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ABSTRACT

Číx^{w}icən (pronounced *ch-WHEET-son)* is a 2700 year-old ancestral village of the Lower Elwha Klallam Tribe (LEKT), located on the northwest coast of Washington State, U.S.A. The Číx^{w}icən project has scientific values that broadly contribute to research in human ecodynamics and maritime foragers, given the scale of the project, excavation methods, and enormous quantities of faunal materials recovered. The village holds great significance to the LEKT as their traditional village, which includes a sacred burial ground. The project began under challenging circumstances, when the village was inadvertently encountered during a construction project, incurring huge political, social and financial costs. Commitment by the LEKT and Číx^{w}icən scholars and other partners turned an "opportunity lost" into an "opportunity found." This paper provides background to this remarkable site and project goals that guided the Číx^{w}icən research project. The Special Issue papers showcase project results, including reflections by tribal members. Overall, the project shows the potential for archaeology and heritage to support reconciliation between tribes and archaeologists and broader society.

1. Introduction

Číx^{w}icən[1] (pronounced *ch-WHEET-son*) is a 2700 year-old ancestral village of the Lower Elwha Klallam Tribe (LEKT), located on the northwest coast of Washington State, U.S.A. (Fig. 1). The site is important for several reasons. It is one of the most intensively sampled archaeological sites in the Northwest Coast culture area, with 518 m^2 and 261 m^3 of sediment excavated as part of a large-scale Washington State Department of Transportation (WSDOT) project in 2004 (Larson, 2006). Excavation recovered over 12,000 artifacts, over a million faunal remains, and documented remnants of multiple large plankhouses.

Číx^{w}icən also holds great significance to the LEKT as their traditional village, which includes a sacred burial ground. The 2004 mitigation of the site received national attention when the village was inadvertently discovered during the construction of a large dry dock. Indeed, the site is featured in a book on avoiding archaeological disasters because of the huge social, political, and economic costs associated with the mitigation (Stapp and Longenecker, 2009). Before the dry dock project was terminated, construction activities and the mitigation excavation disinterred remains of over 300 individuals, causing tribal members profound pain (Charles, 2009). At the same time, the process of the mitigation project fostered tribal links to cultural traditions and the ancestral village site itself, which had been attenuated since Indigenous people were displaced from the area in the 19th-early 20th centuries (Valadez and Watson-Charles, 2018). Thus, Číx^{w}icən provided an opportunity for healing trauma tied to colonialism (Charles, 2009; Mapes, 2009; Schaepe et al., 2017).

In 2012, we developed a research project focusing on Číx^{w}icən's faunal remains and geoarchaeological records from the 2004 mitigation. The microstratigraphic methods of excavation, the 102 radiocarbon dates obtained, joined with geological records for dynamic coastlines affected by great earthquakes (magnitude 8.0 and greater), local geomorphic change, and late Holocene climate change, provided an opportunity to explore the long-term relationships between humans and environments in the area. We reasoned that the high level of precision in chronology and sampling from multiple houses and extramural activity areas would allow us to study resilience of economically important animal species—and in turn, human populations, in the face of a range of environmental and social changes. Our project falls under the rubric "human ecodynamics", an interdisciplinary research framework that has been gaining currency in the past 10 years, and that

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[1] An alternative spelling for the site name, Tse-whit-zen, has been used in some previous reports and publications. The Klallam language spelling, Číx^{w}icən (Montler, 2012), is preferred by the Lower Elwha Klallam Tribe.

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Fig. 1. Map of Northwest Coast showing location of Čĺx̌ʷicən. Dashed line outlines the Salish Sea watershed. (Figure drafted by Kendal McDonald.)

encompasses concepts and methods from historical ecology and resilience theory to build an integrated deep history of human-environment interactions (Fitzhugh et al., this issue; Kirch, 2007; McGlade, 1995).

Besides the scientific value, we also wanted our project to support the LEKT's goals for a tribal museum to curate Čĺx̌ʷicən's cultural materials and commemorate the ancestral village. Given the tribe's interest in restoring coastal environments in the heavily industrialized harbor where Čĺx̌ʷicən is located, our records of past marine resources documented in site deposits help establish environmental baseline conditions prior to major habitat destruction. In short, working with the LEKT, we sought to turn an "opportunity lost"—the negative associations of the construction project, into an "opportunity found"—where positive cultural and scientific values could be fostered, showing the power of archaeology and heritage to promote reconciliation between tribes and archaeologists and the general public.

