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2 The Physical and Cultural Background

2.1 Introduction to the Site

The Sunken Village wet site (35MU4) is on one of the most important river junctures on the Northwest Coast of North America – where the Columbia River drainage of British Columbia, Canada and Washington State, U.S.A. is joined by the Willamette River flowing through much of western Oregon State, U.S.A. (Figure 2.1). The site is on Sauvie Island, where a major aquifer pumps under the natural levee into Multnomah Channel, providing a unique 125 m wide beach area where acorns placed in shallow hemlock bough-lined pits were leached in huge numbers by ancient Multnomah Peoples (Figure 2.2).

2.2 Location and Setting

By Melanie Diedrich

2.2.1 Introduction

The Portland Basin of the lower Columbia River (the current location of the largest city in Oregon State, USA: Portland) exhibits a widening floodplain containing several alluvial islands, Sauvie Island being the largest at more than 24,000 acres (Figure 2.2). This floodplain is rich in resources, both natural and agricultural; not only is the land attractive for its resources, the Columbia and its tributaries have provided a huge transportation network to Natives and, later, to European/American settlers. Human settlements have occupied the Lower Columbia River Basin for thousands of years, adapting to changes caused by geologic, catastrophic, seasonal and climactic events.

Developing a regional survey of the geology, hydrology, climate, and Basin ecology provides a platform from which to view the formation of Sauvie Island as a whole, and more particularly the streamside resources available at the Sunken Village Archaeology Site (35MU4). From this we hope to build a better picture of the ancient peoples and cultures that called this area home.

2.2.2 Location

Sauvie Island is part of and just northwest of the major city of Portland, Oregon, U.S.A. (Figure 2.1). At the southern tip of the island the Willamette River divides, forming

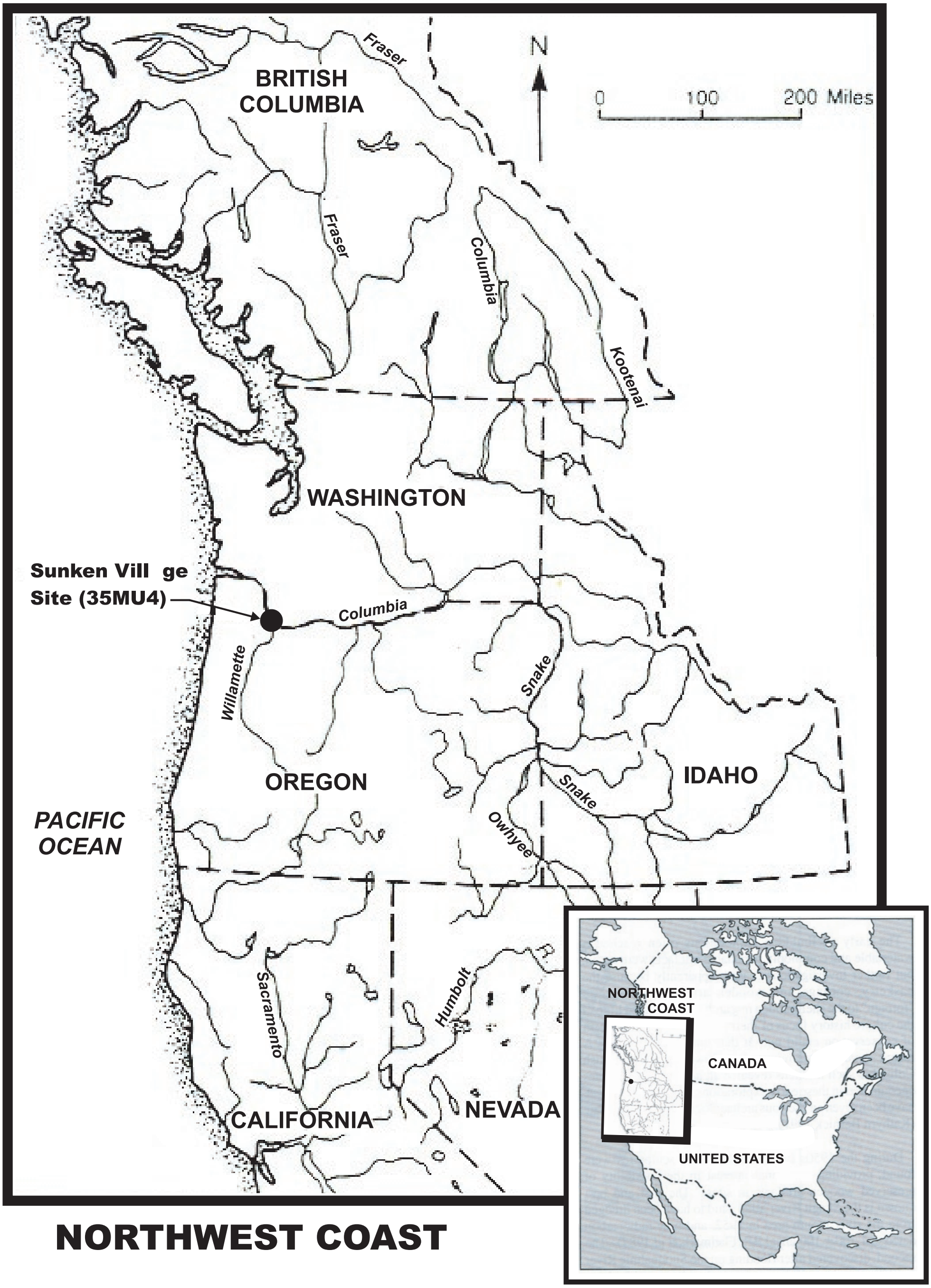

Figure 2.1. Location of the Sunken Village Site (35MU4) in the Northwest Region of the U.S.A, strategically placed at the juncture of the Columbia and Willamette Rivers.

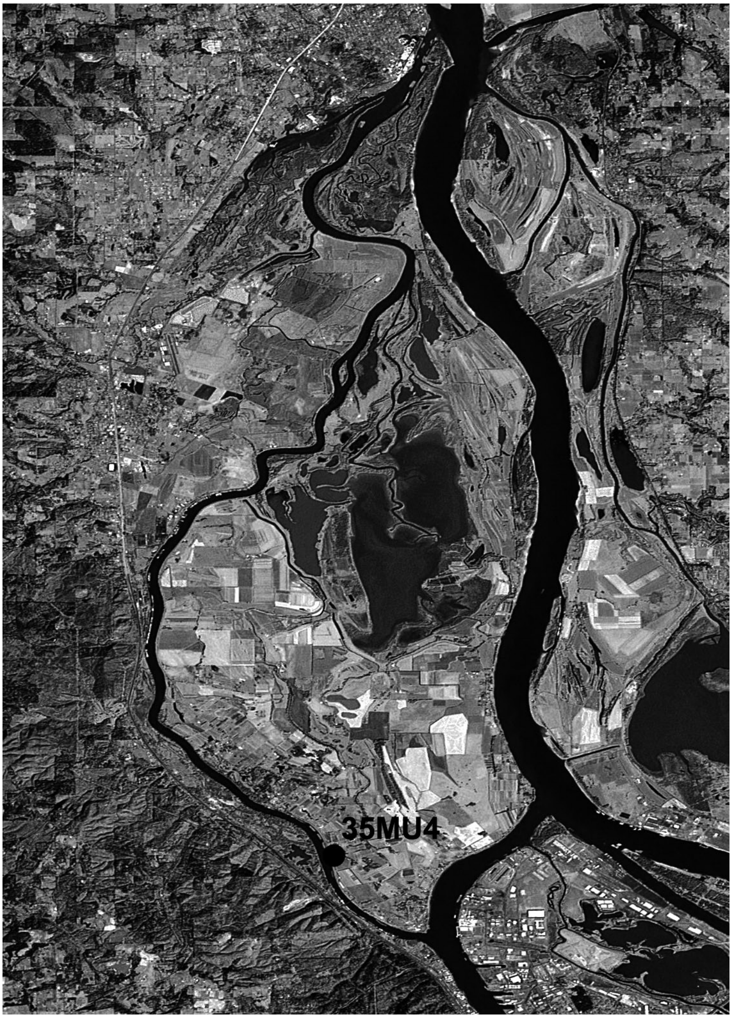

Figure 2.2. Aerial photograph of Sauvie Island, between the Columbia River (right) and the Multnomah Channel (left) on the northwest edge of Portland, Oregon, USA. Sunken Village, Site 35MU4, is on the southwest shore of Sauvie Island, and the rivers flow northwards round the island (i.e., from bottom to top of the photo).

the Multnomah Channel to the west, and flowing into the massive Columbia River to the east (Figure 2.2). This island was formed in the floodplain of the Columbia River where the river makes a nearly 90° bend to the north. At the downstream end of the Island is a rocky outcrop, which stretches across the Multnomah Channel and into the Columbia River. It has been suggested that sediment accumulated at this outcrop and grew from there, as the river's bend caused the flow of the water to decrease. The island also contains many ridges, lakes, and drainage streams; some are the result of recent flood control, some are ancient channels or ridges (Figure 2.2). Yearly winter and spring floods, occasional extreme flood events and various upstream and downstream catastrophic events, have combined to deposit layer on layer of sediment, forming Sauvie Island (Bourdeau 2003; Hajda 1984; Spencer 1950).

