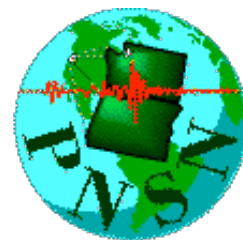


# DRAFT: CASCADIA MEGATHRUST EARTHQUAKES IN PACIFIC NORTHWEST INDIAN MYTHS AND LEGENDS



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## Introduction

The oldest earthquakes documented in Cascadia are known from geologic evidence (Atwater, 1995). The most recent of the Cascadia megathrust earthquakes occurred between August 1699 and May 1700, and probably accounts for a tsunami which is documented in Japan (Satake et al., 1996, Tsuji et al., 1998). We searched for Pacific Northwest Indian tales and legends related to the 1700 megathrust earthquake and found a set of related stories that, taken together, indicate that strong shaking was felt over a wide area and accompanied by severe coastal flooding.

Although the natives of the Pacific Northwest possessed a rich oral tradition, only fragmentary remnants of their stories are available today. European diseases spread across the continent much faster than settlement, and Pacific Northwest Native populations were substantially diminished long before the actual arrival of Europeans on the Northwest coast (Dobyns, 1983), and continued to decline rapidly until after 1900 (Arima et al., 1991, p. 2). Stories were likely lost as the population declined. Sudden epidemics and their attendant disruptions may have had an especially damaging effect; stories were individually owned in some tribes, and may have perished with their owners.

It is estimated that perhaps 95% of the native oral literature of Oregon has been lost (Jacobs, 1962). Stories from Washington likely also suffered great losses. Published stories collected by ethnographers, anthropologists and others reflect to some extent the interests and biases of the Europeans that recorded them. The available representations of Native oral literature may not be a representative sampling of the original material.

From our perspective at the beginning of the 21st century, it is difficult to imagine how traditional cultures experienced the world before the persuasive explanations of science. As scientists, we seek clear and unambiguous descriptions of earthquakes and/or tsunamis. However, Indian myths and legends are not newspaper reporting, but stories from a traditional culture.

Native accounts of a once-in-many-generations event like a great earthquake may be incorporated into preexisting myths and explanations of phenomena in a way that makes that event difficult to separate from the intertwined background. Native stories served many purposes, and were deeply embedded in the overarching tribal cultures. Understanding the

story motifs and characters that are most likely to be linked with earthquake stories requires careful study and insightful interrogation of the material.

**Review of Previously Cited Material** We began our investigation with a review of the material cited in geophysical literature or listed in the "Bibliography and Index of Indian Tales in Special Collections University of Washington Libraries" (Edwards, 1983), an index of Indian myth story motifs and characters. Under the motif or character name of "earthquake", most of the entries in Edwards (1983) are from the Yurok (northern California) and Haida (northern Vancouver Island and the Queen Charlotte Islands).

All of the earthquake-related Yurok stories are contained in "Yurok Myths" (Kroeber, 1976). These include the relatively unambiguous story of co-seismic subsidence and tsunami "How the Prairie Became Ocean" (Kroeber, 1976; BB3) (previously discovered by D. Carver and G. Carver). The Yurok stories include a character called "Earthquake" (Kroeber, 1976; stories B5, C1, C5, F1, L1, P1, P6, W1, X1, and BB3).

Haida earthquake stories appear in several volumes (Tora, 1976; Barbeau, 1928, Swanton, 1905), and feature an Atlas-like and/or hero-figure who causes earthquakes by moving his hands and feet, or by stomping on the ground, or by boiling over duck grease. This figure is variously known as "Stone Ribs", "Strong Man who holds up the World", and "Sacred One both Still and Moving". The Haida and Yurok areas are located at the north and South ends of Cascadia, where earthquake activity is more frequent than on the Washington and Oregon coastal margin.

Within Cascadia, from Vancouver Island, several stories clearly set in historical (not mythic) time, and possibly related to great Cascadia earthquakes. One such story is of the destruction of a village on Vancouver Island's Pachena Bay, "The tsunami at !ANAQTL'A or 'Pachena Bay'" related during 1964 by Louis Clamhouse, published in [Arima et al. \(1991, p. 231\)](#), and cited in Hutchinson and McMillan (1997).

