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Maliseet Cultivation and Climatic Resilience on the Wəlastəkw/St. John River During the Little Ice Age

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Article abstract

This article examines how Maliseets extended maize cultivation in the Americas northeastward to the Wəlastəkw (St. John River) using Indigenous cultivation techniques and knowledge of riverine microclimates during the Little Ice Age, a time when many peoples in the Northern Hemisphere abandoned cultivation. It also suggests that agriculture in New Brunswick began as an Indigenous complex, and that the cultivation work of Indigenous people prepared some of the field and town sites later used by Acadian and British colonial farmers.

Maliseet Cultivation and Climatic Resilience on the Wəlastəkw/St. John River During the Little Ice Age

JASON HALL

Cet article examine comment les Malécites ont étendu la culture du maïs dans les Amériques vers le nord-est jusqu'au Wəlastəkw (le fleuve Saint-Jean) grâce aux techniques de culture indigènes et à leur connaissance de microclimats riverains au cours du Petit Âge glaciaire, une période où de nombreux peuples de l'hémisphère Nord ont abandonné la culture. Il affirme aussi que l'agriculture au Nouveau-Brunswick a débuté sous la forme d'un complexe indigène et que les travaux de culture des Autochtones ont préparé certains des endroits convertis plus tard en champs et en villes par des fermiers acadiens et britanniques.

This article examines how Maliseets extended maize cultivation in the Americas northeastward to the Wəlastəkw (St. John River) using Indigenous cultivation techniques and knowledge of riverine microclimates during the Little Ice Age, a time when many peoples in the Northern Hemisphere abandoned cultivation. It also suggests that agriculture in New Brunswick began as an Indigenous complex, and that the cultivation work of Indigenous people prepared some of the field and town sites later used by Acadian and British colonial farmers.

THE INDIGENOUS PEOPLE OF THE ST. JOHN RIVER, THE MALISEET, successfully cultivated maize in northeastern North America during one of the coldest eras in the past several thousand years. This article places Maliseet maize cultivation squarely within the long tradition of Indigenous agriculture in North America that includes the domestication and diffusion of maize within the Americas. Maize cultivation in the St. John River Valley began as part of a broad pattern of Native agricultural innovation and adaptation that saw Maliseets extend and maintain maize cultivation to the *Wəlastəkw* – the Maliseet name for the St. John River – by the 1680s, if not sooner. Scholarship that has cast maize cultivation on the Wəlastəkw as a development inspired by the arrival of Europeans is grounded in a misinterpretation of early records and a failure to adequately situate maize cultivation within Maliseet culture. Maize cultivation was part of a broad spectrum of Maliseet plant management. Maliseet success in cultivating maize during the Little Ice Age was the product, in part, of their ability to use a knowledge of local microclimates and early harvesting strategies to cope with a period of cold weather and short growing seasons. Considering where and how Maliseets grew and consumed maize helps scholars refine their understandings of the historic range of cultivation, and Indigenous peoples' responses to climatic change across North

Jason Hall, "Maliseet Cultivation and Climatic Resilience on the Wəlastəkw/St. John River During the Little Ice Age," *Acadiensis* XLIV, no. 2 (Summer/Autumn 2015): 3-25.

America and beyond. As well, it indicates that Maliseet cultivation created a foundation for European agriculture on parts of the Wəlastəkw in the years that followed.

The vegetation along the banks of the St. John River has altered significantly since sunlight began to reach bare land at the end of the last ice age approximately 13,000 years ago. Climate fluctuations, the erosive power of the river itself, the slow rebound of the Earth's crust, and the arrival of new species – humans included – have been among the forces shaping changes. When humans first arrived on the banks of the St. John River, circa 11,500 years ago, the surrounding landscape was shrubby tundra. Small bands of mobile hunter-gatherers hunted caribou and other animals with a unique style of long, fluted spear points known as Clovis points. When climate change altered the vegetation and distribution of animals in this region, people stopped manufacturing Clovis points.[1]

As temperatures warmed in the Northeast, birch, spruce, pine, maple, beech, and hemlock began to dominate a varied landscape and new cultures developed along the waterway. These human cultures appear to have responded to the shifting climate and smaller sizes of animals by reducing the size of their projectile points and developing more diverse and distinct cultural traditions that were adapted to the changing regional circumstances of North America. The people who lived in the river valley in the years that followed adapted to the new microenvironments that were emerging by developing sophisticated ecological knowledge, as well as seasonal patterns of food production and acquisition that mixed hunting and fishing with plant gathering. This mix of inhabitable niches and subsistence strategies provided humans with a broader array of foods than had been the case in earlier periods. Indigenous peoples harvested the increasing diversity of trees and plants along the river's bank, using them for food, tools, medicines, shelter, and tinder. Birch bark served to make canoes, shelters, and maps. Humans cut and burned

1 S.R. Clayden, "History, Physical Setting, and Regional Variation of the Flora," in *Flora of New Brunswick: A Manuel for the Identification of the Vascular Plants Histories of Maize of New Brunswick*, 2nd ed., ed. Harold R. Hinds et al. (Fredericton: Department of Biology, University of New Brunswick, 2000), 35-73; Atlantic Geoscience Society, *The Last Billion Years: A Geological History of the Maritime Provinces of Canada* (Halifax: Nimbus, 2001), 185-93; Richard W. Judd, *Second Nature: An Environmental History of New England* (Amherst and Boston: University of Massachusetts, 2014), 21-8; Tim Flannery, *The Eternal Frontier: An Ecological History of North America and its Peoples* (New York: Atlantic Monthly Press, 2001), 181-93; Christopher Ellis, "Understanding 'Clovis' Fluted Point Variability in the Northeast: A Perspective from the Debert Site, Nova Scotia," *Canadian Journal of Archaeology* 28, no. 2 (December 2004): 205-53; Béatrice Craig and Maxime Dagenais, *The Land in Between: The Upper St. John Valley, Prehistory to World War 1* (Gardiner, ME: Tilbury House Publishers, 2009), 2-6, 16-26. See also David J. Meltzer, *First Peoples in a New World: Colonizing Ice Age America* (Berkeley: University of California Press, 2009), 184, 200-7, 215, 236, 242, 307-8 (and for mega-fauna extinction, see 255-280); Matthew T. Boulanger and R. Lee Lyman, "Northeastern North American Pleistocene Mammals Chronologically Overlapped Minimally with Paleoindians," *Quarterly Science Reviews* 85, no. 1 (February, 2014): 35-46; and Jonathan Lothrop et al., "Paleoindians and the Younger Dryas in the New England-Maritimes Region," *Quarternary International* 242, no. 2 (October 2011): 546-69. For climate change and the demise of Clovis points, see P. Newby et al., "A Paleoindian Response to Younger Dryas Climate Change," *Quaternary Science Reviews* 24, no. 1-2 (January 2005): 141-54.

forests, spread seeds, and created garbage heaps; as they did so, they altered the distribution of the existing vegetation. In time, humans would also add new plant species to the mix of vegetation and animals living in the watershed.[2]

The climate of North America continued to fluctuate in ways that affected later humans and the vegetation along the Wəlastəkw in the years that followed. One of the most significant of these fluctuations within the past 5,000 years has come to be known as the Little Ice Age. This epoch, which lasted from approximately 1,300 to 1850 CE, was characterized by periods of extreme cold and fluctuating climate patterns. These conditions posed challenges for Native North Americans and for other peoples across the Northern Hemisphere.[3]

Native peoples living within the region now called New Brunswick maintained regional and long-distance linkages with peoples living elsewhere. Archaeologists have unearthed evidence of plant material, stone tools, architecture, and burial traditions that demonstrate inter-cultural contact among the Indigenous peoples of this region and those living in Labrador, southern New England, the Great Lakes, and the Mississippi valley dating back more than 3,000 years. The early inhabitants of the St. John River Valley shared belief systems, foods, clothing, and knowledge within an exchange network that connected a large portion of the continent's biomes and human communities.[4]

One of the most important historical developments within this broader Indigenous population was the domestication of maize. The crucial early developments in domestication occurred in South-Central Mexico more than 6,000 years ago. Native peoples there developed the plant into a high-yielding grain that became the basis of large populations and civilizations. From Mexico, maize cultivation spread throughout North and South America as people adapted the crop to meet new climatic

2 Atlantic Geoscience Society, *Last Billion Years,* 193; Judd, *Second Nature*, 26-31; Meltzer, *First Peoples*; Lothrop et al., "PaleoIndians"; Boulanger et al., "Northeastern North American Pleistocene Mammals"; and Nancy Asch Sidell, "Prehistoric Plant Use in Maine: Paleoindian to Contact Period," in *Current Northeast Paleoethnobotany*, ed. John P. Hart (Albany, NY: State Education Department, University of the State of New York, 1999), 194-222. For encouraging edible plants such as goosefoot with clearing and other activities, see William Doolittle, *Cultivated Landscapes of Native North America* (New York: Oxford University Press, 2000), 25-6, 29-30, 61-2. For uses of birch bark, see Barry M. Pritzker, *A Native American Encyclopedia: History, Culture, and Peoples* (Oxford and New York: Oxford University Press, 2000), 428, and Edward J. Lenik, *Making Pictures in Stone: American Indian Rock Art of the Northeast* (Tuscaloosa, AL: University of Alabama Press, 2009), 29-30.

