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Hatchery's Child:
A Winnemem Wintu History of the Baird Station Salmon Hatchery and the Formation of Fisheries Science

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For thousands of years, the Winnemem Wintu stewarded abundant runs of their *nur* (Chinook salmon), which spawned, hatched, and spent the first several months of their lives growing in the nourishing riffles and tributaries of the tribe's ancestral watershed, the Winnemem Waywaket.[1] Now known by mainstream society as the McCloud River in far northern California, it weaves through seventy-seven miles of forested canyons, fed by percolating springs and snowmelt that cascades down from the glaciers on the 14,179-foot volcano *Buliyum Puyuuk* (Mount Shasta).[2] According to Winnemem Wintu traditional knowledge, the snowmelt occasionally floods the watershed with volcanic ash, minerals and mud that coat the juvenile salmon and protect them from disease, predators, and the elements.[3] Today, those sediment-rich flows still occur naturally but also due to water releases from a hydroelectric dam on the upper McCloud. Unlike the tribe, Western scientists and anglers have long framed the McCloud's tendency to turn into a milky froth as a danger to fish. In mid-July 2022, staff members from fish and wildlife agencies believed a surge of those turbid flows threatened the survival of salmon eggs they were rearing in streamside incubators on the banks of the McCloud.[4] The incubating eggs were part of a mad-dash emergency pilot project to reintroduce endangered winter-run salmon to the McCloud, whose frigid ice melt represented a cold water refuge from the impacts of climate change.[5] The river had been bereft of salmon for more than eighty years since the construction of the 602-foot Shasta Dam permanently blocked the fish's spawning passage, flooded twenty-seven miles of the watershed and rendered the estimated 400 surviving Winnemem Wintu homeless and landless.[6] In the following decades, the Chinook salmon miraculously adapted to spawning in a new but inhospitable habitat, the flat and hot environs of the river in the Sacramento Valley, though their DNA, behaviors, and cultural memory of how to survive were dramatically altered.[7]

Figure 1. *Caleen Sisk, chief of the Winnemem Wintu Tribe, Charlton "Chuck" Bonham, director of the California Department of Fish and Wildlife, and Cathy Marcinkevage, assistant regional administrator in the Central California Office of NOAA Fisheries' West Coast Region, sign agreements creating a framework for restoring endangered winter-run Chinook salmon to their original habitat in the McCloud River above Shasta Reservoir on May 1, 2023. Photo by Jessica Abbe. Photo courtesy of the Winnemem Wintu Tribe.*

Without mother salmon to dig their nests, the agency staff had used salmon eggs they artificially inseminated 300 miles south of the McCloud River at the Livingston Stone National Fish Hatchery at the base of Shasta Dam.[8] Salmon and their relatives are unique among freshwater fish because they are born in rivers, creeks, and streams, migrate to the Pacific, transforming into saltwater fish to spend most of their adulthood in the ocean, and then navigate back to their natal waters to spawn. To imprint the Sacramento River eggs with a connection to the McCloud that would spur them to return as adults, water was piped from the river and cascaded through the streamside incubators. Fearing the turbidity would suffocate the salmon eggs, the agency staff decided to move them to a different type of incubator called "Heath trays," which resemble two columns of thin dishwashing tubs stacked on top of each other, with about 5,000 to 7,000 salmon eggs in each container.[9] The staff believed the Heath trays were better equipped to filter out the volcanic sediment and more reliable because they have proven to hatch salmon eggs at rates as high as 96 percent.[10] They did not anticipate such statistics would mean little to leaders from the Winnemem Wintu, who are codecision-makers on the reintroduction project under a costewardship–comanagement agreement.[11]

Hereditary chief and spiritual leader Caleen Sisk recalls feeling horror when she saw the newborn salmon, known as alevin, wiggling aimlessly and lying sideways on top

of each other, like "worms in a can," inside the Heath trays.[12] Not only was the sight ghastly for a Winnemem Wintu, who understand salmon as sentient kin, but the Heath trays disrupted how the alevin are meant to bond with their river and their spawning grounds during that early life.[13] According to Winnemem Wintu traditional knowledge, the alevin should be free to swim within and around the nest until they decide to leave its confines, having learned to navigate the river's currents and fostered a "magnetic" connection with the spawning rocks, which will help draw them back to their birthplace as adults.[14] Reflecting months later about the Heath trays, Chief Sisk stated,

> (The scientists) view the salmon like they don't have feelings and they don't learn, that they don't have a direct connection to the Creator. They think the salmon are fine in the Heath trays, in that worm-like condition, but I see it as a major problem because they're not learning the things they would in the wild. You're taking away their knowledge of the river system.
>
> I keep telling (the scientists) that it's not about how many fish are alive, but it's how healthy and smart they are, so you know they'll come back to spawn. When I saw the Heath trays, I thought of babies being neglected in an orphanage, who are just fed and left alone lying in their cribs. It was traumatic, it was abusive for them.[15]

Figure 2. Heath Trays on the McCloud River. *Government fish and wildlife staff members chose to use the Heath trays as salmon egg incubators on the McCloud River in July 2022 to deal with sediment-heavy flows. Photo by Marc Dadigan.*

Chief Sisk's reaction reveals a major fissure between the Winnemem Wintu salmon stewardship (who treat salmon as thinking and feeling kin) and Western salmon management (which is influenced by the prevalence of factory-like hatcheries). For Chief Sisk and the Winnemem Wintu, the Heath trays are emblematic of a Manifest Destiny–infused salmon management ideology they trace back more than 150 years, when the first fish scientist appeared on the Winnemem Waywaket. In August 1872, Livingston Stone, a former unitarian minister from Massachusetts turned professional artificial salmon breeder, traveled to California to establish the federal government's first Pacific coast salmon hatchery. Based on scouting reports from railroad officials, Stone selected the McCloud River and its thronging salmon runs as his base of operations, even though the Winnemem Wintu still remained in their homelands and had a reputation for fiercely expelling uninvited invaders.[16] As the deputy superintendent of the newly established US Fish Commission, Stone sought to develop a hatchery system that could artificially produce and export copious amounts of Pacific salmon eggs to replenish Atlantic salmon fisheries that had been depleted by industrialization, damming, and unregulated commercial fishing.[17]

During his time on the McCloud, Stone's innovations, technological advances, and public relations campaigns would legitimize the American practice of piscine artificial breeding, then called fish culture, through a veneer of science.[18] His operations would export seventy million fertilized McCloud salmon eggs to rivers throughout the world in his first ten years.[19] Commonly memorialized by government agencies and fish biologists as a forefather of the field, Stone operated in an era when fisheries science was in its fragile infancy, struggling to bureaucratize and gain authority in a laissez-faire era.[20] Some scholars also contend his work on the McCloud River provided the blueprint for modern hatcheries, which became a politically convenient and woefully ineffective nostrum to mitigate the devastating damage megadams wreaked on the region's fisheries.[21] He is also a prominent figure in Winnemem Wintu oral history, though primarily as a malevolent presence, even though Stone claimed to be their friend. They see his salmon ethos, predicated on the control and domination of salmon's life cycle ultimately to protect an unsustainable fishing industry, as reverberating from the past and influencing the practices and attitudes of modern salmon managers. From Winnemem Wintu's analysis, there is a tangible connection between the contemporary agency staff's faith in the Heath trays to Stone's effusive writing about his own hatching troughs, which were twenty feet long and could hatch 500,000 eggs with limited space and supervision. "Too much can not be said in praise of these hatching-trays," he wrote in his 1876 report, meticulously describing how the troughs far exceeded the hatching rate of wild salmon, who he saw as victims of an inefficient and capricious nature.[22] Such historical echoes don't surprise the Winnemem Wintu. According to Chief Sisk,

