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Duane Miller, a member of the Confederated Tribes of the Warm Springs Reservation, uses a hoop net he drops from the scaffold into the Columbia River, hoping to catch a spring Chinook salmon — one of nature's most luscious and nutritious foods. For many Native people of the Pacific Northwest, fishing this river and others is a right reserved by their ancestors in treaties signed with the U.S. government nearly 170 years ago. Promised was the continuation of a way of life, inextricably tied to hunting, fishing and gathering in the lands and waters of their traditional territories. "It was promised we would have access to these things," said Valerie Segrest, a Muckleshoot Indian Tribe member and Native foods educator. Under the treaties of Medicine Creek and Point Elliott, the Muckleshoot forever reserved hunting, gathering and fishing rights beyond their reservation at Auburn. "It was always based on food," she said of the treaties. "That is what we ceded all our lands for. It was important to us because in our creation stories, our foods teach us who we are. If we didn't have access to our foods, we would not be a Native person." Valerie Segrest, Native foods educator and Muckleshoot tribal member, says decolonizing Native diets and palates is essential to bring back health and wellness. Native people suffer from disproportionately high levels of diabetes and other diseases because of the loss of their traditional foods and the switch to white flour, sugar, low quality fats and other commodity foods. This spring, The Seattle Times traveled along with Native people gathering their First Foods, to document these cultural practices, their meaning and centrality to the treaty promises. "People have to understand why we reserved the rights we did, why our people did that," said Shannon Wheeler, vice chairman of the Nez Perce Tribe. "It is because of the unwritten laws we have, our obligation to the land and its inhabitants, and our obligation to the First Foods and how we live with the land and interact with the land and treat the land. It is our oldest law. Before the treaty. It is what the treaty was meant to capture." A clam sits on a log at the Muckleshoot Indian Tribe's property on Vashon Island, and Mazzy Ungaro, 9, shows a salmonberry flower. One of the first fresh foods of the year, the flowers have a light, clean taste and are lovely in salads. Spring brings forth the first fresh greens of the year Birds sang out as Segrest headed down the trail through Vashon Island land purchased by the Muckleshoots to provide access for their people to First Foods and a place to live their culture. Alders, cedars and sword ferns lined the trail, and the sweet scent of opening cottonwood buds was on the air. The hush-hush of the tide lapped the beach below, and fat alder catkins were all over the ground. Segrest passed out buckets, gloves and scissors to her daughters, and the three started clipping. They took the top several inches of the plant and left the rest to thrive. They spread out their effort so no part of the patch was depleted. "It is easy to forget what time it is," Segrest said as they worked, and it was true. The rhythms of the natural world — the seasons, the native plants and their harvest time — reset the usual mainstream frenetic clock. "We are not seasonally attuned anymore," Segrest said. "For the first time in human history, we are so disconnected." Spring isn't supposed to be just months on a calendar, Segrest said. It is the time of cleavers, claytonia and nettles bursting through soil damp with rain. These are among the first fresh green foods of the year, and they deliver the energy to live the dreams from the time of rest and renewal that is winter, Segrest said. NETTLES: The supergreen of spring As spring breaks through the cold, gray skies of the Pacific Northwest winter, Native foods educator and Muckleshoot tribal member Valerie Segrest harvests nettles with her two young daughters, teaching them how to sustainably cultivate these greens that deliver essential nutrition and medicine. The nettle patches here are among her favorites. "They call to us to get out here; I crave the feeling of stinging on my fingers," Segrest said. The sting comes from the plant's tiny hairs, which are easily removed with cooking. Steeped into a tea, eaten steamed or blanched, nettles deliver more iron than spinach, and a healthy punch of magnesium, calcium and phosphorus. That is typical of First Foods, Segrest said. They are very nutrient-dense. In her culture, nettles and other plants are teachers, and they like to be visited. Mazzy Ungaro, 9, left, her mother, Valerie Segrest, a Native foods educator, and sister Gea Ungaro, 7, collect nettles on the Muckleshoot property on Vashon Island. The girls' parents are teaching them how to harvest and enjoy First Foods. Feasting from the Salish Sea "When the tide is out, the table is set" is a saying in Coast Salish country. Here at the beach of the Muckleshoot property on Vashon Island, it is easy to see why. As the spring season brought daytime low tides, a feast on the beach was planned. For many, this was their first time learning to dig clams on the beach. It was a day as it used to be every day for Native societies all around Puget Sound, gathering, laughing and passing on harvest skills to the next generation. "Every time we go out, it's an exercise in our treaty right, being