Keys Road Flood Protection Cultural Resources Survey, Satsop RM 0.5-1.5, Elma, Washington

NWS-2020-TBD

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Acronyms and Abbreviations

APE	area of potential effects
ASRP	Aquatic Species Restoration Plan
BP	before present
CFR	Code of Federal Regulations
Corps	U.S. Army Corps of Engineers
DAHP	Washington State Department of Archaeology and Historic Preservation
Ecology	Washington State Department of Ecology
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NSD	Natural Systems Design, Inc.
RM	river mile
SHPO	State Historic Preservation Officer
SP	shovel probe
WAC	Washington Administrative Code
WHR	Washington Heritage Register
WISAARD	Washington Information System for Architectural and Archaeological Records Database
WDFW	Washington Department of Fish & Wildlife

Chapter 1
Introduction

Grays Harbor County has sought to implement reach scale plans to reduce riverbank erosion affecting farmland and important infrastructure. Within this strategy, Grays Harbor County initiated a project to protect Keys Road from bank erosion associated with the drastic meandering of the Lower Satsop River. Grays Harbor County has contracted Natural Systems Design to manage permitting and final design of their Keys Road Flood Protection Project between river miles (RM) 0.5 to 1.5.

The goals for the Keys Road Flood Protection Project are to distribute stream power across the floodplain and to create a system with dynamic equilibrium that supports riparian vegetation, aquatic habitat, and a restored historic channel migration zone. Specific design elements of the proposed project include two setback revetments intended to protect Keys Road and allow the eventual removal of sections of rock toe that have contributed to truncating the natural extent of floodplain. Other design elements will include a temporary bypass channel, seven floodplain roughness engineered log jams, 17 engineered log jams in the river, and a linear timber complex unit engineered log jam along the riverbank.

The project is anticipated to require permits from WDFW, Ecology, and the U.S. Army Corps of Engineers (Corps). As the project is also anticipated to require a Corps permit, it is considered a federal undertaking. As a federal undertaking, it is required to comply with Section 106 of the National Historic Preservation Act (NHPA). As such, this cultural resources inventory is designed to comply with federal standards.

In support of the project's cultural resources obligations, NSD retained ICF to perform a cultural resources study of the project's area of potential effects (APE). This technical report describes the methods and results of the cultural resources survey and provides technical recommendations.

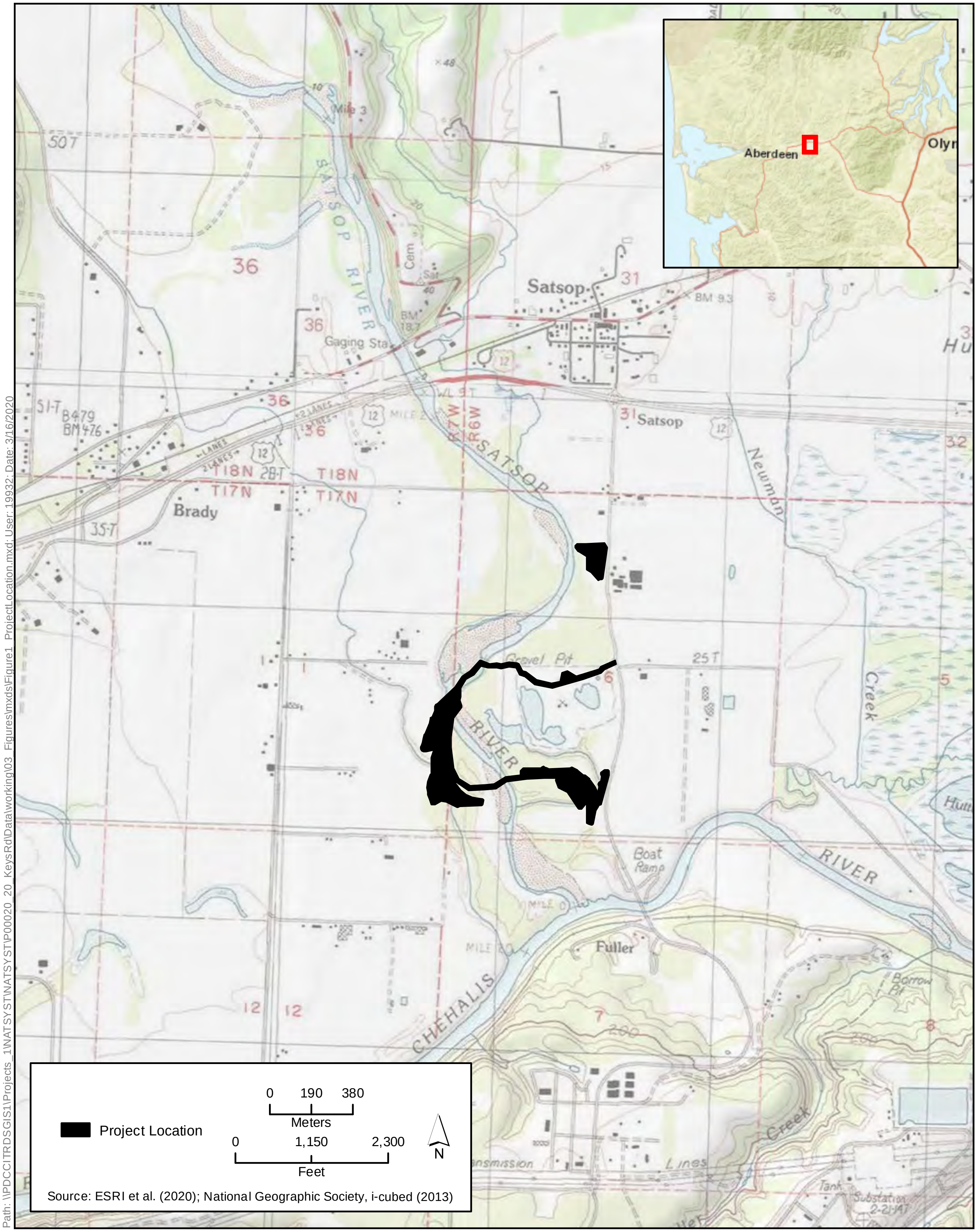


Figure 1
Project Location
Keys Road Flood Protection Cultural Resources Survey

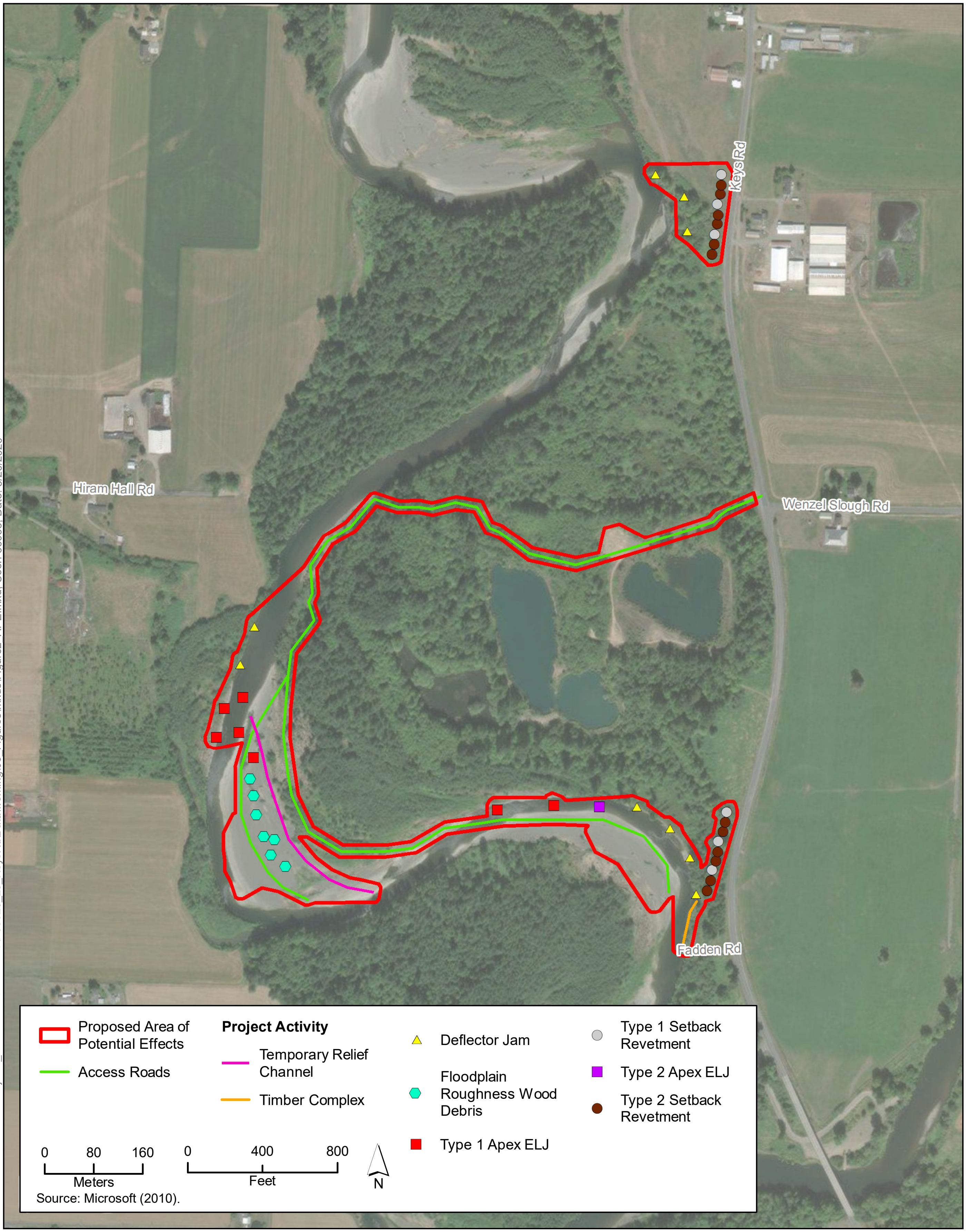


Figure 2
Proposed Area of Potential Effects
Keys Road Flood Protection Cultural Resources Survey

Project Background

Area of Potential Effects

The project would occur at two discontiguous locations along the Lower Satsop River –between RMs 0.5 to 1.5 (Township 17 N, Range 6 W, Sections 6) (Figure 1). These locations would be accessed via existing county roads from outside the proposed APE and from within the proposed APE via very lightly improved roads.

The horizontal extent of the project's APE is defined as the total area of ground disturbance, including in-water work and planting areas, staging areas, and access routes. In this case, the proposed APE consists of two discontiguous work areas. Temporary construction-related effects (e.g. dust, noise, and light) are not anticipated to extend beyond the project's construction footprint. Therefore, no additional areas outside of the project's construction footprint are included in the proposed APE.