> (Stone) was a disaster for salmon and caused the plummeting numbers of California salmon. . . . We taught him about salmon, but he forgot the most important parts. He used his half-knowledge to promote the idea that hatcheries are the answer, but it continues to distract from the actual restoration of salmon habitat. Many of

> these salmon experts went through school, they have degrees in fish biology, but they don't talk about salmon and their relationship to the river. They're missing a lot of information about salmon life cycles. It's like these salmon experts are going to "expert" them out of existence.[23]

The influence from Stone, Chief Sisk contends, is a continued unverified faith in hatcheries as well as a knowledge system that fails to understand the complete interdependence between the salmon and their rivers. Some environmental historians concur with Chief Sisk, that Stone and his fish culturalist peers were key to establishing a hatchery-centric ethos of salmon management predicated on the domestication and the technological manipulation of the salmon's life cycle.[24] As the Heath trays reveal, this approach can collide and diverge greatly with the Winnemem Wintu philosophy of salmon stewardship, encapsulated by Chief Sisk's invocation of *lendada nur*. She often uses this term to refer to the salmon who once thrived in the McCloud, and who must return to restore the watershed's ecosystems as well as the tribe's way of life. *Lendada nur* translates to "ancient, wise, all-knowing salmon," and the phrase encapsulates the tribe's understanding that salmon are sentient beings who carry their own wisdom, passed down from generation to generation. They are not simple DNA-controlled automatons whose only impulse is to survive and reproduce. Rather, they are self-sacrificing relatives, driven by a higher ecological purpose to sustain the river as well as the human and nonhuman relatives who live there.[25] *Lendada nur*, Chief Sisk explains, will "know what to do" to make the river healthier and restore their runs if they're liberated to complete their migrations and reproduction free of the interference from dams and hatcheries.[26]

The reverberating and unexamined influence of Stone and the nineteenth-century fish culturalists on modern Western salmon management contributes to the challenges the Winnemem Wintu face in enacting the *lendada nur* philosophy stewardship. The historical and public memorialization of Stone's operations on the McCloud River are powerful colonial narratives that continue to marginalize Winnemem Wintu salmon knowledge and their inherent rights to reclaim their stewardship traditions. A retelling of Stone's Baird Station hatchery through Winnemem Wintu oral history and theory provides an important historical intervention at a pivotal moment. The McCloud River salmon reintroduction represents a rare opportunity to revitalize the tribe's salmon stewardship, restore their relationship to the watershed and heal some of the cultural and spiritual ruptures caused by their displacement.[27]

The Winnemem Wintu history of Stone and Baird Station has been passed down from their ancestors, who worked at the hatchery at a time they were struggling to survive colonial incursions and attacks from Euro-American settlers. Although the Winnemem Wintu were firsthand witnesses and key figures in this history, the existing scholarship and public memorializing of Stone largely erased the tribe's role in the operation. When they are included in the story, they are relegated to bit players, subservient menial laborers who seemed just happy to be there, as if they were a people facing a forthcoming apocalypse. These narratives tend to imply that the Winnemem Wintu's ancestors were simple hunter-gatherers, eliding their history

of expertly stewarding the abundant McCloud River salmon runs and portraying the replacement of their salmon knowledge with Western fish biology was an inevitable, if not natural, process.

The Winnemem Wintu oral history of Baird Station reveals how the foundation of fisheries science is steeped in the ideology of Manifest Destiny and epistemic racism that continues to undergird the field's attempts to save endangered fish. The interpretations of Winnemem Wintu ancestors reorient Stone's endeavor as a colonial project of conquest in service of commercial interests rather than science or conservation. Under the guise of scientific progress and economic development, not only did Stone leverage the specter of genocidal violence to seize Winnemem Wintu lands and salmon, he also exploited the tribe's labor and salmon knowledge to bolster his operation. Ignoring or failing to perceive the sophistication of the Winnemem Wintu's salmon stewardship, which had successfully sustained bountiful salmon runs for millennia, Stone supplanted it with an antecedent of what would become Western science-based fisheries management.

In an era when agencies are increasingly recognizing the value and vitality of Indigenous traditional ecological knowledge, many fish scientists, unaware of this history, are hampered by their assumptions that their discipline originated as a culturally and politically neutral field of inquiry.[28] By providing a new historical and epistemological foundation for Indigenous collaborations with Western science, the Winnemem Wintu oral history offer pathways for fisheries scientists to disentangle their discipline from the colonial suppression of Indigenous stewardship that fostered the state's original salmon abundance in the first place. Cree Métis archaeologist Paulette Steeves describes this kind of intervention as "pyroepistemology," the process by which Indigenous peoples use ceremony, traditional knowledge, and the oral tradition to "cleanse" academic fields of colonial biases that distort our understanding of the world.[29] In Winnemem Wintu circles, this might be called "doctoring their minds."

What is most important, the Winnemem Wintu history of Baird Station is not just an unrelenting narrative of Indigenous dispossession but also a stunning survival story—how the bond between the members of a tribe and their salmon fortified their resistance to the supposedly inevitable extinctions assigned to them by colonial powers. In the Winnemem Wintu creation story, Salmon takes pity on the helpless humans and gifts them its voice; in return, humans promise to always speak on their behalf.[30] Through the lens of *lendada nur*, the history of Baird Station is another narrative of salmon saving the Winnemem Wintu, this time from the encroaching forces of genocide, removal, and forced assimilation. In Chief Sisk's telling, the salmon are transfigured from objects of study to heroic protagonists. "What Stone was doing to the salmon was a violation of our traditions," she explains. "But ultimately it was the fish who saved (the Winnemem Wintu ancestors)."[31]

Chief Sisk as a Living Primary Source

One of the Winnemem Wintu leaders who interacted with Stone during the fish culturalist's time on the McCloud River was Dollenkentillema, who was also known

by his English name, Bill Curl. He would ascend to becoming a respected Winnemem Wintu chief, later marrying Jenny Curl, a powerful Indian doctor and Chief Sisk's great-great grandmother.[32] The Curls worked at Stone's hatchery, known as Baird Station, and they passed down their memories to their daughter, Florence Curl Jones, who would assume the tribe's traditional leadership role after her father's death in 1934.[33] Jones in turn trained Chief Sisk in Winnemem Wintu ceremony, medicines, traditional knowledge, and history, including the testimonies of her parents' experiences at the hatchery. Because the Winnemem Wintu have only 125 members (following the genocide, Indian boarding school era, and Shasta Dam diaspora), Chief Sisk is the tribe's primary knowledge-keeper and caretaker of their oral history.

As a living primary source, Chief Sisk decolonizes and enriches a historical record that is otherwise entirely composed of documents produced by white male officials, most of whom were writing with ambitions to promote and sustain the fish culture enterprise.[34] The research methodology of this article was a mélange of archival investigation, a survey of secondary sources, and various recorded conversations with Chief Sisk, typically following a breakfast of fried eggs and sourdough toast, in which we discussed specifics of the Winnemem Wintu oral history as well as her interpretations of Stone's writings from that era. This "cyclical, spiraling" approach to weaving narratives about the past from collective memories, the oral tradition, and archival documents is a vital form of recovering decolonized histories, according to Abenaki scholar Lisa Brooks.[35] Such a multimodal approach undermines the unquestioned authority of colonial voices in the historical record, and enriches the past with a wider variety of interpretations and experiences. In the case of the Winnemem Wintu, our approach allows their ancestors to speak for themselves through Chief Sisk about what they experienced, felt, and did at Baird Station, an opportunity they never had when they were alive.