3 W.R. Baron, "Historical Climate Records from the Northeastern United States, 1640 to 1900," in *Climate Since A.D. 1500*, ed. Raymond S. Bradley and Philip D. Jones (New York: Routledge, 1992), 74-91; Brian M. Fagan, *The Little Ice Age: How Climate Made History, 1300-1850* (New York: Basic Books, 2002), 120-2; Victor Lieberman, *Strange Parallels*: *Southeast Asia in Global Context, c. 800-1300*, vol. 1 (New York: Cambridge University Press, 2003), 101, 107.

4 See Bruce J. Bourque, "Evidence for Prehistoric Exchange on the Maritime Peninsula," in *Prehistoric Exchange Systems in North America*, ed. Timothy Baugh and John E. Ericson (New York: Plenum Press, 1994), 17-46; Allan D. McMillan and Eldon Yellowhorn, *First Peoples in Canada* (Vancouver: Douglas & McIntyre, 2004), 48-52; Susan Elizabeth Blair, "Ancient Wolastoq'kew Landscapes: Settlement and Technology in the Lower Saint John River Valley, Canada" (PhD diss., University of Toronto, 2004), 38-9, 46; Charles C. Mann, *1491: New Revelations of the Americas Before Columbus* (New York: Vintage Books, 2006), 289; and Craig and Dagenais, *Land in Between,* 18-23.

conditions. By 800 to 1,000 years ago Indigenous peoples were successfully raising maize in southern Maine, within easy reach of Maliseet trade networks. The question of when and how maize moved further north and east to become part of the vegetation of the St. John River Valley has been a matter of debate.[5]

Most late 19th- and early 20th-century scholars thought Maliseet maize cultivation had pre-contact origins. More recently, however, scholars have suggested that Maliseets started cultivating maize in the late 17th century when European influence caused them to begin growing maize and other crops. Historical geographer David Demeritt, for instance, suggests that "the arrival of European colonists, fishermen, fur-traders, and their diseases on the shores of North America . . . transformed the human geography of the Northeast" and encouraged Maliseets and other Native peoples to adopt maize cultivation. Using regional climatic zoning and maize's heat requirements as his guide, Demeritt argues that Native peoples north of the Kennebec River did not cultivate maize prior to 1689, as cool weather during the Little Ice Age made that an unattractive option. His analysis builds on earlier claims that Maliseets and Mi'kmaq avoided growing crops before European contact because they found hunting a more reliable subsistence strategy given their homelands' marginal soils and climate. Conceptualizing Maliseet maize cultivation as a response to European missionaries, traders, soldiers, and pathogens casts Europeans as the central players in a key shift in human ecology. There are two problems with this conceptualization: it is historically inaccurate and it obscures the profile of Native peoples in a centuries-long process of adapting plants and cultivation and harvesting practices to the diverse soils and climate of the region. There is considerable evidence that maize cultivation in the Wəlastəkw watershed began as part of a broad pattern of Native horticultural innovation and adaptation before Europeans visited the region.[6]

Our knowledge of human adaptation to the possibilities of northeastern North America is, in large part, reliant on accounts of European visitors. The earliest

5 Arturo Warman, *Corn and Capitalism: How a Botanical Bastard Grew to Global Dominance*, trans. Nancy L. Westrate (Chapel Hill, NC: University of North Carolina Press, 2003), 28-33; Mann, *1491*, 19-20, 215-19; James McCann, *Maize and Grace: Africa's Encounter with a New World Crop, 1500-2000* (Cambridge, MA: Harvard University Press, 2005), 1. For Maine maize, see Elizabeth S. Chilton, "The Origin and Spread of Maize (Zea Mays) in New England," in *Histories of Maize: Multidisciplinary Approaches to the Prehistory, Linguistics, Biogeography, Domestication, and Evolution of Maize*, ed. John E. Staller et al. (Boston: Elsevier Academic Press, 2006), 539-47. For expanding continental and trans-Atlantic trade networks, see John Robert McNeill and William Hardy McNeill, *The Human Web: A Bird's-Eye View of World History* (New York: W.W. Norton, 2003).

6 David Demeritt, "Agriculture, Climate, and Cultural Adaptation in the Prehistoric Northeast," *Archaeology of Eastern North America* 19 (Fall 1991): 195, 197, 192. See also Frederic L. Pryor, "The Adoption of Agriculture: Some Theoretical and Empirical Evidence," *American Anthropologist*, n.s. 88, no. 4 (December 1986): 879-97, and Tom McFeat, "Rise and Fall of the Big Men of the Northeast: Maliseet Transformations," *Papers of the Twentieth Algonquian Conference*, ed. William Cowan (Ottawa: Carleton University Press, 1989), 237-49. For suggestions Abenaki introduced crops to the Wəlastəkw, see Harald E. L. Prins, "Cornfields at Meductic: Ethnic and Territorial Reconfigurations in Colonial Acadia," *Man in the Northeast* 44 (Fall 1992): 55-72. For the historiographical debate on the origin of Maliseet maize cultivation,

records of trans-Atlantic human contact are from the 11th century, when Norse colonists encountered Indigenous hunter-traders they called Skraelings in northeastern North America. Norse records of these fleeting contacts do not comment on Native plant consumption in North America aside from noting a wooden grain container explorers found on an unnamed island west of their overwintering camp, Leifsbuðir. When the cool era known as the Little Ice Age froze sea routes and impaired Norse colonies and trading during the 14th century, European records of North America ended and did not resume until the late 15th-century voyages of John and Sebastian Cabot. Although Europeans met the inhabitants of the St. John River in 1603, whom they described as Etchemins (and later Maliseets), European knowledge of the river and its people remained piecemeal until later in the century.[7]

Initial European observations of Native societies and vegetation were limited in many ways. The explorers and colonists who came to Acadia initially focused on the coasts and estuaries, as these were places they could easily explore and supply with sailing ships. They had little opportunity to observe the biomes and labour practices that Indigenous peoples used to survive in interior regions, such as the St. John River Valley. Although Champlain visited the St. John River several times in the early 17th century and wrote some of the most important descriptions of the region, he never sailed far above the rapids at the mouth of the river known as the Reversing Falls. His accounts of the St. John River Valley above the Reversing Falls are brief and second hand. Lawyer-poet Marc Lescarbot's description of Ouïgoudi, the Etchemin "town" at the river's mouth, is based on observations across a few days. The Jesuit priest Pierre Biard described a short trip to the lower St. John and provided a brief account of fellow Jesuit Énemond Massé's overwintering with Native peoples there. The scattered records from Charles de la Tour's trading post at the river's mouth say little of interior flora or Native plant use. The French merchant Nicolas Denys wrote about

see endnote 1 on p. 68. Prins supported his claims with a map that situated "Nations Errantes des Abénaquis socoquis" on the upper Wəlastəkw. See Jean-Baptiste-Louis Franquelin, "Carte de l'acadie," 1702, CARTO159, Library and Archives Canada (LAC). This labelling does not imply population shifts. French officials sometimes called all regional Natives "Abenaquis." See Jean Baptiste Loyard, "Memorial of Father Loyard: Upon the Present Condition of the Abnaquis, 1720-1722," in *The Jesuit Relations and Allied Documents: Travels and Explorations of the Jesuit Missionaries in New France 1610-1791,* vol. 67, ed. Reuben G. Thwaites (Cleveland: Burrows Brothers, 1896), 121. When sources discuss Abenaquis on the Wəlastəkw, they were usually visiting or located far north of Meductic in a separate community described as a "retreat" rather than a permanent village.

