INTERSTATE 5 COLUMBIA RIVER CROSSING

Archaeology Technical Report

May 2008

Columbia River CROSSING

TO: Readers of the CRC Technical Reports

FROM: CRC Project Team

SUBJECT: Differences between CRC DEIS and Technical Reports

The I-5 Columbia River Crossing (CRC) Draft Environmental Impact Statement (DEIS) presents information summarized from numerous technical documents. Most of these documents are discipline-specific technical reports (e.g., archeology, noise and vibration, navigation, etc.). These reports include a detailed explanation of the data gathering and analytical methods used by each discipline team. The methodologies were reviewed by federal, state and local agencies before analysis began. The technical reports are longer and more detailed than the DEIS and should be referred to for information beyond that which is presented in the DEIS. For example, findings summarized in the DEIS are supported by analysis in the technical reports and their appendices.

The DEIS organizes the range of alternatives differently than the technical reports. Although the information contained in the DEIS was derived from the analyses documented in the technical reports, this information is organized differently in the DEIS than in the reports. The following explains these differences. The following details the significant differences between how alternatives are described, terminology, and how impacts are organized in the DEIS and in most technical reports so that readers of the DEIS can understand where to look for information in the technical reports. Some technical reports do not exhibit all these differences from the DEIS.

Difference #1: Description of Alternatives

The first difference readers of the technical reports are likely to discover is that the full alternatives are packaged differently than in the DEIS. The primary difference is that the DEIS includes all four transit terminus options (Kiggins Bowl, Lincoln, Clark College Minimum Operable Segment (MOS), and Mill Plain MOS) with each build alternative. In contrast, the alternatives in the technical reports assume a single transit terminus:

- Alternatives 2 and 3 both include the Kiggins Bowl terminus
- Alternatives 4 and 5 both include the Lincoln terminus

In the technical reports, the Clark College MOS and Mill Plain MOS are evaluated and discussed from the standpoint of how they would differ from the full-length Kiggins Bowl and Lincoln terminus options.

Difference #2: Terminology

Several elements of the project alternatives are described using different terms in the DEIS than in the technical reports. The following table shows the major differences in terminology.

DEIS terms	Technical report terms
Kiggins Bowl terminus	I-5 alignment
Lincoln terminus	Vancouver alignment
Efficient transit operations	Standard transit operations
Increased transit operations	Enhanced transit operations

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Difference #3: Analysis of Alternatives

The most significant difference between most of the technical reports and the DEIS is how each structures its discussion of impacts of the alternatives. Both the reports and the DEIS introduce long-term effects of the full alternatives first. However, the technical reports then discuss "segment-level options," "other project elements," and "system-level choices." The technical reports used segment-level analyses to focus on specific and consistent geographic regions. This enabled a robust analysis of the choices on Hayden Island, in downtown Vancouver, etc. The system-level analysis allowed for a comparative evaluation of major project components (replacement versus supplemental bridge, light rail versus bus rapid transit, etc). The key findings of these analyses are summarized in the DEIS; they are simply organized in only two general areas: impacts by each full alternative, and impacts of the individual "components" that comprise the alternatives (e.g. transit mode).

Difference #4: Updates

The draft technical reports were largely completed in late 2007. Some data in these reports have been updated since then and are reflected in the DEIS. However, not all changes have been incorporated into the technical reports. The DEIS reflects more recent public and agency input than is included in the technical reports. Some of the options and potential mitigation measures developed after the technical reports were drafted are included in the DEIS, but not in the technical reports. For example, Chapter 5 of the DEIS (Section 4(f) evaluation) includes a range of potential "minimization measures" that are being considered to reduce impacts to historic and public park and recreation resources. These are generally not included in the technical reports. Also, impacts related to the stacked transit/highway bridge (STHB) design for the replacement river crossing are not discussed in the individual technical reports, but are consolidated into a single technical memorandum.

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Cover Sheet

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ACRONYMS

Acronym	Description
ABCFM	American Board of Commissioners for Foreign Missions
ADA	Americans with Disabilities Act
AMS	Accelerator Mass Spectrometer dating method
APE	Area of Potential Effect
API	Area of Potential Impact
BLM	Bureau of Land Management
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe Railroad
BP	Before Present
BPA	Bonneville Power Administration
BRT	Bus Rapid Transit
CBD	Central Business District
CFR	Code of Federal Regulations
COE	U.S. Army Corps of Engineers
CRC	Columbia River Crossing
CRD	Columbia River Datum
CRL	Confirmed Release List and Inventory
CSS	Columbia South Shore
CTWSRO	Confederated Tribes of the Warm Springs Reservation of Oregon
DAHP	Washington Department of Archaeology and Historic Preservation
DEIS	Draft Environmental Impact Statement
DEQ	Oregon Department of Environmental Quality
DLCD	Department of Land Conservation and Development
DOI	U.S. Department of Interior
DOGAMI	Oregon Department of Geology and Mineral Industries
DOT	Department of Transportation
DSL	Oregon Department of State Lands
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FEIS	Final Environmental Impact Statement
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Maps
Ft	feet/foot
FONSI	Finding of No Significant Impact
FTA	Federal Transit Administration
GIS	Geographic Information System
GMA	Growth Management Act
GPR	Ground Penetrating Radar
GPS	Global Positioning System
HAZMAT	Hazardous Materials/Incidents
HBC	Hudsons Bay Company

Acronym	Description
HCT	High Capacity Transit
LRT	Light Rail Transit
MOA	Memorandum of Agreement
MSL	Mean Sea Level
NEPA	National Environmental Policy Act
NFA	No Further Action
NGVD	National Geodetic Vertical Datum
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OAR	Oregon Administrative Rule
ODFW	Oregon Department of Fish & Wildlife
ODOT	Oregon Department of Transportation
ONHP	Oregon Natural Heritage Program
RCW	Revised Code of Washington
RLIS	Regional Land Information System
ROD	Record of Decision
ROW	Right-of-way
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SEPA	State Environmental Policy Act
SHPO	Oregon State Historic Preservation Office
SMA	Shoreline Management Act
SPT	Standard Penetration Test
SRA	Sensitive Resource Areas
STIP	State Transportation Improvement Plan
TAZ	Transportation Analysis Zone
TCP	Traditional Cultural Properties
TDM	Transportation Demand Management
TEA-21	Transportation Equity Act for the 21st Century
TSM	Transportation System Management
UPRR	Union Pacific Railroad
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VNHR	Vancouver National Historic Reserve
WM	Willamette Meridian
WRD	Oregon Department of Water Resources
WSDOT	Washington State Department of Transportation
Yr	Year

1. Summary

1.1 Introduction

The Columbia River Crossing (CRC) Project seeks to improve safety, access, and capacity for traffic and transit in the Interstate 5 (I-5) corridor between Portland, Oregon and Vancouver, Washington. The objective of this report is to provide information pertaining to the identification of historic (archaeological) properties that may be affected by the proposed CRC project. The purpose of the archaeological work is to ensure compliance by the project with the National Historic Preservation Act (NHPA), National Environmental Policy Act (NEPA), stipulations of the Transportation Act, and other laws and regulations regarding resources typically referred to as historic properties or archaeological resources. The NHPA, as amended, is the umbrella law that requires that federal agencies identify and assess the effects of federally assisted undertakings on historic properties and to consult with others to find acceptable ways to avoid, minimize, or mitigate adverse effects.

This document is a preliminary archaeology technical report that identifies known or potential archaeological historic properties that may be affected by construction of the CRC Project in Washington and Oregon. As a means of establishing the prehistoric and historic context of the project area, this document contains sections on geology and geomorphology, prehistory, ethnography, ethnohistory, history, and historical archaeology. This document is preliminary in the sense that, aside from a brief pedestrian reconnaissance of the I-5 corridor, no archaeological field investigations have yet been undertaken. The considerable information about prehistoric and historical archaeological sites compiled in this document will contribute to the identification and assessment of historic properties that may be affected by the proposed project.

Within the Area of Potential Effect (APE), no prehistoric or historical archaeological sites have been identified on the Oregon shore. On the Washington shore, 10 archaeological sites and one landscape feature (with an underlying archaeological component) have been previously recorded within the CRC APE. Three of these sites—Vancouver Barracks (45CL162H), Fort Vancouver National Historic Site (45CL163H), and Kanaka Village (45CL300H)—encompass extensive overlapping areas containing multiple archaeological features and activity areas.

In recognition of the significance of the historical above-ground/built and archaeological resources around historic Fort Vancouver, the "Omnibus Parks and Public Lands Management Act of 1996" (Public Law 104-333) created the Vancouver National Historic Reserve (VNHR) which encompasses 366 acres in the city of Vancouver on which the following historic areas are found: (1) Fort Vancouver National Historic Site and Adjacent Cultural Landscape; (2) Vancouver Barracks and Officers Row; (3) Parade Ground; (4) Pearson Field; (5) Columbia River Waterfront; and (6) Water Resources Area. Most of these resources fall to some extent within the project APE.

Review of the geomorphology and archaeology of the project area indicates that there is a greater likelihood of encountering prehistoric archaeological sites on the south shore and historical archaeological sites on the north shore. Despite differences in the types of sites likely to be found on the two shores, generally similar ranges of site discovery procedures may be applied throughout much of the CRC APE in efforts to identify sites during the next phase of work. In view of the great amount of ground disturbance in the I-5 corridor and adjacent areas, the identification of archaeological sites will require extensive subsurface investigations using a range of techniques. Project archaeologists are preparing a companion research design document that will provide guidelines for choosing which techniques to use under a range of conditions.

1.2 Description of the Alternatives

The alternatives being considered for the CRC project consist of a diverse range of highway, transit and other transportation choices. Some of these choices – such as the number of traffic lanes across the river – could affect transportation performance and impacts throughout the bridge influence area or beyond. These are referred to as "system-level choices." Other choices – such as whether to run high-capacity transit (HCT) on Washington Street or Washington and Broadway Streets – have little impact beyond the area immediately surrounding that proposed change and no measurable effect on regional impacts or performance. These are called "segment-level choices." This report discusses the impacts from both system- and segment-level choices, as well as "full alternatives." The full alternatives combine system-level and segment-level choices for highway, transit, pedestrian, and bicycle transportation. They are representative examples of how project elements may be combined. Other combinations of specific elements are possible. Analyzing the full alternatives allows us to understand the combined performance and impacts that would result from multimodal improvements spanning the bridge influence area.

Following are brief descriptions of the alternatives being evaluated in this report, which include:

- System-level choices,
- Segment-level choices, and
- Full alternatives.

1.2.1 System-Level Choices

System-level choices have potentially broad influence on the magnitude and type of benefits and impacts produced by this project. These options may influence physical or operational characteristics throughout the project area and can affect transportation and other elements outside the project corridor as well. The system-level choices include:

- River crossing type (replacement or supplemental)
- High-capacity transit mode (bus rapid transit or light rail transit)
- Tolling (no toll, I-5 only, I-5 and I-205, standard toll, higher toll)

This report compares replacement and supplemental river crossing options. A replacement river crossing would remove the existing highway bridge structures across the Columbia River and replace them with three new parallel structures – one for I-5 northbound traffic, another for I-5 southbound traffic, and a third for HCT, bicycles, and pedestrians. A supplemental river crossing would build a new bridge span downstream of the existing I-5 bridge. The new supplemental bridge would carry southbound I-5 traffic and HCT, while the existing I-5 bridge would carry northbound I-5 traffic, bicycles, and pedestrians. The replacement crossing would include three through-lanes and two auxiliary lanes for I-5 traffic in each direction. The supplemental crossing would include three through-lanes and one auxiliary lane in each direction.

Two types of HCT are being considered – bus rapid transit and light rail transit. Both would operate in an exclusive right-of-way through the project area, and are being evaluated for the same alignments and station locations. The HCT mode – LRT or BRT – is evaluated as a system-level choice. Alignment options and station locations are discussed as segment-level choices. BRT would use 60-foot or 80-foot long articulated buses in lanes separated from other traffic. LRT would use one- and two-car trains in an extension of the MAX line that currently ends at the Expo Center in Portland.

Under the efficient operating scenario, LRT trains would run at approximately 7.5 minute headways during the peak periods. BRT would run at headways between 2.5 and 10 minutes depending on the location in the corridor. BRT would need to run at more frequent headways to match the passenger-carrying capacity of the LRT trains. This report also evaluates performance and impacts for an increased operations scenario that would double the number of BRT vehicles or the number of LRT trains during the peak periods.

1.2.2 Segment-Level Choices

1.2.2.1 Transit Alignments

The transit alignment choices are organized into three corridor segments. Within each segment the alignment choices can be selected relatively independently of the choices in the other segments. These alignment variations generally do not affect overall system performance but could have important differences in the impacts and benefits that occur in each segment. The three segments are:

- Segment A1 – Delta Park to South Vancouver
- Segment A2 – South Vancouver to Mill Plain District
- Segment B – Mill Plain District to North Vancouver

In Segment A1 there are two general transit alignment options - offset from, or adjacent to, I-5. An offset HCT guideway would place HCT approximately 450 to 650 feet west of I-5 on Hayden Island. An adjacent HCT guideway across Hayden Island would locate HCT immediately west of I-5. The alignment of I-5, and thus the alignment of an adjacent HCT guideway, on Hayden Island would vary slightly depending upon the river crossing and highway alignment, whereas an offset HCT guideway would retain the same station location regardless of the I-5 bridge alignment.

HCT would touch down in downtown Vancouver at Sixth Street and Washington Street with a replacement river crossing. A supplemental crossing would push the touch down location north to Seventh Street. Once in downtown Vancouver, there are two alignment options for HCT – a two-way guideway on Washington Street or a couplet design that would place southbound HCT on Washington Street and northbound HCT on Broadway. Both options would have stations at Seventh Street, 12th Street, and at the Mill Plain Transit Center between 15th and 16th Streets.

From downtown Vancouver, HCT could either continue north on local streets or turn east and then north adjacent to I-5. Continuing north on local streets, HCT could either use a two-way guideway on Broadway or a couplet on Main Street and Broadway. At 29th Street, both of these options would merge to a two-way guideway on Main Street and end at the Lincoln Park and Ride located at the current WSDOT maintenance facility. Once out of downtown Vancouver, transit has two options if connecting to an I-5 alignment: head east on 16th Street and then through a new tunnel under I-5, or head east on McLoughlin Street and then through the existing underpass beneath I-5. With either option HCT would connect with the Clark College Park and Ride on the east side of I-5, then head north along I-5 to about SR 500 where it would cross back over I-5 to end at the Kiggins Bowl Park and Ride.

There is also an option, referred to as the minimum operable segments (MOS), which would end the HCT line at either the Mill Plain station or Clark College. The MOS options provide a lower cost, lower performance alternative in the event that the full-length HCT lines could not be funded in a single phase of construction and financing.

1.2.2.2 Highway and Bridge Alignments

This analysis divides the highway and bridge options into two corridor segments, including:

- Segment A – Delta Park to Mill Plain District
- Segment B – Mill Plain District to North Vancouver

Segment A has several independent highway and bridge alignment options. Differences in highway alignment in Segment B are caused by transit alignment, and are not treated as independent options.

There is one option for the replacement crossing –downstream of the existing I-5 bridge. At the SR 14 interchange there are two basic configurations being considered. A traditional configuration would use ramps looping around both sides of the mainline to provide direct connection between I-5 and SR 14. A less traditional design could reduce right-of-way requirements by using a “left loop” that would stack both ramps on the west side of the I-5 mainline.

1.2.3 Full Alternatives

Full alternatives represent combinations of system-level and segment-level options. These alternatives have been assembled to represent the range of possibilities and total impacts at the project and regional level. Packaging different configurations of highway,

transit, river crossing, tolling and other improvements into full alternatives allows project staff to evaluate comprehensive traffic and transit performance, environmental impacts and costs.

Exhibit 1-1 summarizes how the options discussed above have been packaged into representative full alternatives.

Exhibit 1-1. Full Alternatives

	Packaged Options				
Full Alternative	River Crossing Type	HCT Mode	Northern Transit Alignment	TDM/TSM Type	Tolling Method[a]
1	Existing	None	N/A	Existing	None
2	Replacement	BRT	I-5	Aggressive	Standard Rate
3	Replacement	LRT	I-5	Aggressive	Two options[b]
4	Supplemental	BRT	Vancouver	Very Aggressive	Higher rate
5	Supplemental	LRT	Vancouver	Very Aggressive	Higher rate

[a] In addition to different tolling rates, this report evaluates options that would toll only the I-5 river crossing and options that would toll both the I-5 and the I-205 crossings.

[b] Alternative 3 is evaluated with two different tolling scenarios, tolling and non-tolling.

Modeling software used to assess alternatives' performance does not distinguish between smaller details, such as most segment-level transit alignments. However, the geographic difference between the Vancouver and I-5 transit alignments is significant enough to warrant including this variable in the model. All alternatives include Transportation Demand Management (TDM) and Transportation System Management (TSM) measures designed to improve efficient use of the transportation network and encourage alternative transportation options to commuters such as carpools, flexible work hours, and telecommuting. Alternatives 4 and 5 assume higher funding levels for some of these measures.

Alternative 1: The National Environmental Policy Act (NEPA) requires the evaluation of a No-Build or "No Action" alternative for comparison with the build alternatives. The No-Build analysis includes the same 2030 population and employment projections and the same reasonably foreseeable projects assumed in the build alternatives. It does not include any of the I-5 CRC related improvements. It provides a baseline for comparing the build alternatives, and for understanding what will happen without construction of the I-5 CRC project.

Alternative 2: This alternative would replace the existing I-5 bridge with three new bridge structures downstream of the existing bridge. These new bridge structures would carry Interstate traffic, BRT, bicycles, and pedestrians. There would be three through-lanes and two auxiliary lanes for I-5 traffic in each direction. Transit would include a BRT system that would operate in an exclusive guideway from Kiggins Bowl in Vancouver to the Expo Center station in Portland. Express bus service and local and feeder bus service would increase to serve the added transit capacity. BRT buses would

turn around at the existing Expo Station in Portland, where riders could transfer to the MAX Yellow Line.

Alternative 3: This is similar to Alternative 2 except that LRT would be used instead of BRT. This alternative is analyzed both with a toll collected from vehicles crossing the Columbia River on the new I-5 bridge, and with no toll. LRT would use the same transit alignment and station locations. Transit operations, such as headways, would differ, and LRT would connect with the existing MAX Yellow Line without requiring riders to transfer.

Alternative 4: This alternative would retain the existing I-5 bridge structures for northbound Interstate traffic, bicycles, and pedestrians. A new crossing would carry southbound Interstate traffic and BRT. The existing I-5 bridges would be re-striped to provide two lanes on each structure and allow for an outside safety shoulder for disabled vehicles. A new, wider bicycle and pedestrian facility would be cantilevered from the eastern side of the existing northbound (eastern) bridge. A new downstream supplemental bridge would carry four southbound I-5 lanes (three through-lanes and one auxiliary lane) and BRT. BRT buses would turn around at the existing Expo Station in Portland, where riders could transfer to the MAX Yellow Line. Compared to Alternative 2, increased transit service would provide more frequent service. Express bus service and local and feeder bus service would increase to serve the added transit capacity.

Alternative 5: This is similar to Alternative 4 except that LRT would be used instead of BRT. LRT would have the same alignment options, and similar station locations and requirements. LRT service would be more frequent (approximately 3.5 minute headways during the peak period) compared to 7.5 minutes with Alternative 3. LRT would connect with the existing MAX Yellow Line without requiring riders to transfer.

1.3 Long-Term Effects

In view of the great amount of ground disturbance in the I-5 corridor and adjacent areas, the identification of archaeological sites will require extensive subsurface investigations using a variety of excavation methods. This additional discovery work, to be outlined in the research design currently in preparation, will be required before a determination of long-term effects can be finalized.

1.4 Temporary Effects

Temporary measures required for construction, including acquisition of temporary rights-of-way and construction staging areas, may have both temporary and long-term effects on archaeological resources. The locations of staging areas and temporary rights-of-way are yet to be confirmed based on final engineering designs. Once these locations are determined, this section will be updated.

1.5 Mitigation

Where property acquisitions and other effects on NRHP-listed and eligible archaeological resources are unavoidable and where the project causes an adverse effect to the resource, mitigation plans will be designed and drafted in cooperation with WSDOT, ODOT, the Washington DAHP, the Oregon SHPO, the National Park Service, appropriate tribes, local jurisdictions, other vested agencies, and FHWA. Mitigation measures may include data recovery excavations, off-site mitigation measures, public interpretation (displays, videos, presentations, or other public interpretation), or other measures as agreed upon. Cultural resource mitigation measures must be approved in a Memorandum of Agreement (MOA) prior to issuance of the NEPA EIS Record of Decision.

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2. Methods

2.1 Introduction

It is anticipated that as the project evolves and the range of potential impacts to resources becomes better understood, revisions to the methodology will be necessary to address new and/or different issues to ensure project compliance with federal, state and local regulations pertaining to the protection and management of archaeological and cultural resources. The extent to which laws and regulations apply to this project will depend upon the specific resources encountered within the project area.

2.2 Study Area

The study area used for initial data collection and alternatives development included both a primary and a secondary Area of Potential Impact (API). The analysis area in Washington extends from approximately 164th Street south to the Columbia River, through an intensively developed business district and adjacent residential neighborhoods of Vancouver. The analysis area in Oregon is divided into northern and southern sections based on topography and the extent of historic development. The northern section is situated between the Columbia River and Columbia Slough, and has relatively recent development. It consists of relatively low ground that corresponds to the current flood plain of the Columbia River.

The primary API extends from the I-5/Main Street interchange in Vancouver, south approximately five miles, to Columbia Boulevard in Portland. It generally encompasses the area within 0.25 mile on either side of I-5. In some areas, the primary API is less than 0.25 mile due to built or natural features that limit the potential for impact. Possible direct impacts would most likely occur in the primary API.

The secondary API defines a larger area in which indirect impacts from the project could occur. The secondary API extends from the I-5/I-205 interchange north of Vancouver, south approximately 15 miles to the I-5/I-84 interchange in Portland. The eastern and western boundaries of the secondary API extend approximately one mile from the outside lanes of I-5.

The initial resource identification effort focused on the primary API.

After development of the alternatives to be considered in the Draft Environmental Impact Statement (DEIS), a preliminary Area of Potential Effect (APE) pursuant to National Historic Preservation Act (NEPA) Section 106 requirements was developed and sent to Consulting Parties for review and comment. While the project's overall APE included the most extensive boundary of areas to be considered for historic built environment resources, the portion of the APE addressing archaeological resources is much less encompassing. The archaeological area of concern includes the project's proposed

footprint (existing facilities to be improved and new rights-of-way), with an additional 50-foot wide buffer to capture potential temporary construction easement areas. The VNHR is included because the project would need to address any potential impacts to the archaeological resources of the VNHR.

The National Park Service (NPS), a Consulting Party pursuant to 36 CFR 800, expressed concern that the Preliminary APE encompassed any portion of the VNHR. While acknowledging the NPS concerns, the project continues to include the VNHR, as the alternatives that have been developed to a conceptual level for consideration in the DEIS include only sliver portions of land within the VNHR. The Federal Highway Administration (FHWA) will continue to coordinate with the NPS as (archaeological) historic resources are identified, site significance assessed, potential effects determined, and adverse effects are resolved.

2.3 Effects Guidelines

The purpose of the archaeological assessment is to ensure compliance with the National Historic Preservation Act (NHPA), NEPA, and stipulations of the Transportation Act by the project. The NHPA, as amended, requires that federal agencies identify and assess the effects of federally assisted undertakings on "historic properties" and to consult with others to find acceptable ways to avoid, minimize, or mitigate adverse effects.

As defined in 36 CFR Part 800, one of the key regulations implementing the NHPA, an "historic property means any prehistoric or historic district, site, building, structure or object included in or eligible for inclusion in the National Register of Historic Places…(and) include artifacts… and remains that are related to and located within such properties." Amendments to Section 101 of the NHPA in 1992 explicitly allowed properties of traditional religious and cultural importance to be eligible for inclusion on the NRHP. Archaeological resources include the physical remains of human thought and behavior as often evidenced in artifacts, remains, sites, buildings, structures, or objects. An archaeological resource is considered an "historic property" if it is determined National Register-eligible. Eligible properties generally must be at least 50 years old, possess integrity of physical characteristics, and meet at least one of four criteria of significance.

The eligibility of archaeological and cultural resources is based on the criteria set forth in 36 CFR 60 and detailed in *Treatment of Archeological Properties: A Handbook* issued by the Advisory Council on Historic Preservation, as well as in a series of bulletins, including *National Register Bulletin 15 – How to Apply the National Register Criteria for Evaluation, National Register Bulletin 36 – Guidelines for Evaluating and Registering Historical Archeological Sites and Districts, National Register Bulletin 38 – Guidelines for Evaluating and Documenting Traditional Cultural Properties,* and *National Register Bulletin 41 — Guidelines for Evaluating and Registering Cemeteries and Burial Places*, among other resources.

Regulations implementing Section 106 (36 CFR Part 800) also encourage maximum coordination with the environmental review process required by the NEPA and with other statutes. The Section 106 process also identifies elements of the project that may require 4(f) analysis and supports preparation of the EIS draft and final documents.

2.4 Data Collection Methods

Because the CRC project is complex and involves two states, two large urban cities, many agencies, tribes, and a substantial number of archaeological and cultural resources, the study was divided into two phases.

2.4.1 Phase I Data Collection

Archaeological and cultural resources tasks, accomplished by cultural resource professionals meeting the qualification standards set by the Secretary of the Interior, included the following:

- Documentary research using primary and secondary source materials on file at DAHP and SHPO (to identify properties designated as National Register listed or eligible, or Statewide Planning Goal 5-protected historic or archaeological resources), Clark County, the City of Vancouver, the City of Portland, and other appropriate archives.
- Reconnaissance-level survey of the primary API to confirm the location of known resources and to identify areas where previously unidentified archaeological and cultural resources may likely be located.
- Background research regarding the potential location of cultural resources in the project vicinity, and information regarding the nature and extent of direct and indirect impacts, were used to refine the APE in consultation with the agencies, DAHP, and SHPO.
- Coordination and consultation with the DAHP and SHPO National Register Coordinators and Review and Compliance representatives was initiated and is ongoing. Consultation with interested parties, such as Native American tribes, local planners, cultural resource specialists, historical commissions and societies, and private interest groups is likewise ongoing. All formal consultations with the tribal governments are being channeled through the lead agency.
- Established a Cultural Resources Technical Group composed of the DOT cultural staff specialists for Washington and Oregon, and project management and consultant staff, who invited (as appropriate) National Parks Service archaeologists, a representative from the city of Vancouver, and Washington and Oregon SHPO Section 106 cultural specialists, to review and gain insight on the potential importance of the range of historic and archaeological resources encountered during the investigations.

- Established a Cultural Resources/Section 4(f)Work Group (CWG) made up of consulting parties who have regulatory interests in historic built environment, archaeological, cultural, and recreational resources associated with the project to discuss, in part, the archaeological and cultural resources and the proposed project as it develops. The work group provided input on critical steps in the project development and review process; e.g., the appropriateness of the API and APE; evaluation (screening) measures; appropriateness of alternatives to advance to the DEIS; choice of locally preferred alternative; and possible mitigation strategies and/or measures.

2.4.2 Phase II Data Collection

Phase II archaeological and cultural resources tasks, currently underway, were accomplished by cultural resource professionals meeting the qualification standards set forth by the Secretary of the Interior, and have included:

- Consulting with Consulting Parties regarding the APE.
- Working with the Cultural Resources Technical Group to determine the appropriate research designs, recordation techniques, and analytical methods to use.
- Continued coordination with the NPS Fort Vancouver National Historic Site archaeologists regarding archaeological resources in the area.
- Applying typical Section 106 procedures, including:
    - Documentary research using primary and secondary source materials, including materials on file at Washington DAHP (to identify properties designated as National Register listed or eligible, or Statewide Planning Goal 5-protected historic or archaeological resources), Oregon SHPO, the cities of Vancouver and Portland, other appropriate archives, and various published and unpublished sources for the project area.
    - Ongoing preparation of an archaeological research design that defines the process by which archaeological resources will be identified, significance evaluated, and effects determined.
    - A non-invasive reconnaissance pedestrian survey of the existing roadway rights-of-way within the APE. The survey involved walking the project at intervals not exceeding 10 meters, opportunistically observing bare ground, existing levels of disturbance, and identifying areas within which further field work should occur. Indian tribal representatives were invited to accompany the surveyors during the brief reconnaissance but were unable to attend; consequently, in lieu of walking with the surveyors in a largely built environment, tribal representatives requested information on the results of the reconnaissance.

Once the archaeological research design is completed, the following activities are expected to be conducted:

- Intensive archaeological survey of the remaining portions of the APE, for which access can be obtained. This would involve further pedestrian transects on tracts outside the existing DOT rights-of-way. Additional work will be phased. The first phase would likely focus archaeological investigations in key areas that may need extensive and time-consuming coordination to avoid or minimize potential impacts, and would inform the process of choosing a Locally Preferred Alternative. Such areas are likely to include the I-5 mainline section generally south of Fourth Plain, the Fort Vancouver West Barracks area, the properties on the west side of the interstate, and the area around the I-5/SR 14 interchange. Within this area, ground penetrating radar, potentially in combination with another non-invasive remote sensing technique, may be used to identify soil anomalies that warrant further subsurface investigations. Depending on project timing and potential for discovered resources to be affected by a wide range of alternatives or the preferred alternative, subsurface excavations to determine the spatial extent and other discovered site characteristics may be conducted.
- Archaeological and cultural property forms for new discovered resources identified in the APE will be prepared for submission to Oregon SHPO or Washington DAHP, as appropriate, for review by staff for concurrence on property eligibility under National Register of Historic Places criteria. Location maps and photographs will be included with the submittals.
- Separate evaluations for previously unevaluated archaeological and cultural resources will be prepared for those resources that may be affected by the project. Location maps and photographs will be included with the evaluation documentation submittals.
- Assessments and determinations of significance will be prepared according to the National Register of Historic Places criteria; and findings of project effect in accordance with Section 106 (36 CFR 800.5)
- Memorandum(s) of Agreement (MOA) identifying treatment (mitigation) measures would be prepared where unavoidable adverse effects are identified and/or anticipated to listed or eligible NRHP resources. This includes establishing protocols for addressing discovery of Native American graves (an intermittent discovery treatment plan has been prepared in consultation with participating Indian tribes, and addresses treatment of grave discoveries; this "living document" will be included in the archaeology research design).
- Section 4(f) Evaluation(s) will be prepared if there are any property uses that alter the characteristics that qualify an archaeological or cultural property for the NRHP if required under Section 4(f).

Several important topics will require substantial attention and will be incorporated into the archaeological research design as information becomes available.

- Ethnographic/Oral History Documentation – During preliminary discussions with DOT representatives, tribal government representatives indicated an interest in having oral histories conducted that would be meaningful and useful to both the project and to maintaining their tribal cultural identity. A project tribal liaison is

coordinating with Indian tribes to develop a program by which cultural resources important to Native Americans are expected to be identified. Some of the information gained may be confidential and not reported within the NEPA review process. Other information that tribes consider transferable may be appropriately incorporated into the archaeological research design.

- Traditional Cultural Properties (TCP) – Often, these resources are discovered through consultations with tribal governments. Should potential TCP's be identified, specific methods will be developed to determine how to further define and identify these resources, and provide appropriate protection measures through considering avoidance, impact minimization, or mitigation measures.
- Graves – During preliminary discussions with DOT representatives, tribal government representatives indicated a concern about the project's potential effects to Native American graves. Further research, as will be discussed in Section 5 of this report, has revealed that potential remnants of an historic military cemetery may lie within the APE. This is an area within which focused investigations would likely occur. The CRC Tribal liaison worked with Indian tribes to develop a grave Inadvertent Discovery Plan that identifies protocols for post-discovery treatment which is incorporated into the archaeological research design.

Data recovery excavations at archaeological sites that would be adversely affected by the project typically occur after the NEPA lead agency selects an alternative and issues a Record of Decision. The aforementioned MOA typically establishes the parameters for the methods and the procedural framework by which this work would be completed.

2.4.3 Primary Data Sources

- Washington DAHP (historical site records, resource maps, and library)
- Oregon SHPO (historical site records, resource maps, and library)
- National Park Service (historical information regarding sites on Vancouver National Historic Reserve)
- Clark County inventory (historical inventory records) and Clark County Heritage Register
- City of Vancouver (historical inventory records)
- City of Portland cultural resource files (Bureau of Planning)
- Field investigations (reconnaissance to confirm and/or modify existing data, and locate and preliminarily record previously uninventoried historic resources)

2.5 Analysis Methods

Potential cumulative effects from this project are evaluated in the Cumulative Effects Technical Report. Please refer to this report for an evaluation of possible cumulative effects.

The project team identified historical properties in consultation with the Oregon SHPO, Washington DAHP, Indian tribes, the National Park Service, and other Consulting Parties, as appropriate, based on the criteria set forth in 36 CFR 63. The goal of the project is to avoid impacts to historic properties, minimize unavoidable impacts, and mitigate for adverse impacts. The DOT and/or FHWA manage consultation with Indian tribal governments regarding resources significant to Native Americans and relay that information to the archaeological and cultural resources team members.

A significant impact to an individual resource with respect to NHPA Section 106 would result if the project causes the direct loss, destruction, or alteration of the character or integrity of an historic property. Archaeological properties determined to be National Register-eligible are very rarely subject to Section 4(f) provisions. Archaeological resources are only subject to Section 4(f) protection if they must be kept in place and are important for reasons other than the information they contain.

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3. Coordination

This technical report was developed in collaboration with federal, state, and local agencies, including the Washington DAHP, the Oregon SHPO, Federal Highways Administration (FHWA), Federal Transit Authority (FTA), Oregon and Washington Department of Transportation, the National Park Service, the City of Vancouver, Metro, and the City of Portland.

3.1 Agencies and Consulting Parties

The project consultant team coordinated with DAHP, SHPO, Native American tribal governments, WSDOT, ODOT, local planners and municipal historic preservation specialists, historical commissions and societies, private interest groups, and other involved or interested agencies. All formal consultations with tribal governments were channeled through FHWA, acting through its WSDOT and ODOT agents. Coordination included, but not necessarily be limited to:

- The CRC Internal Cultural Resources Group included DOT archaeologists and historic built environment cultural specialists, CRC environmental project management staff, and cultural resources consultants who met bi-weekly to discuss status, approaches, issues, and provide guidance.
- Historic Resources Technical Advisory Group which included the same people in the Internal Cultural Resources Group and representatives from the City of Vancouver, City of Portland, FHWA cultural specialists, National Parks Service (NPS) historic resource specialists, Section 106 historic resources specialist from DAHP and SHPO who met three times.
- Cultural Resources/Section 4(f) Work Group (CWG). CWG included parties with regulatory interests in project-area historic, archaeological, cultural, and other Section 4(f) resources. As determined appropriate by WSDOT and ODOT historic resources, archaeological/cultural resources, and Section 4(f) specialists, this group will meet on an as-needed basis.

Meetings were held, beginning in 2005, with representatives from the federal and state regulatory agencies to provide input on this project. Native American tribes with resource interests relevant to this project also provided input and guidance during several meetings. These tribes include the Cowlitz Indian Tribe, Confederated Tribes of the Grand Ronde Community of Oregon, Nez Perce Tribe, Confederated Tribes of Siletz Indians, Spokane Tribe of Indians, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation of Oregon, the Confederated Bands and Tribes of the Yakama Nation, and the Chinook Tribe.

3.2 Group Coordination Objectives

The role of the Cultural Resources Groups was to:

- Provide CRC project information and updates to interest group review.
- Identify issues and concerns in the process, and present recommendations at key milestones to the project team.
- Provide input to the project team into relevant areas of interest or potential impact (such as air quality, noise, highway interchange alignments and design features) to help inform the project's efforts to avoid, minimize and/or mitigate potential impacts of the project to the historic resources.
- Communicate frequently with their respective constituency groups to keep them informed of project information, bring their input to the project team and to help develop an understanding and support of project recommendations.
- Identify historic cultural resources concerns related to the project and communicate those concerns to the Project Team in a timely manner.
- Provide input to the project team to assist with developing potential solutions as challenges arise on the project.

4. Affected Environment

4.1 Introduction

The CRC project area extends across the Lower Columbia River Valley, a region known to be rich in prehistoric archaeological resources (Exhibit 4-1). At the time of historic contact, the abundant natural resources in the valley supported one of the densest Native American populations in North America. This dense population is reflected in the large number of former camps and villages of the native peoples of the valley that have been recorded as archaeological sites. Previous archaeological research has demonstrated the presence of Native American settlements in the CRC vicinity spanning the last 3,000 years of prehistory, and the potential exists for encountering even earlier evidence of prehistoric occupation during archaeological investigations for the CRC project.

The CRC project area contains an extensive historical archaeological record associated with Euroamerican settlement that begins with the Hudson's Bay Company's (HBC) Fort Vancouver founded on the north bank of the Columbia River in 1829. Kanaka Village, the multi-cultural settlement where the majority of the HBC employees lived, emerged along the southwest side of the fort. Vancouver Barracks, established by the U.S. Army in 1849 adjacent to the HBC stockade, expanded over the years to become one of the most important military installations in the Pacific Northwest. The City of Vancouver developed in the 1850s and 1860s on the north bank of the Columbia River immediately west of the U.S. Military Reserve.

4.2 Segment A Delta Park to Mill Plain District

This segment contains lands within both Oregon and Washington. Review of the geomorphology and existing archaeological record of the project area indicates that there is a greater likelihood of encountering prehistoric archaeological sites on the south shore and historical archaeological sites on the north shore of the Columbia River.

4.2.1 Oregon

Research at SHPO indicates that no archaeological resources have been previously recorded within the CRC APE on the Oregon shore.

Previous archaeological research along the south shore flood plain has sought to explain archaeological site locations in relation to five factors: (1) elevation; (2) distance to water; (3) wetland type; (4) landform (e.g., slough, levee, terrace, riverbank; and (5) habitat. A site prediction model developed for the Columbia South Shore project for the City of Portland Bureau of Planning (Minor et al. 1994) defined four zones for further archaeological testing. Zones 3 and 4 were later combined into a single grassland/woodland zone for elevations above 20 feet due to difficulty in distinguishing them in the field.

A review of the zone definitions in light of the distribution of nine confirmed archaeological sites in the Columbia South Shore project area indicated that Zone 2, marsh/meadow, has the greatest likelihood of containing sites. Zones 3/4, grassland/woodland, are the next most likely, and Zone 1, slough/pond, is the least likely.

The known distribution of sites on the south shore flood plain of the Columbia River indicates that prehistoric settlements were clustered in particular areas. One cluster was east of the project area, around or near two of the largest intermittent water features. This cluster of sites, which encompasses intermittent occupation over the past 2500 or more years, is associated not only with a concentration of waterways, but also with a series of ridges at the extreme eastern end of the project area. This site concentration appears to be part of an activity pattern, perhaps related to the Blue and Fairview lakes vicinity a mile or more to the east.

The other cluster of prehistoric settlements was at the west end of the south shore flood plain around Smith and Bybee lakes and the confluence of Columbia Slough with the Willamette River. With the exception of the St. Johns Site (35MU46) on Columbia Slough (Woodward and Associates 1990), at the time of the CSS project the existence of this western cluster of settlements was known primarily from site record forms. In the decade since the CSS project, investigations have been conducted at a number of sites in this area.

This recent work has included excavations at the Columbia Slough Site (35MU105) (Ellis 1996), excavations at 35MU117 on Bybee Lake (Ellis 1999), and further excavations at the St. Johns Site (Pettigrew 2003, 2005). Radiocarbon dating indicates that occupation at most sites at the west end of the south shore flood plain date within the last 500 years or so. Significantly, excavations at 35MU117 recovered cultural materials in association with charcoal from which radiocarbon dates of 2970 +/- 80 BP, 2850 +/- 30 BP, and 2800 +/- 100 BP were obtained. These dates are the earliest reported for prehistoric occupation on the south shore flood plain, being slightly older than the previously earliest date of 2420 +/- 70 BP from the Hemlock Site (35MU84) in the CSS project area (Musil 1992).

Based on this previous work, the following areas have been identified as containing a moderate to high likelihood of containing evidence of buried prehistoric archaeological deposits:

1. Areas within 100 feet (30 meters) of a historic slough bank
2. Areas within 100 feet (30 meters) of Marine Drive, and
3. Areas within 15-20 feet elevation.

Using the above criteria, much of the APE on the Oregon shore can be considered to have a moderate likelihood for archaeological deposits. An archaeological reconnaissance of the existing right-of-way within the project APE was conducted to inform the identification of methodologies for discovery probing. On the Oregon side of the river, probes could be placed within the broad areas at the interchange with Victory Boulevard and on the east side of the interstate in or next to East Delta Park.

Analysis by J. Koloszar; Analysis Date: Aug.-2007; Plot Date: Apr.-2008; File Name: MG002_11x17.mxd

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In particular, the banks of an abandoned slough in the park appear to be high probability areas. The presence of developed properties and houseboat moorings along the north and south banks of Oregon Slough prohibits probing along those shorelines. The upper end of Hayden Island is relatively recent in age and has been subject to centuries of flooding by Columbia River freshets, greatly reducing the likelihood that archaeological deposits could survive, even without subsequent roadway and commercial development.

The high degree of commercial development, along with a century of roadway construction and improvement within the APE, contributes to a low potential for historical archaeological features and deposits on the Oregon shore. There is no specific information suggesting that historic features may survive beneath the fill and construction of the APE on the south side of the Columbia River.

4.2.2 Washington

On the Washington shore, 11 archaeological sites, including one landscape feature (with an underlying archaeological component), have been previously recorded within the CRC APE. Three of these sites—Vancouver Barracks (45CL162H), Fort Vancouver National Historic Site (45CL163H), and Kanaka Village (45CL300H)—encompass extensive overlapping areas containing multiple archaeological features and activity areas that could have been recorded as separate archaeological sites.

As previously noted, the Vancouver National Historic Reserve (VNHR) created by the "Omnibus Parks and Public Lands Management Act of 1996" (Public Law 104-333) contains the following cultural resources: (1) Fort Vancouver National Historic Site and Adjacent Cultural Landscape; (2) Vancouver Barracks and Officers Row; (3) Parade Ground; (4) Pearson Field; (5) Columbia River Waterfront; and (6) Water Resources Area. Most of these resources fall to some extent within the project APE. In 2007, the VNHR National Historic District was established, which includes the overlapping archaeological, built environment, and cultural landscapes within approximately 252 acres of the 366 acres of the Reserve. Four character areas, were defined in this District and specific research questions were outlined to help determine the research potential of known archaeological sites, as well as identified in the future, within each character area.

The Prehistoric/Contact Native American Character Area encompasses basically the entire District, and the current state of information on prehistoric/contact-period archaeological remains suggest that the pre-contact period components of sites are significant at the state level. Sites tend to be sparser and associated with shorter duration habitation and use activities in the northern and more upland portions of the District (i.e., East Barracks, West Barracks, and parade ground areas). Sites in the southern and more lowland portions that lie in the floodplain and riverside environments appear to reflect longer-duration settlement and activities.

The portion of the Hudson Bay Company Fort Vancouver Character Area of most concern with respect to this project includes the HBC (Kanaka) Village, historic agricultural, riverfront/pond and St. James Mission areas. The current state of information on the archaeological remains from this era indicates that the known archaeological

resources, and those with potential to be encountered, are of national significance. Portions of the proposed project closest to and/or encompassing the Village and riverfront/pond would likely have greater potential to impact significant archaeological remains than the historical agricultural areas.

During this era, outbreaks of disease, especially malaria, greatly reduced the Native American population residing in the area, particularly those living in the Village. Native Americans, among others, were treated at the HBC hospital in the riverfront/pond area. People who died during this period may have been buried in this general area, in both dispersed and possibly concentrated patterns. Because so many people died, relatively few people were available to handle the dead, and less care may have been rendered than in normal burial practices. Many parties are very concerned about the potential of the project, regardless of Alternative, to impact single or concentrated burials in this general area.

The U.S. Army, Vancouver Barracks Character Area, abuts I-5 generally north of the FHWA Western Federal Lands building, including Officers Row and vicinity. The current state of information on the archaeological remains from this era indicates that the known archaeological resources, and those that may potentially be encountered, are of national significance. Documentation suggests an historical "military cemetery," was generally located in and/or west of the west end of Officers Row, and may have contained Native American as well as Euroamerican remains (some of which may have been reinterred at this cemetery from an earlier cemetery located elsewhere on the Reserve). While records indicate burials within the cemetery were exhumed and reinterred elsewhere, other records suggest that some burials, the exact locations of which are unknown, may still remain.

The Mission 66 Character Area is associated with the U.S. Army Vancouver Arsenal/Ordinance Depot Site dating to 1855-1885. NPS archaeologists tested this area in 2005-2006; a report on this work is not yet available (Robert Cromwell, personal communication, 2008).

Most previous archaeological research has been conducted on the east side of the APE within the confines of the Vancouver National Historic Reserve. In recent years, archaeology has begun to be conducted on the west side of the APE, which corresponds to the oldest part of the City of Vancouver. Historic Sanborn insurance maps dating between 1884 and 1949 indicate that this portion of the APE south of 20th Street was heavily developed and contained a range of residential and commercial sites. Several projects conducted within the past decade confirm the high likelihood of extant historical archaeological deposits in the historic area of the City of Vancouver. Although few comprehensive reports have been filed on archaeological excavations in the historic downtown portion of Vancouver, the information so far available suggests that the historic "urban archaeology" resources in this area minimally may be of statewide significance, especially in view of their likely contemporaneous character and socioeconomic and cultural (material) affiliations with the U.S. Army presence in the abutting Reserve area.

Consequently, between the potential for historical archaeology relating to the settlement of the City of Vancouver on the west side of the project corridor and the known historical archaeological resources in the Vancouver National Historic Reserve on the east side of the project corridor, virtually this entire segment of the APE is considered to have a high potential area for archaeological resources. In addition, the Clark County Archaeological Probability Model indicates that a broad margin along the Columbia River, both below and above the riverbank, is a high probability area because of its proximity to the river and its resources.

During an archaeological reconnaissance along this segment undertaken to identify locations where subsurface probing might be feasible, opportunities appeared to be severely restricted due to the extensive construction, which includes broad expanses of concrete within roadway rights-of-way. The most likely locations for subsurface access are within the interchange loops at the junction of I-5 with SR 14 that are not covered by deep fill. On the southeast side of the I-5/SR 14 junction is old Apple Tree Park, the location of an historic apple tree (45CL164H), and an area in which archaeological deposits are known to be present. Other possibilities, depending on the depth of fill, are the gravel-covered lots just north of the river between the interstate and Columbia Street on the west side of the interstate and the gravel-covered lot on the east side south of the railroad tracks. Additional areas for possible probing include certain non-fill areas at and adjacent to the I-5 interchange with Mill Plain Boulevard.

4.3 Segment B Mill Plain District to North Vancouver

Review of records on file at DAHP indicates that no prehistoric or historical archaeological sites have been previously recorded within this segment of the APE north of 20th Street.

The Clark County Archaeological Predictive Model indicates that only the area in the vicinity of Burnt Bridge Creek has a high potential for containing prehistoric archaeological resources. An archaeological reconnaissance indicates that possible areas for discovery probing would be feasible in non-fill areas at and adjacent to the interchange of Fourth Plain Boulevard and at the 39th Street interchange. There also appear to be some unaltered landforms at the interchange with Main Street at the north end of the APE where probing may be possible in the vicinity of Burnt Bridge Creek.

Historic Sanborn insurance maps indicate that the City of Vancouver began to spread north of 20th Street by 1907 and had reached 41st Street by 1949, indicating that there is a moderate likelihood of encountering buried historical archaeological deposits associated with residences and businesses dating to the early 20th-Century settlement of Clark County.

4.4 Geology and Geomorphology

The I-5 bridge within the CRC project area is located at River Mile 106.4 in the Portland-Vancouver basin of the Lower Columbia River Valley. The Portland-Vancouver basin was formed early in the Pliocene by a gentle syncline or downwarp of flows of volcanic rock known collectively as Columbia River Basalt. The Pliocene compression or folding produced a regional north-south trend of highlands and basins. The Willamette and Puget valleys were formed between the Cascade and Coast ranges. Near the end of the Pliocene the Columbia River flow appears to have been slowed or impounded, leading to deposition of 1500 feet of fine-grained Sandy River Mudstone (Trimble 1963). The Columbia River Basalt and Sandy River Mudstone are not exposed in the CRC project area.

Before the end of the Pliocene a change in deposition occurred, as a sand and gravel delta emanating from the west end of the Columbia Gorge formed in the Portland Basin. These deposits are referred to as either Troutdale (cemented) or Pleistocene (uncemented) fluvial gravels. The upper member of the Troutdale Formation, which includes sand, cobbles, and boulders, ranges from 5 million to 2 million years in age (Trimble 1963; Beeson and Tolan 1993). The younger Pleistocene gravel deposits could range from 2 million years in age to the last ice age (e.g., the late Wisconsin). The younger Pleistocene gravels occur well above the present grade of the Columbia River, indicating changing base levels in late-Pleistocene times.

Uncemented naturally stratified sand and silt deposits at elevations higher than historic flood heights or latest Holocene floods (~35 feet NGVD29) represent cataclysmic flood deposits from glacial Lake Missoula. Multiple dam bursts from this glacially dammed, ice-age lake produced numerous sequences of fining-up beds called rhythmites, which were locally remobilized to form interbeds of loess (Lentz 1983). The youngest glacial flood deposits from Lake Missoula that inundated the Lower Columbia Valley are dated to about 12,000 years ago (Benito and O'Connor 2003). The upland terraces adjacent to the north and south sides of the Columbia River in the CRC project area are covered by the glacial flood rhythmites and loess, representing the latest-Pleistocene peri-glacial deposits (Beeson et al. 1991).

The Columbia River is presently tidally controlled from the mouth upstream to Bonneville Dam. Tidal range in the CRC project area is about 1.8 feet. As sea level rose from a depth of -360 feet at 16,000 years ago, the ancestral Columbia River Valley was submerged. Sea level extended upslope (landward) in the ancestral Columbia River Valley to an elevation of -230 feet relative to modern sea level at 12,000 years ago (Gates 1994). At the time of the deposition of Mazama ash from the eruption of Mount Mazama at present-day Crater Lake 7,000 years ago (Bacon 1983), sea level in the Lower Columbia Valley would have reached -41 feet. The declining rate of sea level rise after 7000 years ago resulted in sea level approaching its present elevation by several thousand years ago. Sea level, and corresponding river level, in the CRC project area has risen only 3 meters (9.8 feet) in the last 3,000 years, a rate of about 1 mm/year (Peterson et al. 2007).

The earliest bathymetric and shoreline map available (1841) indicates that the Columbia River channel in the CRC project area averaged 24-30 feet depth. A U.S. Army Corps of Engineers map from 1933 provides another record of main channel depths prior to Columbia River and tributary impoundments ranging from 15 to 22 feet, but rarely exceeding 20 feet below the Columbia River Datum (about mean sea level). A modern bathymetric chart indicates a turning basin between the Port of Vancouver and Hayden Island dredged to about 40 feet, with the channel above the I-5 bridge maintained to -27 feet for barge traffic.

The 1948 flood height in the north Portland area was measured at +32.8 feet (NGVD29). The flood of 1894 is reported to have had a slightly higher elevation. Other flood heights range from 17 feet for 1-year freshets to 32 feet for 20-year floods (Kuper and Lawes 1994). Elevations on the south shore flood plain in the CRC APE range from 0 to 30 feet; thus this area was regularly subject to inundation from seasonal floods. In comparison, the terrain on the north shore flood plain in the CRC APE ascends quickly, so that only a narrow strip of ground adjacent to the river lies at elevations of 30 feet or less and was subject to regular inundation.

The underlying geology and geomorphology have combined with hydrology to form environments on either side of the Columbia River within the CRC project area that contrast in their potential for containing prehistoric archaeological resources. As well, the history of settlement and development on the two shores differs significantly, with the result that prehistoric archaeological resources are the primary concern on the Oregon shore, while historical archaeological resources are the primary (although not exclusive) concern on the Washington shore.

Appendix A includes detailed information on the geology of the project area and how it helps identify which areas are more likely to contain archeological resources.

4.5 Prehistory

The Lower Columbia River Valley, within which the CRC project area is located, has long been recognized as a pivotal area in Pacific Northwest prehistory. As used here, the term Lower Columbia refers to that portion of the valley extending downstream from The Dalles to the Pacific Ocean. As a near-sea-level connection between the interior Columbia Plateau and the coastal lowlands of western Oregon and Washington, the Lower Columbia served as a route of transmission for populations, cultural traits, and trade throughout prehistory.

At the time of historic contact, speakers of Chinookan languages occupied the shores of the Lower Columbia River from the Pacific coast upstream to The Dalles. These peoples are often included in the Northwest Coast culture area (e.g., Kroeber 1939; Drucker 1955). More recent assessments in the *Handbook of North American Indians*, however, have clarified the broader culture area relationships of the Chinookan peoples. The Chinookan groups "who lived from the coast to a point above the Willamette River" continue to be considered with the Northwest Coast (Silverstein 1990:533), while the Chinookan groups upstream from the confluence of the Willamette and Columbia Rivers are assigned to the Plateau culture area (French and French 1998).

Early archaeologists often compared prehistoric remains along the Lower Columbia to the archaeological record in The Dalles area upstream on the western edge of the Plateau. The narrowing of the Columbia River at The Dalles created the single most productive area for fishing in the Plateau. In turn, the concentration of subsistence resources enabled native peoples to gather during the fall, making The Dalles area one of the major centers of interregional trade and exchange in the Pacific Northwest (Wood 1972:156; Galm 1994:294; Stern 1998).

The archaeological record in The Dalles area, particularly at Wakemap Mound, contained evidence of a cultural "florescence" (Butler 1959:7) or "efflorescence" (Cressman et al. 1960:70) over the last few thousand years that is reflected in elaborate bone, antler, and stone artifacts as well as rock art. The late prehistoric inhabitants of The Dalles area attained a higher level of cultural complexity than contemporary native peoples elsewhere on the Plateau (Schulting 1995:57; Hayden and Schulting 1997). Aspects of this cultural complexity are apparent in the archaeological record downstream from The Dalles in the Lower Columbia Valley.

The following review of the archaeological literature takes an historical approach, attempting to trace how conceptions of the prehistoric peoples of the Lower Columbia Valley have evolved over time. Because the time span of interest extends into the historic era, the ages of radiocarbon dates (uncalibrated) are presented in terms of calendar dates AD/BC.

4.5.1 Conceptions of Lower Columbia Prehistory

While artifacts collected from the region are sometimes mentioned in earlier publications (e.g., Eells 1889, Smith 1906), the first attempts at understanding how the prehistoric cultures of the Lower Columbia Valley fit into the larger picture of Pacific Northwest prehistory date to the 1920s and later, before many archaeological sites had yet been identified, investigated, and reported. Because little archaeological data was actually available, early archaeologists used ethnography as a point of departure, framing their discussions of Lower Columbia prehistory primarily in terms of competing influences from the Northwest Coast and Plateau culture areas.

4.5.1.1 Rock Art

The first investigations by professional archaeologists in The Dalles-Deschutes area, at the extreme upstream end of the Lower Columbia Valley as defined here, were undertaken from 1924 to 1926 by archaeologists from the University of California (Strong et al. 1930). This work included extensive surveys and test excavations, and large-scale excavations at Wakemap Mound, the most prominent late prehistoric site in The Dalles area, and at several sites on Miller Island at the mouth of the Deschutes River. A related aspect of this research included study of rock art in Petroglyph Canyon on the Washington shore at The Dalles. In drawing comparisons with the rock art in this canyon, Strong and Schenck (1925:87) referred to sites downstream on the Columbia:

> "Around the mouth of the Willamette River, on the Washington shore of the Columbia, are a few large boulders with exceedingly crude faces pecked on them. Many others having the surface and face of the rock toward the river are elaborately pecked, often an inch deep. Here some circular designs are observable, but as a rule a series of pits with connecting channels characterized the type."

Strong and Schenck (1925:87) briefly noted the occurrence of this petroglyph style at Fishers Landing in Clark County, and also mentioned two "up-river examples seemingly of this old type." The most noteworthy petroglyph at Fishers Landing is known as the "beaver bowl" (Exhibit 4-2), which has been described as a "beaver image pecked using bas-relief to create a shallow three-dimensional animal form with great emphasis on the beaver's anatomical details" occurring on the top of a very large boulder or bedrock outcrop (Poetschat et al. 2003:33). Similar beaver bowls are known to have been found at Wakemap Mound and other sites in The Dalles area (Poetschat et al. 2003:38-39). The petroglyphs characterized by concentric circles and by simple pits or cupules along the Lower Columbia River downstream from The Dalles originally noted by Strong and Schenck (1925) have been referred to as the "Down River Style" to distinguish them from the more elaborate rock art in The Dalles area (Hill and Hill 1974:240-242).

Exhibit 4-2. Photograph of the Beaver Bowl Petroglyph at Fishers Landing (45CL6)

Photograph by Mike Taylor

A more recent rock art study has recognized two styles among the petroglyphs along the Columbia River downstream from The Dalles. The curvilinear petroglyphs that make use of circles and smoothly curved connecting lines "noted on deeply carved riverside boulders near Portland" are characteristic of the Basic Conventionalized Rock Art Style, which is widely distributed on the Northwest Coast (Lundy 1982:91). The pits or cupules were assigned to the Abstract Curvilinear Style which, although regularly occurring with the Basic Conventionalized Rock Art Style, "is widely but sparsely distributed along the coast and appears to link up with the pit and groove designs and style of the American

Great Basin and Southwestern cultural areas" (Lundy 1982:94-95). The Basic Conventionalized Rock Art Style is thought to be related to the mobile stone sculpture complexes of the Fraser River, Gulf of Georgia, and Columbia River systems (Lundy 1982:91).

Although not directly datable, pit or cupule petroglyphs are thought to be the oldest form of rock art in The Dalles-Deschutes area. As noted by McClure (1984:159), "one pit and groove panel at site 35WS8 is located adjacent to cultural deposits which span at least 10,000 years of prehistory." From The Dalles area, pit petroglyphs on boulders extend downstream along the Washington shore, where they have been identified at three sites in Skamania County and five sites in Clark County, with the site farthest downstream situated about halfway between Camas and Vancouver (McClure 1978).

4.5.1.2 Mobile Stone Sculpture

In addition to their extensive research in The Dalles-Deschutes area, the University of California archaeologists conducted small-scale investigations on the Columbia River on Sauvie Island, situated just below the confluence of the Willamette and Columbia Rivers (Strong et al. 1930:146-147). Among the noteworthy finds during surface surveys and test excavations at one site near the west end of the island were ground stone artifacts decorated with elaborate carvings that link the prehistoric inhabitants of this area with those farther upstream. In summarizing the information available about elaborately decorated artifacts found in The Dalles-Deschutes area, Strong et al. (1930:143) commented:

> "These sculptures of large decorated, or small double-sided mortars, effigy pestles, and the animal or anthropomorphic forms with cup-like containers which we have described from the Dalles-Deschutes region, have also been found on the lower Columbia (notably on Sauvie Island at the Mouth of the Willamette River), and on the coast of Washington and British Columbia. They are often characterized by a clear delineation of ribs suggesting some early widespread ghost cult."

This idea of a "ghost cult" was later elaborated upon by William D. Strong, who linked "anthropomorphic and animalistic effigies which suggest the dead by clearly accentuated ribs" to the catastrophic decline in the native population of the Lower Columbia resulting from epidemics introduced in protohistoric times (Strong 1945:248, 254).

Mobile stone sculpture in the Lower Columbia Valley was dominated by a particular art style in which birds, fish, and human forms were carved as an enrichment on mortars, and as figures in the round and in relief (Wingert 1952:12). This art style appears to have been concentrated on and around Sauvie Island (Wingert 1952:12; Butler 1965a:11; Peterson 1978:192).

An important recent study has pointed out a connection between rock art occurring on boulders and the mobile stone sculptures that occur along the Lower Columbia, noting that a continuum exists "from small mobile pieces, to images on larger boulders, to carved bedrock images, and finally to ordinary petroglyphs" (Poetschat and Keyser

2007:27). This connection is well illustrated by the fact that at least eight examples of "beaver bowls" occurring as mobile stone sculptures similar to the beaver bowl in bedrock at Fishers Landing have been found along the Lower Columbia (Poetschat and Keyser 2007:27-30).

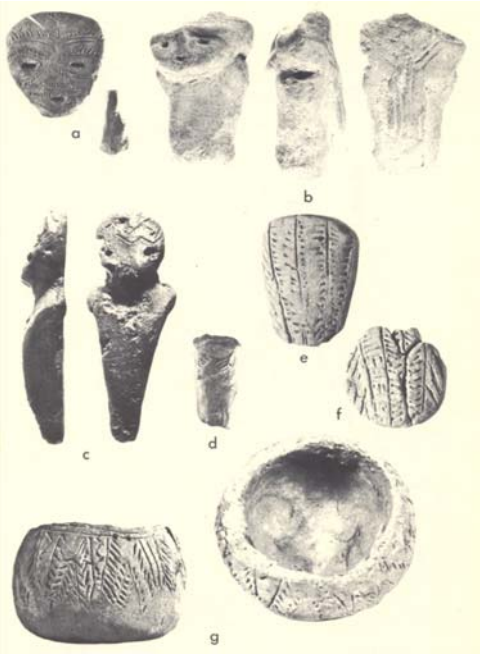
Observing that artistic elaboration in stone sculpture reached its highest development on the Fraser and Lower Columbia Rivers, Smith (1956:291) suggested that the two areas were once connected culturally by a "Foothills Province" that "occurred in the foothill regions of the Cascades and the Coast Range, on both sides of the mountains from the upper Lillooet to the Dalles." Smith (1956:291) envisioned that elaboration in stone sculpture developed earlier in the north, "arriving at the Dalles in the protohistoric period." Subsequent research, however, has established that elaborate stone sculpture on the Lower Columbia has considerable time depth. Specifically, Butler noted similarities between the mobile stone sculpture around Sauvie Island and some of the stone sculpture dating to the Middle Period at The Dalles, estimated to date from 4500 BC to AD 500 (Butler 1957:161-165).

4.5.1.3 Ceramic Complex

Discoveries of decorated ceramic objects in archaeological sites along the Lower Columbia prompted further discussions of the relation of this area to the Plateau and Northwest Coast culture areas (Exhibit 4-3). Two fired clay figurine fragments decorated with punctations or incisions found in 1932 in a site near Sara (Ridgefield) in Clark County were reported by Pendergast (1957), and another "truefired potsherd" from a "heavy mortar-shaped vessel" bearing an incised "pine tree" or "fish skeleton" design found at a site near the mouth of Salmon Creek in Clark County was reported by Osborne (1957a). The latter object was from Site 45CL11 recorded in the survey by Warren (1959:15). Noting that "a fair number of fragmentary figurines and other presumably associated clay objects are known in the interior" farther upstream on the Middle Columbia River, Caldwell (1957:56) suggested that the occurrence of decorated clay artifacts on the Lower Columbia "extends a similarity of pattern, categorized perhaps as pre- or incipient Plateau, from the Columbia Basin west to the Coast."