The Sunken Village Wet Site, 35MU4 is located on the Southwestern portion of

Sauvie Island, on the east bank of Multnomah channel, Section 46, Township 2 North, Range 1 West, Willamette Meridian (Croes *et al*. 2006). During limited excavations in September of 2006, more than 60 acorn-leaching pits were located and mapped. It has been demonstrated that groundwater from a large freshwater aquifer continually moves through this particular 125 m section of the beach, perpendicular or oblique to the Multnomah Channel. This type of flowing aquifer, just below the water table would be necessary, regardless of the river level, in order to remove the tannins from the acorns buried in the hemlock bough lined pits (Mathews 2007, below).

2.2.3 Physiography and Hydrography

The combined Columbia and Willamette river basins comprise an area that covers approximately 258,000 square miles in four USA states and British Columbia, Canada (Figure 2.3). Many of these river basins were modified during the Missoula Floods, which were the result of several periodic sudden ruptures of a lobe of ice in northern Idaho State, USA, that blocked drainage of Glacial Lake Missoula. The glaciers of the last Ice Age peaked about 16,000 years ago, the ruptures and flooding occurred between 15,000 and 13,000 yr BP. These massive floods formed the Channeled Scablands of Eastern Washington State, USA, (Alt and Hyndman 1984). The sedimentation they carried also affected the floodplain and delta of the Lower Portland Basin. Because of Sauvie Island's location, the rivers of primary interest here are the Willamette and the Columbia itself, and to a lesser degree, the Sandy River, east of Portland (EPA 2006).

The Willamette River originates 450 feet above sea level, 187 miles south of the city of Portland, and flows north between two mountain ranges; the waters of the Willamette contain ancient volcanic material originating in the Cascade Mountains to the east, as well as Coastal Range marine sediment and littoral sedimentary rock to the west. There are eleven flood-control dams on the Willamette River today; these reservoirs also provide irrigation for a large agricultural industry that runs the length of the fertile Willamette Valley (USACE 2003).

The Sandy River issues from Reid Glacier on Mount Hood and carries a variety of primarily volcanic material as it flows northwest past the towns of Sandy and Troutdale where it joins the Columbia River approximately 14 miles east of the city of Portland. The Sandy River Delta was formed by volcanic eruptions that triggered lahars and sediment-rich flows from Mt. Hood. These sediments were further washed down the Columbia to the Lower Portland Basin. A significant volume of deposits within the delta are from "eruptions of about the year 500" and the more recent "'Old Maid' eruption probably started in the winter of 1781–1782" (Cameron and Pringle 1986, 1987; Crandell 1980; O'Connor, 2004; Pringle *et al*. 2002). The first American overland expedition by Lewis and Clark crossed the Sandy through this delta less than 25 years later. William Clark's detailed descriptions and map indicate active sand deposition that has subsequently aggraded downstream areas of the Columbia River floodplain (Bretz 1913; O'Connor 2004).

The Columbia River totals more than 1,230 miles in length, and begins in British Columbia, Canada 2,657 ft above sea level (Figure 2.3). There are more than forty tributaries that contribute to the river. The twelve largest range from 2,930 to 56,900

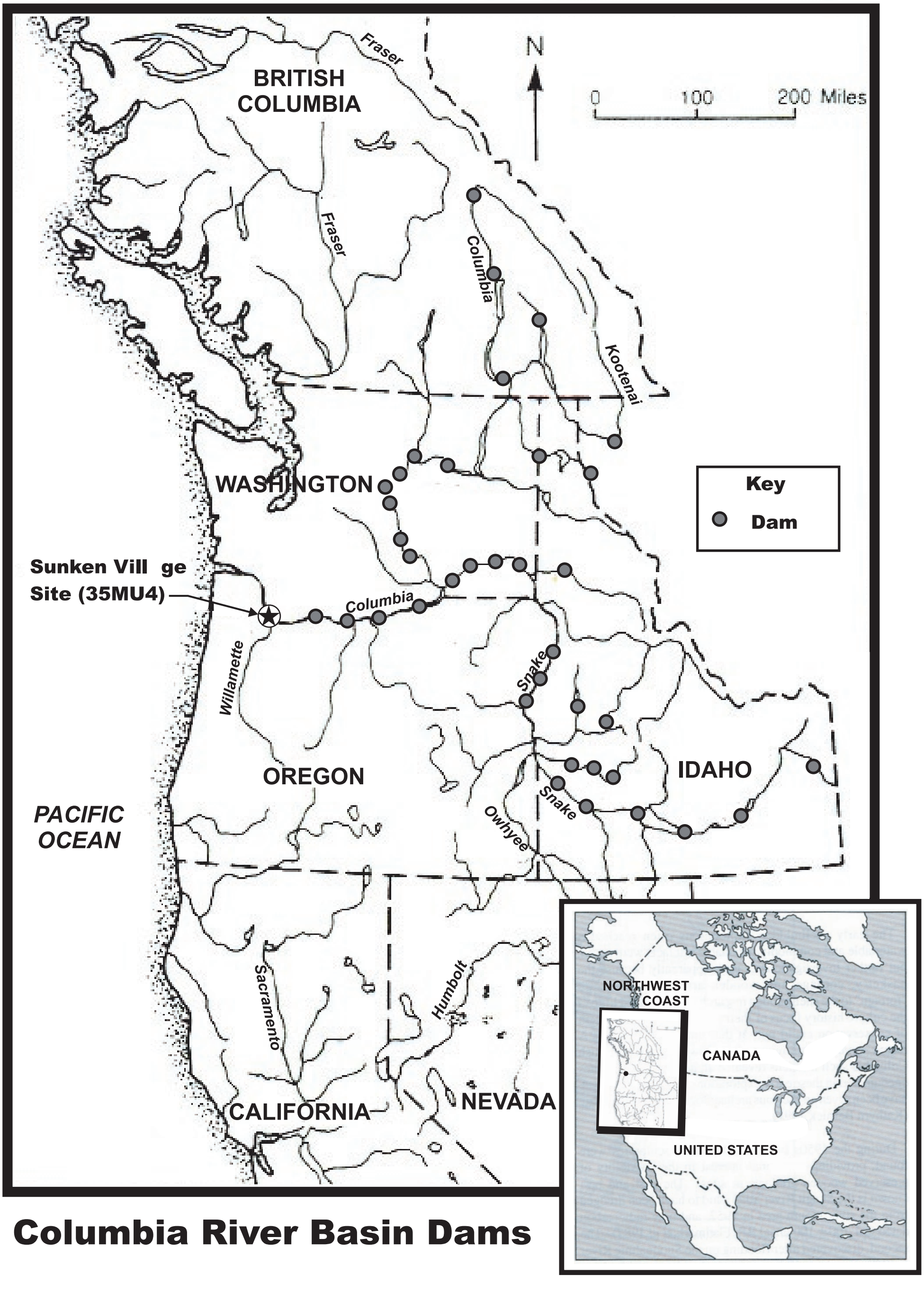

Figure 2.3. Columbia River Drainage, dams and location of 35MU4

cubic feet per second average discharge. The Columbia's sediment load is "enriched with materials eroded from the northern Rocky Mountains and volcaniclastic materials derived from the Columbia Plateau and the eastern… [and] western slopes of the Cascades" (Bourdeau 2003). Development of the Grand Coulee dam began in the 1930s; there are now six federal, five non-federal and three Canadian dams along its main-stem, many others both large and small, are on its tributaries. These dams are not only used for production of hydroelectric power, but also flood control and irrigation reservoirs (Figure 2.3). Unfortunately, they have also resulted in the dramatic decline and in some cases eradication of once abundant salmon runs within the Columbia basin.

Since discharge data collection began only a few years prior to dam construction, obtaining accurate data that reflects pre-dam/reservoir seasonal flows has been difficult and complex. River flow in the Portland area is strongly affected by daily tidal fluctuations, especially during low river flow months in late summer and early fall. The river levels can rise and fall as much as two feet twice a day. The USGS has official Portland stage data, adjusted for tidal effects on the Columbia and Willamette Rivers from as early as 1879. The Vancouver station began stage data measurements, as opposed to simple discharge data, in 1973 (USACE 2004).