The Special Issue of *JASR* includes papers describing the results from the Čĺx̌ʷicən project, including reflections by tribal members, and representatives of the state agency (WSDOT), which initiated the 2004 mitigation. This paper reviews the historic context of the ancestral village, describes the mitigation project that reaffirmed the LEKT's long-connection to its village on the harbor, and outlines the overall goals of the Čĺx̌ʷicən research project.

2. Historic context

Čĺx̌ʷicən (45CA523) is located on the southern shore of the Strait of Juan de Fuca at the base of Ediz Hook, a 5.5 km (3.5 mi) long sand spit that creates a large natural harbor (Fig. 2). The city of Port Angeles now occupies part of the harbor's shoreline. Čĺx̌ʷicən is one of 33 + villages in the traditional territory of Klallam-speaking Coast Salish people, located along the southern side of the Strait of Juan de Fuca between Hoko River and Port Townsend and across the Strait from Port Angeles on the northern shoreline, near Victoria, British Columbia (Fig. 2) (Lane, 1975; LEKT, 2017a; Mapes, 2009). Klallam people are represented by three federally recognized tribes: Jamestown, Port Gamble, Lower Elwha Klallam, and the Canadian First Nation at the Beecher Bay Reserve.

Ethnographic and explorer accounts emphasize the economic importance of fishing in the region, but people also made extensive use of shellfish, marine and terrestrial mammals and birds (Gunther, 1927;

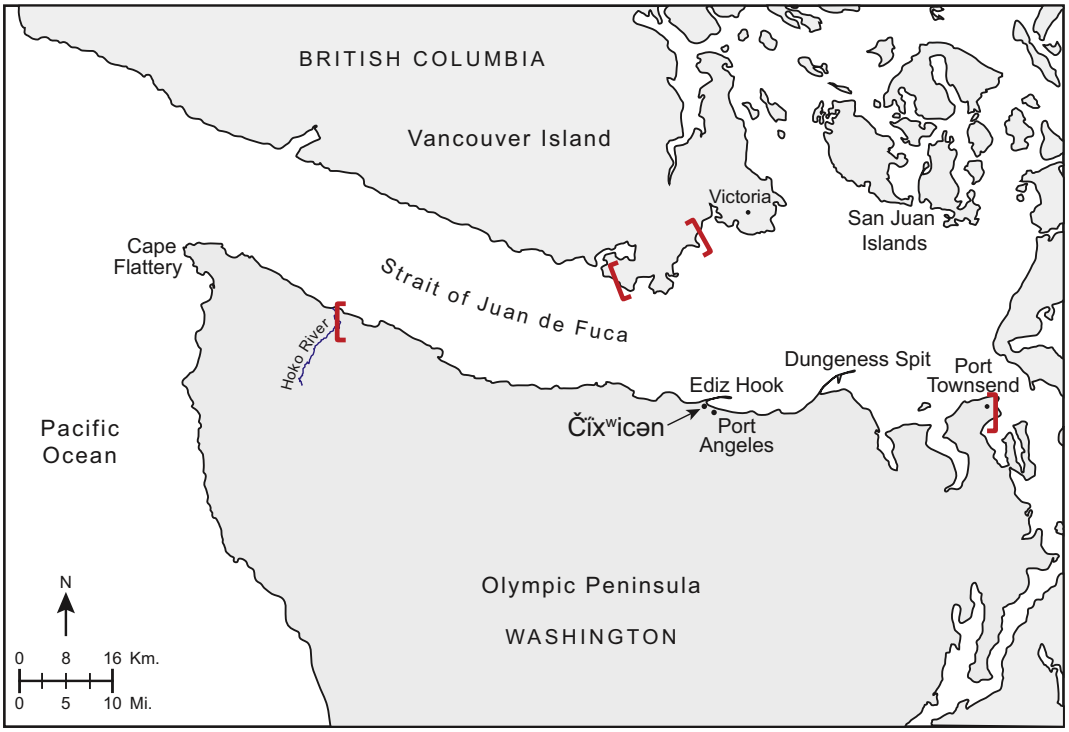

Fig. 2. Location of Číx̌ʷicən village in regional context. Brackets show spatial extent of Klallam villages, mid-19th century (28 are on southern shore of Strait of Juan de Fuca located between Hoko River and Port Townsend; 5 are on northern shore of the Strait, on Vancouver Island) (LEKT, 2017a).
(Figure drafted by Adrienne Cobb.)

