

## Appendix N: Historic and Cultural Resources Technical Appendix

For Programmatic Environmental Impact Statement on Green Hydrogen Energy Facilities in Washington State

For the  
**Shorelands and Environmental Assistance Program**  
Washington State Department of Ecology  
Olympia, Washington  
January 2025

# Table of Contents

<b>Acronyms and Abbreviations List .....</b>	<b>4</b>
<b>Summary.....</b>	<b>5</b>
<b>1 Introduction .....</b>	<b>6</b>
1.1 Resource description.....	6
1.1.1 Washington Department of Archaeology and Historic Preservation (DAHP) terminology .....	6
1.2 Regulatory context.....	8
1.2.1 Federal requirements.....	11
1.2.2 State requirements .....	11
1.2.3 Local regulations .....	11
1.2.4 Tribal consultation for cultural resources protection .....	12
<b>2 Methodology.....</b>	<b>13</b>
2.1 Study area .....	13
2.2 Technical approach .....	15
2.2.1 Risk identification.....	16
2.3 Impact assessment approach .....	19
<b>3 Technical Analysis and Results .....</b>	<b>20</b>
3.1 Overview .....	20
3.2 Affected environment.....	21
3.2.1 Precontact setting.....	21
3.2.2 Ethnographic setting .....	23
3.2.3 Historic setting .....	24
3.2.4 Geographical context .....	24
3.2.5 Archaeological resources .....	25
3.2.6 Historic architectural resources .....	25
3.2.7 DAHP archaeological predictive model results.....	27
3.3 Impact assessment.....	28
3.3.1 Impacts from construction and decommissioning .....	28
3.3.2 Impacts from operation .....	29
3.4 Actions to avoid or minimize impacts.....	30
3.4.1 Siting and design considerations .....	30
3.4.2 Permits, plans, and best management practices.....	31
3.4.3 Additional mitigation measures.....	31
<b>4 References .....</b>	<b>32</b>

# List of Figures and Tables

## Figures

Figure 1. Green Hydrogen Energy Facilities PEIS geographic scope of study..... 14

## Tables

Table 1. Applicable laws, plans, and policies ..... 8

Table 2. WISAARD layers..... 16

## Acronyms and Abbreviations List

APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
BESS	battery energy storage system
CFR	Code of Federal Regulations
DAHP	Department of Archaeology and Historic Preservation
Ecology et seq.	Washington State Department of Ecology and subsequent sections
GEO	Governor's Executive Order
GLO	Government Land Office
NAGPRA	Native American Grave Protection and Repatriation Act
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
NRHP	National Register of Historic Places
PEIS	Programmatic Environmental Impact Statement
RCW	Revised Code of Washington
SEPA	State Environmental Policy Act
SHPO	State Historic Preservation Officer
TCP	Traditional Cultural Property
THPO	Tribal Historic Preservation Officer
USC	United States Code
WAC	Washington Administrative Code
WISAARD	Washington Information System for Architectural and Archaeological Records Data

## Summary

This technical appendix describes historic and cultural resources in the study area. It also describes the regulatory context, potential impacts, and actions that could avoid or reduce impacts.

Historic and cultural resources analyzed in this report include the following:

- Archaeological resources, both recorded and unrecorded
- Historic architectural resources listed in a historic register or not listed but eligible for listing in a historic register
- Human remains and cemeteries
- Sacred sites
- Documented and undocumented Traditional Cultural Properties

Each historic or cultural resource's significance is unique to that resource; therefore, the impact analysis will also be unique and would need to be conducted during future project-level review for facilities. Specific facilities and site-specific resources, impacts, and mitigation strategies are not addressed by the PEIS—it is a planning document that takes a broad look at resources and impacts.

The significance of impacts to Tribal cultural resources analyzed within this report can only be understood from within the cultural context of an affected Tribe. Accordingly, impact assessment and determinations of significance or non-significance to Tribal cultural resources would be done with engagement and in consultation with Tribes.

# 1 Introduction

This technical appendix describes historic and cultural resources in the study area and assesses probable impacts associated with the types of green hydrogen facilities evaluated. Chapter 2 of the State Environmental Policy Act (SEPA) Programmatic Environmental Impact Statement (PEIS) provides a description of the types of facilities evaluated.

This section provides an overview of the aspects of historic and cultural resources evaluated and lists relevant regulations that contribute to the evaluation of potential impacts.

## 1.1 Resource description

Historic and cultural resources analyzed in this technical appendix include:

- Archaeological resources, both recorded and unrecorded
- Historic architectural resources listed in a historic register or not listed but eligible for listing in a historic register
- Human remains and cemeteries
- Sacred sites
- Documented and undocumented Traditional Cultural Properties (TCPs)

Revised Code of Washington (RCW) 43.21C.535 directs the Washington State Department of Ecology (Ecology), as part of the nonproject environmental review process, to identify potential impacts on Tribal rights, interests, and resources. These rights, interests, and resources include Tribal cultural resources, archaeological sites, sacred sites, fisheries, or other rights and interests in Tribal lands and lands within which an Indian Tribe or Tribes possess rights reserved or protected by federal treaty, statute, or executive order are described in the *Tribal Rights, Interests, and Resources Technical Appendix*. Certain information obtained by Ecology under this section is exempt from disclosure consistent with RCW 42.56.300.

### 1.1.1 Washington Department of Archaeology and Historic Preservation (DAHP) terminology

**Cultural resources** are sites, buildings, structures, districts, and objects that are potentially eligible for listing in the National Register of Historic Places (NRHP).

**Historic properties** are elements of the built environment that includes buildings, structures, sites, districts, and objects dating from the post-contact era.

**Recorded, known, documented historic properties and cultural resources** means historic and cultural resources that are listed in a publicly available register; listed within DAHP's Washington Information System for Architectural and Archaeological Records Data (WISAARD)

database,<sup>1</sup> on either the redacted or the public side; or are known to a Tribal cultural resources department or official.

Resources that are **eligible for inclusion in the NRHP** are those that have formally been evaluated by staff at a federal or state agency in consultation with the State Historic Preservation Office (SHPO) and have been determined by evaluators to meet the criteria for listing in the NRHP.

An **archaeological site** is the location of objects that comprise the physical evidence of an Indigenous and subsequent culture, including material remains of past human life, such as monuments, symbols, tools, facilities, and technological byproducts. DAHP has established that an archaeological site must contain at least two archaeological objects; a single archaeological object is known as an archaeological isolate.

**Archaeological or historic districts** possess “a significant concentration, linkage, or continuity of sites, buildings, structures, or objects united historically or aesthetically by plan or physical development” (National Park Service [NPS] 1997). Resources within historic districts that contribute to the district’s character (called **contributing resources**) receive the same considerations and protections as individually listed properties.

A **Traditional Cultural Property (TCP)** is a property or a place that is inventoried or determined to be eligible for inclusion on the NRHP or the Washington Heritage Register because of its association with cultural practices and beliefs that are (1) rooted in the community’s history, and (2) are important to maintaining the continuing cultural identity of the community’s traditional beliefs and practices (DAHP 2017).

The term **sacred site** means any specific, discrete, narrowly delineated location on federal or state land that is identified by an Indian Tribe, or an Indian individual determined to be an appropriately authoritative representative of an Indian religion, as sacred by virtue of its established religious significance to, or ceremonial use by, an Indian religion, provided that the Tribe or appropriately authoritative representative of an Indian religion has informed the lead federal agency under the National Historic Preservation Act (NHPA) or the lead state agency under Washington State Governor’s Executive Order (GEO) 21-02 of the existence of such a site (Executive Order 13007).

**Cemetery** means any one or more of the following, in a place used, or intended to be used, for the placement of human remains and dedicated for cemetery purposes: a burial park, for earth interments; a mausoleum, for crypt interments; a columbarium, for permanent niche interments; or for the purposes of Chapter 68.60 RCW only, “cemetery” means any burial site, burial grounds, or place where five or more human remains are buried. Unless a cemetery is designated as a parcel of land identifiable and unique as a cemetery within the records of the

---

<sup>1</sup> <https://wisaard.dahp.wa.gov/>

county assessor, a cemetery’s boundaries shall be a minimum of 10 feet in any direction from any burials therein (RCW 68.04.040).

**Integrity** is “the ability of a property to convey its significance” (NPS 1997). There are seven aspects that comprise integrity: location, setting, materials, design, workmanship, feeling, and association. A resource’s integrity is different than its condition; the former refers to the resource’s ability to convey its significance, whereas the latter refers to its physical condition. A poor condition can lead to the deterioration of elements that contribute to a resource’s integrity, but they are two distinctly different ways to describe a resource (NPS 1997).

## 1.2 Regulatory context

Potentially applicable federal, state, and local laws and regulations that address historic and cultural resources and could apply to green hydrogen facilities are listed in Table 1.

Table 1. Applicable laws, plans, and policies

Regulation, statute, guideline	Description
<b>Federal</b>	
Antiquities Act of 1906 (54 United States Code [USC] 320301–320303, 18 USC 1866(b))	The Antiquities Act was enacted in 1906 and grants the President the authority to designate national monuments to protect significant natural, cultural, or scientific features. The goal of the act is to preserve public lands and cultural heritage, and it has played an important role in the formation of historic preservation policy. The act establishes a process of creating national monuments and protecting archaeological sites on federal land from looting and vandalism.
Preservation of American Antiquities (43 Code of Federal Regulations [CFR] 3)	These are implementing regulations for the Antiquities Act. The regulations establish the permitting process and the treatment of the archaeological objects collected as a result.
Archaeological and Historic Preservation Act (Moss-Bennett Act, Archaeological Recovery Act) (54 USC 312501–312508)	The act applies to all federal projects or federally assisted or licensed projects, activities, or programs. The act requires the preservation of significant scientific, prehistorical, historical, or archaeological data that would be irrevocably lost or destroyed by the activity. Then the federal agency must undertake the recovery, protection, and preservation of the data. This act can extend to private individuals, associations, or public entities if their project receives federal financial assistance.
Archaeological Resources Protection Act (ARPA) (16 USC 470aa–470mm)	Enacted in 1979 to safeguard archaeological resources on public and Indian lands. Key provisions of ARPA emphasize its role in preventing the excavation, removal, or damage of cultural artifacts and archaeological sites. The act creates the requirement for permits for archaeological activities, penalties for violations, and the collaborative efforts between government agencies, Tribes, and the public to protect and preserve archaeological resources. It also establishes the prohibition of public disclosure of sensitive information, specifically the description and location of archaeological sites.



