Conservation Need (Source: WDFW 2015); WNHP: Washington Natural Heritage Program (DNR 2025).
5. "Experimental population, non-essential" is a population that has been established within its historical range under section 10(j) of the ESA to aid recovery in the species. For the purposes of consultation, these populations are treated as threatened species on National Wildlife Refuge and National Park land and as a proposed species on private land (USFWS 2025c).
6. Proposed for delisting.

3.2.3 Aquatic habitats

The following sections describe the types of aquatic habitats that could be present in the study area, including habitats for freshwater and anadromous fish, amphibians, turtles, mollusks, urchins, crustaceans, and aquatic macroinvertebrates that could be affected by utility-scale solar projects. The Washington Priority Habitat types that could be affected by the projects include instream, freshwater wetland, and fresh deepwater habitats (WDFW 2023).

Freshwater aquatic habitat conditions are influenced by climatic conditions including precipitation level and temperature, and whether the source of the waterbody is glacial meltwater, snowmelt, or rain dominated. In addition, the connectedness of surface water with groundwater is determined by local geology and soil conditions.

Instream habitat is defined as the combination of physical, biological, and chemical processes and conditions that interact to provide functional life-history requirements for instream fish and wildlife resources. Freshwater wetlands are defined as transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or covered by shallow water during the growing season each year. Ponds containing emergent vegetation may also be classified as freshwater wetlands. In western Washington, wetlands can be dominated by tidal influences and developed in the outwash plains left by glaciers (Hruby and Yahnke 2023). In the semi-arid regions of eastern Washington, aquatic habitats and associated riparian vegetation develop along elevation contours and gradients determined by geomorphic, erosional, and depositional formations (Hruby 2014). In comparison to wetter environments, water is present on the land for shorter durations and low levels of precipitation support lower vegetation biomass in riparian areas.

Instream habitat and freshwater wetlands can be further subdivided by the predominant hydrologic conditions in different areas and accessibility of the habitat to aquatic animals.

Surface waters that provide aquatic habitat can be categorized based on how long water is present and flowing on land throughout the year:

- Ephemeral streams are rain and snowmelt dependent. They have flowing water during brief periods of precipitation, typically during fall and early spring rain events.
- Intermittent streams are seasonal, with flowing water only during certain times of the year based on precipitation patterns or groundwater levels.
- Perennial streams have flowing water year-round.
- Springs and permanent seeps are locations where groundwater naturally discharges to the surface, providing year-round flowing water.

Unique ecological functions are provided by low-order ephemeral and intermittent surface waters with intact riparian corridors:

- Provision of fish and wildlife habitat, oftentimes temporary, especially for reproduction or early rearing life stages in the spring
- Regulation of water temperature when shaded by reed-beds or riparian shrubs and trees

- Provision of organic inputs (e.g., leaves, pollen, and terrestrial insects) as a source of nutrients that support aquatic food webs close to, or distant downstream areas when seasonally connected

Fresh deepwater habitat is defined as permanently flooded areas lying below the deepwater boundary of wetlands (WDFW 2023). Surface water is permanent and often deep and includes all underwater structures and features such as rock piles, woody debris, and caverns. The principal medium in which the dominant organisms live is water, and the dominant plants are hydrophytes (WDFW 2023). Fresh deepwater habitat is found in all ecoregions of the state of Washington.

Human-created water storage features such as ditches, irrigation canals, or water retention ponds can provide opportunistic habitat for aquatic species although they are often lacking important habitat elements and may be lower quality habitat compared to natural ponds, wetlands, and streams. These features may not be protected by the regulatory framework in place to protect natural aquatic habitat.

Instream, fresh deepwater, and freshwater wetland habitats occur throughout all six ecoregions. Persistent snowpack in the Cascades, Eastern Cascades Slopes and Foothills, North Cascades, Northern Rockies, and Blue Mountains regions creates snowmelt-dominated waterbodies. In the uplands of the Cascades, Eastern Cascades Slopes and Foothills, North Cascades, and Northern Rockies regions, waterbodies are also glacially fed. Snowmelt originating from high-altitude watersheds with large snowpack and glacial meltwater can sustain abundant, cold aquatic habitat throughout the dry season (approximately July through September), even in more arid Eastern Cascades Slopes and Foothills that experience greater air temperature extremes. In contrast, large portions of the eastern, semi-arid ecoregions that lack high-altitude water sources, including the Columbia Plateau and parts of the Eastern Cascades Slopes and Foothills, are characterized by low precipitation and higher water temperatures in summer and fall. In comparison to wetter environments, snow and runoff is present on the land for shorter durations and lower vegetation biomass is present in riparian areas.

3.2.3.1 Special-status habitat

Critical habitat includes geographic areas containing features essential to the recovery of listed species. Aquatic critical habitat is extensive throughout the state of Washington and the study area. Many waterbodies within the state are critical habitats for listed species such as salmon, bull trout, and steelhead. The extent of critical habitat for each ESA-listed aquatic species is determined and mapped by USFWS or NOAA Fisheries, where those analyses have been completed (87 *Federal Register* 37757, 2022) (USFWS 2025a, NOAA Fisheries 2025a).

EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” and is designated for groundfish, Pacific salmon, and coastal pelagic composites (50 *Code of Federal Regulations* 600.10, 2024). For the purposes of this PEIS, the

EFH considered in the study area includes wetlands, lakes, and rivers that are necessary for fish reproduction, growth, feeding, and shelter (NOAA Fisheries 2025b).

3.2.4 Aquatic species

This analysis focuses on aquatic and amphibious plants and animals that are likely to occur in areas that could be affected by new solar projects. The solar projects are likely to be sited to avoid aquatic habitat; however, potential impacts such as changes to drainage patterns or water quality could extend to adjacent freshwater streams and lakes or wetlands and ponds. Groups of aquatic animals that could be affected include fish, shellfish, aquatic macroinvertebrates, amphibians, and turtles.

3.2.4.1 Aquatic vegetation

Aquatic vegetation grows in a variety of growth forms and habitat types. Shoreline plants grow along the edges of lakes, rivers, streams, and ponds. Emergent vegetation is rooted in sediment with at least part of the stems, leaves, and flowers emerging from the water's surface. Floating rooted plants are rooted to the sediment with leaves that float on the water's surface. They may grow individually or form a mat on the water's surface. Free-floating plants float on the surface of the water, in the water column, or lie on the bottom of the waterbody. These plants do not root in the sediment. Submersed plants root to the sediment, usually with their leaves entirely underwater (Ecology 2024a).

Riparian vegetation communities occur along the banks of waterbodies such as rivers, lakes, and perennial and intermittent streams. These vegetation communities provide essential ecological functions such as providing shade, large woody debris, and pollutant removal to create complex channel morphologies and diverse aquatic habitat conditions (Quinn et al. 2020). Local environmental conditions such as hydrologic regimes, local climate, and soil type may result in broad variations in the make-up of aquatic plant communities (Ecology 1997).

There are also 21 aquatic noxious weeds listed by the WSNWCB that could be found in the study area. Alteration to aquatic habitat can promote the spread of noxious weeds, which can have negative impacts on native species distribution. Further information on identification and distribution of aquatic noxious weeds can be found on the WSNWCB website (WSNWCB 2024).

3.2.4.2 Fish

Numerous fish species occur throughout Washington. Species are dependent on the unique ecological functions of freshwater and wetland and riparian ecosystems to carry out the stages of their life cycle.

3.2.4.2.1 Migratory species

Several highly migratory species use Washington's major river basins and their tributaries, sometimes traveling hundreds of miles between spawning, rearing, and foraging habitats. These include native anadromous species of salmon, steelhead, lamprey, and white sturgeon,

which migrate from freshwater spawning and rearing areas to the ocean to grow, then back to freshwater to complete their unique life cycles.

Salmon, steelhead, and bull trout

There are nine anadromous salmonid species found in Washington state. Some fish travel hundreds of miles upstream to reach their spawning grounds and rely heavily on the connectivity of waterbodies to complete their migration. The duration of freshwater rearing stages depends on the species, and migration rates depend on seasonal flows and fish age and size. Salmonids rely on riverine conditions with cold, well-oxygenated water with clean gravels; low levels of fine sediments to complete spawning and embryo incubation; and intact riparian zones with complex channel features that include woody material for rearing.

Table 4 summarizes the 12 populations of anadromous salmon and trout listed as threatened and endangered under the Federal ESA (WDFW 2025c) that could be found in the study area. Anadromous salmonids can be found in all six ecoregions within the study area depending on their species and distinct population.

Table 4. ESU and DPS salmonid populations in Washington

Species	Population (ESU/DPS)	Federal ESA status
Chinook salmon (*Oncorhynchus tshawytscha*)	Lower Columbia River ESU	Threatened
	Snake River Fall ESU	Threatened
	Snake River Spring/Summer ESU	Threatened
	Upper Columbia River Spring DPS	Endangered
Coho salmon (*Oncorhynchus kisutch*)	Lower Columbia River ESU	Threatened
Chum salmon (*Oncorhynchus keta*)	Columbia River ESU	Threatened
Sockeye salmon (*Oncorhynchus nerka*)	Snake River ESU	Endangered
Steelhead (*Oncorhynchus mykiss*)	Middle Columbia River DPS	Threatened
	Snake River DPS	Threatened
	Upper Columbia River DPS	Threatened
Bull trout (*Salvelinus confluentus*)	Coastal Recovery Unit	Threatened
	Mid-Columbia Recovery Unit	Threatened

Notes:
An evolutionarily significant unit (ESU) is a population of Pacific salmonids that is substantially reproductively isolated from other populations of the same species (NOAA Fisheries 2025c). A distinct population segment (DPS) is a population that is discrete from other populations of the same species and significant in relation to the species as a whole (NOAA Fisheries 2025c).

Lamprey

The Pacific lamprey (*Entosphenus tridentatus*) and river lamprey (*Lampetra ayresii*) are anadromous species that can migrate upstream hundreds of miles to complete the freshwater phase of its life cycle. Lamprey heavily rely on the connectivity of waterbodies to complete their

migration. Larvae burrow in the soft substrate of low gradient, cold-water streams to filter feed and rear for up to 8 years. Adults spend several years in the ocean and migrate back to freshwater to spawn. They are largely nocturnal and migrate through the lower part of the water column, stopping frequently to attach to substrate. Anadromous lamprey can be found in all six ecoregions within the study area.

Sturgeon

The white sturgeon (*Acipenser transmontanus*) is an anadromous species that spawns in large rivers and migrates to estuarine and marine environments to feed and develop from juveniles to adults. Sturgeon are able to spawn multiple times during their extended lifespan, which can be around 60 to 70 years. During spawning, eggs are broadcast into the water column in relatively swift portions of the river and may be dispersed downstream before settling into river substrate. White sturgeon exhibit physiological sensitivity to water temperature, and increasing water temperatures may reduce spawning success while increasing the risk of disease (WDFW 2025c). White sturgeon can be found within or adjacent to the study area in the mainstem Columbia and Snake rivers, which extend through the Cascades, Eastern Cascades Slopes and Foothills, Columbia Plateau, Northern Rockies, Blue Mountains, and North Cascades regions.

3.2.4.2.2 Resident freshwater fish species

The resident freshwater fish population is composed of species that spend their entire life cycle in freshwater habitat, and move across relatively smaller areas within a single lake or river basin.

Rainbow trout, cutthroat, and whitefish

Similar to anadromous salmon and steelhead, resident rainbow and cutthroat trout prefer clean, cold-water habitat, which is especially key for spawning. Adults require enough water depth and flow to provide unimpeded access to spawning areas. Spawning adults require specific flow conditions, cover, and access to spawning gravel to deposit eggs. Rainbow and cutthroat trout can be found throughout all six ecoregions within the study area.

In summer, whitefish species occur in groups in pools in locations of upstream tributaries that exhibit cooler temperatures. Whitefish species can be found in the North Cascades, Northern Rockies, Columbia Plateau, and Eastern Cascades Slopes and Foothills regions.

Freshwater sculpins, minnows, and suckers

Sculpins are benthic species that are widely distributed throughout Washington rivers. They are highly mobile, with a range of a few hundred meters or less, and may occupy the river environment year-round. Adult sculpins prefer rivers with gravel or cobble substrate and tolerate warm or cool water. Sculpin species can be found in the North Cascades and Columbia Plateau regions.