Shaffer et al., 2004). Like other Northwest Coast societies, Klallam people lived in villages consisting of large plankhouses typically arrayed in one row, located on bays and estuaries for ready access to marine resources (Gunther, 1927). Plankhouses were the center of social and economic activities, food preparation, consumption and sharing, manufacturing, and ritual, as well as being the principal food-storage areas for resources such as dried salmon and other fish, cured whale, seal, and sea lion blubber and oil, and dried berries that were vital for winter survival (Ames and Maschner, 1999; Drucker, 1965). Travel for social interaction and resource procurement at fishing stations, hunting and gathering grounds, and other settings was accomplished primarily by steam-bent dugout canoes (Ames, 2002; Ames and Maschner, 1999).

Lifeways of Northwest Coast Indigenous people, as throughout the Americas, drastically changed with European contact and the colonial enterprise. Face-to-face contact between Europeans and aboriginal people began in the 1770s with Spanish coastal exploration, followed by British, Russian, and U.S. led expeditions. Developing the maritime fur trade was the chief interest early on, shifting later to colonization, resource extraction, missionizing, and other goals. The consequences of contact for aboriginal people were devastating. Populations greatly declined from infectious disease (Boyd, 1999). People were removed from traditional lands and access to resources was restricted. Cultural practices, including speaking native languages, were made illegal.

The colonial experience of Klallam people was consistent with this general picture, one of extreme challenge coupled with resilience and persistence (Valadez, 2002). Some Elwha Klallam families continued to maintain households on Ediz Hook and the shoreline of the harbor until the 1930s as documented by Native American oral traditions, Euro-American chroniclers, and 20th century accounts (Curtis, 1913; Kane, 1859; Shaffer et al., 2004; Waterman, 2012, in Lane, 1975; Valadez, 2002) (Fig. 3). During the mid-19th century, two distinct villages located on the harbor were visited by several Euro-Americans (Kane,1859; Curtis, 1913; Waterman, 2012, in Lane, 1975). One village corresponds with the location of Číx̌ʷicən and another with the area at the mouth of Ennis Creek (village name: *ʔiʔínəs*; near what is now the public pier in downtown Port Angeles). Paul Kane (1859:229–230) spent three days at Ennis Creek in 1847, and described a single large roofed structure with multiple compartments (for the use of separate families) that housed approximately 200 people. Číx̌ʷicən is the place name noted as “Indian Village” on the 1852 map by the U.S. Coast Survey, near the base of Ediz Hook and adjacent to a tidal lagoon (Alden, 1853). In the 1920s, anthropologist T.T. Waterman noted,

> an old village site Port Angeles, Tcixwi tsEn, “inside the spit.” The original village was situated west of the city of Port Angeles, just at the base of the spit. A swampy place and a small lagoon lay to the west of it. This was a place of considerable importance in aboriginal times. I found only two households of Indians at the time of my visit.
> (Waterman, 2012 in Lane, 1975)

Port Angeles Harbor is one of only two large natural harbors found along the ~150 km long southern shore of the Strait of Juan de Fuca (Fig. 2); 19th century visitors remarked on the harbor's value for settlement and commercial activity. In 1859, James Swan visited the harbor noting,

> The high mountains immediately in the rear of the beach effectually protect the anchorage from the southeast storms of winter, while the spit forms a barrier against heavy swell caused by northwest gales of summer. The soundings are from 20 to 30 fathoms of water in the deepest part, gradually shoaling to 7 fathoms, which are within 100 ft of the beach, on the spit. … It is decidedly the best harbor and easiest of access of any place between Port Townsend and Cape Flattery, and will eventually become a place of commercial importance.
> (Swan, 1971: 26–27)

Euro-American settlement in the vicinity of Číx̌ʷicən began in 1858 when three settlers, including sea captain Alexander Sampson, took out a Donation Land Claim for 320 acres at the base of Ediz Hook and along the western edge of the harbor (Mapes, 2009). The property