Three more impressed clay objects from a site on the Columbia River near Ridgefield in Clark County were reported by Bryan (1959). According to Bryan (1959:59), "two of these artifacts are pieces of clay figurines, one of which has been fired." The "fired piece" was identified as "a torso of a human figurine" (Bryan 1959:59). One of the unfired pieces was "the head of a human figurine having a decoration impressed and incised prior to hardening, possibly by the sun. The decoration represents a human head wearing a headdress" (Bryan 1959:60). The other unfired piece had "a flattened oval shape with irregular horizontal and vertical rows of punctations on one face" (Bryan 1959:60).

Exhibit 4-3. Examples of Ceramics from the Lower Columbia Valley: a-c, Figurines; d-f, Tablets; g, Bowls (from Butler 1965a:Figure 2)



Although recognizing that decorated clay objects had also been found upstream on the Middle Columbia, Bryan (1959:61) viewed these distinctive artifacts as aspects of a "larger complex, which includes decorated stone and antler, as well as clay, [that] is most highly developed in the area straddling the Cascades from The Dalles to Vancouver and becomes weaker farther up the Columbia in the heart of the 'Plateau.'" Bryan (1959:62) then suggested that

> "Perhaps students should reorient their thinking to consider the possibility of a Trans-Cascadian province which is neither Northwest Coast nor arid Plateau (Columbia Basin) in orientation. To me it seems plausible to view this Trans-Cascadian ecological province, especially along the Columbia, as more of a cultural unifier than a cultural barrier".

In the years since ceramics were first described in the area, additional finds have been made, mostly in the Sauvie Island-Lake River area (Butler 1965a; Woodward 1977; Stenger 1990, 1992). The ceramics consist primarily of figurines, but also include vessels, smoking pipes, pendants, and handles (Stenger 1990, 1992). Stenger (1992) drew a distinction between low-fired ceramics and high-fired ceramics. The low-fired ceramics are earlier, having been found at the Lady Island Site (45CL48) from which radiocarbon dates ranging from 60 +/- 50 BC to 530 +/- 60 BC have been reported (Woodward 1977). The later high-fired ceramics have been reported from a number of later prehistoric sites in the Sauvie Island-Lake River area. From there, they were apparently traded upriver where they have been found at Wakemap Mound and at sites even farther upstream along

the Middle Columbia River (Osborne 1957b; Dumond and Minor 1983). The making of ceramic artifacts apparently ceased sometime before historic contact, as ethnographic and historical accounts make no mention of pottery among the native peoples of the Lower Columbia Valley.

4.5.1.4 Ghost Cult

The idea of "ghost cult" along the Lower Columbia first introduced by Strong and others (1930:143) was later addressed by B. Robert Butler, who demonstrated that a basic style of depicting the human figure with exaggerated ribs "persisted from the 9th through the 19th century at The Dalles" (Butler 1965a:9). The considerable time depth over which the exaggerated ribs motif occurred indicates that it cannot be viewed as evidence of a "ghost cult" associated with catastrophic population decline in protohistoric times, as earlier suggested by Strong (1945).

However, Bulter (1957) pointed out that there is another distinctive decorative motif that occurs on artifacts on the Lower Columbia that appears very likely to have been associated with a "ghost cult." This motif was first described by Julian H. Steward (1927:256) when he reported carvings found in The Dalles area on which "the exaggerated crescent-shaped mouth is open and grinning, with the teeth, usually in two sets, clearly demarked and the tongue appearing in the center." This was named the "grinning face" motif by Butler (1957), who noted that it tends to occur in protohistoric and historic contexts in The Dalles area and elsewhere on the Lower Columbia.

A number of stone and antler artifacts bearing the "grinning face" motif have been reported from sites on Sauvie Island. These include a stone carving and a stone mortar illustrated by Wingert (1952), as well as antler figurines (Butler 1965a:7). One of the antler figurines was from the Bridge Camp Site, better known as Sunken Village (35MU4), where many perishable artifacts remain well-preserved in sediments in the tidal zone (Newman 1991). Although artifacts bearing the "grinning face" motif appear to have been more common in The Dalles area, Butler (1965a:8) suggested that "there is an indication of an earlier, intermediate, or incipient 'grinning face' style" in the Sauvie Island region, and on that basis he suggested that "the Sauvie Island region **might have been** the center of development for the "grinning face" style (Butler 1965a:11, bold in original).

4.5.1.5 Trans-Cascadian Tradition

Following the initial investigations in the mid-1920s by Strong, Schenck, and Steward (1930), additional excavations were undertaken in Wakemap Mound at The Dalles in the 1950s by Warren W. Caldwell (1956). In discussing Wakemap Mound in relation to surrounding regions, Caldwell summarized the principal evidence then available from the Lower Columbia, which consisted of brief reports on three sites in the Portland Basin excavated by amateur archaeologists. While recognizing that these three sites "do not provide a complete picture of the archaeology of the area," Caldwell (1956:253) concluded that "the region is characterized by a basic Plateau material culture and has been so from an early time."

Based on experience excavating sites along the Pacific Northwest Gas Pipeline through southwestern Washington, Bryan (1957:9) identified a complex of artifacts found in this area including circular semi-subterranean house depressions, cobble choppers, and small projectile point types as "closely related to the Plateau culture." Bryan added that "although some coastal traits were observed along the Columbia River, such as rectangular house depressions, the preponderance of Plateau-like traits and paucity of typical coastal traits such as ground stone celts and spool-shaped hand mauls," led him "to concur with Caldwell's conclusion" that "a Plateau-like tradition was of long-standing duration" in southwestern Washington (Bryan 1957:9). Bryan proposed the concept of "a widespread Coast-Plateau land-oriented tradition which could be called Trans-Cascadian" to explain the "parallel interrelated development" between southwestern Washington and the Plateau" (also see Tuohy and Bryan 1959:46).

Caldwell's and Bryan's conclusions about the existence and time depth of a "Plateau-like tradition" in southwestern Washington were immediately criticized by Claude N. Warren (1959), who argued that "not only is the 'long-standing duration' of this 'Plateau-like complex' questionable, but…the very presence of such a complex throughout the whole of Southwestern Washington is itself in question" (Warren 1959:10). Warren proceeded to summarize evidence from sites recorded during a survey along the Lower Columbia in 1955 (supplemented by even earlier surveys), dividing the sites into two groups. Sites along the north shore of the Columbia from Skamania downstream to five miles east of Vancouver were included in the "foothills" group, in which

> "… villages are characterized by circular and oval, semi-subterranean house pits scattered about the sites in no discernable pattern, by an abundance of chipped stone, choppers, perforated sinkers, plain and elaborately carved pestles, mauls, mortars and grooved sinkers, and by stone sculpture in the round, as well as elaborate petroglyphs. Most of these traits are found throughout the Plateau." (Warren 1959:14)

In contrast, farther downstream "along the shore of Lake River" and on nearby Sauvie Island were "a number of village sites which are very similar in surface indications and appear to represent a homogeneous group when compared to sites located in the foothills east of Vancouver" (Warren 1959:14).

> "Though information is extremely limited from the Lake River area, it appears that the village pattern during the contact and proto-historic period was distinct from that of the Plateau. House pits were rectangular, usually at least twice as long as they were wide and often approaching 100 feet or more in length. They were constructed in a single row parallel to the river and sometimes small, circular pits were located nearby, probably representing huts for specialized purposes. Whether or not these rectangular house pits represent the coastal plank houses is unknown. However, such houses were reported by Lewis and Clark for this area in historic times (Coues 1893)." (Warren 1959:18)

Warren (1959:23) concluded that the site data suggest (1) "a late 'Plateau-like' or 'Interior' complex penetrating as far as the western foothills of the Cascades," and (2)

"the interior influence appears to be less pronounced as a late overlay in the Sauvie Island and Lake River areas." Warren (1959:24) suggested that both of these patterns dated to the late prehistoric to early historic periods. Accordingly, he concluded that the idea of a "Plateau-like tradition" of "long-standing duration" in southwestern Washington "appears to be premature in light of the information now at hand."

Warren (1960) subsequently sought to clarify what he viewed as distinct differences between housepit and village patterns along the Lower Columbia and in the Plateau.

> "The villages in the Lake River-Sauvie Island area are characterized by large rectangular housepits, probably representing plank houses, and in some cases probably subdivided into small apartment-like units. These houses are arranged end to end in a singe line parallel to the river… The village pattern for the Plateau appears to be less rigid and is usually only roughly oriented toward the river, with occasional parallel orientation. The house forms are varied and generally of smaller dimensions than those described for the Lake River-Sauvie Island region. (Warren 1960:27)"

Donald R. Tuohy and Alan L. Bryan subsequently reported on the sites recorded and tested along the Pacific Northwest Gas Pipeline through southwestern Washington previously referred to by Bryan (1957). Seven sites were in Clark County, with one site each in Klickitat, Cowlitz, Lewis, and Snohomish counties. Although housepits were not identified at any of these sites, Tuohy and Bryan noted that two sites containing housepits occurred nearby.

One site, recorded as 45CL11 by Warren (1959), on the north bank of Lake River contained both rectangular housepits and smaller circular depressions; according to Tuohy and Bryan (1959:37) this site "almost certainly is the Chinook village Lewis and Clark called 'Shoto'". The other site consisted of a series of large circular house depressions on the south bank of Lake River (Tuohy and Bryan 1959:33). Tuohy and Bryan (1959:37) noted that historic trade goods have been recovered from both sites, "both of which contain circular depressions usually regarded as housepits by Plateau archaeologists."

According to Tuohy and Bryan (1959:37), "these data [the occurrence of trade goods] unequivocally demonstrate that circular depressions are features found at historically known Clackamas [Chinookan] villages on the flood plain of the Lower Columbia west of the Cascades." In view of this situation, Tuohy and Bryan (1959:37) suggested "that circular depressions can be considered as much a part of the ethnographically known Chinook (Coastal) cultures of Southwestern Washington as they are part of the ethnographic Plateau cultures (Ray 1939:137-140; Smith 1947:256-264)."

In separate discussions at the end of their article, Tuohy and Bryan both returned to the concept of a Trans-Cascadian Tradition earlier proposed by Bryan (1957) "…to explain the interrelated developments which culminated in the ethnographic 'Coastal' and 'Plateau' cultures in Washington" (Tuohy and Bryan 1959:42). Bryan related this tradition to the sequential Lithic, Archaic, and Formative Stages defined by Willey and Phillips (1958), writing "I view the Lithic and Archaic Stage sites from Western

Washington as representatives of a wide-spread Coast-Plateau land-oriented tradition for which I have suggested the term 'Trans-Cascadian'" (Tuohy and Bryan 1959:46).

In Bryan's view, "the area encompassed by this Trans-Cascadian Tradition gradually shrank in size as the Early Maritime Tradition, oriented almost entirely towards the sea, expanded along the sea coasts, and initiated an acculturation process which culminated in a Maritime Cultural Tradition adapted to both land and sea resources" (Tuohy and Bryan 1959:46). Tuohy and Bryan (1959:Table 1) estimated a time range from around 4000 BC to AD 500 for the Trans-Cascadian Tradition, following immediately after the time range of the Old Cordilleran Culture (discussed below).

4.5.2 Units of Culture and Units of Time

Early archaeologists conducting research along the Lower Columbia River often employed the sequence of broad "historical-developmental" stages outlined by Willey and Phillips (1958) to interpret their findings within the larger context of New World prehistory (e.g., Caldwell 1956; Bryan 1957; Tuohy and Bryan 1959). Archaeological evidence found in the Pacific Northwest is representative of the Paleo-Indian, Archaic, and Formative stages. While some, perhaps most, archaeologists currently working in the Pacific Northwest eschew the Willey and Phillips terminology, characterizations of prehistoric cultures according to these broad cultural stages continue to appear in the archaeological literature because they provide a common interpretive framework understood by most archaeologists.

In contrast to the broad cultural stages outlined by Willey and Phillips, which are atemporal cultural units, chronological units such as phases and traditions have been difficult to distinguish in the Lower Columbia Valley downstream from The Dalles. Aside from the previously discussed Trans-Cascadian Tradition, the first attempt at defining chronological units for the Lower Columbia Valley downstream from The Dalles was made in the mid-1970s by Richard M. Pettigrew (1977, 1981, 1990). Excavations were conducted to recover artifact assemblages from seven sites in the Scappoose-Sauvie Island area, from which more than twenty radiocarbon dates were obtained.

The two-phase "Portland Basin" sequence consisted of the Merrybell Phase, estimated to date from 600 BC to AD 200, and the Multnomah Phase, estimated to date from AD 200 to 1835. The later Multnomah Phase was subdivided into three subphases. The Multnomah 1 (AD 200-1250) and Multnomah 2 (AD 1250-1750) subphases were distinguished primarily by differences in the frequency of particular narrow-necked projectile point types. The division between the two subphases was thought to correlate with the "Cascade Landslide Flood," a flood assumed to have been of catastrophic proportions that followed breaching of a landslide dam near present-day Bonneville Dam in the Columbia River Gorge. The Multnomah 3 Subphase (AD 1750-1835) was indicated by the presence of historic trade goods at Native American settlements.

The sequence of phases and subphases defined by Pettigrew (1977, 1981, 1990) is still often referred to today. A similar sequence, with only slight adjustments in beginning and ending dates, was later proposed for the area around the mouth of the Columbia River

(Minor 1983). Both of these sequences are susceptible to criticism on two main grounds. The first criticism focuses on the criteria used to define the projectile point typology, which formed the primary basis on which phases and subphases were distinguished. Aside from measuring neck-width to determine broad-necked from narrow-necked points, the remainder of the criteria for identifying point types were judgmental rather than metric (Dunnell and Beck 1979:86-91). Most classification systems applied to projectile points today employ a metric approach to ensure types are defined on the basis of verifiable attributes (e.g., Thomas 1981; Toepel 1985).

Analysis of projectile points from the excavated sites in the Scappoose-Sauvie Island area indicated that broad-necked (8 mm and greater) points are generally older than narrow-necked (7 mm or less) points. This conclusion is consistent with other studies, which associate broad-necked points with use of the atlatl and dart weapon system, and narrow-necked points with the bow and arrow (e.g., Thomas 1978; Schott 1997). Although chronological patterns in other artifact classes were noted, broad-necked points represent the primary criteria for distinguishing the earlier Merrybell Phase from the later Multnomah Phase, which is primarily indicated by narrow-necked points (Pettigrew 1981:120).

The attempt to break down the pre-contact portion of the Multnomah Phase into shorter chronological units was not as successful. The distinction between the Multnomah 1 and 2 subphases rested primarily on the relative proportions of two narrow-necked point types that were distinguished from each other by diverging (Type 7) versus non-diverging (Type 9) stems. Type 7 was thought to be more frequent during the Multnomah 1 Subphase (AD 200-1250), and Type 9 was thought to be more frequent during the Multnomah 2 Subphase (AD 1250-1750). It is doubtful that these often minute differences occurring on generally very small projectile points actually are temporally significant. These differences probably have more to do with vagaries in the reduction process and the size and shape of the flake blank than differences associated with function or style (Minor and Musil 1997:97-98).

As originally proposed, the "Portland Basin" sequence was thought to be applicable "in the Lower Columbia Valley from the confluence of the Columbia and Sandy rivers east of Portland downstream to the vicinity of Rainier, Oregon, and the Lower Willamette Valley from the confluence of the Willamette and Columbia rivers upstream to Willamette Falls" (Pettigrew 1981:119). Following investigations in the late 1970s upstream in the Columbia Gorge, the geographic range was expanded when it was asserted that the "Portland Basin" sequence "is directly relevant at least as far upstream on the Columbia River as Bonneville Dam" (Pettigrew 1981:iii; 1990:518). According to Pettigrew (1981:137):

> "The general impression received from a comparison of the total inventories of the sites excavated, from the earliest to the latest, is that, while changes in individual attributes are apparent through time and allow the cultural chronology to be defined in terms of those changes, a cultural continuum is evident. There is no evidence suggesting cultural replacement, migration, or any basic changes in the way of life of the

> people. The pattern of culture has apparently existed in the Portland Basin for at least the past 2600 years."

As an alternative to the "Portland Basin" sequence, in recent years some archaeologists have begun to interpret sites in terms of the "Cascadia Sequence" introduced by Kenneth M. Ames (1991a). Adoption of this new sequence has been stimulated in part by the discovery of older sites above the flood plain that antedate the earliest phase in the "Portland Basin" sequence. Borrowed from California (Chartkoff and Chartkoff 1984), the "Cascadia Sequence" was initially applied by Ames to "Cascadia," "a region that essentially encompasses SE Alaska, British Columbia, Washington, northern and central Idaho, most of Oregon and northern California" (Ames 1991a:936). The "Cascadia sequence" was subsequently applied to the Portland Basin (Ames 1994; Ames et al. 1999).

The "Cascadia sequence" begins with a Paleo-Indian Period (to 11,500 BP), followed by an Archaic Period from 11,500 to 5500 BP. Following Chartkoff and Chartkoff (1984), the last 5500 years is referred to as the Pacific Period, which is subdivided into three sub-periods of Early (5500 to 3500/3000 BP), Middle (3500/3000 to 1500 BP), and Late (1500 BP to 250 BP or "Modern") (Ames 1991a:936; 1994:65). Ames (1994:66) was careful to note that "the subdivisions within the Pacific period are not phases in the Willey and Phillips (1958) sense (see Abbott 1971), they are time periods."

In contrast to Pettigrew's attempt to define a cultural sequence using data actually recovered from archaeological sites in the Portland Basin, the "Cascadia sequence" is derived from data obtained almost exclusively from outside the Lower Columbia Valley. Ames (1994:66) notes that "Pettigrew's PB [Portland Basin] sequence fits the Cascadia sequence quite readily." This is not surprising, since the Middle Pacific is more or less equivalent to Pettigrew's Merrybell Phase; the Late Pacific is equivalent to the Multnomah 1 and 2 subphases; and the "Modern" period is equivalent to the Multnomah 3 subphase.

In terms of the Lower Columbia Valley, the primary innovation in the "Cascadia sequence" is simply in splitting the long interval of time during which native peoples practiced lifeways characteristic of the Archaic Stage into two periods: Archaic and Pacific. According to Ames (1991a, 1994), the Pacific Period is distinguished by important social and economic changes, including the evolution from semi- to fully sedentary settlement patterns, appearance of higher population densities, emergence of complex social systems, and elaboration of material culture and development of artistic traditions. These social and economic changes were not unique to "Cascadia." Elsewhere in North America, social and economic changes of this nature have been interpreted as reflecting the transition from Late Archaic to Formative lifeways (*sensu* Willey and Phillips 1958).

4.5.3 Reassessment of the Cascade Landslide Flood

The "Cascade Landslide Flood of AD 1250" was identified as a "major chronological marker throughout the Lower Columbia Valley," forming the "temporal boundary" between the Multnomah 1 and Multnomah 2 subphases in the Portland Basin culture

sequence (Pettigrew 1981:121). The "Cascade Landslide" blocked the Columbia River near present-day Bonneville Dam at the lower end of the Columbia Gorge (Lawrence and Lawrence 1958). The impounded waters drowned a narrow fringe of forest along the banks of the river for 60 km upstream. The river eventually broke through the landslide barrier, and the river channel was reestablished about one kilometer to the south. Wood samples from the stumps of two submerged trees produced radiocarbon dates of AD 1280 +/- 300 and AD 1250 +/- 200 (Lawrence and Lawrence 1958:41; Crane and Griffin 1959:175-176).

According to Pettigrew (1981:121), the release of the waters impounded behind the landslide resulted in a cataclysmic flood, with catastrophic effects on human populations living in the Lower Columbia Valley downstream.

> "When the earthen dam broke, it caused a catastrophic flood downstream that destroyed many aboriginal settlements; it also may have caused major changes in the topography of river channels and land surfaces. As a consequence, villages may have been re-established at new sites, in response to shifted salmon migration routes and alterations in the river and slough channels used for transportation. (Pettigrew 1981:121)"

In support of this idea, it was noted that there was a "paucity of known sites which exhibit continuous occupation through the date of the Cascade Landslide Flood" (Pettigrew 1981:122). At the time the idea of a cataclysmic flood was conceived, seven sites in the Portland Basin were known to have been occupied before the landslide, and 10 sites were known to have been occupied afterward (Pettigrew 1981:122).

Only one site in the Portland Basin was identified as containing evidence of occupation before and after the time of the Bonneville Landslide. At the Cholick Site (35MU1) on Sauvie Island, a sterile silt stratum 40 to 70 cm thick interpreted to represent "an episode of major flooding in the valley" separated the two cultural components (Pettigrew 1981:35). A radiocarbon date of AD 1100 +/- 180 was obtained from slightly below this sterile silt stratum (Pettigrew 1981:43).

More recent geological studies indicate that the Cascade Landslide was actually a composite of four separate smaller landslides, each of which collapsed at different times (Wise 1962, 1970; Waters 1973). A lobe of the Bonneville Landslide, the most recent in this series, with an area of about 14 km^2, extends into the Columbia River, diverting the channel against the Oregon shore (Palmer 1977:75). It is this landslide that most directly correlates with the "Bridge of the Gods" legend and events previously attributed to the Cascade Landslide.

Wood samples collected from Bonneville Landslide deposits during construction of the Second Powerhouse at Bonneville Dam produced radiocarbon dates of AD 1120 +/- 60 and AD 1550 +/- 70. The older date of AD 1120 +/- 60 was statistically indistinguishable from the radiocarbon dates from the two drowned trees reported by Lawrence and Lawrence (1958). Considering its direct association with landslide deposits, as well as its smaller standard deviation, the AD 1120 +/- 60 date was assumed to more reliably reflect the age of the Bonneville Landslide (Minor 1984a).

In a subsequent analysis of radiocarbon dates (n=76) from archaeological sites in the Portland Basin downstream from the Cascade Landslide, Ames (1994:24) noted an absence of radiocarbon dates between 1000 and 800 BP, concluding that "there can be no doubt that site distributions in the PB [Portland Basin] shifted abruptly at around 1000 BP." However, after noting evidence of frequent high floods farther upstream along the Middle Columbia River, it was suggested that "it is possible, therefore, that the shift in settlement patterns is the result of a series of floods, of which the Bridge of the Gods event [Cascade Landslide] was only one" (Ames 1994:30).

A more in-depth assessment of evidence for a flood related to the Bonneville Landslide in the Portland Basin was carried out in conjunction with archaeological investigations on the City of Portland Columbia South Shore area in 1994 (Minor et al. 1994:168-171). By 1994 at least eight sites downstream from the landslide were known to have been occupied before and after the estimated time of this event. Of these sites, four contained sterile strata intervening between the early and later occupations. While Pettigrew inferred that the sterile stratum at 35MU1 "represents an episode of major flooding in the valley" (1981:35), other archaeologists concluded that the sterile strata at the sites they investigated were the result of overbank sedimentation associated with regular (non-catastrophic) inundation of the Columbia River floodplain (Ellis and Fagan 1993:167; Wessen 1983:B-24).

The idea that a cataclysmic flood occurred in association with the Bonneville Landslide was based to a large extent on an apparent "gap" corresponding to the date of this event in the distribution of radiocarbon dates from archaeological sites downstream in the Portland Basin (Pettigrew 1981:122; Ames 1994:24-30). Plotting of the distribution of all radiocarbon dates (n=89) available from archaeological sites in the Portland Basin as of 1994 indicated that no "gaps" corresponding to the date of the Bonneville Landslide (ca. AD 1120) continued to exist (Minor et al. 1994:171, Figure 37).

More recently, additional, still unpublished, radiocarbon dates obtained on wood samples from trees drowned behind the landslide dam have been shown to have a wide time span, falling in the interval between AD 1120 +/- 60 and AD 1550 +/-70 (Alex Bourdeau, personal communication, 2002). The most recent attempt at determining the date of the landslide places this event between AD 1415 and AD 1455 (O'Connor 2004:420fn).

Available evidence does not support the idea that the breaching of the Bonneville Landslide resulted in a cataclysmic flood downstream. Physical evidence of a flood associated with this landslide is not readily apparent in the archaeological record (cf. Bourdeau 2004). The "gap" in the distribution of radiocarbon dates from archaeological sites in the Portland Basin that once seemed to correlate with the timing of the landslide has been closed with the acquisition of additional dates. The absence of direct physical evidence of a "flood episode" correlative with the Bonneville Landslide in the Portland Basin is consistent with the fact that evidence of deposition or erosion attributable to this event has not been reported in any of the available descriptions of the geology of the Lower Columbia Valley (e.g., Trimble 1963; Gates 1994; Rapp 2005). Even if geological evidence of a flood correlative with breaching of the Bonneville Landslide is eventually identified, it is now reasonably certain that any consequences of this event for people living downstream were far less serious than originally imagined.

4.5.4 The Lower Columbia Culture Sequence

At the present time, chronological units for Lower Columbia Valley archaeology, based on data actually recovered from sites in the region, remain poorly defined. Due to taphonomic factors associated with the flood plain environment, archaeological evidence of occupation along the river margins has limited time depth. The earliest radiocarbon dates associated with prehistoric activity are only about 3500 years old, and evidence of occupation in lowland settings mostly dates within the last 1000 to 1500 years.

Projectile point cross-dating remains the primary means of estimating the ages of sites. As elsewhere in the Pacific Northwest, sites or components may be assigned to broad time periods according to the presence (and perhaps the relative proportions) of lanceolate or leaf-shaped points, stemmed broad-necked atlatl points, stemmed narrow-necked arrow points, or artifacts of Euroamerican (and occasionally Asian) manufacture.

In view of shortcomings in previously proposed chronological schemes, information available about the prehistory of the Lower Columbia Valley downstream from The Dalles is summarized below in terms of the Paleo-Indian, Archaic, and Formative stages previously recognized in the Pacific Northwest (Willey and Phillips 1958). By definition, cultural stages are not chronological units, although certain artifact classes (e.g., projectile points) may be more characteristic of one stage than another.

4.5.4.1 Paleo-Indian Stage

The origins and broader cultural affiliations of the earliest peoples in the Pacific Northwest have not yet been established in the archaeological record (Carlson 1990; Aikens 2006). It has long been the consensus of opinion that peoples associated with the continent-wide Fluted Point Tradition were the earliest inhabitants of North America. Elsewhere, Paleo-Indian peoples are known to have used Clovis and Folsom fluted points to hunt big game, including extinct megafauna such as mammoths and giant bison. To the east of the Pacific Northwest, on the Great Plains as well as farther south in the Southwest, Clovis dates from about 11,600 to 11,000 years ago, while Folsom dates from about 10,900 to 10,200 years ago (Huckell and Judge 2006:149).

Little evidence of the Fluted Point Tradition has so far been found in the Pacific Northwest. Among the few reported finds of fluted points in the region are a “classic” Clovis point on display at the Clark County Museum found at an unrecorded site in southwest Washington by Harold Koethe, the same individual who collected artifacts from 45CL54 near Lewis River described by Tuohy and Bryan (1959:29-32). Additional isolated finds of single fluted projectile points have been reported in The Dalles-Deschutes area to the east, the Puget lowlands to the north, and western Oregon to the south (Strong et al. 1930: Plate 12; Osborne 1956; Minor 1985).

In contrast to the “Clovis-first” model, other archaeologists believe that the earliest populations in western North America are represented by artifact assemblages containing various forms of stemmed lanceolate projectile points (Bryan 1980). The idea that the earliest manifestations of the Stemmed Point Tradition may be at least as old as the fluted points found in western North America is gradually gaining credibility (Willig and

Aikens 1988; Aikens 2006). However, evidence in support of this idea has not come from the Pacific Northwest, as the projectile points from this region that are considered part of the Stemmed Point Tradition, including Lind Coulee, Windust, and Cascade points, are generally associated with radiocarbon dates of less than 10,000 BP.

Whatever the ultimate origin of the earliest inhabitants of the Pacific Northwest, it is almost certain that they were not big game hunters who stalked extinct megafauna like the Clovis and Folsom peoples east of the Rocky Mountains. Instead, the little evidence related to subsistence available suggests that the earliest inhabitants of western North America practiced lifeways more like those of later Archaic peoples. The term "Paleo-Archaic" has been suggested to describe the adaptations of hunters and gatherers who inhabited western North America, including the Pacific Northwest, prior to 10,000 years ago (Willig and Aikens 1988; Aikens 2006).

4.5.4.2 Archaic Stage

The Archaic Stage is characterized by hunting and gathering cultures that were technologically complex, with a variety of specialized tools, most notably milling stones and fishing equipment, reflecting a broad-spectrum adaptive strategy. The Five Mile Rapids Site near The Dalles, excavated between 1952 and 1956, was one of the first localities in the Pacific Northwest to produce evidence of early Archaic occupation (Cressman et al. 1960). The lowest levels of the cultural deposit in the Roadcut area at the upper end of the Five Mile Rapids Site contained "enormous numbers of salmon vertebrae" as well as leaf-shaped projectile points and at least one shouldered lanceolate point, a variety of bone and antler tools, burins, scrapers, and bola stones. A radiocarbon date of 7835 +/- 220 BC was obtained from Stratum I, while later radiocarbon dates of 5725 +/- 100 BC and 5925 +/- 100 BC were obtained from Strata II and III, respectively. These early radiocarbon dates bracket the interval of intense riverine adaptation characteristic of the Early Stage of occupation at The Dalles (Cressman et al. 1960:59-60).

The results of excavations at Five Mile Rapids formed the basis for the development of the concept of the Old Cordilleran Culture by B. Robert Butler (1961, 1965b), who envisioned it as an unspecialized hunting-gathering culture, identified primarily by the presence of the leaf-shaped "Cascade" projectile point, which was posited to have existed in the Pacific Northwest (and elsewhere) between 13,000 and 7000 years ago (Butler 1961:63-64). The Old Cordilleran Culture concept proved controversial because of the ambiguous nature of its diagnostic elements and the extreme geographic and temporal range proposed for its occurrence. However, leaf-shaped project points and other elements of the Old Cordilleran Culture continue to be widely recognized as indicators of early occupation in the Pacific Northwest.

Stylistically early projectile points comparable to those found in the early components around Five Mile Rapids have been reported at a number of sites in the Lower Columbia Valley downstream from The Dalles. These localities include the Geertz Site in the foothills of the Cascade Range east of Portland (Woodward 1972), the Burnett Site in Lake Oswego (Burnett 1991; Hamilton and Roulette 2005), the Morasch Site near Camas (Woodward and Associates 1996; Roulette et al. 2003), and the Youngs River Complex

near the mouth of the Columbia River (Minor 1984b). None of these sites has produced reliable radiocarbon dates. On stylistic grounds, the projectile points compare closely with those from sites elsewhere in the Pacific Northwest dating between 10,000 and 6000 years ago.

A somewhat more diverse assemblage that included leaf-shaped points, girdled stones (bolas or fishing weights?), and pestles and bowls indicative of plant processing, was found at Site 45CL54 on the East Fork of the Lewis River in Washington (Tuohy and Bryan 1959:29-32). Stylistically early artifacts including leaf-shaped points, bola stones, and cobble celts have also been recovered from the surface of sites on Sauvie Island and the adjacent Oregon shore (Pettigrew 1981:93-101). These artifacts co-occur with later stemmed broad-necked projectile points, suggesting occupation not long before the earliest radiocarbon dated sites on the island (cf. Pettigrew 1981:110). The earliest radiocarbon dates from Sauvie Island are from the Merrybell Site (35MU9), where radiocarbon dates of 900 +/- 85 BC, 900 +/- 95 BC, and 930 +/- 155 BC were obtained from cultural deposits 2.7 meters below the surface (Pettigrew 1981:79).

At the present time, a hearth found at 45CL31 on Vancouver Lake that yielded two dates of 1560 +/- 100 BC and 1410 +/- 70 BC represents the earliest radiocarbon dated evidence of occupation in the Portland Basin (Wessen 1983:99-116). Slightly later radiocarbon dates, essentially coeval with the early dates from the Merrybell Site, of 850+/- 110 BC, 900 +/- 30 BC, and 1020 +/- 80 BC have been reported from Site 35MU117 on the south shore flood plain near confluence of the Columbia and Willamette Rivers (Ellis 2000). Farther downstream in the Columbia Valley, a radiocarbon date of 850 +/- 105 BC has been reported from a cultural stratum exposed in the bank of Lewis River at 45CL117 (Kennedy and Jermann 1978). A slightly younger radiocarbon date of 1180 +/- 130 BC has been reported from Eddy Point in the Columbia River estuary (Minor 1983:127).

In the interior portion of the Pacific Northwest a transition toward greater residential stability occurred with the appearance of oval to circular pithouses between 6000 and 4000 BP (Ames 1991b). These small pithouses are similar to those made elsewhere in western North America by Archaic cultures. The earliest circular pithouses in the Lower Columbia River region were documented at the Par-Tee Site (35CLT20) in Seaside on the northern Oregon coast, where radiocarbon dates indicate these features date between AD 200 and AD 950 (Phebus and Drucker 1979). Circular pithouses continued to be the primary winter house type made by the ethnographic peoples of the Plateau culture area upstream on the Columbia River into historic times.

From the Plateau, circular pithouses have been found extending from The Dalles area downstream along the Columbia River. The best documented occurrence of this house type was at the Caples Site (45SA5), on the Washington shore just downstream from Bonneville Dam, where a minimum of 41 pithouses were present (Dunnell and Beck 1979). These features can be characterized as broadly oval pits roughly one meter deep, five to six meters long, and four meters wide. Four radiocarbon dates ranging from AD 1210 +/- 100 to AD 1650 +/- 110 were reported. The types of projectile points represented, together with the absence of small side-notched points and historic trade materials, indicates that use of this locality ended before the time of historic contact.

Proceeding downstream along the Columbia, a village consisting of 17 oval and circular pithouses (45SA1) near Skamania was described by Warren (1959:10-11). A site with 11 circular pithouses (45CL8) in Washougal was described by both Caldwell (1956:250) and Warren (1959:11-12). Boulders bearing pit or cupule petroglyphs occur at both of these sites. As previously noted, circular pithouses were observed by early archaeologists on the Washington shore as far downstream as Lake River (Tuohy and Bryan 1959:33; Warren (1959:15).

The pithouses at Site 45CL8 in Washougal ranged from 4.5 to 13.5 meters in diameter. Test excavations in one of these pithouses encountered the floor 120 cm below the surface in the center and about 70 cm below surface at the outer edge of the depression. No radiocarbon dates were obtained, but the artifact assemblage included one leaf-shaped and two stemmed broad-necked projectile points (Warren 1959). Relic collectors have recovered collections dominated by stemmed broad-necked points from this site (Burnett et al. 1992). On the basis of projectile point cross-dating, it seems reasonable to suggest that occupation of this site occurred sometime before 2000 BP, and possibly considerably earlier.

To date, the only example of a circular pithouse in the Lower Columbia Valley with associated radiocarbon dates was at the Ede Site (35CO34) on the Oregon shore near Scappoose. Excavations along the bank of Multnomah Channel in 1984 exposed a semi-subterranean house with two floors in the river bank. The profile of this feature suggested a saucer-shaped, circular house floor rather than a steep-sided rectangular housepit of the kind associated with plank houses. Radiocarbon dates of AD 260 +/- 60 and AD 490 +/- 60 were obtained from the lower and upper house floors, respectively (Minor 1989).

Although circular pithouses were recognized by early archaeologists as an important indicator of broader cultural relationships, later archaeologists have made little effort to obtain information about the occurrence of these features in the Lower Columbia Valley. Pithouses were thought by early archaeologists to have been associated with a “basal cultural stratum” from which the later ethnographic cultures of the Northwest Coast and Plateau developed. Pithouses in the form of earth lodges continued as the primary winter house type among ethnographic Plateau peoples. In areas where the Northwest Coast culture later emerged, including the Lower Columbia Valley, pithouses were replaced by rectangular plank houses, with the custom moving upriver from the coast (Strong et al. 1930:40).

It seems likely that, at least initially, the replacement of circular pithouses by rectangular plank houses was a gradual process. Because plank houses involve considerably more labor to construct, they were probably first built for and inhabited by chiefs and their relatives, with the remainder of the population continuing to reside in pithouses. Some conservative individuals may have persisted in living in pithouses long after the general adoption of the plank house (Barnett 1944). These situations may account for the continued occurrence of pithouses after the introduction of plank houses, as well as the apparent co-occurrence of pithouses and plank houses at the same settlements.

4.5.4.3 Formative Stage

The Formative Stage is characterized by the appearance of sedentary village life. Elsewhere in North America, Formative Stage village communities were based on agriculture. The Northwest Coast culture area is recognized as an exception to this pattern, as the hunting-gathering-fishing subsistence practices in this region were effectively equivalent to economies based on agriculture (Willey and Phillips 1958:145). Some archaeologists object to application of the Formative Stage concept in the Pacific Northwest, citing the association of this term with agriculture, but this reasoning becomes increasingly moot in light of recent reassessments of the nature and extent of plant cultivation practiced by the native peoples of this region (Deur and Turner 2005). As Willey and Phillips (1958:145) point out, the settlements pattern and other indirect evidence of sedentism, not agriculture, "are the effective criteria for classification" as Formative stage cultures.

Although the rock art, mobile stone sculpture, and ceramics found in the Lower Columbia Valley almost certainly represent manifestations of Formative-level cultures, little chronological information is available regarding the emergence of these traditions. At the present time, the emergence of Formative lifeways in the Lower Columbia Valley can be correlated with the widespread occurrence of rectangular plank houses in the region, as cross-cultural studies indicate that rectilinear houses are a strong indicator of sedentary lifestyles (Whiting and Ayres 1968; Hunter-Anderson 1977).

The transition from circular to oval pithouses to rectangular plank houses in the Lower Columbia Valley appears to be analogous to the patterns observed by Flannery (2002) in villages in Mesoamerica and the Near East where two types of societies appear to be represented. One type lived in encampments of circular structures, many of which appeared too small to house an entire family, and with most of the storage units out in the open as if stored items were to be shared communally. These types of settlements, which appeared to represent a large extended family, are found in "Archaic Mesoamerica" (Flannery 2002:417). The second type of society lived in villages of rectangular houses, with each house large enough for a nuclear family. The houses in Early Formative Mesoamerican villages were divided into rooms, some of which were used for storage. Flannery (2002:418) observed that "in both Mesoamerica and the Near East, villages of rectangular, nuclear family houses tended to replace settlements of small, circular huts over time."

Flannery proceeded to emphasize that the geometric shape of the residence is not the crucial variable. Instead, "my main distinction was between (1) societies where small huts are occupied by individuals and storage is shared, and (2) societies where larger houses are occupied by whole nuclear families, and storage is private" (Flannery 2002:421). Little is presently known about the internal arrangement of circular to oval pithouses on the Lower Columbia, as few of these structures have been excavated. Storage pits beneath the floors are known to have been a common feature in rectangular plank houses (Ames et al. 1992).

The earliest radiocarbon dated rectangular plank house in the Lower Columbia Valley vicinity was found at the Palmrose Site (35CLT47) in Seaside on the northern Oregon

coast. This feature appeared to have been similar in many respects to the Northwest Coast style plank house made by Chinookan peoples at the time of historic contact. Estimated to measure 6 by 12 meters, this house had a well-defined bench along the north side, a graded ramp on the west end (probably the entrance), and a centrally situated firehearth that appeared to continue through most of the length of the house. Charcoal from this firehearth produced a radiocarbon date of 615 +/- 70 BC (Phebus and Drucker 1979; Connolly 1992).

Available evidence indicates that Formative lifeways were established upstream on the Lower Columbia as far as the Portland Basin by around 2000 years ago. At the Kersting Site (45CL21) on Lake River, "rectangular pithouses were found which were associated with [the] earliest units and are nearly identical to those of nearby late sites" (Dunnell et al. 1973:6). A radiocarbon date of 165 +/- 100 BC was obtained for the earlier material, apparently including the rectangular house remains (Dunnell et al. 1973:6). Radiocarbon dates of 120 +/- 85 BC and AD 61 +/- 100 were also obtained from this site, but the relationship of these dates to the rectangular houses was not reported (Jermann et al. 1975:50).

The most detailed report of the excavation of a Chinookan-style semi-subterranean plank house is from the Meier Site (35CO5) near Scappoose (Ames et al. 1992). Two phases of construction and rebuilding were identified. During the later, better understood phase this house is estimated to have measured "14 m x 35 m, with sidewalls 2.4 m high, and to have had a 6.1 m-high ridge beam and a single 2 m-wide sleeping platform along each side wall" (Ames et al. 1992:286). This house is estimated to have required 40,000 (without a plank floor) to 55,000 (with a plank floor) board feet of lumber. Radiocarbon dates from the Meier Site range from AD 1230 +/- 70 to AD 1820 +/- 60. Some trade goods were recovered, but the site was apparently abandoned before sustained contact with Euroamericans began.

Across the Columbia River on the Washington shore, six large rectangular depressions from semi-subterranean plank houses were identified along a ridge top at the site of the Chinookan village of Cathlapotle (45CL1). Lewis and Clark observed 14 houses at this village on November 5, 1805 (Moulton 1990:21-24) and visited this settlement on March 29, 1806 (Moulton 1991:26-31). The house depressions varied between 20 and 70 meters in length, between 8 and 12 meters in width, and averaged 1 to 2 meters deep (Ames et al 1999:26). The depressions were arranged in two rows of three depressions each, with the long axis of each depression aligned parallel with the present course of Lake River (Ames et al. 1999:36-37). Other house depressions at the site are apparently buried under debris fields, midden accumulations, and flood deposits.

Excavations at Cathlapotle from 1992 to 1996 sampled the six house depressions visible on the surface to various degrees as well as other areas of the site, establishing the presence of cultural deposits in excess of two meters deep in some areas. Depression 1, the largest at the site at 63 meters long and 10 meters wide, was found to be subdivided into four sub-depressions interpreted as compartments within the larger dwelling (Ames et al. 1999:37-39). Twenty-nine radiocarbon dates establish a span of occupation beginning ca. AD 1000, while historical artifacts and historical accounts document continued use perhaps into the 1860s (Ames et al. 1999:63-65. 86).

The largest house depression at Cathlapotle appears to be similar to, but somewhat larger than, those observed by Warren (1959:15) at 45CL11 on Lake River, which he described as "housepits 125 feet long, with a high outer lip and lower walls running across the width of the floor. These lower walls appear to represent separate units within the larger house." Some Formative plank houses apparently were even larger. A second large housepit on Lake River was described as a single depression 300 feet long and 25 feet wide (Warren 1960:27). These long housepits suggest large houses with smaller subdivisions, such as the one described by William Clark at the Nechacolee village on the Oregon shore opposite Government Island that consisted of seven square houses in a line, separated by passageways, but under a single roof (Moulton 1991:64). This trend toward the construction of "row houses" is thought to reflect population growth and an accompanying increase in the range of activities carried out within houses (Hunter-Anderson 1977:306-307).

Farther upstream on the Columbia River, rectangular plank houses have been excavated at 45SA11 at North Bonneville in the Cascades area near the downstream end of the Columbia Gorge (Minor et al. 1989). Located on the north shore of the Columbia River across from Bradford Island, later the location of Bonneville Dam, 45SA11 corresponds to the Chinookan Clahclellah "village of four large houses" visited by Lewis and Clark on October 31, 1805 (Moulton 1988:358-369), and noted again on April 10, 1806 (Moulton 1991:99-104). The plank houses overlie a component containing at least 11 oval house depressions interpreted as the remains of mat lodges like those built by the native peoples of the Plateau. The stratigraphic context of these features below the plank houses, the types of artifacts recovered from them, and the absence of historical materials, indicates that occupation of the mat lodges occurred in late prehistoric times immediately preceding the plank house occupation.

The seven plank houses documented during the excavations were arranged in two rows, with five in front facing the river and two in back. All of the plank houses were roughly square in shape; six of the seven contained evidence of more than one floor indicating multiple occupations. Radiocarbon dates of AD 1700 +/- 55, AD 1730 +/- 55, and AD 1720 +/- 95 were obtained from one of the plank houses. Although available information is somewhat contradictory, it appears that some of the occupations in these structures were entirely prehistoric in age, but that all contained historical materials in their latest occupations.

From the Cascades upstream to The Dalles, both circular pithouses and rectangular plank houses were observed by Lewis and Clark in the early historic period (Moulton 1988:333-335; 1991:119-121). At The Dalles, Chinookan settlements were restricted to the vicinity of Fivemile Rapids; the greater portion of The Dalles-Deschutes area was occupied by Sahaptin-speaking peoples of the Plateau. Although Wakemap Mound is known primarily for containing the remains of mat lodge dwellings like those made by ethnographic Plateau peoples, the latest occupation represented by houses with shallow, vertically walled pits (Butler 1960:85, 94), probably corresponds to the Chinookan settlement observed by Lewis and Clark on their journey down the Columbia River on October 24, 1805 (Moulton 1988:328-336). An oral tradition links the Chinookan Wishram to both Wakemap Mound and the nearby village of Nixluidix (Sapir 1909:201).

Judging from the archaeological evidence, Wishram use of Wakemap Mound was rather sparse, an inference which is supported by ethnographic information indicating that Nixluidix rather than Wakemap was the principal Wishram village in the area (Spier and Sapir 1930:164).

4.5.4.4 Protohistoric Era

The protohistoric era in the Lower Columbia River region commenced when one or more shipwrecks of Spanish vessels occurred along the northern Oregon coast (Beals and Steele 1981; Stenger 2005). A century or more may have elapsed between the time of these first unrecorded encounters and the earliest historically documented contacts between Chinookans and Euroamericans in 1792.

For the native peoples of the Lower Columbia Valley, the most critical event of the protohistoric era was the introduction of infectious disease. Direct evidence of catastrophic population decline in protohistoric times is represented by the use of burial vaults to dispose of large numbers of the dead. These features were already in use in the Columbia River Valley when Lewis and Clark passed through the region, as they were observed by these explorers near Blalock Island (Moulton 1988:311), on an island downstream from Celilo Falls (Moulton 1988:325) that may correspond to Upper Memaloose Island, on Lower Memaloose Island near Lyle, Washington (Moulton 1988:349), and in the Cascades area (Moulton 1988:361; 1991:107-108). Descriptions of burial vault sites by Euroamericans consistently relate that the vaults were packed to the ceiling with human skeletal remains. On Upper Memaloose Island alone, the remains of 2500-3000 individuals were removed and reburied elsewhere before the completion of The Dalles Dam (Cole 1958:10).

Robert Boyd, the leading researcher of epidemics in the Pacific Northwest, favors the idea that smallpox was first introduced by a Spanish expedition to the Northwest Coast in 1775, although alternative sources, including introduction from the Northern Plains, "cannot be ruled out" (Boyd 1990:138). Significant population decline from infectious diseases is believed to have occurred in the late sixteenth century or early seventeenth century in the Middle Missouri region east of the Plateau (Ramenofsky 1987:133-134). A later smallpox outbreak in 1800-1801 definitely originated on the Northern Plains and then spread westward across the Rocky Mountains into the Columbia Plateau (Boyd 1985:105). If the smallpox outbreak of 1800-1801 is any precedent, infectious disease may have spread westward from the Northern Plains and into the Columbia River Valley by the early to middle 1600s.

Based on distinctive motifs in the Lower Columbia Art Style, Strong (1945) suggested that catastrophic population decline might have led to the emergence of a "ghost cult" on the Columbia River. Butler (1965a:11) identified the distinctive "grinning face motif" as likely to have been associated with the ghost cult. Although Butler broached the idea that this motif may have originated in the Portland Basin, this motif seems to have been much more common in The Dalles area, where it has often been found on artifacts associated with cremations. The association of this motif with mortuary remains dating to the 1700s and early 1800s lends support to the idea that a "cult of the dead" arose as a reaction to rapid population decline (Butler 1965a:8-11). This cult may have provided the basis for

the emergence of the Prophet Dance, a revitalization movement that prophesied a return to conditions before the arrival of Euroamericans that spread among Plateau peoples in the early historic period (Spier 1935; Strong 1945:253-254).

Although further research is necessary to resolve this matter, the archaeological record in the Lower Columbia Valley, especially The Dalles area, is consistent with the idea of significant population decline some time before the first documented epidemic in the 1770s (cf. Boyd 1985:95; 1990:137). Although generally thought of as a Chinookan trait (Strong et al. 1930:41-42), burial vault sites appear to have been more common within the territories of Sahaptin peoples farther upstream on the Columbia River, and were only found within areas occupied by the easternmost Chinookan groups at the time of historic contact. The fact that burial vault sites were more common in The Dalles area is consistent with an observation by Dobyns (1983) that the inhabitants of large trading centers were particularly susceptible to infectious disease and suffered far higher mortality rates than native peoples in more dispersed settlements.

4.5.4.5 Historic Period

The Historic Period in the Lower Columbia Valley began with the first recorded contacts between Chinookans and Euroamericans by Robert Gray and William Broughton in 1792 and by Lewis and Clark in 1805-1806. In terms of the archaeological record, Historic Period occupation is indicated by the presence of artifacts of non-Indian manufacture. Glass trade beads are by far the most common, but other items frequently found include rolled copper tubes and bracelets, iron axes and chisels, metal buttons, bells and thimbles, kaolin pipes, and earthenware and porcelain vessels.

Elsewhere in North America, archaeologists have often subdivided the Historic Period into smaller chronological units (e.g., protohistoric, contact, frontier, post-contact, reservation) based on the nature of the contacts between native peoples and Euroamericans and associated artifact assemblages. This has not been attempted in any systematic way on the Lower Columbia, in part because of the catastrophic collapse of the native population from the introduction of infectious diseases, and the relatively brief span of time between the first contacts and assignment of the few survivors to reservations.

Archaeological investigations have been conducted at a number of Native American settlements along the Columbia River occupied during the Historic Period that are mentioned in historical accounts. From downstream to upstream on the Columbia River these include the Kathlamet village of *hlilusqahih* at Knappa (Minor 1983); the *Whill Wetz* village at Oak Point (Reese and Fagan 1990); the *Cathlapotle* village near present-day Ridgefield, Washington (Ames et al. 1999); the *Nechacolee* village in present-day east Portland (Minor et al. 1997); the *Clahclellah* village (Minor et al. 1989) and the *Skamanyak* village (Minor and Musil 1997) at the Cascades; and the Wasco village of *wotsaqs* or lone pine near The Dalles (Minor 1997).

A recent study of faunal remains from eight archaeological sites on Sauvie Island and the adjacent Oregon shore "provides empirical support for the view that Native subsistence systems underwent significant *change* as a result of European contact" (Butler 2000:659,

original italics). High-ranked resources like large mammals and large fish (sturgeon and salmon) were observed to decline, and low-ranked resources (small mammals and fish) to increase, in faunal assemblages from late prehistoric components, a pattern interpreted to reflect human-induced resource depression from over-exploitation of these animals. Conversely, high-ranked resources were observed to increase and low-ranked resources decrease in faunal assemblages from historic components, a pattern interpreted to reflect reduced foraging and rebound in prey abundance following the decline in the human population after historic contact. The results of this study raise serious questions about the extent to which descriptions of subsistence practices in ethnographic and historical accounts can be taken to reflect conditions and practices in prehistoric times (Butler 2000:659-660).

4.5.5 Cultural Dynamics in the Lower Columbia Valley

As suggested long ago by Alan Bryan, Donald Tuohy, and Claude Warren, multiple lines of evidence point to the former existence of a "Plateau-like" complex extending from the western edge of the Plateau culture area at The Dalles downstream along the Columbia River to the area around the confluence with the Willamette River in prehistoric times. These lines of evidence support Bryan's concept of a Trans-Cascadian Tradition proposed as an explanation for the "parallel interrelated development" observed in The Dalles area and sites downstream at least as far as the Willamette-Columbia confluence (Bryan 1957:9).

The first line of evidence in support of this idea is the close similarities in rock art around the Willamette-Columbia confluence to rock art at The Dalles. In particular, cupules or pit-style petroglyphs have a nearly continuous distribution from The Dalles downstream to just east of Vancouver. Along this section of the river pit petroglyphs often occur at villages composed of circular to oval pithouses. There are no recorded occurrences of rock art downstream from Vancouver to the coast. Although petroglyphs cannot be directly dated, the rock art around the Willamette-Columbia confluence is generally thought to be old, antedating later rock art styles in The Dalles area.

The second line of evidence is the close stylistic relationship between the elaborate mobile stone sculptures found at sites around the Willamette-Columbia confluence with the mobile stone sculpture found around The Dalles. Because most known examples were ripped out of context by relic collectors, little is known about the distribution of mobile stone sculpture around the Willamette-Columbia confluence, but examples are often attributed to the Sauvie Island-Lake River area, slightly downstream from the maximum downstream occurrence of rock art. Few finds of mobile stone sculpture have been reported farther downstream on the Columbia River (Peterson 1978).

The third line of evidence is the continuous distribution of circular to oval pithouses from The Dalles on the western edge of the Plateau downstream on the Columbia at least as far as the Sauvie Island-Lake River area. It is worth noting that the occurrence of circular to oval pithouses characteristic of the Plateau in an area where rectangular plank houses were the ethnographic house type is not unique to the Lower Columbia Valley. Circular to oval pit houses were similarly present along the Fraser River far downstream from the

historic boundary between the Northwest Coast and Plateau culture areas in British Columbia (Smith 1947).

Based on very little actual data, the Trans-Cascadian Tradition was originally estimated to have a time range from 4000 BC to AD 500 (Tuohy and Bryan 1959: Table 1). Examples of mobile stone sculpture from around the Willamette-Columbia confluence are stylistically similar to pieces of stone sculpture found in The Dalles area estimated to date from approximately 4500 BC to AD 500 (Butler 1957:161-165). Some settlements with circular to oval pithouses, like Site 45CL8 at Washougal, apparently were relatively old, judging from the predominance of broad-necked projectile points recovered from these features (Burnett et al. 1992).

On the other hand, the Trans-Cascadian Tradition may have persisted relatively late in prehistory. Excavations at sites around the Cascades documented a shift from an earlier "Plateau" settlement pattern before the Bonneville Landslide, as exemplified by circular to oval pithouses at the Caples Site (Dunnell and Beck 1979), to a "Northwest Coast" settlement pattern featuring rectangular plank houses after the landslide, as represented at the Clahclellah village and other settlements in the area (Minor et al. 1989; Minor and Musil 1997).

Who were the people of the Trans-Cascadian Tradition? Were they the easternmost group(s) of Chinookan-speakers, who occupied the banks of the Columbia River from the Willamette River confluence upstream to The Dalles at the time of historic contact? Or were they speakers of a Sahaptin language, like the ethnographic peoples of the western portion of the Plateau culture area with whom they apparently shared close ties?

The answers to these questions may be found in the history of the Chinookan languages, as there appears to be a strong congruence between the late prehistoric archaeological record in the Lower Columbia Valley and movements by Chinookan peoples as reconstructed by linguists (Rigsby 1965:245-250; Silverstein 1974:S98-99; Hymes 1981:17-19; Thompson and Kinkade 1990:45-47). The upstream movement of Chinookan peoples indicated by the internal relationships between the two main Chinookan languages (Lower and Upper Chinookan) and Upper Chinookan dialects (Kathlamet, Multnomah, Kiksht) may correlate with the spread of rectangular plank house from the Pacific Coast upstream into the Portland Basin around 2000 years ago. Likewise, as "the Upper Chinookan speech community expanded its boundaries eastward up the Columbia river to the Dalles region in recent centuries" (Rigsby 1965:250), the late divergence of the two upstream dialects of Upper Chinookan (Multnomah and Kiksht) from one another may correlate with the late appearance of rectangular plank houses in the Cascades area and The Dalles area shortly before historic contact.

The late Chinookan expansion from the Cascades upstream to The Dalles may have been facilitated by an early introduction of infectious disease into the Columbia Plateau from the Plains, resulting in catastrophic population decline among Sahaptin peoples along the Middle Columbia River. As the largest and densest populations typically disappeared first (Dobyns 1983), The Dalles area, where Plateau peoples gathered each year at the falls for salmon fishing and trade, may have been an especially fertile setting for infectious disease. Separated from the Plateau by the Columbia Gorge and Cascade Range,

Chinookan peoples living downstream on the Columbia may have been less affected by this initial epidemic. The late Chinookan expansion up the Columbia River, then, may have involved filling a partial vacuum created by the early depopulation of Plateau peoples upstream in the Middle Columbia River region (Minor and Walker 1993).

As recognized by Bryan, Tuohy, Warren, and other early archaeologists, the archaeological record in the Lower Columbia Valley is complex, reflecting the interplay over thousands of years of peoples and cultures from the interior and coastal regions of the Pacific Northwest. Subsequently proposed cultural and chronological sequences, which view the archaeological record in terms of region-wide phases (Pettigrew 1977, 1981, 1990) or periods (Ames 1994), obscure significant intra-regional differences, and convey an impression of cultural uniformity that is not consistent with archaeological evidence from the Lower Columbia Valley.

Within the last 3,000 years, peoples representative of two relatively distinctive cultures lived in the Lower Columbia Valley. The people in the eastern (upstream) portion of the valley lived in circular to oval pithouses characteristically made by Archaic cultures. This house type, and rock art consisting largely of pit or cupule style petroglyphs, link these people to the Plateau culture area upstream on the Columbia River. The people in the western (downstream) portion of the valley lived in rectangular houses, in this case made of planks, characteristically made by Formative cultures. The rectangular plank houses link these people to the Northwest Coast culture area, which was represented in the Lower Columbia Valley by the western Chinookan groups at the time of historic contact.

The existence of a separate culture with ties to the Plateau, distinguished by the construction of pithouses and a distinctive rock art tradition, supports the idea proposed by Bryan more than a half-century ago of a Trans-Cascadian Tradition in the eastern portion of the Lower Columbia Valley. There does not appear to have been a firm boundary between the people of this tradition and people associated with the emerging Northwest Coast tradition downstream. The distinctive rock art tradition is found only upstream from present-day Vancouver, but circular to oval pithouses have been reported farther downstream in the Lake River and Scapposse areas.

In general, it appears that the two cultures overlapped in the area around the confluence of the Columbia and Willamette rivers, and it was in this milieu that the rich artistic tradition expressed in mobile stone sculpture, and to a lesser extent in the local ceramic complex, emerged sometime within the last 2000 years. The Trans-Cascadian Tradition likely persisted until late in prehistory when the Bonneville Landslide, and later the introduction of infectious diseases, apparently provided opportunities for the Chinookan peoples to expand up the Columbia to The Dalles area to the full extent of their ethnographic territory at the time of historic contact.

4.6 Ethnography

At the time of historic contact the shores of the Lower Columbia River were occupied by Chinookan peoples, whose territory extended from the Pacific Coast more than 200 miles up the Columbia River to The Dalles. In terms of ethnographic lifeways, the Chinookan peoples traditionally have been placed in the Northwest Coast culture area (Kroeber

1939). A more recent assessment has revised this classification. The Chinookan groups living in the area from the Pacific coast upstream to near the Cascades are still included within the Northwest Coast culture area (Silverstein 1990). The Chinookan groups farthest upriver, from the Cascades to The Dalles, are assigned to the interior Plateau cultural area (French and French 1998).

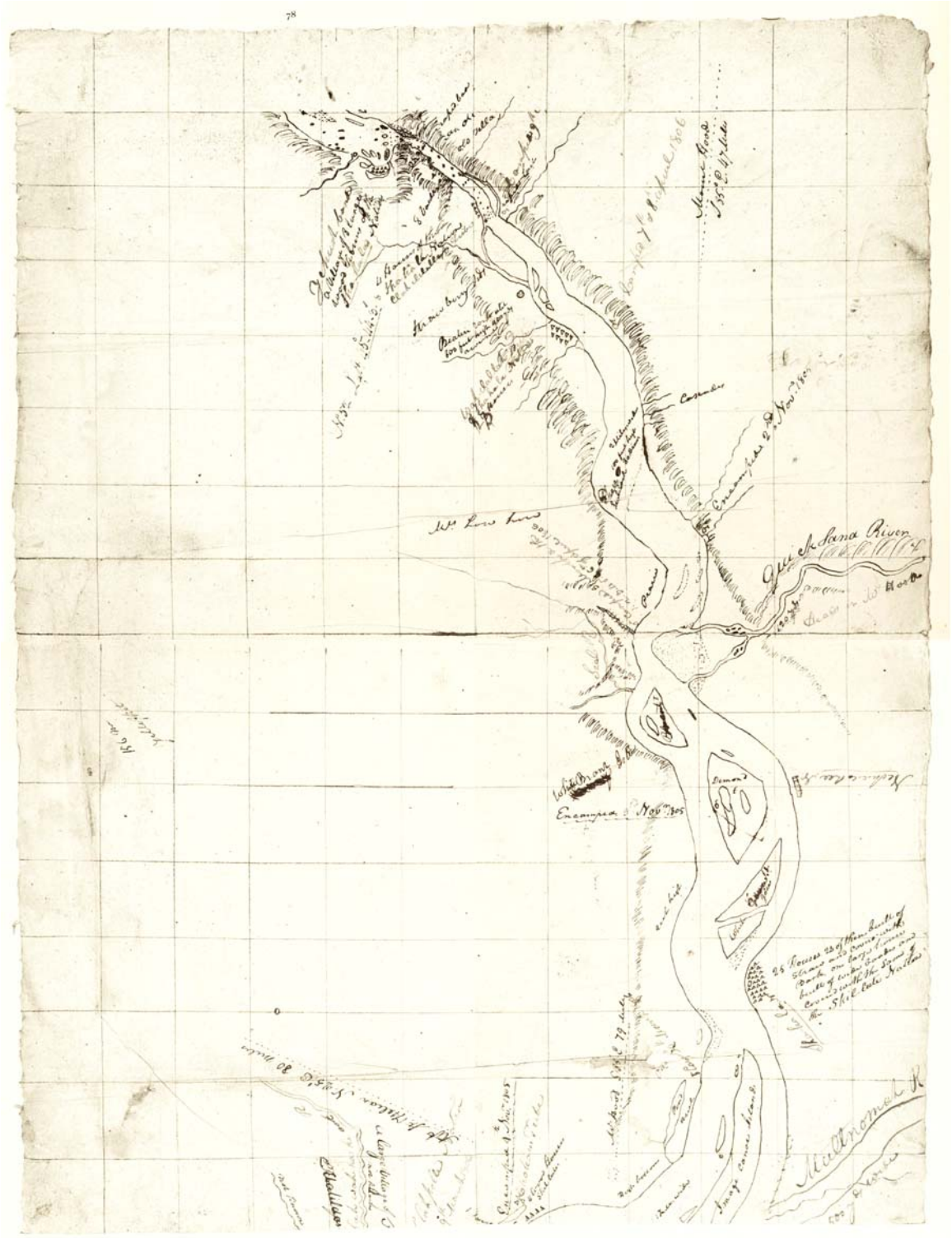
This discussion is based on ethnographic and historical accounts of Native American peoples and groups. Names of groups appearing in the following discussion refer to language groups or cultural groups as they occur in the ethnographic and ethnohistoric records, and no correlation is intended with contemporary tribal governments.

4.6.1 Sources

The first recorded contact between Chinookans and Euroamericans occurred in May 1792 when Robert Gray sailed into the Columbia River estuary. In October of that same year, Lieutenant William Broughton explored up the Lower Columbia to a point above present Vancouver, Washington. In the autumn of 1805, Lewis and Clark descended the Lower Columbia and wintered at Fort Clatsop near its mouth before journeying back upriver in the spring of 1806 on their return trip. These explorers drafted the earliest map available of the CRC project area.