Minnow species are small-bodied fishes. Juveniles and most adult minnows prefer shallow nearshore and shoreline environments, with low velocities during the warmer months, while

retreating to deeper water from October through April. Minnow species can be found in the Cascades, Columbia Plateau, North Cascades, and Northern Rockies regions.

Sucker species tolerate high water velocities and prefer deeper water habitats during the day, moving to shallower habitat at night. Juveniles prefer shallower water, pools, and backwaters. Suckers prefer gravel substrate and riffle habitat for spawning, which occurs in the spring. Sucker species can be found in the North Cascades, Columbia Plateau, Northern Rockies, and Eastern Cascades Slopes and Foothills regions.

3.2.4.3 Freshwater shellfish and aquatic macroinvertebrates

There are five species of freshwater mussels found in Washington. Freshwater mussels are found in shallow habitats in permanent bodies of water, concentrating in areas with consistent flows and stable substrate conditions. Freshwater mussels rely on the movements of host fish to reproduce and disperse. Their association with fish allows them to populate new areas. Highly migratory species such as Chinook salmon (*Oncorhynchus tshawytscha*), cutthroat trout, and steelhead have been documented as host fish for freshwater mussels (WDFW 2025c). They are considered an excellent indicator of water quality (WDFW 2025c). Two of these species, quagga mussels (*Dreissena bugensis*) and zebra mussels (*Dreissena polymorpha*), are highly invasive. Freshwater mussel species can be found throughout all nine ecoregions of Washington. There are 15 species of crayfish found in all freshwaters across Washington state, with signal crayfish (*Pacifastacus leniusculus*) being the only native species. Juveniles prefer shallow, weedy areas that provide protection from predators, while adults favor areas of deeper water (WDFW 2025q). Crayfish species can be found in waterbodies in all six ecoregions within the study area.

There are eight species of freshwater aquatic snails in Washington. They occur in cold, shallow, slow-flowing streams, springs, and permanent seeps with high dissolved oxygen content. Egg masses can be found under rocks or in loose, stable cobble substrate away from the flowing current. *Juga* species exhibit seasonal upstream and downstream migrations (WDFW 2025c). Freshwater aquatic snail species can be found in all six ecoregions within the study area.

Benthic macroinvertebrates in freshwater are excellent indicators of the biological health and water quality of stream systems. Species include insects, crustaceans, mollusks, and worms that live in or near the streambed. Due to their limited mobility, they cannot escape exposure to pollutants and can integrate the effects of the stressors they are exposed to in freshwater drainages (USEPA 2023). These organisms also play a crucial role in freshwater ecosystems by providing food for adults and juveniles of larger aquatic species such as fish and amphibians. Resources are publicly available showing the health of specific streams and rivers within Washington state based on macroinvertebrate presence and abundance (e.g., Puget Sound Stream Benthos 2024).

3.2.4.4 Amphibians and turtles

Amphibians include frogs, toads, and salamanders. There are 25 native species of amphibians and five native species of turtles in the freshwaters of Washington (WDFW 2025p). Amphibians

and turtles rely on still water such as ponds, wetlands, ephemeral pools, or slow-moving areas of rivers and creeks for breeding, egg laying, and juvenile rearing. Amphibians and freshwater turtles may migrate along waterbodies during wetter seasons. Within more arid regions, they may become residents in isolated waterbodies. Amphibian and freshwater turtle species are found throughout the six ecoregions within the study area.

3.2.4.5 Aquatic invasive species

Changes in water conditions and habitat connectivity can alter the distribution and competitive advantage of invasive species. Invasive species can negatively impact native species through direct interactions like predation and competition and indirect actions like disease spread (NOAA 2025c). Aquatic invasive species of greatest concern within the study area include zebra and quagga mussels and northern pike (*Esox lucius*) (WDFW 2025r).

The American bullfrog (*Rana [Lithobates] catesbeiana*) is an invasive species that is approximately two times larger than Washington's native frogs. They are found in lowland permanent waterbodies such as wetlands, ponds, creeks, rivers, and lakes. Bullfrogs have been reported in lowland areas of all ecoregions in Washington except the Blue Mountains region. The Columbia Plateau and Canadian Rockies regions have the most documented sightings (WDFW 2025c).

A major group of resident freshwater fish species that have been introduced to Washington freshwater habitats as game fish are centrarchids, or fish from the sunfish family including smallmouth bass (*Micropterus dolomieu*). Bass are opportunistic predators and large individuals can prey heavily on juvenile salmon where their distributions overlap (Wydoski and Whitney 2003). Other abundant invasive fish species include walleye (*Sander vitreus*), crappie (*Pomoxis* spp.), yellow perch (*Perca flavescens*), and members of the carp or bullhead family.

3.2.4.6 Special-status aquatic species

The state of Washington provides a variety of habitats that support many plant and animal species that are listed as threatened, endangered, proposed for listing (i.e., candidate), or otherwise deemed as species of special concern at the federal and state levels. County or municipal regulations also determine species of local importance under codes and associated ordinances. While specific species of local importance are not included in the following description of special-status species, their animal and plant groups are considered in this analysis.

Special-status species include the following:

- Species listed as endangered, threatened, or proposed for listing by USFWS, and NOAA Fisheries under the Endangered Species Act
- Species listed as endangered, threatened, or sensitive in Washington by WDFW, as designated in Washington Administrative Code (WAC) 220-200-100
- Species designated as candidates for listing as endangered, threatened, or sensitive in Washington by WDFW following procedures in WAC 220-610-110
- Priority species identified by the WDFW Priority Habitats and Species Program

- Species of Greatest Conservation Need identified in the State Wildlife Action Plan

3.2.4.6.1 Threatened and endangered species

ESA-listed and state-listed freshwater or migratory aquatic species that may occur in Washington are summarized in Table 5. These species may also occur in the study area for solar energy.

Attachment 1 includes the USFWS IPaC resource list for the state of Washington and details the two ESA-listed aquatic reptile and amphibian species, and two ESA-listed freshwater fish species located in Washington (USFWS 2025c). Affected species also include those listed by NOAA Fisheries (NOAA Fisheries 2025a). The USFWS and NOAA Fisheries' Critical Habitat for Threatened and Endangered Species online mappers can be used to view designated critical habitat for those ESA-listed species in Washington (USFWS 2025a; NOAA Fisheries 2025a).

3.2.4.6.2 State priority species

WDFW has a total of 26 freshwater aquatic animal and plant species on their statewide PHS list, including freshwater shellfish, fish, amphibians, and turtles that could occur within the study area (WDFW 2023). The following PHS priority habitats identified by WDFW could be affected by solar energy development: Instream, Freshwater Wetlands, and Fresh Deepwater habitat types. The WDFW PHS on the Web online mapper can be used to view species on the PHS list within Washington (WDFW 2025c). The PHS list includes all state-listed species and species from Washington's State Wildlife Action Plan's list of Species of Greatest Conservation Need (SGCN) (WDFW 2015). The SGCN list includes species already listed threatened, endangered, or sensitive, as well as additional species thought to need conservation attention. For the ESA-listed species and state-listed species summarized in Table 5, their SGCN listing status is also included.

Table 5. State and federally listed aquatic species that may occur in the study area for solar energy development

Common name	State status[1]	Federal status[2]	Critical habitat[3]	List[4]
Salmonids				
Bull trout (*S. confluentus*) Coastal Recovery Unit	Candidate	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Bull trout (*S. confluentus*) Mid-Columbia Recovery Unit	Candidate	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Chinook salmon (*Oncorhynchus tshawytscha*) Lower Columbia River ESU	NA[5]	Threatened	Designated/Occurs Within Study Area	ESA, SGCN
Chinook salmon (*O. tshawytscha*) Upper Columbia River Spring DPS	NA[5]	Endangered	Designated/Occurs Within Study Area	ESA, SGCN
Chinook salmon (*O. tshawytscha*) Snake River Fall ESU	NA[5]	Threatened	Designated/Occurs Within Study Area	ESA, SGCN
Chinook salmon (*O. tshawytscha*) Snake River Spring/Summer ESU	NA[5]	Threatened	Designated/Occurs Within Study Area	ESA, SGCN
Sockeye salmon (*O. nerka)* Snake River ESU	NA[5]	Endangered	Designated/Occurs Within Study Area	ESA, SGCN
Chum salmon (*O. keta*) Columbia River ESU	NA[5]	Threatened	Designated/Occurs Within Study Area	ESA, SGCN
Coho salmon *(O. kisutch)* Lower Columbia River ESU	NA[5]	Threatened	Designated/Occurs Within Study Area	ESA, SGCN
Steelhead (*O. mykiss*) Lower Columbia River DPS	Candidate	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Steelhead (*O. mykiss*) Middle Columbia River DPS	Candidate	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Steelhead (*O. mykiss*) Puget Sound DPS	Candidate	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Steelhead (*O. mykiss*) Snake River DPS	Candidate	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Steelhead(*O. mykiss*) Upper Columbia River DPS	Candidate	Threatened	Designated/Occurs Within Study Area	ESA, SGCN

Common name	State status[1]	Federal status[2]	Critical habitat[3]	List[4]
Other Fish				
Lake chub (*Couesius plumbeus*)	Candidate	None	Not Designated	PHS, SGCN
Leopard dace (*Rhinicthys falcatus*)	Candidate	None	Not Designated	PHS, SGCN
Margined sculpin (Cottus marginatus)	Sensitive	None	Not Designated	PHS, SGCN
Mountain sucker (*Catostomus platyrhynchus*)	Candidate	None	Not Designated	PHS, SGCN
Olympic mudminnow (*Novumbra hubbsi*)	Sensitive	None	Not Designated	PHS, SGCN
Pygmy whitefish (*Prosopium coulterii*)	Sensitive	None	Not Designated	PHS, SGCN
River lamprey (*Lampetra ayresii*)	Candidate	None	Not Designated	PHS, SGCN
Umatilla dace (*Rhinichthys umatilla*)	Candidate	None	Not Designated	PHS, SGCN
Amphibians				
Cascade torrent salamander (*Phyacoriton cascadae*)	Candidate	Under Review	Not Designated	ESA, PHS, SGCN
Columbia spotted frog (*Rana luteiventris*)	Candidate	None	Not Designated	PHS, SGCN
Larch Mountain salamander (*Plethodon larselli*)	Sensitive	None	Not Designated	PHS, SGCN
Northern leopard frog (*Lithobates [Rana] pipiens*)	Endangered	None	Not Designated	PHS, SGCN
Oregon spotted frog (*Rana pretiosa*)	Endangered	Threatened	Designated/Occurs Within Study Area	ESA, PHS, SGCN
Rocky Mountain tailed frog (*Ascaphus montanus*)	Candidate	None	Not Designated	PHS, SGCN
Van Dyke's salamander (*Plethodon vandykei*)	Candidate	None	Not Designated	PHS, SGCN
Western toad (*Anaxyrus boreas*)	Candidate	None	Not Designated	PHS, SGCN
Reptiles				
Northwestern pond turtle (*Actinemys marmorata*)	Endangered	Proposed Threatened	Not Designated	ESA, PHS, SGCN
Mollusks				
California floater mussel (*Anodonta californiensis*)	Candidate	None	Not Designated	PHS, SGCN
Shortface lanx snail (*Fisherola nuttalli*)	Candidate	None	Not Designated	PHS, SGCN
Aquatic Plants				
Water howellia (*Howellia aquatilis*)	Threatened	Delisted	Not Designated	ESA. WNHP

Notes:

1. DNR 2025; WDFW 2024b
2. NOAA Fisheries 2025a; USFWS 2025d
3. NOAA Fisheries 2025a; USFWS 2025d
4. ESA: Endangered Species Act; PHS: Priority Habitats and Species List (WDFW 2024b); SGCN: Species of Greatest Conservation Need (WDFW 2015); WNHP: Washington Natural Heritage Program (DNR 2025).
5. WDFW typically aligns its salmonid conservation efforts with federal listings under the ESA. As a result, WDFW often does not assign separate state-level listings to salmon populations already protected under federal law.

3.2.5 Wetlands

Wetlands occur throughout the study area. However, unlike many streams, rivers, and lakes whose locations and boundaries are often evident and relatively well mapped, there are no comprehensive sources that identify and map the presence, extent, and condition of wetlands. As such, future developers of utility-scale solar energy projects would be required to conduct additional quantitative analyses and site surveys (e.g., wetland determination or delineations, wetland rating and functions and values assessments, critical area assessments) to determine the amount, type, and category of wetlands, and the width and condition of their associated buffers, that exist on and adjacent to proposed development sites as part of the project planning phase.