Fig. 3. Photograph ca. 1900 taken on the bluff west of Čí́x^{w}icən, looking east towards the tidal lagoon and Port Angeles Harbor beyond. The narrow spit of land, Ediz Hook, extends 5.5 km to the distant horizon. Note the structures, including likely LEKT residences, found on land and built on piers that extend into the lagoon. The construction and archaeological project focused on land adjacent to and right of the lagoon. Used with permission from the Clallam County Historical Society. Inset photograph taken in mid-2000s, aerial view of harbor, looking east. Red arrow in lower right is pointing in the direction ca. 1900 photo was taken. Čí́x^{w}icən village mitigation located between lagoon (bottom) and harbor. Used with permission by Marins.com (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

encompassed the Číx^{w}icən village and a cemetery. When Sampson tried to build a house and barn near the cemetery, Klallam people strongly resisted (Mapes, 2009). Only after promising to leave the cemetery alone was Sampson able to continue operating the farmstead. Intensive industrial development of the harbor began in 1913–1914 when a large saw and shingle mill, at the time the largest of its kind in the U.S., was constructed in the site vicinity. Industrial scale development along the harbor accelerated over the 20th century, mainly tied to logging and ship building (Kaehler and Trudel, 2006). The area at the base of Ediz Hook was the locus of a series of timber and paper mills over the century (Mapes, 2009). Over the same period, extensive in-filling and regrading occurred along most of the harbor shoreline to raise the city streets and eliminate tidal flooding; as much as 8 m of fill was deposited over tidelands, beaches and nearshore areas ringing the harbor (Wegmann et al., 2012) (Fig. 3).

As Port Angeles grew, Elwha Klallam people continued to occupy the harbor area, on the edges of commercial development (Fig. 3). According to the LEKT (2017b), over 30 Klallam families were living on Ediz Hook in 1930. In 1936, a reservation was established with 372 acres at the mouth of the Elwha River, ~8 km (5 mi) west of Port Angeles. Fourteen homes were built on the reservation for landless families, including those living on Ediz Hook (Valadez, 2002). Some tribal members retained knowledge of Číx^{w}icən and the cemetery and its importance over this time, as evidenced by the testimony of elders, who shared their concerns about the construction project as the archaeological mitigation began (Mapes, 2009).

3. Číx^{w}icən's "discovery", mitigation, and legacy

In the early 2000s, the Washington State Department of Transportation (WSDOT) needed a large parcel of coastal land on which to construct a large-scale dry dock, where massive pontoons could be fabricated that would be used to repair an aging floating bridge in the region. With support from the City of Port Angeles, the agency selected 5.6 ha of land at the base of Ediz Hook for this development. Because of its location in a highly industrialized harbor characterized by extensive landfill, heritage managers assumed that intact cultural deposits would not be encountered and thus "fast-tracked" the project (King, 2009). Pre-construction sub-surface testing to identify potential archaeological deposits included 17 backhoe trenches and nine split-spoon auger tests carried out over three days of fieldwork (JLARC, 2006). Testing did not identify intact cultural deposits and the contractor suggested there was a low probability for buried archaeological deposits. Given the known ethnohistoric village and cemetery in the area, however, "the contractor recommended archaeological monitoring in construction areas where excavation would exceed 4 ft (1.3 m)" (Stapp and Longenecker, 2009:42; see also Reetz et al., 2006). The contractor's recommendations were reviewed and approved by the Washington State Historic Preservation Office and the LEKT; though the fast pace of the permitting process did not allow for detailed consideration or face-to-face discussions between the contractor and the tribe (JLARC, 2006; Mapes, 2009). The plan was set for on-site archaeological consultants to monitor construction and document cultural materials that might be revealed during ground disturbance.

Construction began on August 3, 2003, and two weeks later, on August 16, intact cultural deposits were identified by monitors; and not long after that, human remains were uncovered. LEKT tribal members were notified and consulted about how to proceed. Construction activities ceased in locations where human remains were found, but continued in adjacent areas until August 25, with monitoring carried out by archaeologists and LEKT members (Reetz et al., 2006). At this time, monitors identified human remains and artifacts in construction spoils that had been stockpiled for use as fill in later construction (Reetz et al., 2006). Such findings raised major concerns among all parties involved and WSDOT shut the project down to allow time to develop a way forward (Mapes, 2009). As required by U.S. federal law (Section 106 of the National Historic Preservation Act), all the affected parties needed to engage in negotiations to find a solution to the challenge: how to accommodate a large-scale construction project and protect cultural resources or mitigate construction-related impacts. This process played out over the next seven months (Stapp and Longenecker, 2009).