Regulation, statute, guideline	Description
Protection of Archaeological Resources (43 CFR 7)	Along with 43 CFR 3, these are the implementing regulations for ARPA. These regulations provide more detail regarding the permitting process, curation of archaeological objects, enforcement, and confidentiality of archaeological information. The regulations also establish the requirement to notify Tribes when a permit issued under the act may harm or destroy Indian Tribal religious or cultural sites on public lands and provides a definition of “sites of religious or cultural importance.”
NHPA (54 USC 300101 et seq.)	The NHPA was approved on October 15, 1966, for the management and preservation of historical and archaeological sites. This act created the NRHP, National Historic Landmarks List, SHPO, and Tribal Historic Preservation Officer (THPO). Washington State’s SHPO is DAHP, which is the state agency that administers NHPA compliance in Washington.
NRHP (54 USC 302101-302108)	This section of the NHPA establishes the NRHP, the authority to establish procedures for listing in the NRHP, and the right of the owner of the potential property to object to the listing in the NRHP.
54 USC 302303	This section of the NHPA outlines the responsibilities of SHPOs.
54 USC 302702	This section outlines the procedures for Indian tribes to assume the functions of SHPOs.
Section 106 of the NHPA (54 USC 306108)	The procedures for implementing the NHPA are detailed in the Protection of Historic Places regulations. Section 106 of the NHPA requires federal agencies to consider the effects of project undertakings, project approvals, or project funding on historic properties. This process requires consultation with the relevant THPO, Indian Tribes, and Native Hawaiian organizations.
Section 110 of the NHPA (54 USC 306101–306114)	This section of the NHPA requires each federal agency to assume responsibility for the preservation of historic properties that they own or control. Part of this responsibility is to identify, evaluate, and protect historic properties.
36 CFR 60	This section of the regulations establishes the procedural requirements for listing on the NRHP.
36 CFR 61	This section of the regulations outlines the procedures and responsibilities for SHPOs, THPOs, and Certified Local Governments. This section also establishes the minimum professional qualifications for archaeology and historic preservation.
36 CFR 65	This section of the regulations establishes the National Historic Landmarks Program.
36 CFR 68	This section of the regulations establishes the Secretary of the Interior’s Standards for the Treatment of Historic Properties.
36 CFR 296.18	This section of the regulations requires confidentiality regarding the nature and location of archaeological resources.
National Park Service Organic Act of 1916 (16 USC 1 et seq.)	Enacted in 1916, The Organic Act established the National Park Service to promote and regulate the use of national parks, monuments, and reservations.

Regulation, statute, guideline	Description
Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001–3013)	Enacted on November 16, 1990, NAGPRA establishes rights for lineal descendants, Native Americans and Tribes, and Native Hawaiian organizations to repatriate their culturally affiliated items, including human remains, associated and unassociated funerary objects, sacred objects, and objects of cultural patrimony. NAGPRA includes provisions for unclaimed and culturally unidentifiable Native American cultural items and the intentional and inadvertent discovery of Native American cultural items on federal and Tribal lands only.
American Indian Religious Freedom Act (42 USC 1996)	Establishes the policy to protect and preserve Tribal religions. The act requires that federal agencies managing federal land accommodate access to and ceremonial use of Indian sacred sites and avoid adverse effects on the physical integrity of the sites.
Protection and Enhancement of the Cultural Environment (Executive Order 11593)	The 1971 executive order establishes the policy that federal agencies should administer federal projects in a way that preserves, restores, and maintains historic and cultural resources for future generations.
Indian Sacred Sites (Executive Order 13007)	The 1996 executive order directs federal agencies to manage federal lands to accommodate access to and ceremonial use of Indian sacred sites and avoid adverse effects on those sites. The executive order also establishes the importance of maintaining confidentiality of sacred sites.
Consultation and Coordination with Indian Tribal Governments (Executive Order 13175)	The 2000 executive order establishes principles for Tribal consultation that include supporting Tribal sovereignty and self-determination and interacting on a government-to-government level.
Preserve America (Executive Order 13287)	The 2003 executive order advances historic preservation policy by promoting the reuse of historic properties owned by the federal government and promoting intergovernmental cooperation regarding historic preservation.
<b>State</b>	
Centennial Accord Between the Federally Recognized Tribes in Washington and the State of Washington (and Implementation Plan)	Executed in 1989, the Centennial Accord provides a framework and implementation procedures for the government-to-government relationship between federally recognized Indian Tribes and the state of Washington.
Chapter 27.53 RCW, Archaeological Sites and Resources	Relates to the conservation, preservation, and protection of archaeological sites and resources.
RCW 27.53.030, Professional Archaeologist Definition	Relates to the procedures of application for and review processes of archaeological excavations and removals; permits are issued by DAHP.
Chapter 25-12 Washington Administrative Code (WAC), Advisory Council on Historic Preservation	Outlines the purpose and procedures of the Advisory Council on Historic Preservation including procedures for the nomination of properties to the state and local registers.
Chapter 25-48 WAC, Archaeological Excavation and Removal Permit	Establishes the procedures for application for and review processes of archaeological excavations and removals; permits are issued by DAHP.
RCW 42.56.300, Archaeological Site Public Disclosure Exemption	This section of the Public Records Act exempts records, maps, or other information identifying the location of archaeological sites and Traditional Cultural Properties.

Regulation, statute, guideline	Description
Archaeological and Cultural Resources (GEO 21-02)	Enacted in 2021, GEO 21-02 requires state agencies to consider the impacts of project undertakings, project approvals, or project funding on significant cultural and historic properties. This process requires consultation with DAHP, the Governor’s Office of Indian Affairs, and relevant Indian Tribes.
RCW 19.27.120, Washington State Historic Building Code	Establishes the minimum standards for the restoration, rehabilitation, or strengthening of architecturally or historically significant buildings that are eligible or potentially eligible for listing in a historic register.
RCW 27.34.400, Heritage Barn Program	Relates to the preservation of heritage barns 50 years or older.
Chapter 27.44 RCW, Indian Graves and Records	Relates to the protection, management, and processes in the care of Indian Tribe cemeteries, historic graves, and related records.
Chapter 68.50 RCW, Human Remains	Relates to the protection, management, and processes in the care of human remains.
Chapter 68.60 RCW, Abandoned and Historic Cemeteries and Historic Graves	Relates to the preservation and protection of abandoned and historic cemeteries and graves, including human remains.
Chapter 43.376 RCW, Government-to-Government Relationship with Indian Tribes	This chapter establishes a requirement of state agencies to engage in government-to-government relationships with federally recognized Tribes.

### 1.2.1 Federal requirements

Historic and cultural resource protection at the federal level is predominantly guided by the NHPA. Section 106 of the NHPA requires federal agencies to consider the effects of their actions (including federally funded, permitted, or licensed projects) on properties listed in, or determined eligible for listing in, the NRHP. The Section 106 implementing regulations require the responsible federal agency (or their designee) to identify historic properties within a pre-determined project Area of Potential Effects (APE). The consultation process also requires consultation with the SHPO, Tribal governments, and the public.

### 1.2.2 State requirements

SEPA requires that historic and cultural resources be evaluated in the environmental review process. The lead agency administering the SEPA action coordinates with DAHP and notifies potentially affected Tribes of probable adverse impacts from a proposed project. Additionally, RCW 43.21C.535 directs Ecology to identify potential impacts on Tribal rights, interests, and resources as part of the nonproject environmental review process. Potential mitigation strategies are identified through consultation with DAHP and affected Tribes.

### 1.2.3 Local regulations

County and city governments throughout the state, including some within the study area for historic and cultural resources, have enacted laws protecting historic and cultural resources.

These laws vary from establishing local historic registers, similar to the NRHP or Washington Heritage Register, to establishing pre-project review processes that must be completed before a local county or city agency issues a permit, similar to the NHPA Section 106 process.

#### **1.2.4 Tribal consultation for cultural resources protection**

Many federal, state, and local statutes and ordinances require notice and consultation with affected Tribes before, during, and after project review. Formal government-to-government consultation is between the federal government or the state of Washington with Tribal sovereign governments.

## 2 Methodology

### 2.1 Study area

The study area for historic and cultural resources includes the PEIS geographic scope of study for green hydrogen facilities (Figure 1) and the surrounding areas. Facilities may have impacts localized to areas of construction and operation activities, or impacts may extend well beyond future proposed facility footprints, including cumulative impacts.

Tribal reservation and trust lands were not included in the study area, based on input from Tribes. A Tribe may choose to have their Tribal reservation and trust lands included in the study area.

Figure 1, which shows the PEIS geographic scope of study, does not include federal lands, national parks, wilderness areas, wildlife refuges, state parks, or Tribal reservation lands.