Information on the potential occurrence of wetlands in the landscape is available from the following sources:

- USFWS's NWI (USFWS 2025e)
- Ecology's 2016 Modeled Wetland Inventory (Ecology 2016)[2]
- USGS NHD (USGS 2025)
- Available local wetland inventories
- Aerial photography and Light Detection and Ranging (LiDAR) imagery
- USGS topographic maps
- Natural Resources Conservation Service Web Soil Survey (USDA-NRCS 2025)

Although these sources can offer general information on the likelihood of a site to support wetlands, they do not provide a definitive indication of the presence or absence of wetlands. The definitive presence of wetlands and a demarcation of their boundaries can only be determined through a wetland delineation performed in accordance with the 1987 *Corps of Engineers Wetland Delineation Manual* (1987 Manual; Environmental Laboratory 1987) and the appropriate regional supplement produced by the U.S. Army Corps of Engineers (USACE).[3]

Wetlands provide a number of important ecosystem functions, including habitat for terrestrial, aquatic, and amphibious species; water quality improvement; flood flow reduction/protection; shoreline stabilization; groundwater recharge; and streamflow maintenance (Ecology 2023). Many of these functions such as flood flow reduction and shoreline stabilization are particularly valuable to humans. This technical resource report focuses on wetland functions and values associated with the provision of habitat for aquatic and terrestrial species. Hydrological wetland functions and values, including those related to water quality, flood protection, shoreline

[2] The Ecology (2016) Modeled Wetland Inventory only covers the western portion of the state.

[3] Two regional supplements to the 1987 Manual are applicable to Washington: 1) *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* (USACE 2010); and 2) *Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008).

stabilization, and groundwater recharge are addressed in the *Water Resources Technical Report*.

Because of their ecological importance and value to humans, wetlands are regulated under various federal, state, and local laws including Sections 401 and 404 of the CWA, the Washington State Water Pollution Control Act, and county and municipal critical areas ordinances and SMPs within designated shorelines. Although the definitions of the jurisdictional limits of wetlands are similar under these various laws, there are differences in whether or not a wetland is subject to federal or state regulation. In particular, federal regulations typically only apply to those wetlands that are directly connected to certain surface waters that are considered to be waters of the U.S. Those wetlands determined to be non-federally regulated are generally regulated under state and local laws.

As part of state and local regulation of wetlands in Washington, wetlands are rated and categorized using the Washington State Rating System, which was developed by Ecology. The rating system includes specific regional methods for the western (Hruby and Yahnke 2023) and eastern (Hruby 2014) portions of the state.[4] These methods are designed to consider regional differences in climate, landforms, hydrology, and wetland types that are characteristic of those areas. Ecology's wetland rating system is used to differentiate wetlands based on their sensitivity to disturbance, significance in the watershed, rarity, ability to be replaced, and the beneficial functions they provide to society. The rating system evaluates wetlands on their ability to provide water quality improvement, hydrologic, and wildlife habitat functions based on the wetland's physical characteristics (site potential), surrounding environment (landscape potential), and the importance of those functions to humans (value) in the vicinity. The categories derived using the rating system include the following:

- **Category I wetlands** represent a unique or rare wetland type, are more sensitive to disturbance, or are relatively undisturbed and contain ecological attributes that provide a high level of functions. These types and functions are very difficult to replace.
- **Category II wetlands** provide high levels of some functions. These types and functions are very difficult to replace.
- **Category III wetlands** have moderate levels of functions. They have been disturbed in some ways and are often less diverse or more isolated from other natural resources in the landscape than Category II wetlands.
- **Category IV wetlands** have the lowest levels of functions and are often heavily disturbed.

Wetland categories are used by local entities to assign protective buffers to wetlands under their critical areas regulations and SMPs within shoreline jurisdiction.

[4] Western Washington is typically considered to mean "the geographic area in Washington west of the crest of the Cascade Mountains from the international border to the top of Mt. Adams, then west of the ridge line dividing the White Salmon River drainage from the Lewis River drainage and west of the ridge line dividing the Little White Salmon River drainage from the Wind River drainage to the Washington-Oregon state line" (Hruby and Yahnke 2023). Areas to the east of this boundary are considered eastern Washington.

Because Category I and II wetlands typically represent relatively unique or rare wetland types that are difficult to replace and that provide high levels of function, any impacts on those wetland types would be difficult to compensate for and would be determined on a case-by-case basis. As shown in Table 6, Ecology has identified typical Category I and II wetlands for both the eastern and western portions of the state. Based on the geographic scope of study, some western Washington wetland types (e.g., estuarine, interdunal, and coastal lagoons) are unlikely to occur where solar projects may be sited.

Table 6. Typical Category I and II wetlands in the study area

Regional wetland category descriptions
Eastern Washington Category I wetlands
Alkali Wetlands: Wetlands characterized by the presence of shallow saline water with a high pH. Such wetlands provide primary habitat for several species of migrant shorebirds and are also heavily used by migrant waterfowl. They also support unique plants and animals not found anywhere else in eastern Washington, including important pollinators (e.g., alkali bees) that are vital to agriculture in the western United States.
Wetlands of High Conservation Value: Wetlands previously called Natural Heritage Wetlands that have been identified by the DNR Natural Heritage Program as important ecosystems for maintaining plant diversity in the state.
Bogs and Calcareous Fens *Bogs:* Wetlands with peat soils and a low pH (typically <5) that support plants and animals specifically adapted to such conditions. Bogs do not tolerate changes or disturbance well with even minor changes in water quality or nutrient inputs potential resulting in major adverse effects on the plant and animal communities. They are also extremely slow to develop. *Calcareous Fens:* Wetland with peat soils that exhibit neutral or alkaline conditions (pH >5.5) that are maintained by groundwater rich in calcium and magnesium bicarbonates (or sometimes calcium and magnesium sulfates) and that support rare plants and animals. Considered to be one of the rarest wetland types in the United States and one of the rarest peat wetland types in Washington. Found only in north-central to northeastern part of the state.
Mature and Old-growth Forested Wetlands with Slow Growing Trees: Wetlands containing mature of old-growth forested wetlands that are over 0.25 acre and dominated by slow growing tree species such a red cedar (*Thuja plicata*), Alaska yellow cedar (*Chamaecyparis nootkatensis*), pines (mostly western white pine, *Pinus monticola*), western hemlock (*Tsuga heterophylla*), Oregon white oak (*Quercus garryana*), and Engelmann spruce (*Picea engelmannii*).
Forests with Aspen Stands: Forested wetlands that include quaking aspen (*Populus tremuloides*) stands. Aspen stands are a PHS habitat.
Wetlands that Perform Many Functions Very Well: Wetlands scoring 22 points or more (out of 27) from the rating of functions.
Eastern Washington Category II wetlands
Forested Wetlands in the Floodplains of Rivers: Forested wetlands in the floodplain that are critical to the proper functioning and dynamic processes of rivers including influencing channel form and providing habitat for many aquatic species.
Mature and Old-growth Forested Wetlands with Fast Growing Trees: Mature and old-growth forested wetlands with over 0.25 acre of forest dominated by fast growing native trees such as red alder (*Alnus rubra*), cottonwood (*Populus* spp.), willow (*Salix* spp.), quaking aspen, and birch (*Betula* spp.)

Regional wetland category descriptions
Vernal pools: Vernal pool ecosystems are formed when small depressions in scabrock or in shallow soils fill with snowmelt or spring rains. They retain water until the late spring when they dry out as a result of reduced precipitation and increased evapotranspiration. Vernal pools hold water long enough throughout the year to allow some strictly aquatic organisms to flourish, but not long enough for the development of typical wetland characteristics.
Wetlands that Perform Functions Well: Wetlands scoring between 19 and 21 points (out of 27) on the questions related to functions. Includes wetlands judged to perform most functions relatively well or one group of functions very well and the other two moderately well.
Western Washington Category I wetlands
Wetlands of High Conservation Value: Wetlands previously called Natural Heritage Wetlands that have been identified by the DNR Natural Heritage Program as important ecosystems for maintaining plant diversity in the state.
Bogs: Wetlands with peat soils and a low pH (typically <5) that support plants and animals specifically adapted to such conditions. Bogs do not tolerate changes or disturbance well with even minor changes in water quality or nutrient inputs potential resulting in major adverse effects on the plant and animal communities. They are also extremely slow to develop.
Wetlands with Mature/Old-Growth Forests: Mature and old-growth forested wetlands over 1 acre in size.
Wetlands that Perform Functions at High Levels: Wetlands scoring 23 points or more (out of 27) on the questions related to functions are Category I wetlands.
Western Washington Category II Wetlands
Wetlands that Perform Functions Well: Wetlands scoring between 20 and 22 points (out of 27) on the questions related to functions. Includes wetlands judged to perform most functions relatively well or one group of functions very well and the other two moderately well.

Source: Hruby 2014; Hruby and Yahnke 2023

Category III and IV wetlands are the most common types of wetlands in the state. As a result, most wetlands that would be encountered on proposed sites for utility-scale solar energy facilities are likely to be those types. Category III and IV wetlands typically provide moderate to low levels of functions and support relatively common plant and animal species. While such wetlands are still important (and regulated), they have likely experienced some level of disturbance and are easier to replace through compensatory mitigation. Permits that may be required for impacts on such areas are described in Section 3.3.

3.3 Potentially required permits and approvals

The following permits related to biological resources would potentially be required for construction, operation, or decommissioning of typical projects and activities:

- **Bald and Golden Eagle Protection Act compliance (USFWS):** Prohibits the take of bald and golden eagles without prior authorization from USFWS. Eagle Take Permits may be required for mitigating incidental bald and golden eagle mortality. An Eagle Disturbance Take Permit may also be needed for construction activities near nesting sites or for other project activities that disturb eagle behavior.

- **Clean Water Act Section 401 Water Quality Certification (Ecology/USEPA/Tribes):** This certification is required for any project needing a federal permit or license that may result in discharges to waters of the United States, ensuring compliance with state water quality standards.
- **Chapter 90.48 Revised Code of Washington (RCW) authorization (Ecology):** Impacts on non-federally regulated waters, including wetlands, may require authorization to work in waters of the state from Ecology pursuant to Chapter 90.48 RCW (Water Pollution Control Act). Compensatory mitigation is required for any impacts.
- **Coastal Zone Management Act Consistency (Ecology):** Required if the project is located in Washington's 15 coastal counties and could have reasonably foreseeable impacts on state coastal resources and uses. A notice of consistency with the state Coastal Zone Management Program is a condition of federal actions, including federal activities and issuance of federal licenses and permits.
- **Construction and Development Permits (e.g., road access, grading, building, mechanical, lights, signage) (local agency):** Various project construction activities and placement of new or modification of existing facilities would be subject to local permits to ensure compliance with land use, grading and drainage, stormwater management, building standards, fire codes, etc.
- **Endangered Species Act Section 7 Consultation (USFWS/NOAA):** Federal actions require interagency consultation with USFWS regarding terrestrial species under Section 7 of the ESA. Interagency consultation is performed to ensure that a proposed project would not jeopardize the existence of any listed species.
- **Endangered Species Act Section 10 Review (USFWS/NOAA):** If take is determined likely to occur for ESA-listed species, Section 10 review would be required for the issuance of an incidental take permit and a habitat conservation plan may be required.
- **Environmental Permits (e.g., Critical Areas, Shorelines) (local agency):** Must be obtained for construction and development activities within designated critical areas and shorelines regulated by local jurisdictions. Projects would be reviewed under local critical areas ordinances and Shoreline Master Programs.
- **Floodplain Development Permit (local agency):** Needed for development activities including grading within special flood hazard areas mapped by FEMA.
- **Forest Practices Act application/notification (DNR or local agency):** A permit is not required for every forest practice, but the forest practices rules must be followed when conducting all forest practices activities. A permit is required for timber removal and conversion of forested land to non-forest use, and one may be required for forest road construction activities.
- **Hydraulic Project Approval (WDFW):** Required for projects in, near, or over state waters that use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state. Ensures that construction is done in a way that protects fish and aquatic habitats.
- **Magnuson-Stevens Fishery Conservation and Management Act (NOAA Fisheries):** This consultation is required to protect essential fish habitats affected by the project, particularly those near significant waterbodies.