To obtain greater understanding about the presence and extent of buried archaeological deposits, WSDOT hired an archaeological consultant to do further testing, which consisted of 80 mechanically excavated trenches (Stapp and Longenecker, 2009). The LEKT hired a second archaeological contractor to review the work of the first. The two archaeological consultants interpreted the record in different ways. Where the first company tended to see disturbance, the second saw intact, well-preserved stratigraphy, with great potential to reveal insights about the human past and support tribal heritage (Mapes, 2009; Stapp and Longenecker, 2009). As these divergent views were being reviewed, the Tribe was under great pressure from the local government and business leaders to support moving the project forward, given the scale of economic benefit (jobs, ancillary revenue) (Mapes, 2009).

In March 2004, all the parties came to an agreement, through support for a Treatment Plan: a large-scale archaeological recovery plan that would involve archaeological excavation over a 14-week period (plus laboratory analysis and report writing) with a cost of 4.6 million dollars (Stapp and Longenecker, 2009). The LEKT were to receive 3.44 million dollars to support burial mitigation, which would include reburial of human remains that were encountered and also funds for a museum and curatorial facility.

In late April 2004, data recovery began, led by Larson Anthropological Archaeological Services (Larson, 2006). After mechanical scraping removed surface deposits resulting from the construction of the timber mill, intact archaeological deposits were excavated in 1 × 1 m units using a modified isolated block technique (Fig. 4). This approach provided vertical and horizontal control and allowed for excavation by fine stratigraphic divisions (Reetz et al., 2006), following the geoarchaeological approach developed by Stein (1992).

For the large-scale excavation, both archaeological technicians and LEKT members were hired to excavate, water screen and work in the field laboratory. When human remains were encountered, a special set of protocols was followed that had been developed as part of the Treatment Plan; and modified over the course of the project in line with

Fig. 4. Photograph showing archaeological excavation (foreground) in the dry dock project construction zone. Note the depth of fill between the modern ground surface (indicated by heavy machinery) and the pre-industrial, 19th century surface where field technicians Rene Casebeer (left) and Kim Kwarsick (right) are excavating. Photo #248, taken on May 25, 2004 by Sarah Sterling. Used with permission by Washington State Department of Transportation and the Burke Museum of Natural History and Culture.

LEKT requests. A *human remains recovery crew*, which included professional archaeologists, LEKT field assistants and Spiritual Workers would carefully remove the remains and funerary items, as well as a buffer around the remains; and document some aspects of the remains, which were then placed in a cedar box arranged as closely as possible to their position in the ground (Kanipe et al., 2006). Spiritual Workers for the LEKT carried out opening and closing ceremonies during this process (Kanipe et al., 2006).

By June 2004, it became clear that the scale of mitigation stipulated in the Treatment Plan was insufficient; intact archaeological deposits were more expansive and deeper than originally thought (Reetz et al., 2006) and many more burials were present than expected throughout the project area, not in a discrete cemetery area (Mapes, 2009). Parties to the original agreement revised their plans for more excavation mitigation that would be required for the dry dock construction to proceed, and thus data recovery continued for several more months.

However, tribal members became increasingly concerned about the extent of disturbance to ancestral remains that was taking place (Mapes, 2009). Besides the disturbance of human remains associated with the construction of the dry dock, data recovery was exposing past disturbances; in several instances, human remains were found in the backfill of utility trenches, or truncated by sawmill pilings from 20th century construction, emphasizing the history of disrespect nontribal members showed Indigenous people (Charles, 2009; Mapes, 2009). In addition, tribal members came to realize that mitigation plans did not entail removal and reburial of all of the ancestral graves—that some of them would be left in the ground if not directly in the construction zone, or capped under the concrete slab floor of the dry dock (Mapes, 2009). Leaving ancestors in the ground, in the dry dock facility and separated from those individuals who had been exhumed, was not acceptable to the tribe.

In early December, as mitigation was unearthing still more burials, the tribe formally requested that the project be terminated; and state lawmakers and WSDOT agreed to halt the project on December 21, 2004 (Stapp and Longenecker, 2009).