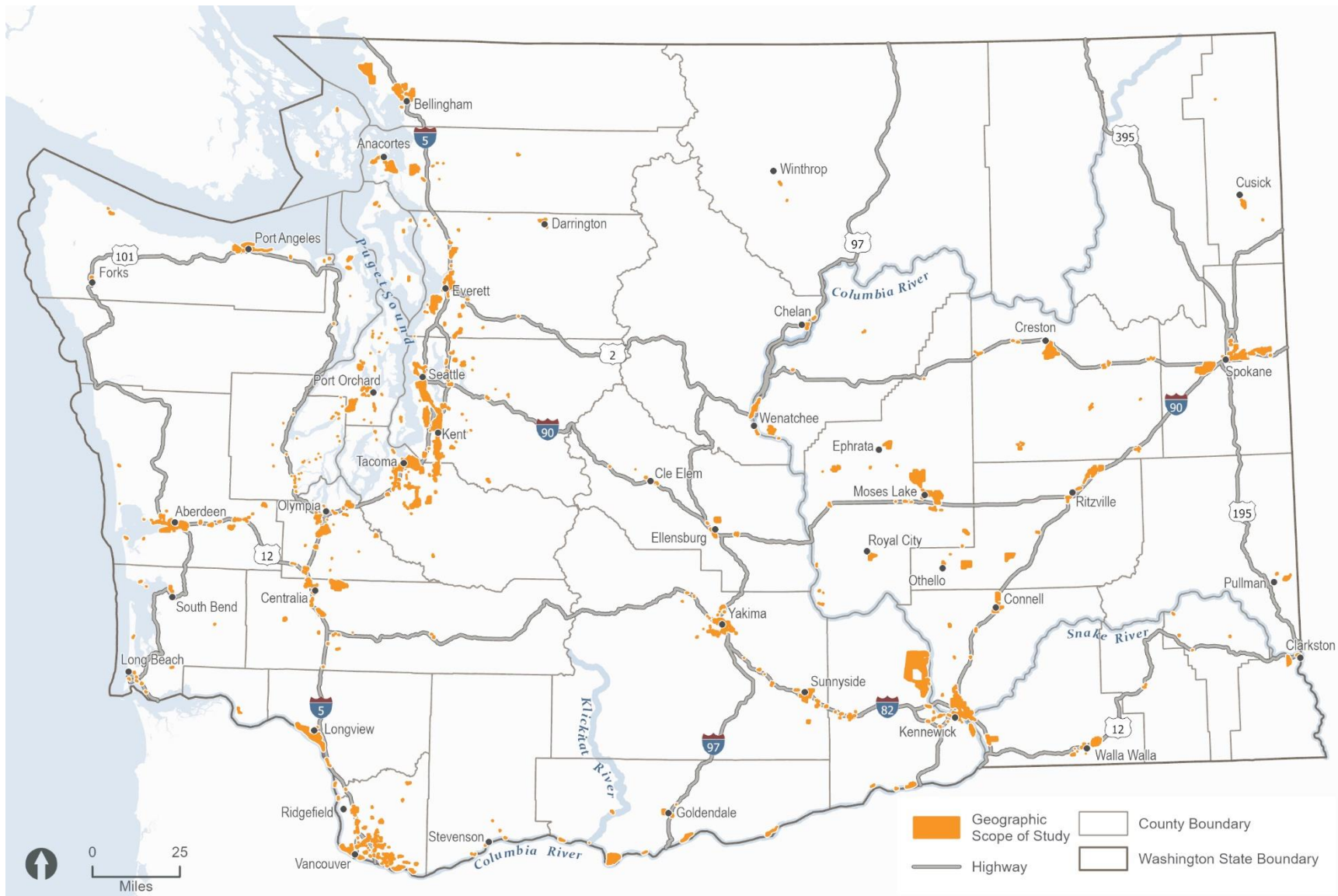


Figure 1. Green Hydrogen Energy Facilities PEIS geographic scope of study

## 2.2 Technical approach

This technical appendix provides information on broad potential impacts on historic and cultural resources from green hydrogen facilities for the PEISs. Historic and cultural resources were analyzed using existing publicly available sources of information, as well as any information shared by Tribes during Ecology’s Clean Energy Tribal Forums or review of draft resource information. Ecology invited early and meaningful engagement and offered consultation with any potentially affected federally recognized Tribe on the PEIS for the purpose of understanding, identifying, and mitigating, if possible, potential significant environmental impacts on Tribal rights, interests, and resources. These include Tribal cultural resources, archaeological sites, sacred sites, fisheries, or other rights and interests in Tribal lands and lands within which an Indian Tribe or Tribes possess rights reserved or protected by federal treaty, statute, or executive order. Sensitive information obtained by Ecology is exempt from disclosure consistent with RCW 42.56.300 and will be filed and labeled appropriately.

The impacts to historic and cultural resources that could occur for the types of facilities considered in the PEIS are discussed based on common impacts that occur for green hydrogen facilities. These impacts could occur during site characterization, construction, operation, and decommissioning. Impacts could include disturbance, destruction, damage, alteration, and visual, atmospheric, or audible impacts. Each of these impacts is broadly characterized for each stage of development. However, each actual historic or cultural resource’s significance is unique to that resource; therefore, the impact analysis will also be unique and would need to be conducted during future project-level review for facilities. Specific facilities and site-specific resources, impacts, and mitigation strategies are not addressed by the PEIS—it is a planning document that takes a broad look at resources and impacts. Therefore, the analysis in this report focused on identifying typical historic and cultural resources and the impacts to those resources broadly.

This technical appendix will continue to incorporate comments, information, and the perspectives shared during Clean Energy Tribal Forums and from Tribal comments on draft information. Based on input and feedback from Tribes on this technical appendix, follow-up meetings may be held to discuss comments to understand the potential impacts and concerns.

The discussion presented in the next section is based on existing publicly available information. No new data gathering efforts, including archaeological field survey, TCP studies, or interviews, were conducted as part of this process to date. The authors acknowledge that these publicly available sources inherently contain deficiencies, and use of them is not intended to substitute or supersede knowledge held by Tribes.

The PEIS does not propose a process that would supersede the existing requirements provided for assessing historic or cultural resources under Section 106 of the NHPA or Washington State laws and regulations. Site-specific data gathering efforts and engagement with Tribes and communities should be conducted on a project-by-project basis. The nature of those individual studies and efforts would be shaped by the regulatory requirements, location, and scale of the



specific future project proposal. What should be common in all the projects is early and meaningful engagement with the Tribes and communities associated with the historic and cultural resources in the vicinity. This type of engagement, coordination, and consultation should be anticipated to continue throughout the life cycle of the projects.

## 2.2.1 Risk identification

### 2.2.1.1 *Washington Information System for Architectural and Archaeological Records Data*

DAHP maintains a digital database of recorded historic and cultural resources within the state. The database is known as WISAARD and is commonly used to identify the location of recorded archaeological sites, historic resources, cemeteries, historic districts, TCPs, NRHP-listed properties, and cultural survey reports. Some of the information is available to the public, but other information is restricted and requires DAHP’s approval to access (Table 2).

This information can be used to assist with site selection and facility design. In addition to data on specific past efforts and recorded historic and cultural resources, WISAARD contains important tools to help with understanding which Tribes have expressed the desire to be consulted in a given location, and the relative probability of encountering precontact archaeological resources in a given area. DAHP holds records of sensitive archaeological sites and TCPs that have restricted access. The details and locations of these restricted resources are shared on an as-needed basis through the consultation process.

Table 2. WISAARD layers

Data type	Public/restricted	Description
Property	Public	Inventoried historic built environment resources/Historic Property Inventory forms. Not all forms are complete. The layer also contains information on the historic register status of the building (unevaluated, eligible, or not eligible).
Register public	Public	Properties listed in the NRHP, the Washington State Heritage Register, and Heritage Barn Register.
Project/APE	Public	Project areas shared with DAHP for consultation under the NHPA Section 106, the Washington State GEO 21-02, the Washington SEPA, and Washington State Forest Practices rules.
Maritime	Public	Depicts the location of Maritime Heritage Area and maritime resources in Washington waters.
Tribal	Public	Compiled from several different sources, the layer contains historical treaty boundaries, Tribal reservation boundaries, and Tribal areas of interest for consultation, human remains, and oil spills.
Government Land Office (GLO) survey plat maps	Public	Digitized features based on the GLO survey plat map.
GLO images	Public	Georeferenced layer of select GLO survey maps.



Data type	Public/restricted	Description
Environmental	Public	Compiled from several different sources, the layer contains drainages, waterways, surface geology, and soil data.
Predictive model	Public	Statewide predictive model to predict the location of select archaeological sites.
Archaeological	Restricted	Archaeological sites, isolates, and districts recorded with DAHP.
Register	Restricted	Properties listed in the NRHP (including archaeological sites and districts), the Washington State Heritage Register, and Heritage Barn Register.
Cemeteries and human remains	Restricted	Recorded cemeteries throughout the state and location of human remains that were inadvertently discovered.
TCP	Restricted	TCPs recorded with DAHP made available by the Tribe or community who shared the information. May be available only to DAHP staff.
Cultural resources survey	Restricted	Cultural survey reports shared with DAHP written after 1995. Selected older studies are available but lack geospatial references.

Notes: DAHP's use of "property" does not indicate eligibility and instead employs the common use of the term. Some NRHP-listed properties have Historic Property Inventory forms that identify the resource as unevaluated. This marker does not indicate the property is not listed or somehow remains unevaluated and listed; NRHP listing takes precedence.

### **2.2.1.2 DAHP archaeological predictive model**

Archaeological resources are typically identified through archaeological survey work. The majority of the study area has not been archaeologically surveyed. According to DAHP, only a small percentage of the state (approximately 5%; DAHP 2020) has been surveyed for cultural resources at any level. Therefore, it should be assumed that potential facility sites have not been intensively surveyed. Tribal knowledge of specific areas may also contain information regarding the locations of precontact archaeological sites.

DAHP has created a predictive model to help determine the likelihood of precontact era archaeological sites being present based on environmental factors such as elevation, slope percent, aspect, distance to water, geology, soils, landforms as well as archaeological data including archaeological site locations, archaeological survey, and information depicted on GLO maps (DAHP 2010; Kauhi 2013). The DAHP model uses five categories of prediction: low risk, moderately low risk, moderate risk, high risk, and very high risk.

The varying levels of likelihood are associated with recommendations for archaeological survey in three categories:

- If a project area is very high risk or high risk, DAHP would likely require an archaeological survey to be completed for the project.
- If an area is moderate risk, DAHP would likely recommend an archaeological survey.
- If a project area is moderately low or low risk, DAHP would likely recommend only a survey based on the project parameters.

The model's assessment of a location's probability to contain precontact period archaeological resources is based on the interplay between its constituent environmental and cultural variables. These variables reflect current environmental conditions. An understanding of geomorphology and past land use and development is necessary to correctly apply and interpret the model. A full assessment of a location's probability to contain archaeological resources by a professional archaeologist may be higher or lower than the initial assessment provided by the DAHP model.