While some Western historians often question their reliability, Native studies scholars contend Indigenous oral histories must be evaluated by the standards of Indigenous societies, as they are vital to revealing how Native peoples survived genocide by coping and adapting to colonial power. Wheeler observes that even when Indigenous oral histories are scrutinized by traditional historical standards, they often prove to be accurate, providing legitimate and authentic insights that can exceed the value of colonial archives.[36] Other historians, for example, have uncritically used Stone's descriptions of his interactions with the Winnemem Wintu ancestors as well as quotes he attributed to them (words he put in their mouths), but Sioux scholar Elizabeth Cook-Lynn warns against accepting these depictions at face value. The Indian voices in these records, distorted by colonial authors during an era when the Winnemem Wintu had little power to correct the record, are unreliable, as white recorders imbued the words of Native sources with tones of defeat and feckless submission.[37] The Winnemem Wintu oral history of Baird Station directly confronts these biases, restoring the ancestors as complex emotional and intellectual humans who judiciously exercised their agency in ways that were imperceptible to Stone and many future historians.

Figure 3. McCloud River Indians, Arrayed in War Dance Costume. *A Winnemem Wintu tribal member likely reenacting a War Dance originally held in protest of Livingston Stone's incursion. Taken in 1882. Photo by Thomas Houseman, courtesy of the Smithsonian Institution, National Anthropological Archives.*

A Fish Savior's Colonial Trespass

Short and burly and sporting a walrus-looking beard that hung from his cheeks, Livingston Stone allegedly descended from original English colonists who landed on Plymouth Rock, and he began his professional life as an ordained minister in Massachusetts after graduating from Harvard Seminary.[38] Poor pay, declining attendance in the pulpit, and an epidemic of "sectarian disputes" over dogma apparently led many clergy to seek other occupations during this time, though Stone claimed he moved to fish culture because he needed to be outdoors for health reasons.[39] By entering the natural sciences, Stone may have been seeking to uphold the Unitarian and Victorian vision that scientific endeavors, rather than conflicting with the Bible, could provide evidence of God's design.[40] Unitarians also believed that religious leaders shouldn't be didactic, cloistered scholars but men who were immersed in the intellectual developments of their time and weave them into their Christian convictions.[41] Based on his writings, Stone never totally forsook his ministerial roots, as he sought to

spread the gospel of fish culture and improve its technological sophistication with an unmistakable ecclesiastical zeal.

In a 1901 essay, Stone suggested that his fish could come to resemble "dogs and fowls," because "they will prefer to seek the shelter and food which they find around the homes of men to the precarious chances of a wild and roaming life."[42] Such prognostications reflected the Manifest Destiny–infused attitudes of fish culturalists, who saw their efforts to tame and domesticate wild fish as an extension of the nation's mission of agricultural conquest.[43] They also sought to stem widespread anxiety caused by the calamitous decline of Atlantic fisheries due to the damming of rivers, industrial pollution, and unregulated commercial fishing.[44]

In the summer of 1872, a chief engineer of the Pacific Railroad who had been conducting surveys of the mountain rivers in Northern California told Stone he had seen "Indians spearing salmon in the fall on their spawning-beds" near the confluence of the McCloud and Pit Rivers.[45] Following the engineer's evocative story, Stone and his men took the railroad to Red Bluff and then traveled by stagecoach, arriving on the McCloud River on September 1. Hiking up the river by foot, Stone reported they encountered several camps of Winnemem Wintu drying hundreds of freshly caught salmon on nearby bushes. They also reported seeing thronging swirls of salmon in the river, observing sixty swimming in a single spot, and Stone felt resolute he had found the perfect location for his salmon breeding station.[46] Stone's initial impression of the Winnemem Wintu was a disorienting jumble of racism, romanticism, and surprising benevolence for the era. First, he described the Winnemem Wintu as a "good-featured, hardy, and indolent race," which would prove ironic as he would soon be reliant on their reliable and skilled labor to operate his hatchery. He was later surprised by Winnemem Wintu people's honesty and trustworthiness after being warned in San Francisco that the Native peoples were inveterate thieves and savages. He noted that even though the Winnemem would "avenge a murder of their kindred, . . . they have no malice in their hearts," going on to declare the aspersions cast upon the Native people of California by settlers as "untrue and unjust."[47] Some scholars have emphasized Stone's sympathetic writings about the Winnemem Wintu to suggest the two parties had forged a peaceful if not amicable relationship.[48] However, Chief Sisk's oral history coupled with a critical reading of the archives reveal an encounter imbued with shifting tensions, fears, and deeply uneven power dynamics.

According to Stone, the Winnemem Wintu initially tolerated the presence of his first foray into the watershed because he located operations about a mile from the river and they arrived too late in the season to procure many salmon.[49] Conscientious of their ignorance of the river's flooding patterns, Stone's party constructed their hatchery near a runneling brook, whose water Stone would use to incubate the eggs. They erected a ten-by-fourteen-foot cabin with twenty-four open-air hatching troughs made from sugar pine, providing a total of about 400 square feet of hatching space.[50] Because egg-bearing female salmon were in short supply, Stone purchased eggs for a "slight money consideration" from the Winnemem Wintu.[51] Although some Winnemem Wintu were willing to do business with Stone, others began to protest his presence, conveying "these are my lands" and "these are my salmon," according to his 1873 report.

Yet Stone appears to have evaded serious conflict, perhaps because he collected a miniscule number of salmon and was only able to transport about 30,000 eggs back East.[52] According to Chief Sisk,

> They (the Winnemem Wintu ancestors) didn't know what Stone was doing or what their vision was. So they were waiting and seeing what he did. I don't think they ever had any idea what exactly he was planning with the eggs, sending them all over the world. The Indian hunting was already something they had to try to avoid, and they didn't know if he was a hunter of Indian people or not.[53]

In normal times, Stone may have faced immediate expulsion, but the explosive violence of the era led the Winnemem Wintu to lay back, perhaps emboldening Stone to seize a parcel of their land. Indian hunting was a common livelihood at the time, as Shasta City, the closest Gold Rush town, became an epicenter for down-and-out gold miners to launch attacks on nearby Native villages, earning bounties as high as five dollars a head.[54] The state's first governor, politicians, and myriad newspapers of the era openly called for the extermination of Native peoples in California, and the US army, state-sponsored militias, and local vigilantes carried out numerous massacres, fueled by racial animus and greed for Indigenous lands.[55] Spending more than $1.53 million to support the bloody assault on Native peoples, the state and federal governments created a "well-funded killing machine" according to historian Benjamin Madley, who documented hundreds of genocidal mass killings from 1846 to 1873. He estimates that nearly 80 percent of California Indians died during this era.[56] The state government promoted the de facto enslavement of Native people and kidnapping of their children through the deceptively named 1850 Act for the Government and Protection of Indians, which facilitated settlers forcing an estimated 30,000 Native people into bondage.[57] Although the rugged terrains of the McCloud River canyon and its lack of significant gold deposits buffered the Winnemem Wintu from the worst of the bloodshed, they also suffered catastrophic losses during this era. According to Winnemem Wintu oral history, a group of duplicitous settlers, who sought to take advantage of their traditions of forthright peacemaking, invited them to a so-called "friendship feast" sometime around 1853 or 1854. As was a common strategy, the gathering was actually an ambush, as the settlers started opening fire on the vulnerable Winnemem Wintu, murdering close to fifty people. One of the only survivors was Bill Curl's father, who escaped the fusillade by jumping into the river and staying submerged as the rushing currents carried him to safety.[58] The ever-looming threat of genocidal violence permeated the Winnemem Wintu and Stone's encounter, enabling his incursion and dictating the tribe's strategy in coping with his presence. The collective trauma that Winnemem Wintu ancestors were experiencing is a prominent lens through which Chief Sisk remembers this history:

> Trauma would be everything. . . . Surviving the genocide would be like always trying to predict the wildfire—never knowing if it's going to come this way or the wind will take it another direction. You always have to be prepared to do something to protect those who are left.

