

Appendix H – Phase I, Cultural Resource Assessment

**Phase I Cultural Resources Assessment for
the Schultz-Hanford Area Transmission Line
Draft Environmental Impact Statement
Revision 3**

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Chapter 1 Introduction

The Department of Energy's Bonneville Power Administration (BPA) is proposing to build a new 500-kV transmission line between BPA's Schultz Substation, north of Ellensburg, Washington and a substation in the vicinity of the US Department of Energy Hanford Reservation, also in Washington. At present four different alternative routes are being considered for the new transmission line; three of the alternatives may utilize a route option (Segment B south) for a short portion of the proposed line. All four alternatives are addressed within the scope of this work. A new transmission line would allow BPA to increase transmission capacity in central Washington to relieve present and future congestion in its 500-kV transmission system.

The present study assesses the effects of the proposed alternatives on previously recorded cultural resources based only on the available literature; no new field assessments were conducted for the Cultural Resources section of this Draft Environmental Impact Statement. Cultural resources are those historic and archaeological properties, properties of traditional and cultural significance, sacred sites, Native American human remains and associated objects, and cultural landscapes which are entitled to special consideration under federal statute, regulations, and/or executive orders. Cultural resources located in the general area of the proposed project include, but are not limited to, prehistoric camps, lithic scatters, prehistoric stone tool quarries, historic homesteads, historic railroad sites, and traditional root gathering areas. There are no sacred sites recorded at this time in the proposed project area.

This assessment of potential impacts on cultural resources was limited to a literature search, compilation and assessment of records and reports of sites potentially impacted by the five alternatives, delineation of areas of high site probability which have not been surveyed, and a comparison of potential impacts to these sensitive areas for each proposed project alternative. Discussion of both generalized and site-specific impacts is included herein and general recommendations for mitigation of potential impacts are presented.

Chapter 2 Proposed Action and Alternatives

The Department of Energy's Bonneville Power Administration (BPA) is proposing to build a new 500-kV transmission line between BPA's Schultz Substation, north of Ellensburg, Washington and a substation in the vicinity of the US Department of Energy Hanford Reservation, also in Washington. A new line would allow BPA to increase transmission capacity in central Washington to relieve present and future congestion in its 500-kV transmission system.

2.1 Segment A - Schultz to Segment B

All four of the alternatives include the line location from the BPA Schultz Substation following the Schultz-Vantage 500-kV transmission line to a point ca. 8 km south of Interstate 90 at the intersection with proposed Segments B and C (Segment A; green line on map). For all but ten miles of its length, the centerline of this segment of the new line would be 1,200 feet to the north of the existing Schultz-Vantage line, with an additional 75 feet of right-of-way off of the new centerline; for a 10-mile segment in the vicinity of its crossing of Interstate 5, the offset will be 1,400 feet north of the existing line. A small revision of the initially proposed alignment of Segment A involves moving a ca. 3-mile segment to the west a short distance in the vicinity of Coleman Creek and Colockum Roads. Segment A data is included within the descriptions and assessments of the alternatives throughout the balance of this report.

2.2 Route Option for Segment B – Schultz to Vantage via PP&L (PacifiCorp) Line

This constitutes a modification of the originally proposed Segment B only and is not an alternative by itself. *Segment B north* is the originally proposed Segment B route from the end of Segment A south of Interstate 5 east, parallel to and 1,200 feet south of the Schultz-Vantage line, to the Vantage Substation. *Segment B south* initially runs further to the south following the Segment C route, and then heads east on the south side of the John Wayne Trail following an existing PP&L line. Just before the Columbia River, B south turns slightly to the north and crosses the Columbia River at the same location proposed for B north (pink line on the map).

2.3 Alternative 1 -- Schultz to Hanford parallel 500-kV

Alternative 1 includes Segments A, B, and E; both Segment B (B north which is the original Segment B, and B south which is the original Segment G) route options are available to this alternative. The Segment E route follows the Vantage-Hanford 500-kV transmission line from the Vantage Substation into the Hanford Substation (green line on map). The centerline of the new line would be 1200 feet to the north of the existing Vantage-Hanford line, with an additional 75 feet of right-of-way to the north of the new centerline.

2.4 Alternative 1A – Schultz to Hanford via Crab Creek route

Alternative 1A includes Segments A, B, and F; both Segment B route options are available to this

alternative. Segment F would run east from the Vantage substation creating a new right-of-way that would be 150 feet wide (thin orange line on map). The new line would then run south, turning and following the Vantage-Hanford line for a short length before turning east to intersect with the Grand Coulee-Hanford 500-kV transmission line. The centerline of the new line would run south to Hanford, 1200 feet to the east (with an additional 75 feet of right-of-way to the east) of the Grand Coulee-Hanford line.

2.5 Alternative 2 – Schultz to Blackrock via Midway Parallel 230-kV

Alternative 2 includes Segments A, B, and D; both Segment B route options are available to this alternative. The Segment D route would parallel or replace the existing Vantage-Midway 230-kV line (plum line on map). At this time it is undetermined whether the new line would parallel the Vantage-Midway line on the east or west side, so both sides will be assessed herein. An additional 150 feet of right-of-way would be needed. (If the 230-kV line were to be removed and the new line built in its place, the existing right-of-way would need to be increased from the current 100 feet to 150 feet.) South of the Midway Substation, the new line would parallel the existing Big Eddy - Midway line into a new substation to the south (blue line on map). The existing line has a right-of-way of 125 feet. The new line would be located on an additional right-of-way that would be 150 feet wide, either west or east of the existing line. Note: at this time, project planners are assuming a parallel build for this alternative with the centerline of the new transmission line 125 feet from the existing 230-kV line.

2.6 Alternative 3 -- Yakima Training Center route to Blackrock

Alternative 3 includes Segments A and C. This route alternative would start out like the others following the Schultz-Vantage line, but would not cross the Columbia River into Vantage. Instead the new line would turn south at the end of Segment A and create a new right-of-way on the west side of the Columbia River crossing south through the Yakima Training Center (orange line on map) and terminating at the new substation near Blackrock.

2.7 No Action Alternative

The no action alternative would continue operations with the existing transmission lines, with no increase in transmission capacity.

2.8 Agency Preferred Alternative

Bonneville Power Administration has selected Alternative 2 with the B south route option as the agency preferred alternative.

Chapter 3 Affected Environment

The project takes place in the Columbia Basin of Central Washington. Discussion of the affected environment includes the environmental setting, cultural setting, cultural resources types found in the project area, and previous work as it applies to analysis of the affected environment.

3.1 Environmental Setting

The Columbia Basin is characterized as an arid-to-semiarid steppe zone (Franklin and Dyrness 1973). This area is within the rain shadow of the Cascade Range, and receives an average of only 18 cm of precipitation each year, most falling as snow (Campbell 1984), making it the driest part of Washington State (Smith and Chatters 1986). The area's topography is dominated by numerous smaller drainages flowing through deeply entrenched, dissecting canyons, trending towards the Columbia River. These small drainages are fed to some extent by snowmelt and runoff, but springs and seeps provide most of their flow (Smith and Chatters 1986). The area becomes dryer over the summer months, and few streams provide year-round water. Temperatures typically range from -18 to greater than 32 degrees C (Campbell 1984; Franklin and Dyrness 1973). These extreme physical conditions present special challenges to vegetation, animals, and humans occupying the area.

An *Artemisia tridentata*-*Agropyron spicatum* (sagebrush/bluebunch wheatgrass) vegetation community characterizes the area (Daubenmire 1970) featuring xeriphytic fauna such as pronghorn, jackrabbits, and ground squirrels. A variety of edible plants in the project area include multiple species of camas, onion, bitterroot, mariposa and brodiaea lilies, balsamroot, chokecherry, hawthorn, elderberry, and serviceberry, all important Native American food resources; as well as willow, wild rose, grasses and sedges for non-food materials. Trees are for the most part limited to riparian areas.

While at first glance the area may seem barren and monotonous, microclimates present greater diversity. Xerophytic uplands contrast with riparian vegetation along streamsides. Smith and Chatters (1986:23-32) identify twelve modern steppe and aquatic habitats there. Gough (1998:3.1) notes that differences in elevation and aspect result in temperature differences of 2 to 4 degrees C within a single drainage, causing vegetation maturation (and hence harvest) to occur over a period of weeks within relatively close proximity.

Global climate change has resulted in a fluctuation of more arid and moist periods in this area (Table 3.1). More recently, changes in vegetation community have been increased by human activity. Because of historic overgrazing, vegetation densities have decreased, and the disturbance regime, surface erosion and stream channel incision have increased. Although the extent and nature of this change is poorly understood, palynological data suggest that local habitats may have changed significantly over the past 150 years (Mehring 1985). A contributing factor to this could be a lower ground water table at present than observed in the past (Gough 1998:3.2).

The Columbia Plateau is a plain constructed from the Columbia River Basalt Group. The Yakima fold belt within the Columbia Plateau is "comprised of basalt flows and sediments that have been folded under north-south compression forming east-west trending anticlinal ridges and synclinal valleys" (Gough 1998:3.3). This geological activity has resulted in greater relief here than much

Table 3.1
Sequence of Environmental Change in the Columbia Basin
 (from King and Putnam 1994:7)

<u>Period</u>	<u>Climate</u>	<u>Typical Flora and Fauna</u>
12,000 BP	Cold, dry	Sagebrush, grasses, Pleistocene fauna
10,000 BP	Warming, but great seasonal extremes	Grasses, abundant large ungulates
8,000 BP	Warming, drying	Sparse sagebrush, grasses, small mammals
4,500 BP	Moister, perhaps cooler	Grasslands, forests expand, large mammals become abundant
2,300 BP	Warming, drying, approaching modern conditions	Grasslands retreating, xeric-adapted mammals at low elevations
Present	Hot, arid	Sage, bunchgrass, xeric mammals predominate

of the Columbia Plateau. Anticline folding has increased the exposure of silicate lithic raw materials in this area; the Vantage region in particular is known for the abundance of petrified wood and other silicate rocks (collectively referred to herein as cryptocrystalline silicates), and includes several prehistoric, historic and modern quarry sites. For a more detailed discussion of the geological and geomorphic setting, the reader is referred to Gough (1998).

Hillslope soils are typically shallow and rocky, and those of the valley bottoms are deep, silty, and often gravelly (Gough 1998:3.3). The presence of a full complement of volcanic ash, including at least five identifiable episodes, has been a significant asset to archaeological dating, and provides the opportunity for more detailed development of our knowledge of the area's prehistory.

3.2 Cultural Setting

A brief discussion of traditional culture groups and culture history of this area is presented. For a more extensive overview of the area's cultural history, the reader is referred to King and Putnam (1994), Galm, Hartmann, Masten and Stephenson (1981) and Lince (1984). Holstine (1994) presents a well-organized and detailed historic overview, and Hollenbeck and Carter (1986) developed a prehistoric and ethnographic overview, both of the general area.

The following summary of this area's prehistoric cultural history follows the chronological sequence presented by Galm et al. (1981) and summarized by King and Putnam (1994:15-17):

Clovis Phase (11,500-10,500 BP): In eastern Washington, the Clovis Phase is characterized by small, highly mobile bands of hunter/gatherers that exploited a wide range of subsistence resources, including bison and elk (Rice and Stilson 1987). Clovis Phase sites are usually small, exhibit low artifact densities, and are associated with early landforms, especially upland plateaus. The Clovis artifact assemblage consists of lithic debitage, large scraping tools, cobble tools, and large lanceolate, Plano-type projectile points (Clovis points). Bone and antler artifacts are rare, perhaps due to differential preservation.