The vertical extent of the proposed APE is defined as the depth of ground-disturbing activities, which would vary by activity across the proposed APE. Temporary access routes and staging areas in the proposed APE are not anticipated to result in disturbance below the ground surface during their preparation and use, but would be subject to up to 12 inches of ground disturbance as they are returned to native density upon completion of the project. The proposed APE would be accessed using existing lightly improved roads. In order to illustrate how the project activities described above will be distributed across the proposed APE, Figure 2 depicts the ground disturbing activities across the proposed APE.

Tribal Consultation

Formal Section 106 consultation with Native Americans for the portion of the project that requires a Corps permit will be performed by the Corps, as the lead federal agency for the project.

Personnel

Tait Elder, MA, RPA, archaeologist, served as principal investigator. Kainoa Little, MA, archaeologist, served as co-principle investigator, field director, and was the primary author of this report. Mathew Sisneros, BA, archaeologist performed archaeological field investigations. Melissa Cascella, MA, archaeologist, created the map figures in this report.

Regulatory Background

Federal, state, and local regulations recognize the public's interest in cultural resources and the public benefit of preserving them. These laws and regulations require analysts to consider how a project might affect cultural resources and to take steps to avoid or reduce potential damage to them. A cultural resource can be considered as any property valued (e.g. monetarily, aesthetically, religiously) by a group of people. Valued properties can be historical in character or date to the prehistoric past (i.e. the time prior to written records).

The project is receiving state capital improvement funding and will require a permit from the Corps. Therefore, the project must be performed in compliance with Section 106 of the NHPA. The project may also be subject to additional state regulations depending on whether archaeological sites or human remains are encountered. The key applicable federal and state laws and regulations are described below.

Federal

National Historic Preservation Act

As a federal undertaking due to anticipated issuance of the Corps permit, the project must be conducted in compliance with Section 106 of the NHPA. Section 106 requires federal agencies to consider the effects of funded or approved undertakings that have the potential to affect any district, site, building, structure, or object that is listed in, or eligible for listing in, the National Register of Historic Places (NRHP). Under Section 106, the lead federal agency must provide an opportunity for the State Historic Preservation Officer (SHPO), affected Native American tribes, and other stakeholders to comment. The Section 106 process is codified in 36 Code of Federal Regulations (CFR) 800 and consists of five steps.

1. Initiate process by coordinating with other environmental reviews, consulting with the SHPO, identifying and consulting with interested parties, and identifying points in the process to seek input from the public and to notify the public of proposed actions.
2. Identify cultural resources and evaluate them for their potential to be eligible for listing in the NRHP (the process for which is explained below), resulting in the identification of historic properties.
3. Assess effects of the project on historic properties.
4. Consult with the SHPO and interested parties regarding any adverse effects on historic properties; and, if necessary, develop an agreement that addresses the treatment of these properties (e.g. a Memorandum of Agreement [MOA]).
5. Proceed in accordance with the project MOA, if an MOA is developed.

An adverse effect on a historic property is found when an activity may alter, directly or indirectly, any of the characteristics of the historic property that render it eligible for inclusion in the NRHP. The alteration of characteristics is considered an adverse effect if it may diminish the integrity of the historic property's location, design, setting, materials, workmanship, feeling, or association. The assessment of effects to historic properties is conducted in accordance with the guidelines set forth in 36 CFR 800.5.

National Register of Historic Places

The NRHP was established by the NHPA in 1966 as "an authoritative guide to be used by federal, state, and local governments; private groups; and citizens to identify the nation's cultural resources and to indicate what properties should be considered for protection from destruction or impairment." The NRHP recognizes properties that are significant at the national, state, and local levels. According to NRHP guidelines, the quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and that meet any of the following criteria.

- **Criterion A.** A property is associated with events that have made a significant contribution to the broad patterns of our history.

- **Criterion B.** A property is associated with the lives of persons significant in our past.
- **Criterion C.** A property embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- **Criterion D.** A property yields, or may be likely to yield, information important in prehistory or history.

Ordinarily, birthplaces, cemeteries, or graves of historical figures; properties owned by religious institutions or used for religious purposes; structures that have been moved from their original locations; reconstructed historic buildings; properties primarily commemorative in nature; and properties that have achieved significance within the past 50 years are not considered eligible for listing in the NRHP, unless they satisfy certain conditions.

The NRHP requires that a resource not only meet one of these criteria, but must also possess integrity. Integrity is the ability of a property to convey historical significance. The evaluation of a resource's integrity must be grounded in an understanding of that resource's physical characteristics and how those characteristics convey its significance. The NRHP recognizes seven aspects or qualities that, in various combinations, define the integrity of a property, including location, design, setting, materials, workmanship, feeling, and association.

State

Washington State Archaeological Resource Laws

The following state laws govern the protection of archaeological resources.

- Revised Code of Washington (RCW) 27.44, Indian Graves and Records, provides protection for Native American graves and burial grounds, encourages voluntary reporting of said sites when they are discovered, and mandates a penalty for disturbance or desecration of such sites.
- RCW 27.53, Archaeological Sites and Resources, governs the protection and preservation of archaeological sites and resources and establishes DAHP as the administering agency for these regulations.
- RCW 36.70A.020 includes a goal to "Identify and encourage the preservation of lands, sites, and structures that have historical, cultural, and archaeological significance." Cities planning under the Washington State Growth Management Act must consider and incorporate this historic preservation goal.
- RCW 68.60, Abandoned and Historic Cemeteries and Historic Graves, provides for the protection and preservation of abandoned and historic cemeteries and historic graves.

Chapter 2
Environmental Setting

The following is a summary of the key characteristics of the proposed APE's environmental setting—its geology, flora, and fauna. The purpose of this summary is to provide a framework to establish expectations about buried archaeological site sensitivity, precontact land use, and potential archaeological site types in *Chapter 5, Research Design*.

Geology

The proposed APE is situated along the lowest reach of the Satsop River valley, between river miles 0.5 and 1.5 at the southern end of the Puget Sound basin. The Puget Sound basin is a north-to-south-trending depression bordered by the Cascade Mountains to the east and the Olympic Mountains Willapa Hills to the west (Schuster et al. 2009:2). The depression that characterizes the Puget Sound basin and Chehalis basin is a result of tectonic pressure caused by the subduction of the Juan de Fuca plate under the North American plate (Haugerud 2004).

During the Pleistocene epoch (2588 million to 12,000 years before present [BP]), the Puget Sound basin was intermittently covered by glacial ice, which advanced southward from British Columbia (Booth et al. 2005). Each glacial advance scoured and reshaped the topography created by the previous glacial advance and deposited debris. While much of the current topography of the Puget Sound Basin is primarily the result of surface scouring, subglacial trough erosion, and sedimentary deposition from the most recent glacial advance, termed the Vashon Stade of the Fraser glaciation or Vashon advance (18,750 to 16,950 years ago), the proposed APE vicinity was located near the terminal edge of this advance (Booth and Goldstein 1994; Collins and Montgomery 2011; Porter and Swanson 1998).

Geologic and Natural Resource Conservation Service (NRCS) soil mapping indicates that the proposed APE has in-filled with alluvial sediments since the end of the Pleistocene epoch (Washington State Department of Natural Resources 2020, Natural Resources Conservation Service 2020). Analysis of high-resolution Light Detection and Ranging (LiDAR) data indicates that the Satsop River has incised and meandered across the proposed APE, resulting in the formation of several alluvial terraces and a historic channel migration zone (Figure 3). Historic maps and aerial photographs of the proposed APE reveal that the Lower Satsop River channel has experienced significant migration since the middle of the nineteenth century (NETR 2020a; NETR 2020b). An illustration of the extent of historic channel migration is provided in Figure 3.

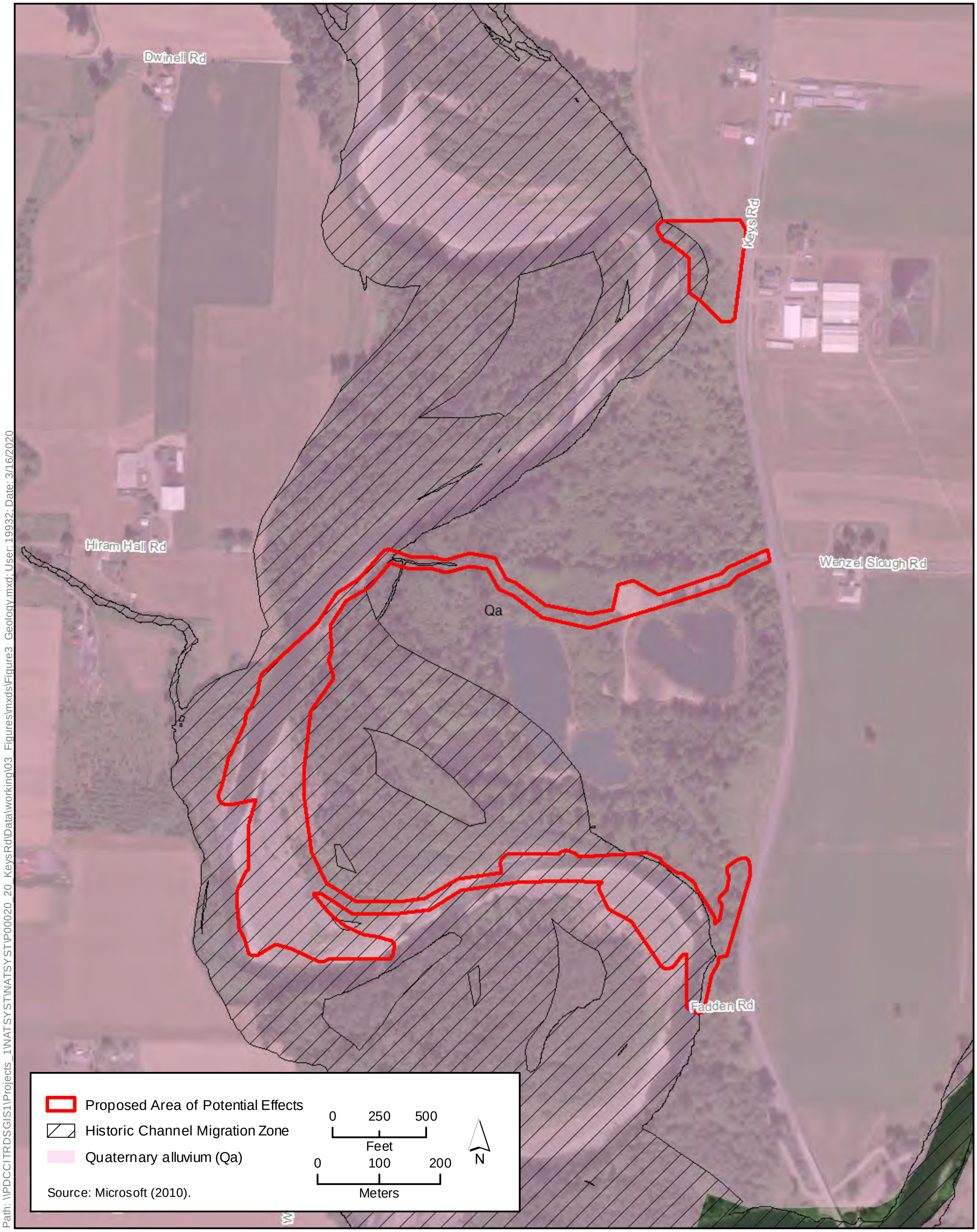


Figure 3
Geology in the Vicinity of the Proposed APE
Keys Road Flood Protection Cultural Resources Survey

Flora and Fauna

The proposed APE is located in the Olympic Peninsula Province in the western hemlock (*Tsuga heterophylla*) vegetation zone (Franklin and Dyrness 1988). Softwoods such as Douglas-fir (*Pseudotsuga menzesii*), western hemlock, and western red cedar (*Thuja plicata*) are the dominant tree species in the region, while hardwoods such as red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*) are generally subordinate and found near water courses or riparian habitats. Understory shrubs with potential food and resource value in the western hemlock zone include, but are not limited to, swordfern (*Polystichum munitum*), bracken fern (*Pteridium aquilinum*), Oregon grape (*Mahonia aquifolium*), vine maple (*Acer circinatum*), blackberry (*Rubus* spp.), ocean spray (*Holodiscus discolor*), salal (*Gaultheria shallon*), blueberries and huckleberries (*Vaccinium* spp.), and red elderberry (*Sambucus racemosa*).