in our usual and accustomed areas, engaging our culture and spiritual practices," said Willard Bill Jr., cultural director for the Muckleshoot, who skippered the tribe's canoe Eagle Spirit over from Redondo for the feast. "It's critical for our treaty, to come and do this, traveling like our ancestors did, to come harvest these First Foods, retrain our palates. People 100 years ago were not overweight. They did not have diabetes. It was the first Paleo Diet." Lawrence Jerry, left, and Louie Ungaro steam shellfish and salmon for a gathering to teach about and savor First Foods on the Muckleshoot property on Vashon Island in April. "You are not really sovereign if you can't feed your people," said Ungaro, a tribal council member who is working to build up First Food traditions at Muckleshoot. The prairie produces beauty and sustenance The spring storm pushing through this prairie outside Rochester in Thurston County didn't deter the diggers, who bent to their work in a sea of blue flowers: camas. It was not the flower, but the bulb they wanted. Cooked, it is sweet, creamy and tastes like baked pear. For some, it was their first bulb harvest. Others brought handmade digging sticks and bags passed down by their elders to continue a lifetime harvesting tradition. As the storm lifted, diggers fanned out over the prairie. They harvested the bulbs by pushing a digging stick with its T-shaped handle into the dirt just to the side of the bulb and giving it a gentle lift. It's work with a steady rhythm and pleasing repetition. This is a way of being with their ancestors, said Billie Jo Bray, a member of the San Poil band of the Confederated Tribes of the Colville Reservation. "I feel that connection when I come out here," Bray said, "I feel that we are still here. It's that way of life of our ancestors that they passed on to us." Somewhere across the prairie, a digger was singing as she worked. Connecting with the land, feeding our spirits Native people have cultivated prairies and harvested the roots of camas flowers for thousands of years. Native plants educator and Spokane tribal member Elizabeth Campbell joined an intertribal group of diggers to tend to the prairie at Glacial Heritage Preserve, aerating the soil around the camas and gathering bulbs to feast on together. Muckleshoot tribal member Rosie Arzate James, wearing red, and Port Gamble S'Klallam member Debby Purser, in black, dig for camas during an intertribal gathering at Glacial Heritage Preserve in Thurston County in May. These bulbs were on the small side, about as big as a pearl onion. The prairie is a preserve and open to the public only one day a year, on Prairie Appreciation Day, scheduled at the peak of the bloom in May. Gathering camas bulbs is an increasingly rare opportunity around Puget Sound, where less than 3% of the original prairie habitat remains. Billie Jo Bray, left, a member of the San Poil band of the Confederated Tribes of the Colville Reservation, harvests camas with Janessa Esquivel, San Poil and Sinixt of The Confederated Tribes of the Colville Reservation, at Glacial Heritage Preserve in Thurston County in May. Members from around 20 tribes participated in the dig to share information about traditional harvesting techniques, nutritional benefits of camas and prairie land management. Bray said the harvest is a way of spending time with her ancestors. Healthy rivers are vital to survival of a species Songs and prayers rang out at the longhouse at Celilo Village along the Columbia River near The Dalles. Here once thundered Celilo Falls, thronged with millions of salmon, drawing Native people from all over the Northwest and beyond for trade, for marriages, for gambling, and to fish and dry the salmon that would be their winter stores. Pounded into pemmican and traded, salmon was currency, survival and harvested in colossal abundance. Even into the 1850s, after the horrific waves of diseases, the river still supported as many as 5,000 Indian fishers at about 480 sites at Celilo, according to historian Katrine Barber in her book "Death of Celilo Falls." That ended in 1957 with the building of The Dalles Dam, which drowned the falls and destroyed the fishery at Celilo. And so the mood at a gathering of salmon tribes at the Celilo longhouse on a recent spring day was somber. Instead of coming together for a harvest, as they once would have this time of year, the purpose was to unite around restoring what has been lost. Victor Jim, 6, left, and Cody Meanus, 8, play atop a totem pole at the Celilo Village longhouse. The pole, carved by Jewell James of the Lummi Nation, is part of the Spirit of the Waters journey, a Native-led movement for the removal of four Lower Snake River dams to rebuild salmon runs and to help the southern resident killer whales. From left: Nancy Shippentower, of the Puyallup Tribe; JoDe Goudy and Wilbur Slockish Jr., of the Yakama Nation; and Bruce Jim, of the Confederated Tribes of the Warm Springs Reservation, are honored for their lifetime of work in defense of salmon. Amid the songs and oratory, the work of the cooks went on, as it always has and as it must, said Melinda Jim of the Confederated Tribes of the Warm Springs Reservation. At 72, she had been up since 6 a.m. for a day on her feet, preparing a feast for the longhouse gathering of salmon nations. Cooking for tribal community gatherings is her art and her work. She has 27 aprons, some from her mother and grandmother, and a lifetime of cooking experience. Jim commands a kitchen. Stirring this, checking that, she directed helpers setting out the foods for the feast: There was biscuitroot, bitterroot, oven-roasted deer, baked salmon and huckleberries preserved last summer. "It keeps us healthy," Jim said of these First Foods. "We don't get sick as much when we eat our own diet." 