Windust Phase (10,500-8,000 BP): The Windust Phase is characterized by small, mobile bands of foragers/collectors that exploited plant and animal resources during a seasonal round (Chatters 1986). The few cultural deposits known from this phase are generally small and exhibit low artifact densities. Large shouldered and large basal-notched lanceolate projectile points are diagnostic of this phase.

Vantage Phase (8,000-4,500 BP): Vantage Phase peoples were highly mobile, opportunistic foragers adapted primarily to riverine environments (Chatters 1986; Galm et al. 1985). Archaeological data from this phase suggests that fish had become an important subsistence resource. Archaeological sites of the Vantage Phase are generally discovered along river and stream margins. Projectile points diagnostic of this phase include large, shouldered lanceolates and unstemmed lanceolate forms.

Frenchman Springs Phase (4,500-2,500 BP): The Frenchman Springs Phase is characterized by the introduction of semi-subterranean houses and the presence of specialized camps for hunting, root collecting, and plant processing. Archeologists have suggested that the ethnographic Plateau pattern emerged by the end of this phase (e.g., Nelson 1969). Several styles of smaller, contracting stemmed projectile points are diagnostic of this period.

Cayuse Phase (2,500-200 BP): During the Cayuse Phase, inhabitants of the Columbia Plateau wintered in large, nucleated villages of 50 pithouses or more (Chatters 1986). In the spring, people dispersed to gather roots, and in the fall and winter small parties established hunting camps in the uplands. This seasonal round became increasingly diverse and better organized over time, and trade with coastal groups was common. By about 200 years ago, the introduction of diseases reduced Native American populations and led to significant changes in the settlement and subsistence patterns of native Columbia Plateau groups (Campbell 1989). Projectile points diagnostic of the Cayuse Phase are generally much smaller than those of previous phases, and are either side-notched or corner-notched. These smaller points probably represent the appearance of bow and arrow technology.

The Historic Period began here with the visitation of Lewis and Clark to the confluence of the Snake and Columbia Rivers in 1805 en route to the Pacific (Thwaites 1959 vol. III:122-130). The Columbia, Kittitas, Wanapam, Wenatchee, and Yakama peoples lived in the vicinity of the project area at contact (Ray 1936) (Figure 3.1). These people were Sahaptan and Salish speakers, part of what would later be described as the Plateau culture. Their life was focused on an annual round anchored by specific times for gathering, hunting, fishing, and trading (Figure 3.2), but also for religious activities, visiting, courting, storytelling, dancing, and other such activities. Better ethnographic descriptions of Plateau groups are available in Mooney (1896), Ray (1936, 1939), Relander (1956) and Spier (1935).

A period of exploration and trapping followed, with early travelers such as Wilson P. Hunt of the Astor Company, David Thompson of the Northwest Company, Alexander Ross, Ross Cox, and many others arriving in this area between 1805 and 1815. The Hudson's Bay Company opened Fort Nez Perces in the 1820's, later called Old Fort Walla Walla in the 1830's. Many interesting

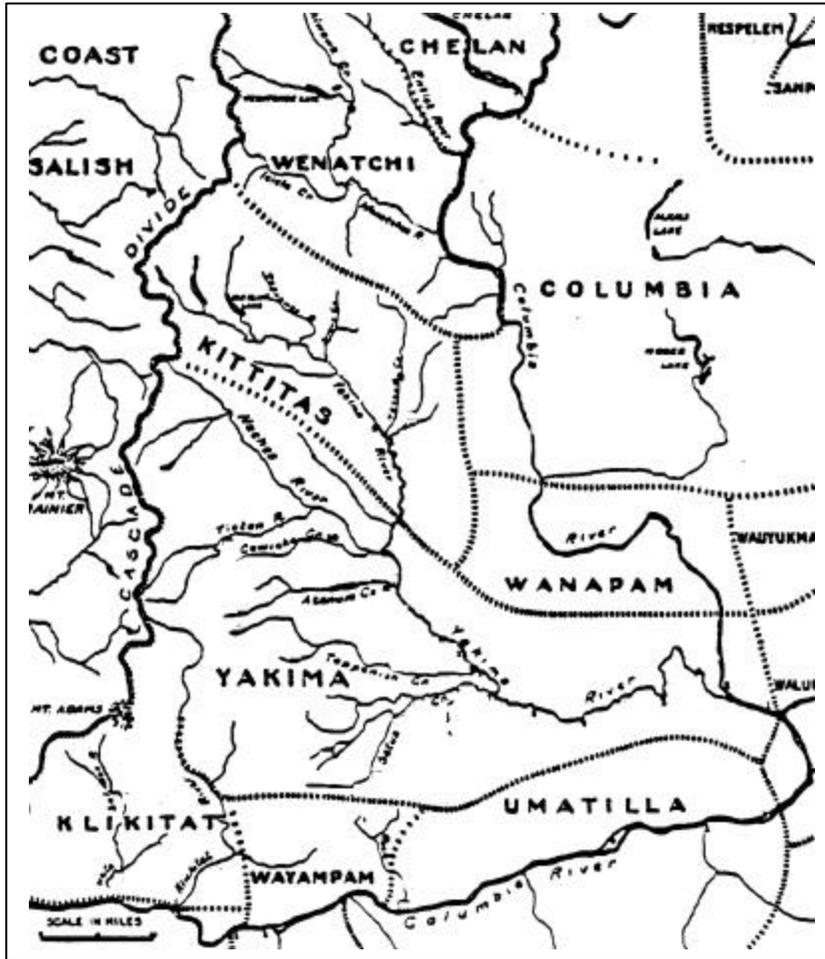


Figure 3.1 Tribes of the project area. After Ray (1936).

and informative historical accounts of this period are available, such as Franchere (1969), Glover (1962), Thwaites (1959), and Symons (1882).

Gold mining brought many Europeans, Euroamericans, and Chinese through the project area beginning around 1850, but it was ranching that kept them there. The area's grass provided sustenance for cattle and their owners alike (Splawn 1917). Transportation -- particularly river crossings -- provided the means for expansion. The Columbia River, the Caribou Trail, wagon roads, and later the railroads, all served to bring travelers and supplies to this area, providing residents with the opportunity to serve as merchants. Camels were even used for several years to bring gold mining supplies from this area to Idaho and Montana (Lewis 1928).

Horse ranching and fruit farming increased in the latter half of the last century, but it was not until more efficient irrigation systems were organized about the turn of the century that fruit farming really became a major activity in this region.

The world's first dual purpose nuclear reactor was built on the Hanford Reservation in 1963-1969 (Rice 1983). Some of the Hanford Reservation structures are now old enough to be considered historic sites.

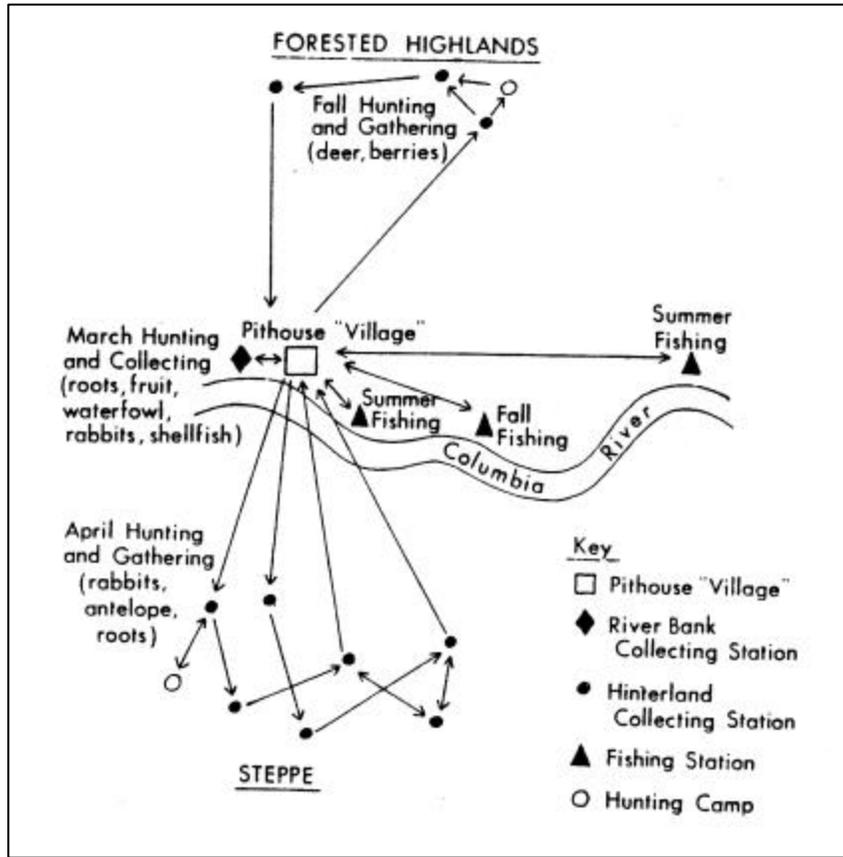


Figure 3.2 The annual round. After Dancey 1973.

3.3 Cultural Resource Types

Significant cultural resources are categorized as historic and archaeological properties, properties of traditional and cultural significance, sacred sites, and cultural landscapes, which are all recognized and protected under federal mandates.

Archaeological lithic scatters produced during stone tool manufacture or modification are the most common archaeological site type in the project area. Flaked tools and debitage are the overwhelmingly the most common cultural material present at these sites, although ground, pecked and battered stone tools also are found. Much of the flaked material is from local cryptocrystalline sources. Campsites, which include a number of material types and features and which represent longer-term use and multiple activities, make up the second most common site type. Other common archaeological site types include resource procurement and processing activities, such as quarries, butchering sites and root gathering areas. Field assessment in Phase II of the EIS process is likely to locate additional prehistoric sites of these kinds. The dominant tool form found in these archaeological sites are lithic flakes, although ground, pecked and battered stone tools as well as bone tools also are present.

Historic sites recorded in this area include historic homesteads, dumps, trails, railroad-related features and earthen structures. These sites include both historic structures and artifact scatters.

Other kinds of historic sites may be recorded with further survey, or as sites become old enough to be considered 'historic' (greater than fifty years old under NHPA).

Traditional cultural properties and sacred sites have not been surveyed in the project area. TCPs in the project area probably include traditional gathering areas. Sacred sites, which may also be traditional cultural properties, may include vision quest sites and other locations for traditional religious activities. Likewise, cultural landscapes have not been identified within the project area, but probably include both prehistoric and historic components, and both man-made and natural features.

3.4 Previous Work

Cultural resource investigations in the general area began with the work of Smith (1905) along the Yakima River valley in 1903. Krieger (1927) followed with a 1926 survey along the Columbia River. In the 1950's the Smithsonian Institution and Lee conducted surveys along the Columbia (e.g., Campbell 1950, Shiner 1951). Results of these surveys provided important contributions to our knowledge of prehistoric site locations but lacked the present day emphasis on interpreting past lifeways.

The following excerpt from King and Putnam (1994) presents a summary of more recent archaeological and historic investigations. Although focusing on the Yakima Training Center (YTC), it provides a clear focus on the trends and accomplishments pertinent to this study, particularly what areas have received the most scientific attention, and how the study of site prediction has developed in this area. A more exhaustive inventory of previous investigations throughout the project area is available in HRA (1999), King and Putnam (1994), Rice (1983), and Schalk (1986).

The first intensive archaeological investigation in the region began in the 1950s and 1960s with the large-scale excavation of deeply stratified sites along the Columbia River floodplain (e.g., [Campbell 1950; Kidd 1964;] Nelson 1969; Swanson 1962; Warren 1968). These early studies focused on resolving chronological issues and concentrated on explaining the emergence of the Plateau pattern using riverine data sets. Early interpretations of archaeological patterns characterize Columbia Plateau cultural development in terms of change from dependence on game resources to an increased reliance on fish and shellfish. In turn, this intensification of fishing techniques is said to have increased the size and number of pithouse villages. Nelson (1969) has argued that this increased dependence on fish resulted from the spread of a more efficient fishing technology from groups in the north.