As shown on one of these maps (Exhibit 4-4), Lewis and Clark camped in the vicinity of the CRC project area on their passage down the Columbia River in 1805, and again on their return journey up the Columbia in 1806. Clark's account for November 4, 1805 relates that they "passed the upper point of a large Island nearest the Lard Side, a Small Prairie in which there is a pond opposite on the Stard. here I landed and walked on Shore…" (Moulton 1990:17, original spelling). Lewis' account for March 30, 1806, relates that "we continued our rout along the N. E. shore of the river to the place we had halted to dine on the 4th of Novembr opposite to the center of Immage canoe island where the Indians stole Capt. Clarks tomahawk. here we encamped a little before sunset in a beautiful prarie above a large pond having traveled 23 M." (Moulton 1991:33, original spelling). The "large island" labeled "Image Canoe Island" on their map corresponds to present Hayden Island The reference by Lewis to the camp's location "opposite to the center of Immage canoe island" suggests that this camp was downstream from the CRC project area.

Exhibit 4-4. Map by Lewis and Clark, Who Were on this Section of the Lower Columbia River on November 3-5, 1805 and March 29-April 6, 1806 (from Moulton 1983: composite of maps 79 and 80)



79. Route about October 30–November 4, 1805, and return camps for March 30, March 31–April 6, April 7–8, and 9, 1806

More than a century passed after the first recorded contact before the first formal ethnographic studies began among the Chinookans. Initial fieldwork by Franz Boas in the early 1890s involved the collection of Lower Chinook and Kathlamet myths (Boas 1894, 1901), and Edward Sapir conducted linguistic research among the Wishram Chinook at The Dalles in 1905. Ethnographic studies intended to document pre-contact lifeways were not undertaken among Chinookan peoples until the 1920s and 1930s, and these involved only two Chinookan groups: the Wishram Chinook at The Dalles (Spier and Sapir 1930) and the Lower Chinook around the mouth of the Columbia River (Ray 1938). An extensive body of Clackamas Chinook myths was collected in 1929 and 1930 by Melville Jacobs (1958, 1959a, 1959b, 1960).

Much of what is known about the Chinookan peoples is from the accounts of early explorers, fur traders, missionaries, and military personnel who traveled along the Columbia River in the early historic period (Ruby and Brown 1976). In evaluating the ethnographic and ethnohistoric literature it must be remembered that these accounts relate to societies that were in the process of collapse as a result of extreme population losses from disease, dislocation from traditional territories by Euroamerican settlers, and acculturation to Euroamerican culture. As a result, ethnographic and ethnohistoric accounts may not accurately reflect pre-contact lifeways practiced in the Lower Columbia Valley.

Although little specific information is available about the particular groups that lived in the CRC project area vicinity, a general picture of Chinookan lifeways can be reconstructed from information contained in ethnographic studies and ethnohistoric sources pertaining to other Chinookan groups. The Lewis and Clark journals are particularly important in this regard, as they contain some of the earliest accounts of Indian peoples in the Lower Columbia Valley. Although necessarily lacking in detail, this reconstruction provides a cultural context for interpreting archaeological evidence associated with Native American use of the CRC project area within the last several centuries.

4.6.2 Languages

The Chinookan language, which is classified as an independent branch of the Penutian phylum, is commonly considered to consist of two languages, referred to as Lower Chinook and Upper Chinook by Boas (1894:5-6; 1901:6) and as Lower Chinookan and Upper Chinookan by Silverstein (1990:533). The two groups at the mouth of the Columbia River spoke two dialects that were very similar and which together compose the Lower Chinook or Lower Chinookan language. These dialects were distinct from the related, but mutually unintelligible, languages of the other Chinookan peoples upstream.

The Upper Chinookan language, in turn, has been classified into the following dialect clusters: Kathlamet, spoken from Tongue Point upstream to Kalama; Multnomah, spoken from the mouth of Lewis River upstream to Government Island (including Sauvie Island and the mouth of the Willamette River); and Kiksht, spoken by the Clackamas at Willamette Falls and along the Clackamas River, as well as by Chinookans farther upstream around the Cascades and at The Dalles (Silverstein 1990:533-535; Thompson and Kinkade 1990:41).

It has recently been suggested that Kathlamet has sufficiently different pronunciation, grammar, and lexical items for it to be considered a third language, standing between Lower and Upper Chinook, and the name Middle Chinook has been proposed (Hymes 1981:16). The name Middle Chinook was previously used long ago by Gatschet (1877), as well as more recently by Wuerch (1979), to refer to the Chinookan groups occupying the central portion of the Lower Columbia Valley.

The existence of language and dialect boundaries among the Chinookans implies some degree of separation of the various groups over time. Based on the location of the boundary between the Lower and Upper Chinookan languages, linguists recognize that the Chinookan "homeland," the point of greatest internal linguistic divergence, was in the Columbia River estuary (Hymes 1981:19). The chain of dialects extending upstream from the estuary indicates that the Chinookans spread up the Columbia, eventually as far upstream as The Dalles (Rigsby 1965:245-250; Silverstein 1974:S98-99; Hymes 1981:17-19; Thompson and Kinkade 1990:45-47). In its latest movement, "the Upper Chinookan speech community expanded its boundaries eastward up the Columbia River to the Dalles region in recent centuries" (Rigsby 1965:250).

4.6.3 Sociopolitical Organization

The principal social and political unit among the Chinookan peoples was the village, or in some cases a small cluster of villages. In certain cases, a local village name came to be applied to a larger cultural entity, as when the name of the Chinook village at the mouth of the Columbia River came to refer to all Indian groups who spoke dialects of the Lower or Upper Chinookan language. Specific "tribes" or "nations" referred to in historical records were often artificial groupings created by Euroamericans, often during the treaty-making process (Hajda 1984:7-15), and may not accurately reflect traditional social groupings.

Each Chinookan village was led by its own chief, who held judicial and advisory power, and who had the power to appropriate the property of others for personal purposes (Ray 1938:55-56; Silverstein 1990:541). The village was composed of a variable number of households. The most frequent estimate of household size was three or four families. These household units apparently consisted of extended families that were usually related patrilineally (Hajda 1984:169). As families grew, members might occasionally split off, forming small groups of related villages or village clusters (Hajda 1984:165-168; Silverstein 1990:536).

As with other Northwest Coast peoples, Chinookan society was ranked. The chief, along with shamans, warriors, and traders, formed the small upper class. The bulk of the population was composed of commoners or lower class, and at the bottom of the status hierarchy were slaves (Ray 1938:48-49; Hajda 1984:183-203; Silverstein 1990:541-543). Class, status, and rank were based for the most part on wealth, as great chiefs were usually described as men of great wealth (cf. Spier and Sapir 1930:211). However, as the office of chief tended to be limited to certain families, it was basically only commoners who could elevate themselves through wealth accumulation and personal achievements (Silverstein 1990:541).

A man and his wife or wives, together with their children and slaves, lived together in the same house (Hajda 1984:170). Ideally, marriages occurred between members of different villages (village exogamy) (Hajda 1984:178-183). While residence was usually patrilocal (with a married couple residing in the same house or village as the husband's family), kinship ties were traced bilaterally (Hajda 1984:176-178). Polygyny (the practice of having more than one wife) apparently increased after historic contact (Hajda 1984:170), and as a result kin ties were widely ramified (Hajda 1984:176-177). Wives generally came from areas where head-flattening was practiced, while slaves were obtained from areas where it was not (Hajda 1984:178).

The Chinookans have been viewed as the central society within the "Greater Lower Columbia," a concept that emphasizes the regional connections of local groups through intermarriage, exchange, conflicts, slave raids, visits, and resource utilization (Hajda 1984:275-286). This social region, it is believed, cut across linguistic, cultural, and ecological zones because the members were multicultural and multilingual (Hajda 1984:278). The characteristic Chinookan practice of flattening the heads of all free-born peoples is believed to have symbolized identity within this social system (Hajda 1984:276-277).

4.6.4 House Types and Settlement Patterns

Like the Lower Chinookans at the mouth of the Columbia River, most if not all of the upriver peoples shifted the location of their settlements biseasonally. Chinookan winter villages involved patrilocal residence in theory, but summer residences might be found anywhere that people related through women lived (Hajda 1984:172). Seasonal movements were regulated primarily by the timing of salmon runs, but the availability of other resources, such as smelt, sturgeon, or wapato may have also affected these moves (Hajda 1984:91-95; Boyd and Hajda 1987:318-320).

Ethnographic and ethnohistoric information about Chinookan houses in the Wappato Valley (the portion of the Columbia River Valley roughly between the Sandy and Cowlitz Rivers) has been synthesized by Hajda (1994). The permanent or winter houses constructed by these peoples were variants of the wooden houses characteristically found throughout the Northwest Coast culture area. With some variations, these houses were rectangular structures, often placed over pits excavated one to six feet below ground, with wall planks placed vertically in the ground, a small oval doorway cut into an end or side, and a gable-roof (Exhibit 4-5). The temporary or summer house, often built of boards taken from the permanent house where the framework was left standing, were usually unexcavated and smaller than a permanent house (Hajda 1994:180).

Exhibit 4-5. Paul Kane's Painting of the Interior of a Chinookan Plank House in the Lower Columbia Valley (from Eaton and Urbanek 1996:81)

As noted by Hajda (1994:184), a distinctive aspect of Chinookan houses in the Wappato Valley was the connection of these rectangular houses into a long row. Various historical sources described "row houses" ranging from 200 to 471 feet in length. Row houses and separate individual houses sometimes occurred at the same settlement, as the Whill Wetz village at Oak Point was described in 1814 as consisting of a "range" of eight houses 120 paces long, with eight "detached" houses each of 15 paces (Coues 1897[2]:795, 832). Row houses were only constructed in the central portion of the Lower Columbia Valley, as "nowhere upstream from the Cascades or downstream from Oak Point is such construction mentioned or suggested, nor is any reference found for adjacent areas" (Hajda 1994:184).

The construction of both permanent (winter) and temporary (summer) houses is consistent with the idea that the native population engaged in biseasonal movements. It has been argued by Saleeby, however, that the dense concentration of subsistence resources may have made seasonal movements in the Portland Basin unnecessary (Saleeby 1983; Saleeby and Pettigrew 1983). As villages were usually located in proximity to concentrations of subsistence resources, in some cases these settlements may have been occupied year-round. Under these circumstances, villages would have been abandoned temporarily only when high water levels during the seasonal freshets reached flood stage (Saleeby 1983:224-228).

Boyd and Hajda (Hajda 1984:91-93; Boyd and Hajda 1987:318-320) have countered this argument by noting the numerous references to seasonal movements contained in ethnohistoric accounts. They also cite differences in the two sets of population estimates provided by Lewis and Clark as evidence of seasonal population movements in the Portland Basin.

As Saleeby's argument for greater residential stability in the Portland Basin is based in large measure on evidence from late prehistoric archaeological sites, it is possible that before historic contact some villages in this area may have been occupied on a year-round basis. The seasonal movements documented in the historical record may represent a

recent settlement pattern that emerged as an outgrowth of extreme population decline in the early historic period.

Unlike the Chinookan groups downstream, the Wishram and Wasco at The Dalles constructed houses similar to those of Plateau peoples. As described by Spier and Sapir (1930:202), two types of houses were made: the semi-subterranean earth lodge built over a circular pit for winter use, and a mat lodge which was rectangular in plan and wholly above ground. One informant "described a plank house," an apparent reference to the introduction of rectangular plank houses characteristic of Chinookan peoples downstream, but these, apparently, were not traditional.

4.6.5 Subsistence Resources

The resource base of foods potentially exploitable by Indian groups in the Lower Columbia Valley has been assessed by Boyd and Hajda (1987). In their study, the frequency with which foods were mentioned in the ethnohistoric literature was used to identify "staples" or Class One resources (cited as food 30 or more times) and "secondary" or Class Two resources (cited 6 to 15 times). Foods cited fewer than six times were assumed to rank low as preferred foods and were not considered further. Boyd and Hajda's resource base compilation is reproduced in Exhibit 4-6.

Exhibit 4-6. Foods of the Lower Columbia Indians Noted in Ethnohistoric Sources (from Boyd and Hajda 1987)

	Common Name	Scientific Name	Habitat	Harvest Months
		A. AQUATIC FOODS		
Class One: Staples				
1.	Salmon	*Oncorhynchus*	main trunk of Columbia	March–August
	Chinook	*O. tschawytscha*	And	March–April (spring)
			lower middle tributaries	June–July (summer)
	Coho	*O. kisutch*	lower tributaries	August–October (fall)
2.	White sturgeon	*Acipenser transmontanus*	main trunk of Columbia,	January–March
			deep water	August–September
3.	Eulachon	*Thaleichthys pacificus*	spawns in lower Cowlitz, Lewis, Sandy, Gray's and Kalama rivers	February–March
Class Two: Secondary Resources				
4.	Trout	*Salmo gairdneri*	Streams	
5.	Steelhead	*(anadromous trout)*	major waterways	July–September
6.	Lamprey Eel	*Lampetra tridentate*	taken at falls	Summer
7.	Clams		seashore, bays	
8.	Salmon	*Oncorhynchus*		
	Sockeye	*O. nerka*	main trunk of Columbia	June–July
	Chum	*O. keta*	main trunk, a few minor Tributaries	October

	Common Name	Scientific Name	Habitat	Harvest Months
		B. ANIMAL FOODS		
Class One: Staples				
1.	Elk	*Cervus Canadensis*	cosmopolitan, open forests	Winter
2.	Deer	*Odocoileus*		Fall
	Blacktail	*O. hemionus*	cosmopolitan, forests	
	Whitetail	*O. virginianus*	river bottoms, prairies	
Class Two: Secondary Resources				
3.	Harbor seal	*Phoca vitulina*	Columbia and Willamette below falls	Spring–Summer
4.	Grey whale	*Eschrichtius glaucus*	Coast	April
		C. BULBS, ROOTS AND GREENS		
Class One: Staples				
1.	Wapato	*Sagittaria latifolia*	middle river swamps	Year-round; best in Fall
2.	Camas	*Camassia quamash*	middle river damp prairies	May–July
3.	Thistle	*Cirsium edule*	coast, moist ground	
4.	Lupine	*Lupinus littoralis*	coast (esp.), beaches	
5.	Bracken	*Pteridium aquilinum*	coast (esp.), burns	
6.	Horsetail	*Equisetum telmateia*	coast (esp.), moist ground	
7.	Shappelel	*Lomatium* spp.	dry rocky soil above cascades	April–August
		D. BERRIES		
Class Two: Secondary Resources				
1.	Huckleberry	*Vaccinium*		August–October
	Evergreen	*V. ovatum*	coast clearings	
	Mountain	*V. macrophyllum*	mountain clearings	
	Oval-Leaf	*V. ovalifolium*	mid-latitude woods	
2.	Blackberry	*Rubus macropetolus*	middle river clearings	August
3.	Bearberry	*Arcostaphylos uva-ursi*	dry banks	Fall
4.	Salal	*Gaultheria shallon*	Woods	August

Note: See Boyd and Hajda (1987) for supporting documentation.

Unlike the Lower Chinookans at the mouth of the Columbia River who were maritime hunter-gatherers with a heavy reliance on marine resources, including shellfish, fish, mammals, and birds available in the offshore and estuarine environments, the Upper Chinookans were adapted to resources upstream in the riverine environment of the Lower Columbia Valley (Saleeby 1983). Accordingly, marine clams, whales, and perhaps certain botanical species (e.g., *Lupinus littoralis*) were not directly accessible to these upriver peoples. Once these marine-estuarine resources are excluded, the results of Boyd and Hajda's analysis suggest that the staple (Class One) foods of the native peoples inhabiting the Lower Columbia Valley above the estuary consisted of (1) fish, especially salmon, sturgeon, and eulachon; (2) animals, especially elk, deer, and possibly harbor seal; and (3) bulbs, roots, and greens, especially wapato and camas.

In terms of specific resources available in the CRC project area vicinity, Lewis and Clark's description of the Neerchokioo village notes that 100 canoes of the type used by women to gather wapato and roots “in the Slashes” [lakes and sloughs] were scattered nearby (Moulton 1991:57). In another journal entry, made on April 5, 1806 while

encamped on the north side of the Columbia across from the mouth of Sandy River, Clark noted that "The Country on either Side is fertile, the bottom on the South Side is wide and inter sperced with Small ponds in which the nativs gather their Wappato" (Moulton 1991:77, original spelling).

As noted by Boyd and Hajda (1987:314), their compilation of subsistence resources does not include some foods that are well represented in assemblages of faunal remains from prehistoric archaeological sites. Among these animals are freshwater fish and shellfish, waterfowl, bear, and a variety of small mammals such as dog, bobcat, beaver, raccoon, sea and river otters, porcupine, muskrat, mink, marten, rabbit, and tortoise (Saleeby 1983:126-145). In addition, botanical species not included on Boyd and Hajda's list that have been recovered from archaeological contexts include acorns and hazelnuts (Saleeby 1983:146-147). This situation suggests, then, that while ethnohistoric sources may provide an indication of the "preferred foods" (Boyd and Hajda 1987:314), under conditions of favorable preservation archaeological contexts will significantly supplement the ethnohistoric record of foods that were actually eaten.

4.6.6 Variation in Resource Availability

The abundance and availability of subsistence resources exploited by the Indian peoples of the Lower Columbia Valley varied geographically and seasonally (Saleeby 1983; Hajda 1984; Boyd and Hajda 1987). This variation is reflected in the data on habitat and harvest months provided in Exhibit 4-7.

In terms of intra-regional variation, it has previously been noted that most species of marine mammals, birds, and shellfish important in the subsistence practices of coastal peoples were not available to the inhabitants of the Lower Columbia Valley upstream from the estuary. Fruits also may have been relatively more important among coastal peoples, as suggested by Swan (1857:88), who observed that among the Lower Chinook on Willapa Bay "as the season advances and the fruits ripen, great quantities are used as food, to the exclusion of fish and meats."

On the other hand, the riverine environment upstream from the estuary provided important resources not readily available to coastal peoples. The largest runs of eulachon, for example, occur in the Cowlitz and other rivers upstream from the estuary (Gray's River at the upstream end of the estuary is the farthest river downstream with a significant eulachon run).

Of greater significance, however, was the higher density of key plant foods in the riverine environment upstream from the estuary. The most important of these resources was wapato, a name in Chinook jargon referring to the tubers of *Sagittaria latifolia* which grew prolifically in the wetlands of the Lower Columbia (Darby 1996). Wapato was apparently not found along the coast (Moulton 1990:154), "except [perhaps] in very small quantities" (Swan 1857:90), and apparently did not grow above the rapids at the Cascades (Cox 1831:76). Camas, while present in the coastal zone, was almost certainly more widespread in the wet prairies of the interior.

Although acorns were described as "fairly extensively used" by the Lower Chinook (Ray 1938:123), they were almost certainly more available upstream in oak woodlands associated with the riverine environment. Hazelnuts, known to have been eaten by the Wishram Chinook at The Dalles (Spier and Sapir 1930:184), are not mentioned among the plants utilized by the Lower Chinook, suggesting that hazelnuts were primarily an upriver resource.

Besides intra-regional variation, there was also a seasonal aspect to the abundance and availability of subsistence resources (Saleeby 1983:148-152; Boyd and Hajda 1987:314-316). As indicated in Exhibit 4-7, eulachon, white sturgeon, and spring Chinook salmon were the most important subsistence resources available in the spring. The broadest range of resources was available during the summer months; these included summer Chinook and Coho salmon, steelhead, lamprey eels, and most of the bulbs, roots, and greens. Autumn resources included Chum salmon, deer, and berries. Although Lewis noted that wapato "is abundant and appears to never be out of season at any time of the year" (Moulton 1991:38), it was probably harvested mostly in fall (Boyd and Hajda 1987:316). Although potentially available throughout the year, elk may have been most important during the winter when fewer other resources were available.

Seasonal variation in the availability of subsistence resources was offset by the development of preservation and storage technology (Saleeby 1983:27-28). Salmon were preserved by drying, pounding, and storage in baskets as well as by smoke-drying (Spier and Sapir 1930:178-179). Berries were preserved by mixing them with salmon or seal oil, drying them in the sun, and storing them in boxes or baskets. Roots were pounded into cakes that when dried were easily preserved (Spier and Sapir 1930:182-185). Despite the fact that the Lower Columbia Valley provided an especially favorable setting for settlement, references to occasional starvation are found in the ethnographic and ethnohistoric literature (e.g., Boas 1894:230; Coues 1897[2]:912).

4.6.7 Population

Lewis and Clark's population estimates have been used by Boyd and Hajda (Hajda 1984:67-75; Boyd 1985:272-286; Boyd and Hajda 1987; Boyd 1999:233-237) to reconstruct the size of the Indian population in the Lower Columbia Valley. Lewis and Clark submitted two sets of figures, an earlier set that was lower compiled during the winter at Fort Clatsop, and a later set that was higher compiled following the return trip upstream in April. As noted by Hajda (1984:71), "while Clark might have revised the figures upwards anyway after greater familiarity with the people, the later figures quite possibly reflect seasonal shifts in population." Boyd and Hajda (1987:321) explore this line of reasoning further, and conclude that the lower estimate of 9,800 represents the permanent winter population of the Lower Columbia, while the larger figure of 17,840 includes spring visitors to the river as well as the resident population. Lewis and Clark's population estimates for the various native groups are presented in Exhibit 4-7.

Exhibit 4-7. Lower Columbia Village Populations in the Two Versions of Lewis and Clark's "Estimate of the Western Indians" (from Boyd and Hajda 1987)

	Villages and Village Clusters	Manuscript Estimate	Printed Estimate
1.	Columbia mouth	**700**	**700**
	Killaxthokle	100	100
	Chinook	400	400
	Clatsop	200	200
2.	"Marshy Islands"	**300**	**500**
	Cathlahmah	200	300
	Wackkiacum	100	200
3.	"Marshy Islands" to Cowlitz (Skillute)	**1,500**	**2,500**
4.	Kalama (Callamak)	**200**	**200**
5.	Lower Sauvie Island/Lewis River	**1,080**	**2,830**
	Quathlahpohtle	300	900
	Clackstar	350	1,200
	Cathlahcumup	150	450
	Clannarminnamon	280	280
6.	Lake River/Vancouver Lake (Shoto)	**180**	**460**
7.	Sauvie Island, Columbia side	**330**	**930**
	Clannaqueh	130	130
	Multnomah	200	800
8.	Multnomah Channel	**420**	**970**
	Clanninata	100	200
	Cathlahnahquiah	150	400
	Cathlahcommahtup	70	170
	Nemalquinner	100	200
9.	Willamette Falls/Clackamas	**1,250**	**2,650**
	Clarkamus	800	1,800
	Charcowah	200	200
	Cushhook	250	650
10.	Wappato Valley, east end	**140**	**200**
	Neerchokioo	40	100
	Nechacokee	100	100
11.	The Cascades (Shahala)	**1,300**	**2,700**
12.	The Cascades to The Dalles	**1,800**	**2,200**
	Smackshop	800	800
	Chilluckkittequaw	1,000	1,400
13.	The Dalles (Echelute)	**600**	**1,000**
TOTALS		**9,800**	**17,840**

The Wapato Valley had a combined total population of 2,210 in the manuscript estimate and 5,390 in the printed estimate (Boyd and Hajda 1987:313n). Considered together, the Wapato Indians formed the densest population cluster in the Lower Columbia Valley. This high population density was apparently made possible by the concentration of vegetal resources in the marsh areas in and around Sauvie Island (Hajda 1984:89). The

existence of this unusually dense population could be inferred as support for the idea that settlement in this portion of the Lower Columbia Valley involved year-round villages, as suggested by Saleeby (1983).

Although Lewis and Clark's estimates are the earliest available, it should be noted that these explorers arrived in the region after smallpox epidemics in the 1770s and 1801 had already ravaged the population (Hajda 1984:71; Boyd 1985:80-81, 99, 102-103; 1999:29, 40-41). The first epidemic, which was probably especially devastating as it presumably took hold upon populations previously unaffected by this disease, resulted in the estimated loss of 33 percent of the Indian population of the Pacific Northwest (Boyd 1985:95). Smallpox was then reintroduced in 1800-1801, as indicated by a comment by Lewis and Clark in their journal entries for February 7, 1806 (Moulton 1990:285-286). As a result, Lewis and Clark's population estimates are almost certainly low (Boyd 1985:286).

The introduction of infectious diseases during the early historic period led to rapid decline in the Indian population. As their territory coincided with the main route of travel and communication along the Columbia River, the Chinookans were especially devastated by these diseases (Boyd 1985:267-323; 1999:231-258). Aside from the early smallpox epidemics, the “fever and ague” of the 1830s, most likely malaria, was a major factor in the decline in the population (Boyd 1985:112-144).

Overall, infectious diseases occurring as epidemics between the 1770s and 1850s resulted in the death of 90 percent or more of the Indian population in the Lower Columbia Valley (Boyd 1985:520; 1999:263). The decline in the numbers of Chinookans led to the depopulation of certain areas of their territory, which were quickly claimed by other peoples, including bands of the Salish-speaking Chehalis and Cowlitz as well as Sahaptin-speakers (including Klickitat) from the Plateau (Ray 1974:249; Boyd 1985:286, 313-319; 1999:257; Hajda 1990:514).

4.6.8 Trade

The Chinookan peoples of the Lower Columbia Valley were well-known for their abilities as traders. The most detailed study of this important activity has been undertaken by Hajda (1984:205-262). Euroamerican observers used the term “trade” to encompass several kinds of exchange (Hajda 1984:228). Among the Chinookans and neighboring peoples, a wide array of goods was exchanged in various ways, including through “intervillage conflicts, 'trade' of valuables and of locally specialized items, especially food; gambling; marriage; visiting; hospitality; shamans' activities; and funerals” (Hajda 1984:206).

Trading activity apparently took place more or less throughout the year. Lewis and Clark, for example, observed Indians in canoes loaded with goods on trading expeditions during the winter of 1805-1806 (Moulton 1990:27, 144). More well known, however, are the trading centers that emerged where fish were taken in quantity during the summer months, most notably at The Dalles, at the Cascades, and at Willamette Falls (Hajda 1984:229).

The most often mentioned item of trade was wapato, which was traded by people in the Wapato Valley, especially the Sauvie Island area, to neighboring peoples farther upstream on the Columbia as well as peoples downstream on the coast, including the Tillamooks (Hajda 1984:233). From coastal peoples, the Wapato Indians received blubber and oil in return. From upriver peoples, they received dried pounded salmon, shapallel (bread or biscuit made from cous), beargrass (probably for basket-making), acorns, and dried berries. Other items of trade included smelt and sturgeon obtained by the Clatsops from the Skillute; camas obtained by the Yamhill Kalapuya in exchange for dried salmon at Willamette Falls; and meat and roots obtained by the Clatskanie from the Skillute in exchange for salmon (Hajda 1984:332-333).

As a result of her analysis, Hajda (1984:250) identified two spheres of exchange among the Columbia River peoples. The first sphere involved food and raw materials, such as wapato, fish, acorns, berries, shapallel, whale blubber and oil, and beargrass. Acquisition of these resources involved little risk, was primarily undertaken during the warmer months by women, and exchanges were made primarily among related groups most frequently during the winter. The second sphere involved dentalia, slaves, furs and skins, horses, and possibly canoes. These resources were relatively scarce, were acquired at some distance, often with some risk, by men, and were exchanged in summer as well as winter, among strangers as well as relatives, sometimes across regional boundaries.

Economic exchanges in the second sphere were facilitated by the use of dentalium shells as a form of currency. After their introduction by Euroamericans, glass beads were used in a similar way. Blue beads were generally preferred. In conjunction with the fur trade, beaver skins and blankets also became a standard form of currency (Hajda 1984:230-232; Silverstein 1990:537).

4.6.9 Chinookan Groups in the CRC Project Area Vicinity

Lewis and Clark recognized two divisions among the Chinookan villages along the Lower Columbia River in the CRC project area vicinity: (1) the Wapato Indians, sometimes referred to by others as Multnomahs, and (2) the Shahala Nation. These two divisions corresponded closely with dialects of the Upper Chinookan language, with the Wapato Indians speaking what has come be referred to as the Multnomah dialect and the Shahala Nation speaking the Kiksht dialect. In addition to the map on which the expedition's routes are indicated (Exhibit 4-4), villages associated with these two divisions of Chinookans are shown on a second map, referred to by the editor of the Lewis and Clark journals as "Confluence of Willamette and Columbia Rivers and Environs, April 3, 1806" (Exhibit 4-8).

Exhibit 4-8. Southern Portion of Lewis and Clark Map Prepared April 3, 1806, Showing the Area Around the Confluence of the Willamette and Columbia Rivers (from Moulton 1991:69)

In their "Estimate of Western Indians," Lewis and Clark refer to the Wapato Indians as encompassing 13 "tribes" concentrated in the vicinity of Sauvie Island. The "tribe" farthest upriver was the Ne-cha-co-kee "on the S. Side of the Columbia a fiew miles below quick Sand river [Sandy River]" (Moulton 1990:484, original spelling). The "tribe" farthest downriver was the Cal-la-maks, who "reside on a creek which falls into the Columbia on the N. Side at the lower part of the Columbia Valley N. Side" (Moulton 1990:484). The Cal-la-maks have been identified as the group that lived at the mouth of the Kalama River (Hajda 1984:111-112).

One of the "tribes" on Sauvie Island subsumed under the name Wapato Indians was the Mult-no-mah who "reside on Wap-pa-tow Island in the Mouth of the Multnomah [Willamette River], the remains of a large nation" (Moulton 1990:484; also see Moulton 1991:32-34). Four other "tribes"—Clannahqueh, Cathlahcommahtup, and Cathlahnahquiah on Sauvie Island and Nemalquinner on the Oregon mainland—were listed as "Tribes of Multnomah" (Moulton 1990:484). The locations of most of these groups appear on both Lewis and Clark maps, with the exception of the Nemalquinner, who only appear on the Willamette-Columbia confluence map (Exhibit 4-9).

The term Multnomah is derived from *malnumax* meaning "those towards the water" ("those closer to the Columbia River") (Silverstein 1990:545). As Alexander Ross, one of the fur traders at Fort Astoria, also later subsumed most of people on Sauvie Island under the name "Moltnomas" (Ross 1849:87), this term apparently gradually came to refer to most, if not all, of the Indians in the Wapato Valley (Hajda 1984:66).

As indicated in Lewis and Clark's "Estimate of Western Indians," the "Shahala Nation reside at the Grand rapids and extend down in different Villages as low as the Multnomah river" (Moulton 1990:483). The village farthest downstream assigned to the Shahala was "*Ne-er-cho-ki-oo* 1 House 100 sole on the S. side a few miles above the Multnomah R." (Moulton 1990:483). This settlement is identified as "Shahala N[ation]" on the route map (Exhibit 4-5), and as "Neerchokioo Tribe of Shahala Nation" on the Willamette-Columbia confluence map (Exhibit 4-9). Lewis and Clark were apparently the only early Euroamericans to use the term "Shahala" (Hajda 1984:67). This term was derived from *saxlatks* meaning "those upriver" and was a term used to refer to Chinookan peoples upstream at the Cascades (Hajda 1984:67; Silverstein 1990:535).

4.6.10 Chinookan Villages in the CRC Project Area Vicinity

Two studies, both doctoral dissertations in anthropology, have previously combed the ethnographic and historical literature for references to Chinookan villages in the Lower Columbia Valley (Saleeby 1983; Hajda 1984). Neither study identifies any Chinookan villages within the CRC project area. The results of these studies are consistent with the most recent map of Chinookan villages, published in the *Handbook of North American Indians* (Silverstein 1990:534), which does not identity any Native American settlements in the CRC project area vicinity.

4.6.10.1 South Shore Villages

On the south (Oregon) shore of the Columbia River, the closest identified village upstream from the CRC project area is *Neerchokioo* just below the last island in the Government Island chain. The closest identified village downstream from the CRC project area is *Waksin* at the mouth of the Willamette River.

4.6.10.1.1 Neerchokioo Village

This settlement was apparently first viewed in November 1792 by Broughton (n.d.:24), who referred to it as the "Old chief's village." It is better known as the village of *Neerchokioo* described at some length in William Clark's journal entry of November 4, 1805:

> On the Main Lard Shore a Short distance below the last Island we landed at a village of 25 *Houses*: 24 of those houses we[re] thached with Straw, and covered with bark, the other House is built of boards in the form of those above, except that it is above ground and about 50 feet in length and covered with broad Split boards This village contains about 200 men of the *Skil-loot* nation I counted 52 canoes on the bank in front of this village maney of them verry large and raised in bow. we recognised the man who

> over took us last night, he invited us to a lodge in which he had Some part and gave us a roundish roots about the Size of a Small Irish potato which they roasted in the embers until they became Soft, This root they call *Wap-pa-to* which the *Bulb* of the *Chinese* cultivate in great quantities called the *Sa-git ti folia* or common arrow head. it has an agreeable taste and answers verry well in place of bread. we purchased about 4 bushels of this root and divided it to our party. (Moulton 1990:17, original spelling)

As noted by Hajda (1994:183), "the houses of 'straw' at Neerchokioo were evidently mat lodges. These may have been of the kind made by Sahapatin speakers living above The Dalles (though the visitors at Neerchokioo were apparently from the Cascades)." The "Skilloot nation" referred to in the passage quoted above is probably a reference to the Echelute or Wishram Chinookans at The Dalles (Hajda 1984:65-66). The initial identification of Neerchokioo as a Skil-loot village was later changed to reflect affiliation of this village with the Shahala at the Cascades (Moulton 1990:20n, 483). This village is designated "Sha-hala N." on the route map (Exhibit 4-5).

On their return upriver the following spring, Lewis and Clark camped on the night of April 1, 1806 on the north side of the Columbia opposite the mouth of Sandy River. The next day William Clark conducted a reconnaissance back downstream to examine the mouth of the Willamette River. On his way to the Willamette he revisited the Neerchokio village on April 2, 1806, at which time he described the village and its inhabitants in some detail:

> At 3 P.M. I landed at a large double house of the *Ne-er-cho-ki-oo* Tribe of the *Shah-ha-la* Nation. at this place we had Seen 24 additional Straw Huts as we passed down last fall and whome as I have before mentioned reside at the Great rapids of the Columbia. on the bank at different places I observed Small Canoes which the women make use of to gather Wappato & roots in the Slashes. those Canoes are from 10 to 14 feet long and from 18 to 23 inches wide in the widest part tapering from the center to both ends in this form and about 9 inches deep and So light that a woman may with one hand haul them with ease, and they are Sufficient to Carry a woman an Some loading. I think 100 of those canoes were piled up and Scattered in different directions about in the Woods in the vecinity of this house, the pilot informed that those Canoes were the property of the inhabitents of the Grand rapids who used them occasionally to gather roots. I entered one of the rooms of this house and offered Several articles to the nativs in exchange for Wappato. they were Sulkey and they positively refused to Sell any. (Moulton 1991:57, original spelling)

On his way back after examining the mouth of the Willamette River, Clark stopped again at the Neerchokio village:

> We arived at the Ne er cho ki oo house in which the nativs were So illy disposed yesterday at 11 A.M. I entered the house with a view to Smoke with those people who Consisted of about 8 families, finding my presence alarmed them So much that the children hid themselves, womin got behind

> their men, and the men hung their heads, I detained but a fiew minits and returned on board the canoe. (Moulton 1991:64, original spelling)

As previously noted, this settlement is identified as "Shahala N[ation]" on the route map (Exhibit 4-5), and as "Neerchokioo Tribe of Shahala Nation" on the Willamette-Columbia confluence map (Exhibit 4-9). Neerchokio village is not mapped or mentioned in the discussion of Chinookan groups in the Northwest Coast volume of the *Handbook of North American Indians* (Silverstein 1990). Instead, it is identified as a "Cascades village" within an "area of overlap with Multnomahs" in the Plateau volume of the *Handbook of North American Indians* (French and French 1998:362).

4.6.10.1.2 Waksin Village

In comparison with Neechokio, little is known about the village of *Waksin*. It was not mentioned or mapped by Lewis and Clark. It is listed as *Waksin* by Silverstein (1990:534) and as *Wakshin* by Curtis (1911:181). Both writers interpret this name to mean "Dam." This village was located "at the mouth of the Willamette River" (Curtis 1911:181). Although Curtis did not identify which side of the Willamette River the village was on, Silverstein (1990:534) places it on the west bank, within the territory of Chinookans who spoke the Multnomah dialect.

4.6.10.2 North Shore Villages

The primary ethnographic sources seem to indicate the existence of a long gap in the distribution of villages on the north (Washington) shore of the Columbia River in the CRC project area vicinity (e.g., Hajda 1984:85; Silverstein 1990:534). The closest identified village upstream from the CRC project area is *Washuhwal* at present-day Washougal. The closest identified village downstream from the CRC project area is *Wakanasisi* nearly opposite the mouth of the Willamette River below Vancouver.

4.6.10.2.1 Washuhwal Village

Curtis (1911:181) identified the "Gahlawashuhwal, a tribe closely related to the Cascades, and occupying the village of Washuhwal, now Washougal, Washington. The name refers to the sound of rushing water." Spier (1936:24) notes "Washoughally" as a "settlement or tribe in 1811 near Quicksand [Washougal?] river which enters the Columbia on the left" (brackets in original). Spier was apparently unaware that Quicksand River was the name given by Lewis and Clark to present Sandy River on the Oregon shore. The source of Spier's information was Alexander Ross, who "stayed at a Washoug-ally Camp, near Quicksand River," on July 24, 1811 (Ross 1849:106). This village was not mentioned by Lewis and Clark, probably because it was situated a short distance up the Washougal River and was not easily visible from the main channel of the Columbia River. *Wasuxwal* is shown as the farthest downstream settlement of the "easterly Chinookan groups" by French and French (1998:362).

4.6.10.2.2 Wakanasisi Village

The most complete description of this village is by Livingston Farrand in the *Handbook of American Indians North of Mexico*:

> A locality on the N. Side of Columbia r., Wash., nearly opposite the mouth of the Willamette; also the name of the Chinookan Tribe, strictly called Galakanasisi ("those of the woodpecker"), formerly living at that point and in its vicinity. Before moving to this place they lived at Lakstak, on the s. side of the Columbia, a little below Nakoaik, and were then called Gatqstax (Boas). About 1840 their chief was Kiesno, whose name is sometimes given to their main village. After the epidemic of 1829 the Wakanasisi were greatly reduced in numbers and included the remnants of several neighboring tribes. In 1849 they numbered fewer than 100, and are now extinct. (Farrand 1910:894)

Using information collected by Edward Sapir, Leslie Spier repeated much the same information in *Tribal Distribution in Washington*, including that "the tribal name is Gal!ak!anasisa, 'those of the woodpecker.'-- Boas" (Spier 1936:24) However, in a footnote Spier added "but Boas' original entry in Sapir's manuscript gives ak!anasisi, 'diver,' i.e., the butter-ball duck" (Spier 1936:24, fn 36).

Curtis (1911:181) refers to the inhabitants as the "Gahlakanashishi, whose village Wakanashishi, 'Butterball Ducks,' was about eight miles below the site of Vancouver, Washington." Likewise, Silverstein (1990:534) lists "galakanasisi 'those of butterball ducks'" as the name of the inhabitants. This village is not mapped or mentioned by Lewis and Clark. Its location "nearly opposite the mouth of the Willamette" (Spier 1936:24) places it within the territory of Chinookans who spoke the Multnomah dialect (Silverstein 1990:534).

4.6.10.2.3 Sketcu'txat Village

Although not mentioned in the primary ethnographic sources for the downriver Chinookans, and also not listed in the compilations of Chinookan villages referred to above (cf. Saleeby 1983; Hajda 1984), an obscure reference has been found to one more village in the CRC project area vicinity. The single reference so far found to this settlement is in *Wishram Ethnography*, which contains an account of a Shasta youth who was captured by the Klickitat and "taken to Sketcu'txat, now Vancouver, Washington" (Spier and Sapir 1930:222). The only other reference found to this site is in *Stone Age on the Columbia*, by amateur archaeologist Emory Strong, where he wrote that "The Vancouver Shipyard at Vancouver is built on a large village site that was called Sketcu'txat" (Strong 1959:34).

4.6.11 Summary

The shores of the Lower Columbia River were occupied at the time of historic contact by Chinookan peoples. A review of linguistic and ethnographic information indicates that the CRC project area falls along the boundary between groups that spoke different dialects of the Upper Chinookan language. The groups downstream, notably in the concentration of villages on Sauvie Island and the adjacent mainland on both sides of the Columbia, spoke the Multnomah dialect. The groups upstream on the Columbia around the Cascades and at The Dalles, as well as those at Willamette Falls on the Willamette River, spoke the Kiksht dialect.

Like other Chinookan peoples downstream on the Columbia, the Chinookan groups who spoke the Multnomah dialect practiced lifeways similar to those of peoples in the Northwest Coast culture area. The broader culture area affiliation of the Kiksht speakers is more difficult to characterize. While some speakers of the Kiksht dialect, notably the Clackamas, appear to have been more like Northwest Coast peoples, the lifeways of the Chinookan groups farthest up the Columbia River, at the Cascades and in The Dalles area, are described by ethnographers as more similar to those of people in the Plateau culture area.

Previous compilations of references to Chinookan villages do not list any settlements in the close vicinity of the CRC project area. However, an obscure reference has been found to a village at the later location of the Vancouver shipyards. While obviously not very precise, this village is estimated to have been one mile or more upstream from the I-5 bridge over the Columbia River.

At the time of historic contact, the Chinookans were the central society within the "Greater Lower Columbia," in which local groups were connected through intermarriage, exchange, conflicts, slave raids, visits, and resource utilization (Hajda 1984:275-286). As the early historic period was a time of extreme upheaval, the extent to which the "Greater Lower Columbia" existed before historic contact remains uncertain. The multilingualism evident in the early historic period, accomplished to a large extent by the emergence of Chinook jargon as a *lingua franca*, was undoubtedly stimulated to a large extent by the 90% decline in the population and consequent amalgamation of survivors from different groups. In this respect, the "Greater Lower Columbia" represents, at least in part, an example of the adjustments made by native peoples to the catastrophic population decline that ensued as a result of the destructive effects of contact with Euroamericans (Dobyns 1983:310-311).

4.7 Ethnohistory by Stephen Dow Beckham, Department of History, Lewis & Clark College

The following narrative addresses the relations of the Indians in the vicinity of the CRC project area in the historic period. The primary source information is inadequate, a consequence, in part, of the decimation of these peoples in the 1830s by pandemic diseases. This discussion is based on written historical accounts of Native American peoples and groups. Names of groups appearing in the following discussion refer to language groups or cultural groups as they occur in the ethnohistoric record, and no correlation is intended with contemporary tribal governments.

4.7.1 Encounters with Early Explorers

In 1792 Captain Robert Gray, an American from Massachusetts, entered the lower estuary on the *Columbia Rediviva* and named the river for his ship. An American sailing under a sea letter granted by George Washington, Gray's voyage became the foundation of the assertion of the "discovery rights" to the Pacific Northwest for the United States. Gray informed Captain George Vancouver of his success in crossing the perilous Columbia bar and that fall William Robert Broughton, sailing with Vancouver, entered

the estuary and anchored in the lower river. With two small boats he and part of his crew explored the estuary as far east as the Columbia Gorge, ascertaining that the stream was a river, not the fabled Northwest Passage (Nokes 1991:179-192).

Crewmen serving with Broughton recorded accounts of the Indians of the Columbia estuary. While anchored about six miles from the mouth of the river during Broughton's reconnaissance, Thomas Manby wrote:

> A party of Natives of both sexes, took up their residence under a Tree, abreast the Vessel, the men supplied us with fish, and the good natured females, came daily on board, to get themselves adorned with Beads and Buttons, altho' the weather was cold, they wore scarce any covering, most of the men and boys were naked, the Women cover their Shoulders with a small skin, and wear twisted grass about their middle, The hair of most of them is long coarse and black with features not very inviting, both Men and Women assist in paddling the Canoe, the Men hunt, and the cooking part, falls to the lot of the Ladies–broiling half through is all the preparation either Fish or flesh goes thro', to prepare it for Eating.
>
> The Men never move without their Quivers filled with Arrows, all of which are stained with various Colors, and pointed with flint made exceedingly sharp, they seldom miss a mark at twenty yards, and will often kill a bird at forty. long Lances they use with great skill in killing Seals and Sea otters, these animals are in great plenty and whales came frequently as high up as the Chatham lays Sea fowl were in the greatest abundance, but I could not go after them, as the Vessel was without a boat. While walking the Deck, I always kept my Gun by me, being sure of three or four shots in an hour, at Pelicans Shaggs and Gulls. (Manby 1792)

These brief accounts by Thomas Manby initiated description of the Chinookan peoples. During his explorations over nearly 110 miles of the Columbia's tidal area, Broughton sighted seven Indian villages. All of his relations with the Indians were peaceable (Manby 1792).

The first recorded contact between American explorers and the Indians in the vicinity of the CRC project area occurred in 1805 and 1806 during the explorations of the expedition led by Meriwether Lewis and William Clark. The Corps of Discovery was dispatched by President Thomas Jefferson to explore the Louisiana Territory and lands west to the Pacific in order to find a practical route for shipment of commerce by water. Lewis and Clark noted the presence of numerous large villages of Indians along the Columbia River, from its confluence with the Snake to the Pacific Ocean. Although the explorers found a number of villages between the Cascades and the mouth of the Willamette as well as on Multnomah Slough on the south side of Sauvie Island, they did not identify any villages in the vicinity of the future Columbia River Crossing–either on the south shore, Hayden Island, or the north shore at Vancouver (Moulton 1990, 1991).

William Clark's "Fort Clatsop Miscellany" noted tribal distribution between the Sandy and Cowlitz rivers. The numerous villages confirmed, in spite of Clark's comments about

"the remains of a large nation" and signs of smallpox or other demographic calamities, that the confluence of the Willamette and Columbia rivers was the setting of a large Indian population:

> *Ne-cha-co-kee* Tribe reside on the S. side of the Columbia a fiew miles below quick Sand [Sandy] river & opposite the dimond Island–(remains)
>
> *Shoto* Tribe resides on the N. Side of the Columbia back of a pond and nearly opposit the enterance of the multnomah [Willamette] river
>
> *Mult-no-mah* Tribe reside on Wap-pa-two Island in the Mouth of the Multnomah, the remains of a large nation
>
> *Clan-nah-quehs* Tribe of Multnomah's on Wappato Island below the Multnomars
>
> Ne-mal-quin-ner's a Tribe of Multnom's reside on the N E Side of the Multnomah River 2 ms. above its mouth
>
> *Cath-lah-com-mah-tup's* a Tribe of Multnoms South Side of the Wappato Island on a slew of the Miltnr
>
> *Cath-lah-nah-qui-ah's* Tribe of Multnomies reside on the S W. side of Wappato Island
>
> *Cath-lah-nah-qui-ah's* Tribe of Multnomies reside on the S W. side of Wappato Island
>
> Clack Star N. resides on a Small river which discharges itself on the S W. Side of Wappato Island
>
> *Clan-in-na-ta's* resides on the S W. Side of Wappato Island
>
> *Cath-lah-cum-ups* on the main Shore South West of Wappato Island
>
> *Clan-nar-min-na-mun's* on the S. W. side of the Wappato Island
>
> *Quath-lah-pho-tle's* N. reside on the S W. of the Columbia above the Enterance of Cah-wah-na-hi-ooks river opposit the Low pt. of Wappato Isd.
>
> *Cal-la-maks* reside on a creek which falls into the Columbia on the N. Side at the lower part of the Columbia Valley N. Side
>
> *Skil-lute* Nation resides on the Columbia on each sides in different Villages from the lower part of the Columbia Vally as low as the Sturgeon Island and on either Side of the *Coweliskee* River. (Moulton 1990:484, original spelling)

The relationships of the Corps of Discovery and the Indians of the Lower Columbia River were peaceful, though marred by petty thefts by the Indians and the stealing of a valuable

dugout canoe by the American party on its departure from Fort Clatsop (Moulton 1990:427-428; 1991:10). During the return from the Pacific Coast the expedition camped for a week at the mouth of the Washougal River, hunted for game, and Clark with a patrol mounted a reconnaissance of the lower Willamette River (Moulton 1991:32-69). The bands and villages identified in the vicinity of the confluence of the Willamette and Columbia rivers were speakers of the Upper Chinookan language. By signing and listening, the explorers did the best they could to secure names and village locations.

Lewis and Clark also recorded information about some non-Chinookan peoples in the area. On his map of the confluence of the Willamette and Columbia Rivers, William Clark identified the village of the Quath-lah-potle Nation at the mouth of the "Cah-wah-na-hi-ooks R." [Lewis River] (Moulton 1991:69, original spelling). Above this Chinookan group, Lewis and Clark noted "a Tribe called the Hul-lu-et-tell reside on this river above it's entr[ance]" (Moulton 1991:26, original spelling).

Scholars have consistently identified the Hul-lu-et-tell as the Cowlitz Tribe. In 1910 Frederick Webb Hodge, editor of the Bureau of American Ethnology's *Handbook of American Indians North of Mexico* noted that the Hul-lu-et-tell were "a numerous nation living N. Of Columbia r., on Coweliskee (Cowlitz) r., above the Skilloot, and on Chahwahnahiooks (Lewis) r., in 1806. It was either a Chinookan or a Salishan Tribe (Hodge 1910[1]:577). The identification of the Hul-lu-et-tell as Cowlitz was used most recently by Dr. Gary Moulton (as buttressed by his editorial review committee) in the definitive edition of the journals of Lewis and Clark (Moulton 1990; 1991).

Lewis and Clark identified the Skillutes as living at the mouth of the "Cow-e-lis'-kee river" [Cowlitz] and noted: "above the Skillutes on this river another nation by the name of Hul-loo-et-tell reside, who are said also to be numerous" (Moulton 1991:18, original spelling).

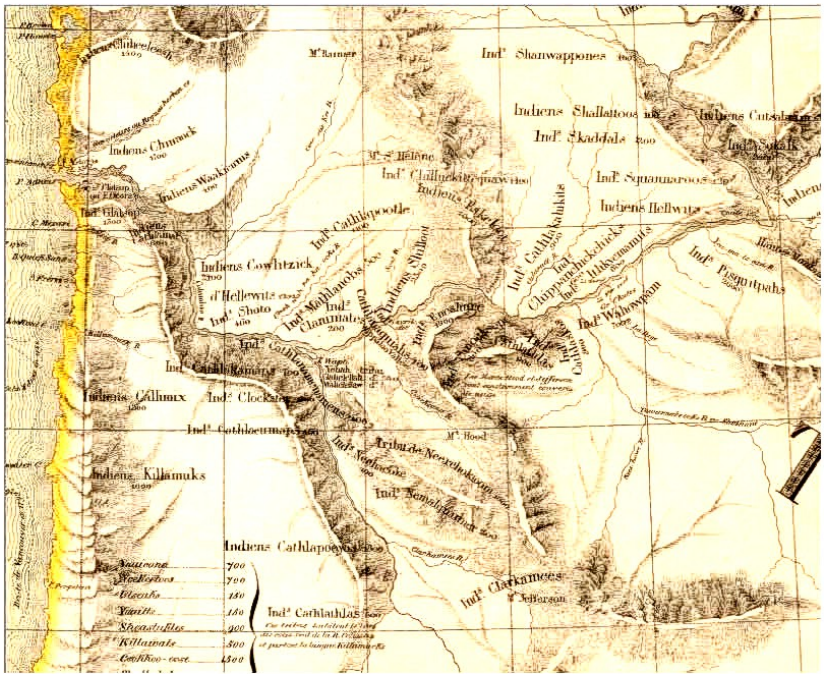
In 1827 Philippe Marie Guillaume Vandermaelen, a Belgian publisher, issued in Brussels a map of the Pacific Northwest extending from the 42nd parallel northward to the mid-portion of Vancouver Island and eastward to the Rocky Mountains. The map was derivative from the maritime charts of James Cook and George Vancouver and the Samuel Lewis engraving of William Clark's map of the American West published in 1814 (Biddle and Allen 1814).

The map of 1827 provided generalized information on tribal distribution and populations–all presumably gleaned from the accounts of Lewis and Clark (Exhibit 4-9). The map identified the following tribes and populations on the north bank of the Columbia River upstream from Wahkiakum County, Washington:

Indiens Cowlitzick	3,100	[living upstream along the Columbia River from the mouth of the Cow-clis-ket River]
d'Hellewits [Hul-lu-e-tell]	1,200	[next tribe east along Columbia River]
Inds. Shoto	460	
Inds. Cathlapootle	1,100	[living on the Chah-wah-n-aha-oohs River]

Inds. Mathlanobs	500	
Inds. Clanimates	200	
Cathlanaquians	400	
Indiens Skilloot	2,500	[living on Seal (the Washougal) River]

Exhibit 4-9. Map of Indian Distribution Based on Data Collected by Lewis and Clark and Possibly Others (Vandermaelen 1827)



The tribal data–location and population–was drawn in part from the accounts of Lewis and Clark, but is not a verbatim transcription of their information. The source for new information, if any, tapped by Vandermaelen is unknown (Moulton 1991).

4.7.2 Trade With the Hudson's Bay Company

In 1825 dramatic changes occurred for the Indians residing near the confluence of the Willamette and Columbia rivers. Executives administering the Hudson's Bay Company concluded that they needed a site better suited to their economic objectives than Fort George (formerly Fort Astoria) at the mouth of the river. Under the leadership of Dr. John McLoughlin, Chief Factor, the company initiated construction of Fort Vancouver. The fort soon became a commercial depot at the crossroads of the Pacific Northwest and the site of disparate enterprises. Between 1825 and 1846 the Hudson's Bay Company tested many of the region's natural resources. It planted gardens, an orchard, and seed crops, imported livestock, established a salmon fishery and salting enterprise, opened a retail store, traded for furs from Native Americans and dispatched brigades to trap for pelts, founded a shipyard, constructed and operated a sawmill to produce lumber, and built a grist mill to process grain. The setting on the north bank of the Columbia–in the

midst of a Native American population–underwent rapid transformation (Rich 1959:606-655).

Construction and operation of Fort Vancouver inaugurated a little more than twenty years of trade opportunities for the Indians of southwestern Washington and northwestern Oregon. The company constructed and operated an "Indian Trade Shop" inside the fort's stockade. This facility received furs from visiting Indians and exchanged a variety of material goods: beads, clothing, blankets, tools, foods, and other items. The building, as identified in 1845, measured 80 by 32 feet, confirmation that trade relations with regional tribes were an important part of the company's enterprise (Hussey 1957:189-190).

In 1839 Thomas Jefferson Farnham described the variety of trade goods imported by the Hudson's Bay Company to Fort Vancouver:

> One of these ships arrives at Fort Vancouver in the spring of each year, laden with coarse woolens, cloths, baizes, and blankets; hardware and cutlery; cotton cloths, calicoes, and cotton handkerchiefs; tea, sugar, coffee and cocoa; rice, tobacco, soap, beads, guns, powder, lead, rum, wine, brandy, gin, and playing cards; boots, shoes, and ready-made clothing, &c.; also, every description of sea stores, canvas, cordage, paints, oils, chains and chain cables, anchors, &c. (Farnham 1906:60)

Duflot de Mofras, a French explorer, commented briefly on the Indians living in the vicinity of Fort Vancouver at the time of his 1841 visit:

> Like all Indians in this territory, Chinooks can distinguish at a glance the nationality of a white man. They refer to the Spanish Californians as *Spagnols*, the English as *Kinjor* (a corruption of the words King George), the Americans, as *Bostons*, probably because so many came from that particular port, and the French Canadians as *Fransé* or *Pasayouk*, meaning pale-faces, for undoubtedly they were the first white men to cross the Rocky Mountains. With the latter settlers the Indians have established relations of a most friendly nature. (De Mofras 1937[2]:99)

Fort Vancouver became a major depot of trade with Indian tribes of the region. De Mofras noted:

> About 15 clerks spend their time trading with the Indians, selling goods, or keeping books. They arrive at their offices punctually at seven o'clock and work until nine at night, except for time required for meals which are served in a common dining room, presided over by the head agent. (De Mofras 1937[2]:99)

The Hudson's Bay Company sold a large variety of articles to the Indians. De Mofras noted the inventory included: "heavy clothe, articles of clothing, common prints, woolens, India prints, pottery, glassware, cooking utensils, plain cutlery, glass beads, cooper ornaments for the Indians, and carpenters' and cabinet makers' tools. Although the company may act unwisely in selling firearms and powder to the natives, up to the present they have abstained from introducing spiritous liquors" (De Mofras 1937[2]:207).

Several tribes engaged in the trade at Fort Vancouver. The local Upper Chinookans, Cowlitz, and Kalapuyans of the Willamette Valley were important customers. The Klikitats, outfitted with horses and eager to travel via a trail through the Western Cascades into the Lewis River watershed, were another important trade partner. A number of Klikitats by the 1830s settled in the vicinity of Fort Vancouver, an event documented in Catholic sacramental registers and in enrollment of Klikitat children in the post school. Emphasizing the volatility of this time period for the region, the pandemic diseases that wiped out entire villages residing along the Columbia River created an opportunity for a significant Klickitat incursion into southwestern Washington and the Willamette and Umpqua valleys of western Oregon. In September, 1854, Washington Governor Isaac I. Stevens wrote about the Klikitats:

> It was not, however, until about 1839 that they crossed the Columbia, when they overran the Willamette valley, attracted by the game with which it abounded, and which they destroyed in defiance of the weak and indolent Callapooyas. They still boast that they taught the latter to ride and hunt. They manifest a peculiar aptitude for trading, and have become to the neighboring tribes what the Yankees were to the once western States, the travelling retailers of notions, purchasing from the whites feathers, beads, cloth, and other articles prized by Indians, and exchanging them for horses, which, in turn, they sell in the settlements. (Stevens 1855:225)

Trade with the Hudson's Bay Company had significant impact on the region's tribes. George Gibbs traveled through Klickitat country on a trail from Fort Vancouver through the Lewis River watershed to the Yakima Valley in 1853. Primary author of Governor Stevens' report on the Indians of Washington Territory, he wrote:

> Very few characteristic features remain among these people. Their long intercourse with the Hudson's Bay Company, and, of late years, with the American, has obliterated what peculiarities they may have had; nor is there any essential difference in their habits or manners from those of the Indians adjoining them. They use, for the most part, the arms and utensils of the whites, and the gun has superseded the bow. The pails and baskets constructed from the bark of the cedar, saddles and fishing apparatus, are the principal articles of domestic manufacture; and even of such things it is almost as common to find the imported substitutes. (Stevens 1855:227)

4.7.3 Pandemic Diseases of the 1830s

Between 1830 and 1841 a demographic calamity swept through the Native American communities of the Lower Columbia Valley and the Willamette Valley. These events were not new. They had proceeded inexorably since the European incursion into the Western Hemisphere at the end of the fifteenth century. Disease, dislocation, and warfare were three events that changed forever the tenure of native peoples in the Americas. On the Lower Columbia River the initial disease event proved so calamitous that dislocation and warfare were but footnotes. Prior to the arrival of the Lewis and Clark Expedition, smallpox had begun its inexorable ravages among the Native Americans, but the pandemics accelerated in ensuing years (Crosby 1972; Stannard 1992).

During the summer of 1830 and recurring for more than a decade, a virulent "fever and ague," "intermittent fever," or "bloody flux" ravaged the Native American populations of the Columbia River and the Willamette Valley. Robert Boyd's assessment of these events, founded on dozens of fragmentary primary sources, presented a compelling account of this epidemic:

> From a total population something under the 15,545 estimated by Lewis and Clark and the Hudson's Bay Company in the early decades of the 1800s, numbers for these two groups [Chinookan and Kalapuyan] dropped to around 1,932 by 1841, a decline of 88%. By 1850, the population of the region had rebounded to what it had been in 1829, but its composition was radically different: English-speaking Americans had almost totally supplanted the Native Americans who had occupied the area a mere 20 years earlier. The fever and ague epidemics probably constituted the single most important epidemiological event in the recorded history of what would eventually become the state of Oregon. (Boyd 1999:84)

Boyd's study of epidemics and population decline in the Columbia watershed describes in detail the outbreak of a fever in July, 1830. The "intermittent fever," so termed by the Hudson's Bay Company officials, struck both Indians and Euroamericans. Among the former, however, it was almost always fatal. Peter Skene Ogden, a company brigade leader, wrote about its impact on nearby Sauvie Island: "In close contiguity with our clearances was a village containing sixty families of Indians; a few miles lower down was a second, of at least equal population… A short month had passed away…. All, all was changed. Silence reigned where erst the din of population resounded loud and lively" (Ogden in Boyd 1999:86).

The diseases (probably malaria, but also smallpox, tuberculosis, and dysentery) swept through the villages at the confluence of the Willamette and Columbia rivers. Families and entire villages died, leaving no one to tend to the ill or bury the dead. John Kirk Townsend, a naturalist visiting Fort Vancouver in 1834-35, observed:

> A disease of a very fatal character is prevalent among these Indians; many of them have died of it; even some of those in the neighborhood of the fort, where medical assistance was always at hand. The symptoms are a general coldness, soreness and stiffness of the limbs and body with violent tertian ague. Its fatal termination is attributable to its tendency to attack the liver, which is generally affected in a few days after the first symptoms are developed. (Townsend 1839:178)

Samuel Parker, a minister scouting the prospects for Indian missions in the Pacific Northwest, noted in 1835 at Fort Vancouver:

> Since the year 1829, probably seven eights if not, as Doct. McLaughlin believes, nine-tenths, have been swept away by disease, principally by the fever and ague. The malignancy of this disease may have been increased by predisposing causes, such as intemperance, and the general spread of venereal…. So many and so sudden were the deaths which occurred, that

> the shores were strewed with the unburied dead. Whole and large villages were depopulated; and some entire tribes have disappeared, the few remaining persons, if there were any, uniting themselves with other tribes. (Parker 1838:178)

The pandemic was recurrent. It spread during the 1830s and reached from the Columbia River to the Sacramento Valley by 1834. With antigens in their systems and some medical assistance, the non-Indian population was more likely to survive, though enduring weeks of illness. Boyd, the ethnohistorian who has most rigorously explored the epidemiology of this event, has concluded that the malaise was malaria. It became rampant in a setting hospitable to *Anopheles freeborni*, a mosquito carrying malaria (Boyd 1999:106-109).

Boyd assessed the death rate for the Columbia River and Willamette Valley in the first four decades of the nineteenth century:

> The most likely loss figures are Wappato, 2,210 to 37, or 98% of the premalaria total; Willamette Valley Kalapuya 7,785 to 600, a loss of 7,185 or 92%; Cascades 1,500 to 150, or 90%; Cathlamet cluster, 1,800 to 300, or 83%; Clackamas, 1,150 to 345, or 70%; and Chinook, 1,100 to 500, or 55%. Cumulated loss figures for all the above peoples are 15,545 to 1,932, or 88% of the total population between circa 1805 and 1840. (Boyd 1999:244)

The consequences of the pandemic of 1830-41 were immense. Entire villages of Upper Chinookans disappeared. Survivors found refuge with other bands and linguistic groups. The densely populated confluence of the Willamette and Columbia rivers–with its abundance of fish, bulbs, and game–no longer sustained one of the major population concentrations of the Pacific Northwest. Collapsing cedar-plank houses, whitening bones, and silence were the legacies of disease and dislocation that came with the Euroamerican incursion into the region.