Terrestrial fauna in the region include, but are not limited to, mule deer (*Odocoileus hemionus*), elk (*Cervus elaphus*), cougar (*Puma concolor*), coyote (*Canis latrans*), black bear (*Ursus americanus*), squirrels (*Scirius* sp.), muskrat (*Ondatra* sp.), and raccoon (*Procyon lotor*) (Eder 2002). Aquatic fauna in the vicinity include North American beaver (*Castor canadensis*), Western toad (*Anaxyrus boreas*), Van Dyke's salamander (*Plethodon vandykei*), great blue heron (*Ardea herodias*), harlequin duck (*Histrionicus histrionicus*), marsh wren (*Cistothorus palustris*), Olympic mudminnow (*Novumbra hubbsi*), Pacific river and brook lamprey (*Lampreta tridentata*), large scale sucker (*Catostomus macrocheilus*), and longnose and speckled dace (*Rhinichthys cataractae*). Native anadromous salmonids such as winter and summer steelhead trout (*Oncorhynchus mykiss)*, fall Chinook (*O. tshawytscha)*, coho salmon (*O. kisutch*), chum salmon (*O. keta*), cutthroat trout (*O. clarkii*), rainbow trout (*O. mykiss*), bull trout (*Salvelinus confluentus*) and mountain whitefish (*Prospium williamsoni*) were also recorded in the vicinity (Natural Systems Design 2019).

Chapter 3
Cultural Setting

The following is a description of the cultural setting of the proposed APE vicinity, including precontact, ethnography, and historic context. The purpose of this summary is to provide a framework to establish expectations about precontact and historical land use and potential archaeological site types in *Chapter 5, Research Design*.

Precontact

Cultural developments of Puget Sound and surrounding areas have been summarized by several reviewers (Moss 2011; Ames and Maschner 1999; Greengo and Houston 1970; Kidd 1964; Matson and Coupland 1995; Nelson 1990). The cultural sequence described by Ames and Maschner (1999), is one of the most widely adopted chronologies for this region. It divides the prehistoric cultural sequence into five periods spanning 12,500 years before present (BP) to 225 years before present (Table 1). These periods delineate groupings of tool types and other physical evidence as they occur over time, which provides a framework for the interpretation of these patterns within the context of regional environmental trends, and economic trends primarily related to subsistence, and land use. It's important to note, however, that the chronological periods are academic constructs, and do not necessarily reflect tribal viewpoints. Since the publication of the reviews above, a significant number of North American archaeological sites have been documented that appear to predate the Clovis culture (Davis et al. 2019; Williams et al. 2018; Rick et al. 2001). For the purposes of this section, these sites will be considered part of the Paleoindian period.

Table 1. Pacific Northwest Precontact Cultural Chronology

Period	Time Range (BP)	Diagnostic Site Attributes	Landform Association
Paleo-Indian	Earlier than approximately 10,000	Large stone bifaces and bone technology— including Western Stemmed points and fluted stone bifaces attributed to the Clovis culture— occur during this period.	Uplands across the Puget Sound. Upland and coastal contexts across the United States.
Archaic	10,000/9,000–6,400	Appearance of leaf-shaped bifaces and cobble, flake, and bone tools.	Uplands and riverine in the Puget Sound. Occasionally found along the littoral zone and in the subalpine zone in the greater Pacific Northwest.
Early Pacific	6,400–3,800	Increased frequency and diversity of bone and antler tools relative to the Archaic period. Tools such as bone points, barbs, harpoons, and ground stone appear. Earliest documented shell middens in the Puget Sound.	Still primarily found on uplands and in riverine environments, but a small number of littoral and sub-alpine sites have been dated to this period in the Puget Sound.
Middle Pacific	3,800–1800/1500	Archaeological evidence for permanent social inequality, storage-based economy, and wooden plank houses appear. Further increases in the frequency and diversity of bone and antler tools and increased variety of fish capture technology. Emergence of near-ethnographic art styling.	Littoral and sub-alpine sites become increasingly prevalent in the Puget Sound during this period. Occasional upland and riverine sites.
Late Pacific	1800/1500–225 BP	Emergence of extremely large houses, heavy-duty woodworking tools, and decreased reliance on chipped stone tools.	Littoral and subalpine sites are by far the most prevalent during this period. Riverine sites are occasionally present, and upland sites are very uncommon.

BP = before present

The question of initial peopling of the Americas has traditionally been framed in the context of the availability of an ice free corridor to allow migration between the Cordilleran and Laurentide ice sheets. An assessment of over 500 radiocarbon dates associated with the ice-free corridor found that such a route was likely inaccessible prior to 11,000 years ago (Arnold 2001). Over the last several decades, researchers in North and South America have documented archaeological sites and sets of human remains in coastal and upland contexts that appear to predate the timing of the ice-free corridor. For example, archaeological investigations at the Cooper's Ferry site in Idaho and the Gault Site in Texas revealed well-stratified archaeological deposits appearing to predate 16,000 years BP (Davis et al. 2019; Williams et al. 2018). These deposits contained lithic technology from the Western Stemmed Tradition, which appears to pre-date and exist alongside the Clovis culture. On the south coastal region of California, evidence of human occupation of the Channel Islands extends as far back as 13,000 years BP (Rick et al. 2001). The presence of these sites has forced researchers to reconsider how early humans migrated to the Americas, with a greater emphasis placed on coastal migration to the Americas.

These finds appear to upend the previous hypothesis, which posited that the earliest human inhabitants of North America were highly mobile terrestrial hunters commonly referred to as Clovis. Archaeological evidence shows they used intricate bone and stone technology typified by large, fluted, lanceolate-shaped stone points. On the west coast of North America, Clovis assemblages are characterized by a wide but sparse distribution of isolated tools and caches dated to between 13,000 and 12,600 years BP (Rasmussen 2014). Several isolated Clovis-style points have been found throughout the Puget trough (Croes and Kucera 2017; Williams et al. 2008). Most of these discoveries, however, were made from undatable contexts from ground surface or within secondary deposits.

A review of over thirty sites from southeast Alaska to Baja California found that the west coast of North America was settled between 13,000 and 11,500 and years ago (Erlandson et al. 2008). Notably, two archaeological sites in Puget Sound contain the remains of extinct mammals that appear to exhibit evidence of human predation and butchery: the Manis Mastodon site (Waters et al. 2011) and a bison from Ayers Pond on Orcas Island, 45S454 (Wilson et al. 2009). A recent article has suggested that the Chehalis River valley may have been the first major waterway to provide access to south Puget Sound and southwest Washington south of the Puget lobe of the Cordilleran Ice sheet (Croes and Kucera 2017). However, evidence supporting this hypothesis is currently contextual, and no site components have yet been dated to the Paleo-Indian period within the Chehalis drainage.

Archaeological sites attributed to the Archaic and Early Pacific periods are relatively infrequent in the Puget Sound area and are typically located on uplands near drainages and in the Cascade foothills. Sites associated with this period typically contain scatters of flakes, cores, and typologically distinct projectile points. The Bear Creek Site, 45KI839, located in Redmond, Washington is one of the earliest Archaic period sites in Puget Sound (Kopperl et al. 2015); artifacts recovered from Bear Creek consist of expedient flake tools, stone points, and bifaces associated with a 10,500-year-old deposit of peat. Some of the tools found in this site are stylistically similar the triangular stemmed points of what is termed the Western Stemmed Tool Tradition. These points are typically found in the east of the Cascade Mountains in the Columbia River plateau. Another projectile point types that is chronologically distinctive of this time period is the Cascade-style point, which is a lanceolate shaped point with a convex base (Nelson 1990). Similar lithic tools associated with organic materials that have been radiocarbon dated at the Glenrose Cannery site in British Columbia, it is postulated that sites containing cascade-style projectile points are comparable to the lower-most levels of the Glenrose Cannery site in age and, therefore, were used between 8,000 and 4,000 BP (Nelson 1990). Although uncommon in the lowlands, several archaeological sites with components dated to the Archaic and Early Pacific periods—based on their vertical position relative to well-dated volcanic tephra deposits—have been documented in the subalpine and alpine zones in the Cascade Range (Burtchard 2007; Mierendorf and Foit 2018). One such site, a lithic microblade core site (45PI438), is located on Mount Rainer (Burtchard 2007). Of particular note, one precontact archaeological site—a precontact village or encampment located near Enumclaw—has been documented beneath Osceola mudflow deposits, indicating that it was in use prior to 5600 BP (Hedlund 1976). The Cascade Pass Site, 45CH221, is the oldest site dated with secure context on an alpine mountain pass. Together with the evidence from Bear Creek indicates that contact with interior peoples occurred deep in prehistory.

Most well-dated archaeological sites in the Puget Basin and Cascade Range are from the Middle to Late Pacific periods. Archaeological sites from these periods are overwhelmingly located along the coastal margin and at the mouths of rivers in the Puget Basin and are primarily located in subalpine contexts in the Cascade Range (Burtchard 2007; Wessen 1985). The distribution of archaeological sites in the Cascade Range is likely, in part, a function of high ground surface visibility in the subalpine zone compared to the alpine and forested zones. Documented archaeological sites from these periods located upstream and inland of the coastal margin in the Puget Basin are very uncommon, but this absence is likely a function of the paucity of materials suitable for radiometric dating and dense vegetation, rather than a pattern in precontact land use. Archaeological remains from the Middle and Late periods typically show an increased reliance on marine resources such as salmon and shellfish, and are typically interpreted in the context of intensification in the harvesting of targeted resources, increased sedentary settlement, and the development of social differentiation (Ames and Mascner 1999). The Middle Pacific Period also marks a shift in housing construction from pit-dwellings to large longhouse style constructions like those found at the Paul Mason site in British Columbia (Ames 2003). The Late Pacific period marks a continuation of the trends established in the Middle Pacific Period, but there is a general replacement of flaked stone artifacts with those made of bone and antler.