"They had practically no way or time to try to save themselves. I think it was at nighttime that the land shook.... I think a big wave smashed into the beach. The Pachena Bay people were lost.... But they who lived at Ma:lts'a:s, :House-Up-Against-Hill." the wave did not reach because they were on high ground... Because of that they came out alive. They did not drift out to sea with the others."

Another story describes a great ebb and flow of the sea in Barkley Sound (Sproat, 1987; cited by Clague, 1995). Hutchinson and McMillan (1997) note that the story of a flood is widespread throughout the tribes of the Pacific Northwest.

Hill-Tout (1978) records a Cowichan tradition of strong shaking. The Cowichan Valley is located on southeastern Vancouver Island.

"In the days before the white man there was a great earthquake. It began about the middle of one night .... threw down ... houses and brought great masses of rock down from the mountains. One village was completely buried beneath a landslide."

Few Native American stories have been found of earthquakes in Washington and Oregon. Heaton and Snavely (1985) have cited the story of a flood at Neah Bay that James Swan recorded in his diary in 1864, and published in 1870 (Swan, 1870).

**A search of Washington and Oregon Indian earthquake and flood folklore**

The UW's Pacific Northwest Collection Indian Myth Index contained a few other references to earthquake shaking, but nothing that could be definitively linked with a tsunami or tidal disturbance in coastal Washington or Oregon. We also reviewed a number of the flood myths listed in the Indian Myth Index, and found that very few had any elements that seem even remotely associated with an earthquake tsunami. Because it is difficult to imagine that a great subduction earthquake 300 years ago involving all of Cascadia would not leave some trace in the native oral literatures of Washington and Oregon, we began to scan other stories in the books that contained flood stories. Incomplete as the preserved oral history of Cascadia is, many stories are repeated in multiple versions, with some "mixing and matching" of story elements, and some of the stories are geographically wide-spread.

We discovered a group of stories with common thematic elements which, if they can be taken together, show that great subduction zone earthquakes may indeed be represented in the oral literature of Pacific Northwest Indians. These stories suggest a widely felt event with strong shaking, severe tidal disturbances, incursion of salt water into estuaries, and death and dislocation of Indians along the northern Washington coast and Strait of Juan de Fuca. An important feature of these stories is that the description of physical phenomena in the distant but historical past is intertwined with the story of a mythic battle between supernatural beings. This representation may reflect typical Native American storytelling techniques and a traditional (i.e. pre-scientific) world view, and helps to explain why Native American stories of Cascadia earthquakes and tsunamis have been difficult to find.

The stories discussed below are attached at the end of this text. Table 1 lists thematic elements contained in the stories. Some stories share as many as 8 or 9 thematic elements, while others have essentially no overlap, but are joined by other stories.

## **Discussion of Selected Native American earthquake and flood stories from Washington State**

### *James Swan Diary Entry*

The first story was recorded by James Swan (1818-1900), a prolific diarist and early resident of Washington (1852) who served as the first school teacher at the Makah Reservation at Neah Bay (1862-1866). This story has been cited by Heaton and Snavely (1985) and Hutchinson and McMillan (1997). The version given here comes directly from Swan's original journal (1864).

The story is a seemingly straightforward description of sea level changes, with water flowing from Neah Bay through Waatch Prarie, making Cape Flattery an island. This story is set at some time in the indefinite, but not-distant past. It describes relatively rapid sea level changes that might conceivably be associated with a tsunami, but without any report of shaking. It includes canoes in the trees, many dead, and population disruptions. Heaton and Snavely (1985) point out that some elements of the story; such as the water being warm, and the very slow rise and fall of the water; seem inconsistent with a tsunami.

### *Albert B. Reagan "A story of the flood"*

Albert B. Reagan (1871-1936) worked for the U.S. Indian Field Service. He was initially trained as a geologist, then became interested in ethnology and received his Ph.D from Stanford in 1925. From 1905-1909, Reagan was government official in charge of the Indian villages of Quileute (now called La Push) and Hoh.