'Our roots to fall back on' Melinda Jim, of the Confederated Tribes of the Warm Springs Reservation, has taught her daughters, grandchildren and great-grandchildren to love bitterroot, biscuitroot and all the native roots in their usual and accustomed areas just as much as she does. For her, it's essential that this way of life and the skills of food preparation — cutting salmon and deer meat, taking care of the roots — continue to be passed down to the next generations. Tribal gatherings honor victories and actions vital to salmon recovery Across salmon country, dam removal and fish passage have long been central for tribes fighting to preserve their First Foods and cultures. From left, Alyssa Macy, of the Confederated Tribes of the Warm Springs Reservation and CEO of Washington Environmental Council and Washington Conservation Voters; Chairwoman Frances Charles, of the Lower Elwha Klallam Tribe; and Amy Cordalis, attorney for the Yurok Tribe, have all been at the center of dam removal efforts on the Lower Snake, Elwha, and Klamath rivers, respectively. Frances Charles, chairwoman of the Lower Elwha Klallam Tribe, was honored in the longhouse ceremony at Celilo for her leadership in dam removal on the Elwha River, the largest ever dam removal project in the world. It was the work, she stressed, of elders and tribal leaders before her that also helped bring the $325 million federal project to completion in 2014. "It took 100 years, but we saw those tears of joy in the elders' faces," Charles said. That success is inspiring for Yurok tribal member Amy Cordalis, attorney for the tribe, as she helps lead the removal of four dams on the Klamath River in Oregon, expected to begin in 2024, for salmon recovery. The treaties demand it, Cordalis said. "Treaties are the supreme law of the land. In light of that, how is it that these populations of salmon in the Columbia River and the Klamath River are down to single-digit percentages of their historical size? "This will not stand. The treaty right was not given to us, it is a reservation of an inherent right that the tribes got from the Creator. We reserved that right in the treaties. And that absolutely meant having salmon in the river." In Washington, the region is considering dam removal on the Lower Snake River. A draft report on replacing benefits of the dams is out for public comment, with a final report and recommendation expected from U.S. Sen. Patty Murray and Gov. Jay Inslee later this summer. Among their considerations is the impact on tribal treaty rights and cultures from the loss of salmon. Also to be weighed: the legal obligation to protect 13 runs of salmon and steelhead listed under the Endangered Species Act; the feasibility and cost of replacing hydropower from the dams, which produce enough electricity to power a city the size of Seattle; providing alternatives to transportation on the Lower Snake through locks at the dams from Pasco, to Lewiston, Idaho; and reworking infrastructure that provides irrigation for growers from the reservoir behind Ice Harbor Dam. The presence of the salmon's absence is overwhelming, and is a reality that must be reversed with dam removal on the Lower Snake River, said Alyssa Macy, CEO of the Washington Environmental Council and Washington Conservation Voters and a member of the Confederated Tribes of the Warm Springs Reservation. Living cultures require living salmon. The food systems of Indigenous Peoples are known to contain a vast tapestry of riches in food biodiversity, nourishment, and the potential to sustain biocultural knowledge, resilience, and sustainability. However, these internationally recognized and outstanding attributes, historically documented in part, are affected by many challenges of globalization that threaten their loss and eventual disappearance (Kuhnlein et al., 2009, 2013a; FAO, 2021; FAO and Alliance of Bioversity International and CIAT, 2021). With the contemporary advent of the 2021 United Nations Food Systems Summit and recent policies that encourage sustainability we highlight the need to address Indigenous Peoples' food system loss, and how communities can proceed to strengthen continuity and sustainability of their cultural food systems' continuity and sustainability and give impetus to improvement of nutrition and health in their communities, for all humanity, and for the planet. The term "food system" is defined through several international agencies as the foods originating from forestry, fisheries, aquaculture, and crop and livestock production and the interlinked actors and activities for their processing, distribution, consumption, and disposal that shape human dietary patterns, food security and nutritional status. Food systems are complex and dynamic interactions and synergies of social, economic, and environmental influences (FAO, 2020; USAID-RFS, 2021; von Braun et al., 2021). In this contribution we refer to a "traditional food system" of an Indigenous People as all foods within the particular culture that are available from local natural resources and culturally accepted, including