- **Migratory Bird Treaty Act (USFWS):** Prohibits the take of protected migratory birds without prior authorization from USFWS. There are currently few permitting options to authorize take at a project. It is recommended that projects consult with USFWS early in the development process to ensure take is avoided or minimized to the extent practicable.

3.4 Utility-scale solar facilities

3.4.1 Impacts from construction and decommissioning

Site characterization, construction, and decommissioning of solar energy projects would likely occur mainly in upland areas. Generation-tie transmission lines (gen-tie lines), roads, and fencing may cross wetlands, streams, or rivers, and sites may include wetlands. Development could affect a wide variety of aquatic and terrestrial species in the areas where it occurs. In general, impacts could increase proportionally with the size of the project because they are expected to occur over a larger area of habitat and affect a greater number of individual species as well as population levels. However, a smaller project could result in relatively greater impacts to species and habitats compared to a larger project depending on site-specific conditions. For example, a smaller project could be located adjacent to an area with high habitat values and result in larger effects, or a larger project could be located in an area with low habitat values and result in smaller effects.

During site characterization, project-level evaluations would require baseline surveys of vegetation, habitat, and potential wildlife presence; water typing; and wetland delineation surveys for a site. These would map and characterize species and habitats for a specific study area for impact analysis. Site characterization would likely involve minimal to no site disturbance except for potential ground disturbance to build access roads, construct meteorological towers, and drill soil cores.

A project would be decommissioned following the end of its useful life, which is expected to be approximately 30 years. A developer may prepare a decommissioning plan as part of the proposal. Some cities and counties require financial security as part of a decommissioning plan. Decommissioning actions include dismantling and removing aboveground solar array components and other aboveground components, such as the collector substation, buildings, battery energy storage system (BESS), and overhead lines. Foundations are expected to be removed to a level of at least 3 feet below the ground surface. Cables, lines, or conduits that are buried 3 feet below grade or more are not expected to be removed. The removal of electrical substations would require inspection for contamination of the soil and decontamination as needed.

A project site would be restored to its pre-project conditions and uses unless the project developer, permitting authority and regulatory agencies agree on alternate actions. Restoring to pre-project conditions could take several years and for some habitat types, such as sagebrush-dominated shrubsteppe, restoration could take several decades. Service roads may

be removed or may remain depending on agreements with the new or existing owner of the land.

3.4.1.1 Terrestrial habitats

Impacts on terrestrial habitats associated with the construction of utility-scale solar facilities include the fragmentation, degradation, or loss of habitat associated with the limits of site characterization and preparation for solar energy infrastructure, access and service roads, and associated construction components (e.g., solar field, power collection system, operations and maintenance buildings, fencing). Land clearing and grading alter existing habitats or habitat connectivity and may introduce invasive species. Solar energy development could also result in erosion, fugitive dust, changes in hydrologic regimes, increased human access, spills, soil compaction or removal, or sedimentation.

The effects of habitat fragmentation, degradation, or loss are more readily observed in vegetation communities and wildlife but can also impact ecological processes. The construction of roads, staging areas, new structures, gen-tie lines, buildings, and other infrastructure disrupts the connectivity between formally contiguous habitats resulting in a reduction in habitat interspersion and complexity. This can result in changes to energy flow and water and nutrient cycles. The reduction of total intact habitat area can also isolate communities, which could affect population sizes and dispersal rates (Faaborg et al. 1993; Wilcox and Murphy 1985). Ungulate habitat, including their migration corridors, would also be adversely affected by construction depending on study area siting.

Terrestrial habitat-related functions (e.g., biotic and abiotic functions) would also be adversely affected by construction. Biotic functions that would be affected include reduced plant growth and reproduction and reduced opportunities for wildlife species to use the habitat for shelter, foraging, and breeding. Abiotic functions that would be affected because of vegetation loss include moisture and temperature regulation, soil formation, and slope stability.

Adjoining habitats may also be affected by habitat fragmentation, degradation, or loss. Disturbances from humans and construction-related noise, dust, and nighttime lighting could also affect nearby habitat. Development could also result in erosion, changes in hydrologic regimes, increased human access, spills, soil compaction or removal, or sedimentation. Construction of gen-tie lines would extend beyond the project footprint, and the associated right-of-way (ROW) has been found to decrease the quality of habitat for forest interior bird species for distances up to 300 feet from the edge of the ROW (Anderson et al. 1977).

Construction of utility-scale solar energy projects would likely not have adverse effects on air habitat supporting bird, bat, and winged invertebrate species. Infrastructure development and associated noise and fugitive dust would impact the quality of air habitat for wildlife use.

Generally, the significance of habitat fragmentation, degradation, or loss associated with construction of utility-scale solar projects depends on the amount of area disturbed, the types of habitats (e.g., grassland, scrub-shrub, forested) that would be affected, and the capacity or

opportunity for the disturbed habitat to recover. Some habitat types may take a much longer time to recover than others, may never recover, or may change to a different, potentially less valuable habitat type. The number, configuration, and overall size of solar fields and associated infrastructure; location and extent of access roads and ROWs for gen-tie line corridors; and overall amount of lighting, noise, and dust generation also contribute to the magnitude of impacts. These factors determine whether the construction impacts to terrestrial habitat would be short or long term.

During decommissioning, it is assumed that habitat disturbance would primarily occur in previously disturbed areas. The degree of impact would vary depending on how much the previously disturbed habitat had recovered during the operational phase. Decommissioning activities would likely include the dismantling and removal of all aboveground structures as well as some underground structures. The types of impacts would be similar to those associated with project construction. The extent of the effects would depend on how much of the project infrastructure would be removed. Decommissioning would result in soil disturbance, potentially including the regrading of some study areas. Ground disturbance would also occur in temporary work areas and storage areas.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some construction and decommissioning activities would result in **less than significant impacts** to terrestrial habitats. Activities that cause the permanent degradation, loss, or conversion of suitable habitat that is critical to species viability or disrupt habitat continuity along migration routes would result in **potentially significant adverse impacts** on terrestrial habitats.

3.4.1.1.1 Special-status habitats

Impacts on special-status habitats associated with construction and decommissioning would be similar to, or the same as, those described on non-special-status habitats. However, because of the more sensitive nature of special-status habitats and the special-status species those habitats support, the impacts would be greater.

Specific impacts from solar energy development would depend on the locations of projects relative to special-status habitats, and the construction and decommissioning details of project development. In the absence of siting considerations (e.g., avoidance of special-status habitats), minimization measures, and appropriate mitigation, impacts on special-status habitats could result from the following:

- Habitat fragmentation, degradation, or loss resulting from vegetation clearing, grading, removal or erosion of soils, construction and decommissioning of solar energy projects and associated infrastructure, changes in hydrologic regimes, sedimentation, fugitive dust, oil or other contaminant spills, fragmentation or degradation of adjacent habitats, and the spread of invasive plant species
- Habitat fragmentation, degradation, or loss resulting from construction of access roads and electricity transmission infrastructure through intact habitats

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some construction and decommissioning activities would result in **less than significant impacts** to special-status terrestrial habitats. Activities that cause the permanent degradation, loss, or conversion of suitable habitat that is critical to special-species viability would result in **potentially significant adverse impacts** on special-status terrestrial habitats.

3.4.1.2 Terrestrial species

3.4.1.2.1 Vegetation

Construction and decommissioning of utility-scale solar energy facilities may require substantial vegetation removal, which could result in varying effects to existing plant communities depending on the scale and design of the project. It may also increase the risk of invasive species introduction and changes in species composition and distribution. Solar energy development could also result in erosion, fugitive dust, altered drainage patterns, increased human access, spills from construction-related chemical pollutants, soil compaction or removal, or sedimentation. Construction of gen-tie line corridors would also adversely affect vegetation through removal or disturbance.

Removal of vegetation can increase surface runoff, resulting in increased erosion and transport of sediment into adjacent vegetation communities. This could lead to long-term adverse effects such as altered soil characteristics, changes in hydrology, and the establishment of non-native or invasive plants. Affected plant communities could undergo short- or long-term changes in species abundance, composition, and distribution.

Depending on the scale and design of the project, effects would primarily be associated with the mortality of vegetation and loss of habitat within the footprint of permanent structures, including solar fields and access roads. All vegetation would likely be cleared in the footprint of permanent structures and may also be cleared from the footprint of construction laydown areas and equipment assembly and staging areas. These areas may also require grading. It is assumed that outside the footprint of permanent structures, construction areas, and access roads, most existing vegetation within the solar energy facility would be retained; however, mowing or trimming may be needed to facilitate construction.

Generally, the significance of vegetation loss associated with construction of utility-scale solar facilities depends on the amount of area directly disturbed, the types of plants (e.g., forbs and other non-woody plants, vines, shrubs, trees) that would be affected and the capacity for the disturbed vegetation to recover, and whether listed or sensitive plants would be affected. Vegetation loss may be minimized during solar energy development by designing the project around existing contours, limiting grading, and mowing or pruning vegetation instead of removing. The re-establishment of vegetation around the solar fields and associated infrastructure would also depend on the climate, soils, and plant community types at a project location. Some vegetation communities in more arid locations, such as shrubsteppe habitat, may be more challenged to recover over time. Where vegetation clearing is necessary, low-

growing native vegetation could be re-established through plantings prior to installation of the solar panels. These factors determine whether the construction impacts to vegetation would be short or long term.

Decommissioning activities would be similar to construction. Vegetation would be removed or damaged in areas of disturbed soil, and these areas would require the re-establishment of plant communities. However, the disturbance of vegetation would be expected to primarily occur in areas previously disturbed by construction. Restoring a site to pre-project conditions could take several years, and for some habitat types, such as sagebrush-dominated shrubsteppe, restoration could take several decades.

Through compliance with laws and permits, and with the implementation of measures to avoid and reduce impacts, some construction and decommissioning activities would result in **less than significant impacts** to terrestrial vegetation, including special-status plants. Activities that cause the permanent degradation, loss, or conversion of suitable habitat that is critical to species viability would result in **potentially significant adverse impacts** on terrestrial vegetation.

3.4.1.2.2 Wildlife

Construction and decommissioning may adversely affect terrestrial wildlife species, depending on the types of wildlife and the various stressors associated with specific construction activities. Wildlife may be affected by site clearing and grading, solar field and associated infrastructure construction, access road and gen-tie line corridor construction, and the movement of construction vehicles and equipment. The magnitude of potential impacts on wildlife also depends on the length of time the construction and decommissioning effects would persist, the time of day or night, and the season of the wildlife activity (e.g., nesting, wintering, migration). The type of impacts associated with construction and decommissioning activities are generally related to habitat disturbance (see Section 3.4.1.1) and wildlife disturbance, injury, or mortality. Mortality could occur from digging or trenching in nests, burrows, or hibernacula or removing nesting vegetation.

In general, terrestrial wildlife species that are less capable of avoiding disturbance (e.g., non-winged invertebrates, reptiles, juvenile mammals, burrowing species, ground-nesting birds) could be more severely affected than more mobile wildlife species (e.g., winged invertebrates, most birds, adult mammals). Removal of vegetation during the breeding season could result in destruction of nests and injury or death to birds or eggs. Construction and decommissioning activities resulting in noise, nighttime lighting, erosion, fugitive dust, vibration, and altered terrestrial habitat may also cause temporary disruption in foraging, nesting, breeding, rearing, and migration activities for some terrestrial wildlife species. Spills during equipment refueling and release of stored fuel or hazardous materials may also adversely affect wildlife if present in the area. Soil compactions could also affect burrowing mammals.

Construction would also affect wildlife through habitat degradation, fragmentation, or loss. Changes in habitat may lead to the introduction of invasive or more opportunistic non-native

wildlife species. The magnitude of impact to wildlife due to affected habitat would be determined by the extent of the solar energy facility (e.g., number and size of solar fields), the amount and configuration of associated infrastructure, and the existing degree of habitat disturbance or conversion in the study area.

Bird species that migrate, nest, or forage in or around projects may be at risk of collision or altered behavior due to the "Lake Effect Hypothesis," which proposes that solar panels may appear to mimic waterbodies for birds in flights (USGS 2024c). This may attract migrating birds and cause them to collide with the panels or misguide them to use the panels as places to rest or feed.