4.7.4 Christian Missions

In 1834 Rev. Jason Lee, an American Methodist missionary, arrived overland with a small delegation of assistants with the stated purpose to try to convert the Indians of the region to Christianity. Within the context of increasing strains between British and U.S. western frontier interests, Lee took the counsel of Dr. McLoughlin and settled at Mission Bottom near French Prairie in the northern Willamette Valley. The site included rich farmlands, proximity to a small community of retired, former fur company employees, and nearby villages of Kalapuyan Indians who were coping with the calamitous diseases decimating their villages. Lee was an ardent evangelical. He tried to convert the Indians both to a sedentary, Euroamerican lifeway as well as to Methodism. Although he secured reinforcements and finances to increase the missions to additional locations--Clatsop Plains, Wascopam (The Dalles), Oregon City, and Nisqually, his programs singularly failed to win converts. Lee returned east in 1843, was dismissed from responsibilities though he continued to raise funds for the Oregon Institute (Indian school), and died in 1845 (Brosnan 1932:164-186; Loewenberg 1976:65-66, 76-77, 113-117).

The Hudson's Bay Company gained exclusive trading privileges in western Canada under its charter revised in 1821 by the British parliament. Its responsibilities were multiple: to sustain peaceful relations with the Indian tribes, to administer justice and settle disputes among its employees, and to serve as a British presence in lands contested by other nations, especially the United States. In an effort to improve conditions for its employees, the company in 1836 dispatched Rev. Herbert Beaver and his wife from London to establish an Anglican presence at Fort Vancouver. While the reverend's name was right, his choice proved wrong in almost every detail (Jessett 1959: xi-xxiii).

Rev. Beaver was an ardent, narrow protestant who settled into prolonged conflict with the officials at the fort. He despised the Catholics among the French-Canadians; he considered the "marriages" of fur company employees to native women unlawful and unsanctified and inveighed against them. He complained about his housing, his allocation of wine and sherry, his offer to serve as a teacher, indeed almost everything. He fought a determined and losing battle to persuade the company to dismiss McLoughlin, the Chief Factor. Beaver's tenure was short and miserable (Jessett 1959). On June 17, 1837, Reverend Beaver wrote at Fort Vancouver:

> Nearly two hundred of the Klickatack Tribe of Indians have congregated for agricultural purposes, on a large plain about fourteen miles distant from the Fort, during the last summer, when I have paid them several visits, on one of which, with the assistance of a youth, who accompanied me, I vaccinated about an hundred and twenty of them, the rest having undergone the operation at the hands of your medical officer. Their language is different from the Chinook, and, I think, of easier acquisition, being less guttural, and more harmonious. Neither are their habits, in consequence of their not dwelling on the banks of the River, so depraved as those of the other tribe [namely, the Chinookans]. They live principally by hunting, and on wild roots, their first attempt at cultivation being made, this year, with potatoes, Indian corn, peas, furnished them by Chief Factor McLoughlin. (Jessett 1959:58-59)

In 1836 Dr. Marcus and Narcissa Whitman and Rev. Henry H. and Eliza Spalding arrived overland at Fort Vancouver. Sent out by the American Board of Commissioners for Foreign Missions (ABCFM), they too planned to convert the Indians of the Pacific Northwest. Outfitted with supplies purchased at the fort, they returned east to establish missions on the Walla Walla and Clearwater rivers among the Cayuse and Nez Perce. Similar to the Methodists, the ABCFM missionaries also insisted on a dualistic conversion: agriculture and Christianity. Their efforts were frustrated by their inability to master the native languages but also by their attitudes and actions. Whitman encouraged overland pioneers to cross the Blue Mountains and pass by his mission. Annually the settlers brought new diseases and the portent of larger scale invasion. In 1847 the Cayuse murdered the Whitmans and nine others at their station. The ABCFM efforts collapsed with this event, followed by the equally tragic Cayuse Indian War of 1847-48 (Drury 1937).

In 1838 Fathers Francis N. Blanchet and Modest Demers arrived overland, having traversed the continent with a Hudson's Bay Company supply party. These Catholic

fathers brought far different talents, methods, and expectations to the Pacific Northwest. College educated with multiple language skills, they had the ability to gain some mastery of native languages. Supported by the bishop of Quebec and the extensive resources of the Catholic Church, they were prepared to endure and sustain a ministry over a long period of time. At Fort Vancouver they encountered a French-Canadian population reared in Catholicism and, in many instances, eager for religious services, sacramental rites, and education for the children. The priests did not demand that the Indians change their lifeways to a sedentary agrarian economy nor that they master English. They wore distinctive robes, burned candles, rang bells, and engaged in interesting religious rites that caught native attention.

With strong support from Hudson's Bay Company officials at Fort Vancouver, the Catholic missionaries established St. James Mission at the fort, St. Francis Xavier at Cowlitz Landing, St. Paul's in the Willamette Valley, and Stellamaris at the mouth of the Columbia. Their registers began recording sacramental acts on December 1, 1838. Over the next several decades, they tallied an impressive success of their missions to Indians, fur trappers, European immigrants, and others.

The registers at Fort Vancouver document the diverse origins of the native population that worked for the company or came to trade at the Indian store. The priests recorded "Pend D'oreille, Kawitchin [Cowichan], Moatwas, 'nation of the Indians of the Cascades,' Tlikatat, Tichinouk, Tchihelis, Okanagan, Clacalam, Clatsoppe, 'Indians of Colville,' Souchouabe [Shuswsap] and others. Some were wives and children of Hudson's Bay Company employees; others were Indians who responded to the priests and decided to be baptized or married by Catholic rites (Munnick and Warner 1972).

The mission registers at Fort Vancouver are a mirror to the presence of Indians at the fort. Numerous Cowlitz, for example, were baptized, married, or buried by the resident priests:

> B[aptized] On the 8^{t} ["18th" crossed out] day of July 1854, we missionary priest baptized, in danger of death, Mary (a girl 7 years old) daughter of Humptux an Indian who lives at the mouth of Lewis River Washington Territory. James Croke, Priest (Munnick and Warner 1972:147).

Umptux or Umtuchs was a Cowlitz chief who resided with his band at the mouth of the Cathlapootle (Lewis) River. He was murdered at Battle Ground in Clark County during the Indian War of 1855-56 (Strong 1930:111-128).

The registers confirm that in addition to the English and French-Canadian community, Fort Vancouver was truly a multi-racial, multi-tribal, and multi-linguistic community in the 1830s to the 1850s. The following are examples with emphasis supplied:

> B[aptized] This 30 September, 1839, we priest undersigned have baptized Pierre, aged 18 years, of the **nation of Kliketates**, being in danger of death. Godfather Jean Baptiste Jeaudoin undersigned with us. F.N. Blanchet, priest, V.g. (Munnick and Warner 1972:52).

B[aptized] This 14 January, 1843, we priest undersigned have baptized Betsy aged 18 years, **Indian of the Tribe of Tchinouks**. Godfather… [Laurent] Sauvé, godmother Emélie wife of Pierre Guilbeau. F. N. Blanchet, priest (Munnick and Warner 1972:15).

S[epulchre, i.e. burial] The 12 October, 1843, we Priest undersigned have buried in the Catholic cemetery of this place, the body of Monsieur John McLoughlin, Surgeon, assassinated at the Establishment of the Honble. Company of Hudson's Bay, at Stikene [British Columbia], of which he was Officer in Charge, in the night of the 20 or 21 of the month of April of last year, about midnight, aged 29 years, 8 months and 3 days, son of John McLoughlin, Esquire, Superintendent for the Honble. Company of Hudson's Bay, at Fort Vancouver… A. Langlois, priest (Munnick and Warner 1972:25).

B[aptized] This 28 January, 1844, we priest undersigned have baptized Betsy aged about 24 years, daughter of infidel parents, **Kilimaux [Tillamook] Indians**. Godfather Joseph Brunel, godmother Emelie Guilbeau. F.N. Blanchet, priest (Munnick and Warner 1972:33).

S[epulchre, i.e. burial] The 30 of November of the year 1845, has been buried in the cemetery of fort, Louis Kataranka **(Iroquois)** engagé of the Company of Hudson, deceased the 27 of the same month. P DeVos SJ. (Munnick and Warner 1972:67).

B[aptized] The 24 of September of the year 1846, we undersigned priest miss. of the Company of Jesus have baptized Marie Marguerite, daughter of a **father of the Cascades nation and of a Tchinouk mother**, aged 7 months about. Her godmother has been Marie Marguerite [Tomwata] wife of Francois Laframoise (Munnick and Warner 1972:75).

S[epulchre, i.e. burial] The year 1847, the 14 December, died, and the following day has been buried Marie daughter of **infidel Umpquois parents**, aged about 17 years. Delévaud, priest (Munnick and Warner 1972:86).

B[aptized] The year 1848, the 2 January, I undersigned priest misse. to the Fort Vancouver have baptized in danger of death, Etienne, **Indian of the Cascades** aged about 20 years (Munnick and Warner 1972:89).

B[aptized] The 1st of July of the year 1848, I undersigned priest misse. To the Fort Vancouver, have baptized Marie daughter of **Kaharro Oahi [Owyhee, or Hawaiian] and of an Indian woman of the Grande Dalles** [of the Columbia], born the 13 June last. Godfather Rev. Léon Achille Lebas priest misse. Apostolic. Delévaud priest (Munnick and Warner 1972:97).

Sacramental activity at the Catholic mission often increased during the winter months with the migration of Upper Chinookans from the Gorge to the more temperate area lying east of Fort Vancouver. Those who came and went included Tchinouks (Upper Chinookans) and Tumwatas (Cascades). The St. James Mission registers recorded numerous burials in the cemetery located north of the church. The cemetery site subsequently lay between the Quartermaster Department and the parade ground of the U.S. Army barracks before it was obliterated by development of the military post (Munnick and Warner 1972).

4.7.5 Treaty Relations with the Tribes

In 1851 Anson Dart, Superintendent of Indian Affairs for Oregon Territory, secured treaty-making powers by Act of Congress, February 27, 1851. On that date, Congress revoked the authority of the Willamette Valley Treaty Commission to negotiate land cessions and transferred authority to Dart. Brother-in-law to George Catlin, documentary painter of Native Americans since the 1820s, Dart traveled from Wisconsin to Oregon, established his headquarters at Elk Rock on the lower Willamette River opposite Milwaukie, and proceeded with treaty councils. He held major meetings at Tansy Point (Point Adams at the mouth of the Columbia) for ten treaties, and two more in southwestern Oregon in councils at Port Orford and the mouth of Rogue River, and a third at Oregon City (Dart 1851a).

Dart negotiated agreements with several bands of Chinookans and Athapaskan-speakers of the Lower Columbia River:

Nuc-que-clah-we-muck Tribe	7 August 1851
Waukikum Band of Chinook Tribe	8 August 1851
Konnaac Band of Chinook Tribe	8 August 1851
Lower Band of Chinook Tribe	9 August 1851
Kathlamet Band of Chinook Tribe	9 August 1851
Klatsaknia Band of Chinook Tribe	9 August 1851
[Athapaskans, not Chinookans]	
Clackamas Tribe of Indians	6 November 1851

The treaties ceded lands and reserved a variety of rights: occupancy of old villages, fishing, hunting, cutting timber, picking cranberries, cultivating land to meet needs, and passing freely to fishing grounds (Dart 1851a, 1851b).

Dart held the Clackamas treaty council in Oregon City. Initially the chiefs and headmen wanted to reserve a large, undescribed tract of land that included several donation land claims. Dart countered with his own proposal of reserving scattered small tracts of land, subsistence rights, plus annuity payments of clothing and provisions. The proposed Clackamas cession ran north from the Molalla cession of May 6, 1851, down the

Willamette River to its confluence with the Columbia, then east to the summit of the Cascade Mountains in the Columbia Gorge, then south along the dividing ridge to the Molalla cession. The draft treaty enumerated several rights:

> Occupancy of the lands "at the ferry of the Clackamas river, during the natural lives of the signers of this treaty."
>
> "Privilege of fishing, without molestation, at all their former fishing grounds on the Clackamas river, together with the privilege of passing freely from one to the other along the river."
>
> The grounds "now occupied by said Clackamas Indians, and upon which they now reside, are not to be encroached upon by white persons during the time for which they are reserved by said Indians, except in passing to and from the ferry across the Clackamas river, in building a bridge or bridges, and in making necessary roads and highways through said grounds."

Dart offered $500 in cash and $2,000 in goods for ten years (United States Senate 1852: Item 58).

Nicholas Du Bois and David McLaughlin served as interpreters, presumably negotiating the agreement through the Chinook Jargon. McLoughlin (1821-1903) was a son of Dr. John McLoughlin and Marguerite Wadin. He grew up at Fort Vancouver before studying in Europe (Munnick and Warner 1972:A-55). The tribal leaders who signed the treaty, each with an "X," were Watchano, Washkai, Wallahpicah, Lomus, Whyna, Kachumult, Joe, and Tummachus. A few historical traces provide a bit more information on these men. In 1905, for example, John Wacheno (1857-ca. 1935) testified that he was a Clackamas Indian and that his father "was head chief of our tribe when we came to the [Grand Ronde] reservation" (Munnick and Beckham 1987:A-9).

In spite of the council and signatures, the Senate rejected this treaty, all of the Dart treaties from the Tansy Point and Port Orford councils, and the treaties forwarded by the Willamette Valley Treaty Commission. Samuel Thurston, territorial delegate from Oregon, expressed opposition to the treaties because they permitted Indians to remain in the areas of pioneer settlement. He and others envisioned removing all Indians in Oregon and Washington to east of the Cascades, a philosophy never transacted.

The Clackamas treaty was drafted in reference to the Molalla treaty negotiated in the spring of 1851 by the Willamette Valley Treaty Commission. The Senate Committee on Indian Affairs tabled all of the treaties negotiated in 1851 in Oregon Territory. As unratified agreements, the treaties were little more than interesting historical documents, but were a dead end in the development of federal Indian policy. The treaties were then hidden from view when published and closely held in *Senate Confidential Document No.39* (United States Senate 1852). Public access to the treaty texts and, ultimately, to the manuscript minutes of the Willamette Valley Treaty councils did not occur until the twentieth century.

In January, 1855, Joel Palmer, Oregon Superintendent of Indian Affairs, secured agreements to a treaty discussed with various tribes and bands in the watershed of the Willamette River. This treaty ceded all of the Willamette Valley to the United States from the summit of the Coast Range on the west to the summit of the Cascade Mountains on the east, and along the Columbia River from the Cascades in the Columbia Gorge west to Oak Point. By this agreement the lands at the future Columbia River Crossing on the south shore of the Columbia River and Hayden Island were formally ceded to the United States. Palmer's treaty provided for no reserved rights and for only a temporary reservation "until a suitable district of country shall be designated for their permanent home" (Kappler 1904b[2]:665).

Palmer secured signatures of seventeen chiefs at Dayton on January 4; then on January 8 at Dayton agreement by five chiefs of the Molalla band of Mollallas and the Calapooia Band of Calapooias; on January 10 at Dayton agreement by twelve chiefs of the Ninefelly [Winnefella], Mohawk, Chapen [Chafan], To-co-pa, Wal-lal-lah [Wat-lal-lah] Band of Tumwaters [Cascades], Clockamus [Clackamas]; on January 19 at Linn City the agreement of two chiefs of the Clow-we-wal-la, or Willamette Tum-water Band; and on January 22 at Dayton, agreement of ten chiefs of the Sant[i]am Bands of Calapooia (Kappler 1904b[2]:668-669).

The treaty contained a provision that referenced lands on the north bank of the Columbia in Washington Territory: "*And, provided*, Any of the bands becoming parties to this treaty establish a legitimate claim to any portion of the country north of the Columbia River, that the amount to which they may be entitled as a consideration for such country, in any treaties hereafter entered into with the United States, shall be added to the annuities herein provided for" (Kappler 1904b[2]:666). Subsequent to this treaty the United States did not enter into any ratified treaty negotiations with the Indians of southwestern Washington. This provision was thus moot.

4.7.6 Tribal Relations with the Oregon and Washington Superintendencies of Indian Affairs

For several years the officials of the Office of Indian Affairs in Oregon Territory suffered from incomplete knowledge of tribal distribution and populations. The lack of language skills, challenges of the terrain, and rudimentary transportation systems compounded the problems of gaining information. Joseph Lane arrived in Oregon Territory in March, 1849, to assume duties as territorial governor and ex-officio superintendent of Indian affairs. He commenced his duties by collecting general data on the Indians in the Pacific Northwest. In the fall of 1849 he wrote to the Commissioner of Indian Affairs and identified some of the tribes and bands living near the confluence of the Willamette and Columbia rivers:

> The *Clackamas* Indians live upon a river of that name, which empties into the Willammette, one mile below Oregon city. They number about 60, and are considered industrious. They have but few arms, and are friendly. They live on fish and roots.

> The *Willammette* Indians live upon a river of that name, which empties into the Columbia, one mile below Oregon city. They number about 70, and are considered industrious. They have but few arms, and are friendly. They live on fish and roots.
>
> The *Wakamucks, Namanamin*, and *Namoit* are bands and parts of bands that claim the country from Oak Point to the mouth of the Willammette, including Wyath's [Wyeth's or Sauvie] Island. They have become so reduced that they have united, and now live together or near each other. Number not known. (Lane 1850:129-130)

In 1851, Anson Dart, the next Superintendent of Indian Affairs, wrote terse comments about some of the tribes in his jurisdiction. These included some living near Vancouver, Washington:

> For a distance of about eighty miles from the Cowlitz river to the Cascades, there are now no real owners of the land living. It is occupied by the Vancouver Indians, of whom it will have to be purchased. Their band numbers in all, sixty.
>
> The Clackamas band, living upon the Clackamas river, near Oregon city, were formerly a part of the Chinook Tribe, and still speak their language. They claim the country on the east side of the Willamette river, from a few miles above its mouth nearly to Oregon city, and extending east to the Cascade mountains. They refuse to sell their land without immediate payment. Their whole number is eighty-eight. They own a valuable tract of country.
>
> The Tum-water [Clowewalla] band, also a remnant of Chinooks, residing at the fall of the Willamette, opposite Oregon City, claim a strip of land some twenty miles in length, on the west side of the Willamette, extending from Souvies island, at the mouth of the river, up to Twality river, and west to Twality plains. They also refuse to sell their land without pay down; giving, as a reason, the probability of their living but a very few years. Their number is thirteen.
>
> The Clickatats claim a district of country north of the Columbia, but they are a roving tribe, and are scattered about in different parts of the Territory. Their number is four hundred and ninety-two (Dart 1852:214-215).

During the summer of 1853 George Gibbs participated as geologist and ethnologist for the McClellan surveys of passes in the Cascade Mountains for the proposed Pacific Railroad. During the time he was at Fort Vancouver he interviewed Butler Ives, a contractor surveyor for the General Land Office. Ives had worked in helping establish the Willamette Meridian and baseline and was acquainted with the Indian villages of the Columbia River. Based on his interview with Ives, Gibbs noted seven Upper Chinookan villages:

Ives estimated the surviving population at 150 people (Gibbs 1853-1854). The data recorded by Gibbs in 1853 did not identify any villages at Sauvie Island or Multnomah Channel.

Congress created Washington Territory in 1853 by carving out Oregon and setting the stage for its statehood in 1859. The new administrative unit reached from the Pacific to South Pass in Wyoming. Isaac Ingalls Stevens, a West Point graduate and veteran of the Mexican War gained appointment as the new governor, as superintendent of Indian Affairs, and as head of the Northern Division of the Pacific Railroad Surveys. In his initial assessment of Indian tribes in his jurisdiction, Governor Isaac I. Stevens of Washington Territory reported to George W. Manypenny, Commissioner of Indian Affairs, in September, 1854:

> The tribes of the Klik-a-tats and Yakamas inhabit properly the valleys lying between Mount St. Helens and Adams; but they have spread over districts belonging to other tribes, and a band of them is now located as far south as the Umpqua. Their nomadic habits render a census very difficult, though their number is not large. Dr. Dart stated them at 492, since when there has been certain a great decrease. The number of the two principal bands, as obtained during the summer, was at Chequoss 138, and at the Kamas plain 84. These must have constituted the chief part, as it was the season of berries when they congregated there. Including all others within the Territory, the total does not probably exceed 300.
>
> In this, however, are not reckoned the 'Tai-kie-a-pain,' a band said to live apart in the country lying on the western side of the mountains, between the heads of Cathlapootl [Lewis River] and Cowlitz, and which probably did not enter into the former estimate. But little is known of them, and their numbers are undoubtedly small. (Stevens 1855:225)

In this same report, Stevens further added:

> The Tai-tin-a-pam, a band of Klikatats already mentioned, living near the head of the Cowlitz, are probably about seventy-five in number: they are called by their eastern brethren wild or wood Indians.
>
> Until very lately they have not ventured into the settlements, and have even avoided all intercourse with their own race. The river Indians attach to them all kinds of superstitious ideas, including that of stealing and eating children, and of travelling unseen. (Stevens 1855:240)

The Stevens report thus placed the Taidnapam, speakers of a language presumably identical with Klickitat, as living on both the upper Cowlitz as well as in the Lewis River watershed in Clark County. In time the Salishan-speaking Cowlitz and Sahaptian-speaking Taidnapam merged through intermarriage. By the early twentieth century the Cowlitz Tribe elected descendants of both to its council and, for several decades, alternated the chairman's position between Cowlitz and Taidnapam (Cowlitz Indian Tribe 1994).

The Washington Superintendency of Indian Affairs estimated an Indian population of slightly over 500 in the Lower Columbia Valley and southwestern Washington Territory in January, 1854 (Exhibit 4-10).

Exhibit 4-10. 1854 Estimate of Indian Population in the Lower Columbia Valley and Southwestern Washington

Name	Location	No.	Comments
Upper Chinooks, five bands, not including Cascades band	Columbia River, above the Cowlitz	200	Estimate. The upper of these bands are mixed with the Klikatats; the lower with the Cowlitz.
Lower Chinook Chinook band	Columbia River, below the Cowlitz	66	One of these is intermarried with the Cowlitz; the rest with the Chihalis.
Cowlitz and Upper Chihalis	On Cowlitz River, and the Chihalis above the Satsop	165	The two have become altogether intermarried.
Tai-tin-a pam	Base of the mountains on Cowlitz, etc.	75	Estimate.

Source: Stevens (1855:249).

George Gibbs, drafter of the Stevens report, in the fall of 1853 explored the lower Columbia River (where he settled in 1849 at Astoria) and Willapa Bay. He filed a special account in the *Pacific Railroad Reports* about this reconnaissance (Gibbs 1855b). His extensive travels in Oregon and Washington, service as secretary to the treaty commissions in the Willamette Valley and northwestern California in 1851, and his work with McClellan during the railroad surveys led him to lay out the basic assumptions for Indian policy in Washington Territory. He prefaced his remarks by observing: "The case of the Chinooks and Cowlitz Indians in particular, seems desperate." Gibbs wrote: "No essential advantage would, it is feared, be obtained by removing them to any one location, for they would not long remain away from their old haunts, and probably the assignment of a few acres of ground for their villages and cemeteries, and the right of fishing at customary points, would effect all that could be done" (Stevens 1855:241). This observation, drafted in September, 1854, became the genesis of the "reserved rights" clauses that Gibbs embedded in the template treaty he created for Governor Stevens. The clauses subsequently appeared in ten ratified Pacific Northwest treaties.

The Stevens report called for agrarian instruction for the Indians on their small reservations, then returned to the matter of fishing:

> The subject of the right of fisheries is one upon which legislation is demanded. It never could have been the intention of Congress that the Indians should be excluded from their ancient fisheries; but, an no condition to this effect was inserted in the donation act, the question has been raised whether persons taking claims, including such fisheries, do not possess the right of monopolizing them. It is therefore desirable that this question should be set at rest by law. (Stevens 1855:248)

William H. Tappan served from May 1, 1854, to 1856 as Indian agent for the "Columbia District," or the "Southern District," in southwestern Washington. This administrative unit extended from the Skookum Chuck River south to the Columbia and from the White

Salmon River in the Columbia Gorge to the Pacific Ocean. Its sub-units included The Cascades (1856), Cowlitz Locality (1856), The Dalles (1856-57), Vancouver (1856), and White Salmon Reservation (1856-1859) (National Archives 1945: xi-xii). Tappan, an artist and engraver, traveled overland in 1849 with his friend George Gibbs. The two civilians accompanied the Mounted Riflemen from Fort Leavenworth to Fort Vancouver. Tappan's reports to Governor Stevens provided brief notes on the Indians living in the vicinity of Vancouver.

On September 30, 1854, after discussing the [Lower] Chinook, Shoalwater Bay, and Cathalamette Indians, Tappan identified the tribes and bands living between the Cowlitz River and the Cascades. He wrote his report at his land claim at the mouth of the Lewis River, at "Cathlapootle, Wash[ington] Terr[itory]:"

> Tai-tin-a-pams The next tribe as we assend the [Columbia] river is the Tai-tin-a-pam a band of which lives upon the Cowlitz river. They were originally from the interior and approached the Columbia as the lands became vacated by the Chinooks. They are an industrious inoffensive people, without their assistance the rapid, shallow river upon which they live would be of but little use to the whites, most of the carrying trade being done by canoes and manned by these indians.…
>
> They are fast wasting away and bitterly do they complain of the injustices of the pale faces, who have taken their lands, fenced up their pra[i]ries, plowed up the graves of their fathers, and of their children, and says Kish-kok (a fine old chief) have not given us one blanket to comfort us in our old age.…
>
> The largest band of the Tai-tin-a-pam are living in the valley of the Cathlapootle River and are the most interesting Indians in the Southern District. They are not all Tai-tin-a-pam proper for there are some Click-a-tats among them but they are so intermarried that they consider themselves one and the same people. In fact the Tai-tin-a-pams are but a band of the Clickatats which is a large tribe occupying an immense region of country.
>
> They are an active industrious people, excellent hunters and subsist principally upon game, though Salmon and berries make up the variety. There are but a very few drunkards among them, and prostitution is of very rare occurrence. Many are quite industrious as farmers, raising potatoes, peas, beans, oats, corn, &c.…
>
> This is the only band in this district which I think would be benifitted by agricultural teaching and the expense attending need be but triffeling. If a good plough a strong sett of horse harness and a harrow should belong to the Agency and be loaned to such as desired the use of them, much good would be the result, more land would be cultivated, and they would remain more at home…

> It is difficult to ascertain their population as many are always on the move between the gold fields of Oregon-California, and trading expeditions among the northern and eastern Indians of Washington.
>
> In July they numbered 140. I suppose 200 to be their usual amount.
>
> There is also a band who live at the fishery [a location west of the townsite of Vancouver on the north bank of the Columbia identified on the map of R. Covington, 1859] in summer, and on Columbia [Sauvie] island in spring and winter. They are a mixed race, nearly all the tribes are here represented. Among them are two or three of the original occupants of the soil, representatives of the once bold and numerous tribe called the 'Warriors' which headquarters were the town of St. Helens now is and who there established a sort of 'Custom House' leveling and collecting taxes of all who passed wether whites or Indian but 4 or 5 of that great tribe are now alive.
>
> The band spoke of above are not numerous but are a troublesome set: their population is about 30.
>
> La Camas A band of Taitinapams and Clickatat live at La Camass pra[i]rie in the vicinity of Fort Vancouver, unlike those below they are great drunkards, and keep both horses and women to let. They number 78 persons.
>
> The next Band are the Tumwaters or Cascade Indians. They are a band of the Clickatats but claim to have occupied their present position and to have caught Salmon in the rapids of this place from time immemorial. (Tappan 1854a)

Tappan formulated recommendations for consideration in the planned treaty program in western Washington. In the area near Fort Vancouver, he wrote:

> Upon the Cathlapootle they should be allowed to take salmon at all their fisheries now used by them. And as they cultivate the land I would recommend that a tract of land (say one hundred acres) be fenced in a substantial manner and all be allowed to cultivate therein. As they find it so difficult to make good fences I think they would be pleased with such an arrangement and would remove the objection they now have to give up the land which they consider theirs and in some instances have cultivated. (Tappan 1854a)

On December 15, 1854, Agent Tappan submitted additional counsel regarding planned treaties in southwestern Washington:

> Those upon the Cathlapoodle (Ta-tin-a-pams) will I think be willing to go to a reserve in the Chalatchee pra[i]rie, retaining however a right to their fisheries, and to winter their horses in the valley they now occupy. There, I think those of the Cowlitz and about Vancouver could be gathered. The

> land is unsurpassed by any in the territory, and in the very heart of the vast berry district frequented by all of their tribes. To this Pra[i]rie they have always been particularly attached. (Tappan 1854b)

On January 25, 1855, while at Fort Vancouver, Agent Tappan wrote specifically about the Indians residing at the nearby "Fishery," a site on the west side of the Vancouver townsite:

> Since I have been in this vicinity I have seen the Fishery Indians. They are dispose[d] to sell all but a right to the fisheries and are disposed to make their permanent home in Oregon Territory. The band about this place [Vancouver] will not give their consent to leave the vicinity of this town. I have had many talks with them, but to no purpose. I think however that when their lands are to be paid for, the temptation will be irrisistable and they will be easily disposed of. (Tappan 1855)

Upon completion of the Fort Steilacoom-Fort Vancouver Military Road survey in November, 1855, George Gibbs, the civilian surveyor hired by Lieutenant George H. Derby to mount much of the reconnaissance, settled in at Fort Vancouver to write his notes and prepare a map of the wagon route. His sojourn also gave him ample opportunity to expand his linguistic and ethnographic notes. In December, 1855, he worked with a Klickitat informant named Yáhotowit. Gibbs noted: "Umtuts, or Imtuts' father was Moke-quáh. Umtuts was Taitinapam – his proper country was not Wiltqa, but in the mountains at the foot of St. Helens, on the head of the Cowlitz. His people were always quarreling and he left them." This information thus confirms that the band headed by Umtuts/Umtux, living at the mouth of Lewis River in the 1840s and the 1850s, was identical to the Taidnapam from the upper Cowlitz watershed (Gibbs 1855-1856b).

The informant Yáhotowit further provided information on the Klikitat ethnogeography of the Vancouver vicinity (Gibbs 1855-1856b):

> Wee-kass, the large lake below Fort Vancouver, "Enati-thlalla" its name by the Wakanaseesie Ind[ian]s
>
> Wilt-kwa, the mouth of Lewis' river, where Umtuts' ranch is
>
> Cathlapootl he did not know, said that *pootl* was not Kilkatat
>
> Skitsoothwa seems to be the name of the Columbia river here
>
> Ata-shee-kass or the place of turtles is the name for the *ground*, near the H[udson's] B[ay] Co[pany]'s fort, as in the overflowed lands there are many of them
>
> Is-ach-lick, the prairie above Switzler's, opposite & a little above Vancouver
>
> Wat-se-ai-as the Mill Creek
>
> Wash-shoo'-hullo the next [creek] above

> Wah-kan-a-sissé, the Indian village below Vancouver, nearly opposite the mouth of the Willamette

Gibbs (1855-1856b). also secured information from Yáhotowit on some of the chiefs or headmen who resided in the vicinity of Fort Vancouver during the occupancy of the site by the Hudson's Bay Company:

> Cowlitz chiefs
>
> > Kamah-tchai-ya of Se-úk'hw
> >
> > Se-al-lal-a-quihl of Se-úk'hw
> >
> > Kweetsoks-ha-ho'h former chief of Cowlitz his sons were Wa-nai-ya, dead and How-hóh, still living
> >
> > Kis-koks, another chief, living
> >
> > Moo-leé-kas was formerly chief at Wish-ham on the Cowlitz
>
> Other chiefs
>
> > Kéh-as-nó, commonly called Cáseno was the great Chief of the country round F[or]t Vancouver. He was a Klikatat [corrected by Gibbs's informant below], & had his house at the mouth of Lewis' R[iver] but governed all the Indians around.
> >
> > Keh-as-nóh, formerly chief of Scappoose. His younger brother was Te-ah-lách both Dead.[1]
> >
> > Kum-kum-ly & Kah-sa-kah-sa were the two sons of Kum-kumly the great the Com-comly of Washington Irving['s *Astoria*]. The latter was a very quarrelsome bad man
> >
> > Kwooli or Whaidli, the chief whom [Robert] Newell[2] calls Kwahtli was half Klikatat & half Skin. He had two countries, the Cascades & Skinpam (Skin & Waiyum people both speak the Klikatat)

In a subsequent interview at Fort Vancouver in December, 1855, Yáhotowit provided more information on Cáseno (Exhibit 4-11):

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[1] Gibbs, in a notebook of 1853-1854, compiled during his work on the survey of passes in the Cascade Mountains for the Pacific Railroad surveys, observed: "Ca-se-no the great chief of the Upper Chinooks died in the fall of 1849 at a very advanced age, & having survived nearly all his people. His proper Tribe at Souvie's Island and Scappoose once numbered 4 or 5000. He was Klikatat on the mothers side" (Gibbs 1853-1854).

[2] Gibbs also interviewed Dr. Robert Newell, former fur trapper who lived at Champoeg but was visiting Fort Vancouver. Newell recounted information about the Klickitat incursion into the Willamette Valley subsequent to the decimation of the Chinookans and Kalapuyans in the 1830s (Gibbs 1855-1856b).

> Kéh-as-no's house was always at Scappoose, not at Wiltqua [mouth of Lewis River]. It appears that he was not of Klikatat blood, but became chief over the Klikatats and all the adjacent people. In former times he was always making war. He took the children & made slaves of them. The men he put in his house, *Kahqua guard house.* All his people died with the cold sick. None of his sons are living. Keh-as-no is mentioned by [Gabriel] Franchére [*Relation d'un Voyage a la cote du Nord-Ouest de L'Amerique Septrentrionale* (1820)]. (Gibbs 1855-1856b)

Exhibit 4-11. Portrait of Casenov, 1847 (from Vaughan 1971:22)

On February 23, 1856, John Cain replaced Tappan as Indian agent for southwestern Washington (National Archives 1945: xxxv). Cain established his office in Vancouver. His reports to Governor Stevens were almost devoid of information on the Indians and devoted instead to political events and financial affairs. On October 7, 1856, A. Townsend, agent at White Salmon reported: "I have about 200 Vancouver Indians, 115 Cascades and the others will swell the number I think to near 700." Townsend was in charge of the short-lived White Salmon Reservation in the Columbia Gorge. Townsend's letters confirmed that many of the Klikitats formerly living in the vicinity of the fort or trading there had returned to the Columbia Gorge (Townsend 1856).

By the fall of 1855 Indian relations had deteriorated significantly throughout Washington and Oregon territories. Where the Hudson's Bay Company had worked diligently to maintain peace through fair dealing in trade, patience, and cementing ties with the native communities by intermarriage, the Euroamerican settlers brought prejudice and violence to the region. The Oregon Donation Land Act (1850) set the stage for filing on 2.5 million acres in 7,437 claims in the Pacific Northwest, almost all transactions recorded prior to the ratification of a single treaty of land cession (Johansen 1957: iii-viii). Broken promises in treaty councils, wholesale invasion and trespass on Indian lands, dislocation of fishers, hunters, and gatherers from their traditional places of subsistence, and the calamitous impact of pandemic diseases were causal factors for conflict. The prohibition of sale of weapons and ammunition to Native Americans by the Oregon Territorial Legislature in 1854 and the suppression of traditional practices of fire ecology for the harvest of seeds and control of the landscape were additional matters (Oregon Territorial Legislature 1854:257).

Although the Native American population of the Lower Columbia Valley was reduced by over ninety percent by 1840, tensions swept through the area at the confluence of the Willamette and Columbia rivers with the outbreak of the Indian wars of 1855-56. Warfare erupted in the late fall of 1855 with the outbreak of hostilities on Puget Sound, the Columbia Plateau, and–as had been the situation in 1852 and 1853–in the gold mining districts of southwestern Oregon. The settlers responded by raising companies of volunteers to provide for defense but also to mount aggression on the native communities. The United States Army headquarters at Fort Vancouver faced a considerable dilemma with the volunteer companies and the mounting of campaigns independent of, and sometimes in the face of, federal policy and action. One of these companies, headed by William Strong of Cathlamet, attacked the Taidnapam Cowlitz at Battle Ground in Clark County in November, 1855, and murdered chief Umtux (Strong 1930:120-121).

Fort Cascades had been established at the Cascades portage near the downstream end of the Columbia Gorge on September 30, 1855, to protect the critical portage for passengers and shipment of Quartermaster Department stores along the north bank of the Columbia River (Derby and Whiting 1855; Townsend 1855). On March 26, 1856, the Klikitats and Upper Chinookans of the Columbia Gorge attacked the settlements at the Cascades portage. They drove the token detachment of soldiers from Fort Cascades and burned the military post. Its destruction suggested to those west of the mountains that they were vulnerable to attack

On March 28, 1856, Lieutenant Philip Sheridan led a troop detachment into a spirited battle with the Indians at the burned ruins of Fort Cascades. His detachment relieved the troops and civilian refugees at the Fort Rains, the Army blockhouse at the Middle Cascades. The civilian refugees fled the Cascades. With the arrival of additional troops from Fort Dalles, the Army quelled the Indian siege and retook the critical portage (Sheridan 1888:74-83; Weatherford 1961:18-21).

The Indian wars of 1855-56, while exciting tensions and preparations at Vancouver, were of no immediate consequence to the area, except for the murder of Chief Umtux. Settlers went on with their affairs. Business quickened with the sale of foodstuffs, weapons, and ammunition to the military companies headed off for Puget Sound, the Rogue River country, or the Columbia Plateau. By June, 1856, peace was largely restored. The volunteers dispersed, congratulating themselves on having fought a good war; the United States Army remained to construct new forts and guard reservations. The Indians, vanquished and driven from their traditional lands, began life confined to reservations.

4.7.7 Reservations

The treaty with the Confederated Tribes of the Willamette Valley set the stage for the removal of the peoples living between the Columbia River and the head of the Coast Fork of the Willamette to the Grand Ronde Reservation. On June 30, 1857, President James Buchanan created by withdrawal and purchase a reservation at the eastern base of the Coast Range on the South Yamhill River (Kappler 1904a[1]:886). A setting of conifer forests and meadows with boggy, clay soil and frequent rain storms sweeping over a low pass from the Pacific Ocean, the reservation became the holding area and administrative

site for the Indians of the western Oregon valleys (including the peoples of the Umpqua and Rogue valleys) and northwestern Oregon (Beckham 2000:102-106).

Prior to official executive order creating the reservation, Superintendent Joel Palmer began removing Indians to the South Yamhill region. Founder of Dayton on the Yamhill River, Palmer selected a site convenient to his office but remote from major settlements. He bought out a half-dozen pioneer land claimants to secure the contiguous tracts he wanted for the reservation. On November 15, 1856, Palmer submitted a detailed census of the "Rogue River Tribe" (13 bands), "Umpqua Tribe" (3 bands), "Calapooia Tribe" (10 bands), and the "Oregon City Indians" (8 bands). The latter were the survivors of the pandemics that swept the lower Willamette and Columbia rivers and probably lived on the Oregon shore of the Columbia River south to the Willamette Falls.

The Oregon Superintendency also submitted a tally of "Oregon City" Indians (Exhibit 4-12). The bands headed by men named Thomas, William, and John, did not appear in subsequent reports or enumerations at Grand Ronde. Whether they were incorporated into the Clackamas Band of Upper Chinookans, the Kalapuyans of the Willamette Valley, or the Molallans of the Western Cascades is unclear.

Exhibit 4-12. Estimate of "Oregon City Indians" Recorded by the Oregon Superintendency

Name	Men	Women	Boys	Girls	Total	Chief
Thomas Band	27	29	16	15	87	Thomas
William's Band	10	10	6	5	31	William
John's Band	8	8	6	4	26	John
Clackamas Band	21	36	15	13	85	Wa-che-no
Molalla Band	27	43	17	16	103	Quack-e-ty
Louis, Jackson, Charley, Cultus Charley, Mack & [?] Indians	6	0	0	0	6	

Source: Anonymous (1856).

None of the subsequent records of the Grand Ronde Reservation documented Clowewalla, Multnomah, or others peoples formerly identified as living along the Willamette River from the falls at Oregon City to the confluence with the Columbia River. A reservation census of 1867 identified 59 Clackamas and 44 Tumwater (Willamette Falls) Indians at Grand Ronde (Huntington 1868:62). After that the reservation documentary record fell silent about these people. It is probable that many of them died shortly after removal to Grand Ronde; some were undoubtedly incorporated into the several tribal and band communities on the reservation.[3]

[3] The sacramental registers kept from 1859 to 1898 by Father Adrian Croquet at the mission of St. Michael the Archangel, Grand Ronde, recorded a number of band or tribe affiliations. Traces of Clackamas, Santiam, Molalla, and other peoples are preserved in these records (Munnick and Beckham 1987).

Closure of the Hudson's Bay Company's Fort Vancouver and termination of its "Indian Store" trade removed the impetus for the region's Native Americans to visit Vancouver. Removal and confinement on reservations precluded free movement of tribal peoples to familiar places. Many of the Klikitats were held at the temporary White Swan Reservation prior to removal to the Yakama Reservation. In 1858 the agent moved the Klikitats to Simcoe and, the following year, took over the military post for agency headquarters, the troops departing to assist with the Northwest Boundary Survey of the 49th parallel (Lansdale 1860a:409-413).

In 1860 Agent R. H. Lansdale removed some of the Lewis River Klikitats to the Yakama Reservation. He reported:

> The band named number, as well as can be ascertained in their scattered condition, 100 souls, thirty-seven of whom were transported by steamer from Lewis river to Rockland, Washington Territory. Forty-three have undertaken to remove their horses, their cattle, and themselves, over the Cascade mountains to Yakima reservation, and the remainder the agent has not yet succeeded in inducing to leave willingly their old hunting and fishing lands, though he yet hopes to accomplish so necessary an undertaking, as soon as possible.
>
> These Indians have been badly treated by the whites; driven without compensation from their own lands; their houses burned and otherwise destroyed; the graves of their people inclosed in the white man's fields. They unwillingly consent to remove to please the government agent… (Lansdale 1860b:206)

The Indian and metisse population that resided on the west side of the Hudson's Bay Company fort dispersed to several locations. Some settled at French Prairie in the northern Willamette Valley, a fertile farming district with landings along the river at Butteville and Champoeg. Others removed to the fishing villages at Dahlia, Chinook, and Ilwaco along the north shore of the Columbia in western Wahkiakum and Pacific counties, Washington. Some moved to the Grand Ronde Reservation to join relatives; and others chose remote locations in the foothills of the Cascades on the South Umpqua River (Munnick 1979: xvii-xxi; Beckham 1987:107-08).

The Lewis River Taidnapam, variously also identified as Klikitats and Lewis River Cowlitz, remained in Clark County. Residing in the Cascade foothills, they were ignored by the Washington Superintendency of Indian Affairs and seldom gained notice in agent reports. For example, in June, 1878, Agent R. H. Milroy, based in Olympia, wrote to E. A. Hayt, Commissioner of Indian Affairs about the tribal populations and census enumerations he made in his district. He reported 1,627 Indians from seven tribes in his jurisdiction, but noted:

> I have not yet succeeded in obtaining the census of the Louis River Klikitat band of Indians, residing in Clark & Skamania Counties about 130 miles from this office, over a difficult & expansive rout[e]. Said band numbers somewhere between 70 & 100. So it is safe to say I have written

> several letters and delayed for some time in hope of obtaining the census of the Louis River Klickitat Bands. (Milroy 1878a)

There is no evidence that Milroy ever obtained a census of the Indians of Lewis River. A search of the letters received from the Washington Superintendency subsequent to 1878 produced no enumeration, though the files contained census records naming heads of household and the numbers of men, women, children, and relatives for the "Cowlitz River Klikitat" and the "Cowlitz Tribe" of the lower Cowlitz River (Milroy 1878b, 1878c).

During the latter part of the nineteenth century the Taidnapam and Lower Cowlitz began operating as a single tribe. They made formal the political relationship in 1918 when they adopted governing documents and elected a single council, predecessor to the present Cowlitz Indian Tribe formally acknowledged by the Department of the Interior in 2001. The Cowlitz secured more than twenty public domain allotments or Indian homesteads in Cowlitz, Lewis, and Clark counties. Some of these properties remain in trust status today. Other Cowlitz participated in the allotment program at Quinault where they obtained an estimated sixteen percent of the allotments (Cowlitz Indian Tribe 1987:31-32; Nicholson 1934).

4.7.8 Conclusion

Between 1792 and 1830 peaceful and mutually remunerative relationships developed between the Native Americans of the Lower Columbia River and surrounding countryside with the traders who came to the region in quest of furs. Initially Fort Astoria, later Fort George, at the mouth of the river served as the primary trading station. The situation changed when, in 1825, the Hudson's Bay Company moved its headquarters to Vancouver a short distance upstream from the confluence of the Willamette and Columbia rivers. The new site was in the heart of the region occupied by numerous villages of Upper Chinookans. It was a location convenient for trade and drew the Klikitats and Taidnapam from the western Cascades, the Cowlitz from that river system, and the Kalapuyans from the Willamette Valley.

The calamity of pandemic diseases (malaria, smallpox, dysentery, and other maladies) decimated the thriving Native American population in the vicinity of Vancouver. An estimated 15,545 Chinookans and Kalapuyans lived in the region in 1805; by 1840 fewer than ten percent, perhaps 1,932 were alive (Boyd 1999:84). Some, like Chief Casanov, survived, but his family, followers, and power had vanished. The Oregon Treaty (1846) and closing of Hudson's Bay Company operations at Fort Vancouver eliminated the commercial connections between Indians and the fur trade. Vancouver was no longer a Mecca where Native Americans traded at the "Indian Store," camped on the nearby meadows, or resided with their French-Canadian or Pacific Island spouses and families.

Vancouver, however, was a testing place for Euroamerican enterprises. The Hudson's Bay Company tried the resources of the region and found fertile soil, productive agriculture, a promising salmon fishery, timber and waterpower for its sawmill, and, of course, furs. Its employees engaged in the retail trade, export of raw materials, and established a small shipyard. As the HBC interests in the area waned, the U.S. presence

waxed with the establishment of the U.S. Army post at Columbia Barracks (later known as Vancouver Barracks) in 1849. In succeeding years the United States Army brought Indian prisoners to Fort Vancouver. Nez Perce, Northern Paiute, and other Indians–usually men who were deemed enemy combatants–were held in the military prison. Some died and were buried at the fort. In time, those remaining were dispersed to reservations.

Descendants of the aboriginal population of the Lower Columbia River survive today, intermixed with other Native American and Euroamerican populations. The largest descendant communities directly connected with aboriginal residency in the Columbia River Crossing area are the Confederated Tribes of the Grand Ronde Community of Oregon, with tribal office and reservation at Grand Ronde, Oregon, and the Cowlitz Indian Tribe, with tribal office at Longview, Washington.

4.8 History

The following overview addresses historical developments which occurred within or immediately adjacent to the project area. The area of focus includes the north shore of the Columbia River at the crossing of the I-5 bridge as well as the south shore and the transit of Hayden Island. The study area thus involves Clark County, Washington, and Multnomah County, Oregon.

4.8.1 British and American Government Exploration and Survey

In the nineteenth century the shoreline at Vancouver became a port-of-call for exploration and reconnaissance parties as well as for the maritime commercial enterprises of the Hudson's Bay Company. British, American, and French explorers, traveling naturalists, and missionaries visited Fort Vancouver, purchased supplies, and gained information from the officials of the Hudson's Bay Company (see Section 4.5).

Several of the nineteenth century visitors wrote accounts of the fort and its surroundings, including the "Village" to the west, a site within or immediately adjacent to the future CRC study area. These expeditions generated letters, diaries, formal reports, and, in some instances, collections of natural history and ethnographic objects. These visitor accounts confirm part of the dimension of early Euroamerican activity along the north bank of the Columbia River at or adjacent to the study area. The following visitors are representative of those landing on the north bank of the Columbia at Vancouver.

4.8.1.1 Lt. William Robert Broughton Reconnaissance, 1792

William R. Broughton, Captain of the *Chatham*, sister ship to George Vancouver's *Discovery*, drew the assignment to explore the Columbia River estuary in October, 1792. With a launch and cutter, Broughton left his ship anchored at Point George (Astoria) to ascend the river to the western end of the Columbia Gorge. He named present Hayden Island (dubbed "Image Canoe Island" by Lewis and Clark) as Menzies Island to honor the expedition botanist, Dr. Archibald Menzies. Broughton found no Indian villages in the vicinity of present Vancouver, Washington, but noted the village of the "Friendly Old Chief" on the Oregon shore near the present location of Portland International Airport (Barry 1926:404, 406-407).

Thomas Manby, a crewman who remained on the *Discovery* in the lower estuary, described Broughton's reconnaissance:

> Capt. Broughton expressed a good deal of satisfaction at his Expedition, a great variety of Scenes were met with and good weather prevailed with them the whole time, the Country was in general Woody, and of moderate height, some clear places of a few Acres were seen, a luxurious verdure every where, cloathed them, and many Bears and Deer were seen on the banks of the River.
>
> Seven extensive Villages were met with, the Indians on first seeing our Boats, came forward in their Canoes, Equip'd for War, almost every Man was provided with War Mat, which they took off, as soon as certain tokens of friendship were given on each side, they were Armed with Clubs, Lances and Bows and Arrows. The report of Fire Arms created great surprise and terror among them, and the effect was shewn to them by shooting many birds, The Indians beg'd of Mr. Broughton to fire, at a War Garment imagining it would not be pierced, of course he satisfied their curiosity, and still more alarmed them, by driving a ball through it when twice doubled, An old Man who appeared of some consequence, kept Company with them few days, and became particularly attached to the Capt, he supplied them with Fish and many other things, as he led the way in his Canoe and had sufficient authority to demand part of the Sport every hunter or fisherman had met with. The River narrowed to a mile about fifty miles up, and where they left off, its breadth was half a Mile, and three fathoms deep, the Water quite fresh and clear, not at all influenced by the tide, but running gently with a continued drain down, Many small Rivers emptied themselves into it, one of which the Captain honor'd with my Name. (Manby 1792)

4.8.1.2 Lt. William A. Slacum Reconnaissance, 1836-37

In 1836 John Forsyth, Secretary of State in the Jackson administration, ordered William A. Slacum, an officer in the U.S. Navy, to visit the "coast of the United States" and assess the number of Indians, residents, attitudes toward Russia and the United States, and potentials of the region. Slacum's mission was a geopolitical move of the United States to identify potentials harbors and commercial prospects, should the nation expand its territory to the shore of the Pacific Ocean. Slacum traveled to Baja California and to Hawaii where he chartered the *Loriot*. The vessel entered the Columbia estuary in December, 1836 (Bancroft 1886:100).

Awaiting a pilot to guide the *Loriot* up the Columbia, Slacum traveled by canoe and landed at Fort Vancouver on January 2, 1837. A week later he departed for the Willamette Valley. He left Oregon in early February. Slacum's reconnaissance eventually included Puget Sound, San Francisco Bay, and San Diego Bay. He described, in particular, the operations of the Hudson's Bay Company and its headquarters at Fort Vancouver. Slacum's account, *Report of the Committee on Foreign Affairs, to which was referred a Message from the President of the United States, with a Resolution to the*

House, in Relation to the Territory of the United States Beyond the Rocky Mountains, was published in 1839 in the *Congressional Serial Set* (Bancroft 1886:100-101).

4.8.1.3 Captain Edward Belcher's Reconnaissance, 1839

In 1835 the British Navy dispatched the *Sulphur* and the *Starling* to the Pacific Ocean to verify existing survey data and collect information of interest to the Admiralty Office. Captain Edward Belcher of the *Sulphur* operated under orders that included the note: "Political circumstances have invested the Columbia River with so much importance that it will be well to devote some time to its bar and channels of approach, as well as its inner anchorages, and shores." Belcher explored the Columbia estuary from 16 July to 12 September 1839. McLoughlin noted: "The *Starling* met with several accidents in this River, and on different occasions lost two rudders which we furnished means to replace" (McKelvey 1991:636; McLoughlin 1943[2]:228; Henry 1984:132-135).

Two accounts document this expedition's work on the Columbia and vicinity of Fort Vancouver: Belcher's (1843) *Narrative of a Voyage Round the World, Performed in Her Majesty's Ship Sulphur, During the Years 1836-1842* and Richard Brinsley Hinds' (1844) *The Botany of the Voyage of H. M. S. Sulphur, Under the Command of Captain Sir Edward Belcher, R.N., C.B., F.R.G.S., etc., During the years 1836-42*. Belcher noted on August 9, 1839: "After being nearly devoured by mosquitoes, we reached Fort Vancouver… as the crow flies, eighty-two miles from Cape Disappointment… As to the appellation of Fort Vancouver, it is clearly a misnomer; no Fort Vancouver exists; it is merely the mercantile post of the Hudson's Bay Company." Belcher assessed the civilian and mission settlements in the Willamette Valley, repaired his ships, and departed in September (McKelvey 1991:644-645, 653).

Belcher's account is representative of the information recorded about the appearance and environs of Fort Vancouver in the 1830s:

> It stands about three hundred yards within the northern edge of the river, is a picketed enclosure three hundred yards square, the pickets being eighteen feet high, composed of roughly split pine logs. No attention to strength has been paid in its construction. It is furnished with three gates, two of which are invariably open by day. The houses of residence, as well as store-houses of the company, are within this enclosure, forming two squares. No guard is observed. The trade store is open during working hours and any increase of number amongst the Indians would not excite uneasiness on the part of the officers.
>
> In the eastern square the main building is occupied by the chief, in which also is the *sala* or mess-room. In front of the steps of this building are two long twenty-four pounder ship guns and two short, merchant-ship cannonades, twelve or eighteen pounders. On the left, at right angles, are the quarters of other clerks, traders, etc. Those who have married the Canadian half-castes generally live in their quarters or come to the general table when it suits. It is not a little strange in a community so long

> established, that the women should be almost totally unacquainted with the language of their husbands.
>
> In the rear of the fort is an excellent kitchen garden and orchard, occupying about the same space as the fort, (three hundred yards on its sides) and behind this is a large tract of cultivated land and extensive shore-houses, barns, etc., and abundance of grain in stacks. (Belcher quoted in Alley and Munro-Fraser 1885:25)

Within or immediately adjacent to the CRC project area was the "Village," residence of company engagés, Indian wives, children, and workers from Hawaii and Polynesia. Belcher wrote:

> To the westward are situated, without the palisade, at a distance of a quarter mile, the hospital and houses of the Canadian establishment, forming a complete village. All is apparently defenseless, although when turned out, every man will be found with a well-tried rifle and *couteau de chase*, or other means of efficient defense; and their partners are efficient helpmates in the literal sense of the phrase. (Belcher quoted in Alley and Munro-Fraser 1885:25)

4.8.1.4 Lieutenant Charles Wilkes and the U.S. Exploring Expedition, 1841

Dispatched by the Jackson administration, Lieutenant Charles Wilkes headed a multi-faceted naval reconnaissance that was in the field from 1838 to 1842. The five vessels and 350 personnel of the U.S. Exploring Expedition visited South America, rounded Cape Horn, explored the South Pacific and Hawaii, and then in 1841 mounted a reconnaissance of the west coast of North America. The expedition included naturalists, artists–Titian Ramsey Peale, James Drayton, and Alfred Thomas Agate, a mineralologist–James Dwight Dana, botanists–William Dunlop Brackenridge and William Rich, a linguist–Horatio Hale, and others. Several of the expedition members kept diaries and some produced sketch books of places and objects they saw during their travels (Viola 1985). The manuscript records of the expedition include significant holdings in the National Archives, Washington, D.C., and personal papers at the Beinecke Library, Yale University, New Haven, Connecticut.

The U.S. Exploring Expedition crossed the Columbia Bar, losing the vessel *Peacock* on what later became known as Peacock Spit, and sailed upstream to Fort Vancouver. Wilkes had traveled overland with a party from Puget Sound south to the fort. He dispatched an expedition to travel up the Columbia to Fort Walla Walla and another to travel south through the Willamette Valley and southwestern Oregon to Sutter's Fort in California. A number of members of the Wilkes expedition wrote about their experiences at Vancouver in 1841 (Bancroft 1886:246-249).

Charles Wilkes described his arrival at the Kanaka Village:

> It becoming necessary to make a short portage within a mile of Vancouver, we concluded to walk thither by road. In this march we first entered a wood of large pines, which had an undergrowth of various

> flowering shrubs. The old stumps in the road were overgrown with the redhoneysuckle, in full blossom. Lupines and other flowers grow even in the roadway.
>
> We came in at the back part of the village, which consists of about fifty comfortable log houses, placed in regular order on each side of the road. They are inhabited by the Company's servants, and were swarming with children, whites, half-breeds, and pure Indians. The fort stands at some distance beyond the village, and to the eye appears like an upright wall of pickets, twenty-five feet high: this encloses the houses, shops, and magazines of the Company. the enclosure contains about four acres, which appear to be under full cultivation. Beyond the fort, large granaries were to be seen… Near by are the rooms for the clerks and visiters [sic], with the blacksmiths' and coopers' shops. In the centre stands the Roman1 Catholic chapel, and near by the flag-staff; beyond these again are the stores, magazines of powder, warehouses, and offices. (Wilkes 1845[4]:326-327)

The Wilkes Expedition report, *Narrative of the United States Exploring and Surveying Expedition During the Years 1838, 1839, 1840, 1841, 1842*, included five volumes, an atlas, and fifteen folios of scientific plates as well as extensive manuscript correspondence, diaries, and sketches, some of which subsequently secured publication (Exhibit 4-13). Volumes four and five included information the Columbia River, Puget Sound, and Willamette Valley and the reconnaissance through southwestern Oregon to Sutter's Fort on the Sacramento River (Wilkes 1845).

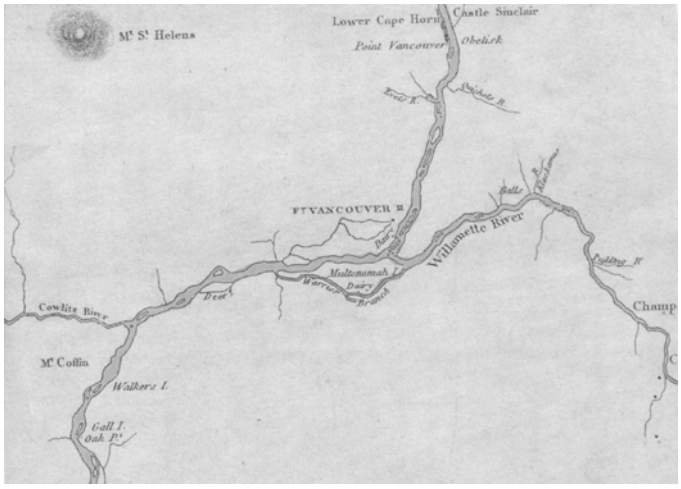
Exhibit 4-13. "A Scene on the Columbia River, 1841," drawing by Henry Eld of the U.S. Exploring and Surveying Expedition of man with musket, Indian woman broiling a salmon, dugout canoe, and Mount Hood in right center background (from Henry 1984:213)

4.8.1.5 Duflot de Mofras Reconnaissance, 1841

The French government in 1839 dispatched Duflot de Mofras, an attaché at the French embassy in Madrid, to go to Mexico and then mount a reconnaissance of the Pacific Coast northward to Alaska. Ostensibly de Mofras was to assess the potentials for French commerce. His observations were much broader and, in addition to producing an informative map of the Lower Columbia River (Exhibit 4-14), de Mofras described harbors, rivers, natural history, and the material culture of the Indian populations (Bancroft 1886:250). De Mofras arrived at Fort Vancouver in the fall of 1841. He noted:

> This [fort] is situated on the north and right bank of the Columbia River, about 30 miles in from its mouth, on a small plain approximately a mile wide that extends for two leagues along the river. The land was a gradual rise, the lower end forming a prairie, while the upper end is crowned by dense forests. The location is extremely picturesque. In front of the fort immense plains covered with verdure are visible stretching off into the distance. In the foreground flow the limpid waters of the river, shaded by great trees. On the southeast towers Mt. Hood, whose eternal snows stand out in striking contrast to the somber tones of the pine forests that rise near by.
>
> The fort is situated 300 meters back from the river. The palisade that overlooks the south is 240 meters wide and 130 meters deep. The fort has neither moats nor any kind of defense except two antiquated iron cannon that have been spiked, which stand in the center of the quadrangle.
>
> The enclosure contains thirty separate buildings. These include quarters for the governor, the superintendent, and other employés of the Company, together with their families, carpenter, locksmith, and blacksmith shops, forges, storehouses for furs, tanneries, a warehouse for European merchandise, a pharmacy, and a Catholic church that also serves as a school. All of these buildings are constructed of wood, except the powder magazine which is an isolated brick structure.
>
> A large vegetable garden filled with fruit trees adjoins the fort, and every year 600 hectares of ground near by are placed under cultivation. On the shore are situated the sheds and dockyards used by barges and small boats. A few hundred feet beyond the fort cluster the small houses erected for the employés. Near them are a flimsy structure used as a hospital, a few sheds, two sheep pens, a milkhouse, stables, granaries, and a machine for threshing wheat. (de Mofras 1937[2]:98-99)

Exhibit 4-14. Portion of Map of the Lower Columbia River showing features in the Vicinity of Vancouver (de Mofras 1937)



4.8.1.6 Captain Thomas Baillie, 1844

In July, 1844, the *Modeste*, a British sloop of war commanded by Captain Thomas Baillie, sailed up the Columbia and anchored at Vancouver. Baillie's visit was a diplomatic assertion of British claims to the region, not a scientific reconnaissance (Bancroft 1886:447). Bailee and James Douglas, a Hudson's Bay Company officer who succeeded McLoughlin in 1846, accompanied him on a tour of the Willamette Valley settlements. According to McLoughlin, "Captain Baillie did not expressly state the object of his Mission, but I infer he came to examine the River, see the Country, and learn what was doing, and support the British influence, which he did greatly by the appearance at this place [Fort Vancouver] of a British Man of War" (McLoughlin 1944:35).

4.8.1.7 Lieutenant William Peel and Captain Park, 1845

In September, 1845, the British ship *America*, outfitted with fifty cannons, arrived at Fort Vancouver. It was under the command of Lieutenant William Peel, a son of Robert Peel, British prime minister. Peel had an associate, Captain Park, who shared with Dr. John McLoughlin a letter informing him of the intentions of the British government to protect the interests of British citizens in the Oregon Country. Peel and Park toured the northern end of the Willamette Valley (Bancroft 1886:497-498; McLoughlin 1944:146).

4.8.1.8 Lieutenant Henry Warre and Lieutenant M. Vavasour, 1845

In August, 1845, two British Royal Engineers arrived overland from Canada. While they were ostensibly surveyors examining the Columbia estuary, Warre and Vavasour were assessing the situation in Oregon: the interests of the British and the attitudes and actions of American residents (Bancroft 1886:500). These observers spent several months in the Pacific Northwest, visiting from the Willamette Valley settlements north to Puget Sound.