> Whenever they heard a buckboard coming down the road, they would send the kids up in the mountains to hide in the cave because the newcomers don't know there's a place up there, so it's the safest. That's something that has [been] passed down our generations, not trusting who's driving down the road.[59]

In this reading, the tribe's "friendliness" with Stone was rooted in the fear and trauma of catastrophic violence; otherwise, they never would have permitted his incursion. The following year, Stone arrived earlier in the salmon spawning season and directed his team to erect the hatchery facilities directly on the banks of the McCloud River to save time transporting eggs from the fishing grounds. The sight of the house and tents so close to the river (and perhaps Stone's catching of salmon during the height of spawning season) stoked a ferocious Winnemem Wintu response, according to Stone. He wrote with a faint trace of condescension:

> Our attempt to locate a camp on the river-bank was received by the Indians with furious and threatening demonstrations. . . . Their success thus far in keeping white men off had given them a good deal of assurance, and they evidently entertained the belief that they should continue, like their ancestors before them, to keep the McCloud. . . . They assembled in force, with their bows and arrows, on the opposite bank of the river, and spent the whole day in resentful demonstrations . . . to try to drive us off.[60]

Chief Sisk remembers this "demonstration" as a significant *H'up Chonas*, or War Dance, a ceremony they revitalized in 2004 to protest a proposed raise of Shasta Dam.[61] Their ancestors' War Dance is a focal point of Winnemem Wintu oral history, verifying their ancestors' clear opposition to Stone's hatchery. Despite having the numbers to expel his party, Stone believed that they seemed to "accept in general the situation" because "the terrible punishments, which they would have suffered from the hands of the whites for past misdeeds, are too vivid in their memories to allow them to attempt any open or punishable violence."[62] During the genocide era, news of an "Indian attack," real or fabricated, would justify a disproportionate fusillade of violence, sometimes targeting random Native communities.[63] On several occasions, Stone expressed clearly that he knew the Winnemem Wintu feared the threat of a murderous response to any armed resistance. Even though he wrote that they threatened to kill him and describes the Winnemem Wintu as "swarming his camp," Stone proclaimed, "They stand in too much fear of the white man to do any open injury."[64] Although the Winnemem Wintu's protests never escalated to violence or persuaded him to relocate, Stone wrote that Chief Sisk and the tribe remember the War Dance as a potent moment of spiritual resistance, a prayer the spirits heard and answered by causing a massive flood in 1881 that destroyed the hatchery and forced Stone to rebuild.[65] Although they made the decision to avoid fighting Stone, many individual Winnemem Wintu apparently continued to confront him and demand he leave their river and salmon alone, Stone reported.[66] In one especially vivid encounter with a Winnemem man, Stone's account reveals his own unwavering belief in his inherent right to possess Winnemem Wintu lands and salmon eggs. Stone wrote,

> He was very much excited and very wrathful. He told me that this was his land, and that his fathers had always lived there, and that I had no right to be there. He said the salmon were his, too; that they belonged to his tribe, and that I was stealing his salmon. He ended by saying that the white man had lands and fish in other places, that the Indians did not go there and steal their lands and salmon, and that white men ought not to come here and take what belonged to the Indians.[67]

Stone added that the Winnemem man's "arguments seemed sound," but that he "could not answer this poor ignorant, indignant savage before me." He claims to have responded by proclaiming himself the Winnemem Wintu's "friend" and promising to "donate" the salmon they captured to the tribe after they had collected the eggs and milt for their hatchery operations. Stone reported that this deal eventually brokered a truce between himself and the tribe, quoting one Winnemem Wintu as stating, "You give Indian salmon, you only want spawn, that all right!"[68] Chief Sisk interprets this reported exchange recorded by Stone through the prism of their two divergent worldviews about salmon. According to Sisk,

> No one trusted Stone. I don't think anyone was friends with him, and no one ever talked about being his friend back then. I don't think Stone really understood what they were mad about. I don't think he understands when they say "these are my salmon" that there is a relationship there that went beyond ownership. He didn't understand the full cycles of a salmon life like we do. He only cared about the egg life.[69]

By saying he only cared about the "egg life," Chief Sisk is critiquing Stone's obsessive focus on artificially breeding the salmon eggs, while neglecting to understand the salmon's development in its natural habitat. The Winnemem Wintu, on the other hand, had accumulated intimate knowledge of the McCloud River salmon based on upholding a sacred covenant with the salmon to support their well-being. They don't see themselves as separate from the salmon's life cycle, but rather an integral part of it through ecological and ceremonial interventions. According to Winnemem Wintu traditional knowledge, their salmon songs, dances, and drumbeats are essential to the salmon fulfilling its mission to complete the watershed's ecosystem.[70] Prior to the genocide, the Winnemem Wintu were active salmon stewards, carrying salmon above impassible barriers so they could spawn throughout the watershed, constructing holding pools for baby salmon along the river banks and lighting ceremonial fires in their villages that lined the river with ocher beacons to guide the salmon home.[71]

When Stone arrived in California in 1872, he was not what we understand a scientist to be today and his interest in salmon was rooted in a simplistic desire to mass-produce their eggs. Rather than reverence for the salmon and its role in the ecosystem, he was "appalled" by the rotting bodies of the salmon who died after spawning[72] and envisioned salmon as mired in a horrific Darwinian struggle. "(Salmon) have no friends that I am aware of, except fish culturalists and fish commissioners," Stone wrote, conflating the natural predators of salmon with dams, fishermen, and industrial pollution as enemies of the wild fish.[73] By suggesting the fish culturalist as

the salmon's "only friend," he envisions himself as a benevolent savior who can save salmon from extinction. He failed to understand the Winnemem Wintu view of the McCloud River as a flourishing, interdependent community, in which every species has a role in maintaining its harmony. Instead, Stone possessed an unshakeable faith in the fish culturalists' destiny to engineer the natural world to their whims. He also failed to acknowledge how the field was wedded to the economic power of the fishing industry. In an era when regulating commercial fisheries or curbing the industrial destruction of salmon rivers seemed politically unfathomable, the fish culturalists offered a convenient if unproven solution. Rather than use their knowledge to protect or enhance ecosystems, they sought to find an alternative that improved an inefficient nature and permitted the continued destruction of salmon rivers.[74]

Considering how Stone and the Winnemem Wintu viewed salmon so differently, Sisk sees their truce as something the tribe's ancestors would have accepted only with trepidation and heavy hearts. It was a means to survive, but also represented a disruption of their responsibilities to salmon and acquiescing to a figure who was a potential threat to their future survival. According to Chief Sisk,

> At first, it's resistance because you don't know what's going to happen when they take all the salmon, and all the food sources. But if he's going to share it, that is something that could be lived with. In 1872, there had been twenty years of killings on the river, twenty years of diseases, and there's nowhere to go. Livingston Stone provides a break from the onslaught. They're struggling to keep people alive, and here comes this guy that's going to close the area off to Indian hunters.[75]

The Winnemem Wintu feared for their survival and for their children, and that was the primary reason they dropped their resistance to the hatchery. The question of whether the salmon could endure Stone's practices was answered through a ceremonial intervention, according to Chief Sisk. The arrival of Stone not only provoked a showing of military might but also an "emergency gathering" of the tribes' spiritual leaders and Indian doctors who held collective prayers for their salmon. They sensed that Stone's arrival might presage disaster for their salmon, as had befallen salmon on the Sacramento, San Joaquin, and American rivers, which had been quickly decimated by overfishing, hydraulic mining, and the railroads.[76] Their prayers received an answer from the spirit world: the salmon would be sent through an ice waterfall on *Buliyum Puyuuk* (Mount Shasta), where they would remain until the world was safe for their return. Chief Sisk says Winnemem Wintu accepted a compromise with Stone in part because they believe the prophecy ensured the salmon's future was secure.[77] Lakota historian Nick Estes contends that stories like the ice waterfall prophecy aren't simple myths or superstitions but a form of "revolutionary theory" that helps Native people make sense of their relationships to their homelands, their ancestors, and nonhuman relations across the generations.[78] As a legitimate form of Indigenous history production, the ice waterfall prophecy provides Winnemem Wintu a window to understand the struggles of their ancestors and how their activism laid a foundation for cultural resurgence in the present.