More recent archaeological studies have focused on upland contexts, in part to provide a less biased, more complete database with which to address the emergence of the Plateau pattern (Benson et al. 1989; Chatters and Benson 1986; Dancey 1973; Hartmann and Lindeman 1979). These studies, which began with Dancey's work in the early 1970's, have resulted in informal predictive statements about the distribution of functional site types in the [Yakima Training Center] YTC.

Dancey's research addressed the development of the Plateau pattern by characterizing functional and geomorphological variability in upland settings in the Hanson, Cottonwood, and No Name Creek drainages. To describe this variability, Dancey implemented a use-wear-based functional analysis of 18 upland surface assemblages and 8 assemblages from Columbia River contexts. The results of his study suggest that functional differences in assemblage content correlate with microenvironments (Dancey 1973:94-111).

Dancey's study identified several site types that he correlates with site categories known from the ethnographic period. Winter village settlements are located on, or directly adjacent to, the Columbia River floodplain. Specialized camps occur at the heads of coulees in proximity to a variety of subsistence resources. Resource acquisition locations occur within coulee bottoms, on upland flats, and along the floodplain. Dancey concluded that this pattern persisted with little or no change during the last 3,000 years (1973:126).

As a result of the inventory of Hanson, Cottonwood, and No Name Creek drainages, Hartmann and Lindeman (1979) proposed an alternative site typology based on the work of Binford and Binford (1966) that distinguishes among base camps, transient camps, and work sites. Their results suggest that base camps occur at the heads of tributary drainages and transient camps occur along major drainages. In contrast, they found that work sites occur in a wide range of environmental settings.

Along similar lines, Chatters and Benson (1986) defined five functional site types as a result of test excavations at 10 sites along Hanson, Cottonwood, and No-Name Creeks: base camps; field or residence camps; locations or stations; lithic reduction stations; and quarries. Several years later, Benson et al. (1989) modified the Chatters and Benson (1986) typology to describe the distribution of functional variability within the proposed YTC expansion area, a 63,000-acre parcel between the Saddle Mountains and Interstate 90. Their modified typology includes five aboriginal site types: camps, quarries, lithic reduction sites, locations, and rock features (Benson et al. 1989:5:2-3).

The results of the Benson et al. (1989) survey suggest that primary winter residence camps occur on the Columbia River floodplain and field camps (centers of food gathering and domestic activity) occur along upland drainages. Their work found that camps tend to be located at relatively low elevations in flat areas or on gentle slopes. Locations, on the other hand, tend to occur in close proximity to specific resources, usually on gentle slopes at slightly higher elevations than camps. In contrast, they found that quarries and lithic reduction sites, which have no direct analogue in Dancey's work, generally occur in steep upland areas away from water sources.

The various typologies used to describe YTC archaeological deposits have played an important role in efforts to model the distribution of cultural resources at the facility. To date, modeling efforts have focused to one degree or another on describing the antiquity and development of settlement and subsistence patterns observed by ethnographers at the time of sustained Euroamerican contact (c.f. Chatters 1986). Dancey's (1973) suggestion that the Plateau pattern has an antiquity of roughly 3,000 years has driven much of this research. As a

consequence, archaeologists continue to compress functional variability into typologies derived largely from ethnographic settlement pattern data.

The majority of cultural resource work in the project area has been conducted on the Yakima Training Center. More recent work includes survey and testing of archaeological sites in the Selah Creek drainage during 1992-1993 (King and Putnam 1994), archaeological and historic inventory in 1996 (Boreson 1998), and excavation and evaluation of sites in the Johnson Creek Drainage the next year (Gough 1998). These works resulted in evaluation of more than five sites eligible for inclusion in the National Register of Historic Places, and provided much needed detail and more refined dating that is possible with contemporary archaeological methods. An overview of this work was completed last year (HRA 1999).

Outside of the YTC area, other important areal surveys have been completed for the Hanford area (1968, 1969, 1983), Chatters (1980) in Grant County north of the Hanford area, and Schalk (1982) along the Columbia. Other important works include Bicchieri (1993), Chatters (1986), Galm, Hartmann, Masten and Stephenson (1981), Hartmann (1980), Hartmann, Landis and Morgan (1982), Jackson and Hartmann (1977), Rice and Chavez (1980), Rice (1983), and Stratton and Lindeman (1978).

Much of the rest of the archaeological work has been project specific. One such project that encompassed an unusually large area was Eastern Washington University's Archaeological and Historical Services survey along Puget Sound Power and Light's Wanapum-Hyak electrical transmission line in 1990 (DePuydt 1990) covering a large portion of Johnson Canyon. Most have been smaller projects with reports confined to gray literature (e.g., Cook and Moura (1996), Hartmann (1977), Hartmann and Galm (1976), Hunter (1992), Jackson (1996), Masten and Galm (1985), Randolph (1980), Rice (1973, 1976, 1980), and Smith, Uebelacker, Eckert and Nickel (1976)), but when considered together comprise a large body of data.

In summary, archaeological and historical investigations and management in the project area has included archaeological and historical survey, testing and evaluation, largely focused within the YTC, the Hanford Reservation area, and along the Columbia River corridor. Outside of these areas, little work has been done toward systematic survey and/or evaluation of archaeological and historic sites. Throughout the project area, including the YTC and Hanford area, there has been virtually no survey or identification of traditional cultural properties or cultural landscapes.

Chapter 4 Environmental Consequences

Significant cultural resources are protected under a number of state and Federal mandates, and consideration of project effects on significant cultural resources is required. Pertinent Federal mandates are listed in Table 4.1.

Table 4.1
Federal Cultural Resource Mandates¹

Federal Statutes

Abandoned Shipwreck Act of 1987 43 USC 2101-2106
American Indian Religious Freedom Act of 1978, as amended 42 USC 1996-1996a
Antiquities Act of 1906 16 USC 431-433; 34 Stat. 225
Archeological and Historic Preservation Act of 1974 16 USC 469-469c
Archeological Resources Protection Act of 1979 16 USC 470aa-470ll
Historic Sites Act of 1935 16 USC 461-467
National Environmental Policy Act 42 USC 4321-4370c
National Historic Preservation Act of 1966, as amended 16 USC 470-470w
Native American Graves Protection and Repatriation Act of 1990 25 USC 3001-3013

Federal Regulations

Advisory Council on Historic Preservation, Protection of Historic and Cultural Properties, 36 CFR 800
Council on Environmental Quality, Regulations Implementing the National Environmental Policy Act, 40 CFR 1500-1508
Department of Defense, Protection of Archeological Resources, 32 CFR 229
Department of the Interior, Protection of Archeological Resources, 43 CFR 7
Department of the Interior, Native American Graves Protection and Repatriation Act, 43 CFR 10
Department of the Interior, Curation of Federally-owned and Administered Archeological Collections, 36 CFR 79
Department of the Interior, Determinations of Eligibility for Inclusion in the National Register of Historic Places, 36 CFR 63
Department of the Interior, National Historic Landmark Program, 36 CFR 65
Department of the Interior, National Register of Historic Places, 36 CFR 60
Department of the Interior, Preservation of American Antiquities, 43 CFR 3
Department of the Interior, Supplemental Regulations [per ARPA], 43 CFR 7.2

Executive Orders and Presidential Memoranda

EO 13007 Indian Sacred Sites
EO 11593 Protection and Enhancement of the Cultural Environment
White House Memorandum for the Heads of Executive Departments and Agencies, dated April 29, 1994: Government-to-Government Relations with Native American Tribal Governments

¹ Historic preservation law also includes a considerable body of case law, which is not discussed in this report.

4.1 General Impacts of Action Alternatives

Generally, any ground disturbing activity within the boundaries of any significant cultural resource is destructive, resulting in permanent, irreversible and irretrievable loss of scientific information and/or cultural value.

Non-ground disturbing activities, such as cutting vegetation and road easements, may or may not have negative impacts on cultural resources depending on the type of resource involved and the proximity of the activity to the resource.

4.1.1 Easements for Right-of-Way

Easements for right-of-way potentially affect cultural resources by changing access and use. In general, grants of easement for the project may increase access and use by the public of area that previously were restricted or difficult to access. Increased access and use may have negative impacts on traditional cultural properties and sacred sites by interfering with the natural auditory and view sheds. Increased access may contribute to an increase in the rate of vandalism and disturbance to archaeological and historic sites.

4.1.2 Clearing of Vegetation

Clearing of vegetation may include ground disturbing and/or non-ground disturbing activities. As stated before, ground disturbing activity within the boundaries of significant cultural resources is destructive, resulting in permanent, irreversible damage. Non-ground disturbing vegetation clearing may result in damage to cultural resources through compaction of cultural deposits within archaeological sites and historic sites.

Clearing vegetation, with or without ground disturbance, affects most types of traditional cultural properties (TCP). Natural vegetation is an integral part of many TCPs, such as traditional gathering areas, and may be relevant to some sacred sites as well. Clearing vegetation in a traditional gathering area or within the viewshed of a vision quest site is likely to have a negative effect on these resources.

Natural and modified vegetation often are a critical component of cultural landscapes as well. Clearing or cutting vegetation in these areas will have some impact on these resources, although the nature and extent of the effect is dependent on the specific resource.

4.1.3 Grading and Backfilling

Grading and backfilling, including but not limited to preparation of construction sites and staging areas, materials delivery, road and structure construction, site restoration and clean-up, and on-going project maintenance, is a ground disturbing activity resulting in permanent, irreversible damage to archaeological and historic sites. Traditional cultural properties and cultural landscapes also may be negatively affected, although the nature and extent of such effects are dependent on the specific resource, and may vary from some restorable or replaceable negative effect to permanent damage. The source locations of materials used in backfilling and road construction would need field assessments as well as the proposed transmission line locations.

4.1.4 Use of Heavy Equipment

In addition to the impact caused by ground disturbing activities, compaction caused by heavy machinery can cause destruction of archaeological and historic sites and traditional cultural properties. Damage caused by compaction to archaeological sites and historic sites, TCP's, and cultural landscapes is likely to be irreversible.

Use of heavy equipment will also cause auditory and visual disturbance to some TCP's and sacred sites. Permanent disturbance to auditory and visual factors may represent permanent, irreversible damage to some TCPs. In addition, continued use of heavy equipment near a sacred site such as a vision quest site would make the site unusable for contemporary Native American practitioners.

4.1.5. Reseeding

Reseeding will in most cases have little affect on archaeological and historic sites depending on the methods used. Reseeding may impact TCPs and cultural landscape by changing the existing vegetation stands or communities. (See comments under Section 4.1.2.)

4.1.6 Construction of Structures

Construction of structures is a ground disturbing activity that may result in permanent, irreversible damage to archaeological and historic sites, and also may threaten burials. Construction of structures at the location of TCPs and cultural landscapes may have negative effects on these resources.

Construction within the viewshed of TCPs and cultural landscapes also may have negative effects. Such effects would include a temporary negative effect by increased auditory and visual disturbance during construction activities, but also may include permanent auditory and visual disturbances. This could include a disruption of the natural view and artificial noise caused by transmission towers and lines. The nature and extent of these effects are dependent on the specific resource as well as the nature and proximity of the structure, and may vary from some restorable or replaceable negative effects to permanent damage.

4.1.7 Conductors, Overhead Ground Wires and Insulators

The presence of conductors, overhead ground wires, and insulators probably would have little to no direct effect on archaeological and historical sites, although long-term effects of such exposure to specific data types encapsulated in archaeological deposits or artifacts (e.g., base and botanical materials' and residues' chemical integrity) has not been explored. Visual effects may impact TCP's and cultural landscapes; such effects are dependent on the nature and proximity of the resource, and may vary from some modifiable effect to permanent and irreplaceable damage.