A 1968 Department of the Interior publication, *Discharge in the Lower Columbia River Basin, 1928–1965*, not only has early- to mid-twentieth century river flow data, but also provides 'adjusted' data giving somewhat more accurate pre-reservoir discharge rates (see Appendix B:205, website: http:www.library.spscc.ctc.edu/crm/JWA9.pdf). The adjusted data was developed from two methods, the summation method and the correlation method. The summation method combined gauged flows with precipitation and, when monthly flow at the beginning of a month was different than at the end of the month, a travel-time adjustment was added. When travel-time adjustments were necessary, the difference between the two flows was used in the equation: flow difference (cf/s) × travel time (days)/# of days in month = adjustment amount (cf/s). When gauging stations data was missing, the correlation method was used. This method used the available summation method data correlated with the sum of flows, adjusted for seasonal changes and upstream storage adjustments. Further adjustments were made for precipitation, evaporation and time-of-travel in the same way as the adjustments in the summation method. All of the above travel times and adjustment were based on information from the National Weather Bureau, Corps of Engineers, and USGS personnel (Orem 1968).

For the purposes of this report, the 1928–1965 adjusted rates for each month during a given year were entered into a spreadsheet, where mean-monthly-discharge rates were tabulated. More recent unadjusted rates from 1970 to present were also tabulated to represent mean-monthly-discharge. These were then put into bar graphs for comparison (Figures 2.4 and 2.5; see data, Appendix B, 205, website: http:www.library.spscc.ctc.edu/crm/JWA9.pdf). It must be remembered that in geologic terms, the river discharge data that is available in general is only a very small period of time and may not reflect anything but the most recent period. What these graphs show us is, first of all, the difference between present discharge rates with the flood control management and what the naturally occurring discharge rates may have been. In general, these graphs illustrate the natural flows of the rivers to have had higher highs and lower lows. A

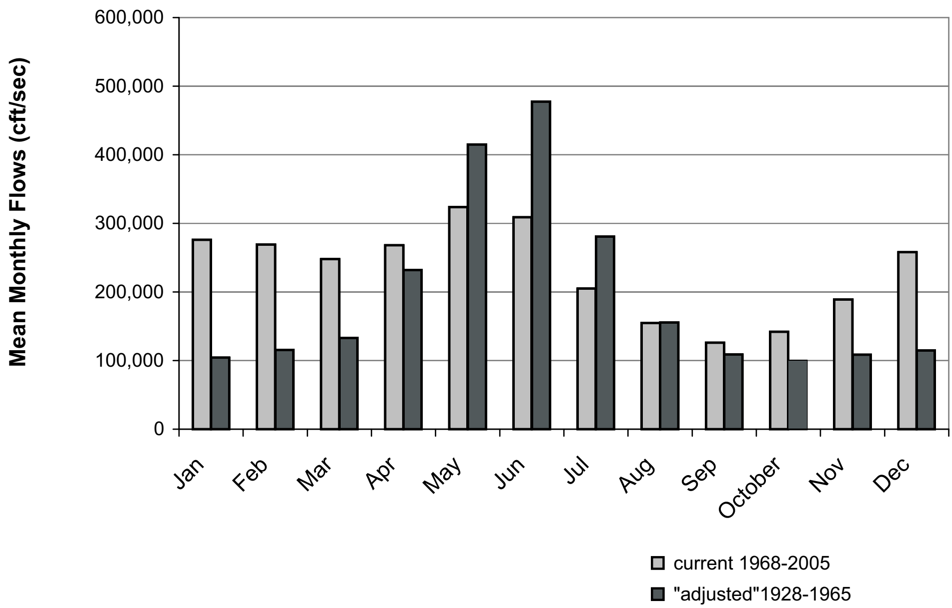

Figure 2.4. Mean monthly discharge rates (cft/sec) of the Columbia River.

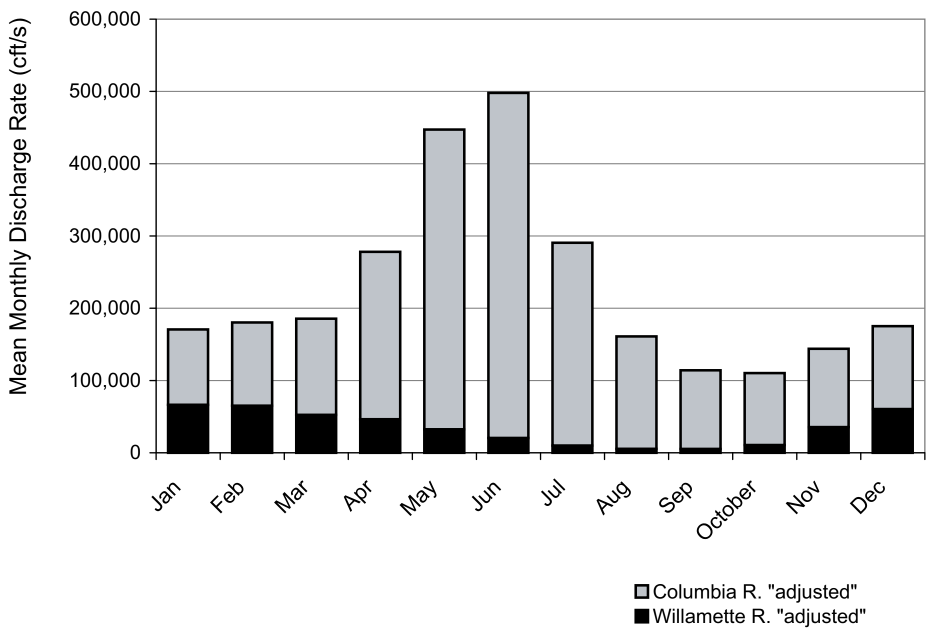

Figure 2.5. Comparison of mean monthly discharge rates (cft/sec) of the Willamette and Columbia Rivers (1928–1965).

comparison graph was also constructed to illustrate the differences and similarities of the Columbia River Discharge rates to the Willamette (Figure 2.5). Though the Willamette flows are much smaller, the graphs do provide a visual picture of the affects of winter rains and rain-on-snow events vs. the spring snowmelt. The most relevant point is the low discharge rates shown for both rivers in August, September, and October. Significantly, the graphs also illustrate a slight drop in discharge rate in February and March. These illustrate seasonal highs and lows, especially significant at the site at Sauvie Island.

Another issue, which directly affected the area, is the sedimentation rate that occurred during seasonal flooding. Unfortunately, the construction of the aforementioned dams within the Columbia River Basin has drastically reduced the quantity of sediment that actually reaches the lower basin area. Nationwide, many dams built 30 to 60 years ago are dealing with reduced reservoir capacity due to a build-up of sediment behind the dams; sediment that in natural conditions of flow would have been carried to wider floodplains or even to the river deltas. Additionally, the changes in land use, drastically changing the surface flows into the basin, increased channelization of the Willamette and the Columbia (Postel and Richter 2003). At the Sunken Village Site it appears what has been buried since before European contact is now being degraded and each year more of the site may disappear, due in part to the lack of regular sediment deposition.

2.2.4 Formation and Change: Catastrophic Events

A number of catastrophic events such as the massive glacial Lake Missoula Floods, volcanic eruptions, with resulting lahars and ash flows, and major landslides and seismic events have played an important role in forming the current lower Columbia River floodplain.

J. Harlan Bretz described the Missoula Flood "flow rate to have been 70 million cubic feet per second, more than fifty times the largest historic Columbia River flood of 1894" (O'Connor 2004). Comprising a series of enormous flood events from about 15,000 to 13,000 yr BP, this size of flood not only explains the formation of the Washington State scablands and gravel deposits, but also clarifies the formation of the current wide floodplain of the Portland Basin, and the deposition of what is known as the Portland Delta gravels. As the glacial ice caps melted the sea level began to change, ultimately rising about 100 meters between 10,000 to 3,500 years B.P. (Newman 1991). It is generally recognized that this rise in sea level accounts for the fact that, although the Portland Basin has been inhabited for about 11,000 years, no cultural site has been found on the floodplain dating earlier than about 2,000 years BP (Newman 1991; Bourdeau 2003).

Although evidence of volcanic activity in the Cascades vicinity extends back more than four billion years, more recent Holocene period eruptions at Mount Hood and Mount St. Helens have produced mudflows composed of pyroclastic material and water, called lahars, that have affected river flow both upstream and downstream (Bourdeau 2003; Pringle, *et al*. 2002).

Upstream about fourteen miles east of Portland, the Sandy River delta has received lahars from Mt. Hood that have aggraded the Columbia and contributed to the natural sediment build-up at Sauvie Island. At 11,239 ft., Mt. Hood is the highest peak in

Oregon State and has had intermittent periods of eruptive activity during the past 30,000 years.