Using these assessments of probability to understand the likelihood of encountering cultural and historic resources in a given location within the green hydrogen study area requires archival review of environmental and cultural sources. The model is intended to be used as an early planning tool to assist decision-makers, project managers, and planners in determining the level of effort that may be necessary to consider the archaeological resources that may be present. The model would be a helpful tool for planning potential green hydrogen facilities because it can guide which areas should be the focus of survey. Project-level assessment would accomplish this through background research into the environmental and cultural context of a given location. The results of this research would partially inform the specific methods and level of effort necessary to identify cultural resources. It is crucial to understand the level and type of both natural and anthropogenic disturbance a location has experienced when assessing the probability for a location to contain archaeological resources.

The predictive model should not be taken as a definitive assessment of a location's cultural resources sensitivity. The model has less relevance for historic period archaeological sites, TCPs, cemeteries, historic buildings, or areas of culturally significant plants or animals. The model is intended to provide a baseline assessment specifically for precontact period archaeological sites and isolates. As a result, the model's results related to the probability for encountering precontact period archaeological resources cannot function as a definitive assessment of cultural resources sensitivity for an area. However, it is an effective tool for understanding the baseline level of probability for encountering certain types of cultural resources and assessing a general level of effort that may be needed for future studies.

A complete assessment of the probability for encountering all types of cultural resources requires a focused research effort into a wide range of archival resources, and consultation with affected Tribes. Tribes often hold detailed information about history of an area, which is a factor in assessing the probability of finding cultural resources in a given location. These ethnographic data are not incorporated into the DAHP predictive model and often cannot be assessed by outside researchers without direct collaboration with Tribal knowledge holders. The Tribes contacted and archival resources reviewed as part of a full probability assessment would be unique to any particular location. The model's baseline probability assessments are often considered in conjunction with archival research findings by researchers once a detailed archival effort has been conducted.

## 2.3 Impact assessment approach

General language about potential impacts to historic and cultural resources is identified in the PEIS. This technical appendix includes consideration of the unique perspectives and specific impacts on a Tribe when evaluating impacts in the PEIS. The significance of Tribal cultural resources analyzed within this technical appendix can be understood only from within the cultural context of an affected Tribe. Accordingly, the impact assessment and determinations of significance or non-significance of Tribal cultural resources would be determined with engagement and in consultation with Tribes.

## 3 Technical Analysis and Results

### 3.1 Overview

Historic and cultural resources are unique, non-renewable resources. Green hydrogen facilities could impact historic and cultural resources in and around the areas where they are built. The potential for impacts is related to the amount of land disturbance and the location of the facility. Impacts include effects to the cultural landscape and reduction in accessibility to cultural site locations.

Historic resources include prehistoric or historic districts as well as historic and archaeological sites, structures, or objects that are listed in (or eligible for listing in) preservation registers such as the NRHP, the Washington Heritage Register, or local preservation registers. Cultural resources refer to a broad range of resources associated with human manipulation of the environment. These include all the resources that are potentially eligible for listing in the NRHP including sites, buildings, structures, districts, and objects.

Cultural resources include Tribal sites and TCPs, archaeological sites and other archaeological resources, historic properties, historic resources, homesteads, and landmarks. TCPs include locations that may be eligible for listing in the NRHP because of their association with cultural practices or beliefs of a living community. TCPs may be associated with Tribal ethnographic locations such as villages, geographical features, and resource gathering areas. Tribal traditions are interwoven into the ecosystems in which Tribal members live, from hunting and gathering to sacred sites. Places and activities have spiritual and cultural meaning for Tribes.

Only a portion of the state has been mapped in detail for historic and cultural resources, and this technical appendix considers impacts at a broad level. A future proposed facility would need to conduct site-specific cultural surveys to evaluate potential impacts in accordance with DAHP and federal requirements and guidance.

DAHP's databases identify the risk of potential historic and cultural resources occurring in an area at a broad level, as well as known resources. Historic and cultural resources will be identified through review of publicly available published literature, anthropological reports, scoping comments, and consultation with Tribes. Tribal communities are the best sources of information about their cultural resources and potential impacts on such resources. Input from an affected Tribe regarding the potential impacts from green hydrogen facilities will be relied upon to characterize impacts for that Tribe in the PEIS.

A green hydrogen facility is expected to have an operational life of 20 to 50 years, at which time it is expected to be decommissioned. Therefore, an approximate 75-year time period is used for resource analyses. This includes when developments are likely to be constructed and operational.

## 3.2 Affected environment

Throughout the study area there are lands, shorelines of major waterways, and their tributaries where Tribes have lived for thousands of years before present and continue to live and utilize these areas. Archaeological sites, historic properties, and Native American place names are also present. They include areas connected to spiritual practices and named places and are represented within oral tradition stories and historic documents.

The summaries presented below provide a simplified context for briefly introducing the human history of Washington state. This land has been utilized since before the retreat of the glaciers at the end of the Pleistocene. During the succeeding millennia, people have used a wide variety of strategies and approaches to interact with the landscape and its resources. As the environment has changed, so have those approaches. This has resulted in a history of human use and occupation that stretches across the entirety of the study area.

### 3.2.1 Precontact setting

The Western scientific approach to archaeology in Washington provides some information on the long and diverse history of the state. Only a very small portion of the state has been subject to any type of archaeological survey, yet the more than 37,000 archaeological sites that have been recorded demonstrate a variety of lifeways and cultural practices that coincide with many environments and landscapes in the state. The presence and age of archaeological sites in Washington state support a cultural continuity between today's Indigenous communities and the people associated with the archaeological sites. This section provides a broad summary of the current understanding of the archaeological record according to the Western scientific approach to archaeology and is largely based on DAHP's current *State Historic Preservation Plan* and DAHP's *Field Guide to Washington Archaeology* (DAHP 2003, 2020). Each Tribe may possess a distinct record, both publicly available and privately held, of their history that may differ from the chronology presented below.

#### 3.2.1.1 Late Pleistocene/Early Holocene

Numerous archaeological sites in North America have been radiocarbon dated to older than 11,050 years ago; these sites are found in a wide variety of environments (Adovasio 2012; Erlandson et al. 2011; Kirk and Daugherty 2007; Lothrop 2015; Waters and Stafford 2007). The stone tools and archaeological features associated with these sites are unique from the later, more commonly observed archaeological sites. In Washington, this timeframe is referred to as Paleoindian, and the archaeological sites contain large fluted projectile points (Ames and Maschner 1999, Ames et al. 1998; Bergland 1983; Blukis Onat 1987; Burtchard 1998; Daugherty 1956; Kidd 1964; Leonhardy and Rice 1970; Mierendorf 1986; Schalk and Taylor 1988; Waters et al. 2011). The Manis Site near Sequim dates from roughly 13,800 years before present and consists of the remains of a mammoth found in a peat bog with a human-made bone point lodged in a rib fragment (Waters et al. 2011). During this time, glaciers began to retreat north, and humans began to utilize the majority of what is now Washington State. Site types would include small seasonal habitation sites related to resource gathering that would have occurred

nearby (Ames and Maschner 1999; Mierendorf 1986; Waters et al. 2011). An archaeological site near East Wenatchee consisted of a large cache of Clovis points and other tools (Mehringer 1989). The Marmes Rockshelter Site, near Lyons Ferry, dates to more than 11,000 years ago and contains a diverse collection of artifacts that includes stone and bone tools, faunal and shell remains, storage pits, hearths, and burials (Hicks 2004).

On the west side of the state, early archaeological sites include the Manis Mastodon Site, the Orcas Island Bison Antiquus Site (Kenady et al. 2011), and the Bear Creek Site in Redmond (Kopperl et al. 2015). Butchered bone on the well-preserved remains of an extinct species of bison found on Orcas Island have been dated to 11,990 years ago (Kenady et al. 2011). Excavations at the Bear Creek Site obtained a radiocarbon date of 10,780 years ago associated with occupational strata (Kopperl et al. 2015:117). This site contained a diverse range of stone tool kits including unfluted concave base points. The site has been interpreted as a short-term occupation site and has yielded evidence of mammal, fish, and plant utilization (Kopperl et al. 2010).

### **3.2.1.2 Middle Holocene**

The middle Holocene timeframe is often referred to as Olcott culture or the Cascade Phase (Ames and Maschner 1999; Ames et al. 1998; Blukis Onat 1987; Burtchard 1998; Chatters et al. 2011; Daugherty 1956; Kidd 1964; Kopperl et al. 2016; Leonhardy and Rice 1970; Miss and Campbell 1991; Reid and Gallison 1995; Schalk and Taylor 1988). The typical archaeological site types include small, seasonally occupied habitation areas; intensive resource gathering locations, such as upland hunting grounds; and quarry sites for stone tool manufacturing (Ames and Maschner 1999; Ames et al. 1998; McClure 1998). From 7,000 years ago to 6,000 years ago, the archaeological record shows a significant shift in subsistence and settlement patterns. This shift is characterized by a decrease in mobility and increase in resource utilization that coincided with a change to a warmer and drier climate, increase in population density, and resource abundance (Burtchard 1998; Kirk and Daugherty 2007; Mierendorf 1986; Schalk and Taylor 1988). The archaeological evidence points to the emergence of multi-season occupation at habitation sites by 6,000 years ago, indicating a less mobile lifeway. Also, marine resources appear more frequently in assemblages, and plant-based processing tools become more heavily used (Blukis Onat 1987). The stone tools from this timeframe included microblades and leaf-shaped projectile points, which are found across Washington (Greengo and Houston 1965; Hicks 2004).

### **3.2.1.3 Late Holocene**

Another shift occurred in the archaeological record of the western part of the state around 3,000 years ago. Settlement patterns were influenced by seasonal salmon fishing, larger occupation sites occurred, and shellfish in marine habitats and terrestrial foraging and harvesting occurred at a greater frequency (Nelson 1990; Schalk and Taylor 1988; Stein 2000; Wessen 1988). Excavations at West Point in King County illustrate the cultural sequence from the middle to the late Holocene. West Point's function was not static, and the site conveys a shift in use at the location from a central habitation site to a resource extraction location over the approximately 5,000-year period this location was in use (Larson and Lewarch 1995).