4.1.8 Access Roads

Access road repair, improvement, and construction may affect cultural resources through ground

disturbance, compaction, changes in access or use, or changes in auditory and/or visual setting. These effects are discussed in Sections 4.1.1 and 4.1.6.

4.1.9. On-going Operations, Maintenance and Other Project Activities

On-going operations, maintenance and other project activities may impact cultural resources. The nature and extent of such impacts are dependent on the type and proximity of the resource and the specific activity involved, and may vary from insignificant effects to permanent, irreversible damage. Discussion of potential impacts in the previous sections, however, illustrates the nature and extent of potential impacts that would occur during ongoing activities. In addition, ongoing activities will have greater cumulative damage to those cultural resources that have contemporary use by Native Americans, by changes in access, use, and auditory and visual setting for these resources.

4.2 Site-Specific Impacts

Impacts and appropriate mitigation measures vary with the specifics of individual resources, therefore consideration of alternatives must include consideration of site-specific impacts. Because much needed site-specific information is lacking until completion of the field assessment and analysis, the following analysis is necessarily limited to anticipated potential impacts to currently recorded sites and unsurveyed areas with a high probability for occurrence of significant cultural resources. These areas, collectively referred to as 'sensitive areas', *potentially* may be impacted by project activities. They have been prioritized as high (with known significant and sensitive materials), moderate (with potentially significant and sensitive materials), and low priority (with potentially significant but less sensitive materials). Note that even low priority sensitive areas contain materials protected under Federal law, they are just lower priority relative to the moderate and high priority areas. Field investigation will be required in order to verify these anticipated site-specific impacts. The following presents a summary of anticipated site-specific impacts based on best available knowledge.

Table A1 in the appendix presents a listing of the sites in or near to the alternatives described in Chapter 2. Segment A sites (n=22) would be impacted by all four alternatives. The proposed realignment of a portion of Segment A in the vicinity of Coleman Creek Road will not affect any recorded cultural resources not already accounted for in Table A1. Because of the proximity of portions of the two Segment B route options, seven sites that potentially would be impacted by the use of the Segment B north route also may be impacted by the B south route option. Segment B north may impact 52 recorded sites that would not be impacted by the use of Segment B south. Conversely, just six sites may be impacted by the use of the B south route option that would not be impacted if the B north route were used; however, the B south option route has not had the same degree of field assessment as the B north route.

4.2.1 Alternative 1

The recorded sites and specific sensitive area segments in or near to the route of Alternative 1 are detailed in Tables A1 and A2, respectively, in the appendix. Ninety-three previously recorded sites are within or near to the Alternative 1 route. The location of sensitive areas, including the recorded sites as well as unsurveyed areas with a high potential for occurrence of significant

cultural resources, in or adjacent to the Alternative 1 corridors are shown in Figure 4.1. Under Alternative 1 (B north), 36 sensitive areas are potentially affected. Based on a 0.4 km (~1300') wide corridor, Alternative 1 (B north) would potentially impact 19.2 km² of sensitive areas, including 3.5 km² high priority areas, 7.5 km² moderate priority areas, and 8.2 km² of lower priority areas. Under Alternative 1 (B south), 38 sensitive areas are potentially affected. Based on a 0.4 km (~1300') wide corridor, Alternative 1 (B south) would potentially impact 19.9 km² of sensitive areas, including 3.1 km² high priority areas, 8.3 km² moderate priority areas, and 8.5 km² of lower priority areas.

4.2.2 Alternative 1A

Alternative 1A represents a variation on Alternative 1 in reaching the Hanford Substation. Ninety-three previously recorded sites could be affected by the Alternative 1A route, most are the same as could be impacted under Alternative 1. Under Alternative 1A (B north), 38 sensitive areas are potentially affected. Based on a 0.4 km (~1300') wide corridor, Alternative 1A (B north) would potentially impact 20.2 km² of sensitive areas, including 2.5 km² high priority areas, 7.5 km² moderate priority areas, and 10.2 km² of lower priority areas. Under Alternative 1A (B south), 40 sensitive areas are potentially affected. Based on a 0.4 km (~1300') wide corridor, Alternative 1A (B south) would potentially impact 20.9 km² of sensitive areas, including 2.1 km² high priority areas, 8.3 km² moderate priority areas, and 10.5 km² of lower priority areas. The location of sensitive areas for this alternative are shown in Figure 4.1.

4.2.3 Alternative 2

Ninety-one cultural resources sites have been recorded in or adjacent to the Alternative 2 route. Under Alternative 2 (B north), 34 sensitive areas are potentially affected. Based on a 0.4 km (~1300') wide corridor, Alternative 2 (B north) would potentially impact 17.8 km² of sensitive areas, including 2.5 km² high priority areas, 6.1 km² moderate priority areas, and 9.2 km² of lower priority areas. Under Alternative 2 (B south), 36 sensitive areas are potentially affected amounting to an total area of 18.5 km². This includes 2.1 km² high priority areas, 6.9 km² moderate priority areas, and 9.5 km² of lower priority areas. The location of sensitive areas for this alternative are shown in Figure 4.1.

4.2.4 Alternative 3

Fifty-five previously recorded sites occur within or near to the Alternative 3 route which has only a single route option. Thirty-eight sensitive areas are potentially affected by this alternative; the location of these sensitive areas, which include the previously recorded sites as well as unsurveyed areas with a high potential for occurrence of significant cultural resources, are shown in Figure 4.1. Based on a 0.4 km (~1300') wide corridor, Alternative 3 would potentially impact 20.7 km² of sensitive areas, including no high priority areas, 7.5 km² of moderate priority areas, and 13.2 km² of low priority areas.

4.2.5 No Action Alternative

The No Action Alternative includes no ground-disturbing or clearing activities in addition to continued operations, maintenance and other project activities addressed in Section 4.1.9. While these project activities for the existing lines have and continue to impact cultural resources, the No Action Alternative, versus other alternatives, includes no new or additional impacts, and hence represents the alternative with the least specific impacts to cultural resources.

4.2.6 Comparison of Alternatives

For the purposes of comparison, a summary of sensitive areas affected by each alternative is presented in Table 4.2.

Table 4.2
Summary of Sensitive Areas by Alternative

<u>Alternative</u>	<u># Areas</u>	<u>Total Area</u>	<u>High Priority</u>	<u>Mid Priority</u>	<u>Lower Priority</u>
Alternative 1-Bn	36	19.2 km ²	3.5 km ²	7.5 km ²	8.2 km ²
Alternative 1-Bs	38	19.9 km ²	3.1 km ²	8.3 km ²	8.5 km ²
Alternative 1A-Bn	38	20.2 km ²	2.5 km ²	7.5 km ²	10.2 km ²
Alternative 1A-Bs	40	20.9 km ²	2.1 km ²	8.3 km ²	10.5 km ²
Alternative 2-Bn	34	17.8 km ²	2.5 km ²	6.1 km ²	9.2 km ²
Alternative 2-Bs	36	18.5 km ²	2.1 km ²	6.9 km ²	9.5 km ²
Alternative 3	38	20.7 km ²	0 km ²	7.5 km ²	13.2 km ²
No Action Alternative	No new or additional areas				

When considered as an entire route, the route alternatives with *least* impact to sensitive areas are:

- 1) Alternative 2-B north option route (Schultz-Vantage-Midway-Blackrock)
- 2) Alternative 2-B south option route (Schultz-PP&L line-Vantage-Midway-Blackrock).

The alternative routes with highest potential for impact to sensitive areas are:

For total area affected:

- 1) Alternative 1A-B south option route (Schultz-PP&L line-Vantage-Grand Coulee line-Hanford)
- 2) Alternative 3 (Schultz-YTC-Blackrock)

For high priority areas affected:

- 1) Alternative 1-B north option route (Schultz-Vantage-direct to Hanford)
- 2) Alternative 1-B south option route (Schultz-PP&L line-Vantage-direct to Hanford)

For total number of sensitive areas affected:

- Alternative 1A-B south option route (Schultz-PP&L line-Vantage-Grand Coulee line-Hanford)

Of these three factors, total area and high priority areas are critical considerations; total number of sensitive areas is less important.

While this comparison allows some discussion of the relative magnitude of potential effects of each of the proposed alternatives, the reader should bear in mind that sensitive areas indicate the presence of potentially affected resources that should be avoided, or when unavoidable, mitigated. Although some resources inevitably will be affected by the chosen alternative, most of the potentially affected resources will be avoidable with due consideration. This summary allows general comparison of relative level of effort to avoid and/or otherwise mitigate significant resources. This summary does *not* replace the need for field investigation to verify the number and extent of cultural properties, to assess the impact of the chosen alternative or to develop specific mitigation measures.

4.3 Mitigation Measures

The mitigation measures for adverse effects to cultural resources presented here are, by necessity, general in nature as field identification and assessment of resources has not yet taken place. Mitigation measures are discussed in terms of resource types.

4.3.1 General

Mitigation planning begins with consultation with the Washington State Historic Preservation Officer (SHPO) through the Office of Archaeology and Historic Preservation (OAHP), affected Native American tribes, local governments, and the public concerning recorded cultural resources, and impacts to and management of these resources. Consultation is required for compliance with Sections 106 and 110 of the National Historic Preservation Act (NHPA), the Archeological Resources Protection Act (ARPA), the Native American Graves Protection and Repatriation Act (NAGPRA), the National Environmental Protection Act (NEPA) and Executive Order 13007. Agency officials must consider comments received during consultation. Information gained during consultation should be incorporated in mitigation planning and actions.

In general, the best means of mitigating effects to significant cultural resources is protection in place. Impacts to significant cultural resources can be greatly reduced simply by avoiding contact with the resource. Avoidance is, of course, not a replacement for protection measures in cases of deteriorating conditions, but avoidance of impact by project construction, operation and maintenance activities should be standard practice whenever feasible.

A plan of action for cases of inadvertent discovery of cultural resources, particularly subsurface resources, should be prepared during planning. If cultural resources are discovered in the course of project activities, work in the immediate area should cease and the area be secured until appropriate actions have taken place. In such cases, the SHPO and affected tribes should be notified immediately and a professional archaeologist that meets the Secretary of Interior's Qualifications Standards examine the site and make recommendations to decision-makers for a course of action. During work in areas of higher probability of encountering subsurface materials, a professional may monitor ground disturbing activities. In any case, the plan of action should outline the process of avoiding irreversible damage to undiscovered resources and the process for dealing with such discoveries. This is especially critical in cases affecting Native American burials. The procedure for Native American burial inadvertent discovery is addressed

by NAGPRA and State Regulations (see Section 4.3.3 below). Project field personnel should be trained in their role in the process before field work begins.

Finally, it is imperative that confidential information be protected. Confidential information includes information about the location and nature of cultural resources that may be endangered by looting, vandalism, or other negative impacts by the public. Confidential information may also include specific information about the use or practices associated with traditional cultural properties and sacred sites. Protection of confidential information for the protection of significant cultural resources is required under ARPA.

4.3.2 Archaeological and Historic Sites

Identification and evaluation of archaeological and historic sites is required for compliance with Sections 106 and 110 of NHPA. When a preferred alternative has been selected, the project proponent should conduct an intensive cultural resources survey of potential impact areas, evaluate potentially significant sites, and complete National Register of Historic Places Determination of Eligibility forms. Recommendations should then be made on impact avoidance and/or site treatment where appropriate.