the sociocultural meanings, acquisition and processing techniques, use, biological composition and nutritional consequences for the people using the food (Kuhnlein and Receveur, 1996). The contribution of nature and culture to a food system form the complete health picture of the individual and the community—the aspects of physical, emotional, mental, and spiritual health, healing, and protection from disease (Kuhnlein, 2009). Since Indigenous Peoples' worldviews differ from mainstream science, their food systems differ from the above in that they are biocentric and intimately tied to nature and spirituality, rather than to linear value chains (FAO, 2021). Situation Recent attention to the world's food systems has highlighted the pressing need to address unsustainable food production and consumption (von Braun et al., 2021). Aimed at addressing the 17 Sustainable Development Goals in 2021, the United Nations Food Systems Summit included virtual presence of national leaders and all United Nations agencies to address global hunger, climate change and biodiversity loss. The Summit had mixed reviews with criticism for obvious private sector control of the agenda and results, and the lack of accountability (Globalagriculture, 2021; International Network of Mountain Indigenous People, 2021; SlowFood, 2021); ultimately a solution cluster and a coalition of Indigenous Peoples developed strategies for accountability (Food Systems Summit, 2021). Indigenous Peoples are among the most severely in need of meeting the Sustainable Development Goals, especially those related to hunger, poverty, wellbeing, inequality, and justice, which are all affected by climate change and unsustainable global food supplies. The UNFAO published two sentinel documents that creatively describe the depth of needs and strengths of Indigenous cultures and food systems: "The White Whipala Paper" (FAO, 2021) and "Indigenous Peoples' Food Systems- insights on sustainability and resilience from the front line of climate change" (FAO Alliance of Bioversity International and CIAT, 2021). Indigenous Peoples collectively make up about 5% of the global population with more than 476 million people. There are more than 4000 Indigenous languages over the 6700 globally spoken in 90 countries. The collective experience of Indigenous Peoples is from managing 22% of the world's ecosystems and land mass (Kuhnlein et al., 2019). Their vast traditional knowledge systems that include appreciation of this extensive global food biodiversity is linked to historical culture, way of life, identity, and spirituality (Cunningham, 2017). These rich natural treasures can sustain the planet if appropriately recognized, respected, and used. Many cultures of Indigenous Peoples realize four dimensions of health that include physical, social, mental, and spiritual health, all of which are interlinked in many ways with cultural food system practices that include the biodiversity that is foundational to food system resilience. Over the past 250 years changes in global food production and distribution have driven large-scale dietary transformations. Communities have foods available from distant places, usually through commercial networks and increasingly through complex international food processing and distribution industries. Dietary change has been heightened by migrations to new areas and from rural to urban settings that present new culinary and dietary practices (Pelto and Pelto, 1983). At the same time, the imperative of colonization took precedence in many areas of the world to subjugate and dispossess Indigenous Peoples and disassociate them from their traditional land, culture, linguistic heritage, and identity to profoundly contribute to gaps in food security, health, and wellbeing (Cunningham, 2009; King et al., 2009; Egeland and Harrison, 2013). Colonization, Dispossession, and Disparities The impact of environmental dispossession cannot be underestimated. Indigenous Peoples are acutely aware of forced dietary change brought by environmental change creating overexploitation of fish and wildlife stocks, pollution and degradation of lands and waters, urbanization and loss of cultivatable lands, invasive species, and climate change (Turner et al., 2013a; Batal et al., 2021b). Further, disparities for Indigenous Peoples are also created from effects of several social determinants often created by colonization that led to a decline in dietary quality and nutritional health. Warne and Wescott (2019) describes these determinants for American Indians as forced relocation from ancestral lands to reservations that restricted access to traditional food, thereby creating dependence on federal food subsidies, and the forced attendance of children in distant boarding schools. Both promoted historical trauma contributing to poverty, alcohol and substance abuse, and rampant non-communicable disease (NCDs). For Indigenous Peoples the role of the physical environment is inseparable from issues of identity, balance, and life control (Richmond and Ross, 2009), food security and food sovereignty (Expert Panel on the State of Knowledge of Food Security in Northern Canada, 2014; Delormier and Marquis, 2018). Globally, Indigenous Peoples experience similar disparities in contrast to their national population averages that lead to increased obesity and NCDs) in high-income countries, and increased malnutrition and stunting in low and middle-income