Appendix K: Land Use Technical Resource 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
BLM	Bureau of Land Management
CBA	Community Benefit Agreement
CESA	Compatible Energy Siting Assessment
CFR	*Code of Federal Regulations*
CRP	Conservation Reserve Program
DNR	Washington Department of Natural Resources
DoD	U.S. Department of Defense
Ecology	Washington State Department of Ecology
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
GMA	Growth Management Act
LESA	land evaluation and site assessment
NFIP	National Flood Insurance Program
NRCS	Natural Resources Conservation Service
OFM	Washington State Office of Financial Management
PEIS	Programmatic Environmental Impact Statement
RCW	Revised Code of Washington
SED	shoreline environment designation
SEPA	State Environmental Policy Act
SMP	Shoreline Master Program
SSDP	Shoreline Substantial Development Permit
UGA	urban growth area
USC	*United States Code*
USDOE	U.S. Department of Energy
USFS	U.S. Forest Service
VSP	Voluntary Stewardship Program
WAC	Washington Administrative Code
WDFW	Washington Department of Fish and Wildlife
WSDOT	Washington State Department of Transportation
WSU	Washington State University

Summary

This technical resource report describes the conditions of land use in the study area. It also describes the regulatory context, potential impacts, and measures that could avoid or reduce impacts.

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

- Population and housing
- Major types of land uses
- Land use planning designations
- Land use constraints
- Consistency with plans, policies, and regulations

Findings for land use impacts described in this resource report are summarized as follows:

- Through compliance with laws and permits and with the implementation of measures that could avoid and reduce impacts, most construction, operation, and decommissioning activities would result in **less than significant impacts** on land use.
- Construction would have **potentially significant adverse impacts** if natural resource lands of long-term commercial significance are converted.
- Changes to rural character resulting from operation of a utility-scale solar energy facility would have **potentially significant adverse impacts** depending on whether plans and development regulations are in place to protect rural character and how they consider utility-scale solar facilities.

Some utility-scale solar energy facilities may result in **potentially significant and unavoidable adverse impacts** on natural resource lands of long-term commercial significance or rural character. Determining if mitigation options would reduce or eliminate impacts below significance would be dependent on the specific project and site and local regulations and plans.

Crosswalk with Land Use Technical Resource 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 land use technical resource reports for each PEIS.

Utility-Scale Solar Energy PEIS (this document)	**Utility-Scale Onshore Wind Energy PEIS**
• Additional agricultural information in affected environment from Least-Conflict Solar Siting Study for the Columbia Plateau • Some differences in measures to avoid and reduce impacts	• Decommissioning considers potential impacts from repowering onshore wind facilities • Some differences in measures to avoid and reduce impacts

1 Introduction

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

1.1 Resource description

Land use refers to how land is developed for various human uses or preserved for natural purposes. This section describes the current land use conditions in the utility-scale solar study area and the potential changes resulting from the facilities. It also generally evaluates the consistency of the facilities with applicable federal, state, and local regulations, plans, and policies. Mitigation measures that can be used to reduce impacts are also described.

The following resources could have impacts that overlap with impacts to land use resources. Impacts on these resources are reported in their respective technical resource reports, as follows:

- **Earth:** The *Earth Resources Technical Report* (Appendix D) discusses impacts to critical areas.
- **Air quality and greenhouse gases**: Dust, emissions, and other impacts to air quality and greenhouse gases are discussed in the *Air Quality and Greenhouse Gases Technical Resource Report* (Appendix E).
- **Water:** The *Water Resources Technical Report* (Appendix F) discusses impacts to critical areas.
- **Biological resources**: Impacts to biological resources, including shrubsteppe habitats, are discussed in the *Biological Resources Technical Report* (Appendix G).
- **Environmental health and safety**: Impacts related to wildfires are discussed in the *Environmental Health and Safety Technical Resource Report* (Appendix I).
- **Noise and vibration:** Impacts from noise and vibration are discussed in the *Noise and Vibration Technical Resource Report* (Appendix J).
- **Aesthetics and visual quality**: Impacts related to aesthetic and visual changes are discussed in the *Aesthetics/Visual Quality Technical Resource Report* (Appendix L).
- **Recreation:** Impacts to recreational areas and uses are discussed in the *Recreation Resources Technical Report* (Appendix M).
- **Transportation and public services and utilities:** Additional aviation resources and other impacts to transportation are discussed in the *Transportation Resources Technical Report* (Appendix O). Additional aviation resources are also discussed along with impacts to public services and utilities in the *Public Services and Utilities Technical Resource Report* (Appendix P).

1.2 Regulatory context

This technical resource report addresses requirements related to land ownership, land use types, and general regulatory agency requirements for utility-scale solar projects. Regulations and plans specific to certain types of resources, such as wildlife, water, cultural resources, and others, are covered in other resource-specific reports and are not repeated here.

Table 1 summarizes the primary land use plans, policies, and regulations that apply to utility-scale solar development in Washington.

Table 1. Primary applicable land use-related laws, plans, and policies

Regulation, statute, guideline	Description
Federal	
Federal Aviation Administration (FAA) Interim Policy for Review of Solar Energy System Projects on Federally Obligated Airports (78 *Federal Register* 63276)	Policy for analyzing ocular (glint or glare) impacts when a solar energy system is proposed on a federally obligated towered airport (i.e., an airport that has accepted federal funding and has an air traffic control tower).
Farmland Protection Policy Act (7 *United States Code* [USC] 73)	Requires a land evaluation and site assessment for projects that may irreversibly convert farmland (directly or indirectly) to non-agricultural use and that are completed by a federal agency or with assistance from a federal agency.
Federal Land Policy and Management Act (43 USC 35)	Requires public lands to be managed in a manner that protects scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values while providing for outdoor recreation and human occupancy and use.
Flood Control Act and National Flood Insurance Act (33 USC 15, 42 USC 50)	Allows property owners in participating communities to purchase flood insurance. Requires participating jurisdictions to implement floodplain management regulations that reduce future flood damage.
National Forest Management Act (16 USC 1604)	Directs the development, amendment, and revision of land management plans for each national forest to provide for the multiple use and sustained yield of products including outdoor recreation, range, timber, watershed, wildlife and fish, and wilderness.
National Environmental Policy Act (43 USC 1638)	Requires environmental review for activities involving a federal permit, federal funding, or work on federally owned land.
Obstruction to Navigation Federal Regulation, Finding of No Hazard to Air Navigation (49 *Code of Federal Regulations* [CFR] Part 77)	Describes requirements for project developers to notify FAA for activities either on or outside of airport property that meet specific criteria.
Renewable Energy Production on Federal Land (43 USC 48)	Set a goal to authorize production of at least 25 gigawatts of electricity from wind, solar, and geothermal energy projects by not later than 2025 on federal public lands.
Section 4(f) review (49 USC 303l and 23 CFR 774)	Applies to projects that receive funding from or require approval by an agency of the U.S. Department of Transportation. Projects must demonstrate that there is no prudent and feasible avoidance

Regulation, statute, guideline	Description
	alternative to the use of and/or adverse impacts to publicly owned parks, recreation areas, and wildlife or waterfowl refuges, or any publicly or privately owned historic site listed or eligible for listing on the National Register of Historic Places.
U.S. Forest Service Northwest Forest Plan	Addresses activities on 24.5 million acres of federally managed lands in western Oregon, Washington, and northwestern California within the range of the northern spotted owl. Delineates land use categories and an aquatic conservation strategy, each with associated standards and guidelines for management activities.
Coastal Zone Management Act (16 USC 1451 et seq.)	The federal consistency provisions of the Coastal Zone Management Act 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 of Washington's 15 coastal counties that could have reasonably foreseeable impacts on state coastal resources and uses. Administered by the Washington State Department of Ecology.
State	
Forest Practices Rules (Title 222 Washington Administrative Code [WAC]), Forest Practices Act (Chapter 76.09 Revised Code of Washington [RCW]), Stewardship of Non-industrial Forests and Woodlands (Chapter 76.13 RCW)	Establish standards for timber harvesting, pre-commercial thinning, road construction, fertilization, forest chemical application and other forest practices applications.
Floodplain Management (Chapter 173-158 WAC, Chapter 86.16 RCW)	Statewide floodplain management regulations. Establishes state requirements that equal the minimum federal requirements for the National Flood Insurance Program, in addition to higher standards. Applies to the planning, construction, operation, and maintenance of any structures or improvements that might affect the flooding regimen of a waterbody.
Governor's Executive Order 21-02	Requires that all projects receiving capital funding from agencies of the Executive Branch and Small Cabinet must consult with the Washington State Department of Archaeology and Historic Preservation and affected Tribes on their project.
Photovoltaic Module Stewardship and Takeback Program (RCW 70A.510.010)	Requires manufacturers of solar photovoltaic modules to provide the public a convenient and environmentally sound way to recycle all modules purchased after July 1, 2017.
State Environmental Policy Act (Chapter 43.21 RCW)	Requires environmental review for activities proposed or permitted by state or local agency.
State land leasing and easement rules (Chapters 79.13 and 79.36 RCW; Chapter 332-22 WAC)	Establishes standards and procedures for state agencies to issue leases or easements on public lands.
Washington State Department of Transportation: Utility Lines – Franchises and Permits (Chapter 468-34 WAC)	Requires a utility permit or franchise for facilities proposed within state highway rights-of-way.

Regulation, statute, guideline	Description
Washington State Growth Management Act (Chapter 36.70A RCW)	Requires fast-growing cities and counties to develop a comprehensive plan to manage their population growth. Establishes a series of 13 goals that should act as the basis of all comprehensive plans. Requires all cities and counties to designate natural resource lands (forestry, agriculture, fisheries, and mining) and identify steps to preserve them. Requires all cities and counties to adopt critical areas regulations.
Washington State Legislature: 2020 greenhouse gas legislation, 2021 State Energy Strategy, 2019 Clean Energy Transformation Act	Commits Washington to an electrical supply free of greenhouse gas emissions by 2045, and to a goal of net zero emissions by 2050. Identifies policies and actions to achieve the state's greenhouse gas emissions and transition to 100% clean energy.
Washington State Shoreline Management Act (Chapter 90.58 RCW) and implementing guidelines (Chapter 173-26 WAC)	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.
Written notice to U.S. Department of Defense (DoD) for renewable energy projects (RCW 35.63.270, 35A.63.290, and 36.01.320; WAC 365-16-475)	Requires local governments to provide DoD with written notice for alternative-energy permit applications.
Local	
Critical areas codes	As required under Washington's Growth Management Act, cities and counties have development regulations to protect critical areas including wetlands and their buffers, streams and their buffers (fish and wildlife habitat conservation areas), critical aquifer recharge areas, and frequently flooded areas.
Floodplain codes	Local codes regulate floodplain development as required by Federal Emergency Management Agency (FEMA) National Flood Insurance Program regulations.
Roadways or rights-of-way permits or franchises	Proposed use of right-of-way owned by local government requires a right-of-way permit.
Zoning	Implements local comprehensive plans by establishing zoning maps and implementing codes describing allowed uses and development standards in each zone.

1.2.1 Federal and state agency lands

Federal and state agencies (U.S. Forest Service [USFS], Bureau of Land Management [BLM], Washington Department of Natural Resources [DNR], U.S. Department of Energy [USDOE], and Washington Department of Fish and Wildlife [WDFW]) must comply with their specific regulations and management plans when considering whether to approve projects on lands they own or manage. Uses proposed on state or federal lands require environmental review under SEPA and/or the National Environmental Policy Act and a lease, license, right-of-way, and/or other authorization. Recent regulations require federal resource agencies to establish national goals for renewable energy production on federal land while continuing to manage public lands for multiple uses and sustained yield (43 *United States Code* [USC] 3004–3005).

State and Federal Solar Energy Land Evaluations

The DNR Clean Energy Program has screened thousands of state trust properties for potential clean energy leases using criteria such as onshore wind and solar electricity generation capability; environmental and cultural resources issues; and compatibility with existing uses. Additional information and a GIS-based Clean Energy Parcel Screening Tool are available at: https://www.dnr.wa.gov/programsservices/product-sales-and-leasing/energy (DNR 2024a). DNR's Clean Energy Program Parcel Viewer mapping tool is available at: https://wadnr.maps.arcgis.com/apps/webappviewer/index.html?id=d0364fb0d1104f87b4e7e8549fb7f220 (DNR 2024b).