When avoidance of significant archaeological and historic resources is not possible, data recovery excavation, or some other appropriate method of mitigating the negative effects determined through consultation with affected parties, should be conducted. Data recovery efforts require ARPA or State excavation permits, depending on land ownership, and must precede project activities in those areas. Data recovery excavations are always permanent and destructive, so avoidance is the preferred alternative. Archaeological sites are tested and/or excavated by professional archaeologists who, when in a supervisory capacity, must meet the Secretary of Interior's Qualifications Standards. Historic structures and landscapes should be recorded by professionals that also meet the Secretary of Interior's Qualifications Standards. Moving structures removes them from their historic context and should be avoided, but may be used in cases of unavoidable destruction of their original site.

4.3.3 Native American Graves

Native American graves are protected under NAGPRA as well as Washington State law (which provides protection for all burials and grave sites, not just those of Native Americans). Native American graves and associated materials should be protected in place whenever possible. Destruction of Native American graves is not an alternative.

In addition to previously recorded burial sites in the project area, additional burial sites may be identified during the field assessment and site treatment phases of work for this EIS. It is strongly recommended that agencies consult with affected tribes and the Washington SHPO to develop an agreement that would establish a plan of action in the event of an inadvertent discovery of Native American graves *before* beginning any ground-disturbing activities.

4.3.4 Traditional Cultural Properties and Sacred Sites

Traditional cultural properties (TCP) vary widely in type and use; hence potential effects and appropriate mitigation may vary widely. Because there has been no inventory of traditional cultural properties in the project area, it is impossible to address specific mitigation needs. However, TCP's in the project area probably include traditional gathering areas. Other types of TCP's, such as traditional meeting places or trails, may be identified during consultation or the Phase II field assessment. Mitigation of effects to such properties must be determined through consultation with the affected tribe(s) and can vary based on the resource's materials, setting, impacts, and traditional uses. As examples of types of mitigation, vision quest sites and traditional gathering areas are discussed on a general level.

Sacred sites, such as vision quest sites, may be affected by any non-traditional human activity in the auditory and view shed of the site. If project activities take place within such areas, attempts should be made to limit the amount of time spent in this area, and visual and auditory impacts should be limited and masked as much as possible. For example, appropriate native vegetation may be planted between an access road and a vision quest site to mask visual and auditory disturbances.

Traditional gathering areas may be affected by construction, or by the introduction of non-native vegetation. A camas gathering area, for example, may be ruined by the introduction of invasive non-native plants. Construction effects to gathering areas may in part be offset by reduction of non-native plants, and protection, enhancement or expansion of other gathering areas.

The first step in mitigating effects to TCPs is to identify the nature and extent of TCPs, identify impacts, and recommend appropriate mitigation. Much of this needs to be determined through consultation with the affected tribe(s) that may interview tribal elders or traditional practitioners likely to use or have used resources within the project area.

Vision quest sites and other sacred sites associated with elevated landforms will probably receive relatively greater impact than other site types; it is therefore important that mitigation for impacts to these resources receive prompt attention. Any mitigation of effects to traditional cultural properties must be planned in consultation with the appropriate Native American tribes.

4.3.5 Cultural Landscapes

Like traditional cultural properties, cultural landscapes have received little attention in this area. When a preferred alternative has been identified, an inventory of cultural landscapes potentially affected by the project should be completed by a landscape architect or other appropriate professional. Appropriate mitigation actions will depend on the nature and proximity of such resources but may include avoidance, revegetation with similar plant types, or data recovery.

Chapter 5 Study Methods

This Phase I assessment of potential impacts on cultural resources began with a literature and archival search at the Washington State Office of Archaeology and Historic Preservation. This intensive search included a review of maps, site records, and pertinent reports stored there. A search of library and archival materials at the University of Washington, especially in the Special Collections of the Pacific Northwest department, located a significant amount of material related to this report. Finally, pertinent national databases, such as the National Park Service's National Archeological Database (Maps and Reports), the National Register of Historic Places, and the National NAGPRA Consultation Database also were searched. While this search was intensive, it was not exhaustive and the limited scope and timeline for this assessment did not allow in-depth review of the materials located.

A list of recorded sites in or near each alternative's corridor was created. The distribution of recorded sites is heavily biased by the amount of archaeological survey that has taken place; some portions of the project area have received much more coverage, and hence have many more sites recorded than others. Those areas that have been the subject of Federal projects, such as along the Columbia River and within the Yakima Training Center, have received the lion's share of work; their high site densities reflect more the level of scrutiny than a real difference in cultural resource distribution. In addition, some resource types -- particularly traditional cultural properties, sacred sites, and cultural landscapes -- have received little or no attention throughout the project area.

This study attempted to correct these biases by inclusion of areas which have not been surveyed but which hold a high potential for cultural resources based on landform association with recorded sites. This method is obviously not perfect, but better correction requires both field sampling and a more in-depth settlement pattern analysis than can be covered in the scope of the current study. Archaeological site density is highest in proximity to springs, stream heads and confluences (Gough 1998; King and Putnam 1984; Smith and Chatters 1986). Vision quest sites, root gathering areas, and quarries are more likely to take place at higher elevations, especially ridgelines and other bedrock exposures. Those portions of the project area that have not been subject to intense survey which fell in proximity to springs, stream heads and confluences, as well as prominent ridgelines, were identified as sensitive areas.

The location of sensitive areas was then plotted and included in the assessment of impacts. In order to protect resources from looting or other negative impacts, exact locations are masked. Areas containing several resources in close proximity were grouped together, and smaller sites were randomly offset. All sensitive areas were made into circles, as site shapes often indicate their landform location. These sensitive areas indicate the location of *potential* negative impacts by project activities to cultural resources.

Priority was assigned based on site significance and sensitivity of materials. Higher priority sites contain highly significant or potentially highly significant materials such as, but not limited to, archaeological sites with multiple components and/or material types, and/or highly sensitive materials such as sacred sites, and TCP's. Moderate priority sites have potentially significant materials, but of a less sensitive or unknown but likely less sensitive nature, as compared to higher priority sites. Examples of moderate priority areas would be an historic railroad site or some quarry sites. Sites with potentially significant but less sensitive materials such as a small lithic scatter, small historic dump, or a single cairn, were given lower priority. Note that low priority areas, especially when considered as a whole, contain important materials protected under

Federal law; they are just lower priority relative to the moderate and higher priority areas. Where a number of low priority sites were tightly clustered and potentially would qualify for nomination to the National Register of Historic Places as an archaeological district, their area was assigned a higher priority than if they had been considered separately. Field investigation will be required in order to assess more site-specific impacts more accurately.

References

- Benson, J.R., J.V. Jermann and D.E. Lewarch. 1989. Cultural Resources Inventory of the Proposed Yakima Firing Center Expansion Area, East Central Washington. Prepared for U.S. Army Corp of Engineers, Seattle District, Seattle. URS Consultants, Inc., Sacramento.
- Bicchieri, B. 1993. Archaeological Survey in the Kittitas Valley: A Report to the Bureau of Land Management, 14 June 1993. Central Washington Archaeological Survey. Central Washington University, Ellensburg.
- Bittinger, C.R. and J.N. Benson. 1982. CWU Anthropology Dept. Site Records. Central Washington University.
- Boreson, K., ed. 1998. Evaluation of Cultural Resources in Construction Impact Areas, Yakima Training Center Expansion Area, Kittitas County, Washington. Technical Report prepared for the U.S. Army Corps of Engineers, Seattle District. Eastern Washington University Reports in Archaeology and History 100-88. Archaeological and Historical Services, Cheney.
- Campbell, J.M. 1950. Report of an Archaeological Survey: Priest Rapids Reservoir, State of Washington. Manuscript on file, National Park Service, Seattle.
- Campbell, N.P. 1984. Geology of the Yakima Area. Revised edition. Department of Geology, Yakima Valley College, Yakima.
- Chatters, J.C. 1979. Survey and Evaluation of Cultural Resources Along Crab Creek and Dry Coulee, Grant County, Washington. Office of Public Archaeology Reconnaissance Report (22). University of Washington, Seattle, Washington.
- Chatters, J.C. 1986. A Deductive Approach. In Archaeological Predictive Modeling: The Yakima Firing Center (Part II), by W.C. Smith and J.C. Chatters. Prepared for the U.S. Army, Fort Lewis, Washington. Central Washington University, Central Washington Archaeological Survey, Geographic Information Systems Laboratory, Ellensburg.
- Chatters, J.C. and J.R. Benson. 1986. Test Excavation and Evaluation of Ten Prehistoric Archaeological Sites in the Multi-Purpose Range Complex, Yakima Firing Center, Washington. Prepared for the U.S. Army Corp of Engineers, Seattle District. Central Washington University Archaeological Survey, Ellensburg.
- Cochran, B.D. 1978. Late Quaternary Stratigraphy and Chronology in Johnson Canyon, Central Washington. Unpublished thesis for M.A. Washington State University Department of Anthropology, Pullman.
- Cook, J. and G. Moura. 1996. Installation Cultural Resource Inventory Forms. Camas Consulting. On file at the Washington State Office of Archaeology and Historic Preservation.
- Dancey, W. S. 1973. Prehistoric Land Use and Settlement Patterns in the Priest Rapids Area, Washington. Unpublished Ph.D. dissertation, University of Washington Department of Anthropology, Seattle.
- Daubenmire, R. 1970. Steppe Vegetation of Washington. Washington Agricultural Experimental Station Technical Bulletin 62.
- Davis, W.V. 1984. Field Notes of 1984 Spring Survey Class. Unpublished. Central Washington Archaeological Survey. Ellensburg.
- DePuydt, R. 1990. A Cultural Resources Survey Along Puget Sound Power and Light's Proposed Upgrade of the Wanapum-Hyak Electrical Transmission Line. Archaeological and Historic Services, Eastern Washington University, Cheney.
- Franchere, G. 1969. Journal of a Voyage on the North West Coast of North America During the Years 1811, 1812, 1813, and 1814. W. Kaye Lamb, ed. Champlain Society, Toronto.

- Franklin, J.F., and C.T. Dyrness. 1973. Natural Vegetation of Oregon and Washington. USDA Forest Service Technical Report PNW-8. U.S. Government Printing Office, Washington, D.C.
- Fryxell, R., and R.D. Dougherty. 1963. Late Glacial and Post-glacial Geological and Archaeological Chronology of the Columbia Plateau, Washington. An interim report to the National Science Foundation, 1962-1963. Washington State University Laboratory of Anthropology Report of Investigations No. 23.
- Galm, J.R. and G.D. Hartmann. 1975. Archaeological Reconnaissance of the Saddle Mountains, Washington. Submitted to the Bureau of Land Management, Spokane. Eastern Washington University, Cheney.
- Galm, J.R. and G.D. Hartmann. 1976. An Archeological of Yakima and Johnson Canyons in South-Central Washington. Submitted to Bureau of Land Management, Spokane.
- Galm, J.R., G.D. Hartmann, R.A. Masten, and G.O. Stephenson. 1981. A Cultural Resources Overview of Bonneville Power Administration's Mid-Columbia Project, Central Washington. Eastern Washington University Reports in Archaeology and History, pp. 100-116. Cheney.
- Gough, Stan, editor. 1998. Yakima Training Center Expansion Area Archaeology: Investigations in the Johnson Creek Drainage Basin, Kittitas County, Washington. Technical Report prepared for the U.S. Army Corps of Engineers, Seattle District. Eastern Washington University Reports in Archaeology and History 100-93. Archaeological and Historical Services, Cheney.
- Greengo, R. 1962. Studies in Prehistory Priest Rapids and Wanapum Reservoir Areas Columbia River Washington. National Park Service. San Francisco.
- Hartmann, G.D. 1977. Archaeological Reconnaissance of the Proposed Rattlesnake Hills Land Exchange. Glenn D. Hartmann. Submitted to BLM, Spokane District, Spokane, WA.
- Hartmann, G.D. 1980. Cultural Resources Reconnaissance and Testing on the Yakima Firing Center, Yakima and Kittitas Counties, Washington, Phase II Final Report. Central Washington Archaeological Survey, Central WA. U. Submitted to COE, Seattle District, Seattle, WA.
- Hartmann, G.D. and J.R. Galm. 1976. Archaeological Reconnaissance of the Vantage and Columbia River Oil and Gas Lease Areas in Central Washington. Report submitted to the Bureau of Land Management.
- Hartmann, G.D., D. G. Landis, and V. Morgan, eds. 1982. Archaeological Evaluation of 15 Prehistoric Sites in the Priest Rapids Reservoir Area Grant, Kittitas, and Yakima Counties, Washington. Eastern Washington University Reports in Archaeology and History (100-23).Cheney, WA, Eastern Washington University.
- Hartmann, G.D. and G.W. Lindeman. 1979. Cultural Resources Survey and Testing on the Yakima Firing Center, Yakima and Kittitas Counties, Washington, Phase I, Final Report. Prepared for the U.S. Army Corps of Engineers, Seattle District. Washington State University Washington Archaeological Center, Pullman.
- Hartmann, G.D. and G.O. Stephenson. 1980. Cultural Resources Reconnaissance and Testing on the Yakima Firing Center, Yakima and Kittitas Counties, Washington, Phase II, Final Report. Prepared for the U.S. Army Corps of Engineers, Seattle District. Washington State University Washington Archaeological Center, Pullman.
- Historical Research Associates (HRA). 1999. Yakima Training Center Cultural Resource Inventory. Seattle.
- Historical Research Associates and Dames & Moore (HRA/D&M). 1996. Cultural and Archaeological Inventory. Dames and Moore Group Company, Seattle.
- Hollenbeck, J.L. and S.L. Carter. 1986. A Cultural Resources Overview: Prehistory and Ethnography, Wenatchee National Forest. U.S. Department of Agriculture Forest Service, Wenatchee National Forest.