On the east side of the state, this period is referred to by anthropologists as Phase II or the late Tucannon Phase and is characterized by winter-occupied pit houses and following a seasonal resource gathering strategy that revolved around salmon and seasonally available flora and fauna (Ames et al. 1998; Hicks 2004; Kennedy 1976; Leonhardy and Rice 1970). The archaeological record also shows an increase in the use of botanical materials such as baskets, nets, cordage, and mats, but this increase in occurrence is likely due to preservation issues (Andrefsky 2004; Hicks 2004; Kirk and Daugherty 2007). During the late Holocene, the lifeways recorded by ethnographies appear to have developed (Ames and Maschner 1999). This pattern is thought to have been influenced by colonizers through the appearance of Euro-American goods, diseases, and practices; it was a period of resource intensification (e.g., salmon mass capture and storage), collector-like settlement patterns with winter village occupation, and complex social organization (Blukis Onat 1987; Burtchard 1998).

### **3.2.2 Ethnographic setting<sup>2</sup>**

In Washington state, the ethnographic period is generally referred to by Western anthropologists as the time between the arrival of the first non-Indigenous people to the establishment of the treaties between the Tribes and the U.S. Government. In what is now Washington State, this is generally considered to be between 1792 and the 1850s.

Tribal knowledge, including oral traditions, supports the presence of people in what is now Washington State since time immemorial, and this is also supported by archaeological evidence as summarized previously. The lifeways and cultures of today's Tribes cannot be fully described in this section. The provided information regarding the setting is general; additional detail can be obtained in existing materials such as those listed in, but not limited to, Section 4. The following discussion is based largely on the publicly available information prepared by Tribes, but also includes accounts prepared by non-Native ethnographers and travelers during the mid to late 1800s and into the early 1900s. The accuracy of these earlier accounts is less reliable, and they are presented without intention of superseding Tribal knowledge, but rather to provide references to other publicly available sources pertaining to the ethnographic setting in today's Washington State. Today, many Tribes have collected and published their own histories, some of which are publicly available, while other information is private or passed down through cultural practices.

Indigenous cultural groups on the western side of the state have been referred to by anthropologists as consisting of the following cultural groups: Central, Southern, and Southwestern Coast Salish; Makah; Quileute; Chinookans; Chemakum; and Kwalhioqua. The

---

<sup>2</sup> The information presented in this section was developed based on the following references: Baenen 1981; Ballard 1927, 1929, 1951; Barkan 1987; Beavert 2012; Beavert et al. 2009; Bergland 1983; Boyd 2013; Carpenter 1986; Carpenter et al. 2008; CTUIR 2022; Daehnke 2017; Gibbs 1854, 1877; Goertz 2018; Gould and Spinden 1917; Galloway and Richardson 1983; Gunther 1927; Hajda 1990; Haeberlin and Gunther 1930; Hilbert et al. 2001; Hollenbeck 1987; Hunn et al. 2014; Karson 2006; Kennedy and Bouchard 1998; Kinkade et al. 1998; Olson 1936; Ray 1933, 1936, 1942; Richardson and Galloway 2011; Ruby 1995; Schuster 1998; Silverstein 1990; Spier 1927; Smith 1940; Spinden 1908; Stern 1990; Storm and Capoeman 1990; Teit 1928; Uebelacker and Wilson 1984; Wray 2016; Zenk et al. 2016.

traditional languages of the western side of the state include Northern Straits, Nooksack, Halkomelem, Makah, Clallam, Chemakum, Quinault, Twana, Lushootseed, Quileute, Lower Chehalis, Upper Chehalis, Cowlitz, Lower Columbia Athapaskan, Lower Chinook, Cathlamet, Multnomah, and Kiksht.

Indigenous cultural groups on the eastern side of the state have been referred to by anthropologists as consisting of the following cultural groups: Thompson; Northern Okanagan, Lakes, and Colville; Middle Columbia River Salishans; Yakama and Neighboring Groups; Wasco, Wishram, and Cascades; Western Columbia River Sahaptins; Cayuse, Umatilla, and Walla Walla; Nez Perce; Palouse; Coeur d'Alene; Spokane; and Kalispel. The traditional languages of the eastern side of the state are part of the Salishan and Sahaptian language families.

### **3.2.3 Historic setting**

This section describes the time after the arrival of non-Indigenous people to the area that is now Washington State, into present day, which can be referred to in anthropology as the post-contact or historic period. This period began in the early 1790s with maritime expeditions sponsored by the Spanish, English, and U.S. governments, followed by terrestrial surveys sponsored by governments and private commercial interests (Hudson et al. 2017; Kirk and Alexander 2001). The most well-known early explorers were the expeditions lead by Captain George Vancouver in 1792 followed by the Lewis and Clark Expedition in 1805. Following these expeditions, American, French, and English fur traders and the Hudson's Bay Company established forts and trade routes throughout the state, and religious groups established missions (Cox 1974; Ficken 1987; Phillips 1972). During the early 1800s, the U.S. Government entered into treaties with some of the Tribes.

Some early industries during this time period included mining, timber, fishing, and agriculture. The Columbia River and deep harbors throughout Puget Sound provided shipping opportunities and contributed to the growth of major cities such as Seattle, Vancouver, and Tacoma. A growing railroad network provided economic opportunity for inland regions, and the arrival of the transcontinental railway further developed other cities like Spokane and Pasco (Carlson 2003). In 1889, Washington Territory became the 42nd state. During the turn of the nineteenth century, agriculture and urban commerce began to be the major drivers of the growth in population and economy of the state. The Great Depression impacted Washington's economy, but with the help of federally backed projects like the Grand Coulee Dam, construction helped the state recover (Kirk and Alexander 2001). While agriculture and logging continued to be important industries through the early and mid-1900s, the economy has since diversified to include airplane production, hydropower, and technology (Cox 1974; Hudson et al. 2017).

### **3.2.4 Geographical context**

The study area includes a diverse range of geological formations, animals, and plants. The major geographic regions for the green hydrogen study area include the Coast Range, Puget Lowland, Willamette Valley, Cascades, Eastern Cascades Slopes and Foothills, Columbia Plateau, Northern Rockies, and North Cascades. Each of these provinces has a unique geological history



that has formed the current landscape. Geological context plays an important role in archaeological site formation. The presence of an archaeological site requires not only past human activity resulting in the deposition of physical objects or remains; the geological conditions at the time of deposition and in subsequent years also must allow for the preservation of those materials.

### **3.2.5 Archaeological resources**

Archaeological resources are discussed based on broad cultural patterns and are referred to as precontact-era and historic-era sites.

Precontact-era archaeological sites are typically considered to be sites predating the 1790s, the widely accepted start of intensive colonization of the region. These sites encompass a variety of materials, but typically have cultural contexts focused on past archaeological research, ethnography, and the natural environment. They are found both underwater and in terrestrial environments and include a wide variety of artifacts and archaeological features such as lithic scatters, tool stone quarries, bone or stone tools, and developed anthropogenic soils, known as middens, which are directly related to human activity.

These sites can represent single-use actions such as kill processing, short-term or seasonal habitation locations, sometimes referred to as camps; or more permanent habitation sites, referred to as villages. Beneath these broad use categories are numerous other site types found across the landscape, such as petroglyphs, rock cairns, and culturally modified trees. Sites of each scale and type may be NRHP eligible, and all precontact archaeological sites are protected under Chapter 27.53 RCW (Archaeological Sites and Resources).

Historic-era archaeological sites are those dated after the 1790s. These sites can be a result of a variety of cultural groups, and any of the listed cultural context themes may be relevant. The most common types of historic-era archaeological sites are concentrations of material artifacts such as refuse deposits, can scatters, or small landfills. Homesteads are often considered archaeological sites and include abandoned houses, barns, sheds, ditches, and outhouses. Railroad properties including alignments, grades, campsites, berms, trestles in ruin, and associated structural remnants are common throughout the study area. Logging-related archaeological sites include mills, flumes, chutes, and railroads, along with logging camps or abandoned equipment. Not all historic-era archaeological sites are considered NRHP eligible, but they all require evaluation by a professional archaeologist to collect the relevant data on the site's context and integrity. The data would be considered by the lead federal agency and/or DAHP in making a determination on a historic-era site's eligibility and whether it is protected under Chapter 27.53 RCW. All sites are considered eligible and are protected until this formal evaluation has occurred.

### **3.2.6 Historic architectural resources**

Historic architectural resources include buildings, sites, structures, objects, or districts that have reached a particular age threshold to be considered eligible for listing in a historic register. The

following is a partial list of these types of resources that might be within sites considered for green hydrogen facilities:

- Agricultural structures like a barn, grain silo, storage building, and other outbuildings
- Airports
- Bridges and functional roads
- Commercial and trade buildings
- Cultural landscapes like parks and plazas
- Homesteads
- Institutional structures like schools, libraries, hospitals, and religious buildings
- Intact dams and hydroelectric features
- Intact logging structures
- Intact railroad tracks, trestles, shelters, and stations
- Irrigation features like canals, waterways, and ditches
- Military installations
- Monuments and markers
- Public works projects like water systems, sewer systems, tanks, power transmission lines, and power substations
- Residential housing

### **3.2.6.1 Human remains and cemeteries**

In Washington State, non-forensic human remains and cemeteries on private and state land are recorded as archaeological sites. These resources have protections relating to both archaeological sites and recorded cemeteries (Chapters 27.53 and 27.44 RCW). Human remains may be encountered in a variety of contexts and landforms.

Tribes often have records relating to the locations of and practices around human remains that are not publicly available. Human remains discovered on federal lands are under the jurisdiction of the federal agency managing those lands, and the requirements of the Native American Graves Protection and Repatriation Act apply.

On state and private lands, the remains become the jurisdiction of DAHP and the State Physical Anthropologist. DAHP will notify any appropriate cemeteries and all affected Tribes of the find. The State Physical Anthropologist will make a determination of whether the remains are Indian or Non-Indian and report that finding to any appropriate cemeteries and the affected Tribes. DAHP will then handle all consultation with the affected parties as to the future preservation, excavation, and disposition of the remains. On finds from state and private lands, DAHP takes the lead in consulting with the treatment of these remains with Tribes and community groups (DAHP 2024). Sites with human remains are most often considered to be NRHP eligible. These types of resources typically cannot be developed without an adverse effect determination requiring additional mitigation.

### **3.2.6.2 Documented Traditional Cultural Properties**

A TCP is a property or a place that is inventoried or determined to be eligible for inclusion in the NRHP or the Washington Heritage Register because of its association with cultural practices and beliefs that are (1) rooted in the community's history and (2) important to maintaining the continuing cultural identity of the community's traditional beliefs and practices.