Throughout Puget Sound and the waterways that feed Grays Harbor, subsistence in the Middle and Late Pacific Periods is likely to have been similar to methods used in ethnographic times. The presence of bone and antler harpoon points point to development of economies based on taking large fish including salmon and sturgeon, and possibly also marine mammals (Ames 2003). The use of stream and intertidal weirs were common in the region and are likely to have their origins in the Middle and Late Pacific periods. Precontact fish weir locations, as well as the location of duck nets through flyways, were owned by specific lineages (DeLoria 2012; Hajda 1991). Therefore, the development of these hunting and fishing methods are likely to have contributed to the complex systems of rights and access observed in the historical past and into the present day.

Ethnography

The proposed APE and vicinity was traditionally inhabited by the Satsop people, who spoke a dialect of Kwaiailk from within the Upper Chehalis group of the Coast Salish language family, though they had a political organization more akin to the Lower Chehalis (Ruby et al. 2010). This is likely due to the fact that the confluence of the Satsop and Chehalis Rivers, near the proposed APE, is understood to be the point that separates the mutually unintelligible Upper Chehalis (Q̓ʷay̓áyiɬq̓) and Lower Chehalis (Łəw̓ál'məš) linguistic groups. The proximity of the Satsop to multiple river systems facilitated close ties and relationships between local groups, including the Quinault (Kʷínayɬ) who inhabited the Quinault River drainage and northwestern area of Grays Harbor, the Lower Chehalis to the south and west, and the Chinookan peoples to the south (Ruby et al. 2010; Hajda 1990). Often these relationships were strengthened by intergroup marriages (Miller 2009). Satsop chiefs, like others among the Upper Chehalis, likely would have been multilingual to maintain good relations with their neighbors (Adamson 1999). The open waters of Grays Harbor and the coast were seasonally fished by the Quinault and lower Chehalis peoples, while the Wynoochee and Satsop rivers were fished by their namesake tribes.

Consistent with many Salish speaking groups, the precontact peoples of the Grays Harbor area relied heavily on fisheries for a large portion of their diet. Salmon fishing occurred throughout Grays Harbor and in its associated watersheds, including the Chehalis river and its tributaries such as the

Satsop River (Welsh 1942:10; VanSyckle 1982:74). Runs of Chinook, chum, and coho salmon were particularly important to the Satsop and Chehalis (Hajda 1990). Salmon were harvested using a variety of methods including dipnets and multiple forms of intertidal and freshwater weirs (Byram 2002; Elder et al. 2015). Sturgeon were usually caught with large hooks and line, but were also netted in conical bag nets between two canoes. Herring and smelt were caught with rakes and dip nets from canoes (Miller 2009) and the Hoquiam people used intertidal weirs built on or near eelgrass beds where herring spawned (Adamson 1969:329–342). Flounder and sole were captured by feeling along the mudflats with the feet and either impaling the fish with a sharp stick thrust between one's toes or by holding the fish to the ground with the foot while another participant dove down to grab it. Lampreys were captured by hand at night using a pitch torch (Miller 2009).

The Grays Harbor shoreline and inland river drainages were also productive hunting and plant gathering areas, providing habitat for mammal, avian, and plant resources (Hajda 1990). Terrestrial game — including bear, beaver, deer, elk, and otter — were hunted with bow and arrow, spears, and traps. Waterfowl were caught using duck spears, pole nets thrown from canoes, and submerged or aerial net traps. Edible plants, such as berries, roots, and bulbs, were collected along the rivers. Camas (*Camasia quamash*) was often roasted in rock ovens and mashed and dried as cakes for storage and trade (Hajda 1990). Many plants including cattail (*Typha* spp.) and stinging nettle (*Urtica dioica*) were collected for weaving and textiles. Nettle was also used to make nets and line for fishing (Miller 2009).

Contact with European Americans prompted rapid change to traditional life among Native Americans in the Pacific Northwest. Starting in the early nineteenth century, fur trade routes were established, and a limited number of European Americans regularly visited the region. Early interactions introduced metal tools, new clothing styles, and new foods to native peoples. This initial contact was followed shortly thereafter by a malaria epidemic that devastated native populations (Boyd 1985). Beginning in the 1840s, large groups of European Americans made their way into the region as part of a large wave of settlers and homesteaders, prompted in part by the passing of the Oregon Treaty in 1846 that established the northern border of Oregon Country and Canada, and the Oregon Donation Land Claim Act of 1850 that permitted unwed settlers to claim 320 acres, and married couples to claim 640 acres, of unsurveyed lands. As a result of this influx, traditionally used lands became increasingly inaccessible (Ruby and Brown 1995).

In the 1850s, Governor Isaac Stevens, Washington Territory's first governor, aggressively sought the consolidation of Washington Native American groups to allow European-American to settle traditional native lands without conflict. Negotiations of these treaties were conducted in Chinook Jargon (*Chinuk wawa*), a creole trade language generally considered to consist of an insufficient lexicon to convey complex treaty terms. In most cases, such treaties obliged Native American signatories to cede their traditional lands for reservations, often in undesirable locations.

In 1854, Governor Isaac Stevens induced sixty-two leaders of western Washington tribes and bands to sign the so-called Treaty of Medicine Creek ceding 2.56 million acres to the United States government in exchange for $32,500 payable over 20 years, $3,250 in resettlement costs, the establishment of three reservations, and recognition of traditional hunting and fishing rights. The major entities involved in the treaty were the Nisqually, the Puyallup, and seven smaller bands inhabiting the southernmost inlets of Puget Sound. The seven bands were given a year to move to the small island that became known as Squaxin Island. However, residents quickly began to leave the island to resettle near their original homes and there are now no permanent residents. It remains accessible only to members of the Squaxin Island Tribe. This treaty was famously the cause for Chief Leschi, the Chief of the Nisqually, to take a leadership role in an insurrection against European-American governance and incursions, for which he was later illegally arrested and executed.

The Quinault River Treaty (also known as the Quinault Treaty) was signed in 1855 by representatives from the Quinault, Quileute, and Hoh representatives. Though the treaty stipulated that all peoples represented by the signatories move to the new Quinault Reservation, most Quileute and Hoh refused. In 1856, a Quileute delegation signed the Treaty of Olympia and received a small reservation at Taholah. The Hoh received a small (443 acres with 1 mile of shoreline) reservation by presidential executive order in 1893.

Following unsuccessful negotiations with Governor Isaac Stevens for the establishment of a reservation for several tribes along the Chehalis River in 1855, the United States government obtained title to Native American lands in Grays Harbor without consent or compensation (Ruby and Brown 1995). A reservation for the Upper Chehalis was established in 1864 by order of the Secretary of the Interior J.P. Usher. Peoples of the Upper and Lower Chehalis (including the Satsop), Klallam, Muckleshoot, Nisqually, and Quinault became part of the Confederated Tribes of the Chehalis and were moved to their reservation (James and Martino 1986; Ruby and Brown 1995). In the middle of the 19th century, members of the nearby Kwaiailk largely became amalgamated with the Cowlitz and now reside on the Cowlitz Indian Reservation, though some also joined the Chehalis Tribe and reside on their reservation.

Historic Context

The first European-American passed through Grays Harbor as early as 1792. A series of merchants and expeditions—fur trader Robert Gray in 1792, an Irishman employed by the Hudson's Bay Company in 1824, an English Botanist in 1825, and the Wilkes Expedition of 1841—looked unfavorably on the harbor's shallow waters and narrow entrance (Ott 2009; Wilma 2006). As such, European-American settlement did not begin in the Grays Harbor region until the 1840s.

In the 1850s, European-Americans began staking homesteads— primarily dairy and cattle farms— along the Chehalis riverfront (Douglas 1914; Wilkes 1845; Wilma 2006; Work 1912). In 1852, John Rady became the first settler on the Satsop River just north of the Chehalis River. The Satsop Valley saw an increasing influx of settlers from England, Ireland, and Germany in the 1860s and 1870s (Washington State Digital Archives 2018). In the middle of the nineteenth century, significant lumber operations began along the Pacific coast. However, by the late nineteenth century, timber on the fringes of the Peninsula had been exhausted and lumbermen began to explore inland. It was during this time that the town of Elma developed as a trading center for logging operations and sawmills along the Chehalis River watershed (City of Elma n.d.). In 1893, three sons of early settlers John and Anna Schafer, who homesteaded 6 miles upstream from the mouth of the Satsop River, formed the Schafer Brothers Logging Company. The Schafer Brothers Logging Company started with oxen and horses and grew to employ over 3,000 workers (University of Washington Libraries Digital Collection 1890–1945). At its height, their logging company was one of the largest in the Pacific Northwest. In 1924, Schafer Brothers Logging Company donated land to the State of Washington to form Schafer State Park, which is located northeast of the proposed APE. In 2010, Schafer State Park was listed on the Washington Heritage Register (WHR) and NRHP.

With the timber industry boom, railroads soon came to the area, bringing greater expansion. The Sol Simpson's Puget Sound & Grays Harbor Railroad arrived in Elma in 1880 and the Oregon

Washington Railroad & Navigation Company arrived in Aberdeen in 1909. Mills and shipyards grew with the region's new capacity to export goods, as did the size of the vessels that came into Grays Harbor. Having long recognized the shortcomings of the bay for oceangoing vessels, businessmen pushed the U.S. Army Corps of Engineers to dredge a channel (1905) and construct jetties (South Jetty in 1896 and North Jetty 1916). They also advocated for the formation of the second port district in Washington State in 1911 (Davidson 2001; Wilma 2006).

Beginning in the 1920s, growth of the logging companies had slowed, and as stands of old-growth trees were exhausted, the mills began to close. The lumber industry of the Olympic Peninsula briefly rejuvenated during World War I as the U.S. military's rush to grow its nascent air force boosted the demand for spruce. The advent of the logging truck and the completion of the Pacific Loop Highway in the early 1930s gave logging operations more flexibility in overcoming the Peninsula's steep and rugged terrain (Dorpat and McCoy 1998).

Although the success of the timber and logging industries far surpassed any other industry in the area, agriculture and dairying have been a steady presence in the Chehalis Basin since the first European-American settlers. The mild climate and fertile alluvial soils of Western Washington's river valleys are generally well-suited for agriculture, though the steep slopes and frequent winter flooding in the Lower Chehalis River Valley made much of the land more suited to dairy farming than producing tillable crops. However, as environmental standards implemented in the 1960s and 1970s increased the cost of operations, family dairying in Washington State declined at an accelerated rate (Rowe 2018). In 2016, only 5 percent of the Chehalis Basin was designated as agriculture, including for livestock, farming, and commercial dairy operations, while forest, grasslands, and wetlands (including timber production) accounted for 80 percent of the land cover (Washington State Department of Ecology 2016).