Mt. St Helens has had an approximately 40,000 year eruptive history, and though the direct influences of any pyroclastic material or lahars occurring on these rivers downstream from Sauvie Island would be slight, if any, the indirect influences may have been very significant. It has been theorized that some of the Mt St. Helens induced large flowage deposits temporarily dammed the Columbia River below Sauvie Island, slowing the flow and thereby causing the Columbia's sediment load to drop, forming additional base layers within the floodplain. When this dam was breached a short time later, deep channeling would have scoured the main river channel of sediment and debris, leaving sediment on upland and slack-water areas (Bourdeau 2003, personal communication 2007; Pringle, personal communication 2007; for more examples, see Croes *et al*. 2006, 2007a).

Another catastrophic event that left its mark on the Lower Columbia River Basin is the Bonneville Landslide. Lewis and Clark made note of the Cascade Rapids and a submerged forest, both believed to be related to the Bonneville Landslide. This submerged forest was still evident in 1934 when Donald B. Lawrence began trying to date the event that buried it (O'Connor 2004). Lawrence's work dated the Bonneville Landslide to about 1250 AD, while more recent radiocarbon dating by Alex Bourdeau, Jim O'Connor, Patrick T. Pringle, and Nathan Reynolds has tentatively placed the event at somewhere between 1430 and 1450 AD, though more field and research work is needed to come to a definitive date (O'Connor 2004).

This landslide originated on Table Mountain, north of the Columbia, and geological investigations prior to the construction of the Bonneville Dam "concluded the slide had dammed the river to a height of at least 250 feet (over three times higher than Bonneville Dam)" (Bourdeau 2003). It is estimated that this blockage of the river would be overtopped in three to eight months, at which time a breach might have caused a cataclysmic flood event that carried sediment far downstream. "Subsequent [studies have] established that Bonneville was the most recent of four major slides and numerous minor slides that have occurred along the stretch of river north and west of Stevenson, Washington" (Palmer 1977; Bourdeau 2003).

All of the volcanic and landslide events most likely contributed to the formation of the wide floodplain and islands of the Lower Portland Basin. Ancient river channels have been filled with sand and debris, fine sediment from annual floods overtopped; the only evidence of these old riverbanks may be the ridges and swales that run through the area, a large one runs the length of Sauvie Island (Bourdeau 2003). There may be more, smaller versions throughout the Island, former basin drainage that is now filled with sand. This may account for relatively late dates for cultural materials at the Sunken Village, where approximately 700 years ago the massive flow of the Bonneville Landslide release may have sheared away sites throughout the Portland Basin (see below; Croes *et al*. 2007a).

2.2.5 Climatic History

Ten thousand years ago signaled the end of the last ice age and the beginning of an extensive warming period, dated by pollen record "from approximately 7000 BC to approximately 600 BC" referred to as the Hypsithermal Interval (Deevey and Flint 1957; Pringle 2002). A gradual decline in temperatures then began approximately 2,000 B.P., and triggered two Neoglacial Advances. "The first of these episodes peaked between 2,800 and 2,600 yr B.P." (Pringle 2002). A second episode, termed the Little-Ice-Age, lasted from AD 1250 to about the middle of the nineteenth century, peaking approximately 600–700 years ago (about the estimated radiocarbon date of the Sunken Village excavations). During this time, localized alpine glaciers were larger, leaving evidence of moraines extending nearly a kilometer further down Mount St. Helens than pre-1980 glaciers (Pringle 2002).

Current climate of the Sauvie Island/Portland Basin area is relatively mild-maritime. Average temperatures are about 40 degrees F, winter temperature ~34 degrees, summer temperature ~75–78 degrees (USDA 1983). As Clinton Rockey describes on the NOAA website, the Coastal range shields the inland area from storms off the Pacific while the higher Cascade mountains "offer a steep slope for orographic lift of moisture-laden westerly winds, resulting in moderate rainfall for the region" (Rockey 2007). Stating reasons of accuracy, the National Weather Service limits their minimum and maximum extreme temperatures to data gathered between 1941 and 1999. The agency lists the extreme maximum temperature (1941–1999) of 107 degrees F occurred in 1981, extreme minimum temperature (1941–1999) of -3 degrees F occurred in 1950. Historically, this may not be the most extreme minimum temperature, however, as there are written records documenting that during the winters of 1862 and 1888, "the Columbia froze over so that teams of horses and wagons were driven across the river on the ice. (Spencer 1950). Average Precipitation is from 36 to 37 inches per year, the highest precipitation occurring November thru March, peaking in December with an average of about 6 inches (NOAA) (Figure 2.6).

These temperature and precipitation figures represent data from only the last one hundred years. As current worldwide glacial melting indicates, this data may reflect a dramatic warming trend. Although the floral remains recovered from the site are not drastically different from present day vegetation, climate conditions at the Sunken Village Site may have been much cooler, making winter conditions more difficult 600 years ago, especially in the upland areas surrounding the rivers.

2.2.6 Resources

Ames *et al*. (1999), Boyd and Hajda (1987) and Newman (1991) refer to the Seven Habitat Types developed by Saleeby (1983) to describe the fresh water and terrestrial habitats of the floodplain in and around the Sauvie Island vicinity. These are listed as Riverine, Lacustrine, Palustrine, Riparian, Oak Woodland, Grassland (prairie), and Conifer Forest. As Ken Ames points out, six of these habitats are "on the floodplain proper" (Ames *et al*. 1999), and all six exist on Sauvie Island. The seventh, Conifer Forest, is within a day's journey by foot and canoe. This means that within this local area there were remarkably variable and seasonally plentiful resources.

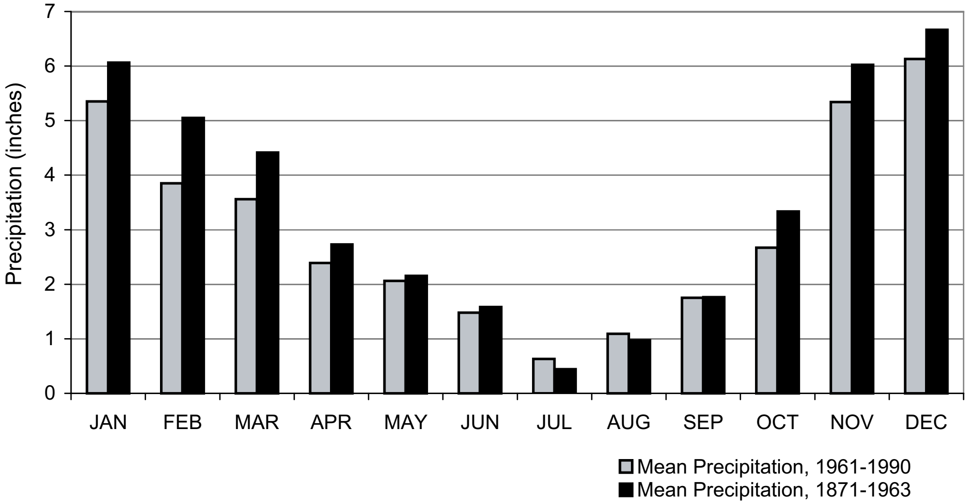

Figure 2.6. Mean monthly precipitation, Portland, Oregon, U.S.A.

2.2.7 Flora

The Soil Conservation Service 1983 Report lists Oregon ash (*Fraxinus latifolia*), Oregon white oak (*Quercus garryana*), black cottonwood (*Populus balsamifera*), and willow (*Salix spp*.) as the primary trees native to the floodplain (USDA 1983). Within close proximity on the adjoining upland slopes are Douglas fir (*Pseudotsuga menziesii*), Western Hemlock (*Tsuga heterophylla*), and Western Red Cedar (*Thuja plicata*) forests. In general, the stands of Oregon white oak (*Q. garryana*) dominated the highest ridges on the floodplain; on Sauvie Island the highest ridges do not exceed 50 feet above sea level. Richard Pettigrew cites a particular oak tree at the Merrybell site (35MU9) with a trunk "about 2 m in diameter, indicating the tree is nearly the maximum age for the species (about 500 years)" (Pettigrew 1981). Interestingly, very little mention is made of acorns as food in the majority of ethnobotanical sources. Pojar and MacKinnon (1994) indicates acorn use by the Salish people of the Puget Sound area; Dan Moerman (2003) lists *Quercus* spp. use by the Iroquois of New York and the Cahuilla, and other tribes, of California; neither indicates these were widely eaten in the study area (see Mathews, below).