A 2005 study by the USFS and the National Renewable Energy Laboratory (USFS and NREL 2005) identified the top 25 national forest system units with areas having the highest potential for concentrating solar power, photovoltaic, and wind projects. The results provide the USFS with information to include in its land and resource management decisions. Screening criteria for photovoltaic projects included solar radiation, slope, transmission line proximity, parcel size, road access, and presence of exclusionary areas (such as roadless areas). Based on these criteria, the study did not identify any national forest system lands in Washington with photovoltaic solar development potential.

BLM recently published a PEIS for utility-scale solar development across 11 western states (BLM 2024a). The purpose of BLM's proposed action is to "facilitate improved siting of utility-scale solar energy development by identifying areas of BLM-administered lands where solar energy development proposals may encounter fewer resource conflicts than in other areas as 'solar application areas,' and identifying areas of BLM-administered lands with known high potential for resource conflicts as 'exclusion areas.'" Depending on the alternative evaluated, the PEIS identified a range of approximately 81,000 to 355,000 acres as lands available for solar applications in Washington state (BLM 2024a).

USDOE has designated a portion of the Hanford Site as eligible for carbon pollution-free electricity projects. This area consists of 14,000 contiguous acres in the southern industrial area.

1.2.2 Washington State Growth Management Act

The Washington State Growth Management Act (GMA; codified primarily in Chapter 36.70A Revised Code of Washington [RCW]) requires fast-growing counties in the state to develop Comprehensive Plans to manage their population growth (Figure 1). The counties with lower population levels and/or growth that are not required to "fully plan" must still plan for critical areas and natural resource lands under the GMA (MSRC 2024a).

A county Comprehensive Plan designates and maps future land uses within the county. These future land uses are implemented through corresponding zoning designations. The county's zoning code specifies the types of uses allowed and design standards within each zone. If a proposed use or development does not meet all of the development standards and zoning requirements for that zoning district, and/or the use or development is only allowed in that zoning district subject to a discretionary conditional use review and approval process, then a zoning variance and/or conditional use permit would be required.

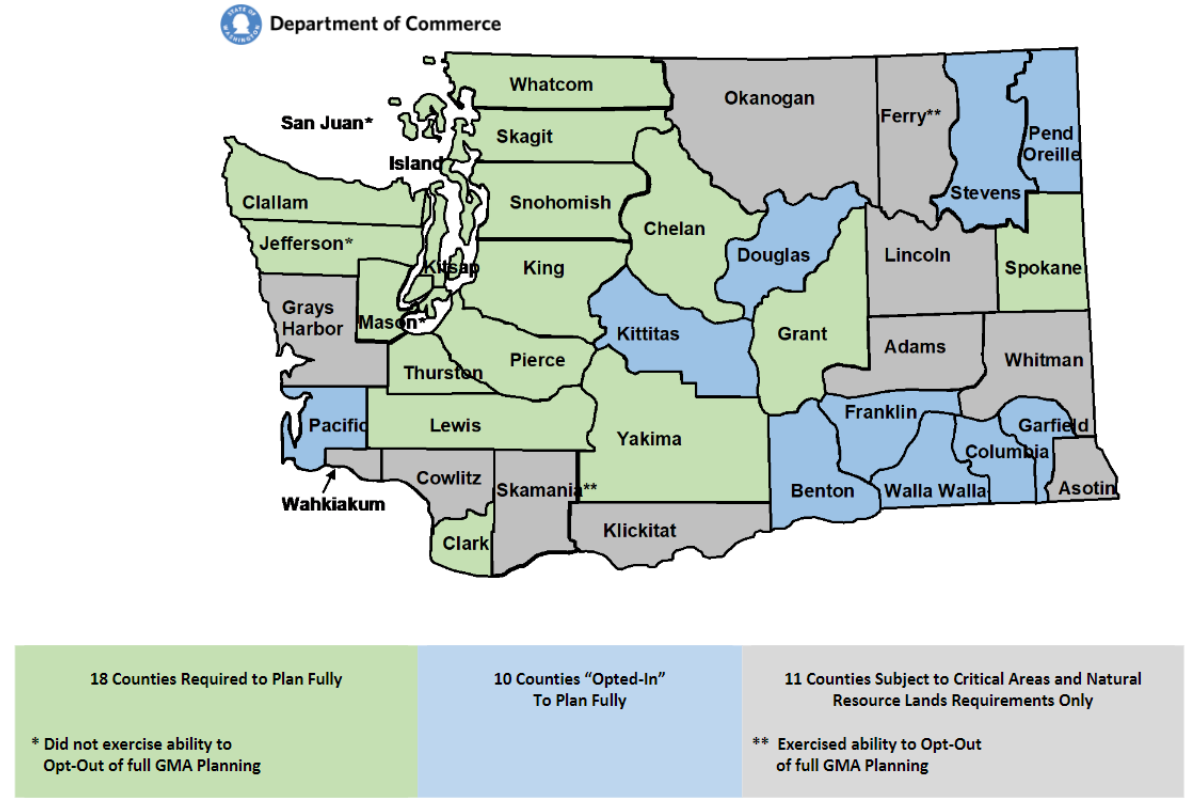

Figure 1. GMA county planning requirements as of 2018

Source: WSDOC 2017

1.2.2.1 Critical areas

Under GMA, all cities and counties in Washington are required to adopt regulations that address the following types of critical areas:

- Wetlands
- Critical aquifer recharge areas
- Fish and wildlife habitat conservation areas
- Frequently flooded areas
- Geologically hazardous areas

Local governments may have mapped these resources within their jurisdictions, or they may rely on state and federal agency resource mapping. These maps provide a preliminary idea of what types of critical areas are present on a property, but this information must be supplemented by field investigations and reporting by qualified professionals.

Critical areas regulations dictate the types of activities allowed within each type of critical area, as well as standard buffers and building setbacks from the edges of these areas. The regulations require mitigation sequencing for critical areas impacts similar to that discussed previously under the Shoreline Management Act. Proposed alterations to critical areas or their buffers for a renewable energy facility require local agency critical areas review and, in some jurisdictions, a critical areas permit.

Local codes also usually include a separate flood hazard management section. The Washington State Department of Ecology (Ecology) is the state coordinating agency for floodplain management to ensure compliance with federal and state regulations. Floodplain development permits are issued at the local level. Projects that would result in changed conditions affecting Federal Emergency Management Agency (FEMA) flood risk mapping may require a Conditional Letter of Map Revision/Letter of Map Revision from FEMA.

Washington State Voluntary Stewardship Program

Created in 2011, the state's Voluntary Stewardship Program (VSP) is a non-regulatory approach to meeting the goals of the GMA by protecting critical areas on agricultural lands. VSP provides opportunities for landowners to avoid future regulation by implementing voluntary, site-specific practices that help protect critical areas while promoting agricultural viability. VSP provides counties with an alternative to enforcing critical areas regulations on agricultural landowners. To date, 27 of Washington's 39 counties are using VSP (WSCC 2024).

1.2.2.2 Natural resource lands

The GMA requires local jurisdictions to designate important natural resource lands, including agricultural, forest, and mineral resource lands. The GMA defines agricultural, forest, and mineral resource lands as those that are primarily used for or have long-term commercial significance for agricultural, forestry, and mineral production. Counties that are required to fully plan under the GMA must also adopt development regulations to conserve these lands

(RCW 36.70A.060), while partially planning jurisdictions are required, at a minimum, to designate natural resource lands.

Natural resource lands regulations describe the types of uses allowed on these lands as well as setbacks and other standards. These regulations may be included in the county's zoning code. They must also ensure that the use of lands *adjacent to* designated natural resource lands does not interfere with their continued use in the accustomed manner (RCW 36.70A.060).

The federal Farmland Protection Policy Act (7 USC 73) applies to projects that may irreversibly convert farmland (directly or indirectly) to non-agricultural use and that are completed by a federal agency or with assistance from a federal agency (i.e., the federal agency assists in acquiring or disposing of land, providing financing or loans, managing property, or providing technical assistance). For Farmland Protection Policy Act purposes, "farmland" includes prime farmland, unique farmland, and land of statewide or local importance (see Section 3.2.3.1). Farmland subject to these requirements does not have to be currently used for crops; it can be forestland, pastureland, cropland, or other land, but not water or urban built-up land (NRCS 2024a).

Activities not subject to the Farmland Protection Policy Act include federal permitting and licensing; projects planned and completed without the assistance of a federal agency; projects on land already in urban development or used for water storage; construction within an existing right-of-way purchased on or before August 4, 1984; and activities related to national defense, farm structures, and minor secondary structures (NRCS 2024a).

A project that has the potential to convert important farmland to non-farm use requires a Natural Resources Conservation Service (NRCS) land evaluation and site assessment (LESA) to establish a farmland conversion impact rating score. This score is used as an indicator for the project sponsor to consider alternative sites if the potential adverse impacts on the farmland exceed the recommended allowable level. The federal sponsoring agency consults with the local NRCS office or U.S. Department of Agriculture Service Center regarding the LESA (NRCS 2024a).

1.2.3 Washington State Shoreline Management Act

Another state regulation implemented at the local level that dictates allowed land uses is the Washington State Shoreline Management Act (Chapter 90.58 RCW). Local governments develop Shoreline Master Programs (SMPs) based on the act and state guidance, and the state ensures local SMPs consider statewide public interests. The SMP applies to the following areas within each county (illustrated conceptually in Figure 2):

- Streams with flows greater than 20 cubic feet per second
- Lakes greater than 20 acres
- Upland areas extending 200 feet landward from the edge of these waters
- Floodways and adjacent floodplain areas
- Associated wetlands

Each county designates different shoreline environment designations (SEDs) within its regulated shoreline areas. The SEDs are similar to different types of zoning and specify the types of activities allowed (the underlying zoning designation also applies). A Shoreline Substantial Development Permit (SSDP) is required from the applicable county for renewable energy facilities proposed within that county's SMP jurisdiction. If the project does not comply with all of the standard requirements for the applicable SED, then a shoreline variance or shoreline conditional use permit is required, both of which also require review and approval by Ecology. Shoreline regulations require projects to follow a stepwise "mitigation sequencing" process, which requires applicants to first avoid impacts to shorelines through design or other measures, then minimize impacts, then compensate for unavoidable impacts.