"A story of the flood" (Reagan, 1934) is a Hoh/Quileute tale strikingly similar to the Swan account. In fact, all the story elements from the Swan account are present. However, this version of the story is clearly set in mythic time, not the historical past of the Swan account, and includes many story elements not present in Swan. "A story of the flood" attributes the tidal phenomena to a battle between two supernatural figures; Kwatee and the Thunderbird. After multiple episodes of battle, Kwatee kills the Thunderbird. This story also adds a unique physical detail - it describes sea animals stranded on dry land when the water recedes.

Kwatee, who figures in this story is also known as the Transformer or the trickster; he is a central figure in many northwest mythologies. Stories about the Transformer deal with how he improves the imperfect world, through "the theft of fire, the destruction of monsters, the making of waterfalls, and the teaching of useful arts to the Indians" (Judson, 1916, p. vii). The Transformer is most widely known as Coyote. This character is called Speelyai in the Columbia River Basin, and appears as Yehl, the Raven, in Alaska.

### ***George Benson Kuykendall "Speelyai fights Eenumtla"***

G.B. Kuykendall, M.D. (1843-?) was an early resident of the Pacific Northwest (1852?). He graduated from Willamette University and was appointed to the post of government physician at Fort Simcoe on the Yakima Indian Reservation. He became interested in ethology of the the natives of the North Pacific Coast, and published a number of popular articles. For the story "Speelyai fights Eenumtla", neither the tribe nor the informant is named. From other stories about Speelyai, we know that this tale is from the Yakama Tribe of the Columbia River Basin,

"Speelyai fights Eenumtla" (Kuykendall, 1889; reprinted in Bagley, 1930) like the previous story, details the lengthy epic battle in mythic time between the Transformer and the Thunder god. This inland version of the story clearly mentions shaking, but not water-level disturbances. "Speelyai fights Eenumtla" shares many story elements with "A story of the flood" but none with Swan's account. In this version of the story the culminating battle "shook the whole world". The battle is accompanied with thunder, lightning, and heavy rain while storm clouds darkened the sky. The Thunder god is finally vanquished, and is forbidden to thunder except on hot sultry days.

In general, the Yakama transformer myths in Kuykendall (1889) have different themes from the Hoh and Quileute transformer myths given by Reagan (1934). The similarities between the previous story and this one suggest a single widely experienced event. It is interesting to consider how widely traveled the various tribes might have been in 1700, how frequently they were in contact, and how stories might have been disseminated, shared, and compared between inland and coastal groups.

### ***Albert B. Reagan "A Hoh version of the Thunderbird myth"***

The fourth story, from the Hoh tribe, is "A Hoh version of the Thunderbird myth", found in Reagan (1934). A slightly different version is available in Reagan and Walters (1933). "A Hoh version of the Thunderbird myth" is another supernatural-being battle story in mythic time, also featuring the Thunderbird. It is worth noting that in Yurok myth Earthquake and Thunder are strongly associated; Kroeber (1976, p. 279 and story BB3). In "Myths and Legends of the Pacific Northwest", Judson (1916, p. v) speaks of "Tatoosh the Thunder Bird who ... shook the mountains with the flapping of his wings".

Like "Speelyai fights Eenumtla", this story shares many story elements of "A story of the Flood", but has few similarities to Swan's account.

In "A Hoh version of the Thunderbird myth" the Thunderbird struggles with two bad whales. There are many battles, a whale is carried over the land and dropped to the prairie below. Ultimately, the Thunderbird prevails, tearing apart the bad whales and strewing them around the country where they turn into landmark rocks and landforms. This story contains an epilogue, where the informant adds some details related to him by his father:

"There was a great storm and hail and flashes of lightning in the darkened, blackened sky and a great and crashing "thunder-noise" everywhere ... There were also a great shaking, jumping up and trembling of the earth beneath, and a rolling up of the great waters".