DAHP maintains a database of TCPs within Washington state, but very few are publicly disclosed. A TCP can be any location, landform, or object that has distinct association and importance to a group. The scale can be as large as an entire river or mountain or can be confined to a single boulder. TCPs are often associated with cultural practices that groups may not wish to become widely known, such as spiritual practices. When a TCP is identified, it is often partially recorded to the degree necessary to determine if project impacts could result in an adverse effect on that TCP.

### **3.2.6.3 Sacred sites**

Executive Order 13007 instructs federal agencies to facilitate access to and ceremonial utilization of sacred sites by Indian religious practitioners. The order requires that federal agencies provide the Tribes with notice of any proposed land-related actions or policies that might potentially limit future access to, limit ceremonial use of, or have adverse impacts on the physical integrity of sacred sites. Federal agencies also need to avoid any actions that could negatively impact these sites on federal land.

Sacred sites can be considered cultural resources when a historic property is also considered a sacred site by a Tribe. Sacred sites are also discussed in the *Tribal Rights, Interests, and Resources Technical Appendix*. The treatment of impacts on sacred sites is guided by federal policy established in executive orders and Memoranda of Understanding. The responsibility of federal agencies under Executive Order 13007 is to protect and improve Tribal access to sacred sites. Projects subject to GEO 21-02 must also avoid, minimize, or mitigate adverse effects to sacred sites.

### **3.2.7 DAHP archaeological predictive model results**

As noted in Section 2.2.1.2, the DAHP predictive model uses five categories to help determine (at a planning level) the likelihood of precontact era archaeological sites being present based on environmental factors and some archaeological data. These categories of risk are associated with recommendations for archaeological survey, detailed in Section 2.2.1.2.

The model results within the green hydrogen study area contain very high- to low-risk areas. The very high- and high-risk areas are typically found along waterways, including Grays Harbor, Puget Sound, Salmon Bay, the Puyallup River, and the Columbia River. These assessments of probability match the archaeological expectations, as there are numerous archaeological sites along the Columbia River, and known settlement patterns focus on occupation near water sources. The model assigns a low to moderate risk for upland areas in the study area, including

rural agricultural lands, industrial lands, and airports in both small and large cities, where previous ground disturbance is likely to have occurred.

### 3.3 Impact assessment

Although the specific impacts on historic and cultural resources need to be assessed on a project-by-project basis, there are certain common activities related to the development of green hydrogen facilities that have the potential to cause significant impacts to historic and cultural resources. The PEIS analyses will focus on the impacts that would result from the construction, operation, and decommissioning of green hydrogen facilities. Impacts will also need to be considered as part of subsequent project-level analyses for any facility.

#### 3.3.1 Impacts from construction and decommissioning

The time needed to construct a green hydrogen facility once site characterization, environmental review, and permitting are completed would vary but is expected to be between 1 and 3 years.

Site characterization and construction could require some site preparation, including excavation, blasting, vegetation removal, and grading. Site access could include modifying existing roads or building new roads. These activities could result in impacts on or inadvertent discoveries of historic and cultural resources. In mountainous terrain, additional site grading as well as clearing and grubbing may be required if existing access routes are unavailable or unsuitable for the planned investigation equipment.

Construction activities that could impact historic and cultural resources include ground disturbance, degradation of visual quality, noise, and interruption of the landscape and habitat. A Tribe's spiritual practices could be interrupted by construction impacts on land areas and cultural or sacred sites, including degradation of visual quality, noise, and interruption of access.

Construction could result in damage or destruction of historic and cultural resources from the clearing, grading, and excavation of the site for a facility and from construction of green hydrogen facilities and associated infrastructure. Construction would likely include some subsurface infrastructure (e.g., foundations and utility trenches). Ground disturbance during construction could impact undiscovered archaeological resources due to the fact that the majority of the study area has not been archaeologically surveyed.

Degradation and destruction of historic and cultural properties could result from the alteration of topography, alteration of hydrologic patterns, removal of soils, erosion of soils, runoff into and sedimentation of adjacent areas, and oil or other contaminant spills if sites are located on or near the site for a facility. Such degradation could occur within the facility footprint and in areas downslope or downstream. Erosion can also destabilize historic structures.

Degradation of settings associated with significant cultural resources could result from the temporary visual and noise changes associated with construction of green hydrogen facilities, associated land disturbances, and ancillary facilities. The regular geometric forms associated with buildings, battery energy storage system (BESS), hydrogen storage, and other infrastructure could contrast with the organic forms and colors of existing landform and vegetation. Construction visual changes, light, dust, and human presence could affect cultural resources for which visual integrity is a component of sites' significance, such as Tribal sacred sites and landscapes, historic structures, trails, and historic landscapes. Construction noise would depend on the activities, terrain, vegetation, and local weather conditions but may involve heavy equipment, which could generate noise and vibration. Cultural resources that are susceptible to noise impacts are TCPs or sacred sites because the cultural uses or practices that occur at these locations could be interrupted or diminished by noise and vibration. Construction vibration could adversely affect cultural resources by toppling rock cairns and damaging other rock features or archaeological sites on the surface.

Decommissioning activities for green hydrogen facilities would likely include the dismantling and removal of all aboveground structures as well as some underground structures. Foundations may be removed to a level of 3 feet or more below the ground surface, while cables, lines, or conduit that is buried 3 feet below grade or more is not expected to be removed. However, the depth to which facilities and infrastructure would be removed would likely be dependent on agreements with landowners and in accordance with applicable regulatory requirements. Service roads may be removed or may remain, depending on agreements with the new or existing owner of the land.

Site restoration activities may include dismantling and removal of all aboveground structures as well as some underground structures; and recontouring, grading, scarifying, seeding and planting, and perhaps stabilizing disturbed surfaces. The types of impacts would be similar to those associated with facility construction. Special consideration of the type of green hydrogen technology employed and disposal of associated components would be required. The removal of electrical transformers would require inspection for soil contamination and decontamination work as needed.

### **3.3.2 Impacts from operation**

For the PEIS, green hydrogen production facilities are expected to have an operational life of approximately up to 50 years. This is the operation period after a facility is constructed. Operational activities that could affect historic and cultural resources include changes in access to natural and cultural resources and increased human activity with associated noise, light, dust, and human presence.

Following construction, ongoing operations and maintenance are anticipated to include little new ground disturbance, as the use of maintenance vehicles and equipment would generally be limited to access roads and designated areas that were developed during construction. Documented or undocumented cultural and historic resources could still be disturbed by the increase in activity during operation of a facility. This includes increased vehicle traffic,

vegetation management, or other activities, as well as the presence of people who might disturb surface artifacts.

There is also a potential to impact unrecorded archaeological sites that are associated with TCPs. Ongoing operations and maintenance ground disturbance could occur in areas where no archaeological sites have been identified during recent surveys, but there is still a potential for previously unrecorded sites to be identified during operation.

Visual degradation of settings associated with significant cultural resources could result from the presence of green hydrogen facilities and associated land disturbances. Visual changes associated with green hydrogen facilities could include the regular geometric forms associated with BESS, hydrogen storage facilities, buildings, and ancillary structures; security and other lighting; fencing; roads; vehicles; and workers conducting maintenance activities. These could affect cultural resources for which visual integrity is a component of sites' significance, such as Tribal sacred sites and landscapes, historic structures, trails, and historic landscapes.

Additionally, ongoing operations could impact accesses and travel paths traditionally utilized for significant historic and cultural resources. This is most likely to impact TCPs, sacred sites, cemeteries, or precontact period archaeological sites where setting, feeling, and association are key aspects of the site's significance. This type of impact is likely to increase in significance based on the amount of the landscape that is no longer freely accessible. The degree of impact from these restrictions is at least partially a result of the overall size of the individual facilities and the overall density of individual facilities in a given area. Impacts from limiting access and travel are likely to be more significant cumulatively than on an individual project basis.

## 3.4 Actions to avoid or minimize impacts

Mitigation may be developed through consultation with affected Tribes as part of the SEPA process. Mitigation may also be developed under Section 106 of the NHPA; this is a separate, federal process outside of the state's SEPA process.

### 3.4.1 Siting and design considerations

- Design and site projects to avoid, to the maximum extent, impacts on cultural and historic resources. This process should begin with the use of the DAHP predictive model but then be refined through the development of site-specific environmental and cultural context and Tribal coordination.
- Contact potentially affected Tribes early in the siting process—ideally, before land is acquired for a project or before permit applications are developed—and offer information relevant to Tribal technical staff to help identify potential impacts on Tribes.
- Consider potential impacts on Tribal treaty reserved rights, Tribal reservations, off-reservation rights, Trust lands, other Tribal-owned land, and other areas of significance to Tribes during project design and in site decisions.

- Conduct a site-specific cultural survey to evaluate potential impacts in accordance with DAHP and federal requirements and guidance. Offer DAHP and cultural experts from potentially affected Tribes the option to help develop the survey strategy.
- Consider requiring a Tribal monitor for survey crews to provide input on TCPs, sacred sites, and culturally significant sites during site selection.
- Provide survey results to potentially affected Tribes for early review.
- Use previously disturbed lands and lands determined by archaeological inventories to be devoid of historic properties to the maximum extent possible.
- In areas where homesteading was a prevalent historic activity, contact the local assessors and historic museums to determine if the area includes known homestead sites.

### **3.4.2 Permits, plans, and best management practices**

- If a project requires federal permits or affects federal lands, mitigation measures would be developed in consultation with Tribes under Section 106 of the NHPA to avoid, reduce, or mitigate the potential for adverse impacts on significant cultural resources, if present. Section 106 consultations between the federal agencies, DAHP, affected federal treaty Tribes, and other consulting parties would be required.
- If any precontact archaeological site or NRHP-eligible historic-era archaeological site related to Tribal activities is impacted by a project, the developer would obtain a DAHP excavation permit and perform necessary archaeological work to comply with Chapter 27.53 RCW.
- Develop an Inadvertent Discovery Plan. In the event that unrecorded archaeological resources are identified during project construction or operation, work within a project-specific buffer (e.g., 30 meters [100 feet]) of the find must be halted and directed away from the discovery until it can be assessed in accordance with steps in the Inadvertent Discovery Plan.