Henry Warre executed numerous pencil sketches and watercolors. His view of "Fort Vancouver on the Columbia River" looked north. The sketch included several buildings, three outside and the remainder inside the stockade, with towering conifers dominating the horizon behind the fort (Warre 1970:Plate 40).

4.8.1.9 Lieutenant Neil M. Howison, 1846

Americans elected James K. Polk in 1844 on a political agenda of territorial expansion. A provocateur of the Mexican War, Polk also pressed for resolution of American claims to the Pacific Northwest that led, ultimately, to the Oregon Treaty with Great Britain in 1846. To further these objectives, the Polk administration dispatched Lieutenant Neil M. Howison, U.S. Navy, to Oregon aboard a *Shark*, a vessel of twelve guns. Howison reached Fort Vancouver on July 24. In light of the fact that several vessels containing more than 300 personnel of the U.S. Navy's Surveying and Exploring Expedition had previously toured the region in 1841, Howison's visit was not necessary, except for unstated geopolitical purposes.

Howison's reconnaissance included a tour during the summer of 1846 of the northern Willamette Valley, a visit to Oregon City, and numerous meetings with Provisional Governor George Abernethy. Howison made an assessment of American and British strengths and commitments in the region and, possibly working under covert orders, laid the groundwork for an American seizure of the Pacific Northwest. His *Report on Coast, Harbors, etc., of Oregon* appeared in the Congressional Serial Set in 1848 (Bancroft 1886:584-590). Howison wrote:

> About twenty-two years ago, leaving a single trader to conduct the trade at Astoria, they [the British] made a new settlement 96 miles up the river, and called it Vancouver. This eligible site is the first prairie land found upon the banks of the river sufficiently elevated to be secure from the summer inundations. (Howison 1848:12)

4.8.1.10 McClellan Reconnaissance, Pacific Railroad Surveys, 1854

Isaac Ingalls Stevens, governor of Washington Territory, assumed command of the Northern Division, Pacific Railroad Surveys, to explore a feasible route for a railroad from St. Paul, Minnesota, to Puget Sound. To facilitate this far-flung enterprise, Stevens assigned Captain George G. McClellan to mount the examination of the Cascade Range in Washington Territory to identify potential passes for the railroad. Using Fort Vancouver as his supply base and point of departure, McClellan's party assembled at Vancouver in 1854 and explored the Indian trail via the South Fork of the Lewis River to carry out its assignment.

Dr. James Graham Cooper, naturalist for the Western Division surveys, described the landscape from the north shore of the Columbia to the Cathlapootle (Lewis) River in July, 1854:

> The principal trees of this region were in three species of abies, (spruce and fir), one oak, two maples, one dogwood, one ash. The character of the shrubs were two wild roses, three spirens, an elder, and the 'Oregon

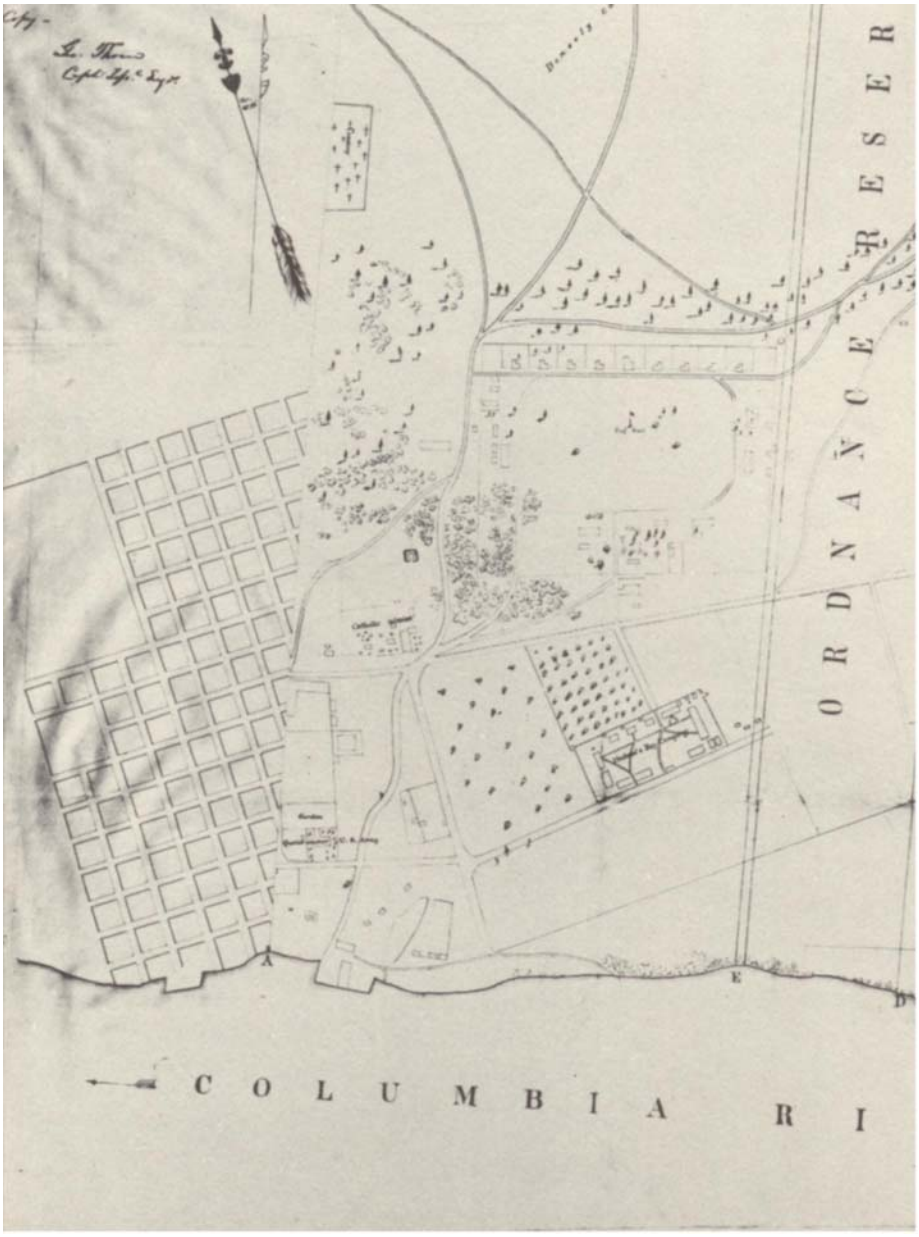
> grape.' Near the streams grew several species of raspberry and the two poplars, and various willows, which were seen on the river banks throughout the country. Two species of huckleberry, a red and a blue fruit kind, were abundant in some parts. Very few plants were in flower in the forest, and but few on the plain, the dry season being accompanied by an almost complete cessation of growth of grass, and then dried up, and round the borders of some was a dense growth of pteris, (fern) reaching above a man's head and almost impassable in places. Most of these prairies are covered by water in wet seasons, which prevents the coniferous trees from growing on them, and assimilates their vegetation to that of the river banks. (Cooper 1855:179)

4.8.1.11 Fort Vancouver-Fort Cascades Military Wagon Road, 1855-56

The Cascade Portage was key to travel and shipment of supplies to military posts in the interior of the Pacific Northwest. In light of the establishment of Fort Dalles and Fort Walla Walla and proposed additional posts to guard Indian reservations, the U.S. Topographical Engineers surveyed and constructed a wagon road, under direction of Lieutenant George H. Derby, from Fort Vancouver via the north bank of the Columbia River to the U.S. Army Quartermaster's warehouse at Fort Cascades and farther east to the Upper Cascades (Derby 1855)

Fort Vancouver, western terminus of the road, served as headquarters for the Quartermaster Department of the U.S. Army for the Pacific Northwest in the mid-nineteenth century (Exhibit 4-15). Annually tons of supplies: food, munitions, weapons, uniforms, harness, wagons, and other materials arrived on the north shore of the Columbia River. The Quartermaster Department logged receipt of these supplies, stored them in warehouses, and, as needed, dispatched them to the military posts in the Department of the Columbia. The Quartermaster warehouses were on the western margin of the military reservation and were situated directly north of the Kanaka Village or servants' quarters of the Hudson's Bay Company post (Wheeler and Dixon 1859).

Exhibit 4-15. Section 1859 map showing plat of Vancouver and Fort Vancouver Military Reservation (Wheeler and Dixon 1859, from Hussey 1957: Pl. XXI)



4.8.1.12 Fort Vancouver-Fort Steilacoom Military Wagon Road, 1855-56

Officials of the U.S. Army deemed critical communication between Puget Sound and the Columbia River. Travel proved difficult and problematic at the time of establishment of Fort Vancouver. Finally in the fall of 1855 the U.S. Topographical Engineers gained the assignment to survey and construct a passable wagon road over this route via the watershed of the lower Cowlitz River. Fort Vancouver was the southern point of origin and supply for the parties mounting this survey and construction project. The

reconnaissance commenced in October, largely under the direction of civilian surveyor George Gibbs who worked under contract for Lieutenant George H. Derby of the Topographical Engineers. Both surveying and construction of this route were interrupted by the outbreak of troubles with the region's Indians (Gibbs 1855a; 1855-1856a).

4.8.2 Civilian Exploration

Between 1825 and 1850 a variety of civilian naturalists–not financed by any government–visited Fort Vancouver and explored the Pacific Northwest. Because Vancouver was the primary outfitting post and center of Euroamerican civilization, the site served as base camp and point of supply for each of these visitors. A number of them kept diaries and described conditions on the north bank of the Columbia River.

4.8.2.1 David Douglas, 1825

David Douglas, a botanist employed by the Royal Horticultural Society of London to collect exotic plants in the Pacific Northwest, arrived at the new post, Fort Vancouver, in 1825:

> My residence is on the north bank of the river twelve miles below Point Vancouver (90 from the ocean), the spot where the officer of his squadron discontinued their survey of the river [in 1792]. The place is called Fort Vancouver. In the river opposite my hut lies Menzies Island [Hayden Island], so named by Mr. [William] Broughton in honour of Archibald Menzies, Esq., then his companion on the famous expedition. On my arrival a tent was kindly offered, having no houses yet built, which I occupied for some weeks…
>
> Made a visit [May 2, 1825] to Menzies Island [Hayden Island], in the Columbia river, opposite the Hudson Bay Company's establishment at Point Vancouver, seventy-five miles from Cape Disappointment. The island is low, sandy shores, rich vegetable soil in the middle, frequently inundated when the river is much swollen. (Douglas 1972:34-35)

4.8.2.1 John Kirk Townsend and Thomas Nuttall, 1834

John Kirk Townsend (1809-1851) traveled overland in 1834 with Nathaniel J. Wyeth's second expedition. Townsend spent nearly two years collecting specimens and writing his observations on the natural history of the Oregon Country. His book, *Narrative of a Journey Across the Rocky Mountains to the Columbia River and A Visit to the Sandwich Islands, Chili, &c., with a Scientific Appendix* (1839), became a classic of early explorations and travels in the Pacific Northwest. Of significant value are the appendices to Townsend's book, enumerating the species he observed and collected in the Pacific Northwest. Little recognized but of interest were Townsend's duplicate bird skins and animal pelts, several of which were used by John James Audubon to illustrate his books on North American natural history. Townsend arrived at Fort Vancouver in mid-September, 1834, and wrote:

> Fort Vancouver is situated on the north bank of the Columbia on a large level plain, about a quarter of a mile from the shore. The space comprised within the stoccade is an oblong square, of about one hundred, by two hundred and fifty feet [yards]. The houses built of logs and frame-work, to the number of ten or twelve, are ranged around in a quadrangular form, the one occupied by the doctor being in the middle. In front, and enclosed on three sides by the buildings, is a large open space, where all the in-door work of the establishment is done. Here the Indians assemble with their multifarious articles of trade, beaver, otter, venison, and various other game, and here, once a week, several scores of Canadians are employed, beating the furs which have been collected, in order to free them from dust and vermin. (Townsend 1839:160-170)

Townsend visited the farm north of the fort and noted that the Hudson's Bay Company had a grist mill, threshing mill, and a water-powered sawmill. He wrote of the employee village (Kanaka Village) west of the stockade:

> On the farm, in the vicinity of the fort, are thirty or forty log huts, which are occupied by the Canadians, and others attached to the establishment. These huts are placed in rows, with broad lanes or streets between them, and the whole looks like a very neat and beautiful village. The most fastidious cleanliness appears to be observed; the women may be seen sweeping the streets and scrubbing the door-sills as regularly as in our own proverbially cleanly city [Philadelphia]. (Townsend 1839:171-172)

Townsend subsequently revised his assessment about the tidiness of the "Village."

4.8.2.2 Samuel Parker, 1835

Samuel Parker, an American missionary, arrived overland at Fort Vancouver in October, 1835. Parker was scouting the Oregon Country for prospective mission locations for the American Board of Commissioners of Foreign Missions. In his description of the fort, Parker also mentions the adjacent settlement of Kanaka Village:

> Fort Vancouver is situated on the north side of the Columbia river about sixty rods from the shore, upon a prairie of some few hundred acres, surrounded with dense woods. The country around, for a great distance, is generally level and of good soil, covered with heavy forests, excepting some prairies interspersed, and presents a pleasing aspect… The enclosure is strongly stockaded, thirty-seven rods long, and eighteen rods wide, facing the south. There are about one hundred white persons belonging to this establishment, and an Indian population of three hundred in a small compass contiguous. There are eight substantial buildings within the enclosure, and a great number of small ones without, making quite a village appearance. (Parker 1838:140)

4.8.2.3 Thomas Jefferson Farnham, 1839

Visiting Fort Vancouver in 1839, the American explorer Farnham reported:

> The fort itself is an oblong square two hundred and fifty yards in length, by one hundred and fifty in breadth, enclosed by pickets twenty feet in height. The area within is divided into two courts, around which are arranged thirty-five wooden buildings, used as officers' dwellings, lodging apartment for clerks, storehouses for furs, goods, and grains; and as workshops for carpenters, blacksmiths, coopers, tinners, wheelwrights, &c. One building near the rear gate is occupied as a school-house; and a brick structure as a powder-magazine. The wooden buildings are constructed in the following manner. Posts are raised at convenient intervals, with grooves in the facing sides; in these grooves planks are inserted horizontally; and the walls are complete. Rafters raised upon plates in the usual way, and covered with boards, form the roofs.
>
> Six hundred yards below the fort, and on the bank of the river, is a village of fifty-three wooden houses, generally constructed like those within the pickets. In these live the Company's servants. Among them is a hospital, in which those who become diseased are humanely treated. At the back, and a little east of the fort, is a barn containing a mammoth threshing machine; and near this are a number of long sheds, used for storing grain in the sheaf. And behold the Vancouver farm, stretching up and down the river (3,000 acres, fenced into beautiful fields) sprinkled with dairy houses, and herdsmen and shepherds' cottages! A busy place. (Farnham 1906:64)

4.8.2.4 Captain Spaulding, 1841

In 1841 Captain Spaulding of the *Lausanne* ascended the Columbia and wrote:

> Fort Vancouver is situated on the north side of the Columbia river, about ninety miles from Cape Disappointment, on a beautiful plain about one-fourth of a mile from the river. The stockade forms a quadrangle, and contains about twelve buildings, including warehouses, mechanics' shops, dwelling-houses, &c., in the course of which is the house, &c., occupied by Dr. McLaughlin, chief agent for the Hudson's Bay company, and who has charge of all their affairs in this part of the territory. (Spaulding 1843:56)

4.8.2.5 James Clyman, 1844

An American fur trapper, James Clyman visited Fort Vancouver in October, 1844. He wrote:

> The great depository of goods and peltries for all the Indian trade west of the main range of the Rocky mountains stands on a gravely plain on the north side of the Columbia River and about five miles above the upper mouth of the Wilhamet and is situated bearly above extreme high water mark.

> The Fort itself is a wooden stockade and contains in its inside the companies store all the offices of the company and a complete Quadrangular row of Buildings for servants &c which like the outer works can be closed by port doors at pleasure all in a good State of repair & kept clean and neat. (Clyman 1960:117)

4.8.2.6 Joel Palmer, 1845

In December, 1845, overland emigrant Joel Palmer traveled down the Willamette River from Oregon City to visit Fort Vancouver. With the advent of Christmas, Palmer found the settlement ready for a holiday as he observed activities that ranged along the north bank of the Columbia River near the fort. He wrote:

> Some were engaged in gambling, some singing, some running horses, many promenading on the river shore, and others on the large green prairie above the fort. H. B. Majesty's ship of war Modesté was lying at anchor about fifty yards from the shore. The sailors also seemed to be enjoying the holydays–many of them were on shore promenading, and casting *sheep's eyes* at the fair native damsels as they strolled from wigwam to hut, and from hut to wigwam, intent upon seeking for themselves the greatest amount of enjoyment… (Palmer 1847:111)

The fort was an imposing establishment for Palmer:

> The fort stands upon the north bank of the Columbia, about six miles above the upper mouth of the Willamette, and about four hundred yards from the shore. The principal buildings are included within a stockade of logs, set up endwise close together, and about twelve feet high; the lower ends of the timbers being sunk about four feet in the ground. A notch is cut out of each log near the top and bottom, into which a girth is fitted, and mortised into a large log at each end, the whole being trenailed to this girth. I judge the area contains about four acres. The first thing that strikes a person forcibly upon entering one of the principal gates upon the south, is the two large cannons, planted one upon either side of the walk leading to the Governor's house, immediately in front of the entrance. Many of the buildings are large and commodious, and fitted up for an extensive business, others are old fashioned looking concerns, and much dilapidated. East of the fort and along the river bank there is a grassy prairie, extending up for about three or four miles; it has been cultivated, but an unusually high freshet in the river washed the fence away, and it has since remained without cultivation. (Palmer 1847:112)

Palmer noted a large farm north of the fort where stood numerous buildings. To the west within or immediately adjacent to the Columbia River Crossing project area he described the settlement of company servants (HBC Village): "Below the fort, and extending from the river for half a mile north, is the village; the inhabitants of which are a mongrel race, consisting of English, French, Canadians, Indians of different nations, and half breeds, all

in the employ of the company. The buildings are as various in form, as are the characteristics of their inmates" (Palmer 1847:113).

4.8.2.7 Paul Kane, 1846

In December, 1846, Paul Kane, a Canadian artist, arrived at Fort Vancouver during an expedition across North America to study and paint the Indians and landscapes. Kane executed several works of art based on his sketches and watercolors in the vicinity of Fort Vancouver. The images included Upper Chinookan lodges and dipnet fishing, portraits of headmen, and views of the eruption of Mount St. Helen. He noted:

> Fort Vancouver, the Indian name of which is Katchutequa, or 'the Plain,' is the largest post in the Hudson's Bay Company dominions, and has usually two chief factors, with eight or ten clerks and 200 voyageurs, residing there. Our society was also enlivened by the addition of the officers of Her Majesty's ship of war the 'Modeste,' which had been on this station for two years, and lay in the river opposite the establishment. The buildings are enclosed by strong pickets about sixteen feet high, with bastions for cannons at the corners. The men, with their Indian wives, live in log huts near the margin of the river, forming a little village–quite a Babel of languages, as the inhabitants are a mixture of English, French, Iroquois, Sandwich Islanders, Crees and Chinooks. (Kane 1925:117)

4.8.2.8 Arline Anderson Cairns, 1890

Thomas Anderson served as commander of the Fourteenth Infantry at Vancouver Barracks from 1882 to 1894. A veteran of the Civil War, his family arrived at Vancouver in 1890 via Portland. His daughter, Arline Anderson Cairns, wrote vividly about the historical landscape surrounding the fort and the city:

> As our destination was Vancouver Barracks on the Washington side of the Columbia River, we had to take a river boat to complete our journey. Accordingly we boarded the old river boat, the 'Lurline' and steamed down the Willamette to its mouth, thence up the Columbia to the town of Vancouver, taking three hours for the trip…
>
> Back of the garrison there still remained a small portion of the forest primeval. The trees attained a height of from two to three hundred feet. On foggy days we could not see half-way to the tree tops. The foot paths wound through dense bracken and flowering shrubs; dogwood made white stars in the dark branches of fir and cedar trees, wild currant made rosy spots here and there, and on the ground, first to appear in spring were the pure, white trillium. (Cairns 1961:32-33)

4.8.3 Historical Assessment of the "Village"

John A. Hussey mounted a rigorous exploration of historical, cartographic, and visual information to write an overview of the Hudson's Bay Company's Fort Vancouver. At

several points he commented about company structures and activities along the north bank of the Columbia River. Under the heading "General View," Hussey wrote:

> In the immediate neighborhood of the fort, in 1846, were the Catholic church, several large barns and other farm structures, the homes of the lower grades of employees which collectively made up the 'Village,' and a scattering of other structures, large and small. Along the river bank were two large boat sheds, a structure known as the 'Salmon Store,' the hospital, the 'Salt House,' several stables, workshops, and residences. (Hussey 1957:117)

Under the heading "In the village, west and southwest of the fort," Hussey noted:

> De Roche's dwelling, lined and ceiled, 30 x 20 feet
>
> Between about twenty to forty additional dwellings, sheds, out-houses, etc. (Hussey 1957:197)

Hussey's more expansive description under the heading "The Village" began as follows:

> The lesser employees at Fort Vancouver–the tradesmen, artisans, boatmen, laborers, and so forth–for the most part had their homes in what was known as the 'village,' on the plain west and southwest of the stockade. Immediately west and north of the fort was a large cultivated field. Bounding this field on the west, and some six or seven hundred feet from the west stockade wall, was a road which led from the area of the wharf and lagoon to the site of the new Catholic church. Along the west side of this road were lined a number of the village houses, giving the appearance of a street. Another road branched from this one about opposite the northwest corner of the palisade and ran in a westerly direction over the plain. Along this second road, also, about half a dozen houses were ranged with some semblance of regularity. But with these two exceptions it is somewhat difficult to identify the neat 'rows' of huts mentioned by certain visitors to the fort. (Hussey 1957:217)

After presenting accounts of the "Village" by John Kirk Townsend, Hall J. Kelley, Thomas Jefferson Farnham, and Joel Palmer, Hussey continued:

> A good description of the town and its buildings as they stood about the end of the 1840s was given many years later by William F. Crate, the millwright. The village in 1849, he said, was in as good condition as it had been in 1843, 'and in my opinion better.' There were separate streets for French-Canadians, for Kanakas, and for Englishmen and Americans, although most of the employees of the latter two nationalities lived 'scattered around,' above and below the fort. Some of the dwellings were built in the Canadian style, of two or four-inch planks; some were built in 'American cottage fashion,' framed and weatherboarded; some were of squared timbers; a 'very few' were of logs; and a number were of edged slabs from the Company's sawmill, the slabs applied with the flat side out.

> The houses were generally one story high, but some had one and half stories. A number were ceiled on the inside, and some were even papered. More were plastered with clay. They generally contained two or three rooms, although many had but a single room.
>
> With the decline of the Company's business at Vancouver during the 1850s, the staff of employees was cut, and the number of houses in the village was proportionately diminished. Beginning in 1849, some of the better structures were rented to the Army, chiefly for use as quarters and offices for the Quartermaster Department. By the early 1850s, the village had degenerated into a collection of 'old slab buildings,' generally described collectively as 'Kanaka Town.' (Hussey 1957:218-219)

Hussey also included a description of "The Salmon House" on the north bank of the Columbia River:

> The salmon house, or "fish house" as it was sometimes called, was located at the head of the Company wharf near the bank of the Columbia. It was a large building, measuring 100 x 40 feet, and as might be assumed from its name, was used principally for storing cured salmon. The date of its construction is not known, but in 1849 it was considered an old building. Its roof was then in good condition, but otherwise it was much dilapidated." (Hussey 1957:221)

Hussey reported that the "Village" fell into increasing disrepair in the 1850s and that the military at Fort Vancouver removed a number of the buildings. He wrote:

> Finally, in February, 1860, the military authorities decided to clear the land west and southwest of the fort, embracing a tract of land lying in front of the Quartermaster's office and depot, and stretching from the western boundary of the reservation to a line of stakes commencing at a point about eight yards east of the Catholic church and running from thence in a southerly direction to the river. On March 1, a board of Army officers examined the area and found nine buildings 'claimed' by the Hudson's Bay Company, 'mere shells,' rapidly going to decay and most of them propped up to keep them from falling down. it was decided that these structures–the Salmon House, the 'Johnson House,' and the 'Field House'–were of 'some little value' and should not be destroyed, but the remaining six had to go. Some of the condemned structures were not in the village, a fact which indicates that by March, 1860, the former town had been almost completely obliterated, at least within the boundaries of the military reservation." (Hussey 1957:219-220)

In March, 1860, the army removed the Hudson's Bay Company fences, burned a house used for hay storage, burned the house of William R. Kaulehelehe, better known as Kanaka Billy, who lived in the village from at least 1846, and may have destroyed a few other structures as well. "Johnson House" was moved, but the "Field House" remained standing and, for some time, was occupied by Mrs. Stubbs. Hussey concluded: "Thus,

with these exceptions, all traces of the village within the boundaries of the military reservation had disappeared by the end of 1860" (Hussey 1957:220).

The demographics of the population at Kanaka Village between 1827 and 1843 have been reconstructed by Ron Towner (1984). The adult male population of the Kanaka village was variable, perhaps a reflection of incomplete records but maybe also a function of the coming and going of men in their jobs for the Hudson's Bay Company (Exhibit 4-16). During this period the French-Canadians dropped from a high of 117 in 1827-28 to 44 in 1843, while the Hawaiians increased from 18 in 1827-28 to 78 in 1843. Other residents included Anglo-Saxons (a low of 6 in 1830-31 to a high of 28 in 1843), Iroquois (a high of 14 in 1827-28), and Indians of other Tribes (a high of 25 in 1843).

Exhibit 4-16. Ethnic Origin of Adult Males at Kanaka Village by Year

	June 1827–June 1828		1830–1831		1837		1838–1839		1842		1843	
Ethnic Origin	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
Hawaiian	18	10	14	14	32	32	35	34	77	38	78	41
French-Canadian	117	61	53	53	30	30	29	28	54	27	44	23
Indians Other Than Iroquois	17	9	3	3	4	4	5	4	25	12	25	13
Iroquois	14	7	4	4	4	4	4	4	5	3	7	3
Anglo-Saxon	10	5	6	6	24	24	22	22	27	13	28	15
Unknown	15	8	20	20	5	5	7	7	16	7	9	5
Totals	**191**	**100**	**100**	**100**	**99**	**100**	**103**	**100**	**204**	**100**	**191**	**100**

Source: Towner (1984:Table B-1).

Based primarily on the Hudson's Bay Company employment records and names bespeaking ethnic identity, Towner's study found that between 1827 and 1837 the primary occupations of the residents related to water transportation: seaman, middleman, boute, and boatswain. The employments confirmed that the fort was a primary port for incoming manufactured goods and furs, as well as for shipment of trade items east via the Columbia River. By the later 1830s the population of the village was increasingly dominated by Hawaiians and Anglo-Saxons and occupational callings shifted more to the mercantile trade: blacksmith, carpenter, storekeeper, and schoolmaster (Towner 1984:793-794).

The demography of Kanaka Village confirms two primary features: ethnic diversity, and employments that shifted from transportation to mercantile activity. When adding in the spouses and children connected to this adult male population, the Kanaka Village was a sizable, indeed vital community and integral to the operations of Fort Vancouver.

In addition to John A. Hussey's pioneering study, several more recent studies have addressed the development of the Hudson's Bay Company's Fort Vancouver. Important among these are the two-volume *Cultural Landscape Report, Fort Vancouver National Historic Site* (Taylor 1992; Erigero 1992a), and *Historic Overview and Evaluation of Significant Resources of Fort Vancouver, Vancouver Barracks, Providence Academy, Kaiser Shipyards (*Erigero 1992b). The sacramental work at St. Joseph's Mission, Fort

Vancouver, is documented in *Catholic Church Records of the Pacific Northwest: Vancouver, Volumes I & II and Stellamaris Mission* (Munnick and Warner 1972). "St. James Mission, Cathedral and Church: A History of St. James Parish and the Diocese of the 'Square Noses'" (Ransom 1974:391-415) and "The First Cathedral: An Account from an Obscure French Book Written in 1863 by Abbe Rossi" (Hussey 1974:416-420) provide a narrative history of the early development of Catholic labors at Vancouver.

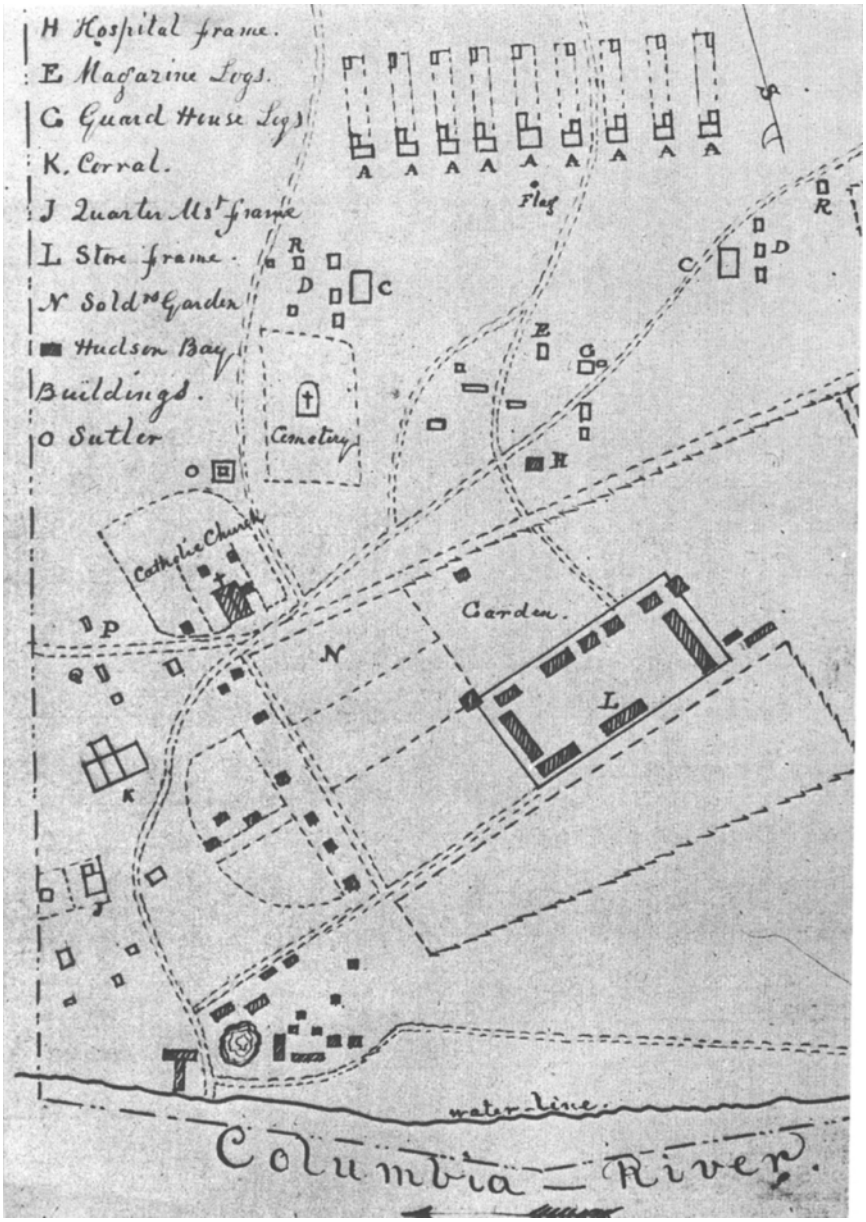
4.8.4 U.S. Army's Fort Vancouver

The Mounted Riflemen, U. S. Army, arrived in Oregon Territory in the fall of 1849. The expedition traveled the Oregon Trail to establish a series of posts to protect emigrants and Indians, respectively, and to assert the presence of the federal government in the American West. Following initial examination of prospects for a western base, Army commanders selected a site immediately adjacent to the Hudson's Bay Company's Fort Vancouver. The site was well chosen at the crossroads of east/west travel through the Columbia Gorge to the estuary and north/south from the Willamette Valley to Puget Sound. The decision, however, was fraught with controversy over competing land claims to the site. The combatants included the Hudson's Bay Company, U.S. Army, Catholic Church, and claimants to lands under the Donation Land Act (1850).

Joseph K. F. Mansfield in 1853-54 mounted a reconnaissance of the U.S. Army posts in the American West. He visited Fort Vancouver, made a map of the post (Exhibit 4-17), and noted:

> *Fort Vancouver* is a beautiful site on the north bank of the Columbia River, in latitude 45^{o} 36' 56" and longitude 122^{o} 4', six miles above the mouth of the Willamette and one hundred miles above the mouth of the river, on a reservation of 640 acres, which lays over land claimed, and in part occupied by the Hudson Bay Company, in full view of Mounts Hood and Jefferson… This post is essential and important for a depot for the supply of posts in this quarter up [the] Columbia River and in parts of Washington Territory, but it would have been better located below the mouth of the Willamette, if a suitable site had been found… (Frazer 1963:114-115)

Exhibit 4-17. Mansfield' s Plat of Fort Vancouver Military Post (Frazer 1963)



The U.S. Army has occupied Fort Vancouver from 1849 to the present. The development of the post has had no documented impacts on the future site of the Columbia River Crossing except, in the 1850s, removal or relocation of structures in the Hudson's Bay Company's servants' village west of the fort. The Army, in time, destroyed all structures in the village, razed St. Joseph's Catholic Church, and eventually obliterated the fencing and markers in the cemetery that served the residents of Fort Vancouver and the "village." Detailed and highly useful assessments of the U.S. Army presence at Fort during U.S. Army tenure have been written by Donna L. Sinclair (2005a, 2005b, 2005c).

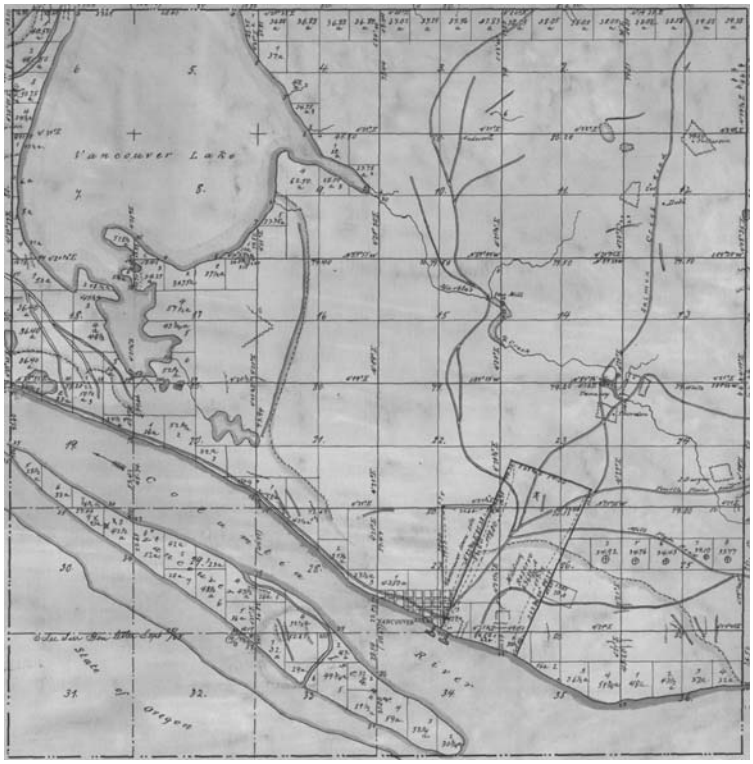
4.8.5 Cadastral Survey Documentation

The Columbia River Crossing project site is located in Township 1 North, Range 1 East, Willamette Meridian. The southwestern corner of the township is located in Oregon; the northern four-fifths of the township is located in Washington. The township's initial survey records are thus split between the two states. All of Hayden Island, identified in the mid-1800s as "Menzies Island" or "Vancouver Island," is south of the primary channel of the Columbia River and lies in Oregon. The following subsections summarize various surveys that also provide a sense of the historic landscape.

4.8.5.1 Washington Shore

In 1860 Lewis Van Vleet, contract surveyor for the General Land Office, recorded a detailed description of lands along the Columbia River at Vancouver, Washington. Van Vleet was engaged in the subdivision of the township in Washington. By that date the riverbank was already well-developed. Vancouver, an emerging townsite, adjoined the western boundary of the former Hudson's Bay Company post and the U.S. Army's Fort Vancouver (Exhibit 4-18). Van Vleet's field notes create a picture of the lay of the land.

Exhibit 4-18. Portion of Cadastral Survey Plat with Subdivisions along the Columbia River in Washington, 1861 (Van Vleet 1860b)



North on a line between Sections 26 & 27 Var. 21o, 30' E.

1.70 Fence bears E. & W. and enter H[udson's] B[ay] field

6.80 Fence bears E. & W. And leave field

8.50 H[udson's] B[ay] Fort, bears N 85o E.

11.30 The Governor of H[udson's] B[ay] Company's house bears East 30 lks. Dist.

12.50 Leave H[udson's] B[ay] Fort bears N. 85o E.

This Fort is about 1000 chains long the Section line passes through it 3.50 chains from the East end

17.50 Fence bears N. 5o W. And enter H. B. Field

20.00 Fence bears N. 85o E. And leave H. B. Field

20.50 Road bears N. 85o E.

21.05 Fence bears E. & W.

23.35 The old Government Hospital bears East 5 lks. dist.

24.35 Fence bears E. & W. And leave yard

25.40 Fence bears E. & W. And enter Garrison grounds.

40.00 Set post for 2/4 section corner from which A white Oak 8 in. Dia. Bears S 67o W 30 lks dist A Fir 40 in dia b ears S. 37o E 125 lks. dist

42.50 Fence bears S 70o E. & Dr. Barns' house and office bears East 30 lks. dist.

44.80 Fence bears S 70o E. And leave the Garrison Grounds.

46.50 A Fir 30 in. dia.

52.00 Road bears N.E.

52.50 Enter timber bears E. & W.

80.00 Set post for corner to Sections 22, 23, 26 & 27 from which

A Fir 18 in. dia. Bears N. 43o W. 67 lks. dist.

A Fir 12 in. dia bears N 47o E. 80 lks. dist.

A Maple 4 in. dia bears S 15o E. 13 lks. dist.

A Maple 8 in. dia. Bears S. 32o W. 276 lks. dist.

Timber, Fir. Undergrowth Hazel & v. maple. (Van Vleet 1860a:84-85)

In this mile-long transit Van Vleet viewed to the east (on his right) several improvements of the Hudson's Bay Company: a field, fence, the Chief Factor's house, and the fort stockade. North of that he encountered part of the U.S. Army's Fort Vancouver: an old hospital, the garrison grounds (possibly the parade ground), and the house and office of Dr. Barns. As he continued north on this transit, Van Vleet entered the forest, a mix of fir and maple with an undergrowth of hazel and vine maple.

Van Vleet next wrote about his survey that ran west at about twelve blocks north of the Columbia River in Vancouver:

> West on a true line between Sections 22 & 27 Var. 20°, 30' E.
>
> 2.30 A Fir 80 in. dia.
>
> 12.75 Road bears N. & S. And [William G.] Langfords house bears North 200 chs. dist.
>
> 36.25 Main street bears N. & S.
>
> 39.76 A Fir 18 in. dia.
>
> 40.00 Set post for 2/4 Section corner from which
>
> A Fir 30 in. Dia. Bears N. 10 W. 116 lks. Dist.
>
> A Dogwood 10 in dia. Bears S. 43o E 44 lks. Dist
>
> 62.50 A Fir 60 in. dia.
>
> 80.00 Set a post for corner to Sections 21, 22, 27 & 28 from which A Fir 30 in. Dia. Bears S. 64o E 105 lks. dist.…
>
> Land level. Soil 2nd rate. Timber, Fir, Undergrowth, Hazel, Vine Maple and Willow. (Van Vleet 1860a:84-85)

In running this westward line across the northern margin of Section 22, Van Vleet crossed Main Street. He found the land level and lightly timbered. William G. Langford, age 29, was an attorney in practice in Vancouver (Bureau of the Census 1860).

Van Vleet ran the line south between sections 27 and 28, a route almost through the middle of the Amos and Esther Short donation land claim, and wrote:

> South on a true line bet. Secs. 27 & 28 Var. 21o E.
>
> 3.00 Trail bears E. & W.
>
> 7.37 A Fir 80 in. dia.
>
> 30.24 A Fir 20 in.
>
> 40.00 Set post for 1/4 sec. Cor. From which

A fir 30 in. dia. bears N. 30o W. 92 lks. dist.

A fir 20 in. dia. bears N. 37o E. 97 lks. dist.

54.75 Road bears E. & W.

57.47 Intersect the right bank of the Columbia River and set a post for meander corner to fractional sections 27 & 28 from which…

Land rolling. Soil 2nd rate. Timber, Fir. Undergrowth, Hazel & Willow. (Van Vleet 1860a:111)

Van Vleet also wrote an assessment of the entire township, most of it lying north of the Columbia River. His account is probably the first "word picture" of the setting of present Vancouver, Washington:

General Description

The land in the Township is much above the common average, the uplands are good 2nd rate, timbered with Fir, Cedar, Hemlock, Ash, and Maple, the Columbia bottom is prairie with a deep rich and warm soil, and subject to annual inundations in the moths of June and July. The land in this Township is nearly all claimed by donation claimants, and several preemption claims are now being taken.

The city of Vancouver is situated in section 27 and is a large flourishing & prosperous, commercial town. The United States Military Reservation at Fort Vancouver is situated in Sections 22, 23, 26, 27, 34 & 35. The St. James Catholic Mission claim is in Sections 22, 26, 27, 34 & 35. The claim of the Widow and heirs of Amos W. Short is located in Sections 21, 22, 27 & 28; the claim of the widow and heirs of F. Bier is located in Secs. 21. 22 & 27; the claim of the widow and heirs of Andrew Bolen in Secs. 15, 16, 21 and 22; the Vancouver townsite in Secs. 22 & 27. (Van Vleet 1860a)

4.8.5.2 Oregon Shore

In 1853 E. Kingsbury, a contract surveyor, began work in the Oregon portion of Township 1 North, Range 1 East, Willamette Meridian. The lands he subdivided included the north shore, a channel of the Columbia River, and Hayden (Vancouver) Island. The line he ran north between Sections 33 and 34 lay west about one-quarter mile from the present route of Interstate 5. Kingsbury wrote:

North Between Secs. 33 & 34

2.90 Intersect Columbia river & Set Meander post from which

an Ash 30 in[ches] dia[meter] bears S[outh] 51 ½ W[est] 36 l[in]ks
a dead Bol[?] level 40 chains S[outh] 55 ½ E 323 ch[ain]s

> Land rich alluvial bottoms under cultivation. (Kingsbury 1853:238)

Kingsbury meandered lakes in Sections 31 and 32 as well as the shore of the channel along the slough between the mainland and Hayden Island. At the time of his survey–1853–he noted the presence of settlers in the area:

> Section 33: "Mr. Force's field"
>
> Section 32: "Alexander Brown's house"
>
> (Kingsbury 1853:234)

Kingsbury created a brief verbal assessment at the completion of his work:

> Most of this township lying north of the Columbia river & an island in the river is claimed by the Hudson Bay Co[mpany] & consequently was left unsurveyed. All south of the Columbia river is rich bottom land subject to inundation, except a narrow ridge along the river, there is a little low prairie arround the lakes, along the river is timbered with Balm gilead Ash willow &c. with a thick undergrowth of brears seeds vines willows &c. (Kingsbury 1853:236)

In 1860 E. Fitzhenry surveyed Hayden (Vancouver) Island. The island lay wholly in Oregon and included land in seven sections. Fitzhenry ran the section lines on the island and then mounted a meander survey. As of February, 1860, Fitzhenry noted only one settler–W. L. Stabler in Section 19. He commented on the island's level terrain, prairies, first-rate soil, and vegetation–a mix of cottonwoods, ash, willow, and briars (Fitzhenry 1860:502-508).

Gay and Mary Jane Hayden settled on Vancouver Island in 1851. Born in 1819 in Oneida County, New York, Hayden married his wife, Mary Jane, in 1846, in Jefferson County, Wisconsin. They arrived in Oregon in the fall of 1850 and settled their claim, then in Clackamas County, in November, 1851, and remained for five years before relocating to Vancouver Island. The Haydens were the first Euroamerican settlers on the island. They raised cattle and hay, produced eggs and vegetables, and sold cordwood to the soldiers at Fort Vancouver. Annually, however, their farm was flooded by spring freshets. Gay Hayden prospered and, after removing to the Washington shore in October, 1856, became mayor of the town of Vancouver. He died in 1902 and his wife died in 1918 (Van Arsdol 1982:54; Genealogical Forum of Portland, Oregon 1957:53).

At the time of the Hayden residency, Vancouver Island was still used and occupied by local Indians. According to Ted Van Orsdal, author of an article on the family: "Indians still lived in the vicinity, and Mrs. Hayden said her nearest neighbors were a camp of the native Americans on the north bank. Other camps were not far away. Hayden Island was a hunting ground for Chief Tamitus, later killed in the 1855-56 war with the whites" (Van Orsdal 1982:60).

4.8.6 Title Contest to the Vancouver Townsite

Under the lure of possible congressional passage in the 1840s of a Donation Land Act, American settlers trespassed on the lands of the Hudson's Bay Company. Amos M. and Esther Short and their family were squatters on the lands immediately west of the fort and the Kanaka Village, the servants' housing. Short was a desperate, driven man. In the spring, 1850, alleging trespass onto his claim, he murdered two men: Dr. D. Gardner and a Hawaiian. When examined by a grand jury, Short was acquitted, yet he was a blatant trespasser whose land claim conflicted with those of the Hudson's Bay Company, U.S. Army's military reservation, and the Catholic mission at Fort Vancouver. In 1853 the U.S. Army resolved part of the conflict when it reduced the military reservation to one square mile; the Short claim lay west of the Army's claim (Bancroft 1888:90).

Short drowned in January, 1853, on the wreck of the *Vandalia* on the bar of the Columbia. His wife, Esther Short, and his children, however, continued to assert rights to land at Vancouver. Neither of the Shorts had filed timely notification of their land claim under the Donation Land Act of 1850, the law that permitted application for 640 acres for those (such as the Shorts) who had settled their claim prior to enactment of the statute. In May, 1853, the conflict took on new dimension when archbishop Francis N. Blanchet filed a claim of 640 acres for the St. James mission at Vancouver. Esther Short, the widow, belatedly filed her donation claim in October (Bancroft 1888:278-279).

The legal contest for the townsite of Vancouver persisted for years. Part of the complication was the long deferral of resolution of the claims of the Hudson's Bay Company, finally authorized for a settlement during the Civil War by the Hudson's Bay Company Claims Commission. Resolution and token payment to the British company finally occurred in 1869. In 1874 and 1875 Congress considered private land claims bills on behalf of the St. James Mission. That latter was ultimately resolved in November, 1874, when the General Land Office issued a deed to Abel G. Tripp, mayor of Vancouver, "for the several use and benefit of the inhabitants according to their respective interests." The Catholic Church gained but a minuscule property (Bancroft 1888:280-281).

The complicated legal wrangles in the contest for ownership of the lands on the north bank of the Columbia River were explored in the essay "Land Claims" in *Clarke County—Washington Territory—1885* (Alley and Munro-Fraser 1885:97-109). The contest eventually included multiple claimants or their heirs, further complicated by the international dimension of the Hudson's Bay Company claim (confirmed in the Oregon Treaty of 1846), the U.S. Army's military reservation, and the Catholic Church mission claim.

4.8.7 Development of the Vancouver Waterfront

The north bank of the Columbia River underwent rapid development starting in 1850. Prior to settlement of the Short family, the site of Vancouver was variously claimed by a man named Ermatinger, a Hudson's Bay Company employee; Job McNamee who arrived in 1845; and Henry Willliamson, an emigrant of 1845 who recorded his claim and built a cabin (occupied in 1848 by the Wilson family). Williamson, in 1846, paid his recording

fee to the land, put the property under control of his friend Alderman, and returned home to Indiana to marry, only to discover that his would-be wife had died. When he returned in 1847, he found that Amos and Esther Short had "jumped" his claim. Williamson then entered a partnership with William Fellowes and built a cabin at the foot of C Street. Williamson and Fellowes hired Peter Crawford, pioneer settler at Kelso, to survey a townsite in May-June, 1848 (Alley and Munro-Fraser 1885:112).

The Williamson-Fellowes town survey included lands within the future Columbia River Crossing:

> The initial point from which this survey commenced was at the Balm of Gilead [cottonwood] tree that stands at the foot of Main street, where the present city line and that of the Government reservation converge. The tree then was only from fourteen to eighteen inches in diameter. A line was run northward to the rear of 'Kanaka town,' as the eastern boundary of the claim of Henry Williamson, and this being determined as a base, lines parallel and at right angles to it were defined, and blocks two hundred feet square with lots fifty by one hundred feet in dimensions laid out. The area surveyed had for its northern boundary the present Eighth street, with the western ends of the streets running from the claim line terminating at the Columbia river. This tract would about equal one-half of the present occupied portion of West Vancouver. The name of Vancouver City was given to the site, and the plat, which showed five hundred lots in all, although a considerable portion of these was unsurveyed, as well as the field-notes, were duly recorded in the office of the Recorder [Theophilus] McGruder, Oregon City, by Henry Williamson (Alley and Munro-Fraser 1885:112).

The California gold rush consumed the commitments of Williamson and Fellowes. Both departed in 1849 for the diggings in the Sierra foothills and did not return (Alley and Munro-Fraser 1885:112-113).

The donation land claim of Amos and Esther Short in Section 27, Township 1 North, Range 1 West, W.M., overlapped both the U. S. Army military reservation and the St. James Mission claim of the Catholic Church. With the departure of Williamson and Fellowes, Short hired Israel Mitchell to survey a townsite. According to Alley and Munro-Fraser:

> This he did, without disturbing the lines or stakes placed by Mr. [Peter] Crawford, who indeed was engaged to draw the plat, and instructed to leave the numbering of the lots and blocks identical to those on the drawing made by him for Williamson. The second map, however, was never recorded, for the Donation law coming into force forbade the location of claims upon a town site, and therefore all maps were cancelled. To this site was given the name of Columbia City(Alley and Munro-Fraser 1885:113).

Esther Short and her children ultimately prevailed in their title claim to the lands immediately west of the U.S. Army's Fort Vancouver. The genesis of the community was in the village or "Kanaka town" associated with the Hudson's Bay Company post. Alley and Munro-Fraser stated in 1885: "It comprised about thirty houses in all occupied by French-Canadians, Kanakas, and half-breeds, nearly all of them married to Indian women, and the whole in the service of the Company. The precise location of this village was within the Reserve line and east of Batemen street (Alley and Munro-Fraser 1885:111).

At the time of pioneer settlement in the late 1840s, the north bank of the Columbia River was an extensive forest. In their history of Clarke County, Alley and Munro-Fraser (1885:111) noted: "When the first American settlers arrived at Vancouver, where now stands the city was covered with a great forest and dense undergrowth. There was nothing but this timber-clad expanse to the west of what is now Main street."

Settlers constructed several structures to the west of the village or "Kanaka Village" by the early 1850s. Among these were (1) the claim cabin of Henry Williamson; (2) the claim cabin of Amos and Esther Short; (3) the dwelling of George Aiken, a blacksmith; (4) the dwelling of Norman Martin, a carpenter; (5) the dwelling of George Johnston, a cooper; (6) the dwelling of James Johnston, a pilot and master of *the Prince of Wales* [Hudson's Bay Company vessel]; and (7) the dwelling of McPhail, a shepherd (Alley and Munro-Fraser 1885:111-112).

The claim cabins of Williamson and Fellowes and Amos and Esther Short were joined in subsequent years by the burgeoning development of Vancouver along the north bank of the Columbia River. Alley and Munro-Fraser wrote:

> In 1854, however, the first house on Main street was erected, and on the Fourth of July opened as a saloon and a ten-pin alley by Pete Fergusson. The building still stands [in 1885] at the corner of Main and Second streets. At the same time the older portion of the Pacific House was built by Mrs. Esther Short, on the opposite corner, and opened with a grand ball on the same auspicious anniversary, although the building had not been completed. That summer, however, a number of houses were erected, among them being one on the site now occupied by T. W. Padden, which was opened as a store by Mr. Hexter; and another, on the grounds where Mrs. Wise lives, and opened by Sam Marsh, as a saloon. The two storied white house on Main street, directly opposite the Alta House, was constructed in this year by Pat. A'Hern, and is, as it looks, an ancient land-mark. Indeed, the eastern side of Main street thenceforward was quickly occupied by houses, while the population kept on increasing and the brush and 'downed' timber disappeared as the lots were utilized (Alley and Munro-Fraser 1885:113).

Vancouver's development was a function of the adjoining U.S. Army base. Saloons, gambling dens, and house of prostitution were part of the river-front community developing as the seat of government of Clark County. George Gibbs found the situation problematic. In January, 1855, he wrote to Governor Isaac I. Stevens about conditions in

Vancouver: "The rum holes at this place are a great curse but as they are licensed, the military authorities cannot break them up. This state of things shows the mischief of restricting military reserves to small tracts of ground" (Gibbs 1855c).

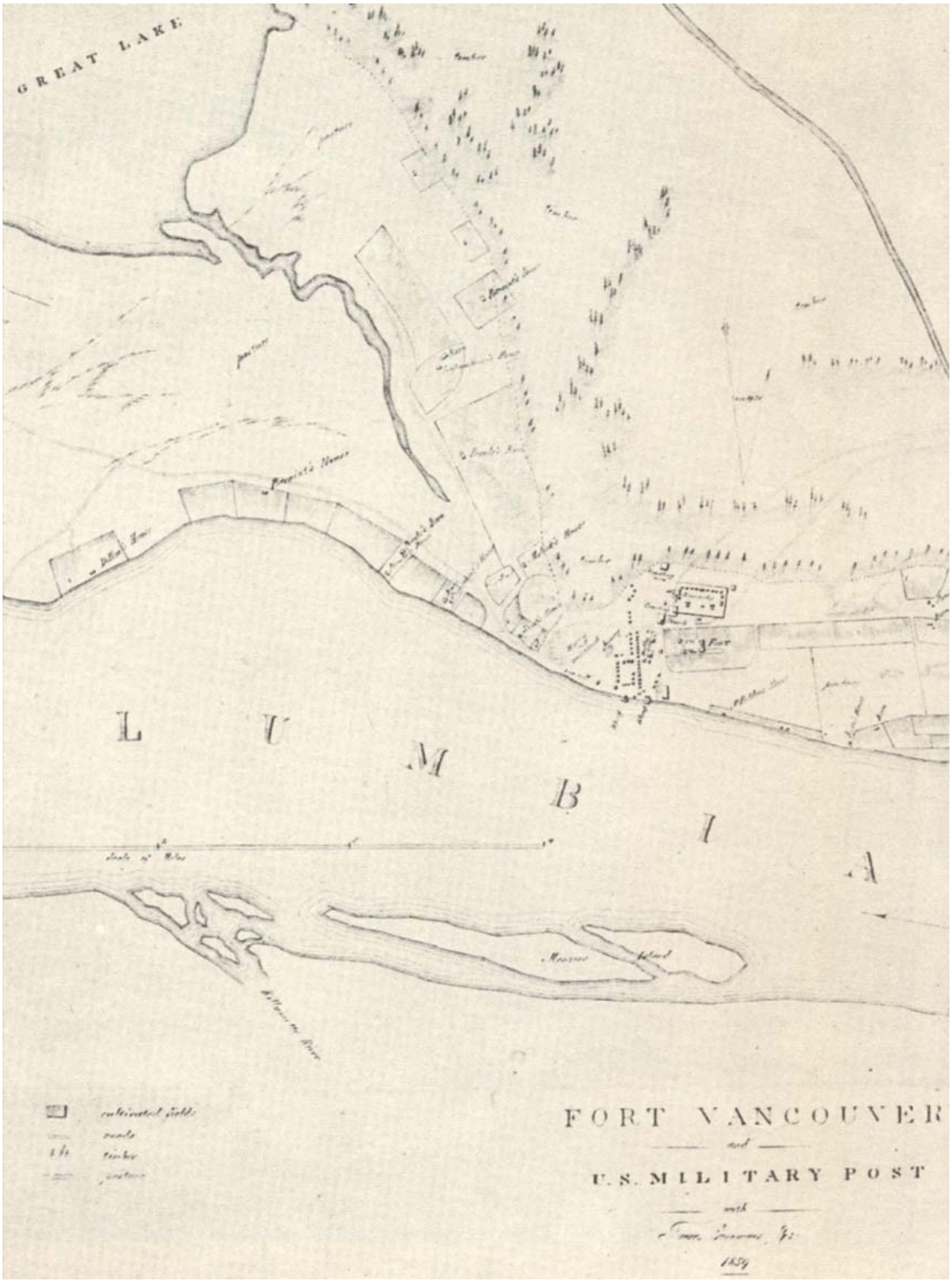
The potentials of the site as a port-of-call were highly important. The waterfront emerged as a landing:

> As early as 1852-53 steamboats were wont to touch at Vancouver and among the first of these were the *Multnomah*, Capt. Hoyt, which called twice a week for the mail on her passage from Astoria; and the *Fashion* and *Belle*, that ran between Portland and the Cascades. In 1854 the *Eagle*, an little iron propeller that had been brought out on the deck of a ship round Cape Horn, was placed on the route between Portland and Vancouver, under command of Captain Woods… (Alley and Munro-Fraser 1885:113).

In 1855 Barker & Stevens moored a wharf-boat on the Vancouver waterfront at the south end of Main Street. Hart & Camp moored another at the foot of B Street. These boats served as docks for import and export of commodities. They were also social places: "These floating wharves were large and flat, entirely surrounded with a wide gunwale to which were attached proper conveniences by which vessels could be tied, while at either end was a saloon and store with a twelve-foot wide passage between." Vancouver became a regular port-of-call for sternwheelers on the Columbia and Willamette rivers. In 1855 the Eagle made daily trips between Vancouver and Portland, succeeded in 1858 by the *Vancouver*, a side-wheeler of eighty-four feet By 1856 investors constructed permanent wharves (Alley and Munro-Fraser 885:113; (Mills 1947:171).

In 1859 R. Covington drew a detailed image of the north of the Columbia River entitled "Map of Fort Vancouver and U.S. Military Post with Town, Environs, Etc." (Exhibit 4-19). The map showed approximately thirty structures standing in the Kanaka Village, the Hudson's Bay Company stockade, U.S. Army post and parade grounds, the HBC cemetery, and features to the west of the military reservation including: (1) an unidentified structure in a fenced field; (2) Esther Short's house in an fenced field; (3) an unidentified structure in a fenced field; (4) Abigail Malick's house in a fenced field; (5) two fenced fields near the river; and Chalifoux's house and barn in a fenced field (Covington 1859).

Exhibit 4-19. Portion of "Map of Fort Vancouver and U.S. Military Post with Town, Environs, Etc., 1859" (Covington 1859, from Hussey 1957:Pl. XXVII)



The citizens of Vancouver incorporated the town on January 23, 1857, again on January 29, 1868, and again on October 27, 1881. The town's waterfront drew a variety of investors in the latter half of the nineteenth century:

> The Lucia mills erected on the river bank in the lower edge of the town, are owned by Eugene Semple [in 1885]. They are constructed on the most approved modern principles and have a daily capacity of 20,000 feet of lumber, 20,000 laths and 20,000 shingles. The building is of good proportions and has more than the usual amount of outside finish… (Alley and Munro-Fraser 1885:118-119)

The early history of Vancouver is variously documented and assessed. Important accounts include B. F. Alley and J. P. Munro-Fraser's (1885), *Clarke County—Washington Territory—1885*, and Donna L. Sinclair's thesis, *Contested Visions of Place: People, Power, and Perceptions on the Columbia's North Shore, 1805-1913* (Sinclair 2004). Additional important articles have appeared in numerous issues of *Clark County History,* a publication of the local historical society;

A little known volume, *Far From Home* (Schlissel et al. 1989) provides fascinating insight in the tribulations of a family residing at Vancouver in the mid-nineteenth century. George and Abigail Malick settled in 1848 on the donation land claim adjoining that of the Short family on the west. For seventeen years Abigail wrote letters to a daughter in Illinois. Deaths, insanity, and disappearances dogged the family and, in time, Abigail survived alone on the claim. The letters document both tragedies and everyday life. For example, in 1852, Abigail noted:

> Well We had Rosted Ducks… And Fat Chickens and Rosted pig and Sausages And green Apl pie And Mince pies and Custard pies And Cakes of difrent kindes [and] Inglish goosburyes And Plums Blue And green gages' And Siberian crab Apples And oregon Apples… Likewise Buter And Sturson pikles and Beet pickles And Sauce And Bread and Mashed potatoes and Oister pie And Coffee And Tea to be shore. Now I Must tel you What other preserves that I have. I have peaches And citrons And Sweet Aples, Crab Aples Jelley And Tomatoes And Mince And pairs and Aple Butter. And now I will Tel you of the Rest of my Winter Suplies. I have A plentey of Butter And Milk And a Thousands poundes of Salmon And plentey Cabage And Turnips And A Bout A Hundred and Fiftey Bushel of potatoes And plenty of dried fruits–Aples and Black Buryes the Best that I evr saw. (Schlissel et al. 1989:21)

The Malick letters discuss the impact of the Army post on the community and the diverse population that lived at Vancouver in the nineteenth century. In 1852 Abigail Malick noted: "We have Indians to work for us. Both women and men. There is two here now A beging for work. We have them A Diging potatoes." The Malicks logged their claim and sold cordwood to power steamboats on the rivers (Schlissel et al. 1989:27, 36).

4.8.8 Railroad Connections

In 1888 investors constructed the Portland and Vancouver Railroad north from Portland. The line led from the Stark Street landing on the east bank of the Willamette River north to Hayden landing on the south bank of the Columbia River. It connected with the steamboat *Vancouver* for ferry service to the Washington shore. This service significantly diminished steamboat connections between Portland and Vancouver by providing more efficient passenger service (Mills 1947:172). Edwin D. Culp wrote:

> A quarter would take a traveler for two ferry rides and a train trip–one of the best travel bargains of the day. Purchasing a ticket at the foot of Stark Street, one boarded the old Stark Street Ferry on the west side of Portland's Willamette River. Arriving in East Portland, the excursionist climbed aboard the two-car P & V train that was pulled by a wood-burner (this motor car was nothing more than a steam engine disguised to look like a passenger car). 'The Dummy,' as this curiously designed locomotive was dubbed, traveled east to Union Avenue, proceeding north on Union… In those days, the last decade of the nineteenth century, the entire area north of Hayden Island was under water. Nearly half the river was crossed by a long trestle, at the end of which was Hayden Landing. The journey was completed by ferry Vancouver.(Culp 1972:179)

For a time in the late nineteenth century, three street car lines served downtown Vancouver (Freece 1985). In 1889 the Columbia Land & Improvement Company built a line from the ferry landing via Main Street to the north, west, and east boundaries of the city. By May its construction crews completed a route to Vancouver Barracks and were at work on another to Vancouver Heights north of the business district. Service commenced in June with the arrival of two cars from the Pullman Company in Pullman, Illinois. In 1890 the Pacific Street Railway & Real Estate Company (later the Vancouver Railway Company) obtained a franchise to build a second street railroad. This line ran from the ferry landing up Main to Fifth then west to the site of a proposed station. Construction commenced in 1891, but stopped when agreements were made with the Union Pacific Railroad. This street car line was abandoned before completion. In 1892 the Columbia Land & Improvement Company secured a franchise for an electric railway in Vancouver. The system began operation in August and ran three cars, but it suspended service in 1895. Dismantling of the line commenced in 1897 (Labbe 1980:77-78).