This is the most clear and unambiguous description of an earthquake and tsunami yet found in the native literature of Washington or Oregon. It is interesting to note how this information is set aside from the main myth. The specific mention of the informant's father suggests that this information, passed from person to person, is not really part of the myth. The manner in which this epilog is tacked onto the main story may indicate that a historical event has been overlain on, and associated with an older myth.

### ***Erna Gunther "The Flood"***

Erna Gunther (1896-1982), was a UW Professor of Anthropology, Chairman of the UW Anthropology Department 1930-1955, and Director of the Burke Museum for thirty years. She wrote numerous books on Northwest Coast Indian Ethnography.

Our last story, "The Flood", recorded by Gunther (1925), is a Klallam folk tale which recounts a version of the flood story. Flood stories are extremely widespread in Pacific Northwest Indian lore, although most versions have no story elements suggestive of either shaking or tsunami. Floods are the most frequently occurring natural disasters, and are certainly common throughout western Washington. Flood myths are known world-wide (Vitaliano, 1973). The story of Noah's ark is very popular, was very likely told by missionaries and early settlers. Native Americans may have incorporated some European stories in their repertoire (Marriott, 1952), and some of the Pacific Northwest flood myths may reflect outside influences. The story given by Gunther (1925) mentions heavy rain over many days and the death of children due to cold weather following the flood. This story does not mention shaking, but has one element that suggests a tsunami; the rivers become salty during the flood. The canoe-in-the-tree and "many dead" elements are very similar to those in the the Swan and Reagan accounts. We have included this story because it includes both typical and distinct story elements when compared with other Pacific Northwest Indian flood stories, and illustrates the difficulty of placing these stories into the context of an earthquake and tsunami. Typical story elements include foresight of the flood and preparation of canoes, rain, tying the canoe to the mountain and the death of many people. Distinct elements include the salt water, extreme cold, and the canoes striking the trees. These distinct and specific details give an impression of the recall of a real event.

### **Discussion and Conclusions**

Oral literature disperses information through multiple versions of a story, with story elements added and subtracted according to the occasion and to the knowledge, recall, and inclination

of the storyteller. The loss of stories and the loss of multiple versions of known stories blurs the information contained in the stories. Taken as a group, these stories suggest how a historic event ten generations ago might be incorporated into a pre-existing mythic world-view. To extract the full information content, the stories need to be viewed in their wider cultural context, with an appreciation for the way that oral literature mixes and matches story elements.

The depiction of a great earthquake as a battle between supernatural beings seems eminently rational, as does the mythic association of earthquake and thunder. Weather and earthquakes are both ephemeral phenomena and in our own culture, they were traditionally grouped together. Early weather observers were responsible for noting earthquake occurrence, and "earthquake weather" was often discussed in 19th century newspaper articles.

We believe that the stories discussed here are evidence of a large earthquake accompanied by a tsunami. Using similar thematic techniques in a more comprehensive review of Pacific Northwest Native American stories may reveal additional details of the effects of the 1700 earthquake, and of prior megathrust earthquakes.

**Table 1: Shared story elements, and mentions of motifs possibly related to earthquakes and tsunamis. Reagan1 refers to "A story of the flood"; Reagan2 indicates "A Hoh version of the Thunderbird Myth".**

	Swan	Reagan1	Kuykendall	Reagan2	Gunther
Not-too-long-ago time frame	X			X	
Mythic time frame		X	X	X	X
Cape Flattery Island	X	X			
Relocation of Chimacums and Quillehutes	X	X			
Flooding	X	X			X
Multiple water receding/rising	X	X			
Canoes in the trees/many dead	X	X			X
"no waves"	X	X			
Waves				X	
Stranded marine life		X			
Whales		X		X	
Battle of supernatural beings		X	X	X	
Lengthy multi-episode battle		X	X	X	
Creator God		X	X		
Thunder God		X	X	X	
Death/Loss of Supernatural Power		X	X	X	

Darkened Skies			X	X	
Dropping on land surface			X	X	
Lightning			X	X	
Rain			X	X	
Thunder-noise			X	X	
Shaking			X	X	
Hail				X	
Landslides				X	
Salt Water in rivers					X

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