- Holstine, C., ed. 1994. An Historical Overview of the Wenatchee National Forest Washington. Eastern Washington University Reports in Archaeology and History 100-80. Archaeological and Historical Services, Cheney.
- Hunter, D.L. 1992. BLM Survey Report 139020191. Bureau of Land Management, Spokane.
- Jackson, B. 1996. Second Report on cultural Resources Survey for Road Upgrade Mitigation, Phase I, Memorandum for Record, 13 May 1996. Yakima Training Center.
- Jackson, B. 1997 and 2000. State of Washington Archaeological Site Inventory Form and Installation Cultural Resource Inventory Form. On file at the Washington State Office of Archaeology and Historic Preservation, Olympia.
- Kidd, R.S. 1964. Ginkgo Petrified Forest Archaeological Project Report on Survey and Excavation Conducted in 1961. Manuscript on file, Washington State Parks and Recreation Commission, Seattle.
- King, J. Scott, and David Putnam. 1994. The Results of Archaeological Investigations in the Middle Selah Creek Drainage, Yakima Training Center, Yakima County, Washington. Prepared for the U.S. Army Corps of Engineers. HRA#134CIS. Historical Research Associates, Inc., Seattle.
- Korber, Z. 1997. State of Washington Archaeological Site Inventory Forms. On file at the Washington State Office of Archaeology and Historic Preservation, Olympia.
- Krieger, H.W. 1927. Archeological Excavations in the Columbia River Valley. Smithsonian Institution, Miscellaneous Collections 78(7):187-200. Washington, D.C.
- Larson Anthropological/Archaeological Services. 1996 and 1998. State of Washington Archaeological Site Forms and Installation Cultural Resources Inventory Addendums. On file at the Washington State Office of Archaeology and Historic Preservation, Olympia.
- Lince, R.S. 1984. The Selah Story: History of the Selah, East Selah and Wenas Valley in Yakima County, Washington. Selah Valley Optimist Printing.
- Masten, R.A. and J.R. Galm. 1985. Final Report of Cultural Resources Investigations Along Arco's Seismic Exploration Lines in the Saddle Mountains, Central Washington. Archaeological and Historical Services Short Report (SR-86).Cheney, WA, Eastern Washington University.
- Mooney, J. 1896. The Ghost-Dance Religion and the Sioux Outbreak of 1890. Smithsonian Institution, Bureau of Ethnology, 14th Annual Report, Part 2, 1892-1893. Washington, D.C.
- Munsell, D. and J. Maas. 1966. University of Washington Archaeological Field Forms Site Survey Forms. On file at the Washington State Office of Archaeology and Historic Preservation.
- Nelson, C.M. 1969. The Sunset Creek Site (45KT28) and its Place in Plateau Prehistory. Washington State University Laboratory of Anthropology Report of Investigations 47. Pullman.
- Northwest Archaeological Associates, Inc. n.d. Draft Report -- NRHP Testing of Upland Lithic Procurement and Quarry Sites.
- Randolph, J.E. 1980. Archeological Assessment for Benton County Unit Resource Analysis Step 3. U.S. Department of the Interior, Bureau of Land Management, Spokane.
- Relander, C. 1956. Drummers and Dreamers. Caston Printers, Caldwell, Idaho.
- Rice, D.G. 1973. Letter Report: Archaeological/Historical Reconnaissance on the Wahluke Slope in Grant CO., Washington. David G. Rice. Submitted to United Engineers and Constructors, Inc., Philadelphia, PA.
- Rice, D.G. 1980. Overview of Cultural Resources on the Hanford Reservation in South Central Washington State. Submitted to Richland Operations, U.S. Department of Energy.
- Rice, D.G. 1983. Cultural Resources at Hanford. Submitted to U.S. Department of Energy.

- Rice, D.G. and M. Chavez. 1980. Inventory of Known Cultural Resources for the Hanford Reach of the Columbia River and Adjacent Areas. Report submitted to the U.S. Army Corps of Engineers, Seattle District.
- Rice, D.G., L.V. Salo, J.C. Chatters, D.A. Munsell, J. Maas. 1991. Seattle District, U.S. Army Corps of Engineers Cultural Resources Site Survey Records. On file at the Washington State Office of Archaeology and Historic Preservation, Olympia.
- Rice, H.S., D.H. Stratton, and G.W. Lindeman. 1978. An Archeological and Historic Survey of the 400 Area, Hanford Reservation. Submitted to the U.S. Department of Energy.
- Schalk, Randall F., ed. 1982. Archaeological Survey of the Priest Rapids Reservoir: 1981. Laboratory of Archaeology and History Project Report (12). Washington State University, Pullman, Washington.
- Sender, M.K. 1981. Report of Archaeological Reconnaissance of Portions of the Yakima Firing Center. Wapora, Inc., Berwyn, Pennsylvania.
- Shiner, J. 1951. An Appraisal of the Archeological Resources of the Priest Rapids Reservoir on the Columbia River, Washington. Columbia Basin Project, Smithsonian River Basin Surveys, Eugene.
- Smith, W.C., and J.C. Chatters. 1986. Archaeological Predictive Modeling: The Yakima Firing Center. Central Washington University, Ellensburg.
- Smith, W.C., M. Uebelacker, T. Eckert, and L. Nickel. 1976. An Archaeological-Historical Survey of the Proposed Power Line Corridor from Ashe Substation, Washington, to Pebble Springs Substation, Oregon. Washington Archeological Research Center Project Reports, No. 42. Pullman.
- Spier, L. 1935. The Prophet Dance of the Northwest and Its Derivatives: The Source of the Ghost Dance. General Series in Anthropology, No. 1. George Banta Publishing Company, Menasa, Wisconsin.
- Splawn, A.J. 1917. Ka-mi-akin: Last Hero of the Yakimas. Kilham Stationery and Printing Company, Portland.
- Stone and Shong. 1996. Installation Cultural Resource Inventory Forms. Camas Consulting.
- Symons, T.W. 1882. Report of an Examination of the Upper Columbia River and the Territory in its Vicinity in September and October, 1881, to Determine its Navigability and Adaptability to Steamboat Transportation. 47th Congress, 1st Session. Senate Executive Documents No. 186. Washington, D.C.
- Thompson, J. 1989. BLM Survey Report 130880071. Bureau of Land Management, Spokane.
- Thwaites, R.G., ed. 1959. Original Journals of the Lewis and Clark Expedition 1804-1806. Antiquarian Press, New York.
- Swanson, E.H. 1962. The Emergence of Plateau Culture. Occasional Papers of the Idaho State College Museum No. 8. Moscow.
- Walker, S. 1993. Seattle District, U.S. Army Corps of Engineers Cultural Resources Site Survey Record, Site No. 45KT988. On file at the Washington State Office of Archaeology and Historic Preservation, Olympia.
- Warren, C.N. 1968. The View from Wenas: A Study in Plateau Prehistory. Occasional Papers of Idaho State University Museum No. 24. Moscow.

Glossary/Acronyms

Advisory Council on Historic Preservation (ACHP) - The Council was established by Title II of the National Historic Preservation Act to advise the President and Congress, to encourage private and public interest in historic preservation, and to comment on Federal Agency actions under Section 106 of the National Historic Preservation Act.

Antiquities Act of 1906 - Provides for the protection of historic and prehistoric ruins and objects of antiquity on Federal lands, and authorizes scientific investigation of antiquities on Federal lands, subject to permits and other regulatory requirements.

American Indian Religious Freedom Act (AIRFA) - States that the policy of the United States is to protect and preserve for American Indians their inherent rights of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians. These rights include, but are not limited to, access to sites, use and possession of sacred objects, and the freedom to worship through ceremony and traditional rites.

Archaeological Resources Protection Act (ARPA) of 1979 - Prohibits the removal, sale, receipt, and interstate transportation of archeological resources obtained illegally (without permits) from public or Indian lands and authorizes Federal agency permit procedures for investigations of archeological resources on public lands under the Federal agency's control.

Archaeological Site - Any material of human life or activities that are at least 100 years of age, and which is of archaeological interest (32 CFR 229.3(a)).

Confidential Information - Confidential information is information which, if released, would potentially endanger significant cultural properties, or their significant qualities. Generally, specific site locations are considered confidential, and will not be released except if such a disclosure is determined to be in the best interest of cultural resource preservation and protection, under an approved Cultural Resource Permit. Confidential information concerning Native American resources will not be divulged without the explicit permission of the affected tribe. Security of confidential information is mandated by the National Historic Preservation Act, and the Archaeological Resources Protection Act.

Consultation - Consultation is "the process of seeking, discussing, and considering the views of other participants, and, where feasible, seeking agreement with them. Consultation is built upon the exchange of ideas, not simply the provision of information. In order to fulfill consultation requirements, the Federal agency should: (1) Make its interests and constraints clear from the beginning; (2) Make clear any rules, processes, or schedules applicable to consultation; (3) Acknowledge others' interests as legitimate, and seek to understand them; (4) Develop and consider a full range of options; and (5) Try to identify solutions that will leave all parties satisfied. On-going relationships always make consultation a more successful and satisfying endeavor. Consultation with Tribes must be performed on a government-to-government basis.

Cultural Items - As defined by NAGPRA, human remains and associated funerary objects, unassociated funerary objects (at one time associated with human remains as part of a death rite or ceremony, but no longer in possession or control of the federal Agency or museum), sacred objects (ceremonial objects needed by traditional Native American religious leaders for practicing traditional Native American religions), or objects of cultural patrimony (having ongoing historical, traditional, or cultural importance central to a Native American group, rather than

property owned by an individual Native American, and which, therefore, cannot be alienated, appropriated, or conveyed by any individual of the group).

Cultural Patrimony - The Native American Graves Protection and Repatriation Act (NAGPRA) defines objects of cultural patrimony as “an object having ongoing historical, traditional, or cultural importance central to the Native American group or culture itself, rather than property owned by an individual Native American, and which, therefore, cannot be alienated, appropriated, or conveyed by any individual . . . and such object shall have been considered inalienable by such Native American group at the time the object was separated from such group.”