7 Jared Diamond, *Collapse: How Societies Choose to Fail or Succeed* (Toronto: Penguin Books, 2006), 274-5, 222-7. See also "Greenlanders' Saga" and "Erik the Red's Saga," in *Vikings: The North Atlantic Saga*, ed. William W. Fitzugh and Elisabeth I. Ward (Washington: Smithsonian Institution Press and National Museum of Natural History, 2000), 219-24. For the Cabots and other early explorers, see Ralph Pastore, "The Sixteenth Century: Aboriginal Peoples and European Contact," in *The Atlantic Region to Confederation: A History*, ed. Phillip A. Buckner and John G. Reid (Toronto and Fredericton: University of Toronto and Acadiensis Press, 1994), 22-39. For 1603 and later contact, see Samuel de Champlain, *The Works of Samuel de Champlain*, vol. 1, ed. W.F. Ganong and H.P. Biggar, trans. W.F. Ganong (Toronto: Champlain Society, 1936), 103, 108-10, 164-70, 262, 374. See also Bruce J. Bourque, "Ethnicity on the Maritime Peninsula, 1600-1759," *Ethnohistory* 36, no. 3 (Summer 1989): 257-84.

the river in 1672, but his descriptions were mostly concerned with the stretch of waterway near the coast. Vicar General Saint-Vallier canoed down the St. John in the spring of 1686. He spent one night at the largest Native village on the river, Meductic, but did not comment on Maliseet subsistence or the vegetation near the village. A French officer, Antoine Laumet, sieur de Cadillac, briefly described this village during the 1692 growing season, and noted maize and other crops. Governor Joseph Robineau de Villebon's writings also sporadically discuss this village in the 1690s. The first detailed record of Meductic, or any other Maliseet settlement, however, comes from the memoirs of John Gyles, a New England youth who lived, fished, and cultivated with Maliseets while held captive by them between 1689 and 1695.[8]

All of the major 17th-century accounts of the St. John River and its inhabitants were written by men. Not surprisingly, they primarily wrote about male activities. Modern scholars, thus, have few descriptions of Maliseet women's labour to inform their understanding of the Maliseet economy. Given that in Maliseet society, and those of neighbouring Native peoples, men sometimes assisted women with maize planting but women directed most of the cultivation and harvesting work, observations concerning maize planting and harvesting are rare. Moreover, most European observers lacked the cultural and botanical knowledge necessary to understand Maliseet resource use and to recognize many of the plants they managed.[9]

8 See Champlain, *Works of Samuel de Champlain,* vol. 1:267; Marc Lescarbot, *The History of New France,* vol. 2, ed. W.L. Grant, trans. W.L. Grant (Toronto: Champlain Society, 1911), 357; Pierre Biard, "Biard's Relation, 1616," in Thwaites, *Jesuit Relations* 3, "Acadia 1611-1616," 197, 211-19, 187-9. For La Tour, see M.A. MacDonald, *Fortune & La Tour: The Civil War in Acadia* (Toronto: Methuen, 1983). For a work whose coastal bias is reflected in its title, see Nicolas Denys, *The Description and Natural History of the Coasts of North America (Acadia)*, ed. and trans. W.F. Ganong (Toronto: Champlain Society, 1908). For the vicar general, see Mgr. de Saint-Vallier de la Croix, *Estat present de l'Église et de la Colonie Française dans la Nouvelle-France* (Québec: Augustin Coté & Cie., 1856), 32. For Cadillac, see "Extracts from the Memoirs of M. Lamothe-Cadillac respecting Acadia, New England, New Netherland and Virginia," in *Documents Relative to the Colonial History of the State of New York Procured in Holland, England and France, by John Romeyn Brodhead,* vol. 9, ed. and trans. E.B. O'Callaghan (Albany, NY: Weed, Parson, and Company, 1855), 548. For Villebon, see J.C. Webster, ed., *Acadia at the End of the Seventeenth Century: Letters, Journals and Memoirs of Joseph Robineau de Villebon, Commandant in Acadia 1690-1700* (Saint John: New Brunswick Museum, 1934). For Gyles, see John Gyles, *Memoirs of Odd Adventures, Strange Deliverances, &c. in the Captivity of John Gyles, esq. Commander of the Garrison on St. George's River* (Boston: S. Kneeland and T. Green, 1736), 6, 14.

9 See Carolyn Merchant, *Ecological Revolutions: Nature, Gender, and Science in New England* (Chapel Hill, NC: University of North Carolina Press, 1989), 81; David D. Smits, "The 'Squaw Drudge': A Prime Index of Savagism," in *Native Women's History in Eastern North America before 1900: A Guide to Research and Writing*, ed. Rebecca Kugel and Lucy Eldersveld Murphy (Lincoln, NE: University of Nebraska Press, 2007), 27-48; Patty Jo Watson and Mary C. Kennedy, "The Development of Horticulture in the Eastern Woodlands of North America: Women's Role," in *Engendering Anthropology: Women and Prehistory*, ed. Joan M. Gero and Margaret W. Conkey (Oxford: Blackwell, 1992), 255-75; and Joel W. Grossman, "Archaeological Indices of Environmental Change and Colonial Ethnobotany in Seventeenth-Century Dutch New Amsterdam," in *Environmental History of the Hudson River: Human Use that Changed the Ecology, Ecology that Changed Human Uses*, ed. Robert E. Henshaw (Albany: State University of New York Press, 2011), 77-121. For a study of Maliseet women that excludes cultivation work, see Montague Chamberlain, "Primitive Life of the Wapanaki Women," *Acadiensis* II, no. 2 (April

The most documented Indigenous cultivation site along the Wəlastəkw was a field next to the large palisaded village of Meductic, on the river's middle reaches. Maliseets petitioned the New Brunswick government to provide them with property rights to their ancestral cultivation lands in 1807. They claimed "their Ancestors upward of two hundred years ago cleared and cultivated a point of land called Meductic Point."[10] In August 1689 John Gyles noted "a large Interval-Corn-Field" near the Meductic fort, at the end of the portage route linking the Kennebec River to the Wəlastəkw. This intervale was a mile long and up to 800 feet wide. Gyles was the son of a prosperous farmer. Prior to his captivity he had worked in farmed fields near Pemaquid Falls (near present-day Bristol, ME), a Native fishing site that had been colonized by English settlers. His characterization of the cultivated land outside of Meductic as a "large" field suggests that it was a sizable, established cultivation site and not a haphazard experiment.[11] Cadillac has provided us with a description of cultivation at Meductic as well. Writing three years after Gyles first saw Meductic, Cadillac noted that its inhabitants "clear the land and every year make fine fields of Indian corn, beans, kidney beans and pumpkins (*citrouilles*)." He described its inhabitants as "pretty warlike . . . well built and good hunters" as well. Cadillac's use of the plural "fields" suggests Maliseets cultivated more than one site. In 1745, William Pote, who like Gyles wrote from the perspective of a European held captive by Native peoples, noted that the residents of the Wəlastəkw cultivated crops on multiple stretches of the riverbank. While paddling to Meductic from Aukapaque, a village just above present-day Fredericton, Pote – who was a trained surveyor – noted "Several Small Spots Clear[ed] land, where the Indians had Improved and planted Corn and beans &c."[12]

1902): 75-86. For Maliseet women's medicinal plant use and colonial records obscuring the healing abilities of women, see Leah Wherry, "Wabanaki Women Religious Practitioners" (MA thesis, University of New Brunswick, 2003), 78-9.

10 See "An Agreement Between John Bedell (representing the Government of New Brunswick) and the Maliseet Natives," 29 July 1807, Indian Affairs Documents, MG H54, no. 31, University of New Brunswick Archives and Special Collections, University of New Brunswick, Fredericton.

11 See Gyles, *Memoirs*, 6, 14; John Adams Vinton, *Thomas Gyles and his Neighbours, 1669-1689: Or the Settlement of the Lower Kennebec* (Boston: David Clapp & Son, 1867); Louis R. Caywood, *Excavations at Fort Meductic, New Brunswick* (Ottawa: National Historic Parks and Sites Branch, Department of Indian and Northern Affairs, 1969), 9, 19, 24; and Nick Smith, "Historian Nick Smith's Comment on the Meductic 'Removal'," *Wulustuk Times* (Tobique First Nation), December 2011. The Mactaquac Dam's flooding of Meductic prevents new excavations. This is unfortunate as previous surveys occurred before archaeologists could identify starch grains; see John P. Hart, "Introduction," *Current Northeast Paleoethnobotany,* vol. II, ed. John P. Hart (Albany, NY: State Education Department, University of the State of New York, 2008), 2.

12 The quotation is from an edition of the memoir with the most details on Maliseet crops; see "M. Lamothe-Cadillac" in O'Callaghan, *Documents Relative to the Colonial History of the State of New York,* 9:548. For the original document, see "Mémoire de L'Acadie, Nouvelle-Angleterre, Nouvelle-Hollande et Virginie par le sieur de Cadillac" (1692), ser. C11D, MIKAN no. 2410553, LAC. Most scholars use a version that only discussed corn and pumpkins. See W.F. Ganong, ed., "The Cadillac Memoir on Acadia of 1692," *Collections of the New Brunswick Historical Society* 13 (1930): 77-96. Gyles's note that Maliseets ate beans at Meductic suggests the four-crop complex is accurate; see Gyles, *Memoirs,* 31. See also John Fletcher Hurst, ed., *The Journal of Captain William Pote Jr. During his Captivity in the French and Indian War from May, 1745, to August, 1747* (New York: Dodd, Mead & Company, 1896), 61.