Construction of solar energy facilities and associated gen-tie lines and access roads could result in new edge habitats. The presence of habitat edges could have both adverse and beneficial effects on wildlife. Adverse effects may include increasing predation of animals in the vicinity of edges, altering wildlife distribution and movement patterns, and reducing contiguous habitat size resulting in possible modification of foraging, nesting, breeding, rearing, and migration activities. Potential benefits include increasing local native wildlife diversity and abundance that are adapted to edge habitats.

Decommissioning activities would be similar to construction. Vegetation would be removed or damaged in areas of disturbed soil, and these areas would require the re-establishment of plant communities. However, the disturbance of vegetation would be expected to primarily occur in areas previously disturbed by construction. Wildlife could be affected by changes to existing habitats depending on the extent of infrastructure that would need to be removed, generation of waste materials and accidental spills, future land use, and the amount of required site restoration (e.g., regrading and revegetation). Restoring a site to pre-project conditions could take several years, and for some habitat types, such as sagebrush-dominated shrubsteppe, restoration could take several decades.

It is anticipated that more mobile wildlife would avoid areas where decommissioning activities are occurring. Disturbance, injury, or mortality of less mobile wildlife (e.g., non-winged invertebrates, reptiles, and juvenile mammals) could occur if those species are unable to avoid the decommissioning activities.

Removal of solar energy infrastructure may reduce potential nesting, perching, and resting habitats for several bird species (e.g., raptors), but this could benefit other wildlife, such as small mammals that are preyed on by those bird species.

The removal of gen-tie lines would reduce the number of bird and bat collisions, and the removal of other aboveground facilities would improve the free movement of wildlife in the study area. Habitats within and adjacent to the study area that had been avoided may become more utilized by wildlife once the disturbance from operations cease. Following decommissioning activities, the control of vegetation would end, and native shrubs and trees would be allowed to grow and increase in density. As disturbed areas reestablish with vegetation and habitat components improve, any impacts from fragmentation that existed

during the project lifetime would likely decrease. The potential improvement in wildlife diversity and habitat use would primarily depend upon the future land use of the study area and the degree of revegetation.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some construction and decommissioning activities would result in **less than significant impacts** to terrestrial wildlife. Activities that affect species viability, the mortality of any individual species, or disturbance that disrupts successful breeding and rearing behaviors would result in **potentially significant adverse impacts** on terrestrial wildlife.

3.4.1.2.3 Special-status species

Impacts on special-status species associated with the site characterization and construction and decommissioning of utility-scale solar facilities would be greater than those described for non-special-status species. Because special-status species vitality and populations are more sensitive to impacts, and these populations are often geographically restricted, the impacts would likely be greater.

Specific impacts from solar energy development would depend on the types of habitats affected, the amount of habitat disturbance, the duration and timing of construction and decommissioning, the amount and type of infrastructure present, and the occurrence and use of those areas by special-status species. In the absence of siting considerations (e.g., avoidance of areas where special-status species may occur), minimization measures, and appropriate mitigation, impacts on special-status species could result from the following:

- Habitat fragmentation, degradation, or loss resulting from vegetation clearing, grading, removal or erosion of soils, construction and decommissioning of solar energy projects and associated infrastructure, changes in hydrologic regimes, sedimentation, fugitive dust, oil or other contaminant spills, fragmentation or degradation of adjacent habitats, and the spread of invasive plant species
- Habitat fragmentation, degradation, or loss resulting from construction of access roads and electricity transmission infrastructure through intact habitats
- Wildlife injury or mortality from collisions with construction vehicles or equipment
- Disturbance to wildlife activities, such as breeding or migration, from noise, dust, and human activities during clearing, grading, construction, and decommissioning

Decommissioning activities would be similar to construction. Vegetation would be removed or damaged in areas of disturbed soil, and these areas would require the re-establishment of plant communities. However, the disturbance of vegetation would be expected to primarily occur in areas previously disturbed by construction. Special-status wildlife could be affected by changes to existing habitats depending on the extent of infrastructure that would need to be removed, generation of waste materials and accidental spills, future land use, and the amount of required site restoration (e.g., regrading and revegetation).

Impacts on special-status species would be greater than those described for non-special-status species because special-status species vitality and populations are more sensitive to impacts, and these populations are often geographically restricted.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some construction and decommissioning activities would result in **less than significant impacts** to special-status terrestrial wildlife. Activities that affect species viability, the mortality of any individual species, or disturbance that disrupts successful breeding and rearing behaviors would result in **potentially significant adverse impacts** on special-status terrestrial wildlife.

3.4.1.3 Aquatic habitats and species

Construction and decommissioning activities that may affect aquatic habitats and species are similar to those described for wetlands in Section 3.4.1.4, including site clearing and grading, installing permanent meteorological towers, constructing access roads, excavating and installing solar field and associated infrastructure, and gen-tie line corridor construction.

Construction of access roads, resulting in vehicle and foot traffic, through aquatic habitat could injure or kill aquatic organisms and disturb aquatic habitats adjacent to a project site. Access roads that cross streams would obstruct fish passage if culverts or low-water crossings are not properly installed. Vehicle traffic could result in the accumulation of cobbles in fish passages that prevents fish from moving freely throughout the stream. This would result in the disturbance of migration, foraging, and rearing behavior. Species most likely to be affected include migratory fish species such as salmon, steelhead, and lamprey.

An increase in sediment loads resulting from construction activities could affect fish and amphibian feeding, breeding, and incubating efficiency. BMPs to minimize erosion and sedimentation related impacts to surface water would be followed.

There is some potential for on-site water well installation and groundwater extraction to support construction and decommissioning of solar energy projects. Groundwater extraction for construction and decommissioning uses could result in changes in drainage patterns and alterations of intermittent streams. The removal of riparian vegetation during site clearing could affect aquatic habitats by reducing the area of shading over the water, leading to higher water temperatures. As water temperature increases, dissolved oxygen levels tend to decrease, which could alter the preferred ecological conditions for many aquatic species. Surface water temperature can affect embryonic development, juvenile growth, migration of adults, susceptibility to disease, and interspecies competition. Salmonids such as bull trout, Dolly Varden, and char have narrow windows of temperature tolerance, while species such as suckers and dace have less stringent temperature criteria (Ecology 2024b). Other benefits of the riparian vegetation for the aquatic habitat that could be lost include moderation of the water chemistry and addition of leaf litter, wood, and insects that fall into the water, which provide habitat structure and food for aquatic animals.

The release of hazardous or regulated chemicals used during construction and decommissioning could affect aquatic habitats and species if released into adjacent waterbodies. The level of impact would depend on the type and volume of chemical entering the waterway, waterbody characteristics, and the location of the release. Hazardous or regulated chemicals would generally not be expected to enter waterbodies if equipment and fueling locations are not used near aquatic habitat.

Removal of project infrastructure and access roads during decommissioning could also alter drainage patterns on the site, potentially affecting aquatic habitat nearby. Removal of buried cables could introduce sediments into adjacent waterbodies through runoff and erosion. Such impacts could be minimized by the implementation of erosion control, soil decompaction, and hazardous material management plans and BMPs. Impacts could be minimized by implementing erosion control measures, BMPs, and safe equipment and hazardous material management.

It is assumed that utility-scale solar facilities are unlikely to be sited in aquatic habitat or riparian areas and that most aquatic impacts can be avoided or minimized. Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, construction and decommissioning activities would result in **less than significant impacts** to aquatic habitats and species.

3.4.1.4 Wetlands

Impacts on wetlands and their ability to provide habitat for terrestrial and aquatic species could occur during the construction and decommissioning. Wetlands may need to be cleared and/or filled to establish initial site access for geotechnical surveys or to install meteorological towers. Wetlands may also need to be cleared and filled for the construction of staging/laydown areas, permanent site access routes, access roads, gen-tie line corridors, and other supporting facilities. Roads and other infrastructure constructed in the vicinity of wetlands could change surface drainage patterns and/or introduce sediments or pollutants into those areas via runoff.

The removal of access roads and associated culverted road crossings from wetlands could temporarily increase erosion potential in those areas. Regrading those areas to pre-construction contours and restoring wetland hydrology and vegetation to those areas would limit the extent and duration of such impacts. Removal of solar arrays and supporting infrastructure would disturb soils and increase the potential for runoff to carry sediments into wetlands and associated waterways. Such impacts could be minimized by the implementation of erosion control measures and BMPs and via prompt revegetation of disturbed soils.

As with construction, operations, and maintenance activities, decommissioning work would increase the potential for spills and leaks of fuel and other vehicle fluids from construction equipment to enter wetlands. Again, such impacts could be minimized by implementing standard construction equipment and chemical and hazardous material use/storage BMPs. Removal of facility infrastructure and access roads could also alter drainage patterns on the

site, potentially affected wetlands that occur in the vicinity. Restoration of pre-construction drainage patterns and previously filled wetlands on the site could reduce such impacts.

State law requires a mitigation plan be developed and approved to ensure there is no net loss of wetland functions for wetlands and wetland buffers. A project would require an approved wetland mitigation plan before permits are issued.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, construction and decommissioning activities would result in **less than significant impacts** to wetlands.

3.4.2 Impacts from operation

Operation of solar energy facilities would likely occur mainly in upland areas. Gen-tie lines, roads, and fencing may cross wetlands, streams, or rivers, and sites may include wetlands. Development could affect a wide variety of aquatic and terrestrial species in the areas where it occurs.

3.4.2.1 Terrestrial habitats

Impacts on terrestrial habitats associated with the operation of utility-scale solar facilities include the long-term effects of habitat fragmentation, degradation, or loss of habitat associated with the limits of the project and ongoing operation and maintenance activities. Adjacent habitats may also be affected by the long-term effects of habitat fragmentation, degradation, or loss, as well as by disturbances from humans and noise and movement from maintenance vehicles.

The loss of habitat or division of habitat into smaller and more isolated fragments can result in long-term changes in species composition or structure and reductions in terrestrial biodiversity that may lead to the degradation of ecosystems. The higher the quality of habitat affected, the greater the impact from operations and maintenance. The permanent removal of vegetation can disrupt ecosystem processes across habitat types. In forested areas, tree removal leads to the loss of native vegetation cover, increased solar exposure, higher soil temperatures, reduced precipitation interception, and greater surface runoff (Elliot et al. 2002; Cao et al.2021). These changes can favor shade-intolerant and invasive species, alter fire regimes, and may cause long-term shifts in vegetation structure and composition. Shrubsteppe ecosystems are slow to recover from disturbance; the loss of woody shrubs reduces native cover, increases wind and soil erosion, disrupts nutrient retention, and may hinder the establishment of specialized species and native seedlings (Maxwell and Germino 2022; WDFW 2024a). In grasslands, vegetation removal or soil disturbance may reduce native plant diversity, increase susceptibility to invasive species, and impair below-ground processes such as carbon storage and nutrient cycling (Maxwell et al. 2024).

The introduction and spread of invasive vegetation from vehicle and human disturbance could also result in long-term impacts on terrestrial habitats. Vehicle movements and trampling by humans may lead to soil erosion and affect the rate of rainfall interception and

evapotranspiration, as well as alter water penetration, which affects soil moisture and surface and subsurface flows.

Solar energy development may potentially affect the long-term persistence of existing wildlife migration corridors. Ungulate migration corridors would be adversely affected, particularly if a solar project is sited where physiographic constrictions (e.g., geologic formations, topography, development) force herds through relatively narrow corridors (Berger 2004).

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some operation activities would result in **less than significant impacts** to terrestrial habitats. Activities that cause the permanent degradation, loss, or conversion of suitable habitat that is critical to species viability or disrupt habitat continuity along migration routes would result in **potentially significant adverse impacts** on terrestrial habitats.

3.4.2.1.1 Special-status habitats

Impacts on special-status habitats associated with operation and maintenance would be similar to those described for non-special-status habitats. However, because of the more sensitive nature of special-status habitats and the special-status species those habitats support, the impacts would be greater.

Specific impacts from operations and maintenance would depend on the solar fields and associated infrastructure and access roads within or adjacent to special-status habitats. In the absence of operational BMPs, impacts on special-status habitats could result from long-term degradation or loss of special-status habitat within the project footprint and in adjacent special-status habitats, altered hydrologic patterns, oil or other contaminant spills from maintenance activities, and the ongoing spread of invasive plant species.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some operation activities would result in **less than significant impacts** to special-status terrestrial habitats. Activities which cause the permanent degradation, loss, or conversion of suitable special-status habitat that is critical to species viability or disrupt habitat continuity along migration routes would result in **potentially significant adverse impacts** on special-status terrestrial habitats.