countries (LMICs; Anderson et al., 2016). The transition driving malnutrition and increasing NCDs can be reversed with more sustainable food systems that provide lifestyle balance in use of biodiverse food resources, increasing energy expenditure, and reducing exposure to high energy but poor nutrient foods and diets (Popkin, 2001; Batal et al., 2017; Swinburn et al., 2019; Popkin et al., 2020). Effective Policies Are Needed The World Health Organization is calling for all nations' policies to address their environments to create more healthy food systems and the populations they sustain; these are policies such as improving food security, reducing food marketing to children, and education to develop public consciousness of healthy foods and diets (World Health Organization, 2017). Barriers created by international trade and investment agreement stakeholders, especially in food and beverage markets in the public and private sectors, are described as accelerating the nutrition transition away from healthy food systems (Garton et al., 2021). Knowledge systems of Indigenous Peoples embrace the use of food resources known and used in the culture, intergenerational wellbeing, traditional knowledge, and preferences to create food security and food sovereignty (Expert Panel on the State of Knowledge of Food Security in Northern Canada, 2014; FAO, 2021). Policies are needed to protect this knowledge and foster its use to promote wellbeing, which is based on the collective five interrelated human rights recognized in international law: the right to food, the right to health, cultural rights, the rights of the child, and the implied right to a healthy environment (summarized in Swinburn et al., 2019). All human rights are especially relevant for Indigenous Peoples as noted in the UN Declaration on the Rights of Indigenous Peoples (United Nations General Assembly, 2007), and protecting these rights is essential for strengthening Indigenous Peoples' food systems. Strengthening Indigenous Peoples' Food Systems This strengthening necessarily includes approaches that broadly stimulate intercultural research and education at several levels: international, regional, national, and within Indigenous communities. Research is needed to fully understand the availability and nutritional potential of biodiverse food resources in Indigenous territories (Kennedy et al., 2021). Intercultural education at all levels includes mutual careful listening and sharing knowledge of commercial food access, its quality and use, and learning the strengths, sustainability, and resilience of cultural resources and practices. Continuity of traditional practices is essential and includes encouraging new ideas and expressions of culture with food, including indigenous cuisines with biodiverse species and preparation techniques. These initiatives require legislation that enables and protects natural resources and their use, and ensures time, funds, and equipment for Indigenous Peoples to reinforce cultural food system access and identity (Kuhnlein and Burlingame, 2013; Delormier and Marquis, 2018; FAO Alliance of Bioversity International and CIAT, 2021). The goal of strengthening Indigenous Peoples' food systems at the global level is to create the way forward for humanity to progress from our currently unsustainable food systems and ways of life (Argumedo et al., 2021; FAO, 2021). Collectively, Indigenous Peoples contain knowledge of a wealth of cultural diversity in the ingenuity of food systems that are adaptive to the world's diverse ecosystems and climate change. Realizing this goal begins with encouraging and enabling Indigenous communities to fully access and appreciate their local cultural heritage and identity. In this contribution, we highlight two very different food systems and the partnerships that established essential data as a platform to create positive change. The Nuxalk Nation in the temperate coastal rain forest of British Columbia has a traditional food system based in wild fish and plant harvests that were assessed in 2009 to provide ~30% of adult dietary energy. The Karen of Kanchanaburi Province, Sanepong Community, in the tropical watershed forest of Thailand have a food system traditionally based in shifting cultivation and wild food harvest that was similarly assessed to provide about 85% of adult daily energy (Kuhnlein et al., 2009; Figures 1, 2). It is our intent to provide these two unique Indigenous Peoples' food system cases, and updates, as stimulation and inspiration for Indigenous communities everywhere to improve use of their traditional food systems, and for policy makers to realize the needs for urgent support of Indigenous communities' food systems at local, national, and international levels. Figure 1. Nuxalk Nation in Bella Coola, British Columbia, Canada. Figure 2. Karen Community in Sanepong, Kanchanburi Province, Thailand. Both authors contributed substantially over several years to research with large teams in the case study communities. Both authors were involved in data collection to define the foods in the food systems (as reported separately in Kuhnlein et al., 2009), and then to stimulate community empowerment to improve wellbeing using traditional food and food system data. A diversity of research methods was employed using both qualitative and quantitative techniques which were summarized in separate chapters in Kuhnlein et al. (2013a). The data reported here include