Among the oak trees grew native blackberry (*Rubus vitifolius*), as well as various undergrowth species such as hazelnut (*Corylus cornuta*), serviceberry (*Amelianchier alnifolia*), and snowberry (*Symphoricarpos albus*) (Ames *et al*. 1999; Pettigrew 1981). Bracken fern (*Pteridium aquilinum*) proliferated in the open prairies adjacent to the oak groves and into the lower marshlands. This is in part because of its widespread habitat, and also because the Native practice of burning encouraged its growth; the rhizomes were harvested and eaten in late summer (Boyd 1987; Pojar 1994; White 1980). Prior to non-Native settlement and agricultural development, lowland areas of the Lower

Columbia Floodplain, especially marshy wetland soils, were noted for wapato (*Sagittaria latifolia*) and camas (*Camassia quamash*), particularly on Sauvie Island, previously known as Wapato Island (Boyd 1987; Hajda 1984; Newman 1991). Both of these were highly prized by local inhabitants; Boyd (1987) lists both wapato and camas as 'Class Two' resources, that is, those cited as food 6 to 15 times among their large database of researchers, literature and ethnobotanists studying the area. Other wetland plants native to the area, and used as food plants, are bracken fern (*Pteridium aquilinum*), horsetail (*Equisetum telmateia*), cattails (*Typha latifolia*), cow parsnip (*Heracleum lanatum*), Indian plum or osoberry (*Oemleria cerasiformis*), salal (*Gaultheria shallon*), thimbleberry (*Rubus parviflorus*), dewberry (*Rubus ursinus*), and salmonberry (*Rubus spectabilis*) (Ames *et al*. 1999; Hajda 1984; Pojar 1994).

2.2.8 Fauna

Due to the remarkable variability of habitat, the Lower Columbia Basin floodplain was home to a wide range of animals. Some were predators such as the black bear, bobcat, red fox, puma, and hawk. In forested areas there were elk and deer. The raccoon, river otter, and beaver populated four of the six habitat types near a source of water; the rivers and lakes abounded with freshwater mussels, freshwater turtles, and seasonally available salmon, steelhead, sturgeon, eulachon, and cyprinids. Non-migratory birds, kingfishers, and various waterfowl lived throughout the area (Ames *et al*. 1999).

In developing their thesis regarding regional population movement to and from the Columbia, Robert Boyd and Yvonne Hajda (1987) highlighted the regional human preference for fish over larger game animals for food, and outlined the seasonal availability of various fish species. The eulachon (*Thaleichthys pacificus*) appear in February and March; the white sturgeon (*Acipenser transmontanus*), which feed upon the eulachon, appear in March and again in August; and finally spring Chinook salmon (*Onchorhynchus tschawytscha*) come up the lower Columbia in March and April. "Spring Chinook salmon appear in the lower Columbia … running in essentially the same tributaries as do the eulachon… The bulk of the Willamette River run passes through the Multnomah Channel by Sauvie Island." The summer salmon runs begin in June with Sockeye (*O. nerka*), the summer runs of Chinook (*O. tschawytsha*), and then Chum Salmon (*O. keta*) in October (Boyd 1987).

2.2.9 Summary and Conclusions

The Sunken Village Archaeology Site is situated in an area known to have been inhabited by humans for thousands of years. It is rich in natural resources, providing food, materials for utilitarian use and trade, as well as transportation. The Columbia and Willamette rivers' seasonal flows, nearby volcanic eruptions on both sides of the Columbia and affecting both upstream and downstream river sedimentation, and landslides at Bonneville and the Cascades have all contributed to the formation of the Portland Basin floodplain in general and Sauvie Island in particular, filling or covering lowland or ancient channels with tephra, sand, and sediment. This, in turn, may have contributed to the flow of groundwater from upland marshes through the

35MU4 archaeology site and into the Multnomah Channel, providing ideal conditions for acorn leaching.

The climate, availability of water, and variation in habitats on and near Sauvie Island provided resources for more than just the people who lived there year around; many people from inland locations migrated to the river at various times of year to partake of available resources. Since no other archaeology site in the Western U.S.A. is known to have used passive acorn leaching in such great quantity, questions regarding the source of this technology, the extent of its use, and its success over time within the culture and its potential influence on cultures to the north, and especially south, remain.

The seasonal flooding and catastrophic events also created hazards for inhabitants. Village sites had to be carefully chosen in regard to high water and sediment deposition. Food storage and trading locations close to the river ran the risk of inundation. Proximity to the river transportation system, however, offset the risks, drawing large populations to take part in food harvesting, fishing and processing, and providing great wealth to those who controlled its waters.

2.3 Portland Basin Cultural Sequence and Ethnographic and Post-contact Background of Sauvie Island

By Maureen Newman Zehendner

2.3.1 Introduction

As seen in the environmental section above, the Portland Basin has been formed and transformed by numerous geological events, no doubt influencing the resources and the cultural history of the juncture point of the Willamette and Columbia rivers. Now we will discuss what is known about the cultural history of the region, mostly established using projectile point typologies, explore the local archaeological and ethnographic record and review the post-contact effect of non-Indian occupation in the Sauvie Island region.

2.3.2 Pre-contact Cultural Sequence

The earliest proposed prehistoric cultural sequence of the Portland Basin developed by Richard M. Pettigrew outlines two main phases: the Merrybell, 600 BC to 200 AD; and the Multnomah, 200 AD to contact. The Multnomah contains a series of sub-phases (Pettigrew 1977; 1981; 1990). The sequence is based primarily on projectile point types and stone implements including net-weights. Pettigrew developed the chronology after sub-surface testing at seven sites, surface collecting at three others in the Sauvie Island-Scappoose area, and studying private collections. He defines two types of archeological sites in the Portland Basin, upland (more than 1 kilometer from the river) and floodplain (less than 1 kilometer from the river) (Pettigrew 1990). Due to post-pleistocene sea level rise and depositional patterns on the floodplain of the Columbia, he suggests that evidence of the earliest occupations of the area has been inundated with water and alluvial deposits on the floodplain. Most of the sites investigated in the Portland

Basin are floodplain sites. The Portland Basin, including Sauvie Island and the north and south shores of the Columbia River, is rich in archaeological sites (Dunnell *et al*. 1974; Hibbs 1972, 1987; Jermann and Hollenbeck 1976; Kongas 1979; Munsell 1973; Newman and Starkey 1977; Reese *et al*. 1990; Strong 1959; and others). Some sites have been excavated by an avocational group, the Oregon Archaeological Society. Pettigrew's work in the late 1970's was the first intensive testing work done by any professional archaeologists. These test excavations were the basis for his chronology.

Recent research, directed by Kenneth M. Ames, has been conducted at the Meier Site (35C05) in Scappoose, Oregon (Ames *et al*. 1998) and the Cathlapotle Site (45CL1) near Ridgefield, Washington (Ames and Maschner 1999; Ames *et al*. 1998). As a part of the Wapato Valley Archaeological Project based at Portland State University a series of summer field school excavations at both the Meier and Cathlapotle sites have revealed large house structures, hearths, and storage pits. Study at these sites is the first long-term, intensive professional research of an archeological site in this area. Based on these investigations, Ames developed a Portland Basin Chronology with Paleo Indian, Early and Late Archaic phases not designated in the Pettigrew sequence, and a Pacific phase beginning 5,500 years before present comprised of three time periods and a late modern period (Ames 1994). The later Pacific and modern periods correspond chronologically with the Merrybell (3,500 to 1500 BP) and Multnomah (1500 BP to present) phases of Pettigrew's chronology.

Pettigrew argues that the Bonneville Flood, a geological event that took place upstream from the Portland Basin in the Columbia River Gorge (see Diedrich, above), had a major impact on archaeological sites in the Portland Basin. He dates the flood at *ca.* 1250 AD (Pettigrew 1990, 523). When the flood entered the Portland Basin, it:

> .....appears to have changed the floodplain topography and may have destroyed many, if not most, settlements in the Portland Basin and downstream. None of the prehistoric sites dated in the vicinity of the Bonneville Dam-Cascades area of the Columbia Gorge predates the landslide, ….Furthermore, in the Portland Basin, sites that were occupied both just before and after the landslide are extremely rare or nonexistent. It would appear that settlement destruction and landform changes were so severe that virtually all subsequent floodplain sites were relocated (Pettigrew 1990).

While Pettigrew makes a strong case for the impact of the Bonneville landslide/flood on archaeology of the area, the flood remains to be clearly defined in the archaeological and geological record of the Portland Basin (see Diedrich, above).

2.3.3 Ethnographic background

As mentioned in the Introduction, the Lower Columbia River section of the Northwest Coast Culture area is thought to have been one of the highest Native population densities in North America (Pettigrew 1981), yet it has only been in recent years that Chinookan sites and culture have been the focus of concentrated research efforts by professional archaeologists.

In 1804–06 journal accounts of the Lewis and Clark expedition the population estimates for the Lower Columbia indicate more than 17,000 individuals occupied the area from The Dalles to the mouth of the Columbia River. Nearly 6,000 individuals lived on Sauvie Island alone (Boyd 1985). However, the Chinookan populations in the Portland Basin (including Sauvie Island) were essentially gone by 1836, dying from "introduced diseases, particularly smallpox and malaria" (Boyd 1985). Between The Dalles and the coast, two Chinookan dialects were spoken. The Upper Chinookan dialect was spoken in the Portland Basin and up-river to The Dalles, while down river the Lower Chinook dialect was used. A substantial trade network flourished on the Lower Columbia and Chinook 'jargon' developed and was widely used as a trade language among speakers of various native languages as well as non-Indian fur traders.