The choice of planting sites reflected Maliseet awareness of the risk of raids along the river as well as their understanding of soil fertility. They planted nutrient-rich interior intervales and islands along the Wəlastəkw that were isolated from coastal invasions. When, for example, English soldiers destroyed French farms and maize fields along the Bay of Fundy in 1696 and 1704, Meductic's residents and crops remained secure. The closest fields to the Wəlastəkw known to Europeans during the early 17th century were far up the Kennebec River. These fields were spatially and climatically close to Meductic. They were also removed from the coast and estuaries frequented by European fishermen, traders, and mapmakers as well as distant from coastal fog. After noting that the Kennebec's rocky and fogbound mouth was dangerous to navigate, Samuel de Champlain also observed that there was

> very little cultivable land. . . . The people live like those near our settlement; and they informed us that the Indians who cultivated Indian corn, lived far inland, and had ceased to grow it on the coasts on account of the war they used to wage with others who came and seized it.[13]

It appears that Native cultivators relocated their crops from the coast to the interior to protect an important and exposed food source.[14]

Europeans' coastal focus limited their early knowledge of interior settings such as that of the Wəlastəkw. They might well have found fields on the Wəlastəkw similar to those on the Kennebec had they spent more time on the river's middle reaches. Lescarbot and Champlain produced the first written descriptions of the waterway above the Reversing Falls. Their second-hand accounts briefly described how pilot Pierre Angibaut and Jean Ralluau, the secretary of the lieutenant general of Acadia Pierre Du Gua de Monts, travelled 55 leagues upstream and traced the Wəlastəkw close to its headwaters in the summer of 1608. These records do not mention the presence (or absence) of crops or people. The lack of description of physical features such as Grand Falls in these accounts, coupled with a lack of clarity concerning what they meant by a "league" makes it difficult to discern if the explorers followed the mainstream of the upper St. John or one of its long tributaries such as the Tobique or Aroostook. Colonists did not describe the interior reaches of the Wəlastəkw in detail until the 1680s.[15]

13 Champlain, *Works of Samuel de Champlain,* 1:320-2. For Meductic to Kennebec portages, see P. Coronelli, "Partie orientale du Canada ou de la Nouvelle France" (1689), http://www.oldmapsonline.org/map/nypl/434139. For raids, see "Account of the Siege of Fort Natchouak by the English of Boston, and of their Retreat," 22 October 1696, in Webster, *Acadia*, 89-91, and *Boston News-Letter,* 24 July 1704.

14 For increased vulnerability to raiding offsetting the advantages of surface crops, see McNeill and McNeill, *Human Web,* 207. For maize, beans, and pumpkins needing protection, see John R. Swanton, *The Indians of the Southeastern United States* (Washington: Smithsonian Institution, Bureau of American Ethnology, 1946), 256.

15 For the 1608 trip, see Lescarbot, *History of New France,* 3:239-40, and Champlain, *Works of Samuel de Champlain,* 1:267.

The seasonality of European observations of Meductic and the crops Maliseets raised impaired the observers' ability to discern cultivation. Champlain wrote that the planting season began in mid-May on rivers to the south of the Wəlastəkw. Maliseets typically planted a little later at Meductic, where hard frosts and snow sometimes blanketed the ground as late as May 25th. Maliseet and Kennebec warriors waited for this date before leaving their fields for raids. Given the timing of planting, the earliest recorded European visitors to Meductic arrived too early to see crops.[16]

Scholars have overlooked the seasonality of European visits to the Wəlastəkw interior and misinterpreted details of the historic record in their appraisals of pre-1689 Maliseet human ecology. Anthropologist Harald Prins, for instance, cited the failure of New France's Intendant, Jacques de Meulles, and Vicar General Saint-Vallier to see crops at Meductic in 1686 as proof Maliseets did not yet practice maize agriculture. However, a misinterpretation of the intendant's itinerary informed this argument. De Meulles likely never travelled far above the Reversing Falls during his three-day visit to the Wəlastəkw in early May. He certainly did not have time to make a return trip to Meductic during freshet season. Prins confused de Meulles with a courier whom the intendant dispatched to Quebec via the Wəlastəkw in the fall of 1685. Stormy weather forced the courier to winter with French settlers on the Wəlastəkw. The messenger continued his trip in late April and passed Meductic before planting began. Prins, however, used the lack of reference to Maliseet crops in the intendant's account of his visit to the river to claim that Maliseets had not adopted maize cultivation as one of their means of survival. However, even if the intendant had travelled to Meductic in early May, he would have arrived before planting season. Saint-Vallier met the courier near Grand Falls before arriving at Meductic on May 18th. As this date also usually predated planting season, it is not surprising that the vicar general did not comment on crops during a cool spring. Moreover, while Saint-Vallier described Meductic as an established settlement, he did not discuss the local landscape or Maliseet subsistence activities. When the village entered the historic record during cultivation season in 1689, Gyles noted a developed cultivation complex. The seasonality of rivers and crops, as well as the timing and duration of European visits has limited our understanding of Maliseet interior human ecology before 1689.[17]

16 For planting, see Champlain, *Works of Samuel de Champlain,* 1:101-2, 450. For mid-May as average last frost at Meductic, see P.A. Dzikowski et al., *The Climate for Agriculture in Atlantic Canada*, Agriculture Canada Publication, no. ACA 84-2-500, Agdex no. 070 (Fredericton: Atlantic Advisory Committee on Agriculture, 1984), 16, Map 9. For late frost, see Tibierge, "Report on Acadia, October 4th 1695 to October 27th 1696," in Webster, *Acadia,* 150. For May 25th and raids, see M. de Villieu, "Account of a Journey Made by M. de Villieu," in Webster, *Acadia,* 54, 58; Villebon, "Journal of What has Happened in Acadia from October 13th, 1691 to October 25th, 1692," in Webster, *Acadia,* 37; and Kevin Leonard, "Mi'kmaq Culture during the Late Woodland and Early Historic Periods" (PhD diss., University of Toronto, 1996), 179-80.

17 See Prins, "Cornfields," 60, 56-7; "Account of the Voyage of Monsieur de Meulles to Acadia Oct. 11, 1685-July 6, 1686," in *Acadiensia Nova (1598-1779): New and Unpublished Documents and Other Data Relating to Acadia,* vol. 1, ed. and trans. William I. Morse (London: Bernard Quaritch, 1935), 91-124. For bad frosts six or seven months after October 31st, see 97, 106. See also Saint-Vallier, *Estat present de l'Église,* 32.

Maliseet practices altered the ecology of the St. John River Valley. They modified the Wəlastəkw's banks, making it a food-yielding and medicinal landscape before colonists' axes and plows arrived. Maliseets killed animals, managed ground nuts and tobacco, and collected, hewed, and burnt wood. As well, they harvested sweet grass, wild rice, fruits, fiddleheads, and medicinal plants in some of the same meadows and intervales that later nourished colonial farming. Cadillac wrote that Maliseets "cleared the land" and Gyles observed many stumps around Meductic's field, suggesting that villagers removed numerous trees from the site. Maliseets and their captives carefully weeded the Meductic field, favouring annual crops over wild flora. Their labour changed the riverbank's appearance and affected erosion patterns and habitat at planting sites. The hoeing and mounding that characterized Maliseet cultivation practices, however, only lightly disturbed the soil.

While maize, beans, and pumpkin cultivation only reshaped small portions of the mainstream's bank, these crops were not the only plants Maliseets tended on the Wəlastəkw.[18] Maliseets cultivated plants that were not typically noticed by Europeans. These included the large numbers of Jerusalem artichokes they introduced and tended along the Wəlastəkw. Offspring of this small sunflower plant that had been part of Maliseet riverside gardens are still growing near former campsites and villages. Botanists such as Janet Seabrook and Leo Dionne also believe that Maliseets and Mi'kmaq introduced ground nuts along the Wəlastəkw and other travel routes. Ground nuts throughout the Maritimes are sexually sterile. Moreover, human harvesting helps them become established by loosening and aerating soil. As this strain of the plant is reliant on people and river freshets to spread its tubers and was widespread by the time Europeans arrived, it would seem that Native peoples introduced them to the watershed and throughout the region. The decision of Indigenous peoples to introduce sterile ground nuts rather than fertile ones raises the possibility that Mi'kmaq and Maliseets may have begun to alter the physiology of this plant in ways that made it dependent on humans. Gyles's experiences in the autumn of 1689 highlight the significance of these plants to Native diets. Gyles noted that he moved upriver with his captors to the mouth of the Meduxnekeag River so that they might live "upon Fish, Wild-Grapes, Roots &c. which was hard Living to me." Pote confirmed that Native travellers on the

18 For tobacco, rice, and fiddleheads, see Lescarbot, *History of New France*, 3:252; Stephen Hibbert, "Mapping and Documenting the First Nations Traditional Activities in Grand Lake Meadows" (MA report, University of New Brunswick, 2008), 46; and Patrick von Aderkas, "Economic History of Ostrich Fern, Matteuccia struthiopteris, the Edible Fiddlehead," *Economic Botany* 38, no. 1 (January-March 1984): 14-23. These findings contribute to the growing scholarly consensus that North American cultures and landscapes were dynamic before Europeans arrived. For pre-European human ecology and overlooking Native impacts, see Mann, *1491*, and William M. Denevan, "The Pristine Myth: The Landscape of the Americas in 1492," *Annals of the Association of American Geographers* 82, no. 3 (September1992): 369-85. See also "M. Lamothe-Cadillac" in O'Callaghan, *Documents Relative to the Colonial History of the State of New York,* 9:548, and Gyles, *Memoirs,* 14-5, 19. For tree removal and rivers, see Alice Outwater, *Water: A Natural History* (New York: Basic Books, 1996), 36-7. See also Doolittle, *Cultivated Landscapes,* 25-6, 29-30, 61-2. Recorded Maliseet maize, beans, and squash cultivation altered less than 0.5 per cent of the river's bank.