some from the former publications as well as new perspectives and research for policy considerations and actionable recommendations. Research and policy activities in both Indigenous communities are ongoing. Policy Options and Implications Nuxalk Nation of British Columbia, Canada Setting and Context The people of the Nuxalk Nation live in the community of Bella Coola and occupy lands on the central west coast of the Province of British Columbia. Their traditional territory extends more broadly in the temperate coastal rain forest of Canada. For tens of thousands of years, they occupied many villages in the region, but the population was decimated during the 1836-7 smallpox epidemic and resettlement of survivors took place in the remote Bella Coola Valley (McIlwraith, 1992). Today ~1,200 Nuxalk People (Nuxalkmc) live in the Bella Coola Valley (about 50% of the valley population) or elsewhere in the province. The traditional Nuxalk language is Salish, and it supports rich cultural activities, although schools, health care, and commerce are conducted primarily in English. The once common extractive industries of logging and commercial fishing are in decline and unemployment and financial poverty are high. Gardening and subsistence traditional Nuxalk food harvesting and use is regularly practiced to supplement food purchased in the two grocery stores and several small outlets in the valley (Kuhnlein, 1992). Health of Indigenous Peoples in British Columbia and Canada reflects the global circumstances noted earlier, with continuing colonization, poverty, and environmental dispossession. Food insecurity data on record for First Nations in Canada is 41% in contrast to the general population of 7% (Chan et al., 2011; Johnson, 2014), with 49% of 81 random Nuxalk First Nation households reporting food insecurity (FNFNES, 2011). Poor dietary habits result from increasing food insecurity and lead to increasing non-communicable diseases and decreasing quality of life (Thommasen and Zhang, 2006; Batal and Decelles, 2019). Batal et al. (2021a) reported that 73% of all British Columbia First Nations adults sampled in 2011 had overweight or obesity and 10% had diabetes, in contrast to 83 and 21% for First Nations over all regions in Canada; they suggest a protective effect of traditional food, especially fish, against diabetes in First Nations in British Columbia. Nuxalk Food System Description Until about 150 years ago Nuxalk families lived in varied environments, with seasonal location and food harvest depending on availability of a range of animal and plant foods from coastal rainforest and sea inlets of central coastal British Columbia to upland lakes and rugged mountains often capped with snow. The Bella Coola Valley, its river and tributaries provide many habitats and food diversity, including five species of Pacific salmon, sea foods, game (rarely found), tree foods, root foods, and a variety of wild fruits and greens (McIlwraith, 1992; Kuhnlein et al., 2013b) (Table 1). Harvested food was preserved by dehydration, smoking, fermentation, as jam, or caching. Today berry jam and fish drying and smoking are still common, as are preservation in jars or cans, and using household freezers. Table 1. Summary of traditional wild food species harvested by Nuxalk Nation families. The use of traditional food species by Nuxalkmc has been gradually declining. Interviews with three generations of Nuxalk women about food use frequency by decade from 1920 to 1980 clearly shows gradually decreasing use of game, berries, greens, roots, and sea foods, with less impact on river fish (Kuhnlein, 1992). More recently, from 1980 to 2009 there has been even more dramatic decline in estimated use of traditional foods attributed to declining local availability and resource collapse of fish species that has increased food insecurity in the community despite families wanting to continue their food use traditions (Kuhnlein et al., 2013b; Batal et al., 2021b). Restoration efforts of salmon species, eulachon (see next section), and gardening have taken place, in particular the strengthening of efforts toward local management of eulachon (Sputc Project Team, 2017; Beveridge et al., 2020). Here we emphasize the eulachon fish and the collective of berries because of their recognition as such in earlier interviews of Nuxalk women (Kuhnlein and Moody, 1989; Kuhnlein, 1992). Eulachon Fish and Grease The eulachon (Thaleichthys pacificus Richardson) is a cultural keystone species documented as important to wellbeing and Nuxalk identity (Sputc Project Team, 2017). This nutrient-rich fish is a popular flesh food harvested and prepared in several ways in spring by Indigenous cultures near rivers on the Northwest Coast. Eulachon grease is the fat rendered from the fish that has been a prominent food in itself, and a gift for feasts and many traditional ceremonies as a general sign of prosperity. It can be widely used as a frying medium, a condiment with several foods, or used as an ingredient in bread, salads, or stews; it can also be a preservative covering in containers of dried berries. It has been used as a versatile traditional lubricant for leather and wood, and as a locally important medicine for skin rashes and various ailments. The preparation of the eulachon (ooligan) grease has specificity by family to yield the preferred flavor and storage capacity. Tradition in the Nuxalk Nation has been to net the anadromous fish