On the other hand, even Stone's amicable narratives were laced with truculent assumptions about the certainty of Winnemem Wintu's future demise, noting how the "gradual but certain disappearance of the red man before the advance of civilization" affected his interactions with Winnemem Wintu people.[79] He also referenced his certainty about their inevitable extinction while creating a list of Winnemem Wintu vocabulary, a small-scale salvage ethnography he undertook for "the sake of preserving something of a language which will soon become extinct."[80] Narratives of predestined Indigenous vanishing were omnipresent in the discourse of the era, including newspaper writers, politicians, and even religious clerics who used the rationale to justify the genocide of California Indians.[81] Anishinaabe scholar Jean O'Brien describes the purpose of this pervasive colonial narrative as a process of "lasting," which ossifies Native people into a romanticized past and frees dominant settler society from reckoning with the past and present crimes of colonialism.[82] Interestingly, Stone would invoke similar terminal narratives about wild salmon throughout his career. In an 1892 essay advocating for the creation of a national salmon park in Alaska, he wrote the following:

Figure 4. Man Spearing Salmon in River; Structures in Background. *A photo of a Winnemem Wintu man fishing for salmon near Baird Station in 1882. Photo by Thomas Houseman. Smithsonian Institution, National Anthropological Archives.*

> I will say from my personal knowledge that not only is every contrivance employed that human ingenuity can devise to destroy the salmon of our West Coast rivers, but more surely destructive, more fatal than all is the slow but inexorable march of those destroying agencies of human progress, before which the salmon must surely disappear as did the buffalo of the plains and the Indian of California.[83]

The quote reveals Stone's adherence to the ideology of Manifest Destiny, the belief that Euro-American Christians were a chosen people by God to conquer Indigenous lands in the West and bend the natural world to their will. Often this manifests in an assumption that Native peoples, such as the Winnemem Wintu, were destined to vanish as they weren't part of God's plan for American democracy or progress. The trope of inevitable extinctions for both the Winnemem Wintu and their salmon served to justify Stone's mission, absolving him from his complicity in the destruction happening around him. In Chief Sisk's mind, it also reveals his supposed friendship had its limits: "The tribe was facing extermination, and they were thinking it was possible they could disappear. Once Stone got the knowledge and help he needed from us, he never did anything to take a stand for the plight of the tribes or the salmon either."[84] In other words, Stone's benevolent language wasn't in tune with his actions, as he relied on various methods of social control to pressure the Winnemem Wintu to tolerate his presence and work on the hatchery. Although Stone would later write florid prose about the accomplishments of Winnemem Wintu workers, the oral history and broader examination of the archival records indicates his peace with the tribe was tenuous at best. It would also become dependent on military surveillance and suppression as Stone's fears of an Indian uprising and salmon poachers grew in the late 1870s.

The Hatchery: A Refuge and a Land Grab

Long-term security at the hatchery became prominent in Stone's mind after they were able to successfully ship 1.5 million fertilized eggs by train during their second year on the McCloud. After a great deal of trial and error, Stone and his workers erected a dam at the precipice of a deep pool that trapped the salmon for easy harvesting.[85] The hatchery workers would take females and squeeze their eggs into a pan, and fertilize the eggs by conducting a similar process with the males to extract their milt. Once the eggs were fertilized, they were reared for twenty days in hatchery troughs, which were filled with a constantly circulating supply of cold water from the McCloud. To transport the eggs safely by railroad and horse cart, hatchery workers wrapped them in wet moss collected from the headwaters of the Sacramento River and placed them in two-foot square wooden boxes, each crate carrying roughly 75,000 eggs. A block of ice was placed on top of every crate, and Stone expressed in his reports it remained a mystery to him how the eggs managed to survive the cross-continental trek.[86]

The fish culturalists like Stone declared their operations successful simply by safely hatching high rates of eggs and transplanting their artificially inseminated eggs into distant foreign streams.[87] Although state fisheries officials claimed transplanted McCloud River eggs boosted declining Sacramento runs, there was far more evidence that attempts to colonize salmon in faraway rivers was otherwise a total failure.[88]

Regardless, Stone's incipient "success" and fear of interference from other settlers with fishing claims led to him lobby the US Fish Commission and President Ulysses S. Grant to establish a piscine reservation around the hatchery to protect the workers and salmon from settlers. In 1875, Grant established 280 acres surrounding the hatchery as a federal pisciculture reservation, making it a permanent federal facility, which Stone promoted as an essential national endeavor project.[89]

For the Winnemem Wintu, even though the reservation transformed their lands into government property, it provided a vital refuge from settler violence as well as a central village hub for the surviving Winnemem Wintu.[90] Chief Sisk states that many Winnemem Wintu people assumed the reservation was meant for them, a belated benefit from the treaty they signed twenty-five years earlier but Congress had refused to ratify and enact. The Cottonwood Treaty, one of the eighteen unratified treaties in California, would have established a thirty-five-square-mile reservation for Wintu and Yana peoples, but when the treaties were never fulfilled, many displaced Native people suffered homelessness.[91] As a result, Winnemem Wintu from as far away as the upper Sacramento and other far-flung parts of the territory relocated to the Baird fish reservation.[92] According to Chief Sisk,

> My grams (Florence Jones) said they all thought it was an Indian reservation, especially later in the 1880s and 1890s, when they were asking the government for land for homeless Indians. It made sense because it was part of the river, and I don't think anyone knew the reservation was for the fish and not for the people. Who knew they would make a reservation for fish?[93]

Belatedly, the Winnemem Wintu learned the federal government valued the potential commercial value of the eggs more than their lives or land claims. Because their treaty was never ratified, Winnemem Wintu lands to this day remain unceded. Thus, the executive order that established the Baird fish reservation extinguished the Winnemem Wintu's aboriginal title to occupancy and transfigured their unceded homelands into the property of the federal government. If Stone ever considered any need to negotiate with the Winnemem Wintu to purchase their lands, he did not record it in his writings. Only a year prior, Congress ended formal treaty-making with tribes, and this development as well as Stone's ingrained belief in the inevitable extinction of Native people may have contributed to his assumption that Winnemem Wintu land was his to possess.[94]

While the reservation provided the Winnemem Wintu safety, they then became vulnerable to surveillance, control, and suppression just as Native people experienced at Indian reservations throughout the United States. In his 1877 report to the US Fish Commission, Stone expressed gratitude for the presence of a military garrison that had been stationed at the hatchery, which he originally requested because two former employees were making claims to the fishing rights at Baird. While he valued the soldiers for protecting the salmon from poachers and the Winnemem Wintu workers from violent settlers, he also utilized them to punish Winnemem Wintu who dared to engage in traditional fishing that interfered with his operations. Stone wrote the following about the garrison: "Their mere presence is a great help, because it prevents

trespasses from being committed. . . . For instance, it was habitual with the Indians to kill the spawning salmon before the soldiers arrived."[95]

The short but telling reference to the soldiers role in curbing Winnemem Wintu "trespass" in their homelands helps explain why Chief Sisk states Jenny and Bill Curl remember the soldiers as a repressive force. They arrested Winnemem Wintu for small offenses and required them to adapt their ceremonies or go underground. In one photograph taken in 1897, Bill Curl and other Winnemem Wintu are seen in their regalia conducting what was likely a *Bałas Chonas*, a puberty ceremony for young women, which was remembered by settlers and Winnemem Wintu alike as the "last dance at Baird."[96] The Winnemem Wintu oral history suggests Chief Sisk explained:

> The soldiers guarded the (Winnemem Wintu) workers because people were coming to kill them. But they also had soldiers at every Indian encampment. That's why the ceremonies had to change, like the roundhouse dances. They had to be modified and go underground. At the time, there were no women, and that was one of the problems. The ceremonies had to change to protect women from being raped and stolen by the settlers.[97]

This fear was not isolated to Baird Station. Throughout the Northern California frontier, settlers systemically targeted Native women for sexual violence and enslavement, even kidnapping young women at their Coming of Age ceremonies and puberty rites that consecrated their important roles in their societies.[98] Although Stone does not mention it in his reports, the federal government enacted the Code of Indian Offenses during his tenure in 1883, which banned Indigenous religious practices and authorized federal agents to prosecute violators of the law.[99] The changing legal climate that supported the suppression of Indigenous culture and spirituality was an important backdrop to the complex relationships and power dynamics at the hatchery.