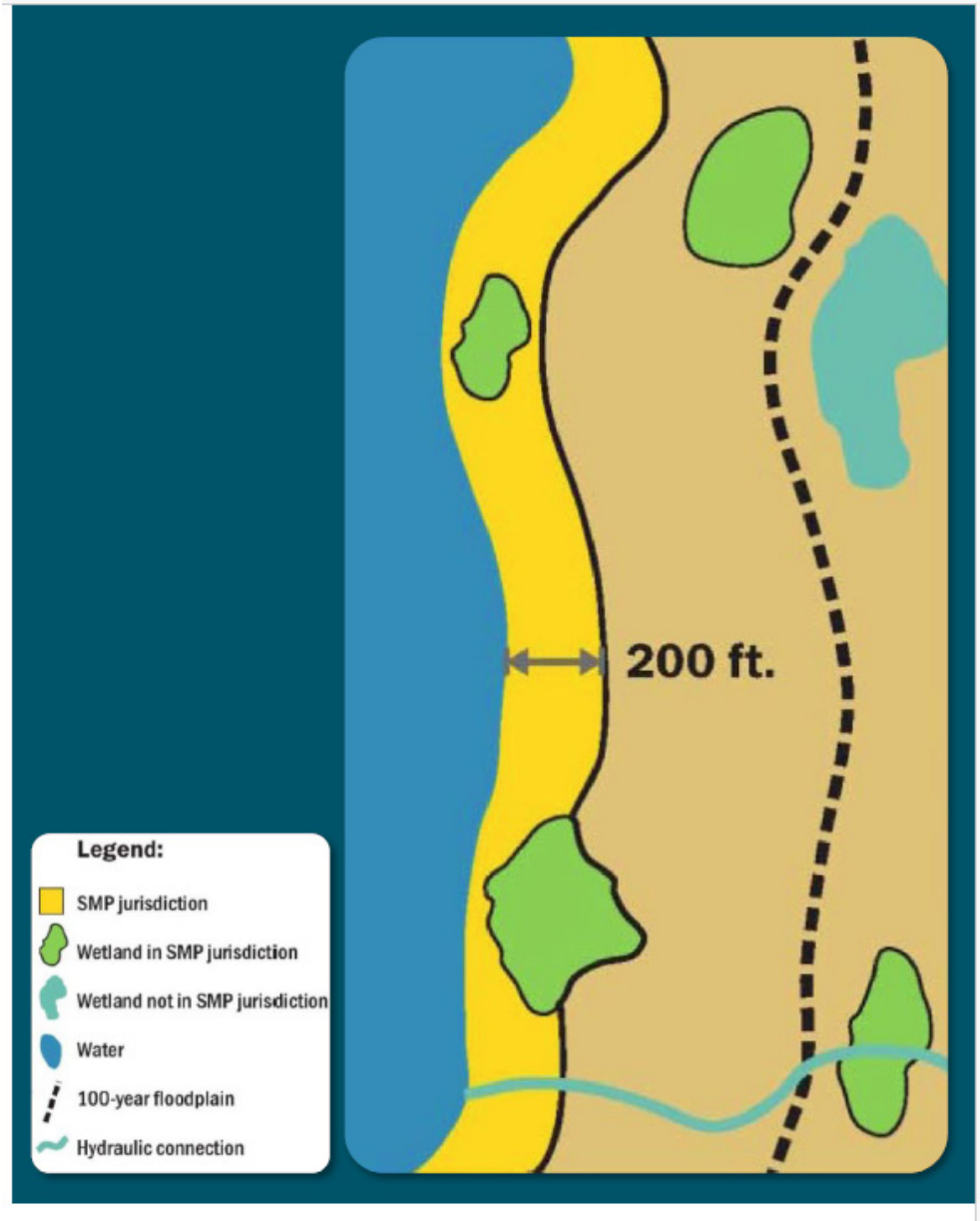

Figure 2. Conceptual diagram of Shoreline Management Act jurisdiction

Floodplain development permits

Local jurisdictions (cities, counties, and Tribal nations) that participate in the National Flood Insurance Program (NFIP) require permits for any development within the Special Flood Hazard Area. The NFIP defines development as "Any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials." Communities that do not participate or have not received FEMA-developed Flood Insurance Rate Maps or Flood Insurance Studies are required to review applications for all proposed construction and development within flood-prone areas. Floodplain development permit requirements are outlined in the local flood ordinance or other development ordinances.

1.2.4 Civil aviation corridors

The Federal Aviation Administration (FAA) is an agency of the U.S. Department of Transportation that oversees the safety of civil aviation. A notification to FAA is required for structures meeting specific height and location criteria. Notifications allow FAA to evaluate the effect of the construction or alteration on operating procedures; determine potential hazards to air navigation; identify mitigating measures to enhance safety; and chart new objects. Additional aviation resources are described in the *Transportation Resources Technical Report* and *Public Services and Utilities Resource Report*.

1.2.5 Military areas

Large areas of land, water, and air outside of military installations are used for military testing, operations, and training. The GMA prioritizes protecting lands around military installations from development that would reduce the ability of personnel to fulfill their mission requirements (RCW 36.70A.530). Development that is incompatible with this priority poses risks to operational efficiency and the safety of military personnel and the public. Energy developers and reviewers should consult with the U.S. Department of Defense (DoD) early during project planning to address these issues. Use the Compatible Energy Siting Assessment (CESA) mapping tool to identify military utilized airspace and if applicable, submit plans to the DoD. State law requires counties to provide the DoD with written notice for alternative-energy permit applications (RCW 35.63.270, 35A.63.290, and 36.01.320; Washington Administrative Code [WAC] 365-16-475; WSDOC 2024a). Military airspace considerations are described in the *Transportation Resources Technical Report.*

Washington State Compatible Energy Siting Assessment

In 2022, the Washington State Department of Commerce published a report about Washington's clean-energy trends, civilian-military coordination needs, and best practices to foster early and ongoing consultation in energy siting. It describes military bases in the state as well as military needs for land, air space, and offshore areas for logistics, training, and testing. The study also included development of a prototype, online mapping tool for renewable energy facilities and military needs, which is available at: https://cesa-wacommerce.hub.arcgis.com/.

2 Methodology

2.1 Study area

The study area for land use includes the local jurisdiction political subdivisions (municipalities and counties) of the state that intersect the overall solar PEIS geographic study area. The PEIS geographic scope of study includes a total of approximately 22,800 square miles covering portions of the following 25 counties in Washington. Most of the solar PEIS study area is located east of the Cascade Mountains (Figure 3):

- Adams County
- Asotin County
- Benton County
- Chelan County
- Columbia County
- Cowlitz County
- Douglas County
- Ferry County
- Franklin County
- Garfield County
- Grant County
- King County
- Kittitas County
- Lewis County
- Lincoln County
- Okanogan County
- Pend Oreille County
- Pierce County
- Skamania County
- Spokane County
- Stevens County
- Walla Walla County
- Whatcom County
- Whitman County
- Yakima County

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.

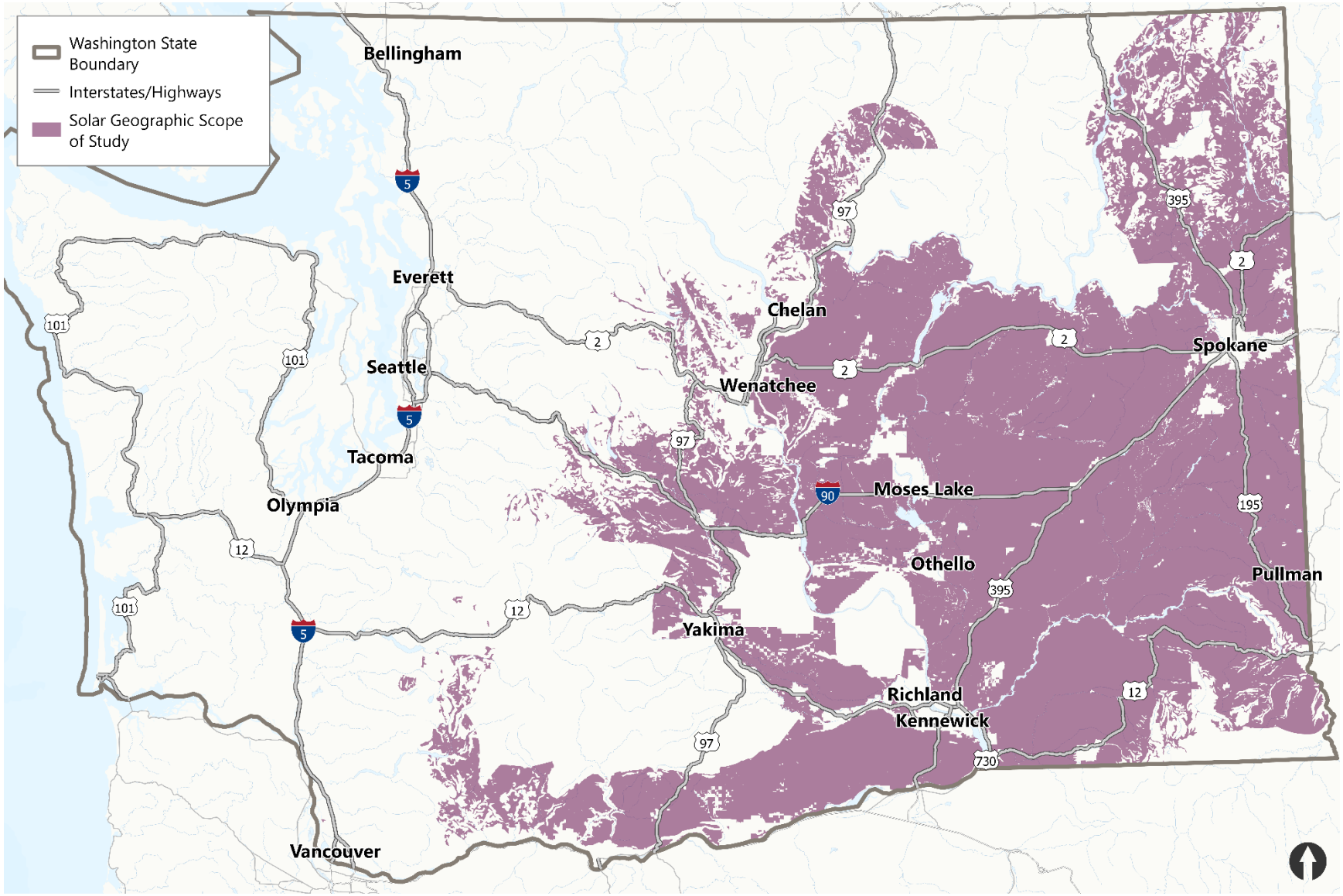

Figure 3. Solar Energy Facilities PEIS – geographic scope of study

2.2 Technical approach

The land use evaluation was based on a high-level review of regulations, plans, and policies (summarized in Table 1) as well as publicly available mapping, aerial photographs, agency plans and reports, and other technical and studies. The types of facilities and activities anticipated, as described in the PEIS Chapter 2, were reviewed and considered for how they would affect existing and future planned land uses, and the key regulatory triggers.

This land use evaluation did not include field surveys. In addition, a detailed review of each county's plans or regulatory requirements was beyond the scope of this programmatic review.

2.3 Impact assessment approach

The PEIS analyzes a timeframe 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 this resource report, potential impacts on land use are evaluated in the context of how new potential utility-scale solar facilities would impact existing and planned land uses, the supply of land suitable for such uses, and the future viability of affected land uses. The analysis includes the potential impacts associated with construction, operation, and decommissioning of new utility-scale solar facilities as related to the following:

- Conversion of land from an existing low-intensity use (rural, agricultural, or other resource uses) to a new utility-scale solar use, including the following:
    - Conversion of designated prime farmland or farmland of statewide importance to non-agricultural land uses and effects on the viability of resource uses in rural areas including agriculture, rangeland, and forestry uses
- Potential for land use conflicts with rural character
- Potential for co-location of other land uses with utility-scale solar facilities
- Potential conflicts with aviation or military testing, operations, or training
- Effects on existing or future land uses
- Consistency with local, state, or federal land use plans, policies, or regulations

For the purposes of this assessment, a potentially significant impact would occur if a project resulted in the following:

- Actions would cause permanent conversion or changes to existing low-intensity uses (rural, agricultural, or resource land uses) and result in land use conflicts
- Actions would be incompatible with or would preclude achievement of the stated goals/objectives for existing plans, policies, or regulations

Definitions of land use terms used in the analysis are provided in Section 3.2.3.

3 Technical Analysis and Results

3.1 Overview

This section describes the affected environment (population, land ownership, and land uses); anticipated permit requirements (with consideration for allowed uses and land use constraints); impacts of projects during site characterization, construction, operation, and decommissioning; measures to avoid, reduce, and mitigate impacts; and potentially unavoidable significant adverse impacts.

3.2 Affected environment

This section provides an overview of population, land ownership, and land use types in the study area. The affected environment represents existing conditions at the time this study was prepared.

The NRCS classifies and maps farmland to identify the location and extent of prime farmland, farmland of unique importance, and farmland of statewide importance for Washington. The Washington State University *Least-Conflict Solar Siting Study for the Columbia Plateau* (WSU 2023) identified areas of high and low value for farmland and ranchland. Washington State has more than 1.4 million acres enrolled in the Conservation Reserve Program to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat.

The GMA requires all counties and cities to designate agricultural resource lands. Criteria for designating agricultural resource lands include the following (WAC 365-190-050):

- The land is not already characterized by urban growth.
- The land is used or capable of being used for agricultural production.
- The land has long-term commercial significance for agriculture.

Land use planning designations considered in the PEIS analysis include GMA comprehensive plans, subarea plans, zoning, and SMPs. The analysis also considered GMA critical areas and resource lands designations, prime farmland, and farmland conservation reserves. In addition, it analyzed mapped flood hazard areas and state-designated areas for agriculture, commerce, conservation, tourism, clean energy development, opportunity zones, and rural character. Military training, testing, and operation areas as well as commercial and aircraft routes are also considered.

Under GMA, all cities and counties in Washington are required to adopt regulations for critical areas. Critical areas regulations include standards such as the types of activities allowed within

each type of critical area as well as standard buffers and building setbacks. Critical areas include the following:

- Wetlands
- Critical aquifer recharge areas
- Fish and wildlife habitat conservation areas
- Frequently flooded areas
- Geologically hazardous areas

Also under GMA, all cities and counties in Washington must designate and protect natural resource lands of long-term commercial significance. These include agricultural, forest, and mineral lands that have long-term significance for the commercial production of food, agricultural products, timber, or for the extraction of minerals.