The area of Sauvie Island is included in Silverstein's Chinookan sub-group of Multnomah (1990). He describes this portion of the Lower Columbia as a densely populated area with villages found from Government Island to the mouth of the Lewis River, a stretch of river which includes the Multnomah Channel and Sauvie (Wapato) Island as well as the mouth of the Willamette River. Groups in the area including the Cathlapotle with villages above the Lewis River, the Shoto at Lake Vancouver, and the Multnomah of Sauvie Island, spoke an Upper Chinookan dialect (Silverstein 1990).

Social organization and various aspects of the culture during the historical period have been discussed by Hajda (1984) based on available ethnographic and historical accounts from 1792–1840. From what is known about the Chinook, at that time, it appears that they typically located their villages at or near the mouths of major rivers and streams and conducted extensive trade up and down the river. During the winter they occupied semi-permanent villages, using plank house construction typical of other areas of the Northwest Coast. Temporary seasonal locations were occupied during the remainder of the year where various activities involved with foraging, fishing, and hunting took place.

Using evidence from archaeological excavations Saleeby (1983) has proposed a model which suggests that some permanent villages occurred aboriginally in the Portland Basin. She divides the Lower Columbia area into three sections: the Coast, Portland Basin, and Cascades. While aboriginal populations in all three areas were basically hunters and gatherers, she suggests that the abundance of resources in the Portland Basin provided the economic and food base for permanent villages. Added to this was the seasonal influx of outside groups which increased the population size during the fishing and harvesting months. Saleeby's model differs from the earlier work done by Dunnell *et al*. (1974) which suggests that none of the villages were occupied year round and that all the groups in the area occupied temporary locations during the fishing and harvesting periods, and semi-permanent villages during the winter months.

2.3.4 Cultural affinity

While there remain a substantial number of unanswered questions about the aboriginal populations of the Lower Columbia, there seems to be well accepted evidence that the groups, at least from The Dalles to the coast, can be clearly linked in terms of their cultural patterns to the Northwest Coast. As a part of the Northwest Coast (NWC) culture area there are many shared traits, but with regional variation in style and perhaps emphasis in regard to the importance of some practices and material objects. Ames and Maschner (1999) included extensive discussions of the Lower Columbia River Chinookan peoples in their comprehensive work on the archaeology and prehistory of the Northwest Coast. While there are some variations on house construction, art and the complex relationships among groups throughout there are vast similarities and cultural patterns linking these groups to the Northwest coastal groups. Ray (1938) describes their social patterns as having class and rank systems but not as rigid as was seen with Northern groups in the NWC culture area. Slavery, warfare and the practice of head flattening were all part of the Lower Chinook culture area. In addition, a highly developed system of trade was conducted along the Columbia River and the main mode of transportation was by canoe or on foot over-land. Permanent or winter village dwellings were cedar plank houses, while simpler cattail mat structures were built during warmer seasons. Ray (1938) notes: "...they made use of sweat lodges of two types, a plank structure" and a "typical Plains hemispherical hut."

2.3.5 Material Culture

Aboriginal populations occupying cedar plant houses made use of a wide array of objects that were produced from wood, cedar bark, spruce root, bone and shell. These served both utilitarian and ornamental functions. Stone was less prominent being used mainly for net-weights, and 'heat radiators' for cooking (Silverstein 1990).

Specific items made from these materials included in Silverstein's text are: (made from wood) carved boxes, troughs, carved and painted spirit-power figurines and reliefs on the house framework; bowls; serving pieces; canoe shaped trenchers. Baskets of several twined varieties; sewn cattail mats up to six or seven feet long; hemlock and crabapple wood wedges for splitting wood; needles of bone and wood; clothing made from cedar bark; robes and capes of fur, sea otter, beaver, raccoon and wood rat (1990). Many of the artifacts from this area are produced from wood and plant fibers and are quite perishable in a moist, mild climate. As will be discussed below, wet-sites provide an excellent opportunity to recover these types of perishables, and 35MU4 has been shown to contain substantial deposits of undisturbed organic remains and some of these items.

The Northwest Coast is also known to have had a highly developed art tradition. The aboriginal populations used wood, bone, antler, and perishable plant fibers for much of the art work. An extensive report on stone art from the Lower Columbia/ Portland Basin was done by Petersen (1978). Clay figurines are also known from sites in this area. Butler discusses the importance and the potential of the Portland Basin in the development of art styles in the region, suggesting the once densely populated Sauvie Island area may hold evidence that could provide substantial information on the origins and development of the aboriginal art styles of the Lower Columbia River Valley (Butler 1965).

When earlier investigations were undertaken on Sauvie Island, an examination of extant collections revealed that the Sunken Village site had already yielded a number of art objects from the wet deposits (Newman 1991, Appendix C, 208), and it was expected other such artifacts would be recovered during future excavations. The 2006 and 2007 excavations reported on below show that the prediction was accurate, and the results significant for our understanding of material culture from the island.

2.3.6 Introduction to Sauvie Island Contact Period History

In late December 2007 a massive 365 foot long steel framed bridge span was floated by barge down the Willamette River and into Multnomah Channel just north of Portland, Oregon, U.S.A. (Tucker 2007). At its new location the arching structure serves as the center span for a new bridge connecting Sauvie Island to the mainland replacing the existing 1950s era bridge. The two-mile trip down stream took several hours and once lifted into place the modern span took three days for construction crews to complete the work required to fit it securely into place. The replacement bridge opened in the summer of 2008 and now accommodates the ever increasing traffic traveling to and from the island. Activity on the island is booming on weekends from early spring bird watchers through a busy summer of bicyclists, and the fall harvest with pumpkin patches and corn mazes attracting families to the island. While a bit more peaceful in the winter there are still the dedicated bicyclists, hikers, runners, dog trainers, hunters and fishing enthusiasts who continue the activity year round. Before the 1950s bridge was constructed transportation between the island and the mainland was usually by ferry boat. The earliest travelers likely reached the island by canoes or fording the waters of Multnomah Channel. Sauvie Island has been inhabited for centuries first by Native American Chinookan speakers, then farmers for the Hudson's Bay Company, and donation land claim settlers, some of whose descendents still occupy the rural properties on the island.

The 1950s bridge brought more visitors to the island, making access easier for residents as well, but the island has managed to maintain its rural lifestyles despite ever increasing development pressure form the surrounding Portland metropolitan area. In recent years the desirability of the island and its rural lifestyle so close to the urban amenities of Portland has pushed land prices to premium levels. The resistance to development, preservation of farming properties and large areas of public Oregon State Fish and Wildlife lands has the added benefit of preserving the abundance of archaeological sites on the island including 35MU4. Despite decades of artifact collecting and digging at many of the island's sites many such as the Sunken Village, 35MU4, still provide the potential for research.

The archaeological and historical evidence suggests that the island has been an attractive place to live for the past 3,000 years. The rich resource base, indicated by the range of biotic habitats listed above, not only sustained the dense Chinookan populations, but also seasonally drew other Indians to the area. During the historic period, it was attractive to early Euro-American settlers. In 1850, the Donation Land Law, distributed land grants of 320 acres for single men and 640 for a man and wife. The law required that claimants occupy and cultivate the land (Carey 1971). After the act several parcels of land on Sauvie Island were claimed by early settlers (Cleaver 1986).

2.3.7 Post-contact Early Period Chronology

During their expedition to the Pacific, the American overland exploration of Americans Lewis and Clark mapped the location of Sauvie Island and called it 'Wappato Island' (Figure 2.7). Following that the island was named Wyeth's Island after the first white settler and later was given the name Sauvies Island (McArthur 1974), (the 's' appears in early maps) for the Hudson's Bay Company (HBC) employee, Laurent Sauve'. Sauvie Island is in use today. While its historic uses have varied, the island remains relatively undeveloped considering its proximity to the City of Portland, Oregon, U.S.A., and its rapidly expanding, particularly west and southwest, suburban areas.

When British Captain George Vancouver sent Lt. William R. Broughton on a mapping and exploration expedition of the Columbia River in 1792, Broughton named several locations which still retain those designations. He named Warrior Point, the downstream tip of Sauvie Island, Belle Vue Point at the southern end of the island, Mt. Hood, and Mt. St. Helens. In 1805–1806 Lewis and Clark mapped a number of locations of villages (Figure 2.7) and named it Wappato Island because of the abundance of Wapato (*Sagittaria latifolia*). Their maps show villages located on both the Columbia River side of the island and along Multnomah Channel. Hajda has suggested that 35MU4 could be the Cathlahcommatup village identified by Lewis and Clark.

William McKay said that a village of 500 was one mile from the head of the island, on the Howell place, and that all inhabitants were found dead during the 1830–34 epidemic. This points to a spot near 35MU4, and it may or may not have been Cathlacommatup. The 'Indian Camp Field' 2/3 miles south of the Benjamin Howell house was being used by Indians (doubtless another group) in the 1880s–1890s according to John Lampher (1881) (Hajda, Part III, in Hibbs 1987).