Even with his truce in place, Stone's own writings reveal the soldiers served to quell resistance from the Winnemem Wintu and neighboring tribes. Undulating throughout Stone's letters and reports is anxiety about Indian uprisings or other forms of troublesome Indian "mischief," as the fish culturalist described it.[100] Stone's use of that word "mischief" to describe Winnemem Wintu and other Native peoples' resistance to genocide and removal is telling, as it reveals his sympathy for his workers was reliant on their compliance to his plans. One potential source of concern was Winnemem Wintu leader Norelputus' role in spreading his own adaptation of the Ghost Dance, an anticolonial ceremonial movement that spread across Indigenous communities throughout the West in the late nineteenth century. The Wintu held their interaction of the Ghost Dance inside partially subterranean roundhouses, where the ceremony's singing and dancing, according to Norelputus, would offer the participants protection from a forthcoming cataclysm of flood and fire that would cleanse their homelands of the colonial occupation.[101] Norelputus is reported to have held a key meeting to recruit Winnemem Wintu to the Ghost Dance movement at the village that would become the site of Baird Station in the summer or fall of 1872, possibly during Stone's first weeks on the river.[102]

As well as the Ghost Dance, Stone's arrival in California coincided with the Modoc War in the lava beds of far northeastern California and an era of fervent Indian resistance. The Modoc people's valiant fight against the US army and local militias to remain in their homelands and stave off removal to the Klamath Reservation was covered by national and international correspondents, whose accounts riveted the nation.[103] The standoff was clearly on Stone's mind as he drew parallels between the Modocs and the Winnemem Wintu hatchery workers:

> I earnestly hope that the policy [that] has been pursued with the Modoc Indians, against whom a war of extermination is now going on just north of the McCloud River, will never be adopted with the McCloud River tribe. It would be an inhuman outrage to drive this superior and inoffensive race from their river, and I believe that the best policy to use with them is to let them be where they are, and if necessary, to protect them from the encroachments of the white men.[104]

The broader moral questions stoked by the Modoc War occupied the public's imagination in 1872 and 1873, but if Stone is any measure of public sentiment, Indigenous resistance could garner sympathy only as long as it remained far away and did not interfere with their pet colonial projects.[105] Throughout his letters, especially in the late 1870s, Stone—seemingly in a panic—requests more soldiers and firearms because of rumors and newspapers stories of fomenting Indigenous resistance.[106] Eventually, Stone's paranoia subsided. In his 1879 report to the US Fish Commission, Stone observed the Winnemem Wintu appeared to have grown less outwardly resistant and more agreeable to working at the hatchery. He suggests their "change of attitude" was perhaps due to "the suppression of revolts by the Army on the frontier" or "the presence of a detachment of soldiers" who had a "moral effect" on the Indians and a "restraint on the white marauders."[107] In other words, the Winnemem Wintu may have felt restrained and afraid due to the state's militarized repression of California Indian resistance that had resulted in the mass murders and removals. Stone's patronizing use of the term "change of attitude" reveals a callous side to his interactions with the Winnemem Wintu—cold to their suffering and focused primarily on achieving his own objectives. The "white marauders," however, did not remain so passive. Stone began to report in great detail about the destructive intrusion of settlers, which was making it unsafe for the Winnemem Wintu even under the protection of the hatchery. In less than ten years, he wrote that settlers were claiming land on the McCloud River, burning villages, and driving Winnemem Wintu to the hills, where they faced starvation. They also interfered with his operations by fishing for salmon downriver and disturbing spawning grounds by mining for gold.[108] To his credit, Stone would write in a September 25, 1879, letter to his boss, Spencer Baird, requesting an Indian reservation. He observed that they fear being "driven away into the mountains, where they cannot get any fresh salmon from the river; the result of which, they well know, would be approximate starvation." Stone goes on to list many reasons for the reservation, including that it would "secure the friendship and facilitate the control of the McCloud Indians."[109] Although there may have been genuine sympathy behind this

Figure 5. Men and Boys in Partial Native Dress with Gun and Bow and Arrows outside Colchoolooloo's Ranch. *A photo of Winnemem Wintu men posing near the home of a key leader who interacted with Livingston Stone. Taken in 1882. Photo by Thomas Houseman. Smithsonian Institution, National Anthropological Archives.*

request, it also reveals the degree to which Stone had become reliant on the twenty to thirty Winnemem Wintu workers at his hatchery every spawning season.

Exploited Workers and First Salmon Scientists

Writing in an 1881 article for *Forest and Stream* magazine, Stone offered his take on whether Pacific salmon die after they spawned, something that was a fierce debate among conservationists at the time. Acknowledging their expertise from having spent their entire lives on the river, Stone surveyed several Winnemem Wintu, including Chief Colchoolulu, about the matter, and reported, "They were unanimous in saying that all the salmon died. There was not one dissenting opinion." The coup de grace of his piece was the inclusion of a joke from Colchoolulu, who said, "Some of them went back to sea, but they went overland."[110] The article provides some insights into Winnemem Wintu humor but also Stone's own general ignorance about the salmon life cycle, which was only of perfunctory interest to him. His inclusion of Winnemem

Wintu sources also sheds light on his reliance on the tribe's traditional knowledge, though he cast aside its embedded values and ethics in order to pursue his own ambitions. As Chief Sisk explains,

> We were the ones teaching him. He didn't come here knowing anything about Pacific salmon . . . and he ignored the most important lessons. He had a half-wit knowledge that didn't understand the big picture. . . . Scientists still think like him, that the Creator made a mistake by setting up this system, and man could just change it however they want to.[111]

Historically, the Winnemem Wintu people were not passive observers of the McCloud River's ecocsystem, and they used their salmon knowledge and ceremonies to nurture the salmon runs. Numerous studies have concluded that, far from being the simple hunter-gatherers of anthropological lore, Native salmon people throughout the Pacific Coast caught millions of pounds of salmon, rivaling the production of commercial canneries. Their protocols, ecological interventions, and ceremonies created limits on fishing, allowed them to adapt their subsistence economy to changing environmental factors, and ensured salmon spawned throughout the watershed.[112] According to Chief Sisk,

> We didn't ever call it traditional knowledge; it's just a way of life that depends on nature, a way of growing up learning how to live off the land and the river. We just knew that when you go to the river, gather plants for the basket material, that it's helping the riverbank area, helping the bugs, creating places for the baby fish to go, but now it has to be scientifically proven that your tradition was important. What better salmon "science" is there than watching the fish grow into adults and then come back for thousands of years?