3.2.1 Population

The estimated population of Washington State was approximately 7.95 million in 2023 (OFM 2023a). Population densities are generally highest on the west side of the Cascades (Figure 4).

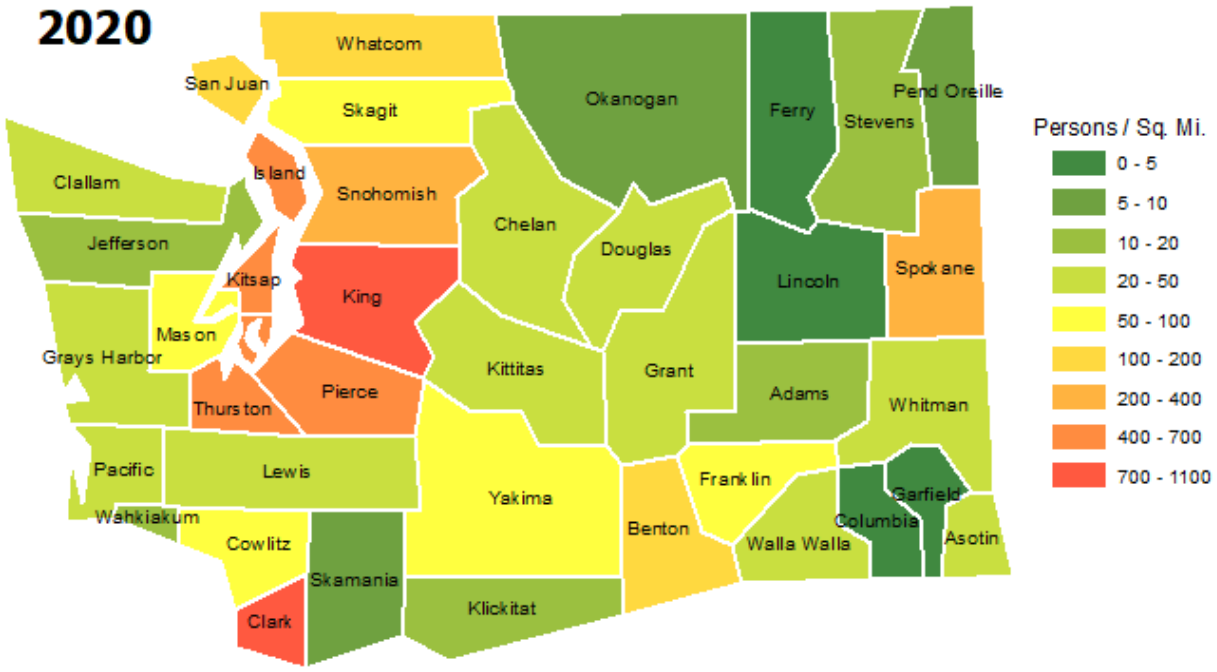

Figure 4. 2020 population density by county

Source: OFM 2020

The Washington State Office of Financial Management (OFM) tracks population changes across the state. Between 2020 and 2023, the state's population increased by 244,840 people, driven largely by people moving into the state (OFM 2023a). In 2023, population growth remained

concentrated in more metropolitan areas, consistent with trends over the past few decades (see Figures 5 and 6).

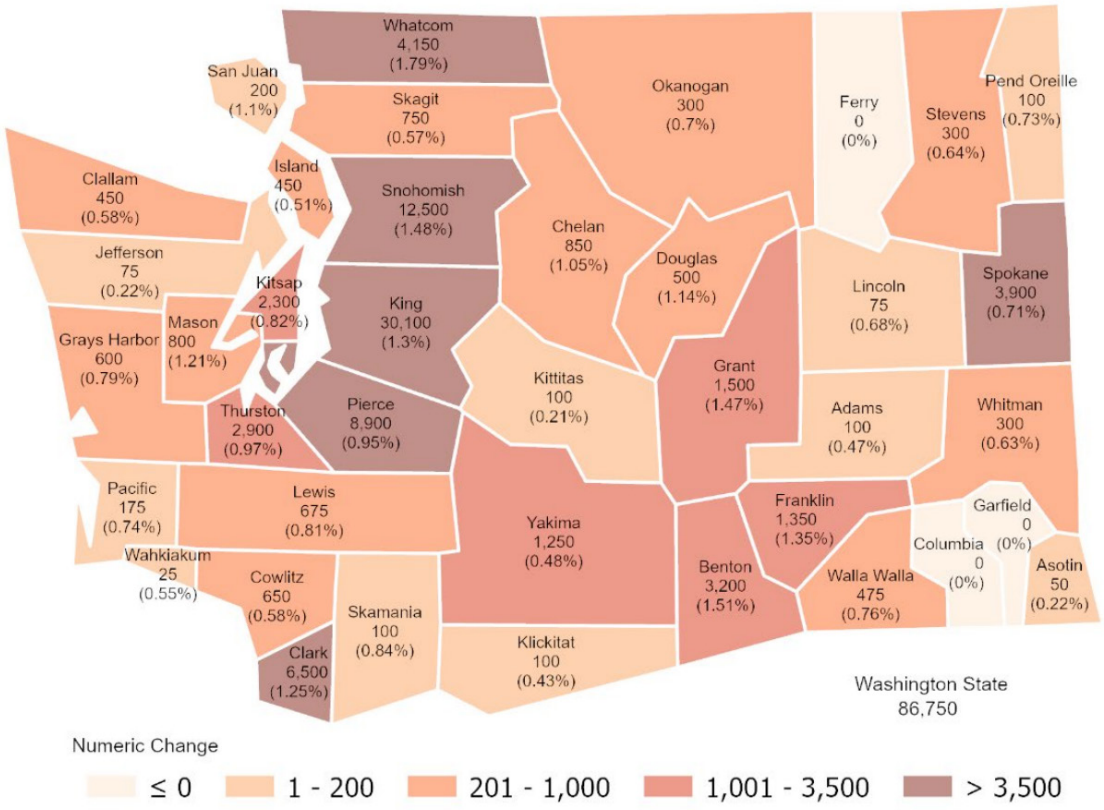

Figure 5. Population change by county in 2023

Source: OFM 2023a

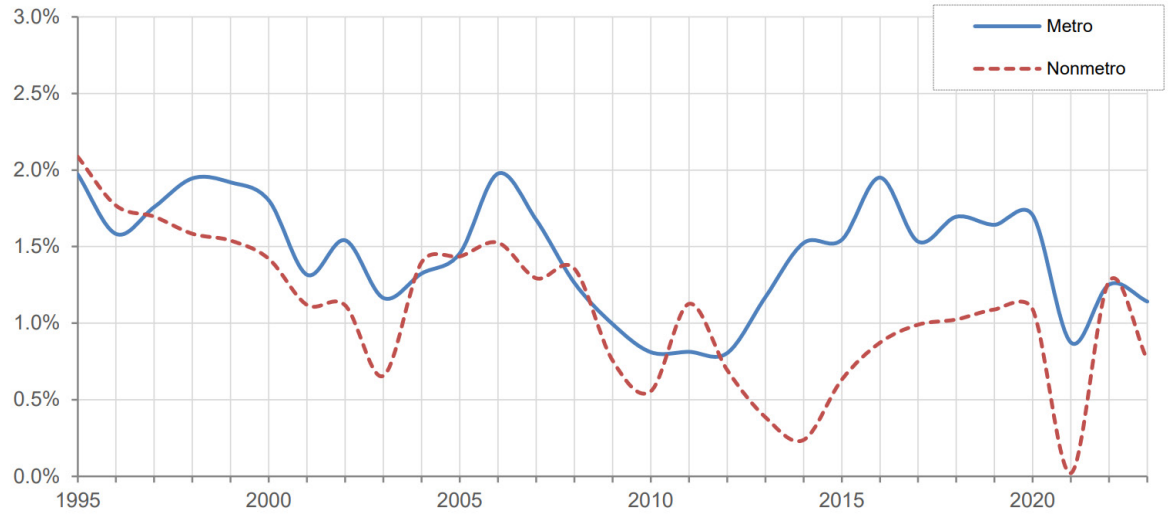

Figure 6. Population change in metropolitan and non-metropolitan areas, 1995 to 2020

Source: OFM 2023a

The OFM expects Washington's population to continue growing to almost 9.9 million in 2050 (a 28% increase compared to 2020 estimates), for an annual average growth rate of 0.8% (OFM 2023b). All counties in the state are predicted to grow in population by 2050 (OFM 2022).

3.2.2 Land ownership

The estimated total land area of Washington State is 45.7 million acres (including aquatic lands). In 2009, private ownership made up approximately 54% of the state's land area, with national forests covering approximately 21%. State, local, and other federal ownership made up the remainder (see Figure 7).

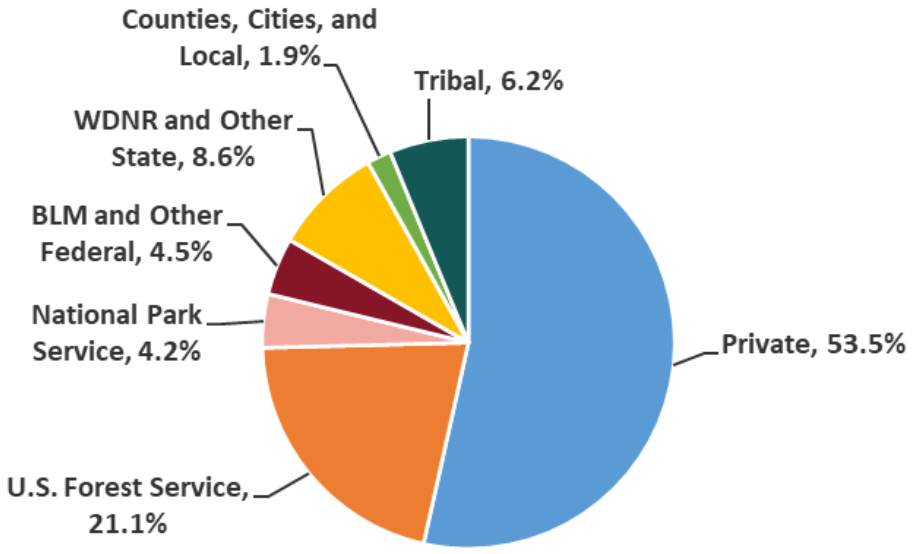

Figure 7. Land ownership percentages in Washington in 2009

Source: Adapted from DNR 2009

Two federal agencies own or manage large areas of land inside the study area in Washington state:[1]

- In Washington, USFS manages the Colville, Gifford Pinchot, Mt. Baker-Snoqualmie, Okanogan-Wenatchee, Umatilla, and Olympic National Forests, together covering approximately 10.1 million acres (USFS 1989, 1990a, 1990b, 1990c, 1990d, 2019, 2025).
- BLM manages approximately 450,000 acres for grazing, forestry, mining, and recreational use in the state (BLM 2024a).

[1] Federally owned lands in the state that have been excluded from the study area include wilderness areas (managed by various agencies), national parks (managed by the National Park Service), and national wildlife refuges (managed by the U.S. Fish and Wildlife Service).

DNR and WDFW manage large areas of state lands, including areas that overlap the study area:[2]

- DNR manages approximately 5.6 million acres across the state. This includes 2.9 million acres of trust lands; 131,000 acres of natural areas; and 2.6 million acres of aquatic lands. DNR manages federally granted trust lands to provide revenue to beneficiaries (largely educational institutions). Revenue-producing activities undertaken on trust lands can include timber harvest and leases for agriculture, mining, energy production, and other uses. DNR also manages hundreds of thousands of acres of state forest lands that help fund services in many counties and contribute to the education funding earmarked in the state general fund (DNR 2024c, 2024d).
- WDFW manages 33 wildlife areas and more than 400 water access sites across the state. The agency holds title to approximately 670,000 acres; manages approximately 284,000 additional acres that are owned by others; and leases approximately 87,000 acres of DNR lands across 10 wildlife areas (WDFW 2021).

3.2.3 Land uses

Washington's cities and unincorporated urban growth areas (UGAs) support much of the state's population and more intensive land uses, such as high-density residential, industrial, and concentrated commercial uses. Outside of cities and UGAs, which are excluded from the land use study area, land uses tend more toward agricultural, rural residential, forestry, wildlife conservation, and undeveloped recreation areas. This land use pattern reflects historic settlement of the state, resource extraction uses and associated transportation routes, and, since its enactment in 1990, the GMA. The GMA seeks to focus growth in areas that have adequate public services, protect natural resource lands and critical areas, and generally discourage urban spawl.