from the river in early spring, March or April, and to pack the fish into cedar plank bins 2–3 m square lined with boughs of cedar (Thuja plicata Donn) built on the riverbank. The bins are covered, and the contents are left to ripen from 4 to 14 days until judged to be sufficiently decomposed. A second box is then constructed with a metal floor to enable heat from a fire below, and filled with water brought to a gentle simmer. The ripened fish is transferred by shovel into the box, and the rendered oil rises to the surface (see Figures 3, 4). From 300–400 L of oil have been rendered from one box in the family process; the seasonal cooking in 1981 from five family preparations yielded about 2,000 L of grease. Grease was then shared with community households that at the time reported to use from 7 to 40 L/family per year (Kuhnlein, 1982). Figure 3. Harvested eulachon fish, Nuxalk Nation. Figure 4. Skimming eulachon grease from the surface of the cooking bin, Nuxalk Nation. The nutritional qualities of the fish and its grease are truly remarkable (Table 2). These were first documented in 1982 by Kuhnlein; a larger study was completed in 1996 that included sampling from five coastal First Nations. Analyses included retinol, calcium, iron, and zinc, and a suite of heavy metal and organochlorine contaminants (Chan et al., 1996; Kuhnlein et al., 1996). None of the contaminants exceeded regulation limits from Health Canada. Table 2. Eulachon (Thaleichthys pacificus) fish and grease data summary. T. pacificus is rich in vitamin A expressed as retinol equivalents (RE/100 g). It appears that the ripening/rendering of the fish for grease, as well as smoking and dehydrating the fish creates some loss of this vitamin. Nevertheless, the fish grease is one of the best sources of retinol in British Columbia natural foods. It would fulfill nutrient needs of children and adults, even when consumed in small quantities. Available in spring, when traditional plant sources of carotene are limited to meet vitamin A needs, and because the grease was stored after preparation for annual use, this fat is an important nutrient in the annual traditional diet. Eulachon grease is also an excellent source of polyunsaturated omega-3 and omega-6 fatty acids, meeting human needs with a 20 g. portion. Calcium, iron, and zinc are also present in meaningful amounts in the fish and grease, especially considering that fish bones contributed some of this amount in edible dehydrated/smoked and ripened/rendered fish. Unfortunately, and sadly for coastal First Nations Peoples, the eulachon has faced serious decline and extirpation, with the last large harvest for Nuxalmc in 1996 (Moody, 2008; Beveridge et al., 2020) because of commercial overfishing and shrimp trawl bycatch in the open ocean, and environmental effects such as flooding and silting of the river. Since then, there has been no eulachon fishing by the Nuxalk Nation. However, recognizing the importance of continued grease-making practices for cultural knowledge transmission, single batches of grease have been made in grease camps using fish from more Northern rivers since 2017 (Thompson, 2017). These camps fulfill important cultural and educational purposes, despite a lack of eulachon in the rivers. An annual community ceremony celebrates the time when sputc (eulachon) would have annually returned to the Bella Coola River (Moody and Beveridge, 2019). Serious efforts are being made to research and strengthen Indigenous management of this species based on extensive knowledge of the local environment and ecology, with the hope of returning and maintaining this nutrient-rich species into the diets of Nuxalk families (Sputc Project Team, 2017; Moody and Beveridge, 2019; Beveridge et al., 2020). Wild Berries The Bella Coola Valley and the coastal rain forest are famous for the diversity and quantity of wild berries available for consumption (Turner, 1995; Moody and Beveridge, 2019). More than 20 species of berries can be harvested at various elevations in the valley from April until frost in the autumn (Figure 5). In addition to being eaten fresh singly or in combination or incorporated into breads and salads, berries have traditionally been preserved by dehydration (by sun or smoke) and under a layer of eulachon grease. Recently, preservation is as jam and by freezing. Figure 5. Berries harvested in mid-July, Nuxalk Nation. Use of traditional berries has been declining, as measured by interviews with three generations of Nuxalk women. From the 1920's until the 1980's both fresh and preserved use declined, although use scores of all berry species indicate that at least one fruit was used several times per week during the year (Kuhnlein, 1992). In 1985 family use of berries was roughly 46 kg/yr that was reduced to about 16 kg/yr in 2009. Although all Nuxalkcm still greatly appreciate all their traditional foods, limited access and availability of the food system continue to decline (Kuhnlein et al., 2013b). Sweetened whipped soapberries (Shepherdia canadensis) continue to be one of the most popular berries in the Nuxalk Nation, but red huckleberries (Vaccinium parvifolium) and salmonberries (Rubus spectabilis) are more available than other species. Nutrient data from species used by Nuxalkmc confirm that the array of Nuxalk traditional foods provided the full complement of nutrients essential for human nutrition (Turner et al., 2009; Centre for Indigenous