Thus, after years of planning and a year and a half of construction, extensive archaeological excavation (518 m^2), and recovery and reburial of over 300 sets of human remains—all at a cost of over 60 million dollars (Mapes, 2009; Stapp and Longenecker, 2009)—the dry dock project was halted permanently in Port Angeles. Funds were provided to catalog and curate the thousands of recovered artifacts and animal remains, but only minimal analysis and reporting. Materials are curated at the Burke Museum in Seattle, Washington, and in the process of being turned over to the LEKT.

The social and economic costs of the project are staggering. For tribes, it brought to the fore a painful colonial history that drove Indigenous people from their original lands and continued to play out in the 20th century development of the harbor (Charles, 2009). As Tribal Chairwoman Frances Charles expressed in her Foreward to *Breaking Ground*, a book about the LEKT and the Čík^{w}icən project,

> Put yourself in our shoes. Be open-minded. See how our ancestors' remains were used as backfill in pipeline trenches. Think about that reality, of how you would like your loved ones treated with respect in what they thought was their final destination and final resting place. Think about my expression as I stood with our tribal youth and those pipeline trenches and the bones of our ancestors were uncovered, and I tried to be strong and their backbone at that time. As I tried to explain how people could have treated another human being like this.
>
> (Frances Charles, 2009: xiv-iv)

Nontribal people lost too: construction workers lost jobs; the city lost an economic generator; Washington state citizens paid for the mistake with tax dollars; the negative publicity contributed to increased cynicism with government process.

At the same time, the project provided tribal members opportunity to renew their connections with the village and the sacred ground that held ancestral remains, and has contributed to greater cultural sovereignty (Charles, 2009). The dramatic uncovering of the village reaffirmed to the city, county, and non-tribal populace that Indigenous people occupied the harbor for at least 2700 years before being forced out by Euro-American settlement. Indeed, the Čík^{w}icən project led senior state lawmakers, such as then Governor Gary Locke, to new ways of thinking about Indigenous heritage, its importance to citizens today, and the need to save heritage for the future.

> I don't think future generations would forgive us for ignoring this site, knowing there is a several thousand year old village and grave site there. I believe that people years from now will say it is more important to preserve that, and educate future generations of what was there and document the findings and tell the story of Washington's first people. If we continue there and build this huge concrete pool, it would be akin to paving part of ancient Greece and ancient Rome, and would be just absolutely unacceptable and unforgivable. The job of replacing the pontoons and replacing the bridge does not go away. We simply must find another place to build them.
>
> (Gary Locke, in Mapes, 2009: 189)

Čík^{w}icən is now part of a *Traditional Cultural Property*, which encompasses Ediz Hook, the shoreline surrounding the enclosed harbor and the harbor itself (Hughes, 2015); it is listed on the National Register of Historic Places (White, 2013). The City of Port Angeles has added bilingual street signs in Klallam and English, acknowledging the tribal link to the city.

Our collaborative project developed out of this challenging context. Our team was familiar with the archaeological mitigation that had unfolded in Port Angeles, and the toll the project had on the LEKT, the city of Port Angeles, and citizens of Washington state. We also saw Čík^{w}icən's research potential and its ability to help reveal the long-term history of people at this place. We also knew that the tribe was developing plans for a cultural center/museum to showcase Čík^{w}icən and thought study of some parts of the site's voluminous materials could contribute to that effort.

In 2012, we developed a research project that focused on Čík^{w}icən's faunal remains, to document long-term human-environmental relationships in line with developing scholarship in human ecodynamics. Importantly, our work, which showcases the enduring presence of the LEKT at Čík^{w}icən for close to 3000 years, complements the name that Klallam people (including the three recognized tribes) give themselves: Nəx^{w}sƛ̓áy̓əm, which means “strong people” (LEKT, 2017c). Overall, our project sought to provide general lessons regarding human-environmental relationships and suggest new ways that residents—tribal and nontribal alike—might engage with each other and their local environment. As Tribal Chairwoman Frances Charles explains, “We can all learn from Tse-whit-zen [Čík^{w}icən] and the damage that has been done to a culture and an environment in just two hundred years … Open your mind and heart. Look at the whole picture. Listen to what our elders tell us: you have to know your past in order to build your future (Charles, 2009: xvi).”

Through our project, we are working to find common ground with the LEKT and to open our minds and hearts to the “whole picture” as Charles directs us. Project team members have visited with tribal members at the LEKT Reservation multiple times since the project began and presented our work in progress. Tribal leaders have joined us at two professional conferences to share their perspectives about Čík^{w}icən to a wider community of archaeologists and anthropologists. We are pleased that tribal representatives have also agreed to share their perspective on the project in this Special Issue.