Other traders and explorers describe the island, including Gabriel Franchere in 1811, and David Thompson in the same year. However, it wasn't until 1834 that the first white settlement took place on the island. Nathaniel J. Wyeth established Fort William on high ground above Multnomah Channel on the west side of the island (Spencer 1950). By 1835, Wyeth's venture in trade had failed and Fort William was dismantled. The site of Fort William on the Multnomah Channel side of the island, is down stream from the Sunken Village site. A later venture at that location, in 1838, by the Hudson's Bay Company proved more successful. The company not interested in the location for a trading post, established a dairy farm on the site of Fort William. Eventually, the HBC operated three dairies on Sauvie Island (Spencer 1950). It was from the HBC employee Laurent Sauve', who was in charge of the dairy operation, that the island received its name. Following Sauve's retirement in 1844, James and Isabelle Logie took on operation of the dairy. They eventually filed a donation land claim including the site of the dairy. After the area was claimed by the United States, the British HBC had evacuated (Spencer 1950).

Following passage of the 1850 Donation Land Law by the U.S. Congress a number of DLC's were established along the southern end of the island. Included in these were the Bybee and the Howell DLC's. At the SW tip of the island is the Menzies DLC. Eventually, the Howell family acquired both the Bybee and Menzies DLC lands forming the Howell Bros. Farms.

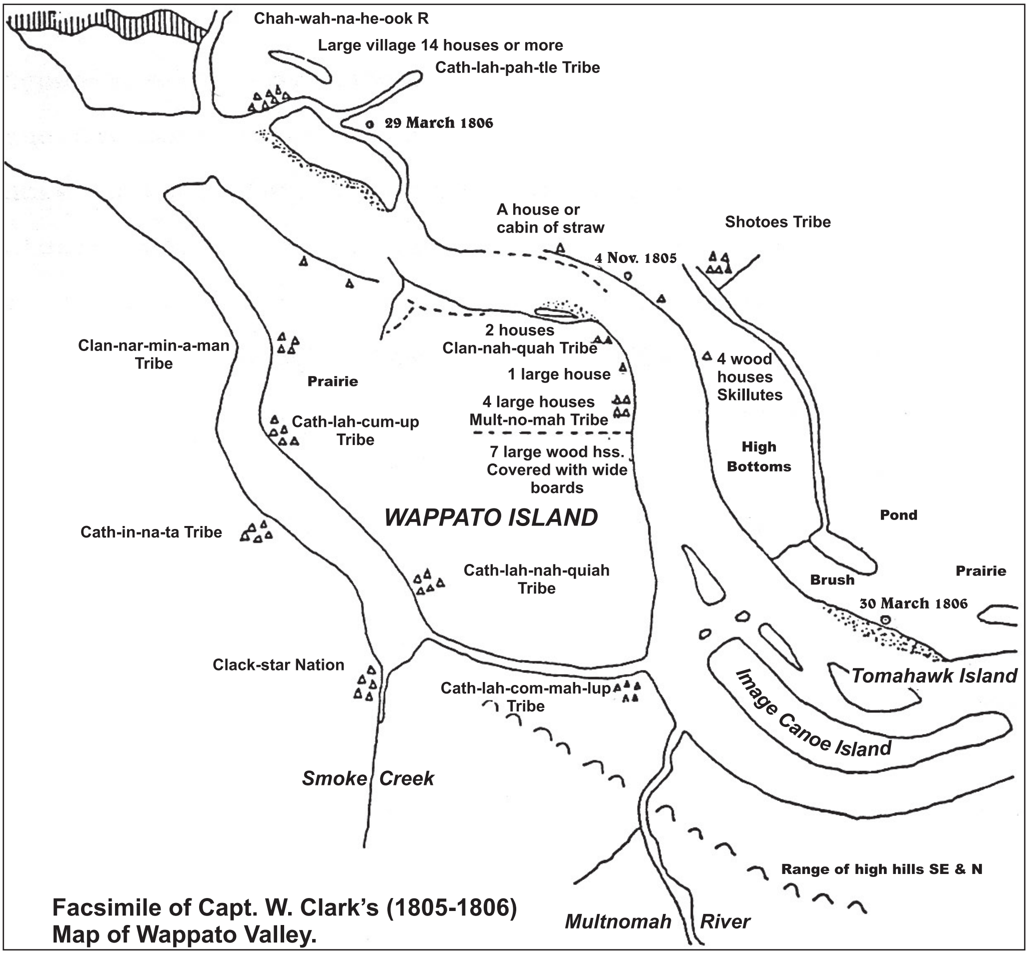

Figure 2.7. Facsimile of William Clark's map (1805–1806) indicating villages on Sauvie Island (from Oregon Archaeological Society's Screenings).

When the Howells bought out the DLC lands of James Bybee they also acquired what is now the historical monument the Bybee-Howell House, owned by the Portland area Metro Regional Government, The house was owned by the Howells until 1962 when it was donated to Multnomah County and was operated by the Oregon Historical Society for several years. Three sisters who are descendants of the Howells, lived in the house as children and the later years of there lives on Sauvie Island properties near the original homestead. The Howell Brothers Farm also included the property where 35MU4 is located. That portion of the land, however, was acquired by the Douglas Brothers Farms in the 1940s, the present day owners of the property.

2.3.8 The Twentieth Century and Change

Along with the modern conveniences made possible when electricity came to the island in the 1930s and vast improvements in communication when the telephone arrived in the late 1940s, two major construction projects have taken place on the island since 1900 that have brought significant changes to Sauvie Island. The first was construction of the Sauvie Island Dike from 1938–40. The Dike allowed a shift from a predominantly cattle grazing economy to farming. In 1949–1950, the Sauvie Island Bridge was constructed. The bridge made the island easily accessible from the mainland increasing its use for recreation including artifact collecting. Emory Strong published an article in the Oregonian in 1952 about the wealth of archaeological materials available at the major sites on the island and gives some specific locations for those interested in collecting. He regales his readers with reports of successful artifacts hunts but also informs them that the finds are now mostly arrow points since the 'large stuff' has been previously 'carried away' (Strong 1952).

Prior to construction of the Dike in 1938–1940, annual floods, or spring freshets made growing crops nearly impossible on the island. In extreme floods, most of the island would be inundated except for some high areas with elevations around 50 ft. along Multnomah Channel (Spencer 1950). Before the bridge, transportation to and from the island, as well as on the island itself was extremely limited. Steamboats and later a succession of ferry boats connected the island with the mainland and the City of Portland. On the island itself there were no official roads until after 1910 when a ferry landing was constructed on the Multnomah Channel side of the Island connecting with the area called Burlington on the mainland. Following this, a section of county road was constructed running southward along Multnomah Channel and a stretch heading eastward across the island. The road was eventually extended to form what is now Reeder Road and Gilihan Loop Road. These sections of county road are shown on the 1918 and 1920 topographic maps.

The section of county road constructed along Multnomah Channel appears to have been constructed through or adjacent to the Sunken Village Archaeological site. According to Marjorie Taber (personal communication 1987), the eastern edge of the site consisted of a series of burial mounds. During construction of the county road these mounds were destroyed. Her father removed the disturbed burials and reburied them at another location on the island. Mrs. Taber said she knew where the Indian remains were reinterred, but in order to protect them she would never disclose the location.

The remainder of 35MU4 seems to have been undisturbed until later construction of the dike. Leon Taber began visiting the Howells at Sauvie Island about 1917–18 and during this time he began to search various locations for artifacts. At that time 35MU4 was on the Howell's property and he remembers visiting the site quite frequently. After his marriage to Marjorie Howell, Taber moved to Sauvie Island to the property he named Arrowhead Acres, adjacent to the Bybee Howell house. When the Taber's home burned in 1986 most of the collection accumulated from 1917–1980s was destroyed (Taber 1987).

2.3.8.1 Construction of the dike

Following passage of the federal Flood Control Act of 1936, island residents decided to request federal funds to construct a dike along the southern tip of the island. The proposed dike was to be approximately 32 ft high and would protect some 12,000 acres on the upper end of the island. Construction of the dike was started in 1938 and finished in 1941. The project was undertaken by the U.S. Army Corps of Engineers and cost was shared by the Federal Government and the island landowners (Spencer 1950). Requirements under the federal act directed the establishment of the Sauvie Island Drainage District with power to assess and collect taxes. The drainage district still continues in operation today as the Sauvie Island Drainage Improvement Company and is one of the agencies that has jurisdiction regarding activities at 35MU4. During construction of the dike much of the fill material used was dredged from the adjacent waterways. A report in the Oregonian describes this:

> Material for the long dike will be dredged from the channels of the Willamette and Columbia rivers and Multnomah channel, work usually done solely in the interest of navigation (McClure 1938).