The Spokane, Portland & Seattle Railway Company was founded by James J. Hill of Saint Paul, Minnesota. In 1905, it entered spirited competition against the investments of Edward H. Harriman in the Pacific Northwest. Hill proposed a line down the north bank of the Columbia River to cross the Columbia River at Vancouver and then connect via the Oregon shore with terminal facilities in Astoria, through purchase in 1908 of the Dalles, Portland and Astoria Navigation Company. The project included four viaducts east of Pasco and major bridges spanning the Columbia at Hayden Island (6,468 feet), Oregon Slough, and the Willamette River (1,769 feet). The bridge at Vancouver replaced the railroad ferry that, since 1883, carried cars from Goble, Oregon, to Kalama, Washington (Wood and Wood 1974:25-32).

The Spokane, Portland & Seattle Railway Company, subsequently the Burlington Northern after 1970, built a line along the Vancouver waterfront in 1907-08. Its construction along the north bank of the Columbia River through the Gorge proved challenging and costly, with twenty-two tunnels and complicated engineering. The line's timetable in February, 1908, announced connections via 221 miles of track from Spokane to Vancouver (Robertson 1995:282-283). The facilities at Vancouver included a double-track atop a levee along the city's waterfront, a railroad yard and shops, and depot (Gaertner 1990:48; Wood and Wood 1974:51).

4.8.9 Development of Hayden Island

Hayden Island underwent transformation in the second and third decades of the twentieth century from wetlands and agricultural use to transportation corridor and amusement park. During the latter half of the century the island became a multiple use site for residences, boat moorage, shopping center complex, tourist service destination, and transportation corridor. Construction of the Spokane, Portland and Seattle Railroad sparked the island's transformation. *The Columbian* (Vancouver, WA) noted in December, 1910:

> The purchase of Hayden Island for the purpose of utilizing the miles of waterfront on both sides of the island for factory sites is of the utmost importance to Vancouver. Some if not all of the employees that will be in the industrial plants to be located on the south side of the Columbia should make their homes in this city.
>
> The number will depend to a considerable extent upon the inducement that Vancouver offers, particularly in the matter of transportation across the river. If they can reach homes in this city more quickly than in Portland, and residence property here can be secured at less cost than across the river, the factory hands will naturally come here (Van Orsdal 1982:73-75).

The Hayden Island Development Company headed by L. Y. Keady of Portland began promotion of the island and its potentials. Keady touted the island's location with five miles of harbor frontage for docks and warehouses as well as street railway connections south to Portland. He called the site "Columbia Harbor" (Van Orsdal 1982:75).

As automobile traveling increased, and the Columbia River ferry crossing became severely strained by the increased need to move commerce between Vancouver and Washington, awareness about the need for an interstate bridge increased during the early part of the second decade of the 20th century. Clark County held a special election in June 1913 in which its citizens voted to bond the county to its limits for such a bridge. The contract for the bridge was awarded on February 27, 1915, and construction commenced that same afternoon. The bridge was completed and opened in 1917, providing the initial unit of the current Interstate Bridge. The bridge was considered an engineering feat, and it significantly expanded north-south transportation connectivity; not only serving the immediate communities of Vancouver and Portland, but also the west coast. It spanned Oregon Slough to reach Hayden Island and then crossed the main Columbia River to Vancouver. The highway drew tens of thousands and travelers (Van

Orsdal 1982:75). In 1927 the Hayden Island Amusement Company purchased forty acres on the west side of Highway 99 (now the route of I-5) on Hayden Island from the Portland Electric and Power Company. Within a year the property expanded to 112 acres. William A. Logus and Leo F. Smith, principals in the company, constructed Jantzen Beach Amusement Park on the property. They strategically named the project for Carl C. Jantzen, an investor in the company who gained national stature as manufacturer of trademark "Jantzen swimsuits." Jantzen and John Zehntbauer, avid swimmers, pioneered in 1910 in making elastic stitch fabric for swimwear. The Jantzen Knitting Mills featured Oregon wool and detailed knitting. By the 1920s the company found a world market for its stylish, colored swimming suits (Lockley 1928[3]:843-845; Jantzen Beach SuperCenter 2007).

Jantzen Beach opened in May, 1928, and featured four swimming pools with diving boards and water slides, the Golden Canopy Ballroom for dances, twenty-five acres of picnic grounds, the Big Dipper roller coaster (designed by Carl Phare), a fun-house, and a colossal merry-go-round designed and built by the C. W. Parker Amusement Company of Leavenworth, Kansas. The merry-go-round has seventy-two horses and first operated at Venice, California, from 1921-27, when it was shipped to Jantzen Beach. The Old Dutch Mill and Fun House with its hall of mirrors, animated ghosts and goblins, and air-jets in the floor, burned in 1959. The park operated for forty years. Investors refurbished the merry-go-round in 1972 as part of the Jantzen Beach Shopping Center, and, in 1995, was spent $500,000 its restoration for the new Jantzen Beach SuperCenter (Jantzen Beach SuperCenter 2007).

In the 1940s Vanport, known as Oregon's "Miracle City," emerged southeast of Hayden Island on the south shore of the Columbia River. For a time, it was the state's second largest town when it housed an estimated 40,000 residents. Henry J. Kaiser, desperate to find residences for his workers, purchased 650 acres on the Columbia flood plain. Constructed to meet the needs of workers in the Kaiser yards in Portland and Vancouver, Vanport received its first residents in Demcember, 1942. By August, 1943, the town had 9,942 housing units in 700 apartment buildings, a police station, three fire stations, a hospital, five recreation halls, a theater, ten ice houses, grocery stoes, and six maintenance buildings. In 1946 Vanport College, predecessor of Portland State University, began offering classes to the community's residents (Oregon Historical Society n.d.).

Because of property restrictions based on race, African-Americans found it exceedingly difficult to rent or purchase housing in Portland and Vancouver. Vanport was the answer, a massive public housing project open to all. The Vanport Housing Authority set several restrictions, among them periodic inspections of apartments and a curfew at night for all residents under the age of eighteen. It is estimated that two-fiths of Vanport's residents were African-Americans. The town's population dropped by more than fifty percent with the end of World War II in 1945 and the curtailment of jobs in the three nearby Kaiser shipyards (Skorgaard 2007:88-93).

In spite of assurances from publice officials that the dikes would hold against the floodwaters of the Columbia River, they gave way on Sunday afternoon, May 30, 1948. Within a few hours water surged through a break and destroyed the city; fifteen people

drowned. Many apartment buildings broke free of their foundations, floated for blocks, and collapsed. Mud and then mold filled the structures that remained in place. Vanport was no more (Skorgaard 2007:98-105. The remaining structures were razed and, for many years, the site was open space at Delta Park and Portland Meadows Race Track. Within the past two decades new stronction has come to the area, now protected by the extensive system of dams on the Columbia and Willamette Rivers.

Hayden Island's north/south transportation corridor has undergone extensive development and change since completion of the first unit of the Interstate Bridge in 1917. Jantzen Beach Amusement Park succumbed to changing tastes and real estate priorities in 1970. Developers razed the amusement park to construct Jantzen Beach Shopping Center with flanking motor hotels on the west and east sides of Interstate 5 (successor to Highway 99). Promoted as "the Mall That Has It All," the shopping center catered to residents of Washington by offering retail goods not subject to Washington sales tax. The mall was reconfigured and upgraded in 1995 (Jantzen Beach SuperCenter 2007).

In 1958 the states of Oregon and Washington increased transportation services over Hayden Island with construction of a second I-5 bridge. The road routing destroyed the eastern part of Jantzen Beach Amusement Park, including the swimming pool complex (PdxHistory.com 2007). Investors constructed two large motor hotels on the north shore of the island. Initially known as the Red Lion Thunderbird, these properties then passed to the Doubletree Corporation and were purchased early in the twenty-first century by an investment group headed by Howard Dietrich, husband of Nancy (Bishop) Dieterich, the owner of Oregon Worsted Company, seller of cloth and related products.

4.8.10 Conclusions

Both the north shore of the Columbia River and Hayden Island have been the location of extensive development in the past 200 years. No historical record documents aboriginal residency within the immediate area of the existing I-5 bridge. However, several types of historic era development occurred within or immediately adjacent to the present I-5 transportation corridor.

The Kanaka Village, or servants' village, of the Hudson's Bay Company lay west of the stockade and scattered along the north bank of the Columbia River at least as far as the western margin of the subsequent Military Reservation. The village included roads, houses, and sheds for chickens, cows, or other livestock. The community was ethnically complex and included approximately 100 company employees and their spouses and children. Residents included French-Canadians, Indians from the Pacific Northwest, Hawaiians, Polynesians, and Scotch-Irish and British.

The north bank of the Columbia River immediately upstream from the Interstate Bridge was the location from about 1825 to 1850 of the Hudson's Bay Company wharf and Salmon House. After 1849 the United States Army established its wharf in this same area and off-loaded tons of supplies for the Quartermaster Department. Starting in 1850 the Quartermaster Department established its wharf, offices, and warehouses on the west side of the Fort Vancouver Military Reservation. Extensive manuscript records in

Washington, D.C. document the importation and shipment of supplies to the region's military posts from this regional supply headquarters. The Quartermaster Department appropriated some structures from the Kanaka Village and razed others when it took over the site.

The Vancouver waterfront included a wharf boat, ferry landing, and wharves from the early 1850s. The waterfront later was altered by construction of the railroad levee, highways, streets, and commercial buildings. Immediately to the north, residents of Vancouver constructed both commercial and residential structures with a variety of outbuildings such as privies, sheds, chicken houses, and stables. This setting was bisected by construction of the Spokane, Portland, and Seattle Railroad levee in 1907-1908, Pacific Highway 99 in 1917, and by I-5 in 1952. Transportation developments included cutting a route below grade for the highways, building levees for flood protection and the railroad, and other ground-impacting activities.

Jantzen Beach Amusement Park opened in 1928. For several decades Hayden Island remained a mixed-use setting: travel corridor, amusement park, and rural residential with agricultural activities. After World War II the island underwent intense commercial development with boat moorages, house boats, restaurants, hotels, and, in time, replacement of the amusement park with a shopping center.

Over time, dredging and filling along the north and south shores have drastically altered the banks of the Columbia River. The Interstate Bridge, its first unit completed in 1917 as part of the major West Coast highway corridor (Pacific Highway 99) running from Canada to Mexico, transformed both Hayden Island and Vancouver. Engineers built a second bridge structure, doubling capacity, in 1952 when it began service as I-5. Traffic on the route has mounted with the steady growth of Clark and Multnomah counties and surrounding areas. These intensive investments over the past 160 years in transportation, commercial, and residential facilities have had major impacts on the natural and cultural landscape in the I-5 corridor and vicinity.

4.9 Historical Archaeology

The CRC project area contains an historical archaeological record associated with Euroamerican settlement that is unmatched anywhere else in the Pacific Northwest (Exhibit 4-20). This record begins with archaeological features, deposits, and artifacts from HBC Fort Vancouver established in 1829. Subsurface remains of the extensive multi-cultural settlement of Kanaka Village, where the majority of the HBC employees lived, occur along the southwest side of the fort. In 1849, the U.S. Army established Vancouver Barracks adjacent to the HBC's Fort Vancouver. This post expanded over the years on the north and west sides of the HBC stockade to become one of the most important military installations in the Pacific Northwest during the late nineteenth and early twentieth centuries.

Exhibit 4-20. Lithographic print by Gustavus Sohon, ca. 1854, showing locations of HBC stockade (right center), Kanaka Village houses (right foreground), St. James Mission (center), and Vancouver Barracks (left center) (from Thomas and Hibbs 1984, Figure A-8)

The City of Vancouver emerged beginning in the 1850s and 1860s on the north bank of the Columbia River immediately west of the U.S. Military Reserve. The earliest settlement and development in Vancouver occurred in the area that today is immediately west of I-5. Archaeological remains in the city postdate the HBC occupation at Fort Vancouver and relate to civilian settlement and development coterminous with the U.S. Army occupation at Vancouver Barracks. Although much less intensively investigated in comparison with the area east of I-5, the few studies conducted thus far have shown that historical archaeological investigations in the older portions of the city have great potential for shedding light on the development over time of the urban environment in Vancouver.

4.9.1 Hudson's Bay Company Fort Vancouver

Fort Vancouver was designated a National Memorial in 1948, a National Historic Site in 1961, and was placed on the National Register of Historic Places in 1966. Under the sponsorship of the National Park Service, archaeological investigations have been conducted in and around the former location of the fort's stockade over more or less the last six decades. A synthesis of this work has never been written, but a summary of fieldwork undertaken through 1991 is available in a useful draft document prepared by Thomas (1992).

The HBC stockade walls and the foundations of some buildings within the stockade were located by archaeological excavations undertaken between 1947 and 1952 (Caywood 1947, 1948a, 1948b, 1949, 1955). Additional testing along the north and east walls of the stockade was carried out in 1966 (Combes 1966; Larrabee 1966). Extensive excavations within the walls of the stockade were conducted between 1972 and 1975 (Hoffman and Ross 1972a, 1972b, 1973a, 1973b, 1973c, 1974a, 1974b, 1974c, 1975, 1976; Ross and Carley 1976; Ross et al. 1975; Steele et al. 1975).

Subsequent investigations in and around the stockade have included assessments of the New Office site (Hibbs 1987), Carpenter's Shop (Brauner 1995), and Powder Magazine (Wilson 2002a). Subsurface investigations have also been conducted for utilities (Thomas 1987a; Cromwell 2005); prior to reconstruction of a well (Wilson 2002b), and in the reconstructed HBC Orchard area (Gembala 2003a; Dorset and Wilson 2006).

As noted by Thomas (1992:57), the HBC Fort Vancouver included a number of agricultural, industrial, and domestic structures and features outside the stockade. These structures and features were described by Hussey (1957), and their locations are shown on historic maps. Most of these structures and features have been subject to only limited archaeological testing. Archaeological investigations at the HBC barns, school houses, root cellars, garden and orchard, cooper's shed/shop, and Lower Mill Road were summarized by Thomas (1992:56-63).

4.9.2 HBC (Kanaka) Village

The site of this settlement was determined eligible for inclusion in the National Register of Historic Places in 1981. Most conceptions of the village held by archaeologists who later excavated there were framed by Hussey's (1957:216-220) brief history of the site. A more recent, and more detailed, description of the village is provided by Erigero (1992a).

In 1834 the village was described as containing 30 to 40 "log huts." Although an 1848 account described the village as having between 60 and 75 buildings, historical maps do not show this many structures (see Erigero 1992a:155, Figure 10). Beginning in 1849 some of the better structures were rented by the U.S. Army, but during the 1850s most of the remaining buildings were torn down. With only a few exceptions, "all traces of the village within the boundaries of the military reservation had disappeared by the end of 1860" (Hussey 1957:220).

As early as 1950 Louis Caywood, who was excavating nearby at the HBC stockade, also tested the village area, as he noted that "fragments of [ceramics] were plentiful in the old village area, and a test trench across the old lagoon uncovered sherds as much as three feet below the present surface. Apparently at least two feet of this was fairly recent fill above the old lagoon bottom. Since the excavations in 1950, the lagoon area has been filled and leveled by the Army" (Caywood 1955:51).

4.9.2.1 Dwellings

The first systematic excavations in the Village were undertaken in 1968 and 1969 by Edward Larrabee and Susan Kardas (Larrabee and Kardas 1968; Kardas 1970, 1971). Exploratory excavations in 1968 mostly involved shallow trenches that, based on an

increase in artifacts, located the east side of the village area beginning about 800 meters west of the HBC stockade. Artifacts were found in a layer from about 3 to 6 inches below the surface (Larrabee and Kardas 1968:41). By the 1969 season the excavators were "reasonably sure that evidence of structures would be discernable within 12 inches of the surface" (Kardas 1970:18). The remains of four structures, all interpreted as dwellings or houses, were documented during the two seasons of excavations.

House 1 was a structure that measured roughly 30 feet by 15 feet, from which a total of 962 artifacts were recovered. This structure was represented by

> … a large concentration of artifacts lying above or pressed into a hard-packed surface, 1" to 2" thick, and containing much charcoal and a higher clay content than the surrounding area. This is assumed to have been the floor of the structure. Its outline was discernable on the west and south side, but was broken on the eastern and northern edges. Both the north and south ends were marked by a heap of burnt rocks and fire pits. About 3 feet to the north and extending eastward of the structure was found the stubs of 3 cedar posts, roughly 5 feet apart, set in rock supports. These probably represent the remains of a fence line running along the north side of the house. (Kardas 1971:275-276)

House 2 lay about 90 feet southeast of House 1. The floor area was "greatly distorted," but what was left of the floor measured 10 feet by 7.5 feet. Most of the artifacts came from a gray clay deposit that filled a rectangular depression lined on at least two sides by cedar planks. Based on its small size, this depression was interpreted as a small shed or root cellar. The only structural debris in the fill inside the plank-lined depressions was broken bricks and rocks, probably from a hearth. A total of 4,157 artifacts were recovered from House 2 (Kardas 1970:24-26; 1971:291-293).

House 3 was represented by bricks, rocks, and charred planks lying on a clay floor of a dwelling situated on the far eastern edge of the village (Kardas 1971:301-306). The clay floor became visible about 2 inches below the sod. The packed layer of clay was about 1 to 2 inches thick. Also numerous on the floor were square nails, ceramic sherds, and pipe stem and bowl fragments. Ceramic and glass sherds from the floor cross-mended with those from a wood-lined pit measuring 35 by 35 inches, situated five feet west of this house. According to Kardas, "the lack of debris above the clay floor indicates that this structure was cleared down to the ground" (1970:45). In addition, "heavy charring of the beams and charcoal fragments" indicated that the structure had burned (Kardas 1970:45). The dimensions of this house were not estimated. A total of 2,019 artifacts were recovered from House 3 (Kardas 1970:45; 1971:306-313).

House 4 consisted of ash and charred wood, nails, and numerous artifacts situated from 2 to 6 inches below the surface over a roughly rectangular area of about 6½ by 8 feet. According to Kardas (1970:61):

> At the top of the debris was a fine white ash overlying a coarser reddish ash with remnants of burnt planks and wood shingles. Under this debris, which must have been the roof, was a heavy concentration of artifacts.

> Those in the northern half of the house were almost exclusively ceramic vessels, many of which were restorable. Artifacts in the southern half were primarily metal including a hoe, hatchet, sledge hammer head, gun parts and other tools. Below the ash and artifacts was a thin patchey layer of clay.
>
> At the southeast corner of the house stood a stone hearth. The stones were set above the clay layers and closely fitted together without mortar.

A total of 2,573 artifacts were recovered from House 4 (Kardas 1970:62-64). According to Kardas (1970:62), "the large number of restorable or intact items recovered from this structure suggests that it was still occupied at the time that it burnt down. The undisturbed nature of the debris indicates than no attempt was made to recover anything from the house."

Excavations of additional dwellings at the Village were undertaken between 1974 and 1981 in advance of the reconstruction of the intersection of I-5 and SR 14 (Chance and Chance 1976; Chance et al. 1982; Carley 1982; Thomas and Hibbs 1981, 1984). The reports from these excavations contain information about at least seven different dwellings.

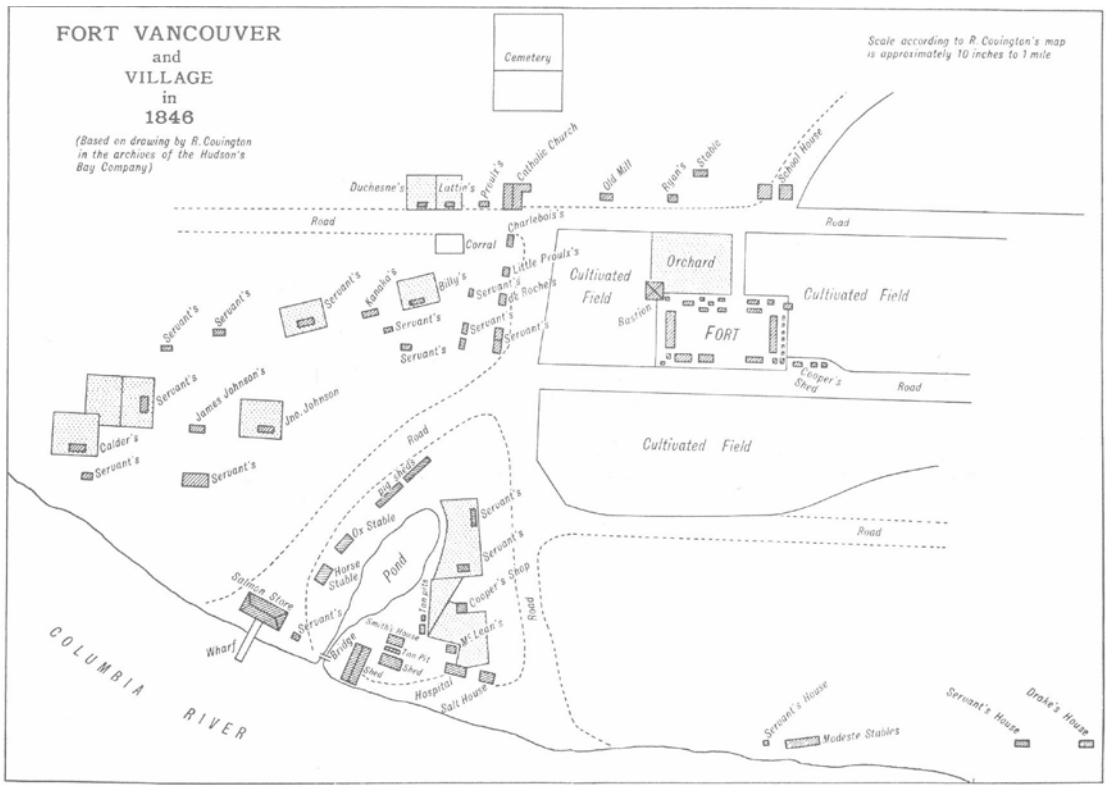
Operation 14 in 1974 involved excavation of a test pit and trench about 100 feet east of the Old Apple Tree. Evidence was found of a late nineteenth century structure, indicated by common cut square nails and window glass; a few items suggested the presence of an earlier HBC structure (Chance and Chance 1976:29-30). Further extensive excavations in Operation 14 in 1981 exposed a dwelling that an examination of historic maps indicates was the home of John Johnson, a cooper at Fort Vancouver. This house was later rented by the U.S. Army in 1849 and was demolished in 1857 (Thomas and Hibbs 1984:111).

The original house was ca. 20 by 13 feet, defined by a compacted silt loam floor and bounded by post features (Thomas and Hibbs 1984:282). The floor conformed to the post hole boundaries except on the north, where it extended ca. 2.5 feet beyond the enclosure. An extra post suggests a door on this side (Thomas and Hibbs 1984:285). A later version of this house, from ca. 1835 to 1846, included a cellar that removed approximately one-third of the original floor, and an 8-ft. addition enclosed by posts constructed on the north side that changed this house from a rectangular structure into an almost square, 21 by 19 foot structure (Thomas and Hibbs 1984:288-289). In the yard of this house, about 30 feet southwest of the southwest corner, was the Old Apple Tree, reputedly the oldest in the Pacific Northwest (Thomas and Hibbs 1984:285-285).

A total of 43,388 historical artifacts were recovered during the 1981 excavations in Operation 14. This represents "the largest collection of Hudson's Bay Company-period artifacts heretofore excavated from a Kanaka Village residence, and second only to the Fort Vancouver chief factor's residence (Hoffman and Ross 1973b) as being the largest Hudson's Bay Company domestic assemblage in the Pacific Northwest" (Thomas and Hibbs 1984:152).

Operation 20A involved excavation in 1981 of six 5 by 5 foot units that partially exposed evidence of an HBC-period structure that probably corresponds to that labeled "Kanakas" on the 1846 Covington map (Exhibit 4-21). This building was in existence by 1845 and was destroyed, probably by burning, by the U.S. Army before 1855 (Thomas and Hibbs 1984:312-324). Evidence of this structure was limited to exposure of posts, stakes, pits, and one possible footing associated with the foundation, and by recovery of 1,003 artifacts. The Operation 20A site was not disturbed by construction of the I-5/SR 14 interchange, and the dwelling at this location is thus available for further investigation (Thomas 1992:46-47).

Exhibit 4-21. 1846 Map of Fort Vancouver and Village, based on a drawing by R. Covington in the Archives of the HBC (from Thomas and Hibbs 1984, Figure A-2)



Operation 27 involved test excavations in 1975 to the east of the pond, and encountered evidence of a structure and artifact scatter "possibly from one of the two servants' houses shown just to the north of the cooper's shop on the Covington map of 1846" (Chance et al. 1982:276). The structure consisted of "a small stockaded enclosure which probably surrounded a small house" (Chance et al. 1982:276). The stockade was composed of "small posts, only two to three inches in diameter" (Chance et al. 1982:276). Nine features were exposed, and 2,343 artifacts were recovered from a component identified as "H.B.C. Servant's House (ca. 1840s)" (Chance et al. 1982:8).

Operations 55, 56, and 57 recovered evidence of HBC dwellings shown on historic maps at the northwest corner of the intersection of a north-south road that separated the village from the Fort Vancouver fields and the Upper Mill Road. Operation 55 exposed posts,

stakes, pits, fire areas, and a trench and recovered 2,466 artifacts associated with an unidentified dwelling. Operation 56 exposed posts, stakes, pits, and fire areas and recovered 2,115 artifacts tentatively associated with the Charlebois house. Operation 57 exposed post holes and pit features and recovered 976 artifacts tentatively associated with Little Proulx's house (Thomas and Hibbs 1984:577-618). Operation 55 was found to be severely disturbed by construction, but Operation 56 was only moderately affected, and Operation 57 was covered by a protective a layer of fill, so there is some potential for future investigations in the latter areas (Thomas 1992:50-53).

Operation 58 was at the location of a house inhabited by William R. Kaulehelehe, better known as Kanaka Billy, who lived in the village from at least 1846 until his house was destroyed by the U.S. Army in 1860 (Thomas and Hibbs 1984:619-625). Excavation of two 5 by 5 foot test units exposed one stratified trash pit, a second pit, and two square or rectangular post casts and recovered 951 artifacts from this area. The Operation 58 site was not disturbed by construction, and is therefore available for further investigation (Thomas 1992:54).

4.9.2.2 Pond

Most historic maps of the HBC Fort Vancouver show a pond on the north shore a short distance inland from the river bank. This pond, now buried beneath SR 14, is thought to be "the western end of a flood channel of the Columbia River that passed between the fort and the river" (Chance and Chance 1976:2). One of the most significant discoveries made during investigations in 1974 occurred in Operation 11, where an east-west backhoe trench was excavated across the pond. The trench walls revealed 16 artifact-bearing strata, some separated by six flood deposits, indicating that the pond had been used as a garbage dump.

The principal feature found in these deposits was a layer of decayed planks situated just below the 1862 flood deposit that, based on the presence of wrought iron nails with faceted heads, was interpreted as remnants of an HBC building demolished by the U.S. Army in 1860 (Chance and Chance 1976:27). Below the layer of planks were additional strata of varying thickness that mostly contained HBC materials, although an early Army button with the Infantry "I" was found in one of the lower strata (Stratum 9B). Stratum 10, the lowest stratum, was black organic silty loam that represented the bottom of the pond at the arrival of the HBC in 1825 (Chance and Chance 1976:28).

Additional sampling of the artifact-bearing strata in the pond was undertaken in four other operations. Operation 13 in the northern portion of the pond produced a better stratigraphic record of the flood deposits, as it was observed that "as one moves north in the pond, the flood deposits are better represented. The flood silts seem to have 'stuck' better in the shallow shelf of the northern part of the pond but were flushed out from the more southerly portions" (Chance and Chance 1976:29). Operation 24, more centrally located on the north side of the pond, contained abundant Army material and two moderately productive HBC strata, but the stratigraphy was more lens-like and could not be easily correlated with the layers in Operation 11.

Operation 21, on the south side of SR 14, revealed highly stratified deposits containing artifacts associated with the U.S. Army occupation. The excavations were stopped by the water table, with the lowest stratum reached dated by headstamps on cartridges to no earlier than 1884 (Chance and Chance 1976:33). Operation 22, also on the south side of SR 14, extended down to the HBC layer and original pond bottom without reaching the water table. However, this operation "was characterized by a notable lack of stratigraphy," as "floods had either not registered here or their deposits had been flushed away" (Chance and Chance 1976:35).

In 1975 additional sampling was undertaken in the northern portion of the pond north of SR 14. Operation 26 was a large excavation adjacent to the north side of the east-west trench excavated in Operation 11. According to Chance and others (1982:6-7): "Here we augmented the sample from the H.B.C. strata (the 9 Series) and took a small sample from the former pond bottom – Stratum 10. Our samples from the Army strata, the Stratum 6 Series and the Stratum 7 Series, were a considerable improvement over the previous year." Operation 11 from 1974 was also enlarged on the south side of the east-west trench "to expose more of the mass of timbers found in Stratum 9Gr which had been thrown into the pond in ca. 1859-60, apparently during the dismantling of Kanaka village by the Army" (Chance et al. 1982:7). An additional flood deposit, attributed to the flood of 1859, was documented in the wall profile from this excavation. Although not specifically identified in the text, this enlargement of Operation 11 to the south probably corresponds to the work Chance et al. (1982:8, Table 1) referred to as Operation 28.

In 1977 Operation 28, consisting of three test units aligned in an east-west transect, was excavated across the pond to further investigate the stratigraphy, and especially to document the flood deposits (Carley 1982:5). Two flood deposits, most likely from floods in 1887 and 1894, were found in each unit, with the majority of cultural material recovered from between them. Only U.S. Army materials were found in these test units; artifacts attributable to earlier HBC occupation were absent (Carley 1982:27-30). According to Carley (1982:30), "this suggests that this part of the pond may have been used for activities other than trash disposal during HBC occupation. If boat building and repairing were taking place nearby, the pond may have been kept clear of debris for some function related to this activity."

4.9.2.3 Riverside Complex

The term "riverside complex" has been used to refer to evidence of HBC occupation and activity south of the Village and close to the river bank (Chance et al. 1982; Carley 1982). As shown on the 1846 Covington map (Exhibit 4-22), the structures within the Riverside Complex included a hospital, cooper's shop, salt house, McLean's and Smith's residences, several servant's quarters, horse and ox stables, pig sheds, and Salmon Store with a wharf projecting into the river (Erigero 1992a:262-266).

Archaeological investigation in the Riverside Complex began in 1974 when test excavations in Operation 19 between SR 14 and the railroad berm encountered HBC artifacts in association with a gray clay floor similar to the floors found in dwellings at the Village. The artifacts "suggested a residential area of Company servants and some

industrial or maintenance activity comprised of boat and ship repair or construction and blacksmithing" (Chance and Chance 1976:31).

Further excavations in Operation 19 in 1975 resulted in discovery of a previously undocumented stockade associated with the HBC occupation. Two corners and part of three walls of a stockade trench were exposed, extending 100 feet east-west and 75 feet north-south (Chance et al. 1982:7, 258-264). Subsequent research by Caroline Carley (1982:23) identified an account by Lieutenant George Emmons of the U.S. Navy, attached to the United States Exploring Expedition under Charles Wilkes, referring to "a hospital near the riverbank, also stockaded, a cooper's shop, boat house and several other out buildings about the premises" (Emmons 1841).

Returning in 1977 to further investigate the stockade, Carley conducted additional excavations in Operation 19 and uncovered medicine bottles and other evidence of medical activities within its boundaries. In a study of nineteenth century medicine at Fort Vancouver, Carley established that the hospital was built in the early 1830s when the number of intermittent fever victims became too great to be handled by the small dispensary in Fort Vancouver (Carley 1982:35-36). After discussing reasons why a stockade might be desirable around the hospital, Carley suggested that when large numbers of HBC personnel became sick and medical supplies ran low, a situation developed in which infected Indians seeking help were "turned away from the Fort without medical aid" (1979:63).

Two attempts to relocate the wharf associated with the HBC Salmon Store have been made by underwater surveys in the Columbia River. The first attempt was made in 1987 by a representative from the National Park Service's Submerged Cultural Resources Unit who "examined an area directly off the bank from Who-Song and Larry's Restaurant" where a local diver had found HBC artifacts (Lenihan 1987:4). This location is within about 600 feet of the I-5 bridge. It was concluded that "if this indeed was the location of the historic wharf it was probably covered by heavy fill from twentieth century use" (Lenihan 1987:5). No "architectural features that could be related to the HBC wharf" were observed, and it was suggested that the HBC artifacts found by the local diver "were more outlying clusters or isolated finds rather than something that could be related to a major primary deposition from historic use" (Lenihan 1987:5).

The second attempt to locate the wharf associated with the HBC Salmon Store was made in 1988 and 1989 by Alison Stenger (1989). As noted by Stenger, historical maps (e.g., Covington 1846) placed the wharf in an area later used for the U.S. Army's Quartermaster Depot, but historical paintings show the wharf "quite a bit farther to the east" (Stenger 1989: not paginated). An underwater survey in 1988 located a mix of historical artifacts from the HBC and Quartermaster Depot recorded as the Quartermaster East Site (45CL400), and a cluster of stone net-sinkers and net weights identified as prehistoric in age recorded as the Benoit Site (45CL401). In 1989 the survey continued to the east, upstream in the river, where archaeological remains interpreted as evidence of the wharf were located "nearly 350 yards from its 19th century cartographic placement" (Stenger 1989). These remains included a small cluster of HBC-era ceramic and glass bottle fragments, as well as a metal wood-working tool found underwater, and "an elongated stack of large rock" exposed at low tide (Stenger 1989). Based on this

evidence, it was considered "highly probable" that the location of the HBC wharf was found (Stenger 1989).

4.9.3 St. James Mission

The St. James Church and the associated rectory, constructed in 1845-1846, were located on the north side of Upper Mill Road (today's East Fifth Street), and west of a north-south-oriented road that separated the Village from a cultivated field and orchard adjacent to the HBC stockade. They were the first buildings constructed in a five-acre mission complex that by 1874 included 28 structures. The boundaries of the Catholic mission were challenged by the HBC and U.S. Army, and in 1887 the commander of Vancouver Barracks took possession of the facilities. The history of the St. James Mission has been compiled by Hussey (1957:208-213), Thomas (1984), Thomas and Hibbs (1984:697-698), and Erigero (1992a:125-126). The limited archaeological excavations undertaken at the site were summarized by Thomas (1992:55-56).

Archaeological excavations at the former site of the St. James Mission were limited to backhoe test trenches in 1980 and construction monitoring in 1981 that mostly exposed features and artifacts from the late nineteenth and early twentieth century U.S. Army occupation (Thomas and Hibbs 1984:698-699). A noteworthy exception was the discovery of a pig burial found in an area that correlates with a "pig sty" shown on an 1872 map. In 1991 the areas examined were "occupied by two relocated U.S. Army duplex residences" (Thomas 1992:56). Thomas (1992:56) added that "the cartographic study of the mission site compiled by Thomas (1984) locates mission building sites on the Federal Highway Administration property that may be preserved despite twentieth century ground disturbances."

During archival research in support of historical archaeological investigations in the West Barracks area, evidence of a previously unrecorded cemetery associated with the St. James Mission came to light (Cromwell and Gembala 2003). A "burial ground" is shown on the east-central boundary of the claim on an 1866 map of the St. James Mission buildings by Father J. B. Blanchet. This map has not been previously included in cartographic studies of HBC Fort Vancouver. Records suggest that burials from this early cemetery were moved to the current St. James Catholic Cemetery located on 29th Street in Vancouver.

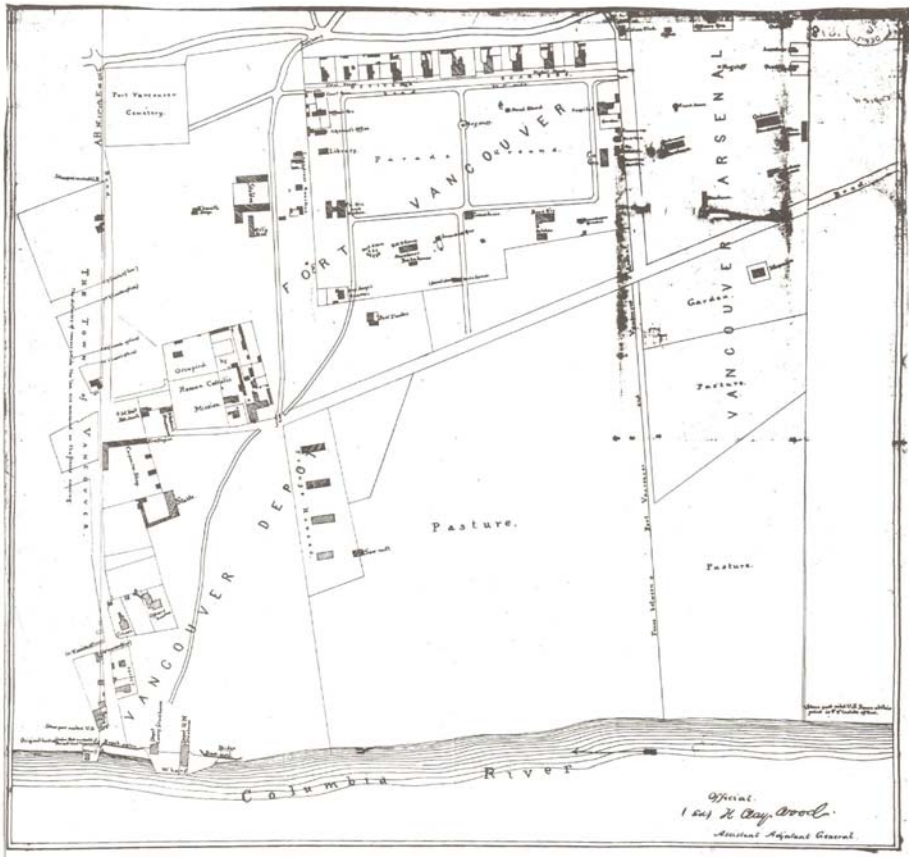
4.9.4 Vancouver Barracks

In response to conflicts resulting from encroachment by American miners and settlers on Native American lands, U.S. Army troops were detailed to the Pacific Northwest in 1849. A military base was established north and west of the HBC stockade at Fort Vancouver. Known as Columbia Barracks or Vancouver Barracks, this post became the headquarters and base of supply for the military offensive mounted by the U.S. Army against hostile Native Americans, especially during the conflicts of 1855 and 1856. Vancouver Barracks later played a significant role in the mobilization of troops during the Civil War, the Spanish-American War, and World War I.

Today, Vancouver Barracks (45CL162H) consists of a complex of historic buildings that occupies 55 acres to the north and west of the reconstructed HBC stockade. Vancouver Barracks was determined eligible for inclusion in the National Register of Historic Places as an Historic District in 1979. Part of this complex known as Officers Row was listed as an Historic District on the National Register of Historic Places in 1974.

The most complete review of the long history of the U.S. Army post at Vancouver Barracks was prepared by Erigero (1992a). Of the many maps of Vancouver Barracks, the 1874 map by 2nd Lieutenant F. K. Ward has proven the most reliable for identifying features on the U.S. Military Reserve (Exhibit 4-22). Archaeological investigations at Vancouver Barracks through 1991 were summarized by Thomas (1992:62-81), who identified 24 separate operations (test excavation areas) as primarily associated with the U.S. Army occupation.

Exhibit 4-22. 1874 Map of the U.S. Military Reserve at Fort Vancouver, Washington Territory by 2nd Lieutenant F. K. Ward (from Thomas and Hibbs 1984, Figure A-15)



4.9.4.1 Quartermaster Depot

By far the most noteworthy investigations at Vancouver Barracks were in Operation 20, where test excavations in 1974 located the Quartermaster's House erected around 1851 by Rufus Ingalls, the first Quartermaster at what was then called Columbia Barracks. This residence was occupied until it was razed in 1937. In addition to the excavation of

numerous features constructed of brick, the 1974 investigations included excavation of a privy and recovery of artifacts spanning the interval from the 1850s into the twentieth century (Chance and Chance 1976:32-33).

Further excavations in Operation 20 in 1975 uncovered a well-defined brick foundation, two privies, a fireplace, an assortment of drains and water pipes, and other fixtures associated with the residence. The excavated portion proved to be the north wing of the L-shaped house. The main section of the house was initially thought to have been "scraped away and covered by a six inch thick concrete hardstand prior to World War II" (Chance et al. 1982:9). Further excavations in 1981 exposed features associated with the main house, basement, the southeast corner of the north wing, and the yard (Thomas and Hibbs 1984:330-351). The Ingalls House remains the most thoroughly investigated residential building from the U.S. Army occupation at Vancouver Barracks.

4.9.4.2 Officers Row, Parade Ground, Garrison, and Cemetery

The northern portion of Vancouver Barracks (45CL162H) includes Officers Row, the Parade Ground, and the part of the garrison north of East Fifth Street between West Reserve Street (now covered by I-5) and East Reserve Street. Archaeological investigations through 1991 in this portion of Vancouver Barracks were summarized by Thomas (1992:81-86). Thirteen separate projects were undertaken, most of which involved monitoring of relatively small-scale construction such as excavations for utilities, sidewalk construction, and paving of road and parking areas (e.g., Thomas 1986, 1987a, 1987b, 1987c, 1988a, 1988b, 1988c).

One of the most productive of these small-scale projects occurred along Officers Row, where excavations for a waterline on the east side of Building No. 7 exposed part of a cellar under a kitchen/washhouse dating from 1850 to 1865. Test excavations revealed that the fill within the cellar included nine strata from which over 6,500 artifacts were recovered. Aside from the portion disturbed by water line construction, this cellar remains intact and available for further investigation (Thomas 1992:81-82). The pattern of small-scale investigations in the Officers Row vicinity has continued with numerous survey and monitoring project in recent years (e.g., Rader 1999; Wilson 1999a, 2000a, 2000b, 2004; McIlrath 2002; Gembala 2003b, 2003c; Cheung et al. 2006).

In advance of proposed construction of a new residential structure in the East Barracks area, archaeological testing was carried out in 1986 on the site of a former "Company Quarters" on the southeast side of the junction of Alvord and McClelland roads. The Company Quarters stood at this location from 1880 to 1885, and was later replaced by an "Infantry Barracks" built in 1885 and possibly standing as late as 1942. The excavations exposed an intact section of brick footing at the southwest corner of the barracks below a dense layer of rubble from the building's demolition. Test excavations also confirmed the location of a privy constructed in 1887 to the west of the barracks, and the possible location of an earlier privy on the east side of the barracks also was identified (Minor and Beckham 1987).

In 2002 the first comprehensive historical archaeological study of the Parade Ground was completed in advance of construction of a new irrigation system (Langford and Wilson 2002). The eastern and western ends of the Parade Ground were found to contain artifacts from the earliest years of the post, beginning with the Army's arrival and initial construction activities in 1849-1850. This study was followed by monitoring during installation of the Parade Ground irrigation system (Gembala 2002) and monitoring during installation of a fiber optic line across the Parade Ground (Cromwell 2006a).

In recent years a number of historical archaeological investigations have been conducted in the West Barracks area, between Evergreen Boulevard on the north and East Fifth Street on the south. Small-scale testing in advance of utility trench excavations was undertaken in 1996 and monitoring during installation of a water line was carried out in 1999 at the O. O. Howard House (Thomas 1996; Wilson 1999b). Monitoring also was conducted in 2002 during renovation of the City Police Station on the west side of the O. O. Howard House (Wilson 2002c).

In 2003 the first comprehensive historical archaeological study was undertaken of the West Barracks area between McCelland Road on the north and the Western Federal Lands Highway Department facilities property on the south (Cromwell and Gembala 2003). Significant archaeological resources were found more or less throughout the area, including the remains of several 1880s infantry barracks in the north, a mid-nineteenth century sutler's store in the middle, and a portion of the St. James Catholic Mission and early twentieth century U.S. Army quarters in the south. In comparison, survey and testing in the adjacent Western Federal Lands Highway Department facilities to the south typically encountered deep deposits of mid-twentieth century fill and a general lack of intact cultural deposits (Cromwell 2006b).

The HBC established a cemetery as early as 1833 on the hillside northwest of the stockade at Fort Vancouver. With establishment of the St. James Mission in 1838, this cemetery was apparently enlarged to include burials presided over by Catholic priests (Erigero 1992a:119-120; also see Cromwell and Gembala 2003). Historical maps and illustrations consistently show that the HBC-St. James Mission cemetery was located on the hillside northeast of the Catholic Church (Thomas and Hibbs 1984: App. A). The Catholic Church records contain information on 208 burials in this cemetery representing individuals from a wide range of ethnic groups (Thomas and Freidenburg 1998:App. B).

In the years following the arrival of the U.S. Army in 1849, the fences and headboards began to be removed by the soldiers for fuel, and "the graveyard became gradually almost obliterated" (Erigero 1992a:232). The Army later constructed a fence through the area, with part of the cemetery falling inside the parade ground and the rest outside. The cemetery was still in existence when the HBC departed in 1860. In 1866 an inspector from the Quartermaster Department recommended that the graves be removed to the post cemetery (Erigero 1992a:292). It is not known if, or to what extent, this action was carried out, but the discovery of burials during construction in the former cemetery area was reported in newspaper articles from 1885 and 1993 (Thomas and Freidenburg 1998:5).

The U.S. Army established a cemetery at Vancouver Barracks around 1855, as first indicated on an 1855 topographic map of the Vancouver area, where it was shown to have been situated along the western reservation boundary to the west of, and in line with, the officers' quarters comprising Officers Row (Thomas and Hibbs 1984:A-10). Curiously, the cemetery is placed a considerable distance north of this location on two maps prepared in 1859 (Thomas and Hibbs 1984:A-12, 13), but appears in its first position at the west end of Officers Row in maps prepared in 1871 and 1874 (Thomas and Hibbs 1984:A-14, 15). The cemetery does not appear on maps dating 1886 and later. An 1866 account describes this cemetery as occupying about four acres enclosed by a rail fence and containing about 20 graves (Thomas and Freidenburg 1998:6). Additional evidence suggests that at one time over 300 individuals were interred in the original Post Cemetery (Cromwell 2008; Crouch 2000) which included Officers, enlisted men and civilians. It is not clear how many were relocated to the Post cemetery on Fourth Plain Boulevard.

In 1883, the Army contracted to remove the human remains from this cemetery to a new one at its current location north of Fourth Plain Boulevard. This action was probably undertaken in conjunction with the westward expansion of the officers' quarters along Officers Row (Thomas and Freidenburg 1998:6). However, as noted by Thomas and Freidenburg (1998:6), "there is reason to believe that not all of the bodies were exhumed and removed." There are uncorroborated reports of human remains being unearthed during construction of I-5, and linear depressions that appear to be graves were observed, but not explored, during monitoring of construction excavations in the area (Thomas 1988b:29).

4.9.5 City Of Vancouver

In contrast to the long history of archaeological research at Fort Vancouver, little historical archaeology has been conducted in the City of Vancouver. Concern about historical archaeological resources in the city threatened by reconstruction of the I-5/SR 14 interchange in 1974 and 1975 was expressed by Chance and others (1982:4), who commented on the limits of their project area:

> It also needs to be emphasized that our excavations were confined to the limits of the right-of-way as marked in 1974 and 1975, and that we were strongly discouraged from conducting tests within the existing interchange. Our limited tests for building "R" of the Quartermaster Depot, a structure we believed had been erected in the 1870s, were somewhat beyond the scope of our mandate. There was thus no prospect of doing serious work on the early portions of the town and port of Vancouver which lay within the interchange as it was in 1974 and 1975.

As recently as the late 1990s, some archaeologists believed that later urban development would have destroyed any significant archaeological remains associated with the early settlement and development in the city (Freidenburg 1998). This notion was soundly contradicted by the results of archaeological monitoring and data recovery excavations in 2000 in advance of construction of the West Coast Bank building on portions of Blocks 24 and 25 immediately west of I-5 and the VNHR (Minor 2006).

Construction of underground parking and foundations for the bank building required a deep pit excavation 11 feet below surface within a 12,600 square foot area. Archaeological monitoring and follow-up investigations during excavation of the deep pit resulted in the documentation of eight cultural features, including cellars under two buildings (one earthen-walled and the other rock-lined), two dry wells, a wood-lined chute, a trash pit, concrete footings, and a concrete wall. A total of 1,910 artifacts was recovered. Of these, 1,222 artifacts, or 64 percent of the collection, were recovered from contexts directly associated with buildings identified on Sanborn insurance maps.

The artifacts recovered reflect the material culture of the inhabitants of Vancouver during the last half of the nineteenth century and early decades of the twentieth century. Most of the people living on Blocks 24 and 25 presumably were of Euroamerican ancestry. An addition to the population occurred by 1928, when Chinese operated a laundry out of the building on the northeast corner of Block 24. The archaeological remains on Blocks 24 and 25 span the interval of time when the area between the U.S. military reserve on the east and the commercial district along Main Street to the west underwent a transition from residential to commercial use.

Historical archaeological investigations have recently been conducted at several other locations west of the I-5 corridor in the oldest portion of Vancouver. The Vancouver Convention Center Site (45CL582) was the subject of data recovery excavations in 2004 (Wilt et al. 2004). Testing was conducted nearby at the Columbian Newspaper's Downtown Campus Site (45CL646) in 2005 (Roulette and White 2005; Roulette et al. 2006). Both sites contained features and artifacts associated with early residences; these projects were conducted so recently that final reports are not yet available.

The Broadway Saloon Site (45CL583) consists of a single shaft feature containing nineteenth century artifacts exposed during construction in 2004. This feature appeared to be associated with a one-story outbuilding on the lot in 1888 but gone by 1892 (Roulette 2004). Site 45CL687 consists of three archaeological features exposed in test trenches excavated in 2006 in the City of Vancouver's proposed Fourth Street realignment project area. One of these features contained glass bottles and other remains associated with the Vancouver Bottling Works and the later Wineberg Bottling Works.

While not every parcel contains significant archaeological resources (e.g., Kent and Reese 2000), recent historical archaeological investigations demonstrate the potential for encountering archaeological remains associated with early residences, businesses, and industries in this portion of Vancouver (Wilt and Roulette 2006). Based on the results of these projects, there is every reason to believe that abundant and well preserved archaeological remains are present beneath the older portions of the City of Vancouver.
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5. Long-Term Effects

In view of the great amount of ground disturbance in the I-5 corridor and adjacent areas, the identification of archaeological sites will require extensive subsurface testing using a variety of methods. This additional discovery work, to be outlined in the research protocol currently in preparation, will be required before a determination of long-term effects can be finalized.

5.1 How is this section organized?

This chapter describes the long-term impacts that are expected from the I-5 CRC alternatives and options. It first describes impacts from the four full alternatives and the No-Build Alternative. These are the five representative alternatives that include specific highway, transit, bicycle, pedestrian and other elements. This discussion focuses on how these alternatives would affect corridor and regional impacts and performance. The discussion then focuses on impacts that would occur with various design options at the segment level, for example, comparing the impacts of each alignment option in each segment. Finally, it provides a more comparative and synthesized summary of the impacts associated with the system-level choices.

5.2 Impacts from Full Alternatives

Final determination of effects to historic (archaeological) resources will depend on the findings of upcoming field investigations. Construction activities are expected to result in long-term direct impacts to historic (archaeological) resources, as will construction of park and ride facilities associated with the various transit operations. No long-term impacts from roadway operation are anticipated for archaeological resources once the project has been completed.

The current assessment of effect to each archaeological property must be understood as preliminary, and was based on available information on site description and location. Design and mapping refinements, as well as ongoing and planned coordination with CRC Project design and engineering staff, DAHP/SHPO, and Consulting Parties, may result in modifications to our potential effects assessments. At this time, all effects are considered "potential," because the site identification process has not been completed and not all appropriate coordination and consultation have occurred, not only with respect to the effects to properties, but also to identification of potentially significant resources. However, with respect to most of the historic resources that have been preliminarily determined potentially affected, additional coordination and consultation will need to more precisely determine the magnitude of effect and to subsequently provide informed recommendations regarding reasonable minimization or mitigation measures.

5.2.1 No-Build Alternative

Under the No-Build Alternative there would be no identifiable displacement of historic resources resulting from the proposed inaction. However, other planned activities in the APE, not related to the CRC project, may impact archaeological resources to an undetermined extent.

5.2.2 Replacement Crossing with LRT and I-5 Standard Toll

At this time there is no appreciable difference between a no toll and a standard toll scenario for a replacement or supplemental crossing with LRT or BRT.

5.3 Impacts from Segment-level Options

This section describes and compares the impacts associated with specific highway alignment and interchange options and specific transit alignments and options. They are organized by Segment, including:

- Segment A: Delta Park to Mill Plain District
- Segment B: Mill Plain District to North Vancouver

For transit options, Segment A is divided into two sub-segments, each with a discrete set of transit choices:

- Sub-segment A1: Delta Park to South Vancouver
- Sub-segment A2: South Vancouver to Mill Plain District

Impacts from highway options are described separately from impacts from transit options. The purpose of this organization is to present the information according to the choices to be made. Where the traffic and transit choices would have a substantial effect on each other, this is considered.

Under the No-Build Alternative there would be no identifiable displacement of historic resources resulting from the proposed inaction. However, other planned activities in the APE, not related to the CRC project, may impact archaeological resources to an undetermined extent.

5.3.1 Segment A: Delta Park to Mill Plain District - Highway Alternatives

Generally, the Downstream Replacement Alternatives may have equivalent potential impacts to archaeological resources in the U.S. Army Vancouver Barracks Character Area. The location of roadways associated with the I-5 / SR 14 interchange is largely dictated by the elevation of the roadway on the River Crossing. The proposed higher replacement bridge roadway would have to meet the roadway farther north in Vancouver. Combining this factor with the proposed additional travel lanes on I-5 and the standard turning radius for the SR 14 to I-5 and Fourth Plain connectors, the proposed roadway footprint would be moved farther east and farther into the VNHR than the current highway system. Because it would appear to require less land in sliver acquisitions, the

Supplemental Alternative may have the least potential to adversely affect archaeological resources in this area.

No historic properties have been identified in the Marine Drive and Hayden Island interchanges. However, the proposed "Diagonal" and "Southern" alighnments of the Marine Drive Interchange cross within 100 feet of Marine Drive, which is considered a moderate to high probability area for archaeological deposists. The SR 14 interchange potentially contains archaeological deposits relating to the HBC Village and the earliest settlement of Vancouver. The Mill Plain interchange may contain archaeological deposits relating to Vancouver Barracks. Additional archaeological sites may be found during discovery efforts prior to construction. If archaeological sites are identified, additional archaeological investigations would be conducted to determine the National Register eligibility of, and potential effects to the sites.

5.3.1.1 Replacement Crossing

At this time the precise extent of impacts is pending refinement of the project design and implementation of the field investigation recommendations included in it. However, general impacts are discernable. In Segment A, the downstream replacement crossing would have potential effects on the following archaeological resources associated with the Vancouver National Historic Reserve (VNHR).

- The Heritage Apple Tree (45CL164H)
- HBC Pond (45CL47)
- Vancouver Barracks (45CL162H)
- Fort Vancouver National Historic Site (45CL163H)
- Kanaka Village (45CL300H)
- Quartermaster East (45CL400)
- Benoit (45CL401)

The downstream alignment includes a double-leaf configuration for the I-5 / SR 14 interchange and would potentially have an effect on archaeological resources and sensitive areas within the VNHR.

Sites 45CL514 and 45CL582, in the CRC APE in downtown Vancouver, have been mitigated during previous construction projects. Their presence reflects the high likelihood of buried historical archaeological deposits and features within the downtown Vancouver portion of the proposed project's APE.

Supplemental Crossing

In Segment A, the Supplemental Crossing would have potential effects on the following archaeological resources:

- Vancouver Barracks (45CL162H)
- Fort Vancouver National Historic Site (45CL163H)

- Kanaka Village (45CL300H)

The supplemental crossing would include modifications to the existing SR 14 /I-5 interchange loop that generally match the configurations of either replacement crossing. Consequently, the potential effects would be similar under all alternatives. The supplemental alignment's SR 14 westbound to I-5 northbound ramp would coincide with the existing ramp and would potentially result in the least impacts to the Village site of all the proposed crossing alternatives. Although this ramp would be modified farther north to allow a link between the highway and Fourth Plain, the effects to the Fort Vancouver National Historic Site and Vancouver Barracks site areas north of Sixth Street would be less than under the replacement interchange options.

Sites 45CL514 and 45CL582, in the CRC APE in downtown Vancouver, have been mitigated during previous construction projects. Their presence reflects the high likelihood of buried historical archaeological deposits and features within the downtown Vancouver portion of the proposed project's APE. The supplemental crossing could potentially affect as yet unrecorded historical (and potentially prehistoric) archaeological sites in the oldest portion of Vancouver, particularly those that might lie below previously disturbed soils associated with the existing I-5/SR 14 interchange area near the I-5 mainline. The extent to which such resources may be impacted largely depends on the depth to which ground preparation for roadway or pier construction (which would likely be deeper), would extend below disturbed soils.

5.3.2 Segment B: Mill Plain District to North Vancouver - Highway Alternatives

No archaeological properties have been identified in Segment B. However, some potential exists for the discovery of historical archaeological resources immediately north of the Mill Plain interchange, and prehistoric archaeological resources near Burnt Bridge Creek.

Generally, levels of potential effects to archaeological resources would depend on the amount of additional right-of-way acquisition resulting from the various build alternatives. Site discovery measures will be implemented in these locations during the next phase of the CRC project. If archaeological sites are identified, additional archaeological investigations would be conducted to determine the National Register eligibility of, and potential project effects to the sites.

5.3.2.1 Transit Alignments

On the Oregon shore, the proposed transit alignments extend within or close by the existing I-5 corridor across the Columbia River south shore floodplain and Hayden Island. Review of records on file at the Oregon SHPO indicates that no prehistoric archaeological sites have been recorded within the vicinity of the proposed transit alignments. An archaeological survey within the I-5 corridor found no evidence of prehistoric or historical archaeological sites. The project area has been subject to alteration on a massive scale, primarily from deposition of fill material, but the geological history suggests there is some potential for the discovery of prehistoric archaeological sites. Due to the fact that little development occurred along the I-5 corridor and vicinity

until relatively recently, there appears to be little potential for encountering significant historical archaeological sites within the project area on the Oregon shore.

On the north shore, the proposed transit alignments are west of the I-5 corridor, extending across a gradually ascending flood plain that appears to have offered little inducement for settlement by prehistoric Native Americans. Review of records on file at the Washington DAHP indicates that no prehistoric archaeological sites have been recorded within or in the close vicinity of the proposed transit alignments. An archaeological survey along the proposed transit alignments found no evidence of prehistoric activity or occupation, but little original ground surface was available because essentially the entire area has been developed. Based on current information, there appears to be little potential for encountering significant prehistoric sites within the transit alignments on the Washington shore.

In contrast, the proposed transit alignments extend northward from the Columbia River through the oldest portion of the City of Vancouver, and consequently there is a high potential that historical archaeological resources may be encountered. From initial settlement in the late 1840s and 1850s, the city's business district and adjacent residential areas gradually developed northward from the river bank into the interior. While there is a general trend for historical archaeological remains closer to the river to be older, and therefore potentially more likely to be deemed significant in terms of National Register criteria, the early construction of railway systems in Vancouver resulted in the rapid spread of residential areas northward from the business district at a relatively early date.

A major leap in residential development occurred in 1889 when a horse-drawn street railway, electrified in 1892, was constructed from Vancouver's business district north to 26th Street to provide access to the new residential area known as Vancouver Heights (situated east of Main Street and north of 26th Street). This first railway system ceased operation in 1895, but a later system built in 1908 and operating until 1926 extended northward as far as 39th Street, facilitating the expansion of residential and commercial development north and east of the city's original business district (Freece 1985).

The proposed transit alignments extend through established commercial and residential areas. An archaeological reconnaissance undertaken along the alignments confirmed the existence of paved streets and sidewalks which effectively cover any evidence of historic (and earlier prehistoric) activity or occupation that might once have been exposed on the ground surface. A review of archaeological site records at DAHP indicates that four historical archaeological sites have been recently recorded in the oldest portion of Vancouver, specifically where historic buildings were formerly present within a few blocks of the Columbia River on Main, Broadway, and Columbia. Strictly speaking, any historic building (i.e., greater than 50 years old) that is demolished for redevelopment is a potential historical archaeological site.

The proposed transit alignments extend along most of the same streets (e.g., Main, Washington, Broadway) where the earlier railway systems were constructed. Although the rails from the earlier systems were reportedly taken up (Freece 1985:43), it is possible that some remains of these historic railway systems may be encountered during construction along the proposed transit alignments. The first modern street pavement in

Vancouver consisted of Belgian blocks, rectangular stone blocks having several square feet of top surface laid lengthwise to the street (Freece 1985:88). Intact segments of Belgian blocks underlying modern pavement may be considered historically significant and require recording as an historical archaeological resource.

Historically, the edges of city streets were often ill-defined, and foundations or other architectural and/or archaeological features associated with the front portions of former buildings may extend into the current roadways. Depending on the precise location of the transit alignments in relation to the modern streets (i.e., whether in the center or on one side or the other of the roadway), construction may encounter archaeological remains associated with historic buildings.

Before the inception of city-sponsored waste disposal, it was not uncommon for trash to be disposed of simply by being discarded into the street (creating what are known as "sheet middens"), or buried in trash pits adjacent to structures. Consequently, historical artifacts (e.g., fragmentary glass containers, broken domestic ceramics, nails and other hardware, and butchered animal remains) from these discard activities may be found below the pavement of current roadways as well as in utilities trenches (e.g., storm water, sewer, electric lines) encountered during construction excavations for the proposed transit alignments.

All areas where transit alignments are proposed in Vancouver have been occupied for more than 50 years. Therefore, there is some potential for historical archaeological remains to be found in these areas. Construction activities within city streets, where the proposed transit alignments are located, generally have not been monitored by archaeologists. Consequently, the extent to which prehistoric and historical artifacts may be found during construction excavations in the streets has never been established. Based on recent investigations by archaeologists at historic buildings sites in Vancouver, however, some potential exists for encountering significant historical archaeological remains during construction along the proposed transit alignments.

5.3.3 Segment A1: Delta Park to South Vancouver - Transit Alternatives

Although no archaeological properties have been identified in Delta Park, the archaeological predictive model indicates that there is a moderate likelihood for buried archaeological deposits because of the deep accumulation of sand and silt on the south shore of the Columbia River over the past several thousand years. Unfortunately, the likelihood that archaeological sites have been preserved in this area has been reduced as a result of the considerable amount of disturbance from recent development along the south shore flood plain.

In the South Vancouver area, this segment has the potential to affect historical archaeological features and deposits associated with early residences, businesses, and the waterfront area in the oldest portion of Vancouver. Site discovery measures will be undertaken to locate archaeological resources in these likely locations. If archaeological sites are identified, additional investigations would be conducted to determine the National Register eligibility of, and potential project effects to, the sites.