3.4.2.2 Terrestrial species

3.4.2.2.1 Vegetation

Operations could affect the viability of plant communities re-establishing within and adjacent to solar projects as a result of mowing and vegetation maintenance, application of herbicides, trampling and soil compaction from humans and vehicles, and from fire suppression. Increased human activity also increases the risk for damage to adjacent vegetation communities.

The introduction and spread of invasive vegetation could also result in long-term impacts on plant communities. The increase in edge habitats, vehicle movements, and trampling by humans can create gaps in vegetation and allow exotic, non-native plant species to become

established and displace native species over time. In addition, changes to wildlife diversity could affect pollinators of or seed dispersal agents for plants within vegetation communities. These factors could lead to extirpation of native plant species and vegetation communities.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some operation activities would result in **less than significant impacts** to terrestrial vegetation. Activities that reduce the ability for species to re-establish would result in **potentially significant adverse impacts** on terrestrial vegetation.

3.4.2.2.2 Wildlife

Operations could result in adverse effects to wildlife, particularly birds and bats, depending on number, sizes, and locations of the solar fields and associated infrastructure, and powerlines in relation to bird and bat activities. Birds and bats are at risk of collisions with gen-tie lines and vehicles, and all wildlife may be potentially affected by noise, vehicle traffic, hydrologic changes, and runoff. Impacts from operation could also include collision mortality with panels themselves, as water-dependent avian species (such as grebes and loons), and bats are known to collide with panels, presumably mistaking them for a waterbody (USGS 2024c).

The fragmentation, degradation, or loss of habitat could result in a long-term decrease in wildlife richness, abundance, and distribution, affecting overall native wildlife diversity. Some wildlife may become displaced into adjoining habitats that may not be able to sustain population levels. Wildlife could incur increased physiological stress as a result of complications from greater competition for space and food, increased vulnerability to predators, and higher susceptibility to diseases and parasites. Wildlife such as ground-nesting birds or other species that require open grassland areas would be affected from long-term disturbance to habitats within the study area.

Even if adjacent habitats remain unaffected, wildlife may use these areas less due to the increased presence of people and disturbance from increased noise, light, and vehicular traffic that would occur during operation and maintenance of a solar project.

As a result of habitat disturbance from solar projects, the introduction of non-native, invasive animal species could impact native species through resource competition and changes in food web dynamics and biodiversity.

Wildlife injury or mortality due to vehicle collisions are expected to decrease during the operational phase because vehicle activity would likely be less frequent compared to the construction phase.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some operation activities would result in **less than significant impacts** to terrestrial wildlife. Activities that affect species viability would result in **potentially significant adverse impacts** on terrestrial wildlife.

3.4.2.2.3 Special-status species

Impacts on special-status species associated with the operation of utility-scale solar projects would be similar to, or the same as, those described for non-special-status species. However, because special-status species vitality and populations are more sensitive, the impacts would be greater.

Specific impacts from solar energy development would depend on the types of habitats affected, the amount of habitat disturbance over time, the amount and type of infrastructure present, and the occurrence and use of those areas by special-status species. In the absence of siting considerations (e.g., avoidance of areas where special-status species may occur), minimization measures, and appropriate mitigation, impacts on special-status species could result from the following:

- Long-term effects from reduced species use of habitat on and adjacent to a project site due to changes in habitat, including mowing or other types of vegetation management (e.g., removal of woody vegetation)
- Collision with solar panels, gen-tie lines and fences
- Noise from solar energy support machinery, motorized vehicles, and mowing equipment
- Periodic habitat disturbance within the gen-tie line ROWs and along the access roads from maintenance activities, including the risk of oil or other contaminant spills and the continued spread of invasive species
- Altered migration routes; disturbance to foraging, breeding, and nesting behaviors due to placement of facilities; or increased human activities
- Altered fire regimes that negatively impact fire adapted species

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, some operation activities would result in **less than significant impacts** to special-status terrestrial wildlife. Activities that affect mortality of any individual species or disturbance that disrupts successful breeding and rearing behaviors would result in **potentially significant adverse impacts** on special-status terrestrial wildlife.

3.4.2.3 Aquatic habitats and species

Resulting levels of turbidity, sedimentation, and changes to temperature and oxygen regimes altered by utility-scale solar facility construction activities could continue to affect aquatic habitat and species during the operational period.

If water drainage patterns, sediment delivery to waterbodies, riparian area function, or water quality are changed as a result of facility construction, those impacts could continue to affect aquatic habitat and species during the operational period. During operations, potential impacts from the use of motorized equipment and runoff of surface soils would be minimized through limiting the amount of maintenance activities occurring near riparian and aquatic habitat.

Release of hazardous or regulated chemicals used during operations could adversely affect aquatic habitats and species if released into adjacent waterbodies. The level of impact would

depend on the type and volume of chemical entering the waterway, waterbody characteristics, and the location of the release. Hazardous or regulated chemicals would generally not be expected to enter waterbodies if equipment and fueling locations are not used near aquatic habitat. The risk of waterbody contamination from hazardous materials used in site maintenance would be minimized through restriction of machinery use and herbicide and pesticide application near waterways.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, operation activities would result in **less than significant impacts** to aquatic habitats and species.

3.4.2.4 Wetlands

General operating procedures at utility-scale solar energy facilities are unlikely to affect wetlands as they typically involve relatively passive activities that do not readily alter the landscape once the infrastructure is installed. Potential water quality impacts on wetlands that could affect their ability to provide terrestrial and aquatic habitat include the periodic washing of solar panels, which could create runoff that carries sediment and other potential pollutants into nearby wetlands. Water quality impacts could also occur from spills of pesticides, fuel, vehicle fluids, or other hazardous materials used or stored at the project. If not managed property, runoff from parking areas, buildings, and other project infrastructure could also degrade water quality in adjacent wetland areas, as could discharges from undersized or poorly maintained septic systems if such systems are used to manage sanitary wastewater at the project.

If wetlands are located along access roads, in gen-tie line corridors, or on other portions of the project where landscape maintenance is required, activities such as routine mowing, woody vegetation removal, and access road maintenance could also directly injure terrestrial and aquatic species using those wetlands and alter the existing habitat (e.g., convert forested or scrub-shrub wetlands to emergent wetlands). Such activities could also affect wetlands through the alteration of drainage patterns and modification of the wetland water regime. Facility lighting at substations and other project infrastructure, and potential noise from project operations, also have the potential to disturb terrestrial and aquatic species that use nearby wetlands.

Through compliance with laws and permits and with the implementation of measures to avoid and reduce impacts, operation activities would result in **less than significant impacts** to wetlands.

3.4.3 Measures to avoid, reduce, and mitigate impacts

The PEIS identifies a variety of measures to avoid, reduce, and mitigate impacts. These measures are grouped into five categories:

- **General measures:** The general measures apply to all projects using the PEIS.

- **Recommended measures for siting and design:** These measures are recommended for siting and design in the pre-application phase of a project.
- **Required measures:** These measures must be implemented, as applicable, to use the PEIS. These include permits and approvals, plans, and other required measures.
- **Recommended measures for construction, operation, and decommissioning:** These measures are recommended for the construction, operation, and decommissioning phases of a project.
- **Mitigation measures for potential significant impacts:** These measures are provided only in sections for which potential significant impacts have been identified.

3.4.3.1 General measures

- **Laws, regulations, and permits:** Obtain required approvals and permits and ensure that a project adheres to relevant federal, state, and local laws and regulations.

  ***Rationale*:** Laws, regulations, and permits provide standards and requirements for the protection of resources. The PEIS impact analysis and significance findings assume that developers would comply with all relevant laws and regulations and obtain required approvals.

- **Coordination with agencies, Tribes, and communities:** Coordinate with agencies, Tribes, and communities prior to submitting an application and throughout the life of the project to discuss project siting and design, construction, operations, and decommissioning impacts, and measures to avoid, reduce, and mitigate impacts. Developers should also seek feedback from agencies, Tribes, and communities when developing and implementing the resource protection plans and mitigation plans identified in the PEIS.

  ***Rationale*:** Early coordination provides the opportunity to discuss potential project impacts and measures to avoid, reduce, and mitigate impacts. Continued coordination provides opportunities for adaptive management throughout the life of the project.

- **Land use:** Consider the following when siting and designing a project:
  - Existing land uses
  - Land ownership/land leases (e.g., grazing, farmland, forestry)
  - Local comprehensive plans and zoning
  - Designated flood zones, shorelines, natural resource lands, conservation lands, priority habitats, and other critical areas and lands prioritized for resource protection
  - Military testing, training, and operation areas

  ***Rationale*:** Considering these factors early in the siting and design process avoids and minimizes the potential for land use conflicts. Project-specific analysis is needed to determine land use consistency.

- **Choose a project site and a project layout to avoid and minimize disturbance:** Select the project location and design the facility to avoid potential impacts to resources. Examples include the following:
    - Minimizing the need for extensive grading and excavation and reducing soil disturbance, potential erosion, compaction, and waterlogging by considering soil characteristics
    - Minimizing facility footprint and land disturbances, including limiting clearing and alterations to natural topography and landforms and maintaining existing vegetation
    - Minimizing the number of structures required and co-locating structures to share pads, fences, access roads, lighting, etc.

  ***Rationale*:** Project sites and layouts may differ substantially in their potential for environmental impacts. Thoughtful selection of a project site and careful design of a facility layout can avoid and reduce environmental impacts.

- **Use existing infrastructure and disturbed lands and co-locate facilities:** During siting and design, avoid and minimize impacts by:
    - Using existing infrastructure and disturbed lands, including roads, parking areas, staging areas, aggregate resources, and electrical and utility infrastructure.
    - Co-locating facilities within existing rights-of-way or easements
    - Considering limitations of existing infrastructure, such as water and energy resources

  ***Rationale*:** Using existing infrastructure and disturbed lands and co-locating facilities reduces impacts to resources that would otherwise result from new ground disturbance and placement of facilities in previously undisturbed areas.

- **Conduct studies and surveys early:** Conduct studies and surveys early in the process and at the appropriate time of year to gather data to inform siting and design. Examples include the following:
    - Geotechnical study
    - Habitat and vegetation study
    - Cultural resource survey
    - Wetland delineation

  ***Rationale*:** Conducting studies and surveys early in the process and at the appropriate time of year provides data to inform siting and design choices that avoid and reduce impacts. This can reduce the overall timeline as well by providing information to agencies as part of a complete application for environmental reviews and permits.

- **Restoration and decommissioning:** Implement a Site Restoration Plan for interim reclamation following temporary construction and operations disturbance. Implement a Decommissioning Plan for site reclamation at the end of a project. Coordinate with state and local authorities, such as WDFW, county extension services, weed boards, or land

management agencies on soil and revegetation measures, including approved seed mixes. Such plans address:

- Documentation of pre-construction conditions and as-built construction drawings
- Measures to salvage topsoil and revegetate disturbed areas with native and pollinator-supporting plants
- Management of hazardous and solid wastes
- Timelines for restoration and decommissioning actions
- Monitoring of restoration actions
- Adaptive management measures

***Rationale*:** Restoration and decommissioning actions return disturbed areas to pre-construction conditions, promote soil health and revegetation of native plants, remove project infrastructure from the landscape, and ensure that project components are disposed of or recycled in compliance with all applicable laws and regulations.

- **Cumulative impact assessment:** Assess cumulative impacts on resources based on reasonably foreseeable past, present, and future projects. Identify measures to avoid, reduce, and mitigate cumulative impacts. Consider local studies and plans, such as comprehensive plans.

  ***Rationale*:** Cumulative impacts can result from incremental, but collectively significant, actions that occur over time. The purpose of the cumulative impacts analysis is to make sure that decision-makers consider the full range of consequences under anticipated future conditions.

3.4.3.2 Recommended measures for siting and design

- Follow WDFW's best management practices in their current guidelines for utility-scale solar energy development in Washington state. The guidelines outline strategies for avoiding, minimizing, and mitigating impacts to wildlife and habitat resources from early project planning through operations. The guidelines include BMPs, compensatory mitigation, and technical survey requirements.

  WDFW's approach emphasizes close coordination with developers to ensure that guidelines are applied in a site-specific manner, based on the best available data for each project site. The WDFW guidelines are also designed to be adaptable and will be updated as new scientific information becomes available. Developers should coordinate with WDFW to implement the most current WDFW guidelines and best management practices.