### **3.4.3 Additional mitigation measures**

- Conduct a cultural resources survey of the entire project site.
- Use training/educational programs for workers to reduce occurrences of disturbances, vandalism, and harm to historic properties. Plans should incorporate adaptive management protocols for addressing changes over the life of the project, should they occur.
- Address impacts to historic and cultural resources that follow the best available guidance and strategies developed by federal, Tribal, and state governments, including but not limited to compensatory mitigation, formalized ongoing consultation between the state and Tribes to address new concerns and monitor long-term mitigation, and development and maintenance of new technologies and geospatial analysis that help identify and avoid historic and cultural resources.

Additional actions to avoid or minimize impacts would be determined after engagement and consultation with Tribes.

## 4 References

- Adovasio, James, 2012. *Plant Fiber Technologies and the Initial Colonization of the New world*. Pre-Clovis in the Americas conference, Smithsonian Institution, November 9–10.
- Ames, Kenneth M., and Herbert D. G. Maschner, 1999. *Peoples of the Northwest Coast, Their Archaeology and Prehistory*. Thames and Hudson Limited, London, England.
- Ames, Kenneth M., Don E. Dumond, Jerry R. Galm, and Rick Minor, 1998. "Prehistory of the Southern Plateau." In *Plateau*, edited by Deward E. Walker, Jr., pp. 103-119. Handbook of North American Indians, Vol. 12, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.
- Andrefsky, W., 2004. "Materials and Contexts for a Culture History of the Columbia Plateau." In *Complex hunter-gatherers: Evolution and organization of prehistoric communities on the plateau of northwestern North America*. University of Utah Press; pp. 23–35.
- Baenen, James, 1981. "Stillaguamish, Snohomish, Snoqualmie & Duwamish." In *Inventory of Native American Religious Use, Practices, Localities and Resources*, edited by A. R. Blukis Onat and J. L. Hollenbeck, pp. 397–471. Institute of Cooperative Research, Inc. Prepared for Mt. Baker-Snoqualmie National Forest. On file, Washington State Department of Archaeology and Historic Preservation, Olympia.
- Ballard, Arthur C., 1927. Some Tales of the Southern Puget Sound Salish. *University of Washington Publications in Anthropology* 2(3):57–81. University of Washington Press, Seattle.
- Ballard, Arthur C., 1929. Mythology of Southern Puget Sound. *University of Washington Publications in Anthropology* 3(2):31–150. University of Washington Press, Seattle.
- Ballard, Arthur C., 1951. Deposition of Oral Examination of Arthur Condict Ballard in Muckleshoot Tribe of Indians on Relation of Napoleon Ross, Chairman of the General Council, Claimant v The United States of America, Defendant. 2 vols. Heard before the Indian Claims Commission of the U.S., 26–28 November, Seattle. Carolyn T. Taylor, Court Reporter, Seattle.
- Barkan, Frances B. (editor), 1987. *The Wilkes Expedition: Puget Sound and the Oregon Country*. Washington State Capital Museum, Olympia.
- Beavert, V., 2012. *Wántwint Inmí Tiináwit: A reflection of what I have learned*. Ph.D. dissertation, University of Oregon.
- Beavert, V., S. Hargus, and B. Rigsby, 2009. Ichishkíin sínwit yakama= Yakima Sahaptin dictionary.



- Bergland, Eric, 1983. Summary of Prehistory and Ethnography of Olympic National Park, Washington. National Park Service, Pacific Northwest Region, Division of Cultural Resources, Seattle, Washington.
- Blukis Onat, Astrida R., 1987. *Resource Protection Planning Process Identification of Prehistoric Archaeological Resources in the Northern Puget Sound Study Unit*. Prepared for Washington State Office of Archaeology and Historic Preservation, Olympia. BOAS, Inc., Seattle, Washington.
- Boyd, R.T., 2013. "Lower Chinookan disease and demography." In *Chinookan Peoples of the Lower Columbia River*, pages 229–249. University of Washington Press.
- Burtchard, Greg C., 1998. *Environment, Land Use, and Archaeology of Mt. Rainier National Park, Washington*. Prepared for the U.S. Department of the Interior, National Park Service, Columbia Cascades System Support Office, Seattle. International Archaeological Research Institute, Inc., Honolulu, Hawaii.
- Carlson, Linda, 2003. *Company Towns of the Pacific Northwest*. University of Washington Press, Seattle.
- Carpenter, Cecilia S., 1986. *Fort Nisqually: A documented History of Indian and British Interaction*. Tahoma Research Service, Tacoma.
- Carpenter, Cecilia S., Maria V. Pascualy, and Trisha Hunter, 2008. *Images of America: Nisqually Indian Tribe*. Arcadia Publishing, Charleston, South Carolina.
- Chatters, J.C., J.B. Cooper, P.D. LeTourneau, and L.C. Rooke, 2011. *Understanding Olcott: Data Recovery at 45SN28 and 45SN303, Snohomish County, Washington*. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.
- Cox, Thomas R., 1974. *Mills and Markets: A History of the Pacific Coast Lumber Industry to 1900*. University of Washington Press, Seattle.
- CTUIR (Confederated Tribes of the Umatilla Indian Reservation), 2022. *A Brief History of the CTUIR: Background information on our people*. Accessed April 4, 2024. Available at: <https://ctuir.org/about/brief-history-of-ctuir/>
- Daehnke, J.D., 2017. *Chinook resilience: Heritage and cultural revitalization on the Lower Columbia River*. University of Washington Press.
- DAHPP (Washington State Department of Archaeology and Historic Preservation), 2003. *A Field Guide to Washington State Archaeology*. Accessed April 9, 2024. Available at: [https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch\\_1.pdf](https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_1.pdf)
- DAHPP, 2010. *Statewide Predictive Model*. Last updated 2010. Accessed February 2, 2024.

- DAHP, 2017. *Traditional Cultural Properties (TCPs): DAHP Policy*. Policy No. 12.1.2017. Effective and Signed: December 1, 2017. Available at:  
[https://dahp.wa.gov/sites/default/files/2017\\_SIGNED\\_TCP.pdf](https://dahp.wa.gov/sites/default/files/2017_SIGNED_TCP.pdf)
- DAHP, 2020. The Washington State Historic Preservation Plan 2021-2026: Inhabiting our History. Accessed April 9, 2024. Available at:  
[https://dahp.wa.gov/sites/default/files/Final%20State%20Preservation%20Plan\\_2.pdf](https://dahp.wa.gov/sites/default/files/Final%20State%20Preservation%20Plan_2.pdf)
- DAHP, 2024. *Washington Information System for Architectural and Archaeological Records Data (WISAARD)*. Accessed February 2, 2024. Secure database.
- Daugherty, Richard D., 1956. Archaeology of the Lind Coulee Site, Washington. *Proceedings of the American Philosophical Society* 100:233–278.
- Erlandson, J. M., T. C. Rick, T. J. Braje, M. Casperson, B. Culleton, B. Fulfrost, T. Garcia, D. A. Guthrie, N. Jew, D. J. Kennett, M. L. Moss, L. Reeder, C. Skinner, J. Watts, and L. Willis, 2011. Paleoindian Seafaring, Maritime Technologies, and Coastal Foraging on California’s Channel Islands. *Science* 331:1181–1185.
- Ficken, Robert E., 1987. *The Forested Land: A History of Lumbering in Western Washington*. University of Washington Press, Seattle.
- Galloway, B., and A. Richardson, 1983. *Nooksack Place Names: An Ethnohistorical and Linguistic Approach*. Working Papers for the 18th International Conference on Salish and Neighboring Languages.
- Gibbs, George, 1854. *Report of Mr. George Gibbs to Captain McClellan on the Indian Tribes of the Territory of Washington, March 4, 1854*. Attachment J 39 (pp. 402–434) of Report of Governor I.I. Stevens, in Report of Explorations and Surveys, to Ascertain the Most Practicable and Economical Route for a Railroad from the Mississippi River to the Pacific Ocean, made under the Direction of the Secretary of War, in 1853-4, according to Acts of Congress of March 3, 1853, May 31, 1854, and August 5, 1854. Volume I, 1855. 33rd Congress, 2nd session House of Representative Executive Document No. 91. A.O.P. Nicholson, Washington, DC.
- Gibbs, George, 1877. *Tribes of Western Washington and Northwestern Oregon*. In Contributions to North American Ethnology, 1(2):157-361. John Wesley Powell, editor. Geographical and Geological Survey of the Rocky Mountain Region. U.S. Department of Interior, Washington.
- Goertz, J.A., editor, 2018. *Chehalis Stories*. University of Nebraska Press.
- Gould, M.K., and H. J. Spinden, 1917. *Folk-tales of Salishan and Sahaptin tribes*. Vol. 11, American Folk-Lore Society.
- Greengo, R. E., and R. Houston, 1965. *Excavations at the Marymoor Site*. Magic Machine Press.