Under the No-Build Alternative there would be no identifiable displacement of known historic (archeological) resources resulting from the proposed inaction. There would be no specific or known long-term direct or indirect effects. However, other planned activities in the APE, not related to the CRC project, may impact archaeological resources to an undetermined extent.

5.3.3.1 Hayden Island Transit Alignments

For all alternatives on the Hayden Island segment, the likelihood of encountering prehistoric archaeological sites is low, due to the island's recent geological formation and low-lying nature. Historically, the island was subject to scouring by annual freshets and flooding. Historic and modern development has included deposition of substantial amounts of fill to raise the elevation of the ground surface. It is likely that recent development for hotels and shopping establishments, along with construction of I-5 and interchanges, has created extensive disturbance within the project APE. Site discovery measures will be undertaken to locate archaeological resources in any likely locations. If archaeological sites are identified, additional investigations will be conducted to determine the National Register eligibility of, and potential project effects to, the sites.

5.3.4 Segment A2: South Vancouver to Mill Plain District - Transit Alternatives

This segment has the potential to affect historical archaeological features and deposits associated with early residences and businesses in the oldest portion of Vancouver. Generally, different levels of potential effects to archaeological resources would depend on the amount of additional right-of-way acquisition resulting from the various alternatives. At this time, the difference in the amount of potential subsurface disturbance between major alignments is unknown, but would nonetheless provide an approximate proxy estimate of potential effects.

For all alternatives, construction in this segment has the potential to affect historical archaeological features and deposits associated with early residences and businesses in the oldest portion of Vancouver.

5.3.5 Segment B: Mill Plain District to North Vancouver - Transit Alternatives

No archaeological sites have been identified along this segment, and there appears to be little potential for affecting archaeological sites. The possible exception is the Burnt Bridge drainage, which is considered to have a moderate potential for containing archaeological sites. The I-5 transit alignments would require construction in this area, while the Vancouver transit alignments would not.

5.4 Impacts from Other Project Elements

5.4.1 Minimum Operable Segment

Shorter-length transit routes would involve less construction and potentially less discovery or disturbance of potential resources in North Vancouver. Along the I-5 alignment, a shorter transit route would avoid construction near Burnt Bridge Creek, which is rated as having a moderate potential for containing archeological sites.

The Mill Plain MOS is a relatively short alignnment; however, there is a higher likelihood of discovering cultural resources closer to the downtown area. This MOS is also associated with the devlopement of several park and ride facilties, two of which require the consruction of multi-level parking facilities which would require considerable sub-surface excavations for foundations. The Joint Use Structure at 5th and Columbia would most likely impact historical archaeological resources associated with Old Downtown Vancouver, while the Mill Plain Terminus would be less likely to disturb such resources. The other Park and Ride Facilities are surface lots and would have a less likelihood of diturbing archaeogical resources.

The Clark College MOS includes the construction of a three-level parking structure at Clark College. The location of the parking structure is considered low probability for archaeological resources.

5.4.2 Transit Maintenance Base Options

Archeological investigations associated with the options have not been conducted at this time. Archaeological background research indicates that no known archaeological sites have been indentiifed within the APE for the Ruby Junction Maintanance Station and the NE Vancouver BRT Maintanance Site. Archaeological field investigation will be conducted as appropriate.

5.5 Impacts from System-Level Choices

5.5.1 River Crossing Type and Capacity: How does the Supplemental crossing compare to the Replacement crossing?

Neither bridge footprint is likely to impact archaeological resources.

5.5.2 Transit Mode: How does BRT compare to LRT?

Generally, different levels of potential effects to archaeological resources depend on the amount of additional right-of-way acquisition resulting from the various alternatives. As bus rapid transit and light rail right-of-way requirement would differ only minimally, potential effects to archaeological resources would be similar for either option.

5.5.3 Balance of Transit vs. Highway Investment: Enhanced Transit System Operations with Aggressive TDM/TSM Measures, and Standard Transit System Operations with Standard TDM/TSM Measures

Generally, different levels of potential effects to archaeological resources depend on the amount of additional right-of-way acquisition resulting from the various alternatives. As right-of-way requirement would not differ between these options, potential effects to archaeological resources would be the same.

5.5.4 Major Transit Alignment: How does the Vancouver alignment compare to the I-5 alignment?

The I-5 transit alignment would require construction near the Burnt Bridge Creek drainage, which is rated as having a moderate potential for containing archeological sites, although there are no known sites at this time. The Vancouver alignment would not involve construction near Burnt Bridge Creek.

5.5.5 Tolling: How do the tolling options compare (no toll, standard or higher toll on I-5, toll on both I-5 and I-205)?

Tolling options are not expected to have a direct effect on archaeological resources. The only potential effects would result from indirect effects to land use patterns. If one of the tolling scenarios resulted in greater potential to convert land uses, this could result in a greater potential to impact archaeological resources. This would also depend on the location of the land use change and the extent of potential ground disturbance. These potential indirect tolling impacts cannot be analyzed at this stage in the project design.

5.5.6 Transit Project Length: How do the full-length alternatives compare to the shorter length option?

Shorter-length transit routes would involve less construction and potentially less discovery or disturbance of potential resources in North Vancouver. Along the I-5 alignment, a shorter transit route would avoid construction near Burnt Bridge Creek, which is rated as having a moderate potential for containing archeological sites.

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6. Temporary Effects

6.1 Regional and System-wide Impacts

Construction impacts within the APE may result in the loss, destruction, or alteration of the archaeological and/or cultural character or integrity of historic properties. Aside from these direct impacts, it is assumed that there will be no additional short-term impacts (noise, air, etc.) to archaeological and cultural resources associated with construction.

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7. Mitigation for Long-Term Effects

7.1 Mitigation Common to All Build Alternatives

For historic (archaeological) properties, mitigation plans will be designed and drafted in cooperation with DAHP and SHPO. Mitigation measures may include data recovery excavations, interpretive panels or other interpretive materials, photo documentation, and/or other measures as necessary. Historic properties mitigation measures and procedures must be approved in a MOA prior to issuance of the NEPA EIS Record of Decision.

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8. Permits and Approvals

Federal, state, and local permists will be identified in the Archaeology Research Design Report and with the Final Environmental Impact Statement.

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9. Recommendations

When and how additional efforts to identify, evaluate the significance, assess the effects, and resolve unavoidable adverse effects to archaeological resources will be conducted will in large part depend on the timing and character of the following factors:

- A level of design detail and certainty about location of new features and the techniques used to construct them that allow archaeologists to determine efficient and appropriate investigation activities that in themselves minimize potential disturbance to archaeological resources
- Phasing strategies
- Reviews of applicable permits, work plans by appropriate parties

Additional archaeological investigations are needed to appropriately protect archaeological resources. The overall goals guiding the archaeological efforts to date will continue, including, but not be limited to, relying on accurate design data to determine where types of impacts might occur and then determining sets of investigations that will aid in identifying and evaluating historic (archaeological resources) in the least invasive manners. Within that framework, additional archaeological work should include:

- Continued characterization of the geomorphological and paleo/historic landscape contexts, and the identification and significance evaluation of archaeological resources by using a range of optional techniques, including (but not necessarily limited to):
    - Non-invasive surface and subsurface investigations:
        - Pedestrian archaeological reconnaissance to characterize the ground conditions and likelihood of the presence or absence of archaeological resources, and/or a pedestrian archaeological survey to systematically, or semi-systematically identify the surficial presence of archaeological resources
        - Ground penetrating radar (GPR), and, depending on conditions discovered by the GPR, other techniques such as resistivity or magnetometry, likely using multiple apparatus, to more completely characterize geological conditions and identify soil matrix anomalies that may represent archaeological features/artifacts that warrant further archaeological subsurface investigations to confirm their nature.
        - Incorporating appropriate data and information obtained from CRC-project sponsored oral histories being conducted by tribal governments with Native Americans.
    - Invasive subsurface investigations

- Hand excavation discovery probing where original (historical or prehistoric) ground surfaces are accessible using shovel-excavated probes (usually around 30 cm in diameter) or larger (usually 50 cm x 50 cm to 1 m x 1 m) test units to reach usually down to 50 cm – 130 cm.
- Manual auguring to reach deeper depths (up to 2.5 m), usually using hand augers.
- Archaeological and geological monitoring of geo-cores to inform morphostratigraphic and geomorphological assessment of geo-core investigations at approximate locations of proposed features such as piers and/or retaining walls.
- Monitoring geotechnical investigation split-spoon samples for evidence of subsurface archaeological resources
- Mechanical trenching carefully using backhoes to excavate through fill and/or to reach down to around 3 m and expose soil stratigraphy and characterize complex stratigraphy, artifact concentrations, or features

After archaeological resources are discovered, their historical significance will be determined by evaluating them against all National Register criteria for evaluation as described and explained in, "How to Apply the National Register Criteria for Evaluation" (National Park Service, National Register Bulletin 15). This will be done through consultation with Section 106 Consulting Parties that wish to be involved in the evaluation. Effects to the National Register-listed or -eligible historic (archaeological) properties will be determined by assessing the impacts to all of the aspects of integrity that apply in each property's NR-eligibility. If resources are discovered that are subject to other laws and regulations that pertain to cultural resources, such as NAGPRA or AIRFA, they will be assessed as required. Unavoidable adverse effects to historic (archaeological) properties, such as residual effects after measures to minimize impacts have been applied, will be mitigated.

The extensively used urbanized and multi-jurisdictional nature of many of the areas that might be physically impacted by CRC project elements make it logistically and technically impractical and unreasonable to investigate them for subsurface archaeological resources at this time. For example, many of the impact areas traverse extensively paved roadways that are heavily used; consequently, the community would experience substantial disruption from archaeological subsurface excavations that may generate reliable and useful information for assessing the significance of potential archaeological resources.

Given this situation, the CRC project should prepare an MOA that would primarily:

- Stipulate measures that would resolve adverse effects to historic (archaeological) properties identified as of the time of it's preparation
- Establish programmatic guidelines and (likely) stipulations regarding the procedures by which outstanding consultation and technical work would be conducted by appropriate parties in order for the CRC Project to comply with the National Historic Preservation Act.

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APPENDIX A

Geology and Geomorphology

APPENDIX A: GEOLOGY AND GEOMORPHOLOGY

Introduction and Purpose

In this reconnaissance study of the morphostratigraphy of the project vicinity, selected existing data have been compiled and interpreted to establish natural and anthropomorphically influenced deposition/erosion dynamics during the last 12,000 years within the APE. The geologic deposits and landforms are evaluated with respect to potential development and preservation of archaeological resources in the APE.

The data compiled for this report include 10 historic charts dating from 1841 to 2006; 10 historical photographs (dating from 1914 to 2006); 14 historical vertical airphotos and satellite images (dating from 1935 to 2006); and 122 geotechnical borehole logs (dating from 1954 to 2006). Based on present geomorphological conditions near the APE, the following depositional settings, elevations, and deposit proxies have been established: channel axes -30 to -10 ft elevation (sand and/or gravel), channel margin -5 to +5 ft elevation (sand > mud, no roots), flood plain 0 to +20 ft elevation (mud > sand, roots, peat, soil profiles). Based on reported historic and geologically dated events in the Lower Columbia River Valley, the following stratigraphic intervals have been established for the CRC APE: historic fill (<150 yr BP), late-Holocene (150-7,000 yr BP), early Holocene (7,000-12,000 yr BP), and Pleistocene or older (>12,000 yr BP).

Eighty borehole logs were selected to establish stratigraphic cross-sections of age and deposit settings in the APE. Key stratigraphic units include: (1) fill debris; (2) latest-Holocene flood deposits (below 35 ft elev.); (3) Mazama ash at 7,000 yr BP; (4) onset of earliest-Holocene submergence (above -230 ft elev.); (5) latest-Pleistocene rhythmites (12,000 yr BP); and (6): late-Pleistocene, or older, gravels (>12,000 yr BP).

Historic fill in the boreholes ranges from 0 to 30 ft in thickness. Late-Holocene deposits in the Lower Columbia River Valley, between Vancouver and Columbia Slough, extend down to about -50 ft elevation. Early-Holocene deposits under the modern Columbia River channel and Hayden Island reach -230 ft elev. Late-Pleistocene gravels mantle the upland valley terraces in Vancouver and near Columbia Boulevard in North Portland. In Vancouver, Pleistocene rhythmites mantle the Pleistocene gravels, where the rhythmites have not been excavated. Only the Holocene deposits in the submerged river valley, and preserved topsoils on the Pleistocene rhythmites, include strata that are younger than 12,000 yr BP.

Early historic positions of river shorelines, slough shorelines, and flood plain geomorphic features are established from early navigation charts (1841) and vertical aerial photographs (1936). A shoreline change comparison (1841 to 2006) shows a slight widening and lengthening of Hayden Island, demonstrating high, natural preservation potential for river shorelines and adjacent flood plains associated with that island. The shoreline change map also indicates stability, and associated high preservation potential, of the Oregon Slough shorelines in the project vicinity between 1841 and 2006.

The 1936 airphoto mosaic delineates flood plain features between Oregon Slough and Columbia Slough that existed in the APE prior to flood control and urbanization in the mid-1900s. Features mapped for potential archaeological resource locations include abandoned pond and drainage channel shorelines, elevated channel levees, and adjacent flood plains with 200-foot setbacks. The present I-5 corridor and interchanges cross at least five early-historic to latest-prehistoric flood plain channel and levee settings between Oregon Slough and Columbia Slough.

Based on the data obtained in this study, the northern (Vancouver) section of the APE appears to have little potential for pre-European contact archaeological resources below the bottom layers of Holocene soils. Where that prehistoric topsoil has been excavated, only Pleistocene deposits (> 12,000 yr BP) should occur below artificial fill. The central section of the APE (modern Columbia River channel) will also have little potential for preservation of archaeological resources due to active channel erosion processes.

In comparison, the southern section of the APE, including Hayden Island and south to Columbia Slough, should have high potential for the preservation of archaeological sites. A broad flood plain with overflow chutes, drainage channels, sloughs, and ponds has developed over thousands of years in that area. Continuous flood plain deposition, with no major channel erosion, has likely assured very high preservation potential of flood plain deposits and any hosted archaeological resources to depths of 50 feet subsurface. The presence of Mazama ash at this depth in Delta Park indicates that the main channel axis (thalweg) did not migrate south of Oregon Slough since the ash was deposited, so there is likely 7,000 years of semi-continuous sedimentation and preservation in this area of the south shore flood plain.

Vertical Elevation Datum Conversions

Several datum conversions are used in this analysis of existing subsurface conditions. The older borehole data (1960-1980s) are surveyed to the NGVD 1929 datum. The CRC project datum is NGVD88. The conversion from NGVD29 to NGVD88 is taken to be 3.47 feet (Exhibit A-1). Other datums used in the project area include the Columbia River datum (COE CR datum–close to NGVD29 datum) and the MLLW datum (NOAA MLLW datum–about a foot lower than NGVD29 datum). The diurnal tidal range at Vancouver is 1.8 feet (NOAA 2001).

Historic Channel Depths

An early historic chart drafted in 1841 by the Wilkes Expedition shows the main channel of the Columbia River between Vancouver and Hayden Island (Exhibit A-2). This is the earliest bathymetric and shoreline map obtained for the CRC APE in this study (Wilkes 1845). The original text of the Wilkes Expedition report was examined at the Oregon Historical Society to establish the surveying accuracy for this 1:6,000 scale chart. The shoreline and control points for the sounding lines were surveyed by two sets of three vessels each, positioned on opposite sides of the channel. Using cannon fire to time positioning measurements, each vessel surveyed the other five vessels and common shoreline points to establish triangulations from known baselines.

Sightings were made with 18 inch azimuth circles mounted on 3-5 foot long sighting scopes. Such instrumentation should provide better than 10 minute arc accuracy, which should yield better than 3 m error over 1 km distance. Within the Vancouver Channel area, the shoreline positions are assumed to be within 10 m relative accuracy. Sounding was performed along lines flagged on either side of the channel. Measurements over shallow shoals are provided to the nearest foot. Measurements over deeper channels are provided to the nearest half fathom (one fathom is approximately six feet in depth).

In 1841, the Columbia River channel ranged from 2-9 fathoms and the channel thalweg averaged 4-5 fathoms or 24-30 feet depth in the CRC vicinity. Oregon Slough was an important secondary channel in 1841, reaching 20 ft depth at the time of surveying. The Columbia Slough was apparently too small to have been recorded in the 1841 chart. At the time of the Wilkes Expedition the longitudinal bar complex, separating the Columbia River from Oregon Slough, was divided into three islands, called McTavish Island (west), Joe Island (central) and Barclay Island (east). The longitudinal bar lengthened and consolidated after 1841 to yield the Hayden and Tomahawk Islands mapped in 1933 (see COE charts below).

A US Army Corps of Engineers archive chart from 1933 provides another record of main channel axis thalweg depths prior to tributary dam impoundment and major diking in the CRC vicinity (Exhibit A-3). Thalweg depths range from 15-22 feet, but rarely exceed 20 feet below the Columbia River datum (CRD), about mean sea level (MSL). In this report an average, natural channel depth for the main channel of the Columbia River is assumed to be about 20 feet below seasonal low water, or the Columbia River datum near MSL.

As shown on a modern bathymetric chart (COE 2006), the dredged turning basin of the Port of Vancouver in the Columbia River between Hayden Island and Vancouver is maintained by dredging to about -40 feet MLLW (Exhibits A-4a and A-4b). The channel above the I-5 bridge crossing is maintained to -27 ft CRD for barge traffic.

Historic Flood Elevations and Modern Flood Plain Heights

The 1948 flood height in the North Portland area (Exhibit A-5) was measured at +32.8 feet NGVD29 (Gates 1994). The flood of 1894 is reported to have had a slightly higher elevation. These floods are considered, for the purposes of this study, to represent 100-year flood events. These ~100 yr floods of the Columbia River represent natural maximum floods during late-Holocene time prior to tributary impoundments. For this study, the elevations of latest-Holocene flood silts are assumed to reach not more than 35 feet NGVD29.

Elevations bounded by Columbia Slough to the south and the present Columbia River channel to the north range from 0 to 30 ft NGVD29 (Exhibits A-6a and A-6b). The mapped 30 ft NGVD29 elevations are associated with artificial fill at channel bank dikes, roadways, and elevated parking lots. By comparison, the 20 ft contour encompasses some broader areas not associated with dikes and artificial structures on Hayden Island and East Delta Park. Approximately 50 percent of the Hayden Island surface area adjacent to the CRC APE reaches 20 ft NGVD29. Less than 10 percent of the Delta Park-Vanport

surface areas reach 20 ft NGVD29. West of the CRC APE (3-5 km distance), Smith and Bybee Lakes fall below the 10 ft elevation contour. Perennial vegetation occurs at +5 ft NGVD29, and woodlands occur at +10 ft NGVD.

In this study, the 20 foot elevation contour (NGVD29) is used as the maximum elevation of significant, seasonal flood plain deposition in latest-prehistoric time. Flood plain elevations less than 20 ft NGVD29 represent areas of limited flood deposition due to young age and/or distance from the Columbia River channel. The flood plain elevation reflects relative stability (age) and proximity to sediment supply from the main Columbia River channel.

Late Pleistocene Glacial Flood Deposits

Cemented, weathered, and/or substantially consolidated, gravel-bearing, naturally-stratified deposits above the Holocene flood heights of 35 feet NGVD29 are assumed, for the purposes of this study, to represent Pliocene-Pleistocene deposits (Exhibit A-7). These deposits are referred to as either Troutdale (cemented) or Pleistocene (uncemented) fluvial gravels (Trimble 1963; Beeson and Tolan 1993). The upper member of the Troutdale formation, including sand, cobbles, and boulders, ranges from about 5 million to 2 million years in age.

The younger Pleistocene gravel deposits could range from 2 million years in age to the last ice age, e.g., the late Wisconsin 75,000 to 10,000 yr BP. The younger Pleistocene gravels occur well above the present grade of the Columbia River, indicating changing base levels in late-Pleistocene time (Exhibit A-8).

Cataclysmic Glacial Lake Flood Deposits

Uncemented, unaltered, minimally consolidated, naturally-stratified, sand and silt deposits at elevations higher than the historic flood heights or latest Holocene floods ~35 ft NGVD29 are assumed to represent cataclysmic flood deposits from glacial Lake Missoula and/or periglacial loess (Gates 1994). These flood deposits were produced by multiple glacial dam bursts, resulting in numerous sequences of fining-up beds called rhythmites. These deposits were locally remobilized to form interbeds of loess (Lentz 1983). For the purposes of this study, the cataclysmic rhythmites and loess are lumped together as latest-Pleistocene periglacial deposits.

The youngest glacial flood deposits from Lake Missoula that inundated the Lower Columbia River and Willamette valleys are dated to about 12,000 radiocarbon years BP (Benito and O'Connor 2003). These catastrophic flood deposits reach ~350 feet above MSL in the Willamette Valley. The upland terraces adjacent to the north and south sides of the Columbia River valley in the project vicinity are covered by the glacial flood rhythmites (Beeson et al. 1991). Drop stones ranging from pebbles to boulders melted out of glacial ice rafts and are occasionally interbedded with the cataclysmic sand and silt rhythmites. Waning cataclysmic floods and/or smaller floods likely eroded the debris out of the Lower Columbia River Valley after 12,000 years BP, carrying the remobilized sediments downriver (see Columbia River Valley sea level curve in Exhibit A-11).

Mazama Ash

Several eruptions in early Holocene time (7-12,000 years BP) could have produced tephra layers in the Lower Columbia River Valley. For example, the Mt St Helens J tephra is dated between 8,300 +/- 300 and 11,700 +/- 230 yr BP. There are four separate tephras from Glacier Peak dated from approximately 11,200 and 13,000 yr BP (Sarna-Wojcicki et al. 1983). Tephras from these eruptions have not been reported in deposits in the CRC vicinity.

The catastrophic eruption of Mt Mazama at about 7,000 yr BP (Bacon 1983) produced abundant unconsolidated tephra in the eastern tributary basins of the Columbia River, and some tributaries of the Willamette River. These tributaries supplied fine-grained ash to the Lower Columbia River and Willamette River near its confluence with the Columbia River, forming a discrete key horizon of less than one foot to 35 feet in thickness (Gates 1994). The layer is identified by anomalous high standard penetration test (SPT) blow counts relative to hosting flood plain deposits, by its uniform fine silt size, and by its anomalous tan to light gray color (Ken Robbins, personal communication, 1992).

An isopach map for the Mazama tephra layer in the project vicinity has been prepared by Ken Robbins, a geologist with extensive experience in mapping the distribution of Mazama ash in the Lower Columbia Valley (Robbins 1992). This map shows the ash to vary from less than 2 feet to as much as 10 feet in thickness (Exhibit A-9). Corresponding borehole depths (proprietary industry data) indicate an average elevation of the ash layer at about -50 feet MSL in the Delta Park area. Gates (1994) used calibrated elevations to place the ash layer at -49 to-56 feet NGVD29 in the Vanport locality, -52 to -54 feet NGVD29 at the North Marine Drive locality, -50 to -56 feet NGVD29 in West Delta Park, and -51 feet in East Delta Park.

The Mazama tephra layer, when identified, establishes a key stratigraphic horizon in mid-Holocene time (7,000 yr BP). This was a critical time of declining rate of sea level rise (globally) and declining tide level rise (Columbia River tidal basin) as shown in the Columbia River tide level curve (see Exhibit A-11). The declining rate of tide level rise resulted in decreasing accommodation space for river sediment, more sediment bypassing through the river, and possibly changing stability of some flood plains.

The Mazama ash is used as a key time line in this report to break the Holocene fill into later-Holocene (post-Mazama) and earlier Holocene (pre-Mazama) time. Where the ash layer is missing or unidentified in boreholes it is assumed that the Mazama time line occurs at -50 feet (paleo-sea level at 7,000 yr BP) in the Delta Park-Vanport areas. Channel erosion (-20 ft depth) and flood plain deposition (+20 ft height) add +/-20 ft uncertainty to this arbitrary depth estimate.

No Mazama ash layers are reported from Oregon Slough or Hayden Island. This observation may reflect the sampling system used for investigations in this area and does not mean that such ash layers do not exist in this area, or that layers were deposited and subsequently washed away. One recent borehole in the main channel (CRC-RC-003) does record an anomalous ash layer, e.g., lenses of ash, at 53 ft NGVD88 that is consistent with the Mazama ash deposit depths in the Delta Park area.

Later Holocene Tephras and Lahars

Several volcanic tephra or lahar (volcanic debris flow) producing events could have yielded key beds in the Lower Columbia River Valley (Exhibit A-10). Three of these Late Holocene events have left distinct deposits in the Sandy River Delta area upstream of the project area (Gates 1994; Peterson and Madin 1997; Rapp 2005).

Columbia River Valley Sea Level Curve

A sea level curve is provided for the Lower Columbia River Valley in Exhibit A-11. The vertical datum for the sea level curve is NGVD88 (Peterson et al. 2007). The Columbia River is presently tidally controlled from the mouth to Bonneville Dam. The tidal range in the project area is about 1.8 feet.

As sea level rose from a depth of -110 m (-360 ft) since 16,000 years ago, the ancestral Columbia River Valley was submerged. Sea level would have extended upslope (landward) in the ancestral Columbia River Valley to an elevation of -70 m (-230 feet) relative to modern sea level at 12,000 years before present. The -230 ft depth (-70 m) corresponds to the maximum 12,000 yr BP period of interest for archaeological site formation and preservation established for the project area. Coincidentally, the -230 ft NGVD88 is close to the maximum depth of Holocene fill in the project vicinity.

At the time of Mazama ash deposition (7,000 yr BP), sea level in the Lower Columbia River Valley would have reached -12.5 m (-41 ft) NGVD88. The greater depth of ash strata in the Delta Park and Vanport localities of the project area (about -50 ft NGVD88) implies that the ash was deposited in shallow channels or flats of about 10 ft depth. The 50 ft elevation is used for the early-to-late Holocene transition, where the ash layer is absent in the APE. The declining rate of sea level rise after 7,000 yr BP resulted in sea level approaching its present elevation by several thousand years ago. Sea level, and corresponding river level, in the project area has risen only 3 m in the last three thousand years, e.g., about 1 mm yr^{-1} rate of sea level rise.

River floods of 20 feet above seasonal low river level at 3,000 years ago would have reached +10 ft NGVD29. Therefore, flood plain deposits at elevations of +15 to +20 ft NGVD29 in the project vicinity are expected to be less than a few thousand years old. Flood plains of less than +10 ft elevation should have filled in well over a thousand years ago. Flood plains of 0 to +5 ft NGVD29 in the project vicinity are presumed, for the purposes of this report, to have developed very recently from either channel migration or avulsion.

Relative Dating of Quaternary Deposits

The relative ages of the Quaternary deposits summarized above are used to establish timelines or target horizons that could be recognized in boreholes, auger cores, or trench walls in the APE. The target units are listed from youngest, modern fill, to oldest, Sandy River Mudstone (Exhibit A-12). In their borehole log notes, drilling inspectors identify modern fill based on anomalous coarse fragments of gravel, brick, asphalt, and concrete, as well as on disturbed, oxidized soils.

Unfortunately, no radiocarbon dates are available from any of the boreholes in the immediate vicinity of the APE. Mazama ash is recorded from some industry boreholes in the Delta Park area of the project area (see Borehole Compilation below). The Timberline lahar is established upriver at the I-205 bridge crossing (Rapp 2005). The Old Maid lahar is established in the Sandy River Delta, upriver of the I-205 bridge (Rapp 2005).

A flood following breaching of the Bonneville Landslide Dam across the Columbia River at present-day Bonneville Dam has been asserted to have had catastrophic effects on native peoples downstream and to represent a "major chronological marker throughout the Lower Columbia Valley" (Pettigrew 1981:121). Originally radiocarbon dated to around AD 1250, more recent attempts at determining the date of the landslide place this event between AD 1415 and AD 1455 (O'Connor 2004:420fn).

A close examination of cut banks in the Sandy River delta by Peterson and Madin (1997) did not yield any evidence of a catastrophic flood in the exposed continuous sections extending from the present surface down to a tephra layer, thought to be the Mt St Helens SetW horizon at 400-500 years BP. Two charcoal-based radiocarbon dates of 250 +/- 70 and 410 +/- 70 uncalibrated RCYBP bracket the section observed by Peterson and Madin (1997). More recent work in the Sandy River Delta (Rapp 2005) also failed to identify any evidence of anomalous flooding associated with breaching of the prehistoric Bonneville Landslide dam.

For this study, the Holocene deposits were arbitrarily divided into later-Holocene (after 7,000 yr BP) and earlier-Holocene (prior to 7,000 yr BP) based on presence of the Mazama ash layer (Exhibit A-12). Where the ash layer is not reported in borehole records we use elevation proxies from the Sea Level Curve (Exhibit A-11) to establish post-Mazama deposits above – 20 ft NGVD29 and pre-Mazama deposits below -60 ft NGVD29. These elevations occur +/- 20 ft from the 40 ft elevation predicted for the 7,000 yr BP paleo-tidal level in the submerged Columbia River system. For purposes of stratigraphic cross-section drafting, 50 ft NGVD29 is used as a conservative elevation for the early-to-late Holocene transition in the APE.

The relative ages of the deposits serve as a proxy for archaeological site formation in early historic time, latest Holocene, mid-Holocene, and early Holocene time. No archaeological site preservation in the Lower Columbia River Valley is expected from deposits that predate the 12,000 yr BP cataclysmic floods. However, intact topsoils on top of the Pleistocene deposits from the valley sides could host archaeological sites from that time. The intact topsoils of the Pleistocene deposits represent targets for archaeological site identification. In contrast, the Holocene deposits in the submerged Lower Columbia River Valley are capable of hosting archaeological sites below the topsoil. Due to river-valley submergence, the middle and early Holocene deposits in the CRC APE are deeply buried (see Cross Sections below).

Unfortunately, the absence of radiocarbon dates from any intervals in the APE precludes further refinement of deposit stratigraphy, landscape evolution, or ages of potential archaeological site formation in subsurface sediments (see Suggested Additional Work below).

Holocene Depositional Environments in the CRC APE

For the purposes of this study, key depositional environments or settings in the APE are related to sediment composition and stratigraphic sequence. Specific settings are established from facies distribution and stratigraphic sequence, following Walters Law of Lateral Facies and Vertical Sequences. The depositional environments are flood plain, channel margin, shallow channel, and channel axes (thalweg). Shoaling-up sequences are expected in order of shallowing environments, e.g., flood plain over channel margin over channel axes. Erosional lag and basal gravel over pre-Holocene contact are considered to be "in-channel" deposits, but are not restricted to specific depth intervals.

The depositional settings listed above roughly correspond to different river levels as established from most-recent, natural, borehole sediments and corresponding elevations (Exhibit A-13). NOAA (2001) charts show modern, undredged, channel scour to maximum depths -30 ft NGVD29 in the CRC vicinity at RM 106-107. COE (2006) shows a maximum depth of -50 ft CRD at RM 108. Vegetated flood plain (+ 5 ft NGVD29) and forested flood plain (+10 ft NGVD29) are established from USGS topographic maps.

The shallower (higher) depositional settings have a higher probability of archaeological site formation and, most importantly, of site preservation potential. Archaeological sites should not be expected in the channel axes. Lateral migrations of river channels are likely to erode archaeological sites from shallow channel or channel margin environments, though remobilized artifacts might be found (their original depositional context lost). Flood plains, and particularly stable flood plains, have the greatest potential for occupation and for preservation of archaeological sites (Minor et al. 1994; see Cross Section Settings below).

Borehole Compilations

Geotechnical testing by borehole drilling provides useful constraints on identifying units with potential for hosting archaeological sites. Unlike water well drilling, the core tops of geotechnical borings are surveyed for position and elevation. The drilling depths are accurately measured. Soil types are recorded in a systematic manner using the Unified Soils Classification System. Dominant and minor grain size fractions and their relative distribution about the mean (grading) are recorded for the sample intervals. In addition, SPT blow counts and soil structure are recorded.

The borehole logs do not record other important information such as soil profile development, rooted zones, middens, hearth charcoal, fire-cracked rock, or small artifacts. The discontinuous sampling strategy, e.g., 6-inch disturbed samples, collected at intervals every 5 feet or 10 feet downcore, can miss thin cultural horizons, artifacts, ash layers, peat layers, and paleosols that would be observed in continuous auger coring or trenching (see Suggested Additional Work below).

The geotechnical borehole logs used in this study (122 in number) were obtained for bridges and other structures requiring substantial foundation design. There is no regular spacing or alignment of the borehole sites relative to depositional settings or deposit age.

For this report we focus on boreholes completed for the Washington and Oregon Departments of Transportation. These boreholes are identified in agency sites maps (Exhibit A-14). Many of the highway department boreholes, and some other agency boreholes, have been located by the project team (Exhibit A-15). Locations are provided in South Washington State Plane coordinates.

Additional industry boreholes in the project area utilized in this study occur in areas not tested by the public agencies or include records of ash layers at depth. Most of the early DOT boreholes in the Columbia River valley (1950-1980) do not penetrate to the pre-Holocene contact, e.g., flood gravels or the Troutdale formation in the Columbia River valley. The deeper industry boreholes reported here do reach basal gravels or the Troutdale formation. The industry borehole data is proprietary, but has been summarized by Gates (1994) (Exhibit A-16). Gates provides the borehole locations in UTM coordinates (NAD83). Elevation of the industry boreholes is given relative to NGVD29.

The borehole sites compiled for this study are located by project Map Numbers (3.1 to 3.10), as shown in Exhibit A-17. Maps 3.1-3.7 are in Oregon and Maps 3.7-3.10 are in Washington (Exhibit A-18).

Columbia River Crossing APE Cross-Section Ages

The borehole logs contain limited proxy data on estimated deposit age (Exhibit A-12) relative to depth or elevation. The age intervals are estimated from (1) driller's notes on artificial fill (borehole top) or basal gravel (borehole bottom); (2) paleo-tidal level at 12,000 yr BP (-230 ft NGVD29); (3) Mazama ash at 7,000 yr BP; (4) paleo-tide level curve estimated at 7,000 yr BP (-50 ft NGVD29); and (5) elevation of deposits above the reach of late-Holocene Columbia River flooding (+35 ft NGVD29). The ages of the borehole strata are shown in Exhibits A-19a, A-19b, and A-19c.

As shown in Exhibit A-16 artificial fill is reported to extend below the red markers in corresponding boreholes. Many of the earlier borehole logs (particularly from the 1950s through the 1970s) lack any mention of fill. Late Holocene (0-7,000 yr BP) deposits extend below the orange line in the Cross-section Ages exhibits. Early Holocene (7-12,000 yr BP) deposits extend below the green line. Pleistocene (last ice age) deposits extend below the blue line. Yellow markers are reports of Mazama ash (7,000 yr BP) from the boreholes.

The Holocene fill in the central Columbia River valley reaches -260 ft elevation. Deeper water wells in the area indicate that Sandy River formation mudstone exists below the Troutdale formation cemented gravels that form the floor of the deepest part of the ancestral Columbia River valley. The color scheme used in Exhibit A-19 to show the stratigraphic age sections ranges from youngest (warm colors) to oldest (cool colors). The inversion of colors on the flanks of the ancestral Columbia River valley results from a transition of Holocene submergence in the valley axis to draping of Pleistocene flood deposits on the valley sides.

Pleistocene and older deposits cover all of the Vancouver section of the APE. Intact topsoils (where they still exist in the project area), but not underlying parent Pleistocene

deposits, could contain archaeological resources. The Pleistocene deposits predate the 12,000 yr BP termination of cataclysmic floods in the Columbia River Valley.

Columbia River Crossing APE Cross-Section Settings

The borehole logs are evaluated for proxy data on depositional settings (Exhibit A-13). For the purposes of this study, the depositional settings are grouped into six categories: (1) active channel, (2) flood plain, (3) channel margin, (4) channel axes, (5) Pleistocene rhythmites, and (6) Pleistocene gravels. The relations between these depositional settings and their relative elevation and position along the project corridor are shown in Exhibits A-20a, A-20b, and A-20c.

Near the southern boundary of the APE the Pleistocene flood rhythmites overlie older Pleistocene gravels on the valley terraces. At Columbia Boulevard near Delta Park, the Holocene fill deposits transition with increasing depth and increasing distance north from dominantly flood plain to mixed flood plain and channel margin deposits. This part of the APE was not influenced by the main Columbia River channel in late Holocene time.

The central section if the APE between Oregon Slough and Vancouver is dominated by lithologic proxy data for channel axes deposition. The main channel(s) of the Columbia River have influenced the central section, at least episodically, for the entire period of Columbia River valley filling (12,000 yr BP to the present).

The north section contains only Pleistocene deposits. Flood silts and sands (Pleistocene rhythmites) overlie and extend well east of the Pleistocene gravels in the Vancouver area. The gravels might predate the cataclysmic floods. They appear to represent much higher base-level grades, e.g., riverbed elevations, of the ancestral Columbia River. The lack of cementation and/or very-high blow counts in these gravels indicates that they post-date Troutdale Formation deposits. Missing Pleistocene rhythmites from the borehole tops in South Vancouver area (near the BNSF rail line) probably reflect deep roadway excavation into the Pleistocene deposits in the immediate vicinity of I-5. Intact rhythmite deposits might exist on the east and west flanks of the excavated roadway.

Columbia River Crossing APE Stratigraphic Fence Diagram

Both the summarized deposit age and depositional setting data are combined in a stratigraphic fence diagram for the APE (Exhibit A-21). The fence diagram data are taken from the most representative and complete borehole sites in the APE. As previously discussed, the flood plains are thought to have the greatest potential for archaeological site formation and preservation from channel erosion. Furthermore, only Holocene fill deposits (0-12,000 yr BP) and intact topsoils developed on the Pleistocene rhythmites are expected to contain significant archaeological remains. These deposits are bounded by red lines in the fence diagram.

Oregon Flood Plain Surface Topographic Features

Stable shorelines and adjacent elevated flood plains are expected to have the greatest potential for archaeological site formation and geologic preservation in the APE (Minor et al. 1994; see Holocene Depositional Environments). A reconnaissance-level analysis of

the latest-prehistoric to early-historic geomorphology of the APE is based on comparison of historic charts, historic airphotos, and modern satellite images.

The earliest bathymetric chart obtained for the study area was drafted in 1841 by the Wilkes expedition (Wilkes 1845). The Wilkes chart (Exhibit A-2) showing present-day North Portland was rotated (bearing) and scaled (fixed length to width ratio) to overlay on the modern shoreline geometry, based on recent GoogleEarth ™ satellite imagery (Exhibit A-22). Alignment and scaling were based on two control points, Fort Vancouver and the confluence of the Willamette and Columbia rivers.

An analysis of north Columbia River bank fit from Fort Vancouver to the Willamette River confluence between the Wilkes Chart (1841) and the present-day (2006) shoreline yields a length-normalized mean error of less than five percent. By comparison, the shorelines of Hayden Island and the northwestern portion of Oregon Slough show significantly greater change between the 1841 chart and the present-day. Hayden Island has generally widened and lengthened upriver by adjoining to a younger longitudinal bar (Tomahawk Island) that grew from a south bank promontory. There is little to no apparent change in shoreline position of the southeastern Oregon Slough shorelines between the 1841 chart and the present-day.

The preliminary analysis of historic shoreline change suggests high-preservation potential (notwithstanding modern disturbances) for earliest-historical archaeological sites (1840-1900) on the banks of Hayden Island and Oregon Slough. Small, net shoreline accretion likely buried and preserved the earliest historic shorelines in the APE. Evidence of an accreting shoal located just downstream, e.g., northwest, of the Hayden Island north bank at the existing I-5 bridge is evident in a historic airphoto from 1938 (Exhibit A-23).

The earliest vertical airphoto coverage for the project area obtained for this study is from 1936. Overlapping airphoto images, totaling six in number, were stitched together to form a non-rectified airphoto mosaic shown in Exhibit A-24. The airphotos were used to establish the 1936 shorelines in the APE. The shorelines include those of the Columbia River and Oregon Slough, which were adjacent to major waterways, trade routes, and eventually ship lanes. Additional shorelines include those of runoff sloughs, abandoned flood chutes, and cutoff lakes of the Delta Park and Vanport flood plains.

In addition to the 1936 shorelines that bounded low, river-stage water bodies, older shorelines, termed earliest-historic shorelines, are outlined in Exhibit A-24. The early-historic shorelines are identified based on vegetated levees apparent in the high-resolution airphotos. Due to high-preservation potential in the protected flood plains, these older shorelines, possibly extending to the latest-prehistoric in age, are likely to represent potential locations for archaeological sites.

For this study, a 200-foot setback is used to highlight the 1936 shorelines, the early-historic shorelines, and adjacent elevated floodplains, shown by boxes in Exhibit A-24. The boxed shoreline and levee sites are differentiated by elevation corresponding to inter-annual flooding (10-20 ft elevation) and annual flooding (0-10 ft elevation). Annual seasonal flooding of the Delta Park area left large bodies of standing water throughout winter and spring months (Exhibit A-25). Dikes and floodgates constructed throughout

the early 1900s along with subsequent runoff impoundment in 128 dams on the Columbia River system, reduced flooding, eventually permitting the urban development that dominates the landscape there today.

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Exhibit A-1. Elevation Datum Conversion Table

Known Datum to Wanted Datum		
City of Portland	-1.375	USC & GS 1947
City of Portland	-1.375	ODOT ORE ST HWY TRANS
City of Portland	-1.375	NGVD 29 (Approx)
City of Portland	-1.375	NGVD 27 (Approx)
City of Portland	+2.10	NAVD 88 (Approx)
City of Portland	-2.92	Weather Bureau Gauge, Morrison Bridge
City of Portland	-3.22	US Engineers Gauge, Stark Street
City of Portland	-3.22	US Engineers Gauge Vancouver

Exhibit A-2. Wilkes Expedition Chart (1841, Sheet 5) of the CRC Area, from the Willamette River Confluence (Lower Left) to Fort Vancouver (Upper Right) (from Wilkes 1845)

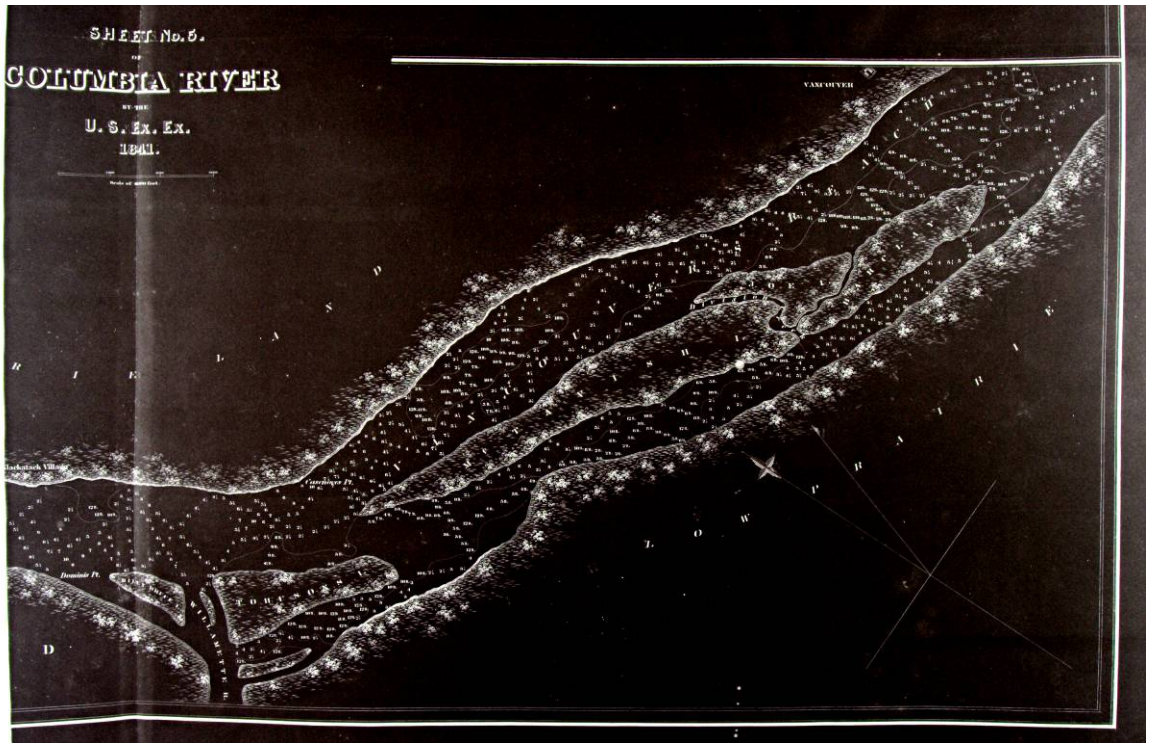


Exhibit A-3. COE Bathymetric Chart (1933) of Columbia River Main Channel between Hayden Island and Vancouver in the CRC Project Area

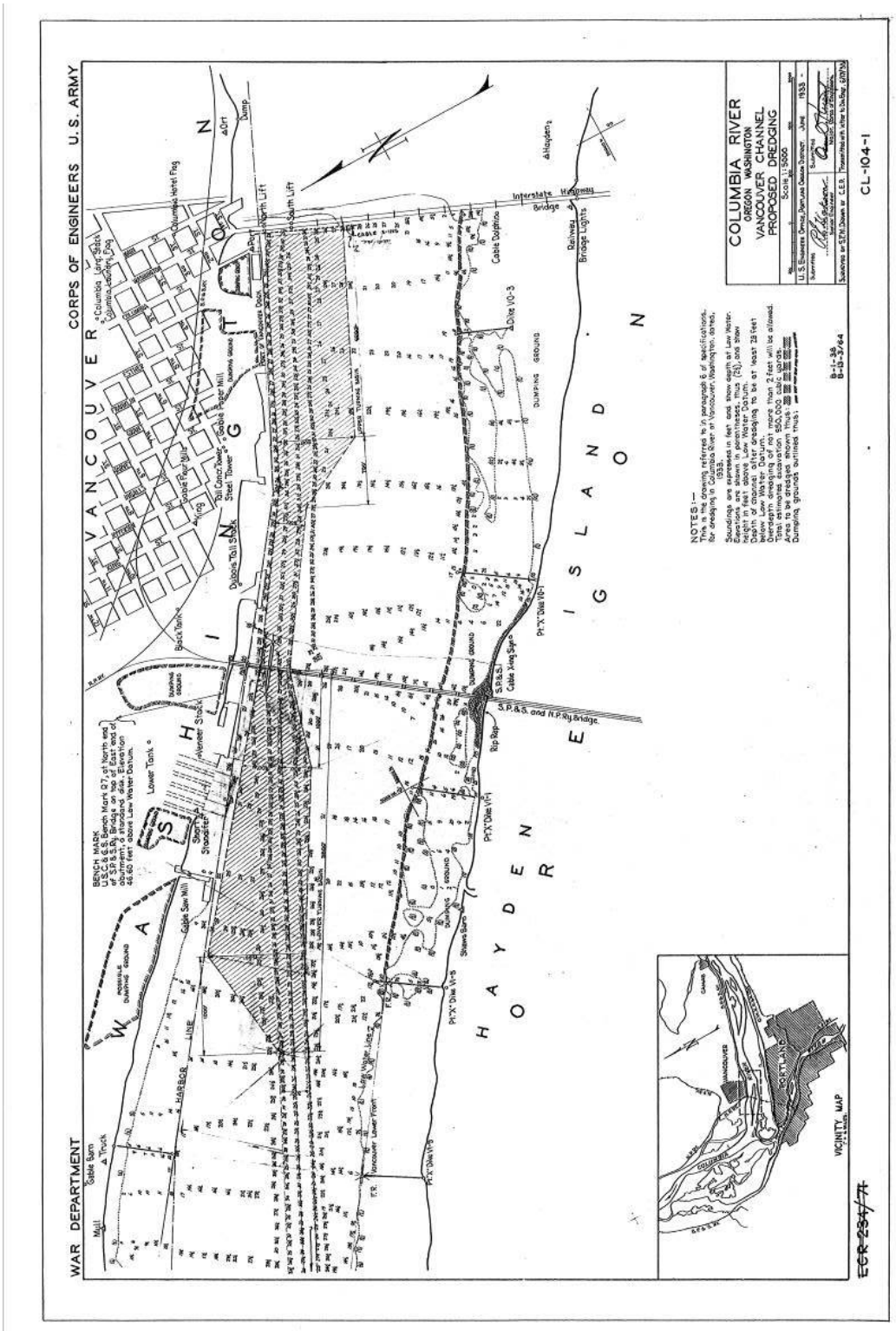


Exhibit A-4a. Modern COE Bathymetric Chart (2006) Showing Maintenance Dredging Depths in the Columbia River Main Channel West of I-5 Between Hayden Island and Vancouver

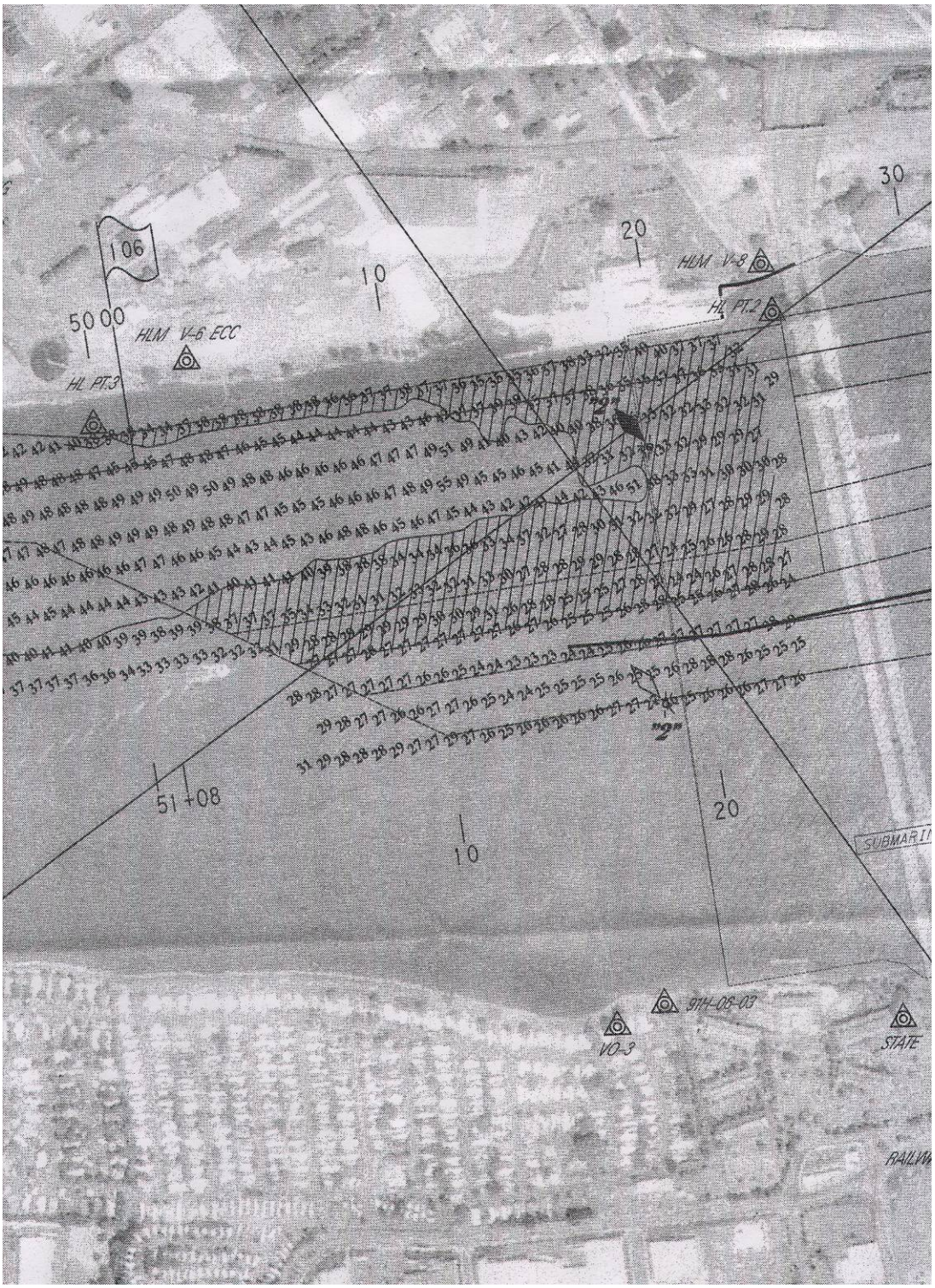


Exhibit A-4b. Modern COE Bathymetric Chart (2006) Showing Maintenance Dredging Depths in the Columbia River Main Channel East of I-5 between Hayden Island and Vancouver

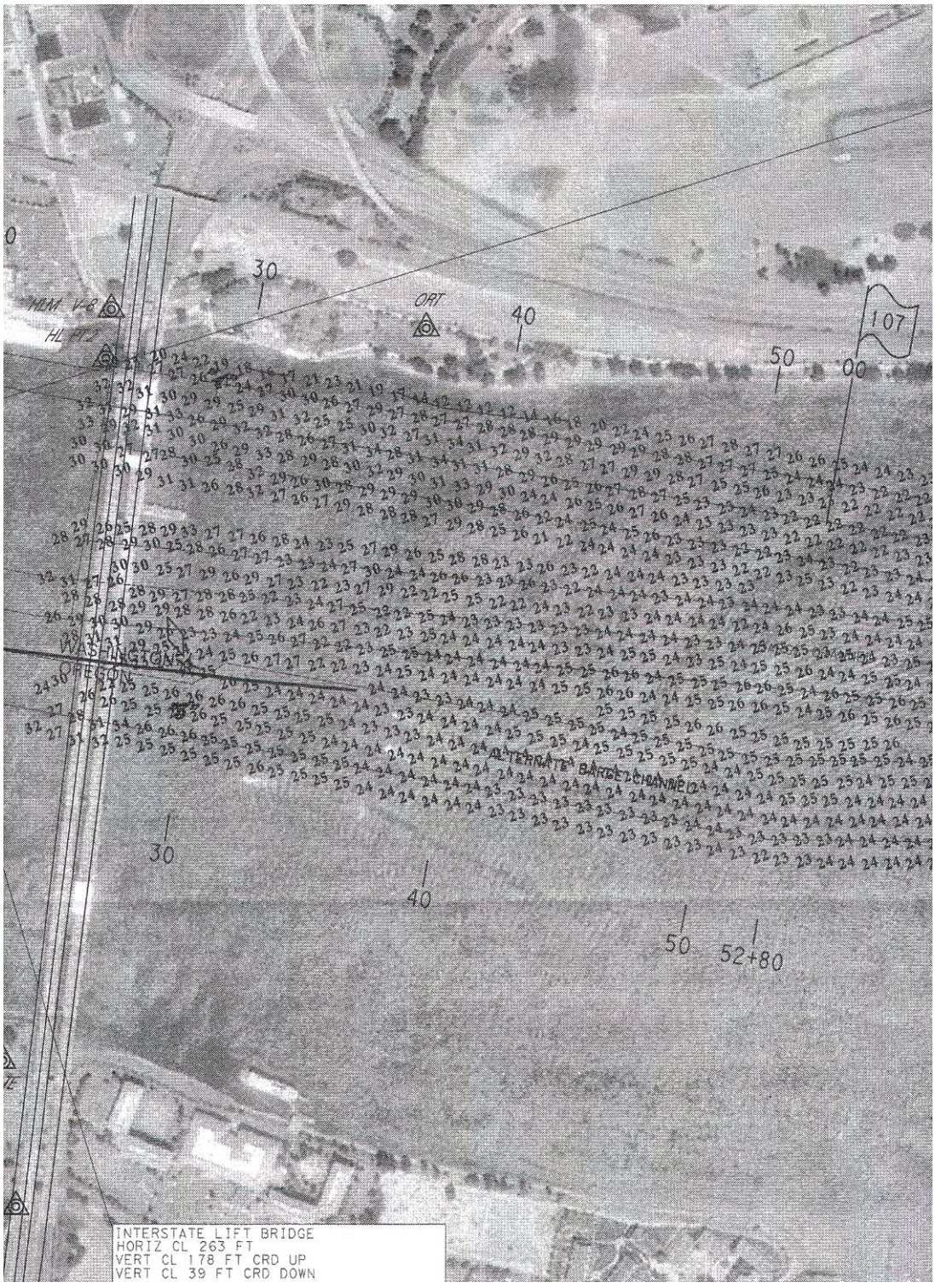


Exhibit A-5. Ground Photo of 1948 Flood Deposits at Vanport in the CRC Vicinity (Oregon Historical Society Photograph)

Exhibit A-6a. USGS Portland 7.5' Quadrangle (1990) of CRC Vicinity East to PDX Airport

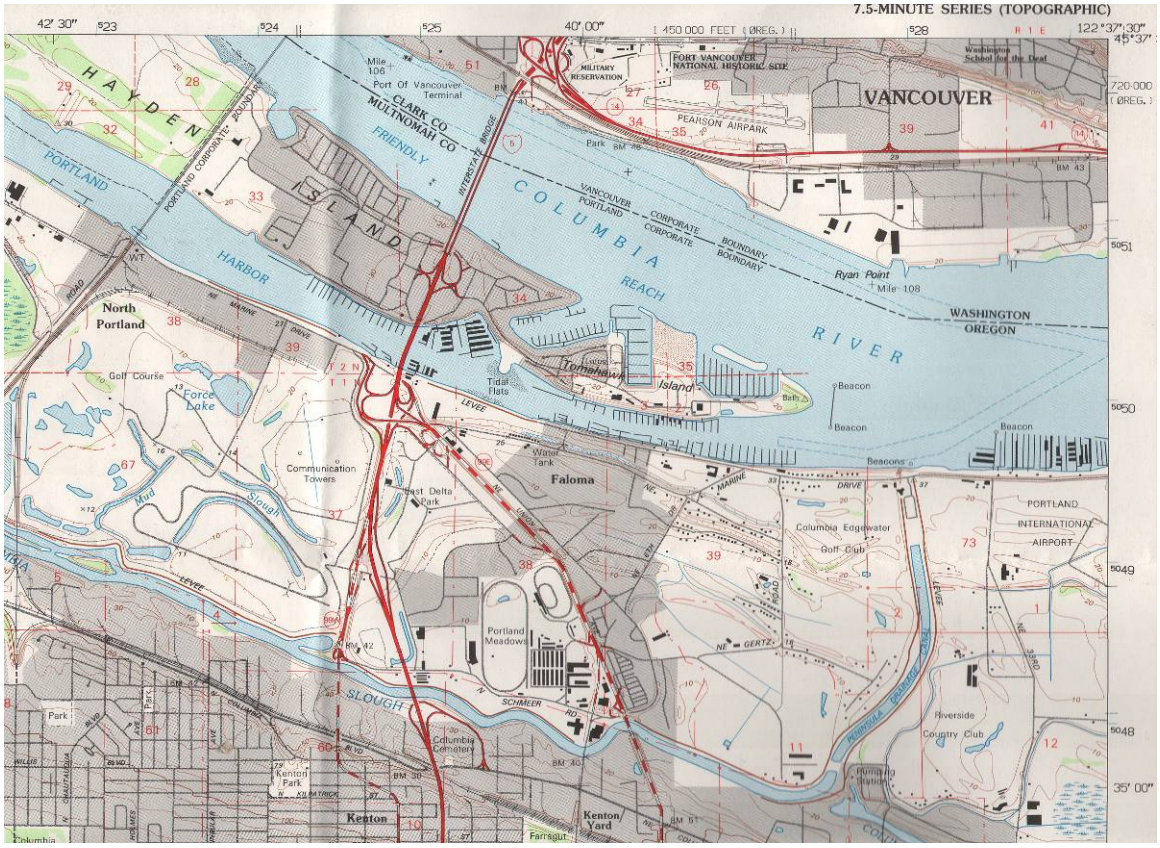


Exhibit A-6b. USGS Portland 7.5' Quadrangle (1990) of CRC Vicinity West to Smith and Bybee Lakes

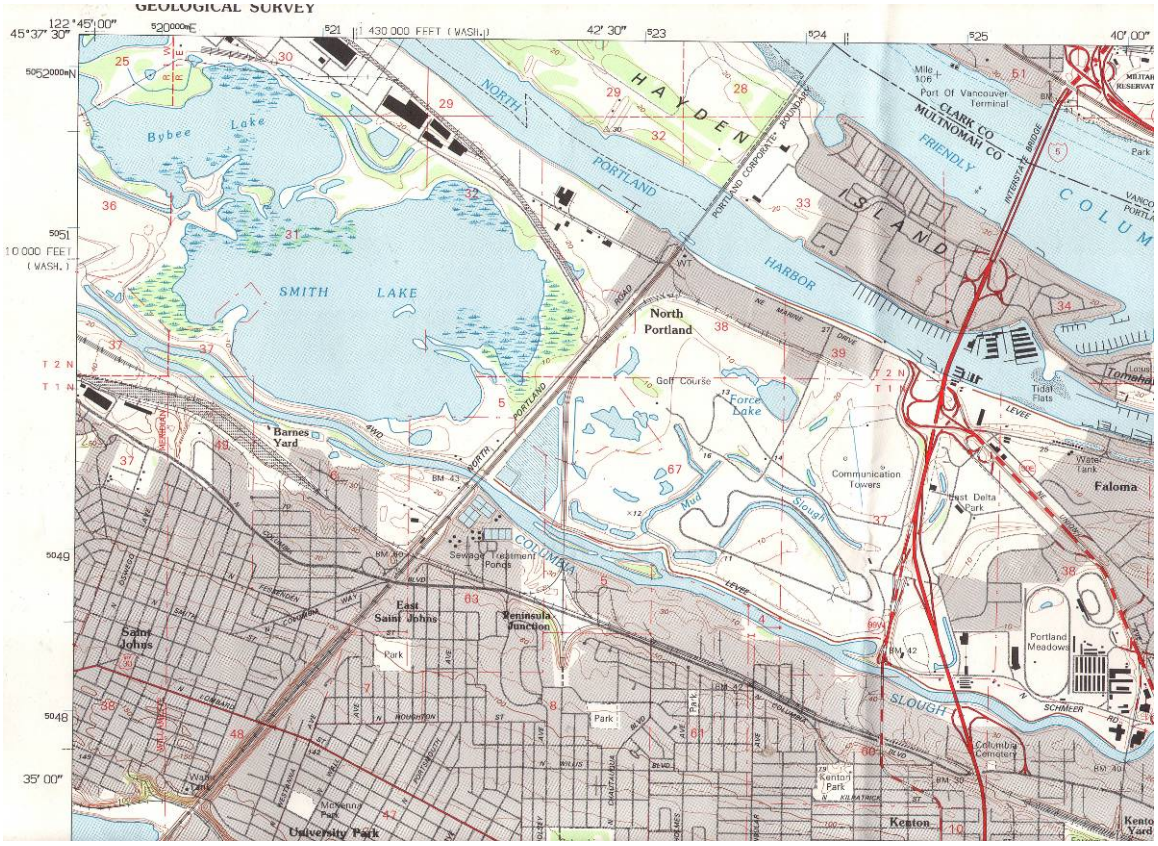


Exhibit A-7. Summarized Stratigraphy of the Portland Basin (from Beeson and Tolan 1993)

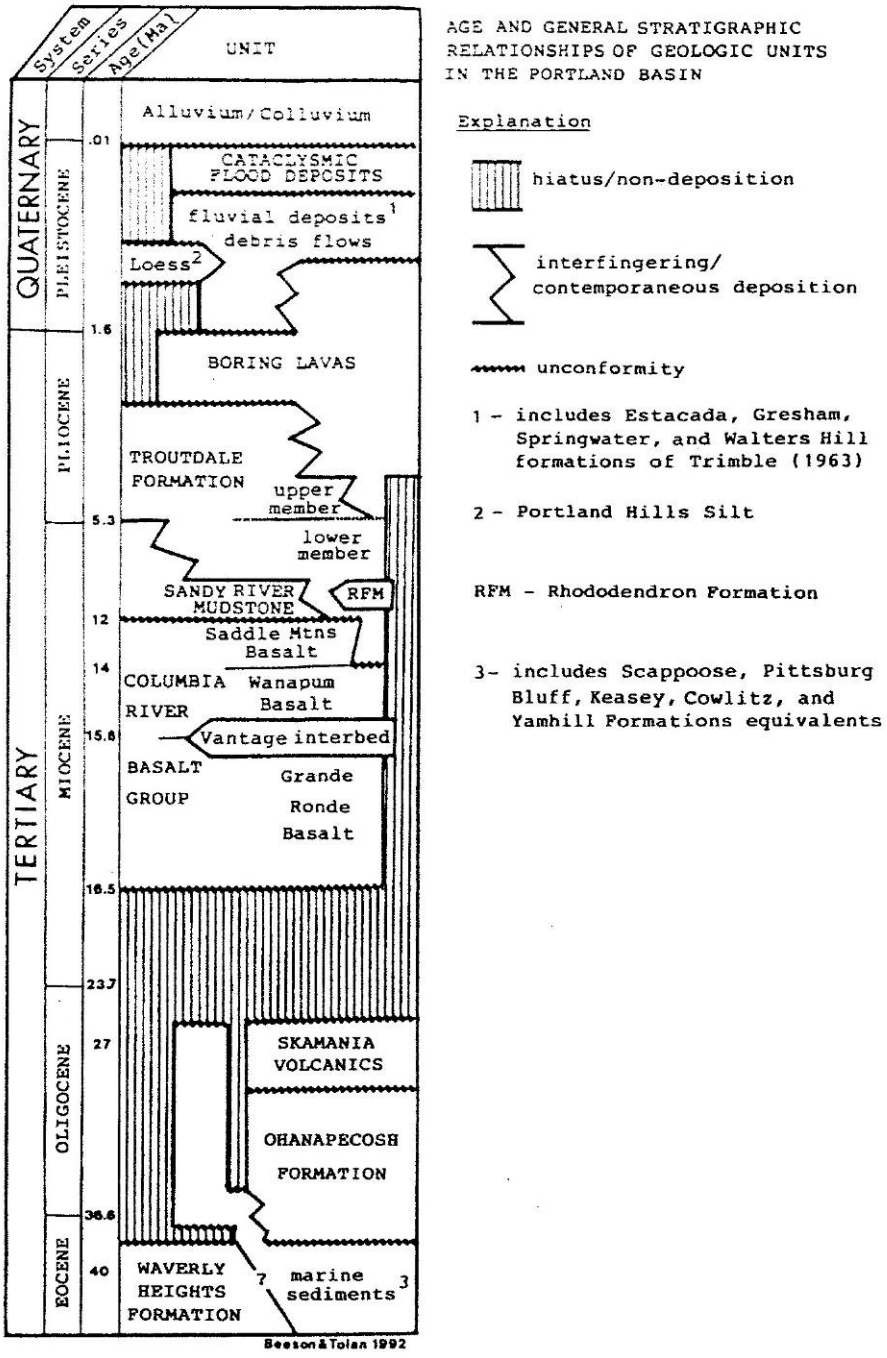
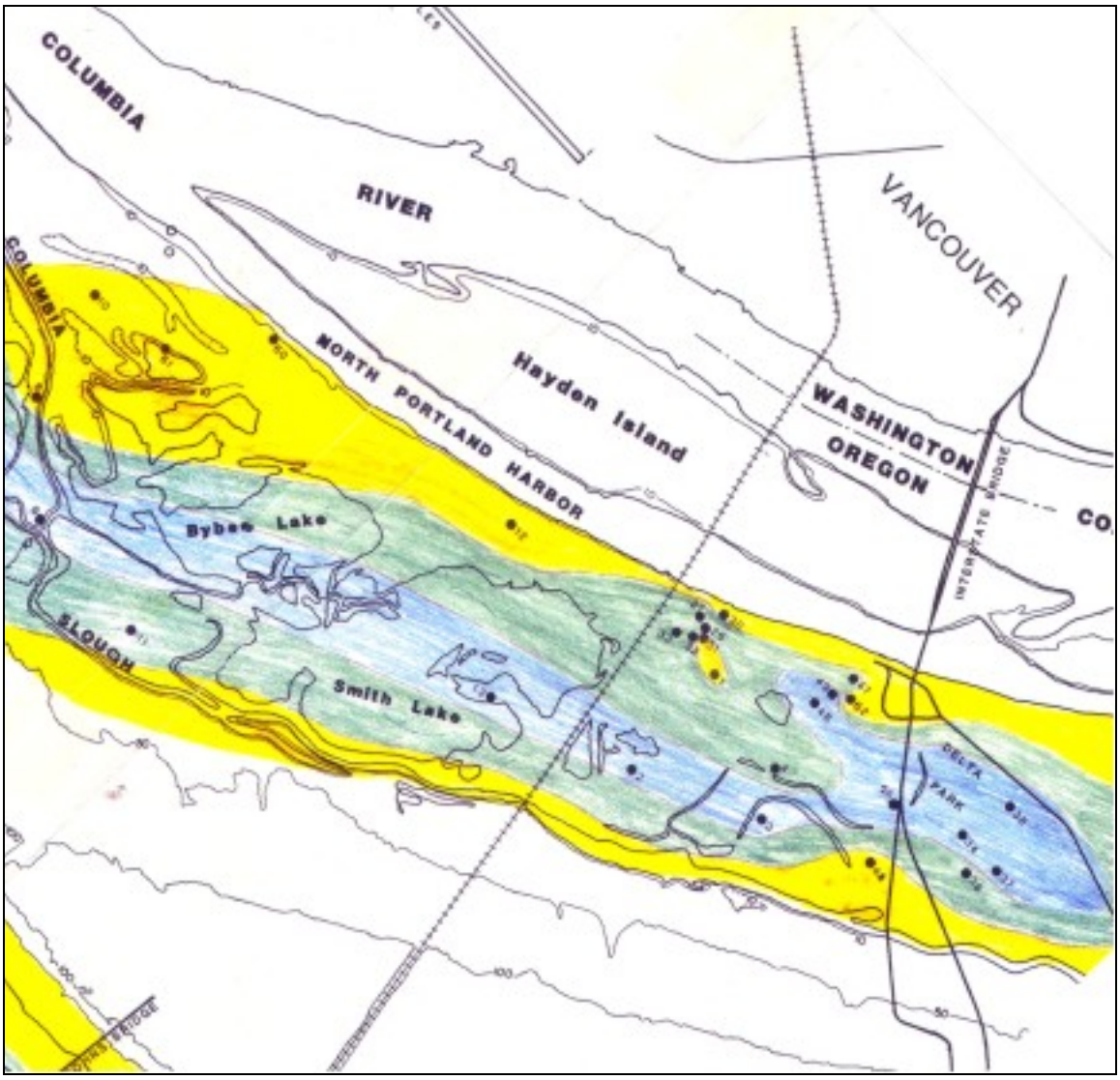


Exhibit A-8. Uncemented Pleistocene Gravel Deposits in the CRC Vicinity

View is from Lombard Street to the South. Very-large foresets represent channel bars aggraded well above the present Columbia River base level (photo courtesy of Oregon Historical Society)

Exhibit A-9. Mazama Ash Isopach Map for CRC Vicinity



Yellow is less than 2 ft thick, green is 2-4 ft thick, and blue is 4-10 ft thick (Ken Robbins, unpublished industry borehole data, personal communication 1992; data summarized in Gates 1994).