4. Research goals

Archaeological research is increasingly being integrated into large-

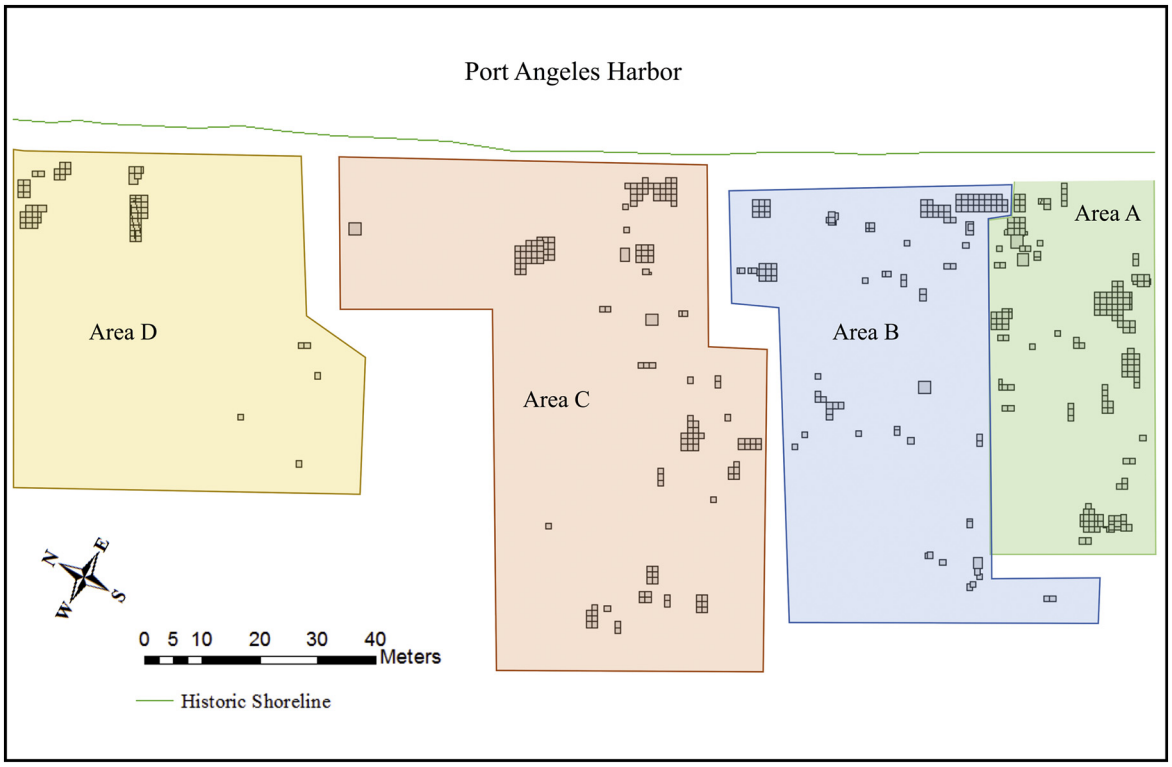

Fig. 5. Map of excavated area encompassing the Číx^{w}icən site. Grid squares are 1 m^2. The boundaries of the cultural remains extend outside the designated areas. (Figure drafted by Laura Syvertson.)

scale scientific programs studying the complex and dynamic interactions between humans and their environment (Cooper and Sheets, 2012; Crumley, 1994; Maschner et al., 2009; McGovern et al., 2007; Redman et al., 2004). The research program, *human ecodynamics* (and aligned fields such as historical ecology) encompasses interdisciplinary research that draws on natural and social sciences, along with history, to build an integrated deep history of these human-environment interactions. Human ecodynamics recognizes that change in human-environmental systems is non-linear and that human agency and historical trajectories need to be incorporated into explanations of our past. The concepts resilience and adaptive capacity are invoked to explore human-environment dynamics in the face of various scales of vulnerabilities (Fitzhugh et al., in this issue; Harrison and Maher, 2014; Kirch, 2007; McGlade, 1995).