Chief Sisk's quote speaks to how the tribe's accumulation of salmon knowledge differed from Stone, as it was based on a responsibility and intimate respect for the salmon and for the delicate design of the ecosystem. They gathered knowledge holistically, through gentle and sensitive interventions, historical memory, and patient observation, whereas Stone's knowledge gathering was efficient, disruptive, and fast-paced. The article implies that, in Stone's eyes, the Winnemem Wintu ancestors were a shortcut to the specific questions he had, not necessarily the wise stewards they were. Stone would have plenty of opportunities to pick the brains of Winnemem Wintu people as he reported in 1879 that he was employing between twenty and thirty of them at the hatchery, paying them a paltry twenty-five to fifty cents a day, compared to the $1.50 they could earn working at one of the nearby copper smelter mines.[113] Every payday, Jill and Bill Curl would receive their earnings in pennies and dimes and head down the trail to a little town with a post office and store, where they purchased candy, beans, and flour.[114] Working at Baird Station led the Winnemem Wintu to enter a wage labor economy for the first time, and Chief Sisk says this was a symptom of the genocidal and ecological violence breaking down their traditional subsistence and trade systems. According to Chief Sisk, "You're taking people who didn't need money, and now they

have to rely on another economic system because everyone they traded with was killed or got driven to a place where they were starving and didn't have anything to trade. It was a choice of survival, going against your own way of life."[115]

Chief Sisk's oral history emphasizes the devastating cultural and spiritual compromise the Winnemem Wintu had to accept to work at the hatchery, where salmon and eggs were treated in ways that were in violation to their beliefs. A narrative of difficult compromise starkly conflicts with Stone's writing and media narratives from the time, which depict the Winnemem Wintu as docile and loyal menial laborers, who were enthralled by the hatchery's operations. Yet it seems more likely that Stone, a skilled public relations man (and possibly still predisposed to crafting ministerial testimonials from his experiences) saw the story of the "last unconquered Tribe"[116] of California submitting to the supposed grandeur of his fish hatchery as a useful narrative. Ronald Yoshiyama and Frank Fisher's examination of this relationship, based solely on Stone's reports, contend the partnership was an example of multicultural cooperation, two divergent groups putting aside their differences in the name of an apolitical and universally good science.[117] However, Chief Sisk states that Jenny and Bill Curl never developed an appreciation for Stone's endeavor:

> They didn't welcome the hatchery with open arms. There was no trust in it or [in] what they were doing to the eggs. They staged war dances against the hatchery. But they worked there because they were trying to stay alive. They were trying to prevent their kids from being kidnapped, and Stone needed them to work at the hatchery because he didn't know the river system or the salmon.[118]

Chief Sisk brings into focus the complexity of the McCloud River's salmon habitat, with its volcanic flows, massive floods, swirling rapids, and incredibly diverse waterscape terrain. Stone, a newcomer to California, would have likely needed and depended on the Winnemem Wintu's knowledge to get the hatchery operating as quickly and efficiently as it did. Sisk also never loses sight of the cataclysmic violence of the time, and how it influenced her ancestors' actions. Yoshiyama and Fisher's narrative neglects any mention of the genocide or the violence of colonization, nor do they consider that Stone gained consent from the tribe under dubious circumstances. The Winnemem Wintu oral history casts Stone's depictions of the Winnemem Wintu workers as a romanticization, if not a fantasy, that ignores the genocidal context and the Winnemem Wintu's vast and sophisticated salmon knowledge. Indigenous scholar Lyla June Johnston, who has examined the history of precontact Indigenous bioregional food systems, contends that the extent of Indigenous ecological knowledge and stewardship has been intentionally ignored by historical colonial witnesses and documenters. These omissions preserve the stereotypes of Indigenous peoples as "primitive," and upholds the rationale of Indigenous inferiority or their failure to "use" their lands in a civilized manner, justifying genocide and dispossession.[119] In a backhanded way, Stone did credit Winnemem Wintu people for the bountiful salmon runs and the wondrous McCloud River waterscape that persisted, despite the crushing pressure of mining, timber, and industrialization. He wrote,

> Their presence here is so singularly connected with the abundance of the salmon in the Sacramento River. Had white men come here and required the salmon for food, this main artery of the supply system of the river would have stopped; or had white men come and engaged in mining, as they have done on the Yuba and on the Feather American Rivers, the spawning-beds would have been covered with mud and ruined . . . and in less than three years the salmon supply of the Sacramento would have shown a vast decrease. The presence of the Indians, therefore, as far as it implies the absence of the whites, is the great protection of the supply of the Sacramento salmon.[120]

He attributes the McCloud's bountiful runs not to the Winnemem Wintu's ecological knowledge but only their ability to delay the inevitable onslaught of industrial modernity, which seemed destined to destroy his mythical conception of a pristine nature. According to his reports, Stone valued the Winnemem Wintu less for their knowledge and more for their skilled manual labor, as Winnemem Wintu women proved deft at parsing dead eggs from the hatchery trays and the men often braved the glacial waters to make underwater repairs or aid in corralling the fish. Of the Winnemem Wintu, Stone concluded in 1880, "I cannot speak in too high terms of the character of the work which some of the Indians do for us. . . . They are faithful, steady, industrious, and very intelligent."[121] For unitarians, religion was often best expressed through "earnest conviction" and good works.[122] Stone may have seen the Winnemem Wintu workers as "faithful" not just because they were reliable but because their assistance was helping him enact his divine mission. In one gripping scene from Stone's report, Winnemem Wintu workers were instrumental in saving millions of incubating eggs after a piece of driftwood damaged the water wheel that supplied the hatching troughs with cold McCloud River water. Stone wrote that they hauled buckets of water weighing up to 70 pounds from the river to the eggs for nearly 17 hours before other workers were able to repair the water wheel. He wrote, "They did not work as if they were working merely for pay; but they worked with genuine enthusiasm. . . . I never saw such a tired look on Indian faces before as there was on the faces of those red heroes who saved our salmon eggs."[123]

Visiting writers from that era often included descriptions of the Winnemem Wintu as similarly invested in the success of the hatchery, depicting them as childlike servants who had been "subdued" by Stone. An *Overland Monthly* writer described the Winnemem Wintu as "cheerful" workers who "watched every stage of the proceedings with intense interest and evidently regard Stone and his party's mission . . . in special providence."[124] While most scholars have accepted these accounts at face value, historian James Rawls showed that the image of California Indians promoted by nineteenth-century settlers was constantly changing and "distorted and incurred but reflected the needs of white observers."[125] In reality, Chief Sisk shares that Jenny and Bill Curl as well as the other Winnemem Wintu workers felt conflicted about the hatchery, which they referred to as the "egg house." She states the following:

> It would have been horrible to watch the salmon die at the foot of the dam. It was a different kind of reaction. Remember, these are the people who would carry salmon over waterfalls.
>
> The tribe never used the eggs for subsistence. We understood those eggs belonged in the nests in the river, and they had a purpose; that, even if they don't hatch or develop, they're going to feed all the critters in the river, the crawdads, other fish. They also knew there was a magnetism between the rocks and the salmon who hatch there. They have to know those rocks, and have a relationship with those rocks. . . . Grams (Florence Jones) said her mom had a sadness working there, seeing what was done to the eyed eggs. But they knew working there would give them a little bit of peace (from violence).[126]

Despite their reputation as fierce resistance fighters, the violence and trauma of the genocide took a toll on the Winnemem Wintu, and the imperfect peace the hatchery provided was a needed reprieve. Considering the ecological role of unhatched eggs would have been anathema to Stone, who believed the natural world was inherently wasteful and needed to be made more efficient through human manipulation and domination.[127] Whereas Winnemem Wintu understand unhatched salmon eggs as playing an important ecological role, Stone only saw a compromised and primitive system, which fish culturalists were fated to improve:

> Nature, perhaps more aptly speaking, Providence, in the case of fish . . . produces great quantities of seed that nature does not utilize or need. It looks like a vast store that has been provided for nature, to hold in reserve against the time when the increased population of the earth should need it and the sagacity of man should utilize it.[128]

While many Victorian scientists sought to reconcile their fields with religion by suggesting they only revealed God's design, Stone appears to have seen a design that he was fated to complete.[129] In his pursuit of this "sagacity," Stone was credited with several innovations, such as reducing the fungal growth on incubating eggs by charring the inside of the wooden hatching troughs, and systematically experimenting to reduce the impact of more than twenty-three diseases.[130] He also created a special fish-egg aquarium car for railroad transportation and pioneered exporting eggs across the Pacific Ocean. While Stone was a clever inventor, he was not exactly a fish biologist, as objectively and scientifically examining the Pacific salmon's life cycle and habitat was more of a passing interest for Stone as he clung to unverified beliefs that helped justify the continued investment in artificial fish breeding. For instance, he conducted rudimentary inspections of the salmon redds and falsely concluded (without providing any data) that less than 1 percent of the 3,000 eggs in each nest hatched.[131] He bragged in an 1873 report to the California Fish Commission, "The artificial propagation of salmon has been carried to such a point of proficiency that, with any given number of fish, ninety-five times as many young salmon can be brought into existence as would be naturally produced by salmon."[132]

Stone was bewildered by the timing of the salmon's spawning runs, unclear how long they stayed out in the ocean. He also was convinced that the number of salmon returning to rivers remained constant if nature was left to its devices, as he and other fish culturalists were largely oblivious to how ocean conditions, weather patterns, and other environmental disturbances could affect runs from year to year. His entire endeavor also hinged on his unwavering belief that salmon could adapt to any river with a similar temperature regime as their natal stream, as he failed to understand the salmon are uniquely adapted to the complex habitat of their birth streams.[133] Knowing the traditional Winnemem Wintu worldview about salmon, their ancestors may have felt discomfort under Stone's supervision. Although Stone valued salmon and feared for their future, his emphasis on control permeated his interactions with the fish and the Winnemem Wintu.

The Prophecy and Inevitable Extinctions Delayed

After Spencer Baird, the founder of the US Fish Commission, passed away, Stone fell out of favor with the new leadership and transferred to a new post in 1897.[134] The new manager at Baird started hiring college men who worked for a dollar a day at the hatchery during their summer vacations, and the Winnemem Wintu role in the operation subsided. The protective powers the hatchery once provided also receded, since by the early 1900s federal and state officials were stealing Winnemem Wintu children who grew up around the reservation and sending them to boarding schools, including Bill and Jenny Curl's daughter, Florence Jones.[135]

Although Winnemem Wintu people would soon be successful in petitioning the federal government for allotment lands, reestablishing several small but significant footholds on the river in addition to Baird, those homes would soon be flooded by Shasta Dam. Bill and Jenny Curl died in the 1930s, and Florence Jones had to oversee the government's disinterment of their graves, as they moved more than 100 Winnemem Wintu ancestors from their village cemeteries to a new "Indian cemetery" on higher ground.[136] Baird hatchery, which ceased operations in 1935 as the McCloud salmon continued to decline from the onslaught of industrialized progress, now lies beneath the waters of Shasta reservoir.[137]

By the 1920s and 1930s, fisheries scientists started publishing research that suggested the hatchery system, which Stone and his peers promulgated as the focal point of fisheries management, had done more harm than good.[138] Not only do hatchery fish, which are generally less fit and disease prone, compete with wild salmon for resources, they interfere with the natural genetic makeup of salmon runs and cause a variety of cascading challenges. Stone and his fish culturalist peers' penchant to promote artificial salmon breeding over more politically challenging interventions, such as habitat preservation and restoration, has also had a disastrous impact on increasingly endangered salmon runs.[139] Several investigations concluded that the billions invested in hatcheries have completely failed to make up for the salmon habitat that has been destroyed by industrialization, pollution, and dams. [140]

Many historians, as well as Stone himself, acknowledge that his mission to replenish depleted rivers with throngs of artificially bred salmon was largely an abject failure. Failing to appreciate the nuanced habitat needs of Pacific salmon, almost every export failed to establish a significant run of salmon and no evidence ever emerged that fish culture improved or stabilized any of the ailing runs.[141] The only foreign rivers where the exported McCloud River salmon miraculously thrived flowed in New Zealand. Braided, high mountain rivers such as the Rakaia resembled the McCloud River habitat, and from the 1870s to the early 1900s, several shipments that totaled millions of eggs established a stable fishery there by 1908.[142]

In the Winnemem Wintu knowledge system, which is interwoven with their spiritual and cultural epistemologies, New Zealand is where the gathering of leaders sent their salmon through the ice waterfall on *Buliyum Puyuuk*, and they are the true *lendada nur,* who have retained the memory and constitutions to traverse the mountainous rapids of the McCloud. According to Chief Sisk, one of the epistemic biases they face in the comanagement agreement is convincing the agency scientists and brass that importing the New Zealand salmon is far more likely to be successful than relying on hatchery-bred fish from the Sacramento River. There is a regulatory imperative the agencies are following, since both the state and federal endangered species acts require the project to specifically focus on sustaining the ailing winter-run Sacramento River salmon.[143] Agency fish pathologists fear that the New Zealand salmon could import dangerous pathogens to California.[144] Chief Sisk believes the risk posed by pathogens is negligible compared to the risk of failing to reintroduce a salmon that is fit enough to adapt to the McCloud River. She sees the bureaucratic resistance to the New Zealand salmon as partially influenced by traces of Livingston Stone:

> There is little known (among the scientists) about wild salmon, and people are mostly afraid of wild. That is why they killed the wolves, because they're not tamed. But there is strength and knowledge in the wild fish that is necessary for them to continue. They have the knowledge of how it should be.[145]

In Chief Sisk's eyes, the influence of Stone manifests among modern salmon managers as a comfort in controlling the salmon and a distrust of nature's ability to heal itself. There are many agency staff members who agree that their field must move away from their hatchery-centric practices. In the summer of 2023, the Winnemem Wintu experienced a minor breakthrough in their relationship with Western scientists and their mission to "rewild" California salmon. In collaboration with scientists from the University of California at Davis, Chief Sisk designed a nature-based *nur* incubator to replace the Heath trays. The device mimics the McCloud River's conditions, allowing the eggs to incubate among river rocks in square hatching boxes. Once the baby salmon emerge from their eggs, they choose when to travel down two channels to a tub with a circulating current and then a holding pool constructed of river rocks along the bank. Just as in the wild, the baby salmon make their own decisions about when the time is right to travel away from the safety of the incubator and immerse themselves into the riffles of the McCloud.[146]

Figure 6. *For the summer of 2023, Chief Sisk and the Winnemem Wintu Tribe partnered with UC Davis scientists to design the* nur *nature-based incubator, which rears salmon eggs in conditions that mimic the river. Photo by Marc Dadigan.*

With the space and time to develop, even scientists have been impressed by the improved fitness of the young salmon, and Chief Sisk marveled at how they showed evasive instincts, as they darted under floating tree branches when she approached the holding pool on the river's banks.[147] The *nur* incubator is potentially a first step toward the Winnemem Wintu creating a new relationship with the practitioners of Western science, one in which their knowledge, their reverence for salmon, and the salmon themselves are prioritized in the decision-making process. The Winnemem Wintu oral history of Baird Station provides important guidance for these future collaborations as well as for fisheries scientists to begin examining how the influence of Stone affects their management imperatives. This history is a potent reminder that the inevitable extinction predicted for the tribe and their salmon was a colonial fiction, and that as long as the memory and the love of long-lost kin is forever passed down, there is no telling what may return.

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