Cultural Resource - This term refers to those historic and archaeological properties, properties of traditional and cultural significance, sacred sites, Native American human remains and associated objects, and cultural landscapes which are entitled to special consideration under federal statute.

Executive Order (EO) 11593 - Directs Federal agencies to provide leadership in preserving, restoring, and maintaining the historic and cultural environment of the Nation; to ensure the preservation of historic properties; to locate, inventory, and nominate to the National Register all properties under their control that meet the criteria for nomination; and to ensure that historic properties are not inadvertently damaged, destroyed, or transferred before the completion of inventories and evaluation for the National Register. The intent of EO 11593 have been integrated into the NHPA Section 110 through the 1980 amendments to that statute.

Executive Order 13007 on Indian Sacred Sites - Directs Federal agencies to consider Indian sacred sites in planning Agency activities.

Historic Contexts - A historic context is an organizational format that groups information about related historic properties, based on a theme, geographic limits and chronological period. A single historic context describes one or more aspects of the historic development of an area, for example, Coal Mining in Northeastern Pennsylvania between 1860 and 1930. A set of historic context is a comprehensive summary of all aspects of the history of the area.

Historic Property or Historic Resource - As defined by the NHPA, is any prehistoric or historic Tribe, site, building, structure, or object included in, or eligible for inclusion in, the National Register. The term includes artifacts, records, and remains that are related to and located in such properties. The term includes properties of traditional religious and cultural importance (traditional cultural properties) which are eligible for the National Register because of their association with the cultural practices or beliefs of an Indian Tribe or Native Hawaiian organization. The term “eligible for inclusion in the National Register” includes both properties formally determined as such by the Secretary of the Interior and all other properties that meet National Register listing criteria.

Memorandum of 29 April 1994 on Government to Government Relations with American Indian Tribal Governments - Directs Federal agencies to conduct their relationship with Federally recognized Indian Tribes on a government to government basis.

Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 - (P.L. 101-601), requires Federal agencies to establish procedures for identifying Native American groups associated with cultural items on Federal lands, to inventory human remains and associated funerary objects in Federal possession, and to return such items upon request to the affiliated

groups. The law also requires that any discoveries of cultural items covered by the Act shall be reported to the head of the Federal entity who shall notify the appropriate Native American Tribe or organization and cease activity in the area of the discovery for 30 days.

National Environmental Policy Act of 1969 (NEPA) - (Public Law 91-190; 42 USC 4321-4347) states that the policy of the Federal government is to preserve important historic, cultural, and natural aspects of our national heritage and requires consideration of environmental concerns during project planning and execution. This act requires Federal agencies to prepare an Environmental Impact Statement (EIS) for every major Federal action that affects the quality of the human environment, including both natural and historic properties. It is implemented by regulation issued by the Council on Environmental Quality (40 CFR Parts 1500-08) that are incorporated into AR 200-2, Environmental Effects of Agency Actions.

National Historic Landmark (NHL) - This is a special category of historic property designated by the Secretary of the Interior because of its national importance in American history, architecture, archeology, engineering, or culture. Section 800.10 of the Council's regulations (36 CFR 800) and Section 110(f) of the NHPA specify some special protections for NHL's.

National Historic Preservation Act (NHPA) of 1966 - [as amended (Public Law 89-665; 16 USC 470-470w-6)] establishes historic preservation as a national policy and defines it as the protection, rehabilitation, restoration, and reconstruction of Tribes, sites, buildings, structures, and objects significant in American history, architecture, archeology, or engineering.

National Register of Historic Places (National Register) - A nationwide listing of sites, buildings, structures, and objects of national, state, or local significance in American history, architecture, archeology, or culture that is maintained by the Secretary of the Interior, NPS.

Sacred Objects - Sacred objects are defined in the Native American Graves Protection and Repatriation Act (NAGPRA) as "specific ceremonial objects which are needed by traditional Native American religious leaders for the practice of traditional Native American religions by their present day adherent." The CCT of Indians includes sacred objects as a subgroup of Objects of Cultural Patrimony.

Section 106 - Under the National Historic Preservation Act, Section 106 requires Federal agencies to take into account the affects of undertakings on historic properties listed, or those eligible for listing on the National Register and afford the ACHP an opportunity to comment on such undertakings. Section 106 requirements are implemented by regulations (36 CFR 800) issued by the ACHP.

Section 110 - Under the National Historic Preservation Act, Section 110 outlines overall Agency responsibilities with respect to historic properties.

Section 111 - Under the National Historic Preservation Act, Section 111 addresses leases and exchanges of historic properties. It allows the proceeds of any lease to be retained by the Federal agency for use in defraying the costs of administration, maintenance, repair, and related expenses of historic properties.

Section 402 - Under the National Historic Preservation Act, Section 402 describes Federal Agency responsibilities for historic properties in other nations and requires the head of the Federal Agency to take into account the effect of an undertaking on property which is on the

World Heritage List or on the applicable country's equivalent of the National Register to avoid or mitigate any adverse effect.

State Historic Preservation Office (SHPO) - Under the NHPA, the SHPO has been designated in each state to administer the state historic preservation program, including but not limited to review of Section 106 activities and National Register nominations.

Tribal Historic Preservation Office (THPO) - Under the NHPA, federally-recognized Native American Tribes may assume SHPO responsibilities for lands within the external boundaries of their Reservation and dependent Indian communities. The THPO may assume some or all of the SHPO responsibilities.

Undertaking - As defined by NHPA is a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal Agency, including those carried out or on behalf of the Federal agency; those carried out with Federal financial assistance; those requiring a Federal permit, license, or approval; and those subject to State or local regulation administered pursuant to a delegation or approval by a Federal Agency. If a proposed activity or action is determined to be an undertaking, Section 106 compliance and the procedures in 36 CFR 800 must be followed.

World Heritage List - A list developed by the World Heritage Committee containing properties forming part of the cultural heritage and natural heritage which the committee considers as having outstanding universal value based on different criteria. The list shall be updated every two years.

Appendix

Data Tables

Table A1. Recorded Site References

Table A2. Areas of Cultural Resources Sensitivity

Table A1. Recorded Site References

ALTERN.	SEGM.*	NUMBER	SITE TYPE	REFERENCES
1, 1A, 2, 3	A	45KT0095	camp	Highways 1966
1, 1A, 2, 3	A	45KT0096	camp	Highways 1966
1, 1A, 2, 3	A	45KT0301	camp, burials, historic	Bittinger and Benson 1982
1, 1A, 2, 3	A	45KT0600	lithic	Yakima Tng Ctr 1986
1, 1A, 2, 3	A	45KT0601	homestead, lithic	Yakima Tng Ctr 1986
1, 1A, 2, 3	A	45KT0602	homestead, lithic	Yakima Tng Ctr 1986
1, 1A, 2, 3	A	45KT0603	historic	Yakima Tng Ctr 1986
1, 1A, 2, 3	A	45KT0626	lithic	Yakima Tng Ctr 1986
1, 1A, 2, 3	A	45KT0664	lithic	Yakima Tng Ctr 1986
1, 1A, 2, 3	A	45KT0665	lithic	Yakima Tng Ctr 1986
1, 1A, 2, 3	A	45KT0974	?	?
1, 1A, 2, 3	A	45KT0984	lithic	Holstine et al. 1994
1, 1A, 2, 3	A	45KT1290	lithic	Boreson 1994; LAAS 1996
1, 1A, 2, 3	A	45KT1294	lithic	Boreson 1994; LAAS 1996
1, 1A, 2, 3	A	45KT1301	lithic	Boreson 1994; LAAS 1996
1, 1A, 2, 3	A	45KT1314	lithic	Boreson 1994; LAAS 1996
1, 1A, 2, 3	A	45KT1382	lithic, historic	HRA/D&M 1996
1, 1A, 2, 3	A	45KT1496	cairns, lithic	Bicchieri 1993
1, 1A, 2, 3	A	45KT1506	isolate (lithic)	Bicchieri 1993
1, 1A, 2, 3	A	45KT1507	lithic	Bicchieri 1993
1, 1A, 2, 3	A	45KT1508	isolate (lithic)	Bicchieri 1993
1, 1A, 2, 3	A	45KT1509	isolate (lithic)	Bicchieri 1993
1, 1A, 2	B	45GR0418H	mining, lithic	Schalk 1982
1, 1A, 2	B	45GR0435H	historic homestead and lithic	Schalk 1982
1, 1A, 2	B	45GR0672	cairns, lithic, historic	HRA/D&M 1996
1, 1A, 2	B	45KT0007	camp	Campbell 1950
1, 1A, 2	B	45KT0036	quarry	Greengo 1962
1, 1A, 2	B	45KT0211	lithics	Galm and Hartmann 1975
1, 1A, 2	B	45KT0212	lithics	Galm and Hartmann 1975
1, 1A, 2	B	45KT0315	?	Cochran 1978
1, 1A, 2	B	45KT0629	lithic, quarry	Boreson 1998; Luttrell and Stolp 1989; Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0630	lithic, quarry	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0631	lithic, quarry	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0632	lithic, quarry	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0633	lithic, quarry	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0649	lithic, quarry	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0659	lithic	Yakima Tng Ctr 1986

ALTERN.	SEGM.*	NUMBER	SITE TYPE	REFERENCES
1, 1A, 2	B	45KT0660	lithic	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0662	lithic	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0663	lithic	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0701	historic	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0703	historic; lithic; pit	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0712	historic	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0713	lithic	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0721	lithic	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0722	lithic, faunal	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0726	lithic	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0727	lithic, quarry	Yakima Tng Ctr 1986
1, 1A, 2	B	45KT0825	historic pit	DePuydt 1990
1, 1A, 2	B	45KT0848	lithic, cairn	DePuydt 1990
1, 1A, 2	B	45KT0849	?	DePuydt 1990
1, 1A, 2	B	45KT0850	lithic	DePuydt 1990
1, 1A, 2	B	45KT0853	cairns	DePuydt 1990
1, 1A, 2	B	45KT0856	historic	DePuydt 1990
1, 1A, 2	B	45KT0992	lithic	Holstine et al. 1994
1, 1A, 2	B	45KT1296	lithic	LAAS 1996
1, 1A, 2	B	45KT1297	lithic	LAAS 1996
1, 1A, 2	B	45KT1298	quarry	Boreson 1994; LAAS 1996
1, 1A, 2	B	45KT1303	lithic	Boreson 1994; LAAS 1996
1, 1A, 2	B	45KT1304	lithic	Boreson 1994; LAAS 1996
1, 1A, 2	B	45KT1305	lithic	LAAS 1996
1, 1A, 2	B	45KT1306	lithic	Boreson 1994; LAAS 1996
1, 1A, 2	B	45KT1307	lithic	Boreson 1994; LAAS 1996
1, 1A, 2	B	45KT1308	lithic	LAAS 1996
1, 1A, 2	B	45KT1309	lithic, quarry	Boreson 1994; LAAS 1996; NWAA n.d.
1, 1A, 2	B	45KT1317	lithic	LAAS 1996
1, 1A, 2	B	45KT1318	lithic	LAAS 1996
1, 1A, 2	B	45KT1319	lithic, cairn, poss. trail, tcp?	LAAS 1996
1, 1A, 2	B	45KT1320	lithic	Boreson 1994; LAAS 1996; Lohse 1985
1, 1A, 2	B	45KT1321	lithic	LAAS 1996
1, 1A, 2	B	45KT1334	lithic	LAAS 1996
1, 1A, 2	B	45KT1341	lithic	Boreson 1994; LAAS 1996
1, 1A, 2	B	45KT1728	lithic	DePuydt 1990
1, 1A, 2	B	45KT1730	lithic	Jackson 1996, 2000
1, 1A, 2	B, G	45GR0058	burial	Campbell 1950
1, 1A, 2	B, G	45KT0037	cave	Greengo 1962
1, 1A, 2	B, G	45KT0213	possible religious marker	Galm and Hartmann 1975
1, 1A, 2	B, G	45KT0214	camp	Galm and Hartmann 1975
1, 1A, 2	B, G	45KT0577	cairn	Davis 1984