Along the western end of the island dredge material was pulled up from Multnomah Channel and deposited on the river bank to gradually build the dike to a height of about 32 ft. Archaeological site 35MU4 is located well within the project area and both field observations, and accounts from island residents indicate that parts of the site were actually scooped out of Multnomah Channel and deposited over other areas of the site. This impact to the site is discussed in both Newman's 'Site Description' and "Management Plan" sections (1991, 97–134). The county road was also buried by the dike in areas and those portions of the road were later rebuilt on top of the dike.

Following construction of the dike the acreage protected by the dike could then be use for farming. Another factor which Spencer points out in his 1950 book (nine years after the dike was completed):

> With improved land use and increased food production and therefore income, have come increased costs and expenses. An illustration is in taxes, which have risen from approximately one dollar per acre per year to five dollars per acre per year (1950).

Following construction of the dike a major portion of the Howell Brothers property, including the area where 35MU4 is located, was purchased by the present owners the Douglas Brothers Farms (personal communication, M. Taber 1987; personal communication, G. and M. Douglas 1988).

Spencer continues:

> The Big Dike has also brought changes other than crops. Roads have been graded, rocked and hard surfaced. The Island now has forty miles of roads with but six dead ends. While electric service from Portland General Electric Company was extended to the Island in the year 1936, since the building of the Big Dike that service has been improved and is maintained at a high state of efficiency. Telephone service came to the Island when The Pacific Telephone and Telegraph Company

> installed its plant and facilities and began furnishing its excellent rural service during 1948 – a service comparable to that in any large city (1950).

From Spencer's description, it is evident that along with the dike came the types of public services needed to serve the developing farming community.

2.3.8.2 Sauvie Island Bridge

The second significant development came in 1950 when construction of the Sauvie Island Bridge, begun in 1949, was completed. Now directly connected to the mainland, the island was easily accessible. Spencer expresses his own concern for the potential development of the island:

> As to those who see in the bridge a chance to plat land into small tracts which they would sell at great profit with inevitable shacks and an uncertain and transient population let their speculative real estate ventures be lost in the fogs of the island (1950).

Spencer's concerns, expressed as a resident of the island and chronicler of its history, have not yet become a reality, although the bridge has made the island accessible for many purposes including recreation. During the 1970s, one attempt was made by some property owners to use several acres for subdivisions. This proposal was opposed by large numbers of island residents, and the environmental organization 1000 Friends of Oregon. The project was never approved by the county planning commission. In the 1980s a portion of the Douglas Brothers Farm was to have been sold for development of a golf course under a special community service designation which can be allowed for farm lands. However, the land sale was never completed when Multnomah County failed to approve the land use applications that would be needed to satisfy conditions set forth by the prospective buyer (personal communication G. Douglas 1987). Under Oregon's Land Conservation and Development Commission regulations, most of Sauvie Island is designated as farm land. In the northern section of the island a large area was established a number of years ago as Oregon Game Commission Land (Department of Fish and Wildlife).

Other development pressures along the waterways such as Multnomah Channel include boat marinas and houseboat moorages as well as increased recreational use of the waterways. At one time a marina was proposed for a section of the bank of Multnomah channel that would come within a few hundred meters of the southern boundary of the Sunken Village.

2.4 Previous Archaeological Research and National Historic Landmark Status

By John Fagan

For such an important and well known archaeological site that has been listed in the National Register of Historic Places and that has been given the status of a National Historic Landmark, it is surprising that so little scientific research has been done. While the water-saturated deposits at 35MU4 have been known to yield rare organic artifacts to collectors for well over 50 years (Strong 1959, 24–31), only a few professional studies until now have been conducted at the site, and controlled scientific excavations have been previously limited to only a few auger tests that were excavated into the saturated deposits below the water line (Croes 1987; Pettigrew and Lebow 1987), and into the upland deposits within the natural levee (Hibbs and Ellis 1988).

Site 35MU4 was formally recorded by Richard Pettigrew in 1973 while conducting his dissertation fieldwork on the Lower Columbia River. The 1973 site form referred to the saturated deposits, twig or basket-lined basins, and to the numerous perishable materials that local collectors had found. Pettigrew also mentioned that shell lenses and burnt areas were visible in the cutbank at the site (Pettigrew 1973). In 1977, Thomas M. Newman, Bob Campbell, and Maureen McNassar, of Portland State University (PSU) documented their observations on a site form for 35MU4. The PSU team described two organically stained strata that were visible in the cutbank at the site, and noted that the bank extended 50 centimeters (20 inches) above the beach and contained charcoal fragments within the two strata. The PSU researchers noted that the upper stratum was horizontal but discontinuous, while the lower stratum was undulating and discontinuous. They also noted that there was evidence of some digging in the bank, particularly in an area that contained a large amount of fresh water mussel shell.

The first formal archaeological testing work at 35MU4 was conducted in 1987 during a survey for a natural gas pipeline (Hibbs and Ellis 1988). During the survey, 25 auger tests were excavated within and adjacent to the recorded boundaries of 35MU4. Map NCF-07 (Hibbs and Ellis 1988) shows that eight of the augers, numbers 2, 4, 5, 11, 13, 14, 20, and 23 contained cultural materials, and the auger record forms in Section A of the 1988 report indicate that augers 19 and 25 also contained cultural materials, but their locations are not indicated on the site map. The excavations conducted for the pipeline survey were all located on the upland portion of the site to determine site boundaries and the presence or absence of cultural deposits beneath the constructed levee within the proposed pipeline corridor (Hibbs and Ellis 1988 Part 1, 92–94).

The subsurface testing work conducted in 1987, documented intact stratified deposits beneath the constructed levee and confirmed the northern, eastern, and southern boundaries of site 35MU4 (Hibbs and Ellis 1988 Part 1, 92–94). The auger tests documented cultural deposits beneath 1.5 to 2 meters (m) (5 to 7 feet[ft]) of levee fill as evidenced by the presence of charcoal, ash, fire-cracked rock, debitage, and bone fragments (Hibbs and Ellis 1988 Part 1, 92).

Formal testing of the saturated deposit at 35MU4 was conducted in November of 1987 by Richard Pettigrew and Clayton Lebow, assisted by Dale Croes and Kenneth Ames. The testing work included the excavation of auger probes in the saturated deposits at the edge of Multnomah Channel. Of the eight 25 cm (10 in) diameter auger probes excavated within the saturated deposits in 1987, six contained cultural material including perishable organic items (Pettigrew and Lebow 1987, 20). The total volume of deposits excavated during 1987 amounted to only 0.61 cubic meter (less than 1 cubic yard compared to approximately 4–5 cubic meters (yards) excavated in our limited evaluation here) (Pettigrew and Lebow 1987, 11; Croes 1987). None of the auger test locations were evident along the beach during the 2003 AINW fieldwork;

however, several of the twig-lined acorn leaching pit features were visible at and just below the water line.

In 1991, Maureen M. Newman completed her Master Thesis at PSU that summarized previous research at 35MU4, reviewed the distribution and significance of saturated sites, particularly in the Pacific Northwest, completed a National Register Nomination form for the site, and provided management recommendations for the protection and preservation of the unique site and its valuable cultural deposits (Newman 1991). The thesis was a culmination of several years of research that included Ms. Newman's participation in the only two previous professional archaeological studies conducted at the site, as well as numerous volunteer efforts to monitor and protect the site during periods of low water when the saturated deposits were exposed and vulnerable to damage from artifact collectors. In her 1991 thesis, Ms. Newman recommended site stabilization as an immediate need for the protection of the resource, and offered several detailed approaches for implementing site protection measures.

The Sunken Village site was accepted to the U.S.A. National Register of Historic Places in 1989, and, in an attempt to provide additional status to the well-preserved wet site, Maureen M. Newman and her thesis chair, Kenneth Ames, proposed its nomination to the U.S.A. National Park Service as a National Historic Landmark (NHL). Only one other archaeological site in Oregon state, the Paleo-Indian Fort Rock Cave (an arid cave site producing 75 woven sagebrush sandals dating to approximately 10,000 years ago), has been afforded NHL status, and only approximately 250 archaeological sites have been given NHL status in all of the U.S.A. Ames and Newman felt that the Sunken Village wet site was unique in its preservation and demonstrated that wood and fiber artifacts reported by collectors through the years, and also hoped, if accepted, that this would provide avenues for raising support to better manage and explore the site. They were right on the archaeological significance of Sunken Village, and it was accepted as a NHL in 1989 as well, however, and unfortunately, this status did not seem to lead to additional support for management or professional investigations. The potential failure of the dike along the site in 2005, largely through tunneling into the dike by collectors, lead to our 2006 evaluation of potential detrimental effects of placing rip-rap along the cutback at this NHL wet site, then, following the 2006 report, the results lead to international interest and support from Japan to further document and compare this site in a northern Pacific rim context.