Peoples' Nutrition and Environment, 2011). Table 3 shows the diversity of berry species, the range of values for micronutrient adequacy, and the berry species with the highest analytical values on record (Table 3). Gooseberries and red elderberries had the highest nutrient values for multiple micronutrients: thiamin and niacin (gooseberries) and folate, iron, and phosphorus (red elderberries). Gooseberries and elderberries also had among the lowest taste popularity scores for women (not shown; Kuhnlein, 1989). Table 3. Micronutrient-rich Nuxalk wild traditional berries. Nuxalk Food and Nutrition Program The Nuxalk Food and Nutrition Program was initiated following identification of rich nutrient resources in traditional Nuxalk foods as detailed above. The program was funded from 1982 to 1986 by agencies within Health Canada, and others, as a demonstration project with objectives to establish the local knowledge of the Nuxalk food system and to then systematically encourage enhanced use of both traditional and nutrient-rich commercial foods to improve health status (Nuxalk Food and Nutrition Program Staff, 1984; Kuhnlein, 1987). With guidance of a committee of Elders, Chiefs and Council, community leaders in the Health Center, and program staff, ambitious and popular educational and assessment activities were conducted with substantial attendance by children and adults (Kuhnlein and Moody, 1989; Kuhnlein and Burgess, 1997). Importantly, the sampling and extensive food analysis provided the backbone of the knowledge platform upon which to base nutrition education activities (Kuhnlein et al., 1982; Kuhnlein, 1984, 1990; Kuhnlein et al., 1996; among others). Over the course of the program there was increased participation in program activities, a significant increase in traditional food use, and reduced commercial food expenditures per family; food use evaluations documented increased family consumption of fish, vegetables, and fruits. Improved retinol, carotene, ferritin and folate status in teens and adults were also documented, as was improved dental health (Kuhnlein and Moody, 1989; Kuhnlein and Burgess, 1997; Turner et al., 2013b). The Nuxalk Food and Nutrition Program emphasized food and nutrition education and development under the leadership described above. The Program was not specifically intended to prevent obesity and other non-communicable diseases, although healthy eating and fitness training and classes were given within the school system and in adult education through the Health Center (Nuxalk Food and Nutrition Program Staff, 1984). The Nuxalk Food and Nutrition Program was the first community program for First Nations in Canada to document the traditional food system and build awareness and activities to improve overall dietary quality and health. It became a model for other Indigenous communities to promote use of local foods and holistic health and wellbeing (Kuhnlein et al., 2013b). The Nuxalk program was revisited in 2009 and 2013 to document its lasting impact in the Nuxalk Nation (Turner et al., 2009, 2013b; Kuhnlein et al., 2013b). While a greater percentage of Nuxalk families using traditional food increased from 1981 to 2009, the estimated weight of use per family had declined for reasons described above, especially decreased resource availability. Evidence from qualitative interviews and discussions with leaders in both 2009 and 2013 described several initiatives to share elder knowledge about local traditional foods and medicines with the intent to increase their use. The Nuxalk Nation has also been included in several provincial and federal research efforts to document continuing change in food use by First Nations (see following section). Policies and Activities Affecting the Traditional Food System of the Nuxalk Nation Global change in food distribution and availability since the mid-1700's, noted earlier, impacted all Indigenous Peoples. In addition, several factors in British Columbia's history have driven movement away from use of traditional food resources: Legislation restricted land and resource access of Indigenous Peoples including Legislative Acts to restrict access to Game, Fisheries, and Forests. Colonial policies beginning in the mid-1800's, such as residential schools, the reserve system, and ban of local cultural practices such as the potlatch had lasting impacts on knowledge transfer to younger generations (Fontaine and Craft, 2015). Environmental degradation and over-fishing because of extractive fisheries and forestry policy as well as widespread dispossession of lands and waters have reduced availability and accessibility of traditional foods (Moody, 2008; Hilland, 2013; Bennett et al., 2018; Beveridge et al., 2020). Nuxalkmc maintain that berries are in decline because of massive clear-cut logging blocks. Further, Nuxalk migration from home territory to urban areas and migration of settlers into the Bella Coola Valley brought increasing availability and use of less nutritious commercial foods. Education, social contact, and the media have fostered availability and appreciation of new foods and reduced native food harvesting, as has the impact of employment on time available for local food harvesting and funds generated to purchase mostly unhealthy energy-dense commercial foods. Employment also affected time available for women and men to create a transfer of food harvesting knowledge to younger generations. Few young Nuxalk women (