3.2.3.1 Agriculture

Approximately 11.2 million acres in Washington are used for agriculture. Agriculture is a dominant land use in eastern Washington, encompassing millions of acres in the study area. Pasture was the largest agricultural use by area across the state in 2022, followed by wheat (WSDA 2022).

The Washington State University (WSU) *Least-Conflict Solar Siting Study for the Columbia Plateau* (WSU 2023) summarizes agricultural use in this large area of eastern Washington as follows:

> Crop farmland on the plateau can be categorized by irrigated land and non-irrigated land. Irrigation introduced from the creation of the Grand Coulee dam has created the most productive agricultural lands in the state. The deep fertile soils of the Palouse region produce wheat and legumes through dryland farming. The diversity of products grown in eastern Washington also

[2] Washington State Parks lands are excluded from the study area.

includes a variety of fruits, vegetables, grains, wine grapes, and specialty crops, such as blueberries.

Prime farmland

The NRCS classifies and maps farmland to identify the location and extent of the most suitable land for producing food, feed, fiber, forage, and oilseed crops. Figures 8a and 8b provide the NRCS mapping of prime farmland, farmland of unique importance, and farmland of statewide importance for Washington.

The NRCS defines prime farmland as having the following characteristics (NRCS undated):

- The best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and that is available for these uses
- The combination of soil properties, growing season, and moisture supply needed to produce sustained high yields of crops in an economic manner if it is treated and managed according to acceptable farming methods
- An adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, an acceptable level of acidity or alkalinity, an acceptable content of salt or sodium, and few or no rocks
- Soils are permeable to water and air
- Not excessively eroded or saturated with water for long periods of time
- Either does not flood frequently during the growing season or is protected from flooding
- Other considerations include land use, flooding frequency, irrigation, water table, and wind erodibility

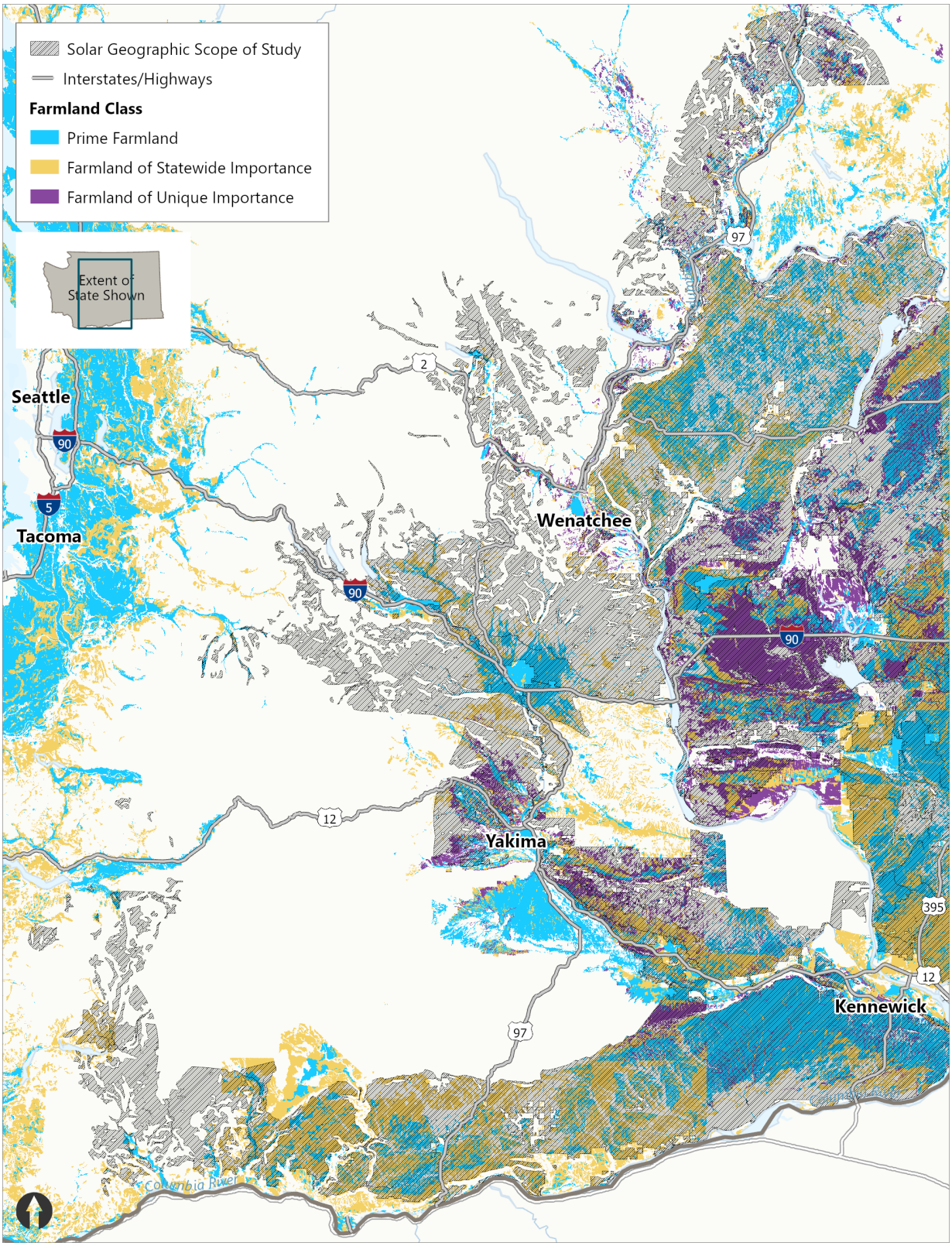

Figure 8a. Western Washington farmland designations

Data source: WSDOT 2024; USDA 2024
Note: The figure shows the entire western extent of the solar geographic scope of study.

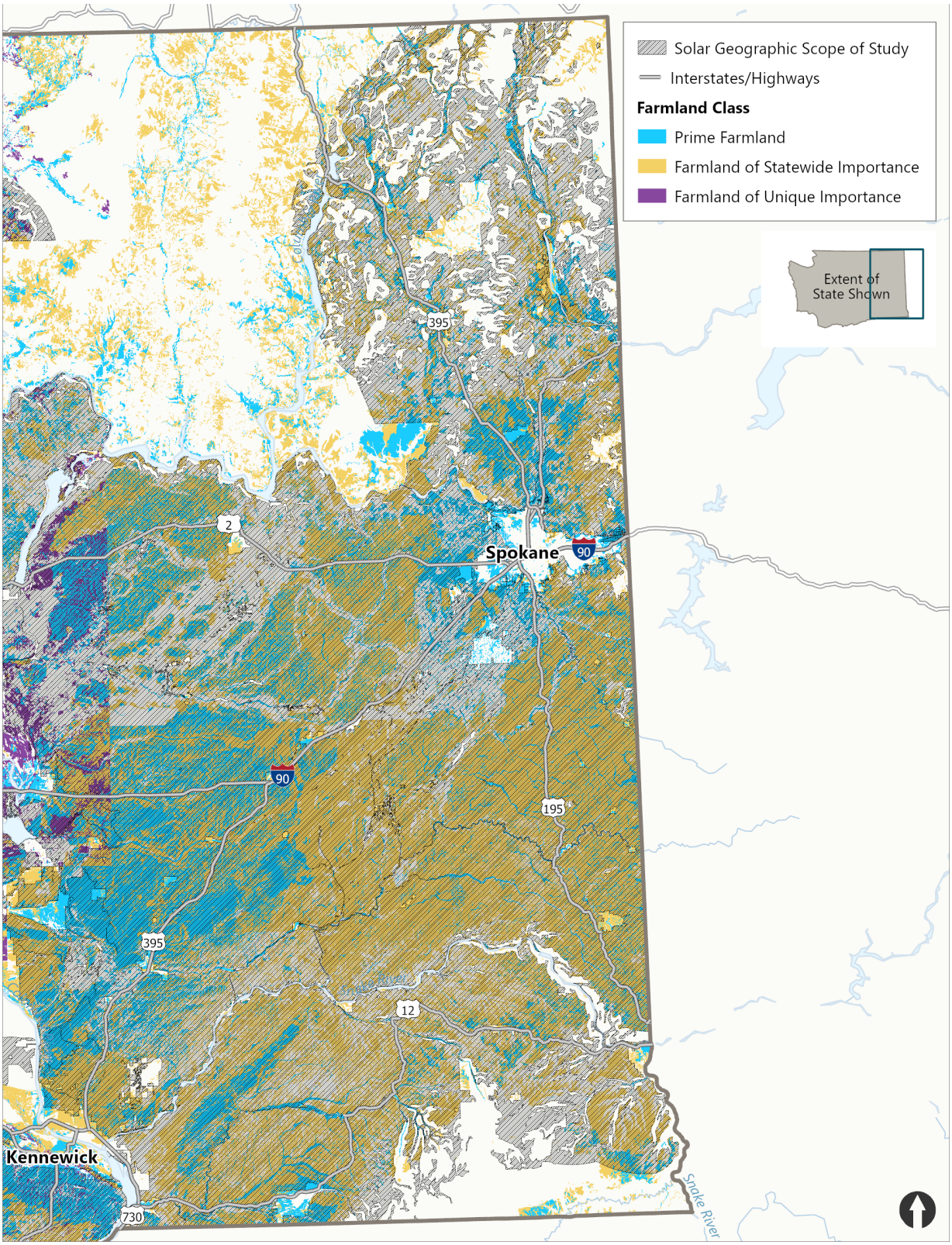

Figure 8b. Eastern Washington farmland designations

Data source: WSDOT 2024; USDA 2024

Least-Conflict Solar Siting Study

In 2023, WSU completed the *Least-Conflict Solar Siting Study for the Columbia Plateau* (WSU 2023). The study scored farmland and ranchland across the plateau on the basis of precipitation, soils, irrigated water supply, livestock water access, forage quality and capacity, and other factors. Lands were scored from very low to very high, and GIS maps were created to illustrate the occurrence of lower to higher quality lands. Figures 9 and 10, excerpted from the study, show the distribution of scores for farmlands and ranchlands resulting from the WSU study. The study then evaluated potential conflicts between proposed solar development and farmland and ranchland uses (as well as environmental conservation), stating:

> High values for farmland, ranchland, and environmental conservation lands indicate areas of potential high conflict. Conversely, mapping low-conflict lands with high solar suitability indicates areas where utility-scale solar may be developed with the potential for fewer disputes.

Table 2 provides summary data from the WSU study, showing the land areas and anticipated levels of conflict with farmland, ranchland, and environmental conservation values for facilities proposed on lands with high levels of suitability for solar development.