The lower Chehalis Basin's economy has historically focused primarily on timber and secondarily on agriculture, and has experienced several growth cycles as demand for, and access to, these products has increased or decreased. By 1900, the lumber industry had turned the communities along the lower Chehalis River — including Aberdeen, Montesano, Brady, Satsop, and Elma —into industrial centers of commerce. The Satsop River Valley, extending north from the Chehalis River between the cities of Brady and Satsop, was home to the headquarters of the Schafer Brothers Logging Company and several of their logging camps, but also included agricultural industries such as dairy farms, poultry ranches, berry fields, and bulb farms (Washington Trust for Historic Preservation n.d.).

During the early twentieth century, the mainstem of the Satsop River was also subjected to extensive gravel mining. Satsop saw a vastly different industry emerge in the 1970s with the partial construction of Washington Public Power Supply System's nuclear power plants, referred to as Washington Nuclear Project Nos. 3 and 5, or simply WNP-3 and WNP-5. The failure of Washington Public Power Supply System to fully fund the project led to its abandonment and the site's eventual transformation into a business/technology park known as Energy Northwest (Center for Land Use Interpretation 2018). The primary industries found in the area today include tree farms, landscaping nurseries, berry and flower bulb farms, and tourism (due to its proximity to Olympic National Park and Olympic National Forest). The communities along the lower Chehalis River and Highway 12 corridor have maintained a slow population growth over the late twentieth and into the twenty-first century through the establishment of commuter populations.

Chapter 4
Literature Review

Existing Data and Background Data

ICF archaeologist Kainoa Little conducted a record search on March 16, 2020 using the Washington Information System for Architectural and Archaeological Records Database (WISAARD) to identify previously documented archaeological, ethnographic, and historic resources within a 1-mile radius of the proposed APE. The WISAARD database includes completed cultural resources survey reports; properties listed in, or determined eligible for, listing in the NRHP; WHR-listed properties; archaeological sites; cemeteries; and inventoried historic resources. This record search was supplemented with data from geotechnical reports, geologic mapping and soil surveys. The results of the literature search are summarized below. Following the summary, Table 2 provides further details on the cultural resources surveys conducted in the area.

Four cultural resources surveys have occurred within a mile of the proposed APE. None have occurred directly within the proposed APE (Table 2). The results of the records search are summarized below.

Table 3 provides further details on the resource previously identified in the records and reports. Four precontact archaeological resources are located within the 1-mile radius of the proposed APE. None are located within the proposed APE. Two historic archaeological resources are within one mile of the proposed APE. 45GH54 is a poorly-described refuse scatter directly south of the proposed APE on the north bank of the Chehalis River. The second historic resource, 45GH55 is the former site of the Fuller School, which was active between circa 1900 and 1945 (Table 3).

Table 2. Previously Conducted Cultural Resources Surveys (within 1 Mile of APE)

Author/Date	Investigation Type/NADB #	Title	Results
Gilpin J. et al./2012	Survey Report/ #1683521	Cultural Resources Technical Report, Satsop PDA Sewer Line Project	No cultural resources identified
Merrill C. et al./2010	Survey Report/ # 1354599	Satsop River Bridge Rehabilitation Cultural Resources Assessment, Grays Harbor County, Washington	No adverse effects expected
Rooke L./2002	Survey Report/ # 1341847	Cultural Resources Survey for the Washington State Department of Transportation's SR 12: Keys Rd Intersection, Satsop	No cultural resources identified
Weed C./2002	Survey Report/ #1340863	Phase I Cultural Resource Investigations of the Proposed Northwest Pipeline Corporation-Grays Harbor Lateral Project In Thurston and Grays Harbor Counties, Washington	Pre-contact and historic resources identified >1 mile from proposed APE

Gilpin et al. (2012) conducted a cultural resource survey as part of the permitting process for a wastewater reclamation plant and conveyance system at the Satsop Business Park. They noted only the modern structures associated with the unfinished nuclear facility and the modern business park, but recommended additional cultural work as the project progressed. Merrell et al. (2010) evaluated the Satsop River Bridge and whether or not its NRHP eligibility would be affected by rehabilitation work. The archaeologists from Paragon Research Associates recommended the bridge, constructed in 1938, eligible under Criterion C and estimated that minor rehabilitation and retrofitting would not negatively affect that recommendation. In 2002, Western Shore Heritage Services Inc. performed a cultural resources pedestrian survey prior to Washington State Department of Transportation improving an intersection (Rooke 2002). The survey found two roadside crosses of unknown age and reported no significant archaeological resources. Weed et al. (2002) conducted a cultural resources survey as part of the permitting for the Grays Harbor Lateral Pipeline. The survey identified nine new pre-contact and historic-period archaeological resources, none of which were recommended eligible for listing on the NRHP.

Table 3. Previously identified Cultural Resources (within 1 mile of the proposed APE)

Site Number	Description	Location
45GH34	Precontact campsite, measuring approximately 520 feet by 40 feet. Hammerstone and two polishing stones eroding from riverbank, with a large mortar and pestle having been recovered by the landowner. Located on north bank of Chehalis River, upriver of confluence with Satsop. Originally recorded in 1969. Lithic scatter recorded during construction of boat launch in 1974. Subsurface survey in 1976 during nuclear facility permitting with indeterminate results.	0.5 miles E of proposed APE
45GH35	Precontact lithic scatter located on river gravels on west bank of Satsop River, downriver from the proposed APE. Scatter included basalt scraper and flakes. Recorded in 1977 and recommended eligible but destroyed by washout.	0.2 miles S of proposed APE
45GH36	"Possible burial" located on north bank of Chehelis River, downriver of confluence with Satsop. Recorded in 1969.	0.9 miles SW of proposed APE
45GH41	Numerous lithics, FCR, charcoal and lithics on north bank of Chehelis River, downriver of confluence with Satsop. Recorded 1973.	1 mile SW of proposed APE
45GH54	Historic-period roadside refuse scatter on north bank of Chehalis River, upriver of confluence with Satsop. Potentially eligible. Recorded in 1977	0.4 miles SE of proposed APE
45GH55	Fuller School was constructed circa. 1900 and operated until 1945. Building was constructed on second terrace above Chehalis River floodplain, but no structural evidence remains today. Bricks, glass, ceramics, and fragments of wood stove visible in area. Potentially Eligible	0.9 miles SE of proposed APE

Both pre-contact and historic-period archaeological sites are more common near the Satsop River's confluence with the Chehalis River than in the Satsop River's upper reaches. As discussed in Chapter 3, the Chehalis River has long been used as a thoroughfare between the southern Puget Sound and Grays Harbor and the greater Pacific coast.

Chapter 5
Research Design

This chapter describes expectations relating to archaeological sensitivity and anticipated archaeological site types based on the information presented in *Chapter 2, Environmental Context*, *Chapter 3, Cultural Context*, and *Chapter 4, Literature Review*. It also presents the methods for identifying archaeological sites in the proposed APE based on these expectations.

Expectations

The following are summaries of expectations relating to archaeological sensitivity and anticipated archaeological site types in the proposed APE.

Archaeological Sensitivity

This section uses geologic, hydrologic, and slope data to consider two distinct classes of *archaeological sensitivity*, which is defined in this study as an area's likelihood for containing archaeological sites. These classes of archaeological sensitivity include whether the proposed APE has the potential to contain archaeological sites in general (i.e. *general site sensitivity*), and whether the proposed APE has the capacity to contain buried archaeological sites (i.e. *buried site sensitivity*).

General Archaeological Sensitivity

For the purposes of this section, the phrase *general archaeological sensitivity* refers a given area's likelihood to contain surface-exposed or buried archaeological resources. This analysis relies on three key environmental attributes: proximity to permanent water sources, topographic slope, and surface elevation relative to the 100-year floodplain. The following briefly describes each of the attributes that were considered, the sources used, and how they influence archaeological sensitivity.

- **Proximity to Permanent Water Sources:** This factor was a particularly important consideration for precontact peoples because there was no infrastructure to transport water in the region, other than by manually carrying it. In recognition of the logistical considerations associated with this condition throughout much of North America, numerous researchers have studied the spatial relationship between archaeological resources and fresh water sources (including, but not limited to, Christenson 1990; Lothrop et al. 1987; Ingbar and Hall 2014). These studies have generally observed that as distance to fresh water decreases, the frequency of archaeological sites and range of archaeological site types increases. For example, Ingbar and Hall's (2014) research in the Willamette Valley revealed that the vast majority of both prehistoric and historical archaeological sites are located within 1,000 meters of water.

  One key factor, *channel migration*, may alter the present-day distance between archaeological resources and fresh water sources and has occurred in portions of the proposed APE, as well as affected the potential for archaeological site preservation. For example, Elder (et al. 2015) observed that archaeological features have limited potential to preserve on landforms exposed in the active channel for much of the year, and are then inundated for short periods during the rainy season. This research supports the premise of a limited potential for encountering archaeological sites in the historic channel migration zone.

- **Topographic Slope:** Slope or gradient can be an important logistical factor that affects how humans navigate and settle on the landscape. This is because as slope increases, the level-of-effort required to traverse, process resources, and construct habitations increases accordingly. In recognition of this, several studies have considered the way in which slope affects the distribution of archaeological sites, including, but not limited to Howey (2007), Ingbar and Hall (2014), and ICF International (2015). For example, Ingbar and Hall's (2014) analysis of archaeological sites in the Willamette Valley revealed that as slope increased, the frequency of archaeological sites and range of archaeological site types decreased. Most of the sites in the study were identified on slopes of 6 degrees or less, while the vast majority were identified on slopes of 12 degrees or less. The same was true of the analysis that ICF International (2014) performed on archaeological sites in the Powder River basin in eastern Montana. This analysis revealed that 92% of the archaeological sites in this region were located on slopes of 15 degrees or less.