- Gunther, Erna, 1927. Klallam Ethnography. *University of Washington Publications in Anthropology* 1(5):171–314. University of Washington Press, Seattle.
- Haeberlin, Hermann, and Erna Gunther, 1930. *Indians of Puget Sound*. University of Washington Press, Seattle.
- Hajda, Yvonne, 1990. *Southwestern Coast Salish in Northwest Coast*. Edited by Wayne Suttles, pp. 503-517. Handbook of North American Indians, Vol. 7, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- Hicks, B.A., 2004. *Marmes Rockshelter: a final report on 11,000 years of cultural use*. Washington State University Press.
- Hilbert, Vi, Jay Miller, and Zalmai Zahir, 2001. *Puget Sound Geography: Original Manuscript from T. T. Waterman*. Lushootseed Press, Federal Way, Washington.
- Hollenbeck, Jan L., 1987. *A Cultural Resource Overview: Prehistory, Ethnography and History: Mt. Baker-Snoqualmie National Forest*. Program Assessment by Madonna Moss, Portland, Oregon. U.S. Department of Agriculture, Forest Service, Pacific Northwest Region.
- Hudson, Lorelea, Johnna R. Shea, Christian J. Miss, and Sharon A. Boswell, 2017. *King County Cultural Resources Protection Project, Phase 3: Historical and Ethnohistorical Archaeology Project Report*. Prepared by SWCA Environmental Consultants, Seattle. On file, ESA, Seattle.
- Hunn, Eugene S., E. Thomas Morning Owl, Phillip E. Cash Cash, and Jennifer Karson Engum, 2014. *Cáw Pawá Láakni / They are Not Forgotten: Sahaptian Place Names Atlas of the Cayuse, Umatilla, and Walla Walla*. Confederated Tribes of the Umatilla Indian Reservation, Tamastslikt Cultural Institute, Pendleton, Oregon.
- Karson, Jennifer (editor), 2006. *wiyáxayxt / wiyáakaaʔawn - As Days Go By: Our History, Our Land, and Our People, The Cayuse, Umatilla, and Walla Walla*. Confederated Tribes of the Umatilla Indian Reservation, Tamástlikt Cultural Institute, Pendleton, Oregon.
- Kauhi, Tonya C., 2013. *Statewide Predictive Model*. Prepared for the Department of Archaeology and Historic Preservation. Prepared by GeoEngineers, Tacoma. On file, Washington State Department of Archaeology and Historic Preservation, Olympia.
- Kenady, Stephen, Michael C. Wilson, Randall F. Schalk, and Robert R. Mierendorf, 2011. Late Pleistocene Butchered *Bison antiquus* from Ayer Pond, Orcas Island, Pacific Northwest: Age Confirmation and Taphonomy. *Quaternary International* 233:130–141.
- Kennedy, H., 1976. *An Examination of the Tucannon Phase as a Valid Concept: Step One*. Unpublished Master's thesis, University of Idaho, Moscow.

- Kennedy, Dorothy I.D., and Randall T. Bouchard, 1998. "Northern Okanogan, Lakes, and Colville." In *Plateau*, edited by Deward E. Walker, Jr., pp. 238–252. Handbook of North American Indians, Vol. 12, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.
- Kidd, Robert, 1964. *A Synthesis of Western Washington Prehistory from the Perspective of Three Occupation Sites*. Master's thesis, University of Washington, Seattle.
- Kinkade, M. Dale, William W. Elmendorf, Bruce Rigsby, and Haruo Aoki, 1998. "Languages." In *Plateau*, edited by Deward E. Walker, Jr., pp. 49–72. Handbook of North American Indians, Vol. 12, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.
- Kirk, Ruth, and Carmela Alexander, 2001. *Exploring Washington's Past: A Road Guide to History*. Revised Edition. University of Washington Press, Seattle.
- Kirk, Ruth, and Richard D. Daugherty, 2007. *Archaeology in Washington*. University of Washington Press.
- Kopperl, Robert E., Christian J. Miss, and Charles M. Hodges, 2010. *Results of Testing at the Bear Creek, Site 45KI839, Redmond, King County, Washington*. Northwest Archaeological Associates, Inc., Seattle, Washington. Prepared for the City of Redmond and David Evans and Associates, Inc.
- Kopperl, Robert E., Amanda K. Taylor, Christian J. Miss, Kenneth M. Ames, and Charles M. Hodges, 2015. The Bear Creek Site (45KI839), a Late Pleistocene–Holocene Transition Occupation in the Puget Sound Lowland, King County, Washington. *PaleoAmerica* 1(1):116–120.
- Kopperl, Robert, Charles Hodges, Christian Miss, Johonna Shea, and Alecia Spooner, 2016. *Archaeology of King County, Washington: A Context Statement for Native American Archaeological Resources*. SWCA Environmental Consultants, Seattle, Washington. Prepared for the King County Historic Preservation Program, Seattle, Washington.
- Larson, Lynn L., and Dennis E. Lewarch (editors), 1995. *The Archaeology of West Point, Seattle, Washington: 4,000 Years of Hunter-Fisher-Gatherer Land Use in Southern Puget Sound Volume 1, Parts 1 and 2*. Larson Anthropological Archaeological Services, Ltd., Seattle, Washington. Prepared for King County Department of Metropolitan Services, Seattle, Washington. Submitted to CH2M Hill, Bellevue, Washington. On file at the Department of Archaeology and Historic Preservation, Olympia, Washington.
- Leonhardy, F.C., and D. Rice, 1970. A Proposed Cultural Typology for the Lower Snake River Region, Southeastern Washington. *Northwest Anthropological Research Notes* 4(1):1–29.
- Lothrop, J.C., 2015. *Pre-Clovis in The Americas*. International Science Conference Proceedings.

- McClure, Richard, 1998. *Prehistoric Archaeology in the Southern Washington Cascades*. In Environment, Prehistory & Archaeology of Mount Rainier National Park, Washington, by Greg C. Burtchard. Report prepared for the National Park Service, Seattle, Washington.
- Mehringer, Peter J., Jr., 1989. *Age of the Clovis Cache at East Wenatchee, Washington*. Prepared for Washington State Historic Preservation Office, supported in part by Grant No. 1-89-701-19. Department of Anthropology, Washington State University, Pullman.
- Mierendorf, Robert R., 1986. *People of the North Cascades*. National Park Service, Pacific Northwest Region. Seattle.
- Miss, Christian J., and Sarah K. Campbell, 1991. *Prehistoric Cultural Resources of Snohomish County, Washington*. Prepared for the Washington State Office of Archaeology and Historic Preservation by Northwest Archaeological Associates, Inc., Seattle. On file, Washington State Department of Archaeology and Historic Preservation, Olympia.
- Nelson, Charles M., 1990. Prehistory of the Puget Sound Region. In *Smithsonian Handbook of North American Indians* Vol. 7: The Northwest Coast, edited by Wayne Suttles.
- NPS (National Park Service), 1997. *How to Apply the National Register Criteria for Evaluation*. National Register Bulletin No. 15, U.S. Department of Interior, National Park Service Cultural Resources. Government Printing Office, Washington, D.C.
- Olson, R.L., 1936. *The Quinault Indians*. University of Washington, Seattle, Washington.
- Phillips, James W., 1972. *Washington State Place Names*. 3rd ed. (revised). University of Washington Press, Seattle.
- Ray, Verne F., 1933. *The Sanpoil and Nespelem: Salishan Peoples of Northeastern Washington*. University of Washington Publications in Anthropology, Vol 5. Seattle. University of Washington Press.
- Ray, Verne F., 1936. Native Villages and Groupings of the Columbia Basin. *Pacific Northwest Quarterly* 27(2):99–152.
- Ray, Verne F., 1942. Culture Element Distributions: XXII Plateau. *Anthropological Records* 8(2): 99–262. University of California Press, Berkeley.
- Reid, K.C., and J. Gallison, 1995. “The Lower Snake Basin: Hells Canyon to the Columbia.” In *An Overview of Cultural Resources in the Snake River Basin: Prehistory and Paleoenvironments* (1st Update), pp. 2.1–2.135. Rainshadow Research Inc. Project Report No. 31. Pullman, Washington.
- Richardson, A., and B. Galloway, 2011. *Nooksack place names: geography, culture, and language*. UBC Press.

- Ruby, R.H., 1995. *Half-Sun on the Columbia: A Biography of Chief Moses* (Vol. 80). University of Oklahoma Press.
- Schalk, Randall F., and Richard F. Taylor (editors), 1988. *The Archaeology of Chester Morse Lake: The 1986-87 Investigations for the Cedar Falls Improvement Project*. Seattle Research Unit, Center for Northwest Anthropology, Washington State University, Pullman.
- Schuster, Helen H., 1998. "Yakima and Neighboring Groups." In *Plateau*, edited by Deward E. Walker, Jr., pp. 327–351. Handbook of North American Indians, Vol. 12. William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.
- Silverstein, Michael, 1990. "Chinookans of the Lower Columbia." In *Northwest Coast*, edited by Wayne Suttles, pp. 533-546. Handbook of North American Indians, Vol. 7, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.
- Spier, L., 1927. *Tribal Distribution in Southwestern Oregon*. *Oregon Historical Quarterly* 28(4), 358–365.
- Smith, Marian W., 1940. *The Puyallup-Nisqually*. Columbia University Contributions to Anthropology No. 32. Columbia University Press, New York.
- Spinden, H.J., 1908. Myths of the Nez Percé Indians. I. *Journal of American Folklore*, 13–23.
- Stein, Julie K., 2000. *Exploring Coast Salish Prehistory: The Archaeology of San Juan Island*. Burke Museum Monograph, University of Washington Press, Seattle.
- Stern, Theodore, 1990. "Cayuse, Umatilla, and Walla Walla." In *Plateau*, edited by Deward E. Walker, Jr., pp. 395-419. Handbook of North American Indians, Vol. 12, William C. Sturtevant, general editor. Smithsonian Institution, Washington, DC.
- Storm, J.M., and P.K. Capoeman, 1990. *Land of the Quinault*. Quinault Indian Nation.
- Teit, James, 1928. *The Middle Columbia Salish*. University of Washington Press, Seattle Washington.
- Uebelacker, M.L., and J.S. Wilson, 1984. *Time Ball: A Story of the Yakima people and the Land: A Cultural Resource Overview*. Yakima Nation.
- Waters, Michael R., and Thomas W. Stafford, Jr., 2007. Redefining the Age of Clovis: Implications for the Peopling of the Americas. *Science* 315(5815), 1122–1126.
- Waters, Michael R., Thomas W. Stafford, Jr., H. Gregory McDonald, Carl Gustafson, Morten Rasmussen, Enrico Cappellini, Jesper V. Olsen, Damian Szklarczyk, Lars Juhl Jensen, M. Thomas P. Gilbert, and Eske Willerslev, 2011. Pre-Clovis Mastodon Hunting 13,800 Years Ago at the Manis Site, Washington. *Science* 334(October):351–353.

Wessen, Gary C., 1988. *Prehistoric Cultural Resources of Island County*. Wessen & Associates, Seattle, Washington. Prepared for Washington State Department of Community Development.

Wray, Jacilee, 2016. Native Peoples of the Olympic Peninsula: Who We Are. *BC Studies* (190), 135–135.

Zenk, H., Y. Hajda, and R. Boyd, 2016. Chinookan villages of the Lower Columbia. *Oregon Historical Quarterly* 117(1), 6–37.