- Contact applicable federal (e.g., USFWS and NOAA Fisheries), state (e.g., WDFW and Ecology), and local agencies and use mapping resources early to identify potentially affected sensitive ecological resources, including special-status species and habitats, aquatic habitats, and wetland habitats.

- Use the mapping resources identified in the WDFW guidelines, including, for example, the following planning resources that support early siting considerations:
    - Conservation Biology Institute's Least Conflict Solar Siting Conservation Value Map
    - Washington State University Least-Conflict Solar Siting Study maps conservation layer
    - WSRRI Map Portal
    - WDFW's priority habitat and species online viewer
    - WDFW's Washington Habitat Connectivity Action Plan maps
    - USFWS Information for Planning and Consultation (IPaC) map viewer
- Site and design projects to avoid and minimize:
    - Impacts to special-status habitat or species, such as shrubsteppe habitat, aquatic habitat, wetlands, and wetland buffers
    - Habitat loss, fragmentation, and resulting edge habitat
    - Impacts to wildlife corridors and landscape connectivity
- Follow WDFW's suggested methodology for field surveys including wildlife surveys, rare plant surveys, and habitat and vegetation surveys, as requested by WDFW or other applicable agencies. Consult a county-level noxious weed list prior to conducting pre-construction vegetation surveys.
- Coordinate with WDFW and other applicable agencies to establish site-specific buffers around habitats and areas identified as critical to special-status species (e.g., nests) and exclude or modify facilities and activities within those areas.
- Review and implement latest recommendations and BMPs for reducing solar panel collision risk for birds and bats.
- Avoid siting access roads and facilities near open water or other areas known to attract a large number of birds. Coordinate with WDFW to determine project-specific siting distances from these areas.
- Minimize use of overhead gen-tie and collector lines, unless underground gen-tie and collector lines are not feasible due to environmental conditions (e.g., topography, soil conductivity) or cultural or Tribal resource concerns.
- Follow Avian Power Line Interaction Committee guidelines.

3.4.3.3 Required measures

This section lists permits and approvals, plans, and other required measures for use of the PEIS, as applicable. See Section 3.3 for more detailed information on potentially required permits and approvals.

- Bald and Golden Eagle Protection Act compliance (USFWS)
- Clean Water Act Section 401 Water Quality Certification (Ecology/USEPA/Tribes)
- Chapter 90.48 Revised Code of Washington (RCW) authorization to work in waters of the state (Ecology)
- Coastal Zone Management Act Consistency (Ecology)
- Construction and Development Permits (e.g., road access, grading, building, mechanical, lights, signage) (local agency)
- Endangered Species Act Section 7 Consultation (USFWS/NOAA)

- Endangered Species Act Section 10 Review (USFWS/NOAA)
- Environmental Permits (e.g., Critical Areas, Shorelines) (local agency)
- Floodplain Development Permit (local agency)
- Forest Practices Act application/notification (DNR or local agency)
- Hydraulic Project Approval (WDFW)
- Magnuson-Stevens Fishery Conservation and Management Act (NOAA Fisheries)
- Migratory Bird Treaty Act (USFWS)
- Where in-water work cannot be avoided, minimize impacts to aquatic species by working within the WDFW- and USACE-recommended in-water work windows, following applicable design guidelines (e.g., WDFW Water Crossing Design Guidelines [Barnard et al. 2013]).
- Implement a Wildlife Habitat Management Plan to avoid and minimize impacts to achieve no net loss of habitat functions and values. Develop the plan in coordination with WDFW and other applicable agencies.
- Implement a Bird and Bat Conservation Strategy and Avian Protection Plan in consultation with USFWS and WDFW.
- Implement a Vegetation Management Plan.
- Implement a Fire Prevention and Response Plan.
- Impacts to both jurisdictional and non-federally jurisdictional wetlands require a wetland mitigation plan developed in accordance with *Wetland Mitigation in Washington State*.

3.4.3.4 Recommended measures for construction, operation, and decommissioning

- Designate a qualified biologist to be responsible for overseeing compliance with all measures related to the protection of ecological resources throughout all project phases, particularly in areas requiring avoidance or containing sensitive biological resources, such as special-status species and important habitats.
- Follow WDFW's best management practices in *Guidelines for Utility-scale Solar & Onshore Wind Energy Development in Washington State*.
- Consult WDFW and other appropriate federal, state, and local agencies for spatial and temporal buffers during construction and operations activities. Any buffers established would be based on site-specific factors determined during coordination with WDFW and other appropriate agencies.
- Conduct seasonally appropriate walkthroughs prior to any ground-disturbing activity to ensure that important or sensitive species or habitats are not present in or near project sites. Conduct walkthroughs by a qualified biologist or team of biologists and include federal agency representatives, state natural resource agencies, and Tribal staff, as appropriate.
- Avoid surface water or groundwater withdrawals that have potential to affect sensitive habitats (e.g., riparian habitats) and any habitats occupied by special-status species.
- Avoid causing changes in surface water or groundwater quality (e.g., chemical contamination, increased salinity, increased temperature, decreased dissolved oxygen, and increased sediment loads) or flow that result in the alteration of terrestrial plant

communities or communities in wetlands, springs, seeps, intermittent streams, perennial streams, and riparian areas (including alterations of cover and community structure, species composition, and diversity).
- Employ noise reduction devices to minimize impacts on wildlife, especially special-status species. Avoid evening and nighttime construction activities to limit the impacts of construction noise on wildlife.
- Manage for low-maintenance vegetation (e.g., native shrubs, grasses, and forbs) and invasive species control, minimizing the use of herbicides near sensitive habitats, including aquatic habitat and wetlands, and using only approved herbicides consistent with all regulations and safe application guidelines.

3.4.3.5 Mitigation measures for potential significant impacts

- In coordination with WDFW and other applicable agencies, develop wildlife/habitat management and mitigation plans and mitigation measures. Use the most current WDFW *Guidelines for Utility-scale Solar & Onshore Wind Energy Development in Washington State* mitigation strategies for temporary and permanent impacts to wildlife and habitat.
    - Compensatory mitigation ratios and strategies in the WDFW guidelines provide baseline guidance, but these ratios may be adjusted on a project-by-project, site-specific basis or if specific mitigation recommendations have already been published by WDFW (e.g., Oregon white oak, ferruginous hawk). Such determinations would be based on best available science and the specific conditions of the site, considering the impacted habitat types, affected wildlife species, and mitigation areas.
    - The compensatory mitigation strategies and ratios for permanent impacts may be higher for some types of sensitive habitats and species. For example, impacts to shrubsteppe habitat may be higher because such a large percentage of the shrubsteppe landscape in Washington has already been lost.

  ***Rationale*:** A wildlife/habitat management and mitigation plan will outline necessary measures to mitigate impacts to achieve no net loss of habitat functions and values.

- Implement measures for operational monitoring and adaptive management, including, where appropriate, establishing a technical advisory committee to advise on adaptive management measures.

  ***Rationale*:** Monitoring operational activities can identify changing site conditions and adaptive management measures can be developed to address those changes.

3.4.4 Unavoidable significant adverse impacts

Construction, operation, and decommissioning of utility-scale solar projects may result in **potentially significant and unavoidable adverse impacts** on terrestrial special-status habitats and species if activities cause the permanent degradation, loss, or conversion of suitable habitat that is critical to habitat or species viability; affect the mortality of any individual species

or create a disturbance that disrupts successful breeding and rearing behaviors; or disrupt habitat continuity along migration routes. Determining if mitigation options would reduce or eliminate impacts below significance would be dependent on the specific project and site. Mitigation to reduce impacts below significance for terrestrial special-status habitats or species may not be feasible.

3.5 Solar facilities with battery energy storage systems

3.5.1 Impacts from construction, operation, and decommissioning

The potential impacts on biological resources described in Section 3.4 also apply to solar projects with co-located BESSs for site characterization, construction, operations, and decommissioning.

Co-locating a BESS would require some additional construction-related ground disturbance and an increased building footprint relative to projects with no BESS. Battery storage containers are typically 40 feet by 8 feet by 8.5 feet and installed on concrete foundations within a fenced area or within a warehouse-type enclosure and designed for secondary containment. The presence and use of a BESS at a solar energy facility would add another stormwater consideration and potentially another regulated element to be included in an Industrial SWPPP. BESSs would require heating, ventilation, and air conditioning (HVAC) units, which could generate increased noise. A fire suppression and prevention system would also be installed.

The evaluation for impacts of utility-scale facilities on terrestrial and aquatic habitats and species described in Section 3.4 also applies to facilities with BESSs for construction, operations, and decommissioning. The additional footprint of the BESS would impact more habitat and the increased noise from the HVAC system would have a greater impact to wildlife compared to facilities without a BESS, but the BESS is not expected to substantially add to the overall level of impact on terrestrial habitats and species through implementation of BMPs. During normal operations, the BESS electrolyte solutions are recovered and reused during the recharging process and are generally not reactive or toxic substances, so it is unlikely the BESS would additionally impact habitats and species.

3.5.1.1 Terrestrial habitats and species

Impacts to terrestrial habitats and species from the construction, operation, or decommissioning of solar energy facilities with a co-located BESS would be the same as described in Section 3.4.

3.5.1.2 Aquatic habitats and species

Similar to facilities without a BESS, it is assumed that the infrastructure of the facilities with a co-located BESS are unlikely to be sited in aquatic habitat or riparian areas and that aquatic impacts can be avoided or minimized. Impacts to aquatic habitats and species from the construction, operation, or decommissioning of solar energy with a co-located BESS would be the same as described in Section 3.4.

3.5.1.3 Wetlands

Impacts to wetlands from the construction, operation, or decommissioning of solar energy projects with a co-located BESS would be the same as described in Section 3.4.

3.5.2 Measures to avoid, reduce, and mitigate impacts

The measures to avoid, reduce, and mitigate impacts would be the same as those identified in Section 3.4.3.

3.5.3 Unavoidable significant adverse impacts

Construction, operation, and decommissioning of solar projects with a co-located BESS may result in **potentially significant and unavoidable adverse impacts** on terrestrial special-status habitats and species if activities cause the permanent degradation, loss, or conversion of suitable habitat that is critical to habitat or species viability; affect the mortality of any individual species or create a disturbance that disrupts successful breeding and rearing behaviors; or disrupts habitat continuity along migration routes. Determining if mitigation options would reduce or eliminate impacts below significance would be dependent on the specific project and site. Mitigation to reduce impacts below significance for terrestrial special-status habitats or species may not be feasible.

3.6 Solar facilities that include agricultural uses

3.6.1 Impacts from construction, operation, and decommissioning

The potential impacts on biological resources described in Section 3.4 also apply to solar projects that include agricultural use (agrivoltaic) for construction, operations, and decommissioning. Facilities with co-located agriculture could be located on lands with existing agricultural uses, or a project could add a new agricultural use to the area.

Some of the ways projects that include agricultural use would differ from those without agricultural land use include the following:

- The solar panels may be spaced in a more dispersed way to allow for improved agricultural activities and grazing.
- Agricultural activities could include maintenance of existing or addition of new infrastructure, roads, fences, gates, and traffic.
- Human use at a site would increase due to continued agricultural use. This would result in an increase in noise, herbicide and pesticide use, crop rotation, and livestock activities that would impact habitats and species.
- Because agricultural use would be combined with solar facilities, there would be a combined demand for water that is higher than for a solar energy facility with no agricultural use. For sites with existing agricultural use, the increase in water demand would be as described in Section 3.4. For sites where the type of agricultural use is changed or where agriculture is added, there could be increased demand for water. The demand would be higher for a site with crop production and irrigation and lower for a

site with livestock use with no crop production. This in turn could affect species and habitats that use the same water sources. Considerations for water availability and water rights are discussed further in the *Water Resources Technical Report*.

The evaluation for impacts on terrestrial and aquatic habitats and species and wetlands described in Section 3.4 apply to facilities with combined agricultural use for construction, operations, and decommissioning. Because the agricultural use would allow for plant growth, impacts could be less; however, because these projects would include crop production or grazing, the habitat and species impacts would be relatively the same as for solar projects without agriculture.

3.6.1.1 Terrestrial habitats and species

Impacts to terrestrial habitats and species from the construction, operation, or decommissioning of facilities with co-located agricultural uses would be the same as described in Section 3.4.