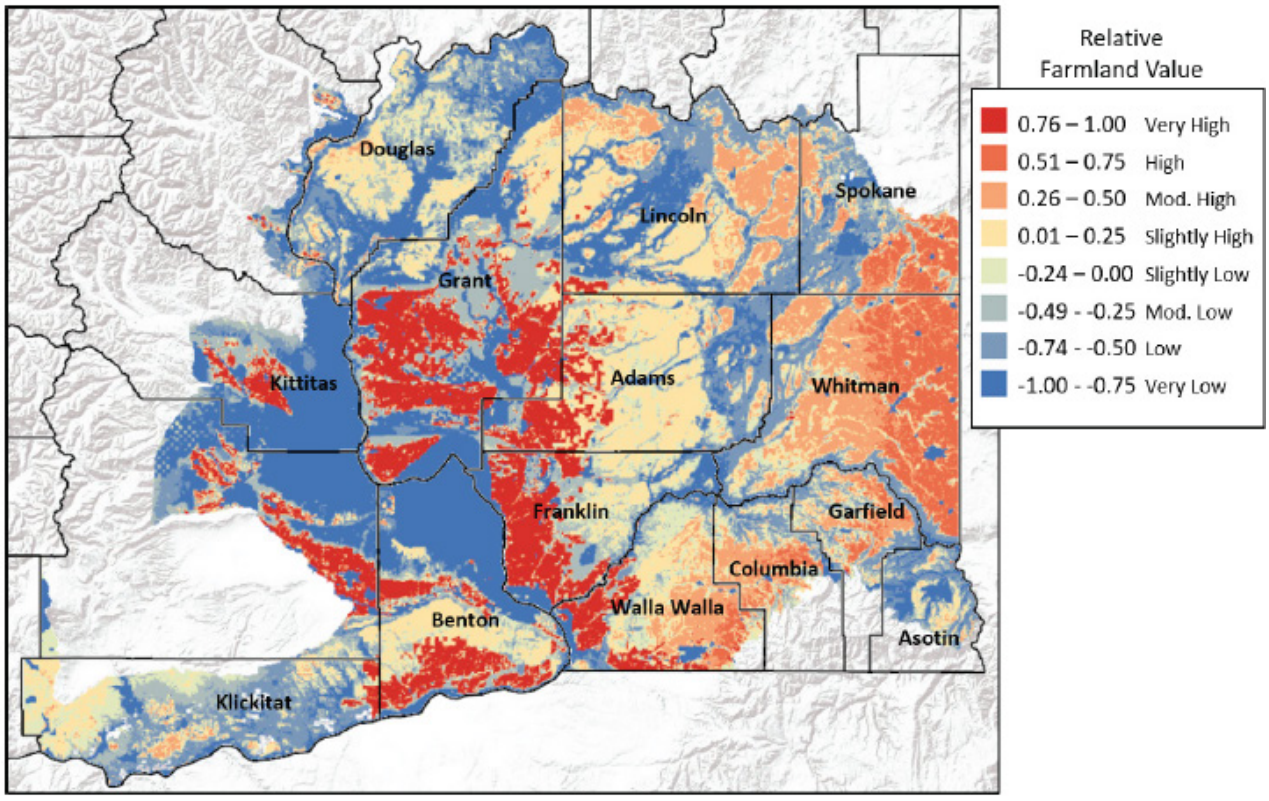

Figure 9. Mapped distribution of farmland values from WSU Least-Conflict Study

Source: WSU 2023

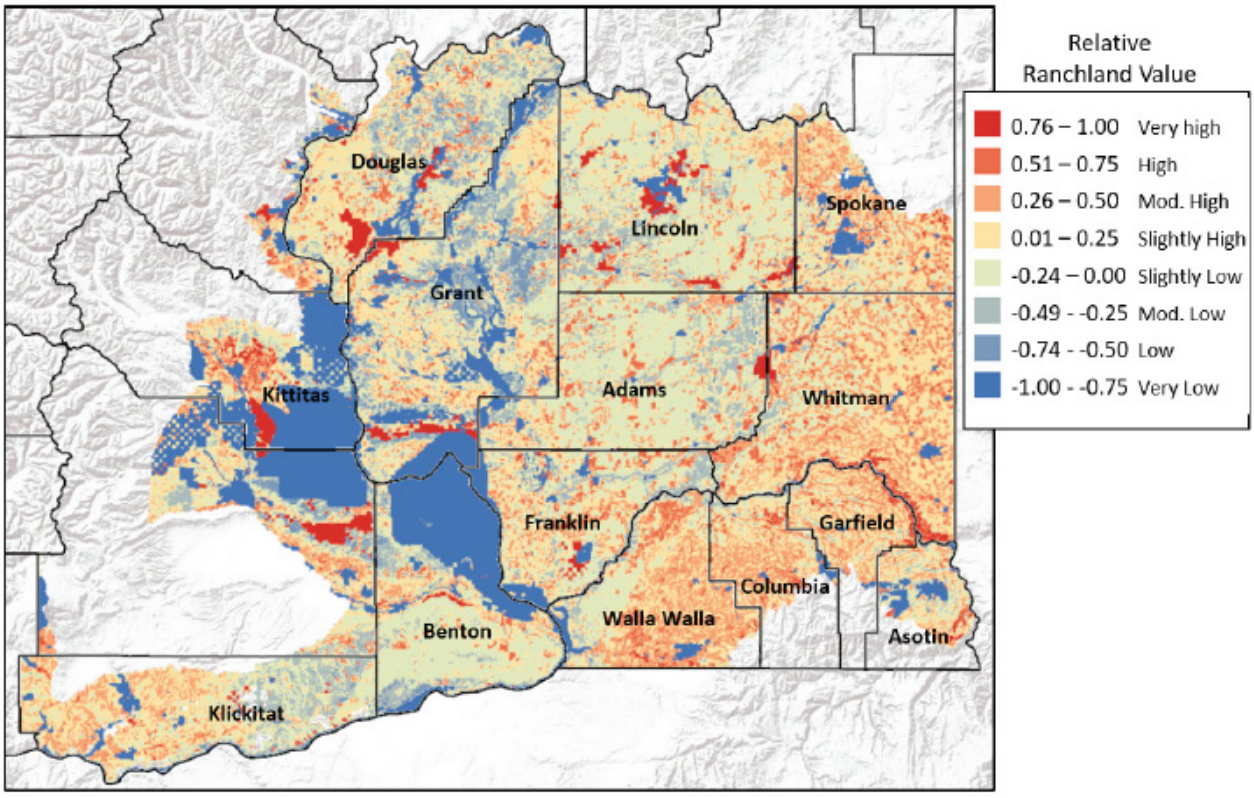

Figure 10. Mapped distribution of ranchland values from WSU Least-Conflict Study

Source: WSU 2023

Table 2. Summary statistics using solar development suitability ranked as very high, high, and moderately high from WSU Least-Conflict Study

Scenario	Description	Acres	Percent of high solar suitability	Percent of total study area
Scenario 1	Low conflict for all values	211,954	3.13%	1.49%
Scenario 2	Environmental Conservation: Low Farmland: Low Ranchland: Moderate	474,071	6.99%	3.33%
Scenario 3	Environmental Conservation: Low Farmland: Moderate Ranchland: Low	757,253	11.17%	5.32%
Scenario 4	Environmental Conservation: Low Farmland: Moderate Ranchland: Moderate	1,561,704	23.04%	10.9%

Note: Table recreated from WSU 2023

Land leases

Federal and state agencies lease their lands for agriculture and grazing. As of January 2022, BLM had 270 grazing permits or leases in Washington (BLM 2024b). In 2021, the USFS had 81 permittees for commercial livestock (USFS 2021). DNR leases approximately 1.1 million acres of

state trust lands for agriculture and grazing (DNR 2024e). The permit/lease periods and requirements vary by agency.

Conservation Reserve Program

Washington State has more than 1.4 million acres enrolled in the Conservation Reserve Program (CRP). Created in 1985, CRP is a voluntary program whose long-term goal is to re-establish valuable land cover to help improve water quality, prevent soil erosion, and reduce loss of wildlife habitat. Contracts for land enrolled in CRP are from 10 to 15 years in length. The federal Farm Service Agency administers the program, and NRCS assists with technical assistance through conservation planning. In exchange for a yearly rental payment, farmers enrolled in the program agree to remove environmentally sensitive land from agricultural production and plant species that will improve environmental health and quality. The CRP includes several different programs, such as the Conservation Reserve Enhancement Program, State Acres for Wildlife Enhancement, and Farmable Wetlands Program (NRCS 2024b; FSA 2024).

Local agricultural resource lands designations

The GMA requires all counties and cities to designate agricultural resource lands. Criteria for designating agricultural resource lands include the following (WAC 365-190-050):

- The land is not already characterized by urban growth.
- The land is used or capable of being used for agricultural production.
- The land has long-term commercial significance for agriculture.

WAC 365-190-050(3) provides specific information used to evaluate lands under each of these criteria. Jurisdictions required to undertake full planning under the GMA must also adopt development regulations to conserve these lands. Such regulations are often found in the local zoning code. Section 1.2.2 discusses the GMA in more detail.

3.2.3.2 Forestry

Forestry is another significant land use in rural areas, covering approximately 22 million acres or half of the state. Approximately 4 million acres of forestland are privately owned; these lands produce three-quarters of the timber harvested in the state (WSDOC 2024b). Timber harvest also occurs through permits, sales, or leases on lands managed by the USFS, BLM, and DNR.

Under the GMA, local governments must designate forest resource lands in accordance with the following criteria (WAC 365-190-060):

- The land is not already characterized by urban growth.
- The land is used or capable of being used for forestry production.
- The land has long-term commercial significance.

WAC 365-190-060 provides specific information used to evaluate lands under each of these criteria. Jurisdictions required to undertake full planning under the GMA must also adopt development regulations to conserve these lands. Such regulations are often found in the local zoning code. Section 1.2.2 discusses the GMA in more detail.

3.2.3.3 Mining

The GMA requires that counties and cities identify and classify "mineral resource lands." Mineral resources include sand, gravel, and valuable metallic substances, as well as other minerals. Counties and cities must designate known mineral deposits so that access to mineral resources of long-term commercial significance is not knowingly precluded. In addition, priority land use for mineral extraction should be retained for all designated mineral resource lands (WAC 365-190-070).

There are dozens of active surface mines across Washington. DNR mapping indicates most of the active surface mine permits are for mining of sand, gravel, rock, and stone, which are important building materials (DNR 2024f).

3.2.3.4 Limited areas of more intensive development

The GMA designates rural areas as lands outside of designated urban areas and not in long-term resource use. Counties may designate "limited areas of more intensive development" in rural areas to allow for existing commercial, industrial, residential, or mixed-use areas; small-scale recreation and tourist use areas; and intensification of development on lots containing nonresidential uses (MSRC 2024b). Washington has many small communities located in rural areas.

3.2.3.5 Military areas

Large areas of land, water, and air outside of military installations are used for military testing, operations, and training. The GMA prioritizes protecting lands around military installations from development that would reduce the ability of the agencies to fulfill their mission requirements (RCW 36.70A.530). Development that is incompatible with this priority poses risks to operational efficiency and the safety of military personnel and the public. Energy developers and project reviewers should consult with DoD early during project planning to address these issues. Use the CESA mapping tool to identify military utilized airspace and, if applicable, submit plans to the DoD.

3.2.3.6 Rural character

The term "rural character" has different definitions. Several, but not all, of the counties in the study area plan under the GMA. The GMA identifies rural character as patterns of land use and development as follows:

- Allow open space, the natural landscape, and vegetation to predominate over the built environment
- Foster traditional rural lifestyles, rural-based economies, and opportunities to both live and work in rural areas
- Provide visual landscapes that are traditionally found in rural areas and communities
- Are compatible with the use of land by wildlife and for fish and wildlife habitat
- Reduce the inappropriate conversion of undeveloped land into sprawling, low-density development

- Generally do not require the extension of urban governmental services
- Are consistent with protection of natural surface water flows and ground water and surface water recharge and discharge areas (WAC 365-196-425(2)(b))

Rural character therefore encompasses many considerations, such as vegetation, views, housing, employment, fish and wildlife habitat, government services, and water. The GMA acknowledges that "rural areas are diverse in visual character and in density, across the state and across a particular county" (WAC 365-196-425(2)(c)). Under the GMA, individual counties are responsible for adopting a locally appropriate definition of local character that guides the development of the rural element in the comprehensive plan and its implementing development regulations.

Counties planning under the GMA must include a "rural element" in their comprehensive plans that addresses "lands that are not designated for urban growth, agriculture, forest, or mineral resources." A key requirement of a rural element are measures to protect rural character. Counties not planning under GMA are not required to have this element in their comprehensive plans.

3.3 Potentially required permits and approvals

- **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.
- **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 SMPs. If the project is located within Shoreline Management Act shoreline jurisdiction, an SSDP, conditional use permit, variance permit, or written SSDP exemption would be required. Local SMPs typically place dimensional standards such as height limits on new structures within shoreline jurisdiction (WAC 173-27-140).
- **Floodplain Development Permit (local or state agency):** Needed for development activities including grading within special flood hazard areas mapped by FEMA. The nature and extent of development may require a hydrologic and hydraulic study or other analyses to determine if the facility would change flood zones, flood elevations, impact downstream properties, etc. Facilities that would result in changed conditions affecting FEMA flood risk mapping may require a Conditional Letter of Map Revision/Letter of Map Revision from FEMA.
- **Forest practices permit (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.