Wəlastəkw continued to rely on these roots in 1745. Both ground nuts and Jerusalem artichokes grow well in cool climates, and frost improves their taste.[19]

The presence of Native root and fruit gardens at former village sites further suggests that Maliseets altered the places they frequented with an array of plants. Abandoned settlement locations such as the Shiketehawk site in Bristol contain a remarkable diversity of edible and medicinal plants such as wild ginger, black raspberry, bloodroot, and ground nut. Such a rich density of edible and healing plants do not typically grow together on the river's middle reaches outside of former Maliseet gardens. Moreover, the 5,500-year-old presence of cucurbits (squash and pumpkins) in Maine, the compatibility of beans with short growing seasons, and evidence of plum and tuber management suggest forms of agriculture were possible and probable on the Wəlastəkw without maize, European colonists, or warmer temperatures. Maliseets' diverse and creative pre-European plant use fits patterns noted by ethnobotanists in locales such as British Columbia and Amazonia.[20]

Maliseets' experience managing many different species of plants highlights their detailed botanical knowledge and their understanding of flooding patterns, soil conditions, and plant growth. Some scholars have claimed that Maliseets and their neighbours did not think "much about soil types, frost frequency, or the other settlement criteria required for successful cultivation" prior to the colonial era.[21] The diverse plant management traditions of the Indigenous peoples of the region, and the long Maliseet tenure at Meductic and other cultivation sites, suggest otherwise. Maliseet moon calendars on the middle reaches of the Wəlastəkw, for instance, named the eighth moon after winter solstice "Accihtewi-kisohs Eighth Moon, Ripening Moon," an indication Maliseets closely observed the growth cycle of edible plants. Gyles noted they also correlated Atlantic salmon fishing with changes in seasonal flora such as the fall of autumn leaves: "When the Leaf falls they have done Spawning and return to the sea." Maliseets accumulated ecological knowledge useful for growing maize over centuries of living along the Wəlastəkw and using other plants. William Doolittle and other scholars of Indigenous cultivation place

19 For ground nut, see J.A. Seabrook and L.A. Dionne, "Studies on the Genus Apios. I. Chromosome Number and Distribution of Apios Americana and A. Priceana," *Canadian Journal of Botany* 54, no. 22 (1976): 2567-72; B.D. Reynolds et al., "Domestication of Apios Americana," in *Advances in New Crops,* ed. J. Janick and J.E. Simon (Portland, OR: Timber Press, 1990), 436-42; and Leonard, "Mi'kmaq Culture," 144-58, 188. For Jerusalem artichokes, see Hinds, *Flora of New Brunswick,* 458. For roots, see Gyles, *Memoirs,* 8, and Hurst, *Journal of Captain William Pote*, 60. Europeans labeled human alterations to make plants dependent on people as domestication and a sign of agriculture.

20 For cucurbits, see John P. Hart, "Evolving the Three Sisters: The Changing Histories of Maize, Bean, and Squash in New York and the Greater Northeast" in *Northeast Paleoethnobotany,* II:89-90, and Nancy Asch Sidell and James B. Peterson, "Mid-Holocene Evidence of Cucurbita Sp. from Central Maine," *American Antiquity* 61, no. 4 (October 1996): 685-98. For beans, see N.K. Fageria and A. B. Santos, "Yield Physiology of Dry Bean," *Journal of Plant Nutrition* 31, no. 6 (June 2008): 983-1004. The authors' surveys of the Shiketehawk site and other former settlements inform this analysis. For the West Coast, see Nancy J. Turner, Douglas Deur, and Dana Lepofsky, "Plant Management Systems of British Columbia's First Peoples," *BC Studies*, no. 179 (Autumn 2013): 122. For Amazonia, see Fikret Berkes, *Sacred Ecology,* 2nd ed. (New York: Routledge, 2008), 73-81.

21 See Demeritt, "Agriculture, Climate, and Cultural Adaptation," 197.

benign plant management activities such as creating shelter habits for useful species through clearing village sites on a continuum with more labour-intensive forms of management, such as introducing edible plants to new areas and cultivating them and growing maize and other crops that require human labour to reproduce. As suggested by anthropologist Kevin Leonard, who drew upon the continuum approach to Indigenous plant use in his study of Mi'kmaw culture, Meductic's maize fields and other cultivation sites are an extension of the knowledge base and skills required to tend Jerusalem artichokes and other plants; they were not the product of a sudden revolution in human ecology.[22]

Maliseets likely learned about maize cultivation when the plant spread into the greater Northeast through Native trade networks early in the second millennium if not sooner. Maliseets also have an oral tradition on the origin of maize. It highlights the kinship between Maliseets (especially Maliseet women) and that plant. The oral tradition explains that a dying Maliseet woman, Sakəmaskwehsis, instructed her husband to cut the second growth forest around their wigwam and

> "drag me seven times around this clearing"; . . . . After he had felled all the trees and burned them, the clearing was dotted with charred stumps of the burnt timber. So after he had dragged her . . . there was nothing left of her but her skeleton – all the rest had been torn off by the stumps. . . . He left his wigwam and that part of the country at once . . . . It was in the spring when he left; but when the autumn came . . . he returned. The place was no longer black with charred stumps; it was beautiful with the yellow waving corn. The yellow tassels reminded him of his wife's golden hair. Then he thought of her words, "If you want to have me with you always, do as I tell you."[23]

22 Andrea Bear Nicholas et al., *2011-2012 Maliseet Moon Calendar; Kweciteten tan Elekiman Pemikisohsewihtit Welastekok* (Fredericton: St. Thomas University, 2011). For maize, see Chilton, "Origin and Spread of Maize." For salmon, see Gyles, *Memoirs*, 27, and John F. Kocik and Kevin D. Friedland, "Salmons and Trouts. Family Salmonidae," in *Bigelow and Schroeder's Fishes of the Gulf of Maine*, 3rd ed., ed. Bruce B. Collette and Grace Klein-MacPhee (Washington: Smithsonian Institution Press, 2002), 175. For plants, see Tappan E. Adney, "The Malecite Indian's Names for Native Berries and Fruits, and their Meanings," *Acadian Naturalist* 1, no. 3 (May 1944): 103-09; Doolittle, *Cultivated Landscapes*; and Leonard, "Mi'kmaq Culture," 186-9. For Meductic crops as a new "crucial turning point in the region's native cultures," see Prins, "Cornfields," 55.

23 Joe Nicholas, "The Origin of Corn," in *Malecite Tales,* ed. W.H. Mechling (Ottawa: Department of Mines, Geological Survey, Memoir 49, no. 4, Anthropological Series, 1914), 87-8. The charred stumps suggest Maliseet used fire to create fields. Appreciating Maliseets' use of fire as a tool for field clearing extends the range of intensively fired landscapes further north than earlier appraisals of Native burning in the Northeast. See William A. Patterson III and Kenneth E. Sassaman, "Indian Fires in the Prehistory of New England," in *Holocene Human Ecology in Northeastern North America*, ed. George P. Nicholas (New York: Plenum Publishing Corporation, 1988), 107-35. For marriages between maize-growing Kennebec and Mi'kmaq in 1605, see Champlain, *Works of Samuel de Champlain*, 1:311-2. For Maliseet sagamore (leader) Chkoudun's 1606 maize trading, see Lescarbot, *History of New France,* 2:324.

Like other Native peoples, Maliseets understood and related to the living entities of their homeland as kin. Similar Maliseet oral traditions speak of kinship ties with medicinal roots such as Kiwhosuwasq (Sweet Flag) and useful trees. In addition, many Maliseet individuals shared the name of local animals. Maliseets clearly had close relationships with the living beings they harvested, hunted, and, in some cases, avoided killing. Anthropologists such as Nancy Turner label the close relationships between Indigenous peoples and plants and animals "kin-centric ecology." To the Maliseet, maize was the most recently adopted sibling of a group of three companion plants. Native peoples usually intermixed maize, beans, and squash in the same fields as these plants grew better together than apart. Some Native peoples in North America referred to these plants as the "Three Sisters." Maliseets' integration of maize with other plants in their kin-centric ecology differs from European ecological perceptions that classified cultivated species as "domesticated" and uncultivated plants as "wild." As well, although not definite, it provides yet more evidence suggesting that maize entered Maliseet foodways as part of the spread of Indigenous plant management traditions.[24]

Europeans often misread the naturalness of the Acadian landscape they observed. While Maliseets considered the Wəlastəkw a familiar and managed environment, colonists perceived the woodlands and meadows outside Native village sites and maize fields as underdeveloped wilderness. For the most part, the Europeans who visited the Wəlastəkw understood cultivation in terms of deforested fields, farmed animals, and year-round-tenure on agrarian lands. People whose views were rooted in French and English ecologies and land use systems could recognize maize fields as human landscapes, but they were less able to see other environments that were also the product of Native management or to understand the practices that Maliseets used to create them. European settlers on the St. John, for instance, assumed that when Maliseets set large fires these were the result of wasteful ignorance, rather than considering them a means of creating edible landscapes of berry fields and deer fodder.[25]