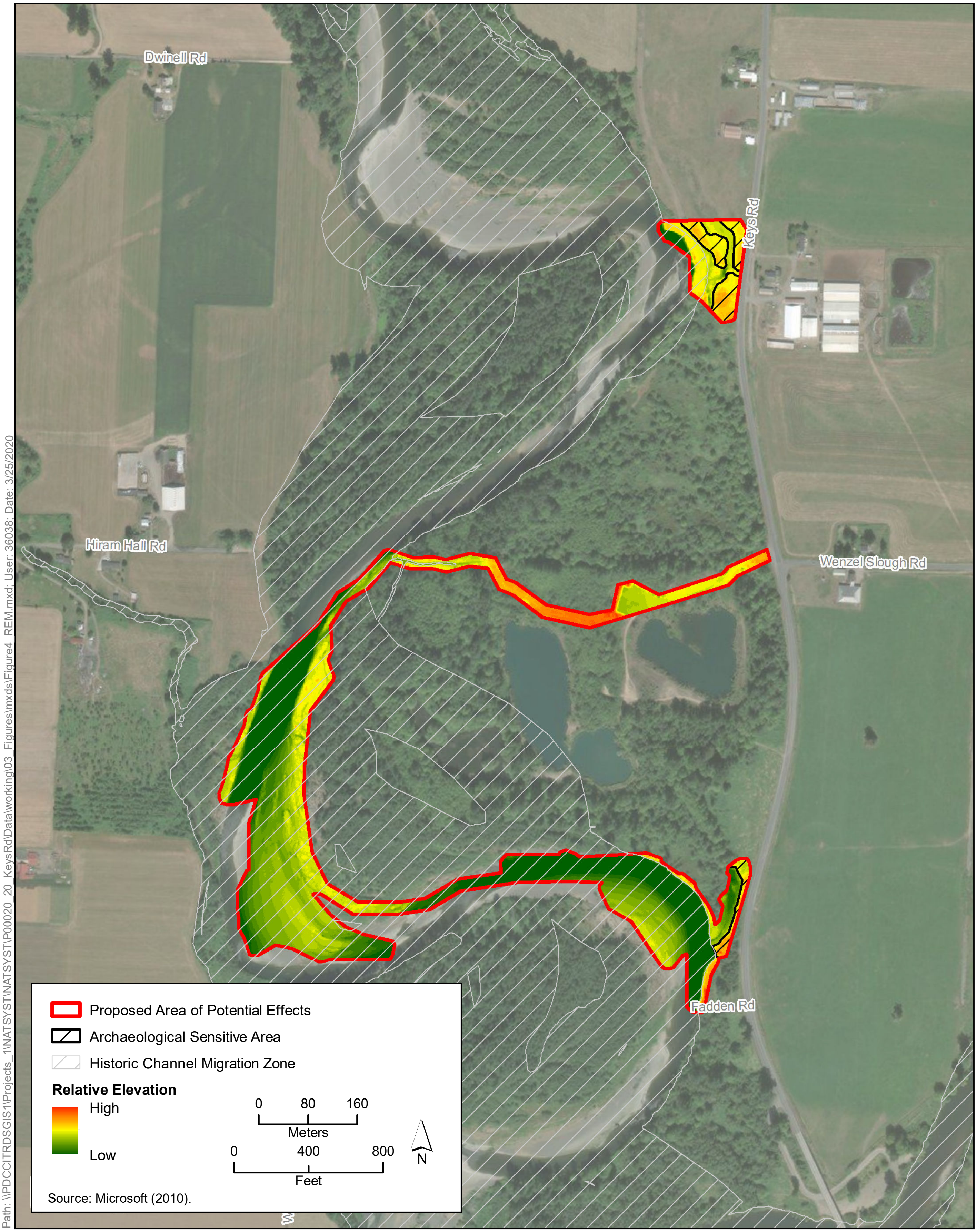
  Although a fairly consistent spatial relationship between many archaeological site types and flat or gradually sloping topography has been repeatedly observed, a few prehistoric sites types may be exceptions to this relationship. For example; hunting blinds, rock art, rock shelters and caves are likely to occur in areas with bedrock outcrops and steep slopes.

  A relative elevation model was used to designate areas of the proposed APE that appeared to have higher probability of containing archaeological resources. These high probability areas were identified outside of the historic channel migration zone in places characterized by relative elevations indicating they may have been terraces or banks during previous periods of channel migration, or were at least less frequently inundated. These areas, shown on Figure 4, were identified during the pre-field planning using the relative elevation model. When ICF archaeologists arrived in the field, some of the areas were observed to have characteristics— disturbance, relative elevation, or other factors— inconsistent with high archaeological probability and were duly downgraded, in terms of testing priority, within the research design.

- **Surface Elevation Relative to the 100 Year Floodplain:** Inundation can negatively affect archaeological feature preservation. It also affects the frequency and intensity with which a given landform can be inhabited. As a result, while there is an abundance of ethnographic and historical literature that documents historical and precontact use of intermittently inundated landforms (e.g. tidal flats, river bars, low elevation flood plains), archaeological evidence of this use can be sparse and difficult to perceive (but see Elder et al. 2014 for exceptions regarding intertidal fish capture features). Therefore, for the purposes of this study, we selected the 100-year floodplain as the zone below which archaeological feature preservation and persistent land use would be lesser than areas located at higher elevations.

  It is important to acknowledge that factors like channel migration and stream incision can rapidly change the elevation of the 100-year floodplain. Using channel course maps from the years 1940, 1981, 1991, 2006, 2009, 2015, 2017, and 2019, ICF created a map layer showing the recorded extent of channel migration during that time. This historic channel migration zone (HCMZ) is depicted in Figure 3. Within the proposed APE, channel migration over the last 80 years has been significant and rapid changes appear to have been common.

Since nearly all of the proposed project is located within 300 meters of a permanent water source, our analysis focused on slope and elevation relative to the 100-year floodplain. In order to perform the general sensitivity analysis, we collected and analyzed Light Detection and Ranging (LiDAR) data for the proposed APE and identified a series of areas located on flat ground and above the 100-year floodplain. This resulted in the identification of a series of alluvial terrace edges as having high general archaeological sensitivity across the proposed APE. These areas are identified in Figure 4.



ICF

Figure 4
Relative Elevation and Archaeologically Sensitive Areas in the Proposed APE
Keys Road Flood Protection Cultural Resources Survey

Buried Site Sensitivity

For the purposes of this analysis, the phrase *buried site sensitivity* refers a given areas' potential to contain buried archaeological sites. This concept differs slightly from the more general concept of *general archaeological sensitivity* discussed above, in that a landform may have high archaeological sensitivity, but limited buried site sensitivity if the landform formed prior to the period in which humans have occupied North America.

The age and environment in which a landform is created has direct bearing on when it becomes accessible for human use, how humans interact with it once it becomes accessible, and how the material remains of these activities are preserved. Landforms tend to be useful analytical units for archaeological sensitivity analyses because each type has a unique set of physical attributes and can be recognized and contrasted at the macroscopic scale. The age and depositional environment of a landform can also provide insight into whether buried archaeological resources are likely to be present.

The proposed APE is wholly located on alluvial landforms which formed during the latter part of the Holocene epoch (between around 12,000 years ago and the present) (Figure 3). This period coincides with the period for which there is scientific consensus regarding human occupation of North America (Meltzer 2004; Rick et al. 2001). Therefore, the proposed APE retains the potential to contain buried archaeological sites.

Precontact Archaeological Sites

Review of the precontact cultural sequence and ethnographic literature reveals moderate to high precontact use of the Chehalis River Basin. This is consistent with archaeologically observed land-use patterns across the region and reflects a regional emphasis on river-based resources, as well as upland hunting, during the late Holocene. The ethnographic and archaeological literature for the region also indicates that precontact peoples practiced a semi-sedentary mobility pattern; where groups of families would winter in large villages at river confluences and then disperse to smaller streams and uplands during the spring and summer months. Considering that the proposed APE is very near the confluence of the Satsop River and the Chehalis River, it is anticipated that precontact land use in the proposed APE would have been temporary habitation and resource collection activities. Thus, it is anticipated that the proposed APE has the potential to contain archaeological sites associated with these activities. Examples of potential precontact archaeological site types are provided below.

Table 4. Potential Precontact Archaeological Site Types

Functional Category	Property Type	Activity – Features and Artifacts
Limited Activity Sites	Fish Capture and Processing	Fish Capture Locations – wood weirs and traps, basket traps, netting, net weights, spears, and rakes. Fish Processing Locations – hearth features, ground or chipped stone knives, posts or post holes, wooden remnants of drying structures, and accumulations of fish bone
	Lithic Procurement and Reduction	Lithic Procurement Locations – debitage, broken tools, tool blanks, tested lithic materials, and hearths
	Plant Collection and Processing	Plant Collection Locations – trenches and hearths, dropped or broken digging sticks, grinding or hammer stones, adzes, and cobble tools. Plant Processing Locations – same as above
	Terrestrial Mammal Hunting and Butchering	Terrestrial Mammal Hunting Locations – dart and arrow points, snares, traps Terrestrial Mammal Butchering Locations – knives, projectile points, cobble tools, waste flakes, faunal remains, and hearths
Multiple Use Sites	Occupation Sites	Habitation – may include any of the limited use activities listed above, as well as temporary or permanent shelters, ritual features, burials, storage features, and tool production areas.
	Multiple Resource Processing Camp	Multiple – may include a combination of artifacts and features described in the limited use activity sites above, dependent on local availability of resources.

Historical Archaeological Sites

Review of the local historic context reveals that the northern portion of the proposed APE was used for agriculture during the twentieth century. Specifically, it served as open grazing land, an activity that has limited potential to form archaeological sites the potential for isolated refuse deposits and agricultural equipment remains.

It is important to note that a large part of the southern portion of the proposed APE was operated as a gravel quarry until relatively recently. The disturbance likely associated with these operations — mass excavation, grading, and operation of heavy equipment — is expected to be significant, especially where the proposed APE follows borrow pits, staging areas, and access roads left over from that time (see Figure 5).

Figure 5. Aerial photograph of the proposed APE taken July 1991 showing disturbance from gravel quarry activity.

Methods

ICF performed field investigations on February 26 and 27, conducting a pedestrian survey across the proposed APE and excavating shovel probes at strategic intervals based on the locations of proposed project-related ground disturbing activities. The following are detailed summaries of the methods used to perform the field investigations.

Pedestrian Survey

ICF archaeologists performed a pedestrian survey of the proposed APE to identify archaeological deposits and surface-exposed features. The pedestrian survey involved walking across the extent of the proposed APE at approximately 15-meter (50-foot) intervals while inspecting the ground surface. The pedestrian survey also involved inspecting the local topography to identify areas that have been subject to modern, anthropogenic landscape alteration and special attention was given to observing the river channel for any potential cultural remains that may be visible in the bank.

Subsurface Investigations

ICF archaeologists employed shovel probes (SPs) to characterize the local stratigraphy and to determine whether subsurface archaeological deposits were present. SPs were between 40 and 50 centimeters (16 and 20 inches) in diameter. All SPs were excavated by hand, and sediments were screened through 6-millimeter (0.25-inch) mesh hardware cloth. Upon the completion of each SP, archaeologists inspected the sedimentary composition and recorded the stratigraphy, presence or absence of fill, level of disturbance, contents, and any other observations. If the SP was terminated prior to reaching the 100 cmbs terminal depth, the reason for early termination was noted. SPs were photographed using a digital camera and their locations were recorded using an iPad with ArcGIS software. After recordation, all SPs were backfilled.

Shovel Probes

Due to the significantly diminished potential for observing intact archaeological deposits in the historic channel migration zone (Elder et al. 2015) these areas were not targeted for subsurface testing. Outside of the channel zone, probes were strategically placed at locations of ground disturbance. Specifically, we targeted areas of the proposed APE along Keys Road where planned Type 1 and 2 setback revetments overlapped with our estimates of archaeologically sensitive areas. Elsewhere in the proposed APE, SPs were excavated at 20 meter (60 foot) intervals. All survey shovel probes were excavated to a minimum depth of 100 centimeters (20 inches) below the current ground surface or until impassable conditions were encountered (i.e. water table or channel gravels). A hand-powered 10-centimeter (4-inch) diameter bucket auger was used at one out of every four SPs to excavate to greater depths (up to 220 centimeters [60 inches]) to better characterize the local stratigraphy and potential for deeply buried archaeological deposits.