- **Land Use Permits (e.g., Comprehensive Plan Amendments, Conditional Use Permit/Special Use Permit, or Zoning Amendments) (local agency):** Required if there are changes to a comprehensive plan or zoning designation and/or if a conditional use permit, special use permit, or variance is required for the project.
- **Land Evaluation and Site Assessment (NRCS, local farm agency, or rural development agency):** Evaluation method for cropland soils. Required for projects subject to the Farmland Protection Policy Act.
- **National Environmental Policy Act (federal agency):** Environmental review required for federal actions including federal projects or any project requiring a federal permit, federal funding, or located on federal land.
- **Right-of-way or lease (federal, state, or local agency):** Placement of infrastructure such as roads, generating facilities, and transmission lines on lands under federal, state, or local agency management jurisdiction requires approval from the applicable land manager.
- **Section 4(f) review (U.S. Department of Transportation):** Required to ensure the protection of publicly owned parks, recreation areas, wildlife refuges, and historic sites.
- **U.S. Department of Defense Clearance for Radar Interference (DoD):** This clearance is required for projects that may interfere with military radar operations, particularly for tall structures near military installations.
- **Utility Accommodation Permits and Franchises (Washington State Department of Transportation [WSDOT] or local agency)**: Required for utility installations crossing state highway rights-of-way or local government road rights-of-way.

3.4 Utility-scale solar facilities

3.4.1 Impacts from construction and decommissioning

The amount of land actually disturbed for construction and decommissioning of utility-scale solar facilities would include construction of the substation, collector and gen-tie lines, posts to support the solar array and tracker system, transformer pads, operation and maintenance buildings, and access roads. The time needed to construct a project, after environmental review and permitting is completed, would vary but is expected to be between 6 and 18 months. Decommissioning timeframes would be dependent on the restoration needed for habitat types. The area of land disturbance would depend on project design. Site characterization would involve minimal to no land disturbance except when building potential access roads and constructing meteorological towers.

3.4.1.1 Land use conflicts

Effects on existing adjacent land uses

Construction and decommissioning of utility-scale solar facilities has the potential to result in impacts such as increased dust, noise, traffic, and visual changes (refer to the *Transportation*, *Noise and Vibration*, *Aesthetic/Visual Quality*, *Air Quality and Greenhouse Gases*, and *Recreation* technical resource reports), which could affect adjacent existing land uses.

People most likely to notice these impacts are those living in nearby areas (if there are any nearby residential land uses) or those whose work requires them to be near the construction and decommissioning area. Nearby agricultural land uses could be affected by increased dust settling on crops, or by construction noise disturbing livestock. Anyone regularly using roads near the facility site may experience temporary traffic delays or detours.

Potential site characterization and construction- and decommissioning-related disturbance, and the resulting extent of effects on affected land uses, would depend on the specific activities, site conditions, adjacent land uses, and proximity.

Conversion of existing land use

The siting and development of utility-scale solar facilities could result in the long-term (and potentially permanent) conversion of existing or designated future land uses to utility-related uses for the life of the project. The impacts of converting land use to a utility-scale solar facility would depend on factors including the existing use of the site, whether solar facilities are an allowed use according to current and future land use plans, and compatibility of current and future land uses with solar facilities. The study area excludes existing cities and UGAs, so it is likely that facilities would be located on lands currently zoned and used for low-density residential or designated as natural resource lands (agriculture, forestry, or mining) or other low-density uses.

Section 3.2.3 discusses natural resource lands (agriculture, forestry, and mining). Changing the use of these lands to a renewable energy project would make the land or a portion thereof no longer available for these other uses for the life of the project. Natural resource uses require certain site conditions, such as soil types, availability of irrigation, microclimate, slope, mineral resources, or other site-specific factors. Removing these lands, particularly those of high quality, from their resource uses would reduce the area available to continue producing agricultural, forestry, and mining products in the future for the life of the project. Impacts to soil resources following decommissioning may also include changes to agriculturally significant lands that make them less suitable for later agricultural use.

The 2024 *Rural Clean Energy Economics and Community Engagement Study and Report,* published by the Washington State Department of Commerce, documented the result of community engagement with rural communities from January through July 2024, and analyzed the economic and financial impacts of utility-scale clean energy projects in rural communities. The study was undertaken in response to a 2023 state legislative mandate "to develop and submit a study and legislative report addressing direct and related issues and concerns across rural Washington regarding clean energy development." Key findings of the report included the following (DOC 2024):

> Rural community residents expressed concern about losing local control over land use, and with it the weakening of the social fabric. Multiple interviewees, public meeting attendees, and website commenters expressed concern over losing agricultural and farmland to clean energy projects. Multiple participants spoke about

the amount of farmland already converted to solar energy projects and expressed concern over continued conversion.

Individuals said that in addition to farmland conversion, other issues include the loss of farm jobs on a large scale, the inability of traditional farms to compete with clean energy projects, and the disparity in land values for traditional farms and neighboring areas with clean energy projects. Some individuals also noted concerns for farmers who do not own land and rent acreage for agricultural operations. These individuals suggested that tenant operators may not benefit financially from clean energy leasing agreements the way that landowners would and could risk losing their operations and any associated jobs if their land were leased for a clean energy project. […]

[S]olar panels and associated facilities (e.g., battery storage) are typically inside fence lines such that preexisting land uses are no longer viable once the clean energy installation is in place. The case studies revealed that solar energy projects convert the majority (if not all) of preexisting land use to solar development with a lease area and the project fence line. These changes in land use are contained to the project footprint; outside of the footprint within the lease area, land use continues as it did before project construction. There may be potential for agricultural land use using agrivoltaics, but the consultant team did not find specific examples alongside current utility-scale projects.

Summary of impacts related to existing land use conflicts
Through compliance with laws and permits and with the implementation of measures that could avoid and reduce impacts, construction and decommissioning activities would likely result in **less than significant impacts** on affected land uses.

Converting natural resource lands of long-term commercial significance to utility-scale solar facilities would result in impacts that range from **less than significant** to **potentially significant adverse impacts** depending on site-specific circumstances. It is possible that the level of impact significance could be reduced through application of mitigation options; this would be evaluated by the local jurisdiction as part of permit review.

3.4.2 Impacts from operation

3.4.2.1 Land use conflicts

Effects on rural character
Land use elements that make up the rural character are described in Section 3.2.3.6 and generally include open spaces and natural landscapes, fostering rural lifestyles and rural-based economies, limitations on conversion of undeveloped lands, and compatibility with natural resources. A proposed utility-scale solar facility would not in itself result in "sprawling, low-density development," which is noted as incompatible with the rural character under the GMA,

but would likely affect vegetation, views, and habitat for species that are components of rural character.

Utility-scale solar facilities would result in increased development intensity at project sites and a change to the visual landscape on and adjacent to those sites that include a greater presence of built environment elements. These changes could result in changes to and/or perceptions of the rural character of the surrounding area.

In evaluating the significance of impacts to rural character for a proposed utility-scale solar facility, the relevant comprehensive plan (in particular its rural element) should be consulted. Whether a proposed project is consistent with the goals and policies of the comprehensive plan would be an important aspect of evaluating the significance of impacts and measures that can be implemented to minimize those impacts. See Section 3.4.2.2 for additional discussion of consistency with adopted plans and policies.

In addition, the PEIS resource reports on transportation, noise, aesthetics/visual quality, biological resources, and recreation provide more details regarding impact significance for each of these resources.

Changes to rural character resulting from operation would range from **less than significant impacts** to **potentially significant adverse impacts** depending on whether plans and development regulations are in place to protect rural character and how they consider utility-scale solar facilities.

See Section 3.4.1.1 for discussion of potential land use impacts resulting from conversion of existing uses to utility-scale facilities.

3.4.2.2 Consistency with plans, policies, and regulations

The consistency of a proposed utility-scale solar facility with federal, state, and local regulations and planning documents would depend on a number of factors, such as whether the project:

- Is considered an allowed use under the applicable state/federal agency management plan and guiding regulations if proposed on state or federal lands
- Is within an area whose local comprehensive plan future land use designations, zoning, and SMP designations (if applicable) allow for this use
- Would impact areas with specific use restrictions and standards (such as SMP-regulated shorelines, critical areas, designated natural resource lands, or prime farmlands) and, if so, whether the project can provide adequate mitigation to offset such impacts
- Can be sited and designed to avoid interfering with civil air navigation and military testing, operations, and training

WAC 365-196-800 provides for development regulations to be established as a specific control on development and/or land uses by a city or county to implement the comprehensive plan adopted pursuant to the GMA. Specific to resource lands, WAC 365-196-815 provides requirements for local jurisdictions to adopt development regulations to ensure the

conservation of natural resource lands, including agricultural, forest, and mineral lands of long-term commercial significance. These regulations do not directly limit or restrict specific development features such as building dimensions or impermeable surface areas, but rather, they establish that local land use regulations must be developed to prevent the conversion of resource lands to uses that remove them from resource production. To the extent that a project is not consistent with the local jurisdiction comprehensive plan and development regulations, there are several potential avenues for achieving consistency, including modification of the project by the developer to comply with local jurisdiction regulations, periodic amendment of the comprehensive plan and development regulations initiated by the local jurisdiction, or project-specific/site-specific comprehensive plan and development regulation amendments initiated by the project developer.

Depending on the extent of critical areas on the site proposed for a project, impacts on critical areas can often be avoided through facility design. Unavoidable critical areas impacts must be addressed through compensatory mitigation. See the other PEIS resource reports for additional discussion of impacts to water (*Water Resources Technical Report*), wildlife (*Biological Resources Technical Report*), and earth resources (*Earth Resources Technical Report*).

If a utility-scale solar facility is inconsistent with federal, state, and/or local plans and regulations, in some cases, plans and regulations may be changed (e.g., through a rezone or comprehensive plan amendment) to resolve inconsistencies and allow a project to proceed with **less than significant impacts**.

3.4.2.3 Military areas

Conflicts with potential physical or visual obstructions from project towers and activities could interfere with military activities. Consultation with FAA and DoD is required to avoid these issues.

Through compliance with laws and permits and with the implementation of measures that could avoid and reduce impacts, the operation of most projects would likely result in **less than significant impacts** related to military areas.

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

- Consider the Washington State University Least-Conflict Solar Siting Study maps, and/or local, state, and federal agricultural lands mapping, to avoid areas identified as having highest ranchland and farmland values.
- If siting on DNR-managed lands, use DNR's Clean Energy Parcel Screening Tool[3] to see lands that may be good candidates for project development. Contact DNR to discuss the process and requirements for siting clean energy projects on state lands.
- Coordinate with federal, state, and local agencies; Tribes; property owners; and other interested parties as early as possible in the planning process to identify potential land use conflicts and issues, as well as state and local rules that govern project development.
- Contact the FAA early in the process to determine if there might be potential impacts on aviation and if mitigation might be required to protect military or civilian aviation use. Submit plans to the FAA for proposed construction of any facility that is 200 feet or taller or that is located in proximity to airports for evaluation of potential safety hazards.
- Contact DoD early in the process siting facilities near or within military training routes, military bases, or training areas to identify and mitigate potential impacts on military operations. Site design must consider military installations and air space needs. Use the CESA mapping tool to determine whether projects are under military-utilized airspace. If so, submit plans to the DoD for review.
- Design roads in agricultural areas to include appropriate fencing, cattle guards, and signs.

[3] https://www.dnr.wa.gov/cleanenergymap

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.

- Construction and Development Permits (e.g., road access, grading, building, mechanical, lights, signage) (local agency)
- Environmental Permits (e.g., Critical Areas, Shorelines) (local agency)
- Floodplain Development Permit (local agency)
- Forest practices permit (DNR or local agency)
- Land Use Permits (e.g., Comprehensive Plan Amendments, Conditional Use Permit/Special Use Permit, or Zoning Amendments) (local agency)
- Land Evaluation and Site Assessment (NRCS, local farm agency, or rural development agency)
- Right-of-Way or lease (federal, state, or local agency)
- Section 4(f) review (U.S. Department of Transportation)
- U.S. Department of Defense Clearance for Radar Interference (DoD)
- Utility Accommodation Permits and Franchises (WSDOT or local agency)

3.4.3.4 Recommended measures for construction, operation, and decommissioning

Many of the general measures and recommended measures for construction, operation, and decommissioning for other resources such as environmental justice, earth, water, noise and vibration, and aesthetics/visual quality may be used to avoid and reduce land use impacts. Additional project-specific measures would be determined during project environmental review and permitting with applicable agencies.

3.4.3.5 Mitigation measures for potential significant impacts

- When natural resource lands of long-term commercial significance are converted, co-locate natural resource land uses, including agriculture, with solar projects.

  ***Rationale*:** Co-locating natural resource land uses with facilities can allow some of the facility site land to remain in natural resource use.