24 Terms such as horticulture, husbandry, and farming derive from European traditions, and do not fully reflect how Maliseets understood their relationship to maize and other plants. For kin-centric ecology, see Nancy J. Turner, *Ancient Pathways, Ancestral Knowledge: Ethnobotany and Ecological Wisdom of Indigenous Peoples of Northwestern North America,* vol. 2 (Montreal and Kingston: McGill-Queen's University Press, 2014), 144, 300, 310-14; for oral traditions fostering proper behaviour toward kin, see 376-7. See also Kenneth M. Morrision, ed., *The Solidarity of Kin: Ethnohistory, Religious Studies, and the Algonkian-French Religious Encounter* (Albany, NY: State University of New York Press, 2002); Mathilda Sappier, "Flagroot," in *Tales from Maliseet Country: The Maliseet Texts of Karl V. Teeter,* ed. and trans. Philip S. LeSourd (Lincoln, NE: University of Nebraska Press, 2007), 2-9. For a Penobscot family's taboo on killing bears as "sentiments of quasi-consanguinity, " see Frank G. Speck and Wendell S. Hadlock, "A Report on Tribal Boundaries and Hunting Areas of the Malecite Indian of New Brunswick," *American Anthropologist* 48, no. 3 (July-Sept. 1946): 364.

25 For fires, see "Charles Morris to William Spry," 25 January 1768, http://archive.org/stream/cihm_39602#page/n5/mode/; Edward Winslow, "Sketch of the River St. John's," ed. W.O. Raymond, *Collections of the New Brunswick Historical Society* 2, no. 5 (1899-1905): 155-7; Robert Morse, "A General Description of the Province of Nova Scotia," in *Report on Canadian Archives, 1884*, ed. Douglas Brymer (Ottawa: Maclean, Roger & Co., 1885), xxxii, xxxvii; and Peter Fisher, *Notitia of New-Brunswick for 1836 and Extending into 1837* (Saint John: Henry

The food plants that Europeans noted and documented were limited by the preconceptions of the observers, the scope of their botanical knowledge, Native secrecy, and the barriers separating male recorders from Native women's knowledge. Moreover, as Naomi Griffiths and John Reid's analysis of New Scotland reveals, amateur European botanists used generalized categories and focused on describing plants that were found in their homelands and known to be useful. After arriving at Port Royal in late August, Scottish colonist Richard Guthry, for instance, remarked that the nearby meadows were full of "Tuleps of diverse kinds." While it is possible that earlier settlers had introduced tulips throughout the meadows, it is more likely that Guthry misidentified a local flower that bloomed in early fall and mistook it for the more familiar tulip that bloomed during spring in Nova Scotia.[26] The limitations of historic records, in turn, have narrowed scholarly discussions of Native cultivation to maize and other crops that interested Europeans. Although a few early colonists noted ground nut and Jerusalem artichoke (and adopted the latter), these plants were exceptions amongst the many species excluded from colonial diets, commodity networks, and descriptions. While the French surgeon and botanist Dièreville praised the richness of Maliseet and Mi'kmaw plant knowledge in his 1699-1700 survey of Acadia, he only recorded small portions of it and understood even less. For instance, the botanist recounted a story of a Maliseet woman who cured a soldier of epileptic seizures with a root, but failed to identify the plant or healer. Less botanically inclined colonists faced even greater obstacles in learning about Native ecologies.[27]

Maliseets had lived at Meductic and other riverside locations for thousands of years and their deep knowledge of riverine environments informed their agriculture. They were intimately familiar with the Wəlastəkw's flood regimes and soil conditions. The intervale land at Meductic was the product of centuries of upstream erosion and soil accumulation. Freshets spread nutrient-rich soil and plant remains

Chubb, 1838), 24, 126-9. See also Berkes, *Sacred Ecology*, 81-6. For contrast of European and Native ecological systems, see Brian Donahue, *The Great Meadow: Farmers and the Land in Colonial Concord* (New Haven: Yale University Press, 2004), 24-73.

26 N.E.S. Griffiths and John G. Reid, "New Evidence on New Scotland, 1629," *William and Mary Quarterly*, 3rd ser., 49, no. 3 (July 1992): 503-4. See also M.J.M. Christenhusz et al., "Tiptoe Through the Tulips – Cultural History, Molecular Phylogenetics and Classification of Tulipa (Liliaceae)," *Botanical Journal of the Linnean Society* 172, no. 3 (July 2013): 280-328.

27 For the limits of European botanical knowledge, see Andrew MacDougall, "Did Native Americans Influence the Northward Migration of Plants During the Holocene?" *Journal of Biogeography* 30, no. 5 (May 2003): 642, and Victoria Dickenson, "Cartier, Champlain, and the Fruits of the New World: Botanical Exchange in the 16th and 17th Centuries," *Scientia Canadensis: Canadian Journal of the History of Science, Technology and Medicine* 31, no. 1-2 (2008): 27-47. For botany, see Sieur de Dièreville, *Relation of the Voyage to Port Royal in Acadia or New France,* ed. John Clarence Webster, trans. Mrs. Clarence Webster (Toronto: Champlain Society, 1933), 181. For the artichoke's introduction to France, see Lescarbot, *History of New France,* 3:254, 256. For artichokes, Kennebec maize, and Mi'kmaw ground nuts, see 38, 46-7, 40-1. For ground nuts as a potato substitute, see Elizabeth Haigh, "They Must Cultivate the Land: Abraham Gesner as Indian Commissioner, 1847-1853," *Journal of the Royal Nova Scotia Historical Society* 3 (2000): 58, and Bruce D. Smith, "Eastern North America as an Independent Centre of Plant Domestication," *Proceedings of the National Academy of Sciences of the United States of America* 103, no. 33 (August 2006): 12223-8.

across the lowland at Meductic and other intervales each spring. While maize growers in Huronia and elsewhere had to relocate and clear new fields every several years to ensure their crops had fertile soil, Maliseets saved time and labour by cultivating the same intervale for generations. Although scholars such as Elizabeth S. Chilton have applied the term "mobile farmers" to Native peoples who combined cultivation with hunting and gathering, Maliseet fields were more firmly rooted in place than the planting sites of their more sedentary counterparts. Rainfall along the Wəlastəkw was sufficient to permit maize cultivation without modifying the watershed for irrigation. Careful site selection, chosen with good knowledge of spring freshet patterns, allowed Maliseets to maintain crops, homes, and fortifications at the same site for decades with little or no manipulation of river water.[28]

Meductic was an outstanding rather than a marginal maize cultivation site. Meductic's fields were on an elevated ridge surrounded by lower intervale land. This topography helped mitigate frost by channeling cold air downslope away from crops. The fields' southern aspect also increased the sunshine plants received. Moreover, the slope enabled Maliseets to establish fields that periodically received fertilizing floodwaters in close proximity to a more elevated village that remained dry. As the evidence from the Wəlastəkw demonstrates, scholarly claims that poor soils, bad drainage, and a difficult climate dissuaded Maliseets from cultivating maize fail to discern the opportunities that were available to those capable of combining intimate local knowledge of soils and topography with the Wəlastəkw's diverse microclimates.

The fields at Meductic were more than 150 kilometres inland from the cool foggy climate and rocky coast. Between Grand Lake and a point a few dozen kilometres above Meductic, a distance of about 100 kilometres, the Wəlastəkw itself still warms the adjacent land by functioning as a heat sink that stores solar heat during hot summer days. This locally stored heat moderates the effects of cool night time temperatures and insulates riverside crops from the onset of fall frosts for a few weeks and sometimes longer. The warm, riparian microclimate is crucial for the survival of heat-loving crops such as maize, in a context where summers are short and the risk of late spring and early autumn frosts are high. P. A Dzikowski and the Atlantic Advisory Committee on Agrometeorology's climate mapping study indicates that Maliseets chose to raise maize along the stretch of the Wəlastəkw that has the most growing degree days in present-day New Brunswick. Indeed, it is one of the few locations in the Maritimes with a proper mix of soil and heat for maize cultivation. During the Little Ice Age when Maliseet grew maize at Meductic, the merits of the site and microclimate were of particular value.[29]

28 See Caywood, *Excavations,* 10; George Frederick Clarke, *Someone Before Us: Our Maritime Indians* (Fredericton: Brunswick Press, 1968), 42-3, 48. For the Hurons, see Conrad Heidenreich, *Huronia: A History and Geography of the Huron Indians, 1600-1650* (Toronto: McClelland and Stewart Limited, 1971), 130. For mobile farmers, see Elizabeth S. Chilton, "So Little Maize, So Much Time: Understanding Maize Adoption in New England," in *Northeast Paleoethnobotany* II:54, 57. See also Gary W. Crawford, "People and Plant Interactions in the Northeast," in *The Subsistence Economies of Indigenous North American Societies,* ed. Bruce D. Smith (Washington: Smithsonian Institution Scholarly Press, 2011), 431-48.