Chapter 6
Survey Results

ICF archaeologists Kainoa Little, MA and Mathew Sisneros, BA performed the field investigations on February 26 and 27, 2020. The field investigations included a pedestrian survey of the entire proposed APE and the excavation of 30 SPs. No archaeological sites or historic built environment resources were identified during the field investigations. The results of the field investigations are depicted in Figure 9.

Pedestrian Survey

The northern section of the proposed APE appeared to be relatively intact, with the only significant historic-period disturbance likely being its transition from woodland to pasture. In the riverbank, it was possible to see that the alluvium in this area exceeds 2 meters in depth (see Figure 6).

Figure 6. Showing depth of alluvium using 2 meter stick - view is north.

Much of the northern half of the main section of the proposed APE had been disturbed by quarry activities. This disturbance was most intense in the 250 meters from Keys Road to the western edge of the pit (see Figures 7 and 10). The area had been excavated up to 3 meters below natural surface, graded, and compacted by heavy machinery.

Figure 7. Area heavily disturbed by quarry activity - view is east toward proposed staging area.

Similarly, much of the area between the pit and the river had also been subject to grading and compaction, evidenced by the boulder pile midway along that arm of the proposed APE.

Figure 8. Showing boulder pile, the product of grading access roads in the area. SP-14 seen in foreground - view is southeast.

In such areas, channel deposits were occasionally seen on the surface, where the low-energy alluvium had been graded away.

At the southeastern extent of the proposed APE, the Port of Grays Harbor well north of Fadden Road and the adjacent rock toe precluded subsurface testing in that area.

During the pedestrian survey, ICF archaeologists noted a concrete slab foundation of an unknown structure near the northern entrance of the proposed APE (see Figure 10). The slab was only partially within the proposed APE and had no diagnostic features but was in situ. ICF archaeologists also noted a collection of concrete slabs on the surface and eroding from a cut bank near the river on the northern arm of the main portion of the proposed APE (Figures 9 and 10). The concrete slabs were 6 inches thick and plywood formed. One fragment of heavily rusted metal was observed. The concentration of concrete slabs measured approximately 31 ft north-south and 44 ft east-west.

Figure 9. Concrete slabs eroding from a cut near the river - view is southeast.

Shovel Probes

A total of 30 SPs were excavated within the proposed APE, amounting to approximately 3 SPs per acre, given the 11.86 acres of the proposed APE outside of the active channel. Six of the 30 shovel probes were continued with a hand auger. On the northern arm of the main section of the proposed APE, no SPs were excavated in the 250 meters between Keys Road and the quarry pit because the pedestrian survey revealed that that area had been extensively modified by quarry activity, limiting its sensitivity for containing archaeological deposits. Review of the sedimentary composition and stratigraphic data from the SPs revealed five strata, all of alluvial origin. Table 4 summarizes the physical attributes and inferred depositional environment for each stratum. Descriptions of individual SPs are provided in Appendix A.

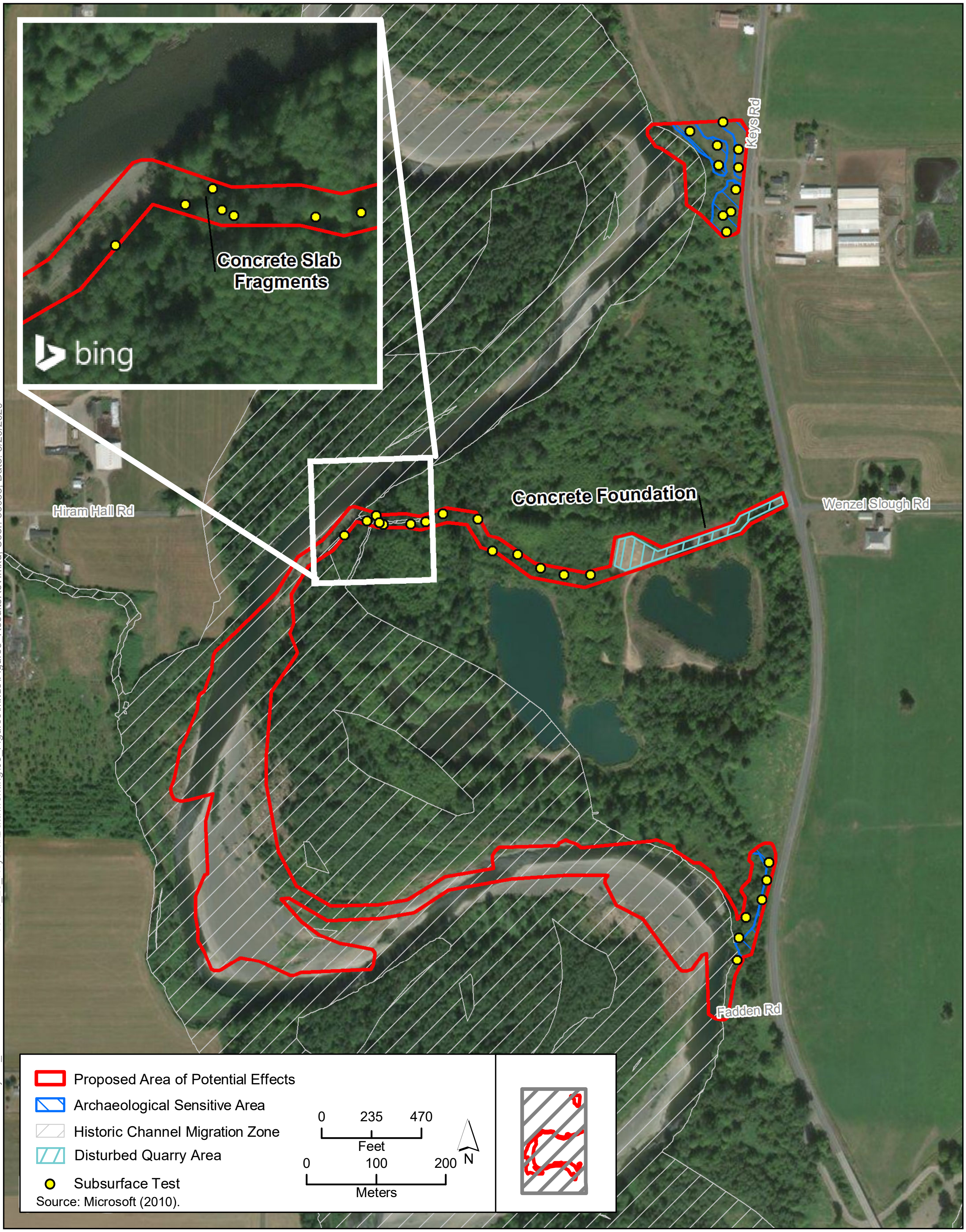


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Figure 10
Survey Results
Keys Road Flood Protection Cultural Resources Survey

Table 4. Observed Depositional Context

Stratum Designation	Description	Inferred Depositional Context
1	Light brown, loosely compacted silt with no gravels.	Low energy alluvium
2	Medium coarse yellowish-brown sand	Moderate energy alluvium
3	Compact grayish brown silt with red mottling	Low energy alluvium, with decomposed organics (likely red alder)
4	Odiferous bluish gray sandy clay with very few rounded pebbles	Low energy alluvium
5	Coarse gray sand with very many rounded fine pebbles to cobbles.	High energy alluvium/channel

All sediments observed across the proposed APE are interpreted to be alluvial in origin based on the fine particle size and homogeneity of the deposits seen in all SPs. In most cases, stratum 1 was present in open areas with relatively little disturbance. Stratum 2 was often present between instances of stratum 1, or on the surface in areas that appeared to experience period or seasonal inundation. Stratum 3 occurred in low areas with concentrated stands of red alder. Stratum 4 was found as a lens or subsurface in low-lying areas. Stratum 5, the channel, was found at the surface near the river and in inland areas where shallower strata had been graded off.

Chapter 7
Conclusions and Recommendations

Conclusions

Much of the proposed APE was covered by the historic channel migration zone, which had low potential for intact archaeological resources (Elder et al. 2014). The remaining areas of the proposed APE were tested, with special attention paid to terraces and other landforms having relative elevations appearing to exhibit archaeological potential. No archaeological resources were identified during the cultural resources investigations of the proposed APE, nor did the pedestrian and subsurface surveys confirm the presence of landforms or deposits likely to have significant archaeological potential. Therefore, the Project is not anticipated to encounter any as-yet undocumented archaeological sites.

The concrete foundation near Keys Road and the concentration of concrete slabs were not found to be diagnostic but were likely remnants of the gravel quarry operation. This operation, based on aerial photography, began sometime between 1953 and 1981 (NETR 2020a; NETR 2020b).

Recommendations

Based on the results of the cultural resources survey presented in this report, the Project is not expected to affect any NRHP-eligible historic properties. Therefore, a finding of no historic properties affected is recommended for this undertaking.

If, over the course of the Project, human skeletal remains are discovered, the Grays Harbor County Coroner and DAHP must be notified immediately. After determining that the remains are non-forensic, the Washington State physical anthropologist will notify the affected Native American tribes. If archaeological materials are uncovered during the Project, Grays Harbor County and their contractors must immediately stop work, and the project manager must contact the Corps as lead federal agency. If the discovery is a precontact archaeological site, ICF recommends that the Corps and Grays Harbor County consult with DAHP and the affected Native American tribes to determine treatment for the resource.

Ground disturbance should not recommence in the vicinity of the find until formal consultation with the affected parties has occurred and permission from the Corps cultural resources specialist has been obtained. Additionally, the Corps may request an unanticipated discovery plan to be in place which would outline the procedures and protocols for dealing with archaeological discoveries that occur during ground disturbance.