3.4.4 Unavoidable significant adverse impacts

There may be **potentially significant and unavoidable adverse impacts** on rural character or from conversion of resource lands of long-term commercial significance depending on local plans and development regulations. Determining if mitigation options would reduce or eliminate impacts below significance would be dependent on the specific project and site and local regulations and plans.

3.5 Solar facilities with battery energy storage systems

3.5.1 Impacts from construction and decommissioning

Construction, site characterization, and decommissioning impacts for solar facilities with battery energy storage systems (BESSs) would be generally the same as for facilities without BESSs. The addition of battery storage could generate a small amount of additional traffic during construction.

Impacts on land use would be similar to findings for utility-scale solar facilities above.

3.5.2 Impacts from operation

Operation impacts for solar facilities with BESSs would be generally the same as for facilities without BESSs. The addition of battery storage could be perceived as added industrial-type facility, resulting in potential increased impacts on attributes of rural character than for facilities without BESSs.

Impacts on land use would be similar to findings for utility-scale solar facilities above.

3.5.3 Measures to avoid, reduce, and mitigate impacts

Measures to avoid, reduce, and mitigate impacts are the same as those identified in Section 3.4.3.

3.5.4 Unavoidable significant adverse impacts

There may be **potentially significant and unavoidable adverse impacts** on rural character or from conversion of resource lands of long-term commercial significance depending on local plans and development regulations. Determining if mitigation options would reduce or eliminate impacts below significance would be dependent on the specific project and site and local regulations and plans.

3.6 Solar facilities that include agricultural uses

3.6.1 Impacts from construction and decommissioning

Impacts during site characterization and construction of a solar energy facility that includes agricultural uses (agrivoltaic) would be generally the same as for other solar facilities considered under the previous listed alternatives. Agrivoltaics is only one approach to co-locating agricultural uses. In addition to the approach of modifying/raising solar arrays, it may also be possible to spread the arrays more widely across a site, allowing more space among the structures for agricultural uses, or locate agricultural use and solar utility components in different portions of a site. Additionally, agrivoltaics may include locating on lands where there is already existing agricultural activity, with or without changing the type of agricultural activity, or adding a new agricultural use to a site.

Impacts from decommissioning an agrivoltaic facility would be similar to those for decommissioning facilities without co-located agricultural land uses. However, by using part of the land for agriculture, an agrivoltaic facility could require less area to be restored following removal of solar equipment, and it would be easier to return the property to full agricultural use.

Impacts on land use would be similar to findings for utility-scale solar facilities above.

3.6.2 Impacts from operation

Numerous studies have evaluated the effects of solar photovoltaic arrays on various types of crops and vice versa. More limited studies have been completed about effects related to livestock. In general, co-locating agriculture with a solar array should consider the following types of operational impacts:

- Shading of crops by solar panels
- Changes in soil moisture regime
- Changes in microclimate affecting both crops and solar panels
- Potential for grazing livestock to be disturbed by equipment (noise, shade, glare)
- Livestock damage to fences and/or equipment
- Potential for farming practices to reduce the efficiency of or damage equipment (e.g., through wind-blown dust or pesticides)

In addition, pollinator habitat may potentially be co-located with a solar array. This type of habitat is not typically part of a commercial agricultural operation but could be planned around solar equipment and any co-located agricultural uses that do not involve regular application of pesticides that are harmful to pollinator plants or pollinator species.

Renewable energy facility development on agricultural lands has the potential to impact conservation projects that have been undertaken by the landowner under VSP.

Impacts on land use would range from **less than significant** to **potentially significant adverse impacts**, depending on the extent to which agriculture or other resource uses can continue alongside new solar energy facilities.

3.6.3 Measures to avoid, reduce, and mitigate impacts

Measures to avoid, reduce, and mitigate impacts would be the same as in Section 3.4.3. Additional measures related to co-located agricultural land use are listed below.

3.6.3.1 Recommended measures for siting and design

- Design project elements such as roads, panel height, panel spacing, and type of tracking system to accommodate crop heights, agricultural equipment and worker access, and irrigation.

3.6.4 Unavoidable significant adverse impacts

There may be **potentially significant and unavoidable adverse impacts** on rural character or from conversion of resource lands of long-term commercial significance depending on local plans and development regulations. Determining if mitigation options would reduce or eliminate impacts below significance would be dependent on the specific project and site and local regulations and plans.

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, operations, and decommissioning, depending on project size and design, and would range from **less than significant impacts** to **potentially significant adverse impacts**.

4 References

BLM (Bureau of Land Management), 2024a. *Draft Programmatic Environmental Impact Statement for Utility-Scale Solar Energy Development*. Volume I: Executive Summary, Chapters 1 – 7. Document #DOI-BLM-HQ-3000-2023-0001-RMP-EIS.

BLM, 2024b. *Draft Programmatic Environmental Impact Statement for Utility-Scale Solar Energy Development*. Appendix F: Methodologies and Supplemental Materials for Analysis of Affected Environment and Environmental Effects of Solar Energy Development on Resources. January 2024.

DNR (Washington Department of Natural Resources), 2009. State Trust Lands and Other Major Public Lands in Washington State. Accessed March 2024. Available at: https://www.dnr.wa.gov/publications/eng_rms_trustlands_map_nu2.pdf.

DNR, 2024a. Clean Energy. Accessed March 2024. Available at:https://www.dnr.wa.gov/programsservices/product-sales-and-leasing/energy.

DNR, 2024b. DNR Clean Energy Program Parcel Viewer. Accessed April 2024. Available at: https://wadnr.maps.arcgis.com/apps/webappviewer/index.html?id=d0364fb0d1104f87b4e7e8549fb7f220

DNR, 2024c. "Funding Schools and Services." Accessed March 2024. Available at: https://www.dnr.wa.gov/beneficiaries.

DNR, 2024d. "Forest and Trust Lands." Accessed March 2024. Available at: https://www.dnr.wa.gov/managed-lands/forest-and-trust-lands.

DNR, 2024e. "Leasing State Trust Lands for Agriculture and Grazing." Available March 2024. Accessed at: https://www.dnr.wa.gov/agriculture.

DNR, 2024f. Active Surface Mine Permit Sites GIS Mapping. Accessed March 2024. Available at: https://www.arcgis.com/home/webmap/viewer.html?url=https%3A%2F%2Fgis.dnr.wa.gov%2Fsite1%2Frest%2Fservices%2FPublic_Geology%2FActive_Surface_Mine_Permit_Sites%2FMapServer&source=sd.

DOC (Washington State Department of Commerce), 2024. *Rural Clean Energy Economics and Community Engagement Study and Report.* Report to the Legislature. November 15, 2024.

FSA (Farm Service Agency), 2024. "Conservation Reserve Program." Accessed March 2024. Available at: https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/index.

MSRC (Municipal Research and Services Center of Washington), 2024a. "Growth Management Act." Accessed March 2024. Available at: https://mrsc.org/explore-topics/planning/gma/growth-management-act.

MSRC, 2024b. "Rural Land Use Regulation/Development." Accessed March 2024. Available at: https://mrsc.org/explore-topics/planning/zoning/rural-land-use.

NRCS (Natural Resources Conservation Service), undated. *National Soil Survey Handbook (NSSH) Part 622*. Section 622.03 Farmland Classification. Accessed March 2024. Available at: https://efotg.sc.egov.usda.gov/references/public/CR/NSSH_Part_622_Prime_Farmland_Definition.pdf.

NRCS, 2024a. "Farmland Protection Policy Act." Accessed March 2024. Available at: https://www.nrcs.usda.gov/conservation-basics/natural-resource-concerns/land/cropland/farmland-protection-policy-act.

NRCS, 2024b. "Conservation Reserve Program." Accessed March 2024. Available at: https://www.nrcs.usda.gov/programs-initiatives/crp-conservation-reserve-program.

OFM (Washington State Office of Financial Management), 2020. "Population Density by County, 2020." Accessed March 2024. Available at: https://ofm.wa.gov/washington-data-research/population-demographics/population-estimates/population-density/population-density-county#slideshow-12.

OFM, 2022. *Projections of the Total Resident Population for Growth Management; 2022 GMA Projections*. December 2022. Accessed March 2024. Available at: https://onedrive.live.com/edit.aspx?resid=2727BEFAB69507A2%2113458&app=Excel&wdnd=1&wdPreviousSession=fbbd9ec0-5243-42bc-98e1-1df52e43ffd0.

OFM, 2023a. *State of Washington 2023 Population Trends*. Forecasting & Research Division. September 2023. Accessed March 2024. Available at: https://www.ofm.wa.gov/sites/default/files/public/dataresearch/pop/april1/ofm_april1_poptrends.pdf.

OFM, 2023b. *State of Washington Forecast of the State Population: November 2023 Forecast*. Forecasting & Research Division. September 2023. Accessed March 2024. Available at: https://ofm.wa.gov/sites/default/files/public/dataresearch/pop/stfc/stfc_2023.pdf.

USDA (U.S. Department of Agriculture), 2024. USA SSURGO – Farmland Class Dataset. Accessed March 5, 2024. Available at: https://www.arcgis.com/home/item.html?id=9708ede640c640aca1de362589e60f46.

USDOE (U.S. Department of Energy), 2024. "Agrovoltaics Primer." Accessed March 2024. Available at: https://openei.org/wiki/InSPIRE/Primer.

USFS (U.S. Forest Service), 1989. *Land and Resource Management Plan and Final EIS for the Okanogan National Forest*.

USFS, 1990a. *Land and Resource Management Plan and Final EIS for the Mt. Baker-Snoqualmie National Forest*.

USFS, 1990b. *Land and Resource Management Plan for the Olympic National Forest*.

USFS, 1990c. *Land and Resource Management Plan and Final EIS for the Wenatchee National Forest*.

USFS, 1990d. *Land and Resource Management Plan and Final EIS for the Gifford Pinchot National Forest*.

USFS, 2019. *Colville National Forest Land Management Plan: Ferry, Pend Oreille, and Stevens Counties, Washington*.

USFS, 2021. *Grazing Statistical Summary, Fiscal Year 2021*. Accessed March 2024. Available at: https://www.fs.usda.gov/rangeland-management/documents/grazing-stats/2021s/2021_GSR_final.pdf.

USFS, 2025. Umatilla National Forest. Available at: https://www.fs.usda.gov/umatilla.

USFS and NREL (U.S. Forest Service and National Renewable Energy Laboratory), 2005. *Assessing the Potential for Renewable Energy on National Forest System Lands*. Accessed March 2024. Available at: https://www.nrel.gov/docs/fy05osti/36759.pdf.

WDFW (Washington Department of Fish and Wildlife), 2021. *Wildlife Area Planning Framework*. Accessed March 2024. Available at: https://wdfw.wa.gov/sites/default/files/publications/01810/wdfw01810.pdf.

WSCC (Washington State Conservation Commission), 2024. "Voluntary Stewardship Program." Accessed March 2024. Available at: https://www.vsp.wa.gov/.

WSDA (Washington State Department of Agriculture), 2022. "Agricultural Land Use in Washington State. Natural Resources and Agricultural Services." Accessed March 2024. Available at: https://experience.arcgis.com/experience/ab85f44a941047878e54503400924388/.

WSDOC (Washington State Department of Commerce), 2017. "The Growth Management Act Status of Washington Counties and Cities." Accessed March 2024. Available at: https://deptofcommerce.app.box.com/s/z8ygn0ifeimybnlh4j6v8cl1wxkp1jfa.

WSDOC, 2024a. "Washington State's Civilian-Military Coordination." Accessed March 2024. Available at: https://www.commerce.wa.gov/serving-communities/growth-management/growth-management-topics/military-base-land-use/.

WSDOC, 2024b. “Choose Washington; Forest Products.” Accessed March 2024. Available at: https://choosewashingtonstate.com/why-washington/our-key-sectors/forest-products/.

WSDOT (Washington State Department of Transportation), 2024. Aviation Non-Military Airports Dataset. Accessed March 5, 2024. Available at: https://geo.wa.gov/datasets/WSDOT::wsdot-aviation-non-military-airports/about.

WSU (Washington State University), 2023. *Report to the Washington State Legislature Least-Conflict Solar Siting on the Columbia Plateau*. Energy Program. June 2023. Accessed March 2024. Available at: https://www.energy.wsu.edu/documents/Least-Conflict_Solar_Siting_Report-WSUEP23-04--6-29.pdf.