29 For summer heat, see Gyles, *Memoirs,* 14, 18. For microclimate, see Dzikowski et al., *Climate for Agriculture in Atlantic Canada*, 2, 10, 16, zoning maps, and Blair, "Wolastoq'kew Landscapes," 131-3. For slope, see Caywood, *Excavations,* 10; Jane Mt. Pleasant, "The Science behind the

The Mi'kmaq appear to have responded to the Little Ice Age by abandoning maize cultivation. According to anthropologist Kevin Leonard, cool and variable weather conditions influenced the Mi'kmaq to stop cultivating and focus more on trade, fishing, gathering, and hunting. Leonard drew upon documentation of Mi'kmaw maize and beans cultivation to develop his theory. After living in Acadia from 1606-1607, Lescarbot noted that "in the time of Jacques Cartier" (1534-1542 CE) the Mi'kmaq had "tilled the ground" and eaten "beans, corn, squashes" as their Native neighbours to the south still did in 1607. He claimed they gave up cultivating these plants when European trade became common. Leonard noted that the onset of dense trans-Atlantic trade coincided with the Little Ice Age and suggested that cool weather helped influence the Mi'kmaq's decision to stop growing maize. Similarly, Recollet priest Chrestien Le Clercq noted that the Mi'kmaq had once cultivated maize. Le Clercq lived with Mi'kmaq on the Gaspé Peninsula in the 1670s, and recorded an oral tradition of Mi'kmaq adopting and then abandoning maize cultivation. Mi'kmaw adaptation fits a pattern researchers have noted elsewhere in northern latitudes. Neutral Iroquois in present-day southern Ontario responded to colder growing conditions by eating less maize and beans and hunting more deer. In present-day Manitoba, Natives stopped planting but retained knowledge of cultivation and their place on the land. The Norse failure to adapt agricultural practices to a changing climate appears to have been a major factor in the demise of their Greenland settlements. Maliseet maize cultivation followed a different pattern during the Little Ice Age; Maliseets adapted maize cultivation to their niche and needs. European accounts of maize cultivation at Meductic first appeared during the Maunder Minimum (1645-1715 CE), one of the coldest periods within the Little Ice Age. Obviously, if Maliseets could raise maize successfully in this period of extreme cold, they could have done so, and more easily, in earlier (warmer) periods.[30]

Three Sisters Mound System: An Agronomic Assessment of an Indigenous Agricultural System in the Northeast," in Hart, *Changing Histories of Maize,* 529-37; and Doolittle, *Cultivated Landscapes*. Demeritt's modelling only used American data. While he did consider microclimates, he grossly misrepresented Meductic's location and placed it near the rocky, fog-enshrouded mouth of the river, where the sea dominates the climate. See Demeritt, "Agriculture, Climate, and Cultural Adaptation," 186-9. For soil, see Pryor, "The Adoption of Agriculture," and McFeat, "Big Men of the Northeast." For canals warming microclimates of elevated crop beds in the Andes, see Alan Kolata, *The Tiwanaku: Portrait of an Andean Civilization* (Cambridge, MA: Blackwell, 1993), 188-92.

30 See Chrestien Le Clercq, *New Relation of Gaspesia, with the Customs and Religion of the Gaspesian Indians,* ed. W.F. Ganong (Toronto: Champlain Society, 1910), 211-3; Lescarbot, *History of New France,* 3:250, 195; Leonard, "Mi'kmaq Culture," 184-5; and Kevin Leonard, "Woodland or Ceramic Period: A Theoretical Problem," *Northeast Anthropology*, no. 50 (1995): 190-200. For the theory that contact led to the Maliseet giving up maize cultivation circa 1650 CE, see Alfred G. Bailey, *The Conflict of European and Eastern Algonkian Cultures 1504-1700: A Study in Canadian Civilization* (Saint John: New Brunswick Museum, 1937), 88. See also William R. Fitzgerald, "Contact, Neutral Iroquoian Transformation, and the Little Ice Age," in *Societies in Eclipse: Archaeology of the Eastern Woodlands Indians, A.D. 1400-1700*, ed. Robert C. Mainfort et al. (Tuscaloosa, AL: University of Alabama Press, 2010), 45, 47; Catherine Flynn and E. Leigh Syms, "Manitoba's First Farmers," *Manitoba History*, no. 31 (Spring 1996): 4-11; and Diamond, *Collapse,* 274-5, 222-7. For Maunder Minimum, see Fagan, *Little Ice Age,* 121-2, and Thomas Wickman, "'Winter Embittered with Hardships': Severe Cold, Wabanaki Power, and English Adjustments, 1690-1710," *William and Mary Quarterly* 72, no. 1 (January 2015): 59-60.

Meductic residents understood the labour suited to each stage of maize's growth cycle. Gyles recalled helping the Maliseet with planting, weeding, and "hilling" throughout the summer. These activities amplified growth and yield by giving plants more light and stronger root systems. Mounding also created a warmer microclimate by elevating plants above frost hollows and increasing the surface area of soil reached by sunlight. On chilly spring nights, this provided a degree of protection from frost, while during the summer it amplified the heat roots received and enhanced plant growth. The fact that at Meductic the Maliseet kept planting maize in the 1690s and into the early 18th century without experiencing crop losses suggests killing frosts were uncommon. Maliseet cultivation and harvesting tactics were important factors in the success of their maize agriculture in the midst of the Little Ice Age.[31]

One of the keys to Maliseet success in maize cultivation was their use of types of maize that they could harvest before the crop ripened. Maize does not need to come to maturity to be nutritious or delicious. In northern North America, Indigenous peoples developed maize with features adapted to thrive in cool weather and short growing seasons. These included maize with small stalks and cobs that ripened early. Maliseets and other northern Indigenous peoples cultivated strains such as those now known as Canadian White Flint Corn, Tuscarora Corn, White Flint Corn, and Early Sweet Corn – all of which could be used before they ripened. Settlers' failure to adopt many of these varieties until the late 18th century may account for Gyles's differentiation of Meductic's "Indian corn" from his father's "English Corn." Authors of recent studies of Meductic cultivation have assumed that Maliseets needed maize to mature in order for it to be useful, and in so doing have missed a critical component of Native harvesting practices and climatic adaption on the Wəlastəkw.[32]

When Maliseets harvested some of the maize early as "Green Corn" or "Milk Corn," they feasted immediately on part of this early harvest and stored the rest after stripping it from cobs with clamshells. Meductic residents harvested their remaining maize as it matured. Gyles kept a rough count of the days between his capture and arrival at Meductic. He noted that Maliseets "champ'd [chewed] corn stalks" when he arrived on 22 August 1689. Moreover, he recorded that his master's family "laid down a Bag of Corn" when he was presented to the village to ensure his protection from abuse. These observations suggest Maliseets had gathered at least a portion of their maize by then. In addition, they reveal that the Maliseet obtained nutrition from maize stalks as well as seeds. Gyles worked in Maliseet fields in later years, observing that harvesting began when "Corn was fill'd with the Milk: Some of

31 For mounding, see Mt. Pleasant, "The Science Behind the Three Sisters Mound System" and Heidenreich, *Huronia*, 185-6. For maize surviving moderate frosts, see C.N. Bement, "History of Indian Corn: Its Origin, Its Culture, and Its Uses," *Transactions of the N.Y. State Agricultural Society* 13 (1853): 338-9.

32 For adaptations, see Frederica R. Dimmick, "Creative Farmers of the Northeast: A New View of Indian Maize Horticulture," *North American Archaeologist* 15, no. 3 (January1994): 235-52. For northern strains and uses, see Bement, "History of Indian Corn," 332-6, 340, 350-1. For ripe harvests, see Prins, "Cornfields," 64. For maturity bias and the assumption that settlers and Natives planted similar maize, see Demeritt, "Agriculture, Climate, and Cultural Adaptation," 189-90. Gyles may have also used "English Corn" for wheat; see Gyles, *Memoirs*, 31, 2. For maturity bias and the Neutral Iroquois, see Fitzgerald, "Contact, Neutral Iroquoian Transformation, and the Little Ice Age."

which we dried then, and other as it ripened. And when we had gathered our Corn and dried it, we put some into Indian Barns, i.e. in Holes in the Ground lip'd & cover'd with Bark, and then with Dirt." The multiple harvests Gyles described diffused labour demands, maximized the time maize was useful, increased its nutritional value, and reduced crop losses to early frosts.[33]

Maliseets' careful selection of short-season maize strains, excellent planting sites, and staggered harvesting at Meductic fit with broader patterns of maize use in the Americas and elsewhere. Maliseet choices reflect the creativity and adaptation that characterized Indigenous peoples' role in adapting maize to diverse climates. In 1591 a Spanish doctor, Juan de Cárdenas, observed early green corn harvesting in Mexico and claimed that it gave maize an advantage over other cultivated grains. In Huronia the Recollet lay brother Gabriel Sagard wrote in 1632 that Hurons consumed maize at several points in its lifecycle, including while it was green. English naturalist John Josselyn observed that in New England during the mid-17th century Natives ate parched immature maize and made a beverage from its green corn stalks as other peoples did with sugar cane. Joseph Lafitau commented in 1724 that immature milk corn, mature corn, and rotten "stinking corn" were distinct Native dishes in Canada. He found milk corn "agreeable to the taste." Moreover, people adopted early maize harvesting and processing in parts of the world such as Thailand, Indonesia, and Africa to embed a new food into local climates and cultures. Maliseet early harvesting is a local example of the wide range of adaptations that characterized the global diffusion of maize and Native peoples' resilience in the face of climate change.[34]

33 Gyles, *Memoirs,* 11, 6-7. For nutrition and viability in cool climates, see Barrett P. Benton, "Green Corn Ceremonialism and Ethnonutrition: A Case Study on the Biocultural Evolution of Maize Processing," *Nutritional Anthropology* 26, no. 1-2 (Spring-Fall 2003): 22-6. See also R.L. Hall, "An Interpretation of the Two-Climax Model of Illinois Prehistory," in *Early Native Americans: Prehistoric Demography, Economy, and Technology,* ed. D. Browman (New York: Mouton, 1980), 401-62.