3.6.1.2 Aquatic habitats and species

Similar to facilities without agricultural uses, it is assumed that the infrastructure of the facilities with co-located agriculture are unlikely to be sited in aquatic habitat or riparian areas and that aquatic impacts can be avoided or minimized. Impacts to aquatic habitats and species from the construction, operation, or decommissioning of facilities with co-located agricultural uses would be the same as described in Section 3.4.

3.6.1.3 Wetlands

Impacts to wetlands from the construction, operation, or decommissioning of facilities with co-located agricultural uses would be the same as described in Section 3.4.

3.6.2 Measures to avoid, reduce, and mitigate impacts

The measures to avoid, reduce, and mitigate impacts would be the same as those identified in Section 3.4.3 along with the following.

3.6.2.1 Recommended measures for construction, operation, and decommissioning

- Minimize use of artificial ground covers such as gravel that require application of herbicides and are not compatible with crops or pollinator plants.
- Select crops that are successful in the area and compatible with growing under solar arrays.
- Select pollinator plants that are native to the area and compatible with growing under solar arrays.

3.6.3 Unavoidable significant adverse impacts

Construction, operation, and decommissioning of solar projects with co-located agricultural uses may result in **potentially significant and unavoidable adverse impacts** on terrestrial

special-status habitats and species if activities cause the permanent degradation, loss, or conversion of suitable habitat that is critical to habitat or species viability; affect the mortality of any individual species or create a disturbance that disrupts successful breeding and rearing behaviors; or disrupt habitat continuity along migration routes. Determining if mitigation options would reduce or eliminate impacts below significance would be dependent on the specific project and site. Mitigation to reduce impacts below significance for terrestrial special-status habitats or species may not be feasible.

3.7 No Action Alternative

Under the No Action Alternative, agencies would continue to conduct environmental review and permitting for utility-scale solar energy facilities under existing state and local laws on a project-by-project basis. The potential impacts would be similar to the impacts for the types of facilities described above for construction, operation, and decommissioning, depending on project size and design, and would likely range from **less than significant impacts to potentially significant adverse impacts**.

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Appendix G, Attachment 1. USFWS Information for Planning and Consultation Resource List for Washington

IPaC resource list

Please note that the Federal Highways Programmatic Consultation for Transportation Projects affecting NLEB or Indiana Bat Determination Key is temporarily offline for updates and will be available soon. We apologize for any inconvenience this may cause. ×

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that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Idaho, Oregon, and Washington

Local offices

Washington Fish And Wildlife Office

(360) 753-9440
(360) 753-9405

510 Desmond Drive Se, Suite 102
Lacey, WA 98503-1263

Oregon Fish And Wildlife Office

(503) 231-6179
(503) 231-6195

2600 Southeast 98th Avenue, Suite 100
Portland, OR 97266-1398

Idaho Fish And Wildlife Office

(208) 378-5243
(208) 378-5262

1387 South Vinnell Way, Suite 368
Boise, ID 83709-1657

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Canada Lynx Lynx canadensis There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/3652	Threatened
Columbian White-tailed Deer Odocoileus virginianus leucurus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/154	Threatened
Gray Wolf Canis lupus There is **final** critical habitat for this species. https://ecos.fws.gov/ecp/species/4488	Endangered
Grizzly Bear Ursus arctos horribilis There is **proposed** critical habitat for this species. https://ecos.fws.gov/ecp/species/7642	Threatened
North American Wolverine Gulo gulo luscus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5123	Threatened
Olympia Pocket Gopher Thomomys mazama pugetensis Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/6713	Threatened
Pygmy Rabbit Brachylagus idahoensis No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1126	Endangered

Roy Prairie Pocket Gopher Thomomys mazama glacialis — Threatened
Wherever found
There is **final** critical habitat for this species. However, no *actual* acres or miles were designated due to exemptions or exclusions. See Federal Register publication for details.
https://ecos.fws.gov/ecp/species/7821

Southern Mountain Caribou Dps Rangifer tarandus ssp. caribou — Endangered
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/4618

Tenino Pocket Gopher Thomomys mazama tumuli — Threatened
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/6290

Yelm Pocket Gopher Thomomys mazama yelmensis — Threatened
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/7257

Birds

NAME	STATUS
California Condor Gymnogyps californianus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8193	EXPN
Hawaiian Petrel Pterodroma sandwichensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6746	Endangered
Marbled Murrelet Brachyramphus marmoratus There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened

Mt. Rainier White-tailed Ptarmigan Lagopus leucura rainierensis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9234	Threatened
Northern Spotted Owl Strix occidentalis caurina Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/1123	Threatened
Short-tailed Albatross Phoebastria (=Diomedea) albatrus Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/433	Endangered
Streaked Horned Lark Eremophila alpestris strigata Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/7268	Threatened
Western Snowy Plover Charadrius nivosus nivosus There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/8035	Threatened
Yellow-billed Cuckoo Coccyzus americanus There is **final** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Northwestern Pond Turtle Actinemys marmorata Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1111	Proposed Threatened

Amphibians

NAME	STATUS
Oregon Spotted Frog Rana pretiosa Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/6633	Threatened

Fishes

NAME	STATUS
Bull Trout Salvelinus confluentus There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/8212	Threatened
Dolly Varden Salvelinus malma Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1008	PSAT

Insects

NAME	STATUS
Island Marble Butterfly Euchloe ausonides insulanus Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/3285	Endangered
Monarch Butterfly Danaus plexippus Wherever found There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Suckley's Cuckoo Bumble Bee Bombus suckleyi No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10885	Proposed Endangered

Taylor's (=whulge) Checkerspot Euphydryas editha taylori — Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/5907

Flowering Plants

NAME	STATUS

Kincaid's Lupine Lupinus sulphureus ssp. kincaidii — Threatened
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/3747

Showy Stickseed Hackelia venusta — Endangered
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/5210

Spalding's Catchfly Silene spaldingii — Threatened
Wherever found
There is **proposed** critical habitat for this species.
https://ecos.fws.gov/ecp/species/3681

Umtanum Desert Buckwheat Eriogonum codium — Threatened
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/3627

Ute Ladies'-tresses Spiranthes diluvialis — Threatened
Wherever found
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2159

Wenatchee Mountains Checkermallow Sidalcea oregana var. calva — Endangered
Wherever found
There is **final** critical habitat for this species. Your location overlaps the critical habitat.
https://ecos.fws.gov/ecp/species/7222

White Bluffs Bladderpod Physaria douglasii ssp. tuplashensis Wherever found There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/5390	Threatened

Conifers and Cycads

NAME	STATUS
Whitebark Pine Pinus albicaulis Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1748	Threatened

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Bull Trout Salvelinus confluentus https://ecos.fws.gov/ecp/species/8212#crithab	Final
Canada Lynx Lynx canadensis https://ecos.fws.gov/ecp/species/3652#crithab	Final
Island Marble Butterfly Euchloe ausonides insulanus https://ecos.fws.gov/ecp/species/3285#crithab	Final
Kincaid's Lupine Lupinus sulphureus ssp. kincaidii https://ecos.fws.gov/ecp/species/3747#crithab	Final
Marbled Murrelet Brachyramphus marmoratus https://ecos.fws.gov/ecp/species/4467#crithab	Final
Northern Spotted Owl Strix occidentalis caurina https://ecos.fws.gov/ecp/species/1123#crithab	Final

Olympia Pocket Gopher Thomomys mazama pugetensis https://ecos.fws.gov/ecp/species/6713#crithab	Final
Oregon Spotted Frog Rana pretiosa https://ecos.fws.gov/ecp/species/6633#crithab	Final
Southern Mountain Caribou Dps Rangifer tarandus ssp. caribou https://ecos.fws.gov/ecp/species/4618#crithab	Final
Streaked Horned Lark Eremophila alpestris strigata https://ecos.fws.gov/ecp/species/7268#crithab	Final
Taylor's (=whulge) Checkerspot Euphydryas editha taylori https://ecos.fws.gov/ecp/species/5907#crithab	Final
Tenino Pocket Gopher Thomomys mazama tumuli https://ecos.fws.gov/ecp/species/6290#crithab	Final
Umtanum Desert Buckwheat Eriogonum codium https://ecos.fws.gov/ecp/species/3627#crithab	Final
Wenatchee Mountains Checkermallow Sidalcea oregana var. calva https://ecos.fws.gov/ecp/species/7222#crithab	Final
Western Snowy Plover Charadrius nivosus nivosus https://ecos.fws.gov/ecp/species/8035#crithab	Final
White Bluffs Bladderpod Physaria douglasii ssp. tuplashensis https://ecos.fws.gov/ecp/species/5390#crithab	Final
Yelm Pocket Gopher Thomomys mazama yelmensis https://ecos.fws.gov/ecp/species/7257#crithab	Final

Bald & Golden Eagles

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their nests, should follow appropriate regulations and implement required avoidance and minimization measures, as described in the various links on this page.

The data in this location indicates that no eagles have been observed in this area. This does not mean eagles are not present in your project area, especially if the area is difficult to survey. Please review the 'Steps to Take When No Results Are Returned' section of the Supplemental Information on Migratory Birds and Eagles document to determine if your project is in a poorly surveyed area. If it is, you may need to rely on other resources to determine if eagles may be present (e.g. your local FWS field office, state surveys, your own surveys).

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Bald and Golden Eagle information is not available at this time

Bald & Golden Eagles FAQs

What does IPaC use to generate the potential presence of bald and golden eagles in my specified location?

The potential for eagle presence is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are an eagle (Bald and Golden Eagle Protection Act requirements may apply).

Proper interpretation and use of your eagle report
On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more

dependable. In contrast, a low survey effort line or no data line (red horizontal) means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide you in knowing when to implement avoidance and minimization measures to eliminate or reduce potential impacts from your project activities or get the appropriate permits should presence be confirmed.

How do I know if eagles are breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If an eagle on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

Interpreting the Probability of Presence Graphs

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:
The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Migratory birds

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (FWS). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The FWS interprets the MBTA to prohibit incidental take.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

Migratory bird information is not available at this time

Migratory Bird FAQs

Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Avoidance & Minimization Measures for Birds describes measures that can help avoid and minimize impacts to all birds at any location year-round. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is one of the most effective ways to minimize impacts. To see when birds are most likely to occur and breed in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location, such as those listed under the Endangered Species Act or the Bald and Golden Eagle Protection Act and those species marked as "Vulnerable". See the FAQ "What are the levels of concern for migratory birds?" for more information on the levels of concern covered in the IPaC migratory bird species list.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) with which your project intersects. These species have been identified as warranting special attention because they are BCC species in that area, an eagle (Bald and Golden Eagle Protection Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, and to verify survey effort when no results present, please visit the Rapid Avian Information Locator (RAIL) Tool.

Why are subspecies showing up on my list?

Subspecies profiles are included on the list of species present in your project area because observations in the AKN for **the species** are being detected. If the species are present, that means that the subspecies may also be present. If a subspecies shows up on your list, you may need to rely on other resources to determine if that subspecies may be present (e.g. your local FWS field office, state surveys, your own surveys).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating, or resident), you may query your location using the RAIL Tool and view the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your IPaC migratory bird species list has a breeding season associated with it (indicated by yellow vertical bars on the phenology graph in your "IPaC PROBABILITY OF PRESENCE SUMMARY" at the top of your results list), there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Bald and Golden Eagle Protection Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially BCC species. For more information on avoidance and minimization measures you can implement to help avoid and minimize migratory bird impacts, please see the FAQ "Tell me more about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Proper interpretation and use of your migratory bird report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please look carefully at the survey effort (indicated by the black vertical line) and for the existence of the "no data" indicator (a red horizontal line). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list does not represent all birds present in your project area. It is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list and associated information help you know what to look for to confirm presence and helps guide implementation of avoidance and minimization measures to eliminate or reduce potential impacts from your project activities, should presence be confirmed. To learn more about avoidance and minimization measures, visit the FAQ "Tell me about avoidance and minimization measures I can implement to avoid or minimize impacts to migratory birds".

Interpreting the Probability of Presence Graphs
Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. A taller bar indicates a higher probability of species presence. The survey effort can be used to establish a level of confidence in the presence score.

How is the probability of presence score calculated? The calculation is done in three steps:

The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.

To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.

The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season ()
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort ()
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data ()
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

Facilities

Wildlife refuges and fish hatcheries

Refuge and fish hatchery information is not available at this time

Wetlands in the National Wetlands Inventory (NWI)

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.