ALTERN.	SEGM.*	NUMBER	SITE TYPE	REFERENCES
1, 1A, 2	B, G	45KT0854	lithic	DePuydt 1990
1, 1A, 2	B, G	45KT1727	lithic; historic forge	DePuydt 1990; Nelson 1969
3	C	45BN0243	cairn, lithic	Hartmann 1972
3	C	45KT0328	?	?
3	C	45KT0332	?	?
3	C	45KT0391	lithic	Dancey 1973; Moura and Cook 1996
3	C	45KT0392	lithic	Dancey 1973; Moura and Cook 1996
3	C	45KT0890	workshop	Cook and Moura 1996; Rice et al. 1991
3	C	45KT0894	quarry	Chatters and Zweifel 1987; Cook and Moura 1996; Rice et al. 1991
3	C	45KT0899	quarry	Rice et al. 1991; Cook and Moura 1996
3	C	45KT0907	lithic	Rice et al. 1991; Cook and Moura 1996
3	C	45KT0922	quarry	King and Putnam 1994; Stone and Shong 1996
3	C	45KT0923	quarry	King and Putnam 1994; Stone and Shong 1996
3	C	45KT0924	lithic	King and Putnam 1994; NWAA n.d.; Stone and Shong 1996
3	C	45KT0925	quarry	King and Putnam 1994; Stone and Shong 1996
3	C	45KT0927	lithic	King and Putnam 1994; Stone and Shong 1996
3	C	45KT0938	lithic	King and Putnam 1994; Stone and Shong 1996
3	C	45KT1329	lithic	LAAS 1996
3	C	45KT1342	lithic	1985
3	C	45KT1343	lithic	LAAS 1996
3	C	45KT1344	lithic	LAAS 1996
3	C	45KT1345	lithic, possible tcp	LAAS 1996
3	C	45KT1346	lithic	Boreson 1994; LAAS 1996
3	C	45KT1353	lithic	Jackson 1997; NWAA n.d.
3	C	45YA0187	lithic	Cook and Moura 1996; Hartmann and Lindeman 1979
3	C	45YA0328	lithic	Cook and Moura 1996; Hartmann 1980; Sender 1981
3	C	45YA0332	lithic	Cook and Moura 1996; Sender 1981
3	C	45YA0630	lithic	LAAS 1996; Sender 1981
3	C	45YA0655	lithic	HRA 1999
3	C	45YA0656	lithic	HRA 1999
1, 1A, 2, 3	C, G	45KT0225	camp	Galm and Hartman 1976

ALTERN.	SEGM.*	NUMBER	SITE TYPE	REFERENCES
1, 1A, 2, 3	C, G	45KT0705	lithic	Regan/Stolp (AHS) 1990; Yakima Tng Ctr 1986
1, 1A, 2, 3	C, G	45KT0723	cairn	Yakima Tng Ctr 1986
1, 1A, 2, 3	C, G	45KT0724	lithic	Yakima Tng Ctr 1986
1, 1A, 2, 3	C, G	45KT0824	historic, RR, lithic	DePuydt 1990
2	D	45BN0544	?	?
	D	45BN0546	?	?
2	D	45GR0151	?	?
2	D	45GR0152	?	?
2	D	45GR0427	lithic	Schalk 1982
1	E	45GR0051	camp	Campbell 1950
1	E	45GR0155	lithic	Galm and Hartmann 1975; Schalk 1982
1	E	45GR0353H	historic homestead	Chatters 1979
1	E	45GR0365	lithic	Chatters 1979
1	E	45GR0428	lithic, faunal	Schalk 1982
1, 1A	E,F	45GR0451	quarry, lithic	Masten and Galm 1985
1A	F	45GR0436	lithic	Schalk 1982
1A	F	45GR0457	lithic, quarry, camp	Masten and Galm 1985
1A	F	45GR0469	lithic	Masten and Galm 1985
1A	F	45GR0633	cairns, lithic	Thompson 1989
1A	F	45GR0645	cairn	Hunter 1992
1, 1A, 2	G	45KT0988	lithic, quarry	Walker 1993

*These are the handwritten segment designations on the 11 x 14 map. They indicate:

Segment A = Schultz to SE corner of Boylston quad.

Segment B=SE corner of Boylston quad to Vantage (now B north option route)

Segment C= SE corner of Boylston quad to Blackrock

Segment D=Vantage thru Midway to Blackrock

Segment E=Vantage direct to Hanford.

Segment F=Vantage through Wahatis Peak, then south to Hanford

Segment G=SE corner of Boylston south to PP&L line then east joining Segment B over river
(now B south option route)

Table A2. Areas of Cultural Resources Sensitivity

NAME	SEGMENT*	ALTERN.	ZONE	UTME	UTMN	RADIUS(km)	PRIORITY	AREA (km ²)
AN	A	1, 1A, 2, 3	10	715016	5199444	0.3	3	0.282743339
AM	A	1, 1A, 2, 3	10	712300	5201300	0.5	2	0.785398163
AL	A	1, 1A, 2, 3	10	710900	5202750	0.3	2	0.282743339
AK	A	1, 1A, 2, 3	10	711400	5202900	0.4	2	0.502654825
AJ	A	1, 1A, 2, 3	10	711040	5203570	0.3	3	0.282743339
AI	A	1, 1A, 2, 3	10	705500	5210500	0.3	3	0.282743339
AH	A	1, 1A, 2, 3	10	704300	5211700	0.5	3	0.785398163
AG	A	1, 1A, 2, 3	10	703500	5212600	0.3	3	0.282743339
AF	A	1, 1A, 2, 3	10	702000	5214000	0.5	3	0.785398163
AE	A	1, 1A, 2, 3	10	701100	5215300	0.5	3	0.785398163
AD	A	1, 1A, 2, 3	10	699400	5216750	0.5	3	0.785398163
AC	A	1, 1A, 2, 3	10	698100	5218000	1.0	3	3.141592654
AB	A	1, 1A, 2, 3	10	694800	5220000	0.3	3	0.282743339
AA	A	1, 1A, 2, 3	10	693200	5221000	0.3	3	0.282743339
A1	A	1, 1A, 2, 3	10	691000	5222350	1.0	2	3.141592654
AW	B	1, 1A, 2	10	727120	5194540	1.0	3	3.141592654
BK	B	1, 1A, 2	11	272500	5195000	0.5	1	0.785398163
AT	B	1, 1A, 2	10	724800	5195210	0.5	2	0.785398163
AV	B	1, 1A, 2	10	724000	5194600	0.4	3	0.502654825
AS	B,C,G	1, 1A, 2, 3	10	720220	5195950	0.5	2	0.785398163
AR	B,C,G	1, 1A, 2, 3	10	722100	5196000	0.4	3	0.502654825
AQ	B,C,G	1, 1A, 2, 3	10	719000	5196500	0.5	2	0.785398163
AP	B,C,G	1, 1A, 2, 3	10	718100	5196900	0.8	3	2.010619298
AO	B,C,G	1, 1A, 2, 3	10	717060	5197800	1.0	3	3.141592654
BM	B,G	1, 1A, 2	11	272090	5193800	0.3	2	0.282743339
BL	B,G	1, 1A, 2	11	274000	5194000	1.3	1	5.309291585
BJ	B,G	1, 1A, 2	11	275200	5195200	0.3	1	0.282743339
CK	C	3	11	279800	5158800	0.3	3	0.282743339
CJ	C	3	11	278000	5160750	1.0	3	3.141592654
CI	C	3	11	275950	5162250	1.0	3	3.141592654
BI	C	3	11	273401	5163842	0.4	3	0.502654825
CG	C	3	11	273700	5167000	1.0	3	3.141592654
CE	C	3	11	271300	5169150	0.7	2	1.5393804
BH	C	3	10	726050	5176000	1.0	3	3.141592654
BG	C	3	10	725400	5178600	0.5	3	0.785398163
BF	C	3	10	724200	5178900	1.0	3	3.141592654
BE	C	3	10	724200	5180800	1.0	3	3.141592654
BD	C	3	10	723600	5182500	0.5	3	0.785398163
BC	C	3	10	723000	5184600	0.3	2	0.282743339
BB	C	3	10	722155	5185350	0.6	2	1.130973355
BA	C	3	10	721744	5187844	0.3	3	0.282743339

NAME	SEGMENT*	ALTERN.	ZONE	UTME	UTMN	RADIUS(km)	PRIORITY	AREA (km ²)
AZ	C	3	10	721700	5189000	1.0	3	3.141592654
AY	C	3	10	721220	5189500	0.4	2	0.502654825
AX	C,G	1, 1A, 2, 3	10	719860	5194500	0.5	2	0.785398163
AU	C,G	1, 1A, 2, 3	10	720500	5194800	0.5	3	0.785398163
CM	D	2	11	281600	5156700	0.7	3	1.5393804
CL	D	2	11	282900	5157700	0.4	3	0.502654825
CH	D	2	11	286700	5165700	0.7	3	1.5393804
CF	D	2	11	287200	5167200	1.0	1	3.141592654
BY	D	2	11	279900	5183500	0.5	3	0.785398163
BW	D	2	11	279900	5185500	0.5	3	0.785398163
BQ	D	2	11	278300	5186750	0.3	3	0.282743339
CB	E	1	11	300750	5175600	0.5	3	0.785398163
CA	E	1	11	299900	5176500	0.5	3	0.785398163
BZ	E	1	11	285500	5183500	0.5	3	0.785398163
BO	E	1	11	278000	5189500	1.3	1	5.309291585
BN	E	1	11	277200	5192800	0.3	2	0.282743339
CD	E,F	1, 1A	11	303000	5173000	1.0	1	3.141592654
CC	E,F	1, 1A	11	302500	5174600	1.0	2	3.141592654
BX	E,F	1, 1A	11	282100	5185300	0.4	3	0.502654825
BR	E,F	1, 1A	11	280200	5186500	0.4	2	0.502654825
CN	F	1A	11	292800	5185500	1.0	3	3.141592654
CO	F	1A	11	299600	5185500	0.7	3	1.5393804
BV	F	1A	11	293700	5185800	0.5	3	0.785398163
BU	F	1A	11	296650	5185950	0.3	3	0.282743339
BS	F	1A	11	286500	5186000	1.0	3	3.141592654
BT	F	1A	11	289200	5186000	0.5	3	0.785398163
BP	F	1A	11	279330	5187640	0.3	2	0.282743339
CS	G	1, 1A, 2	10	728250	5193300	0.3	3	0.282743339
CR	G	1, 1A, 2	10	726700	5193400	1.0	2	3.141592654
CQ	G	1, 1A, 2	10	724650	5193500	0.5	3	0.785398163
CP	G	1, 1A, 2	10	722000	5194200	0.5	3	0.785398163

* These are the handwritten segment designations on the 11 x 14 map. They indicate:

Segment A = Schultz to SE corner of Boylston quad.

Segment B=SE corner of Boylston quad to Vantage

Segment C= SE corner of Boylston quad to Blackrock

Segment D=Vantage thru Midway to Blackrock

Segment E=Vantage direct to Hanford.

Segment F=Vantage through Wahatis Peak, then south to Hanford

Segment G=SE corner of Boylston south to PP&L line, and then east following PP&L line to Vantage