Chapter 8
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Appendix A

Field Data

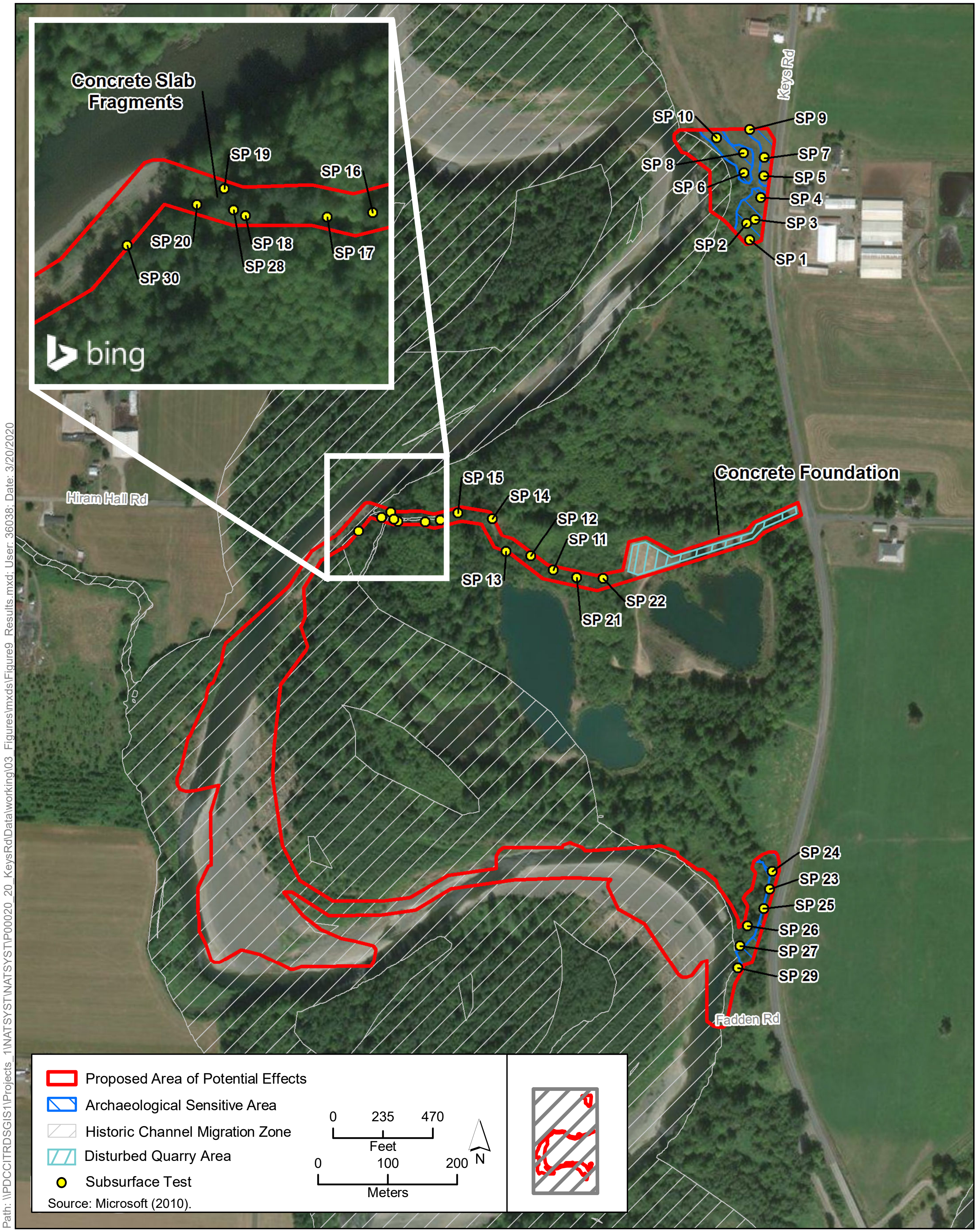

Figure 11
Survey Results
Keys Road Flood Protection Cultural Resources Survey

Shovel Probe Number/Field Number	Depth (Centimeters below surface)	Descriptions	Comments	Origin	Cultural Material Presence
1/MRS-01	0–100	Light brown, loosely compacted silt with no gravels		Strat 1- Low energy alluvium	None
2/ KL-01	0–130	Light brown, loosely compacted silt with no gravels		Strat 1- Low energy alluvium	None
	130-145	Medium coarse yellowish-brown sand		Strat 2- Moderate energy alluvium	
	145-205	Light brown, loosely compacted silt with no gravels	Augered	Strat 1- Low energy alluvium	
3/MRS-02	0–90	Light brown, loosely compacted silt with no gravels		Strat 1- Low energy alluvium	None
	90–100	Compact grayish brown silt with red mottling		Strat 3- Low energy alluvium	None
4/KL-02	0–100	Light brown, loosely compacted silt with no gravels	Burned root in sidewall from 46-63	Strat 1- Low energy alluvium	None
5/MRS-03	0–40	Light brown, loosely compacted silt with no gravels		Strat 1- Low energy alluvium	None
	40-220	Medium coarse yellowish-brown sand	Augered	Strat 2- Moderate energy alluvium	
6/KL-03	0–100	Light brown, loosely compacted silt with no gravels		Strat 1- Low energy alluvium	None
7/MRS-04	0–45	Light brown, loosely compacted silt with no gravels		Strat 1- Low energy alluvium	None
	45-50	Yellowish-brown silty sand			
8/KL-04	0–100	Light brown, loosely compacted silt with no gravels		Strat 1- Low energy alluvium	None
9/MRS-05	0–30	Light brown, loosely compacted silt with no gravels		Strat 1- Low energy alluvium	None
	30–100	Sticky yellowish brown silty sand		Strat 2- Moderate energy alluvium	None
10/KL-05	0–115	Light brown, loosely compacted silt with no gravels	Augered	Strat 1- Alluvium	None

	115-120	Yellowish-brown silty sand		Strat 2- Moderate energy alluvium	
	120-200	Light brown, loosely compacted silt with no gravels; more tacky and blocky due to moisture		Strat 1- Alluvium	
11/MRS-06	0–35	Light brown, loosely compacted silt with no gravels		Strat 1- Alluvium	None
	35-90			Strat 2- Moderate energy alluvium	
12/KL-06	0–75	Compact orangish brown sandy silt with many mostly rounded gravels		Disturbed	None
13/MRS-07	0–55	Compact orangish brown sandy silt with many mostly rounded gravels	Asphalt fragments 40-50 cmbs; terminated at cobbles.	Disturbed	None
14/KL-07	0–3	Disturbed ground above channel gravels		Disturbed	None
15/MRS-08	0–45	Compact orangish brown sandy silt with many mostly rounded gravels		Disturbed	None
16/KL-08	0–5	Yellowish-brown silty sand	On road cut-cum-drainage 1-2 ft below natural grade.	Strat 2- Moderate energy alluvium	None
	5-7	Compact bluish gray clayey silt with oxide mottling		Strat 4- Low energy alluvium	
	7-33	Yellowish-brown silty sand		Strat 2- Moderate energy alluvium	
	33-38	Coarse gray sand with very many rounded fine pebbles to cobbles *Terminated at channel*		Strat 5- High energy alluvium/chann el	
17/MRS-09	0–17	Yellowish-brown silty sand		Strat 2- Moderate energy alluvium	None
	17-30	Coarse gray sand with very many rounded fine pebbles to cobbles	*Terminated at channel*	Strat 5- High energy alluvium/chann el	

18/KL-09	0–58	Light brown, loosely compacted silt with no gravels	South above road cut; large root at termination	Strat 1- Alluvium	None
19/MRS-10	0–47	Yellowish-brown silty sand		Strat 2- Moderate energy alluvium	None
	47-65	Compact bluish gray clayey silt with oxide mottling		Strat 4- Low energy alluvium	
20/KL-10	0–155	Yellowish-brown silty sand	Augered *Terminated at channel*	Strat 2- Moderate energy alluvium	None
21/MRS-11	0–80	Compact brown sandy silt with many mostly rounded gravels		Disturbed	None
22/KL-11	0–103	Compact brown sandy silt with many mostly rounded gravels	Augered; concrete fragments near 70 cmbs	Disturbed	None
23/MRS-12	0–100	Yellowish-brown silty sand		Strat 2- Moderate energy alluvium	None
24/KL-12	0–203	Light brown, loosely compacted silt with no gravels	Augered	Strat 1- Alluvium	None
25/MRS-13	0–100	Yellowish-brown silty sand		Strat 2- Moderate energy alluvium	None
26/KL-13	0–65	Yellowish-brown silty sand		Strat 2- Moderate energy alluvium	None
	65-130	Light brown, loosely compacted silt with no gravels		Strat 1- Alluvium	
	130-157	Coarse gray sand with very many rounded fine pebbles to cobbles.	Augered *Terminated at channel*	Strat 5- High energy alluvium/channel	
27/MRS-14	0–100	Yellowish-brown silty sand		Strat 2- Moderate energy alluvium	None
28/KL-14	0–58	Light brown, loosely compacted silt with no gravels		Strat 1- Alluvium	None
	58-60	Coarse gray sand with very many rounded fine pebbles to cobbles.	*Terminated at channel*	Strat 5- High energy alluvium/channel	

29/MRS-015	0–100	Yellowish-brown silty sand		Strat 2-Moderate energy alluvium	None
30/MRS-016	0–35	Yellowish-brown silty sand		Strat 2-Moderate energy alluvium	None
	35-45	Coarse gray sand with very many rounded fine pebbles to cobbles.	*Terminated at channel*	Strat 5- High energy alluvium/chann el	
cmbs = centimeters below the current ground surface					

Session 1 Shovel Probes

Shovel Probe Number/Field Number	Depth (Centimeters below surface)	Descriptions	Comments	Origin	Cultural Material Presence
1/KY-042	0–57	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None
2/ MRS-47	0–50	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None
3/KY-041	0–45	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None
	45–50	Dark brown, loosely compacted silt with rounded gravels throughout	Channel Deposit	Strat 2-High energy alluvium	None
4/MRS-046	0–50	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None
5/KY-040	0–55	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None
6/MRS-045	0–40	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None
	40–42	Brown, loosely compacted silt with increasing rounded gravels and cobbles throughout	Channel Deposit	Strat 2-High energy alluvium	None
7/MRS-044	0–50	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None
8/KY-039	0–60	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None
9/MRS-043	0–45	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1-Alluvium	None

	45–47	Brown, loosely compacted silt with increasing rounded gravels and cobbles throughout	Channel Deposit	Strat 2- High energy alluvium	None
10/KY-038	0–52	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
11/KY-037	0–59	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
12/MRS-042	0–50	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
13/KY-036	0–63	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
14/MRS-041	0–50	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
15/KY-035	0–52	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
16/MRS-040	0–100	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
17/MRS-039	0–50	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
18/KY-034	0–55	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None
19/KY-033	0–100	Reddish-brown, loosely compacted silty-sand with rounded gravels throughout		Strat 1- Alluvium	None
20/MRS-038	0–100	Reddish-brown, loosely compacted silt with rounded gravels throughout		Strat 1- Alluvium	None

21/KY-032	0–54	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
22/MRS-037	0–50	Reddish-brown, loosely compacted silty-sand with rounded gravels throughout	Strat 1-Alluvium	None
23/KY-031	0–58	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
24/KY-030	0–87	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
25/MRS-036	0–50	Reddish-brown, loosely compacted silt with sparse rounded gravels throughout	Strat 1-Alluvium	None
26/MRS-034	0–50	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
27/MRS-035	0–70	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
	70–75	Brown, loosely compacted silt with increasing rounded gravels and cobbles throughout	Strat 2-High energy alluvium	None
28/KY-029	0–57	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
29/KY-028	0–53	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
30/MRS-033	0–100	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
31/MRS-031	0-45	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None

32/MRS-032	0–50	Reddish-brown, loosely compacted silt with rounded gravels throughout	Strat 1-Alluvium	None
cmbs = centimeters below the current ground surface				