Exhibit A-10. Late Holocene Tephra Producing Events

Source Area	Ash Layer	Lahar	Age yr BP
Mt St Helens	1980 Eruption		27
Mt Hood*		Old Maid	200
Mt St Helens*	WE, WN		500
Mt Hood*		Timberline	1800
Mt Newberry			1,150 - 1,300
Mt St Helens	P		2,580 - 2,930 ∀ 250
Mt St Helens	Ye-Yn		3,350 - 3,510 ∀ 240
Mt Mazama*	O		6,700 - 7,000

* Identified in deposits upriver of the CRC APE (e.g., Sandy River Delta)

Sources: Sarna-Wojcicki et al. (1983); Rapp (2005)

Exhibit A-11. Paleo Sea Level Curve for the Lower Columbia River Valley (from Peterson et al. 2007)

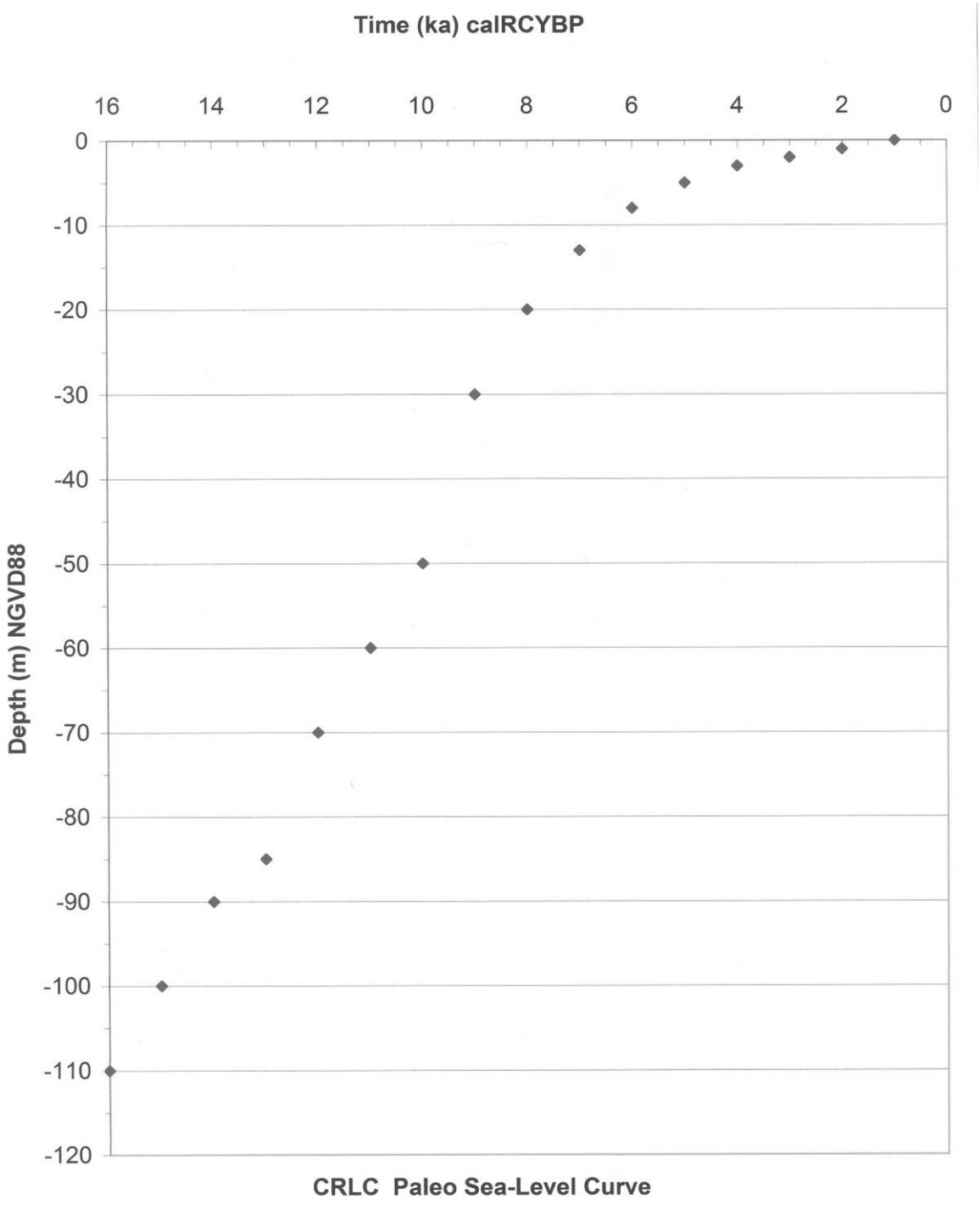


Exhibit A-12. Target Stratigraphic Horizons in CRC Project Area Deposits

Age (Youngest to Oldest)	Stratigraphic Horizon
<75 yr BP	Modern Fill
<150 yr BP	Historic
<300 yr BP	Latest Prehistoric soil (no Bw soil horizon), Old Maid Lahar
<400 yr BP	Mt St Helens Set W
<1,800 yr BP	Timberline Lahar
<7,000 yr BP	Later Holocene Submergence* or Mazama Ash
<12,000 yr BP	Early Holocene Submergence**
>12,000 yr BP	Pleistocene Glacial Flood Silt/Sand, Uncemented
>1.5 mil yr BP	Pliocene Cemented, Weathered, Gravel, Troutdale
	Pliocene-Miocene Sandy River Mudstone

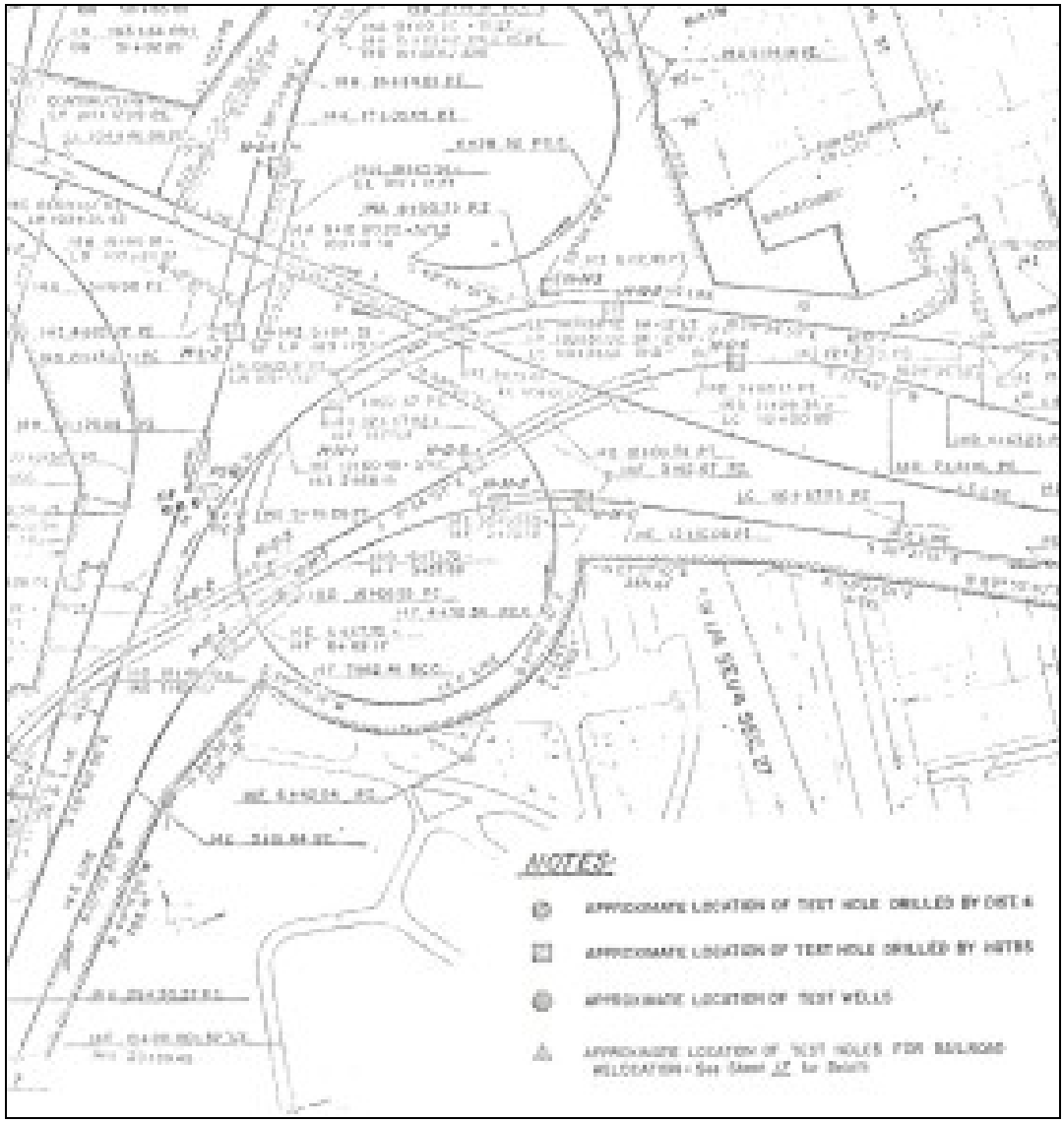
* -40 ft NGVD29

** -230 feet NGVD 29

Exhibit A-13. Holocene Depositional Environments

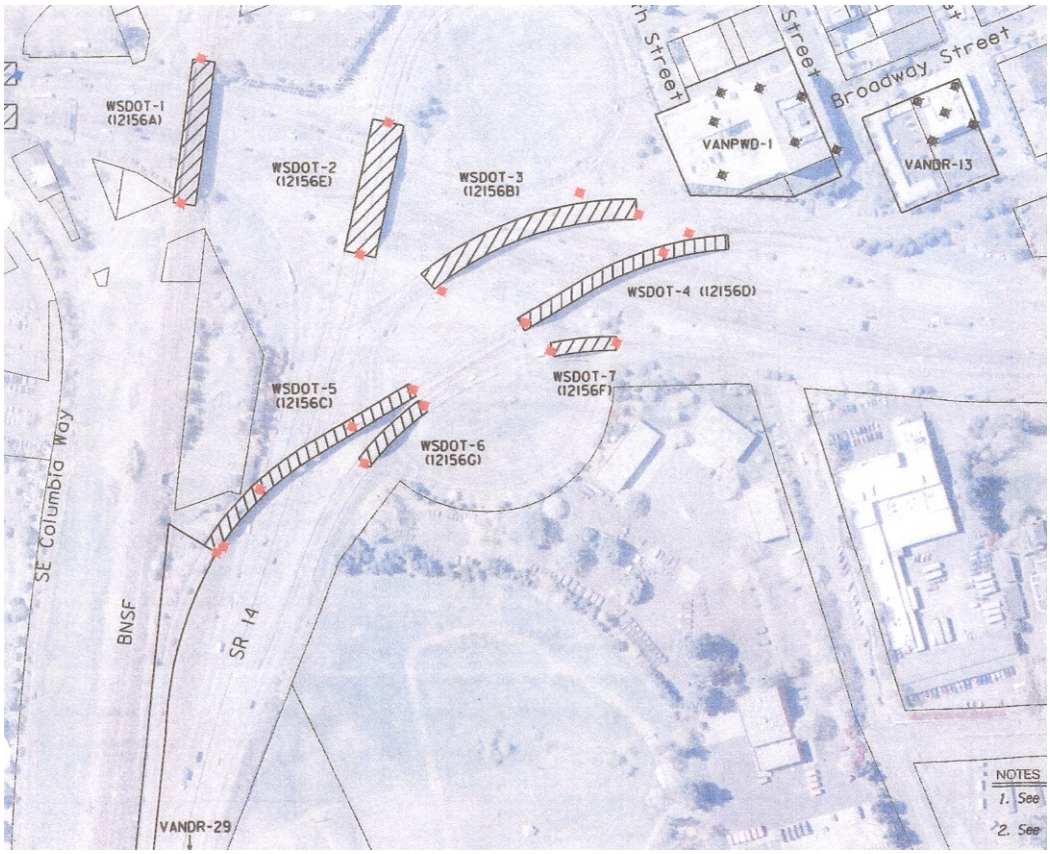
Depositional Setting	Composition Lithofacies	Elevation (NGVD29)
Floodplain	soil profile in silt/sand	+10 to 20 ft
Floodplain	peaty mud/sand	+5 to 15 ft
Channel levee/back-levee	mud>sand	+0 to +10 feet
Shallow channel/levee	sand>mud	-5 to +5 ft
Channel axes	sand	-20 to -5 ft
Deep channel thalweg	sand>gravel	-30 to -10 ft
Erosional lag gravel	>sand	
Basal contact gravel	gravel>cobble	

Exhibit A-14. WSDOT Site Map for Boreholes Taken for Bridge and Highway Foundation Design



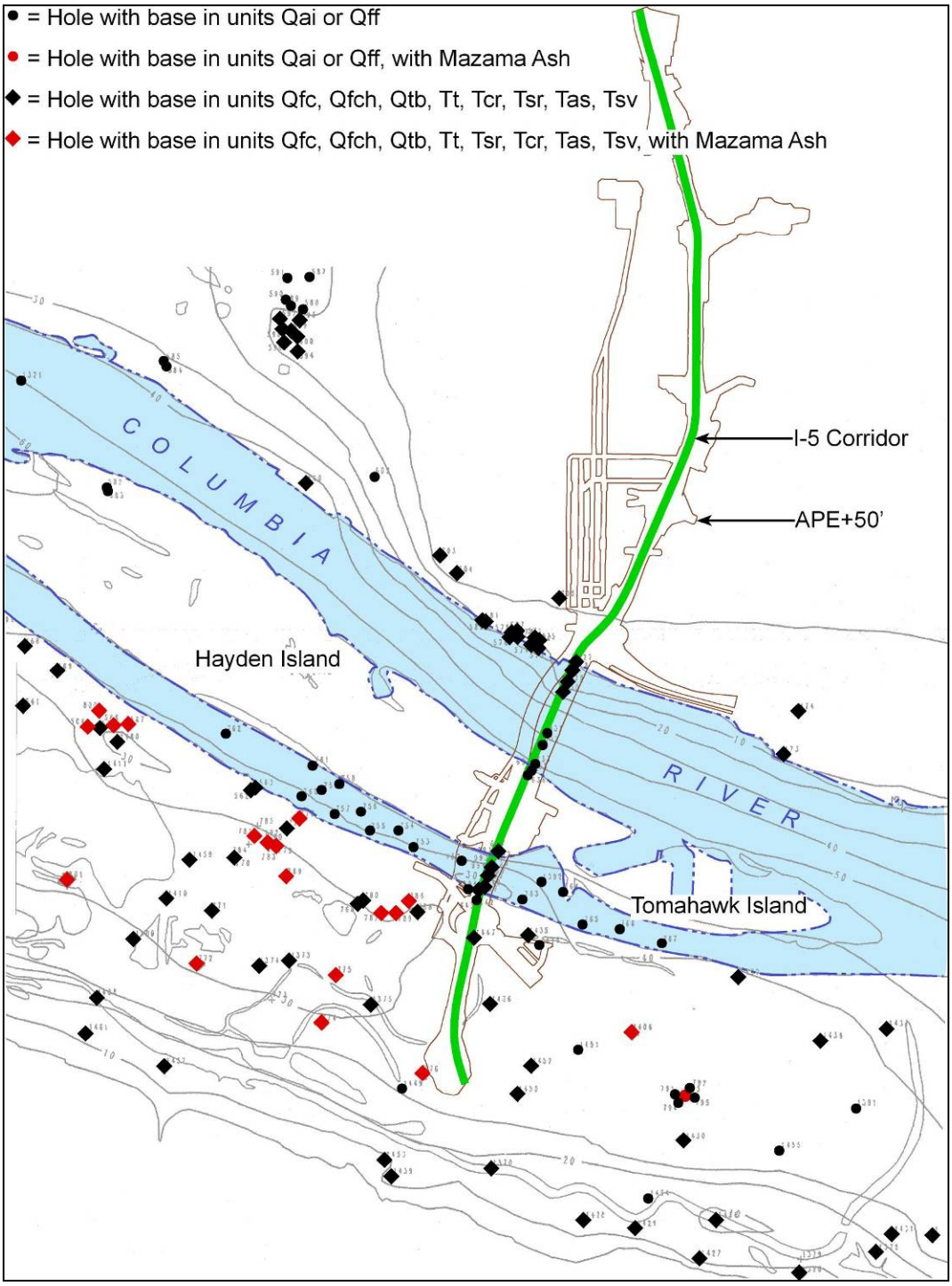
Area shown is the I-5 Interchange in Vancouver on the north side of the Columbia River.

Exhibit A-15. Site Map of Public Agency Boreholes Located by Project Team



Example map shown here is from I-5 Interchange in Vancouver on the north side of the Columbia River. Bridges (striped) and borehole locations (red dots) are shown on the map.

Exhibit A-16. Industry and DOGAMI Boreholes Compiled by Gates (1994)



The site map segment is from the Delta Park area of North Portland, in the I-5 corridor between Oregon Slough (top of map) and Columbia Slough (bottom of map), on the south side of the Columbia River. Black symbols represent boreholes that penetrated to pre-Holocene contacts. Red symbols are boreholes that record the Mazama ash layer, and that penetrated to pre-Holocene contacts. Those data are generally not available from earlier ODOT borehole records.

Exhibit A-17. CRC Map Sections Listed by Number 3.1 (South) to 3.10 (North)

Exhibit A-18. Compiled Borehole Sites in CRC APE

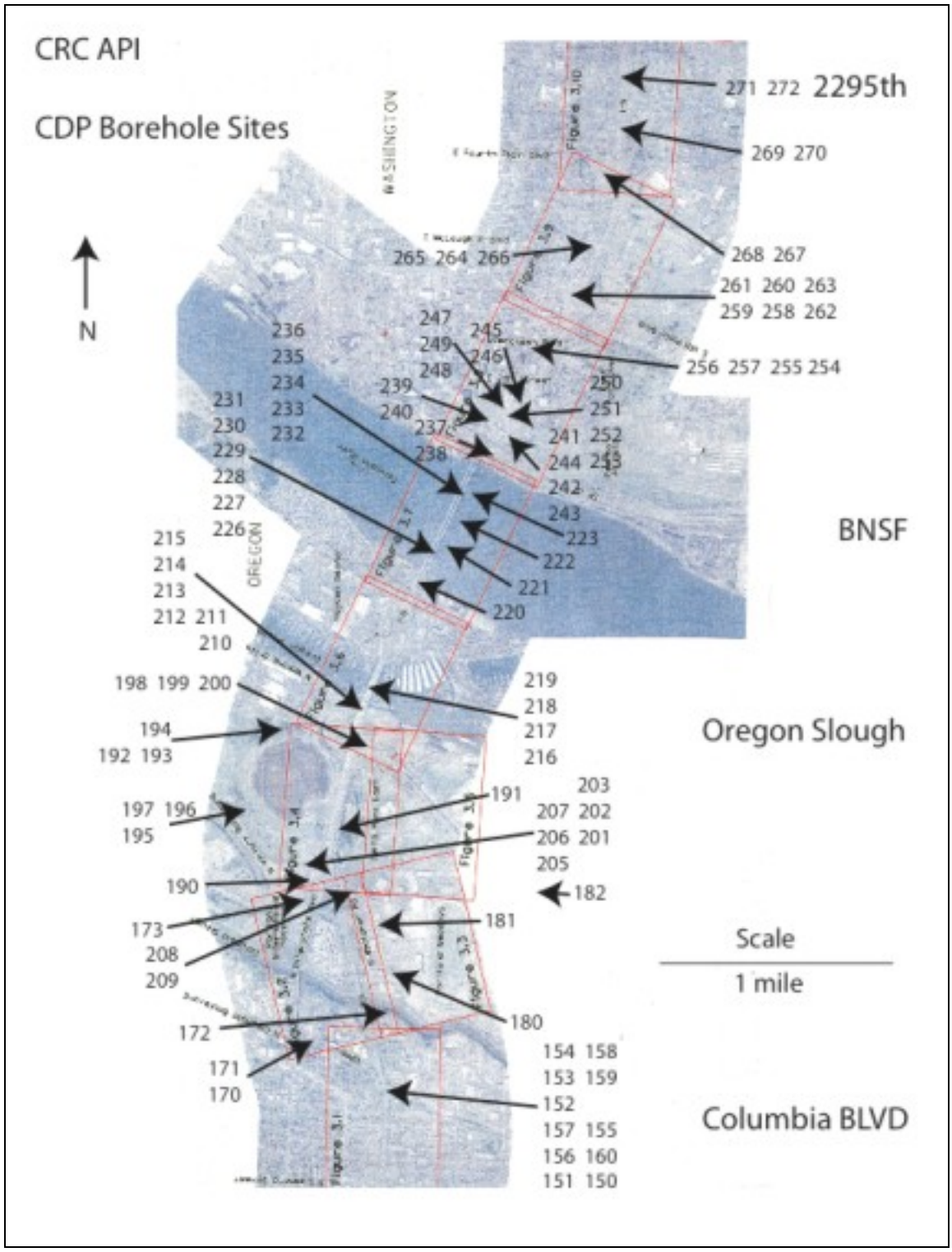


Exhibit A-19a. Stratigraphic Cross-Section (South Section) of Borehole Interval Ages Plotted Against Elevation from Columbia Blvd to Oregon Slough (see Exhibit 4-19 for borehole positions)

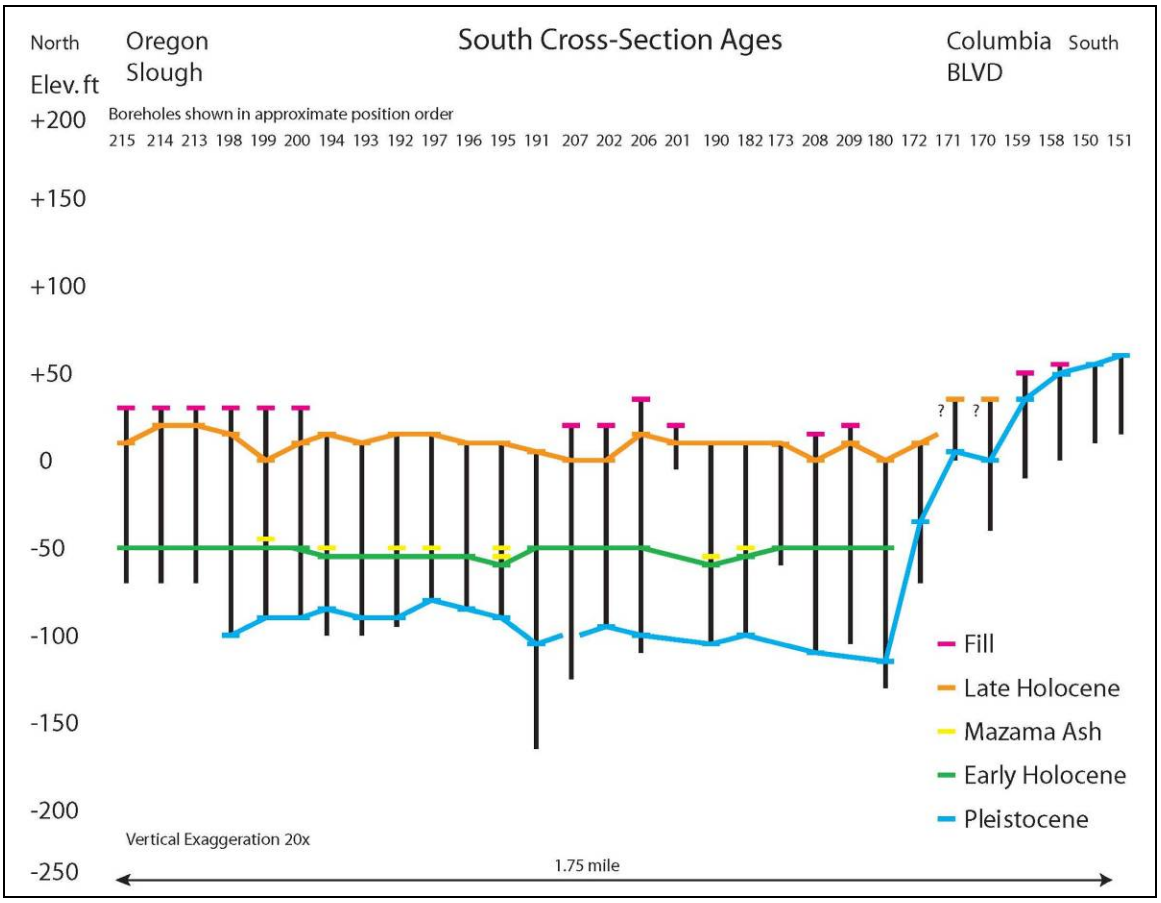


Exhibit A-19b. Stratigraphic Cross-Section (Central Section) of Borehole Interval Ages Plotted Against Elevation from Oregon Slough to BNSF Rail Line in South Vancouver (see Exhibit 4-19 for borehole positions)

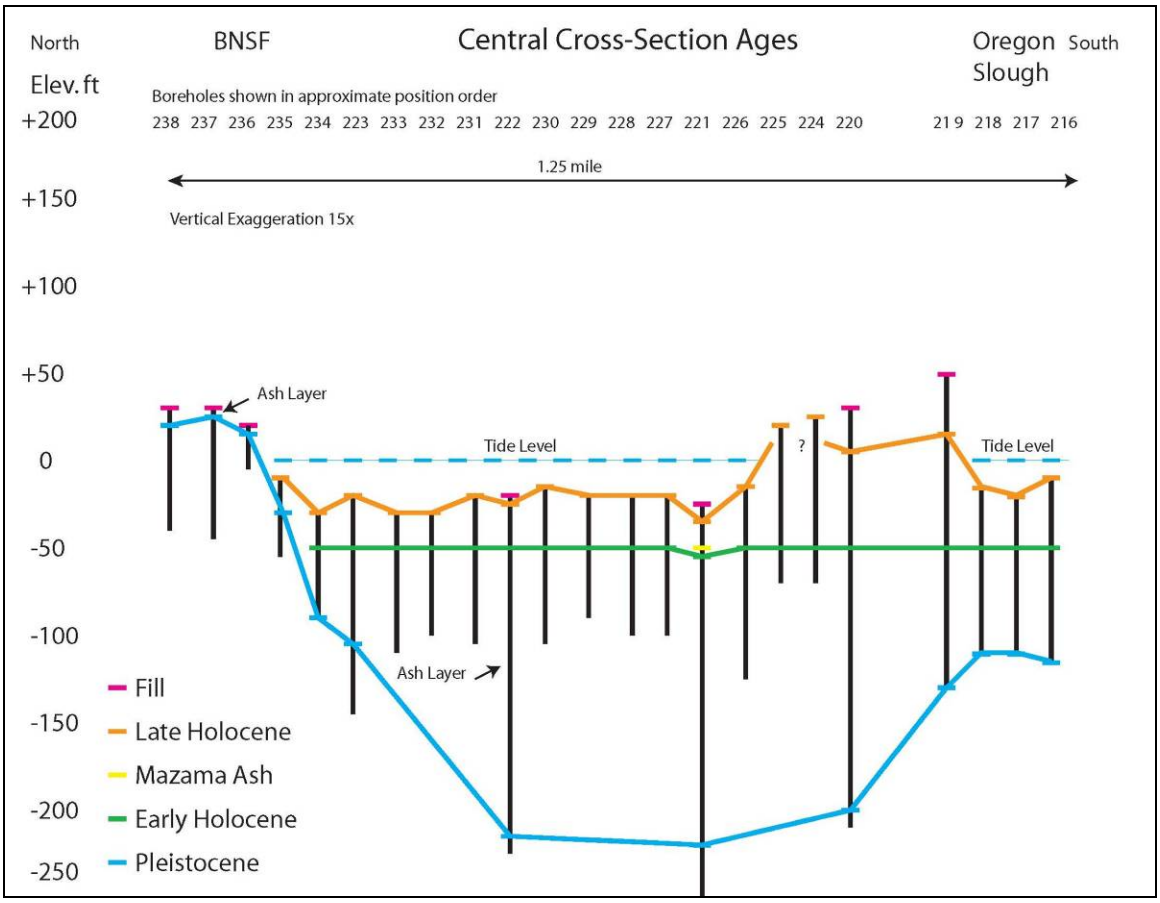


Exhibit A-19c. Stratigraphic Cross-Section (North Section) of Borehole Interval Ages Plotted Against Elevation from BNSF Rail Line to the 229th Cross-Street in North Vancouver (see Exhibit 4-19 for borehole positions)

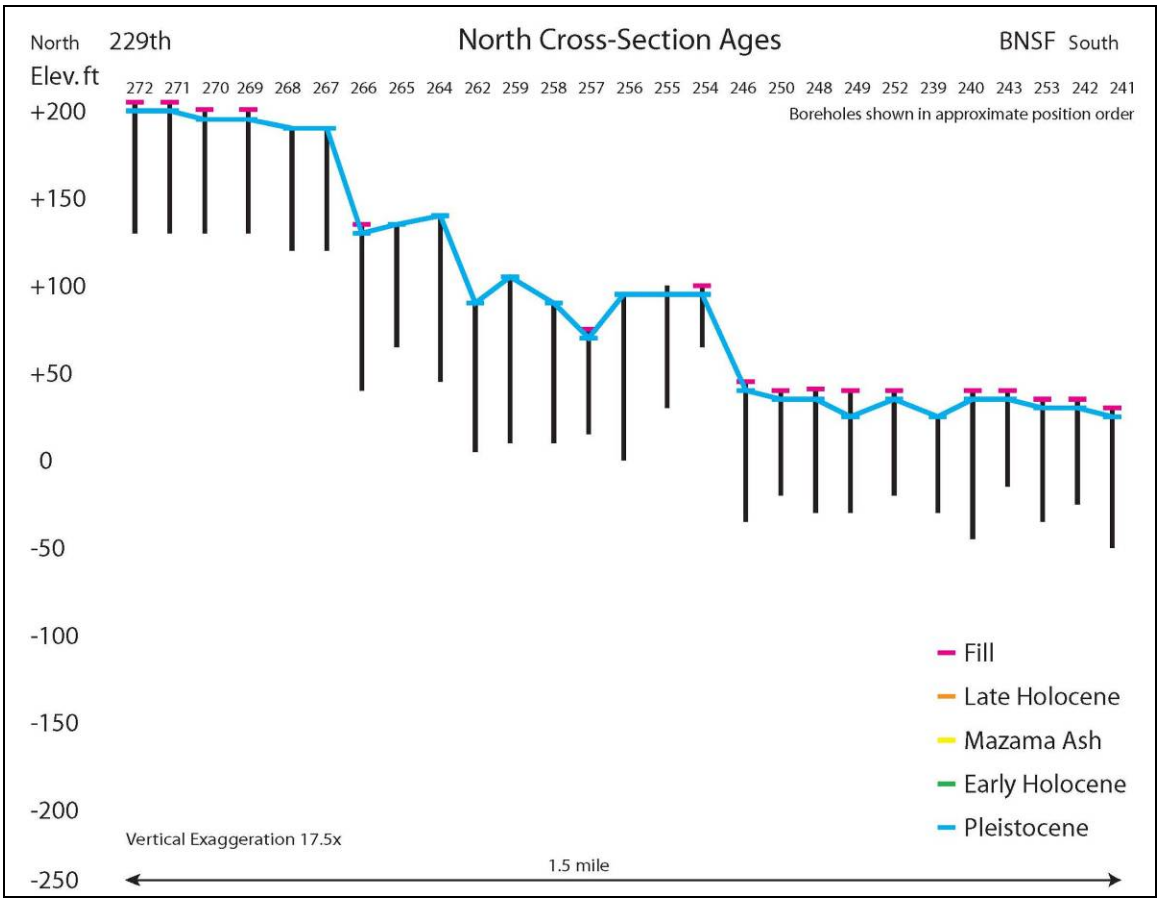
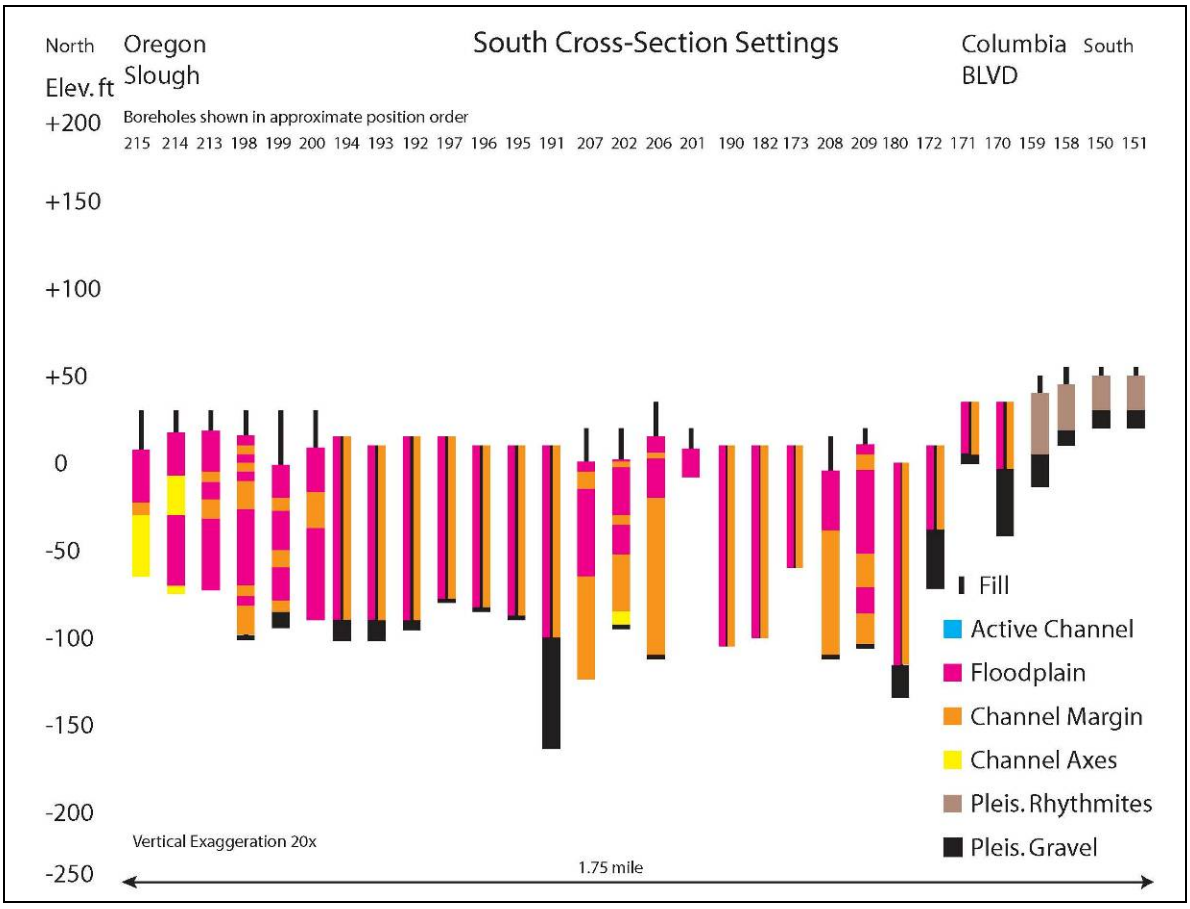
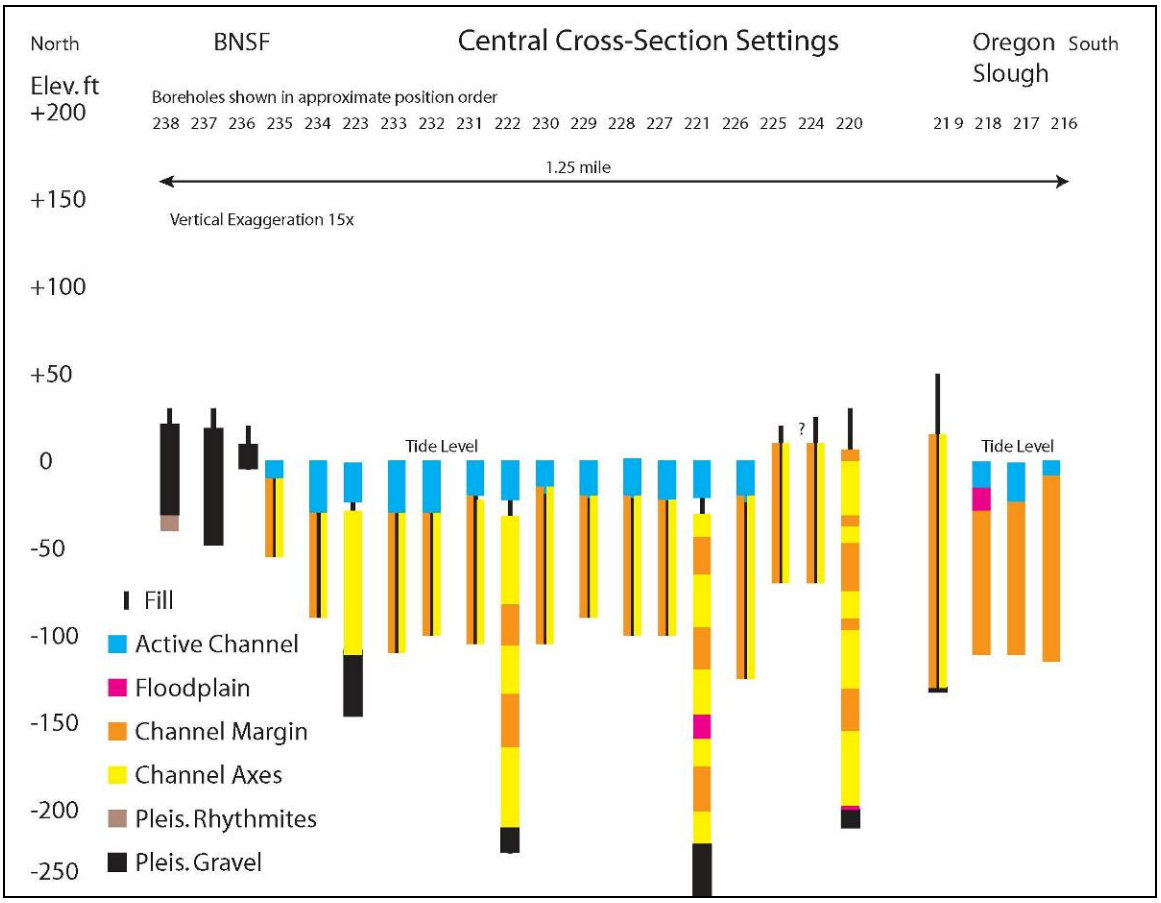


Exhibit A-20a. Stratigraphic Cross-Section (South Section) of Borehole Depositional Settings Plotted Against Elevation from Columbia Blvd to Oregon Slough (see Exhibit 4-19 for borehole positions)



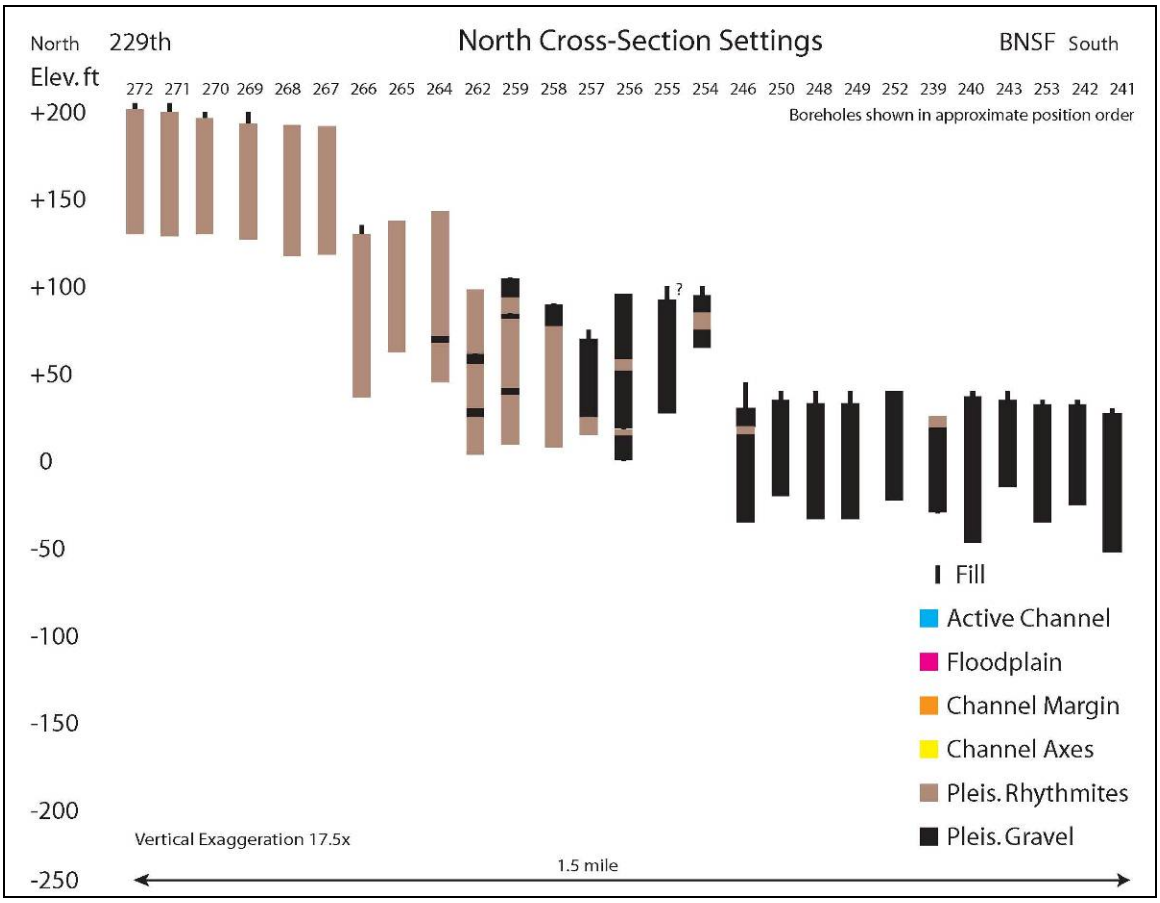
Borehole extensions above colored deposit settings represent fill. Bimodal colored settings are undifferentiated in logs.

Exhibit A-20b. Stratigraphic Cross-Section (Central Section) of Borehole Depositional Settings Plotted Against Elevation from Oregon Slough to BNSF in South Vancouver (see Exhibit 4-19 for borehole positions)



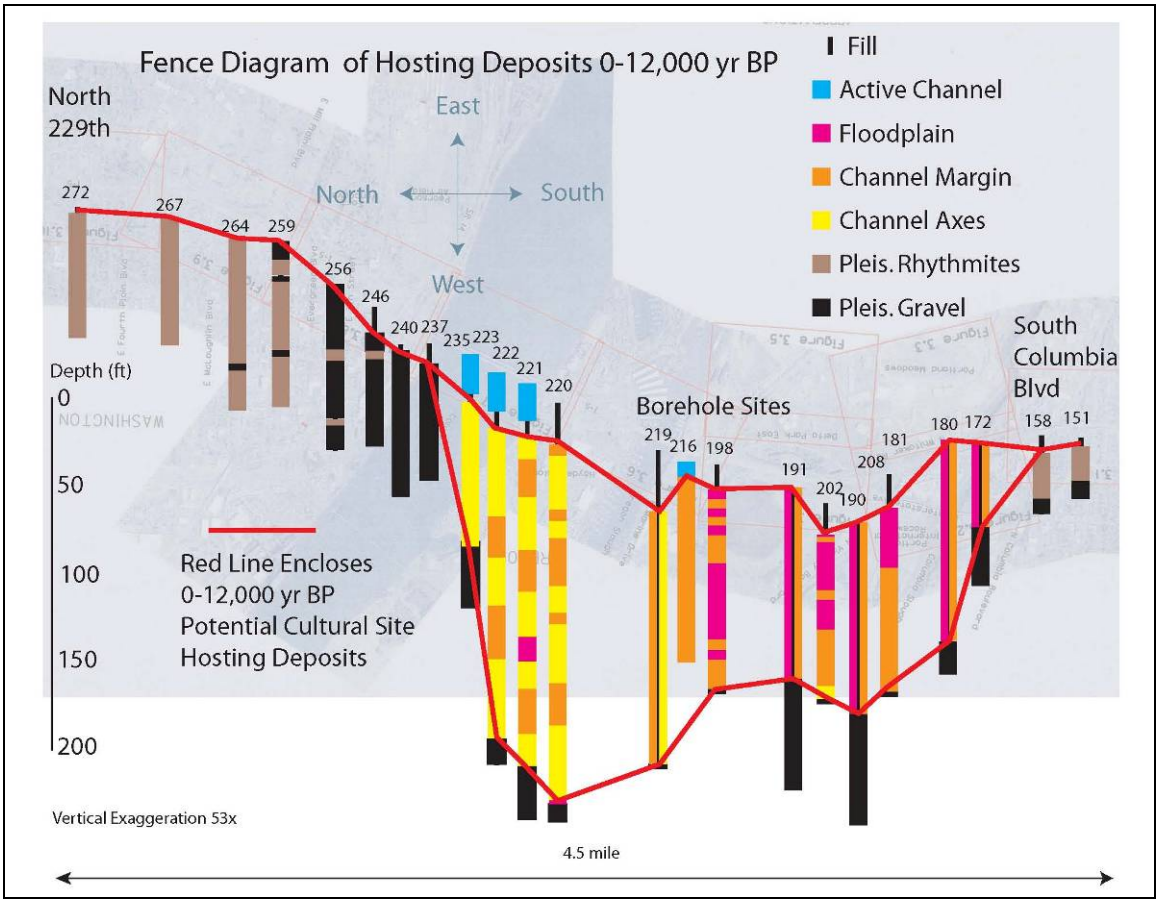
Borehole extensions above colored deposit settings represent fill. Bimodal colored settings are undifferentiated in logs.

Exhibit A-20c. Stratigraphic Cross-Section (North Section) of Borehole Depositional Settings Plotted Against Elevation from BNSF to 229th Cross-Street in North Vancouver (see Exhibit 4-19 for borehole positions)



Borehole extensions above colored deposit settings represent fill.

Exhibit A-21. Fence Diagram of Holocene Fill and Latest-Pleistocene Topsoils that Could Host Archaeological Resources (0-12,000 yr BP) in the CRC APE



Borehole positions are plotted on the CRC base map (underlay). Borehole depths are taken downcore from each borehole surface. Borehole extensions above colored deposit settings represent fill. Bimodal colored settings are undifferentiated in logs.

Exhibit A-22. 1841 Wilkes Expedition Survey Chart (Original 1:6.000 Scale) Overlay on Current (GoogleEarth ™) Satellite Image of the Columbia River from Willamette River Confluence to Fort Vancouver (from Wilkes 1845)

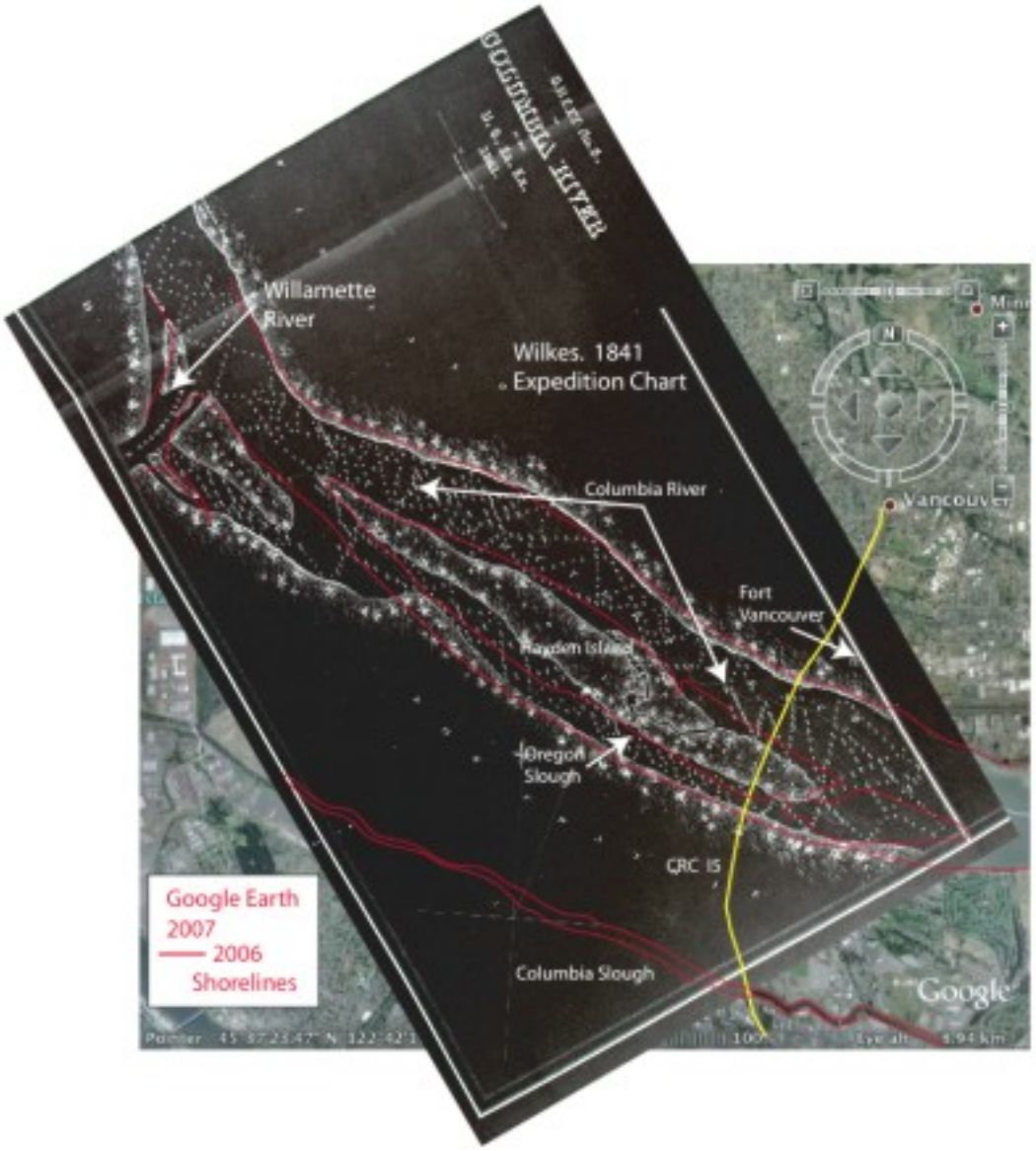


Exhibit A-23. Oblique Airphoto of Pacific Highway Bridge (now I-5 bridge) and Hayden Island (View to the South) circa 1938

The eastern end of the island (photo left) has been deforested and put into pasture. A small inlet (water body and vegetation) is apparent on the northern side of Hayden Island (foreground). An accreting shoal is apparent just downstream (photo right) of the bridge on the north bank of Hayden Island. Oregon Slough and Delta Park flood plains are in the background (Oregon Historical Society photograph).

Exhibit A-24. Composite Image from 1936 Aerial Photos with Interpreted Shorelines (Colored Lines) and Adjacent 200 Foot Setbacks (Colored Boxes)

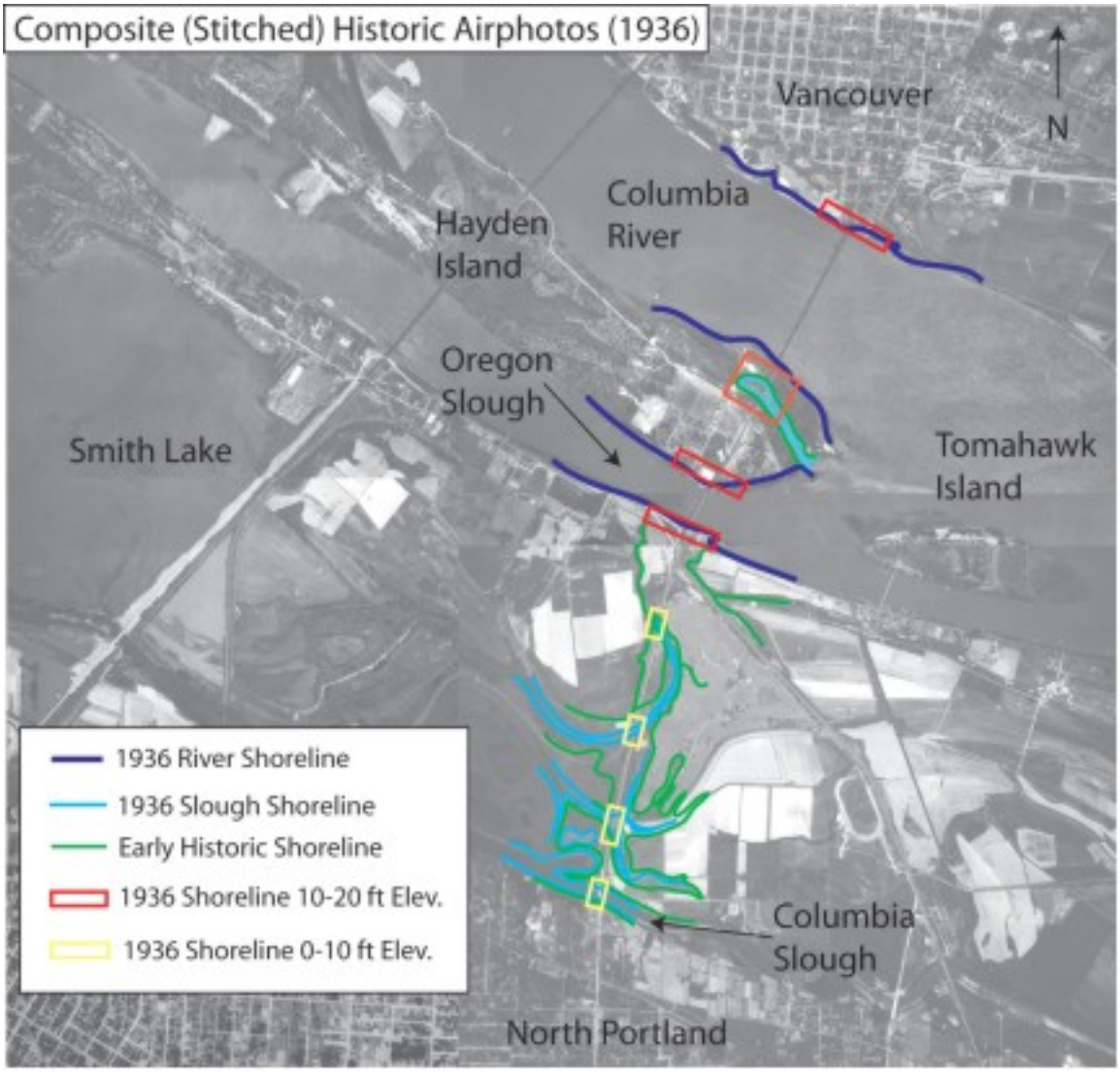


Exhibit A-25. Oblique Airphoto of Oregon Slough, View to East, circa 1924

Hayden Island is still forested but shorelines along the North Portland docks are diked and developed. Standing water is evident in Smith Lake, and both West and East Delta Park areas. The Delta Park low-flood plains experienced routine seasonal flooding until encircling dikes were constructed in the mid-1900s (Oregon Historical Society photograph).