The Northwest Coast is an ideal setting to apply human ecodynamics research. Although rarely labeled "human ecodynamics," scholarly research in the region has long been interested in the dynamics of human-environment relationships. For example, Hebda and Mathewes (1984) examined the role of climate in the expansion of red cedar (*Thuja plicata*), a critical resource to coastal populations; Lepofsky et al. (2005) reviewed ways climate change affected fire regimes and in turn population history in the Fraser River and adjacent areas; Monks (2017) and McKechnie et al. (2014) studied links in ocean productivity to past fish abundance and in turn human use patterns. Scholars have examined the impacts of abrupt environmental events such as great earthquakes on coastal occupation history (Hutchinson and McMillan, 1997; Losey, 2005). Researchers have shown increasing interest in ways humans were actively modifying the environment, for instance increasing habitable space (Grier, 2014) and engineering "clam gardens" to enhance resource areas (Lepofsky et al., 2017). For the last 3000 years, social systems represent complex foragers occupying multi-house villages with long-duration households (500 years or more) (Ames, 2006; Grier, 2006). Such a social milieu provides an opportunity to study resilience of communities in the face of environmental changes of varying scales. In addition, it is feasible to examine the changing nature of resource use and ownership patterns associated with increasing human populations and territoriality (Croes and Hackenberger, 1988).

Within this regional context, Číx^{w}icən village provides an excellent case study for human ecodynamics research. The scale of data recovery was noteworthy, with over 500 m^2 excavated (Fig. 5). Moreover, field design opened large excavation blocks that allowed for identification and sampling of multiple houses and activity areas. We reasoned that the high level of precision in sampling and chronology from samples obtained from multiple houses and extramural activity areas would allow us to study resilience of economically important animal species—and in turn, human populations, in the face of a range of environmental and social changes (great earthquakes, climate change, local landscape change, variable occupational intensity). We approached this goal by focusing on faunal remains. Although faunal remains have been used in household studies to study economic specialization and resource access (Chatters, 1989; Dolan, 2015; Huelsbeck, 1994; Wessen, 1994), their potential for understanding ecodynamics and resilience of human adaptive strategies has not been fully realized. Faunal remains offer several advantages over other artifact classes. Faunal remains have a limited use-life, are not as affected by curation (sensu Schiffer, 1987), and are more directly linked to resource use areas and environment, than many artifact types.

We built on these strengths by integrating more taxonomic groups than are typically examined in North Pacific studies (Butler and Campbell, 2004), to allow for robust tests using multiple lines of evidence. Field sampling was explicitly designed to be "constant volume" sampling to allow for integration of all classes of faunal data (Reetz et al., 2006), which is central to our research goals. As part of field and lab processing, approximately every 20th 10-liter bucket recovered from a uniquely defined deposit was water- screened through graded mesh (down to 1/8″ [3.2 mm]); all the constituents were sorted into class and retained for future study. Though some of the specific analysts examined other samples as well (see individual papers in this volume), we all analyzed the same suite of 20th buckets, ensuring direct

comparability across all faunal classes.

As the first major research project to come out of the massive Číx^{w}icən collections, our approach is innovative in placing zooarchaeology at the forefront, rather than as a descriptive supplement to artifact and feature based summaries. Our research questions take full advantage of the strengths of faunal analysis. The sheer abundance of faunal remains in Northwest Coast shell middens, especially fish and shellfish, can result in sampling and analysis of faunal material being dictated by expedience rather than research design. Bird bones from Northwest Coast sites are less studied (Butler and Campbell, 2004), and even mammal bones, which tend to receive the most analytical attention, are under-studied, with few projects incorporating detailed taphonomic study. Our approach, coordinating in-depth analyses of multiple classes from comparable excavated volumes, helps us separate the confounding influences of environmental and social factors, thereby addressing the persistent problem of equifinality.

5. Conclusions

The Číx^{w}icən site (45CA523), a well-preserved 2700-year old village in Port Angeles, Washington, illuminates the long-term history of the Lower Elwha Klallam Tribe. The archaeological work at this remarkable site began in controversy, with the unintended discovery of burials, remains of houses and midden during WSDOT construction. Despite the unfortunate way the project began, the vast Číx^{w}icən collection provides an unparalleled opportunity to investigate the dynamic interactions between people and their environment in the Northwest Coast, a theme explored in subsequent papers in this Special Issue. Besides the scientific values, the project provided an important opportunity for the LEKT to renew connections with a significant cultural place; one that likely will be revealing insights on the human story long into the future.

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