34 For observations of maize, see Warman, *Corn and Capitalism*; Gabriel Sagard, *Sagard's Long Journey to the Country of the Hurons,* ed. George M. Wrong (Toronto: The Champlain Society, 1939), 105-8; Joseph François Lafitau, *Customs of the American Indians Compared with Customs of Primitive Times*, vol. 2, ed. and trans. William N. Fenton and Elizabeth L. Moore (Toronto: The Champlain Society, 1974), 63; and John Josselyn, *An Account of Two Voyages to New-England, Made During the Years 1638, 1663* (Boston: William Veazie, 1865), 59. See also Flynn and Syms, "Manitoba's First Farmers." For varieties, see Bement, "History of Indian Corn," 335-6. Although some scholars have noted green corn harvesting at Meductic, they have overlooked its climatic, nutritional, and labour benefits, as well as the fact that Maliseets harvested it in sequence with mature maize. See, for instance, M. K. Bennett, "The Food Economy of the New England Indians, 1605-75," *Journal of Political Economy* 63, no. 5 (October 1955): 369-97; John Witthoft, *Green Corn Ceremonialism in the Eastern Woodlands* (Ann Arbor, MI: University of Michigan Press, 1949), 6; and Leonard, "Mi'kmaq Culture," 179-81. For global diffusion, see Benton, "Green Corn"; McCann, *Maize and Grace*; and Itala Paula de C. Almeida et al., "Baby Corn, Green Corn, and Grain Yield of Corn Cultivars," *Horticultura Braileira* 23, no. 4 (October/December 2005): 960-4. See also Stephen B. Brush, *Locating Crop Diversity in the Contemporary World* (New Haven: Yale University Press, 2004), 90-1; Kathy Lynn et al., "The Impacts of Climate Change on Tribal Traditional Foods," *Climatic Change* 120, no. 3 (October 2013): 545-56; and Garrit Voggesser et al., "Cultural Impacts to Tribes from Climate Change Influences on Forests," *Climatic Change* 120, no. 3 (October 2013): 615-26.

Maliseet maize harvesting and storage practices reflected Indigenous traditions. Meductic maize growers used clamshells rather than iron knives to cut the maize from cobs, and "Indian barns" insulated with birch bark to store it. As Kevin Leonard notes, these practices closely resembled Native agriculture further south but bore little similarity to the clergy-controlled maize storage and distribution model Louis-Pierre Thury instituted on the Miramichi during the 1680s. Thury had Mi'kmaw villagers keep their maize in a community storehouse from which he doled out rations at intervals. Saint-Vallier noted:

> Il les a engages à défricher la terre dont il set en possession, et à souffrir que les bleds d'Inde qu'on recüeilleroit chaque année, fussent mis dans un magazin commun, pour être ensuite distribuez par son ordre avec oeconomie aux familles qui auroient travaillé, en préferant les malades, les veuves et les orphelins, aux personnes saines et aux jeunes gens. Par ce moyen on empêchera d'un côté la faineantise de quelques-uns, et de l'autre on remediera au foible qu'ils ont de consumer en peu de semaines ou de mois des provisions, qui étant bien ménagées, suffiroient pour l'année entiere.[35]

These maize consumption practices represented a departure from traditional Mi'kmaw use of tree caches to store surplus food for use in times of dire need. Like many Europeans, Thury thought that Native peoples' seasonal rounds, involving what William Cronon labeled "Seasons of Want and Plenty," were unhealthy and were an unproductive use of land and labour. Thury used the stored maize to encourage Miramichi Mi'kmaq to stay in their village during winter and supplement it with what fish and game they could find close by.[36]

The food distribution system Thury developed stands in stark contrast to the Maliseet system of maize storage and consumption. At Meductic, Maliseet controlled the storage, distribution, and consumption of maize. No record links Maliseet cultivation to Meductic's missionary, Father Simon-Gérard de la Place, although some Maliseet did visit missions where priests encouraged farming. Gyles commented that maize harvests were a time of frequent feasting, where youths served men a maize, bean, and fish soup, or "hasty-pudden made of pounded Corn." The village gave each male head of a family a serving proportionate to the size of his family. However, unlike in Thury's system, Maliseet women and children did not eat until the men had finished eating as much of that portion as they chose. Maliseets

35 Saint-Vallier, *Estat present de l'Église*, 33; Leonard, "Mi'kmaq Culture," 181-2. See also Gyles, *Memoirs,* 11, 7. For missions, see "Lettre Du R. P. Ignace de Paris, Capucin Sur L'Acadie," in *Les anciens missionnaires de l'Acadie devant l'histoire*, ed. Philéas-Frédéric Bourgeois (Shediac, NB: Presses du Moniteur Acadien, 1910), 91-4, and Jean Morain, "Of the Mission of the Good Shepherd at Rivière du Loup," in Thwaites, *Jesuit Relations*, 60:263-9.

36 See William Cronon, *Changes in the Land: Indians, Colonists, and the Ecology of New England* (New York: Hill and Wang, 1983), 34-53; Biard, "Biard's Relation, 1616," 79; and David J. Christianson, "The Use of Subsistence Strategy Descriptions in Determining Wabanaki Residence Location," *Journal of Anthropology at McMaster* 5, no. 1 (Summer 1979): 105. For la Place, see the collected letters in Webster, *Acadia*.

used dried maize as a transportable food source to supplement winter hunting rather than year-round residency at Meductic. They continued their traditional pattern of feasting and fasting. A male member of the feast always sang a Maliseet "feast-song," not Christian prayers, after the men had finished their soup.[37]

Europeans sometimes obscured or overlooked the Maliseet role in reshaping the land when they began keeping census records of agricultural improvements along the interior river. The census taken by the clerk Gargas in 1688 was the most detailed description of the Wəlastəkw in that decade. While it located five arpents of cleared upland between Jemseg and Meductic, it did not specify if this included Maliseet fields. A 1695 census tallied fifteen arpents of cultivated land at "Medoctec, the seigneury of René D'Amours." It did not mention Maliseet fields, dwellings, or individuals, although they were the only people who grew crops at Meductic. The census credited Maliseet cultivation work to the local seigneur, whom French officials most often criticised for not developing agriculture. In a tragic twist of fate, d'Amours, whose liquor trading may have introduced a disease that caused Maliseets to flee Meductic earlier that year, benefited from their cultivation work and abandonment of the village. Not only did recorders classify Maliseet agricultural improvements on similar terms as settlers' fields, but they credited a colonist with the cultivation labour of Natives.[38]

Meductic was not the only location where colonists overlooked Native contributions to Acadian agriculture. In 1610-1611, starving Port Royal settlers survived by gathering ground nuts from a field Mi'kmaq had already harvested. Mi'kmaq had established and tended this field before colonists founded Port Royal. Colonists, thinking the rich broken soil left after their harvest was an ideal place to plant, sowed the ground nut field with Eurasian grains in the spring. The initial success of the Acadian grain cultivation that followed came at the expense of both the ground nuts and the Mi'kmaq, who lost an important food supply after sharing it with desperate colonists. Settlers, however, praised God for their salvation rather than Mi'kmaw plant management and generosity. Moreover, as William Wicken observed, Acadian surveyors such as Monsieur de Bonaventure continued to note that Mi'kmaw ground nut fields were "tres bien marque de bonne terre dans cetter provinces" in the early 18th century. Thus, the Maliseet and Mi'kmaq helped create some of the first fields credited to pioneering colonists on both the Annapolis River and the Wəlastəkw. Prospective colonists used the presence of Native-cultivated

37 See Gyles, *Memoirs,* 8-10, 31.

38 See "Recensement General du Pays de Cadie," in Morse Collection, MS-6-13, Dalhousie University Archives, Halifax; "Recensement des terres que les sieurs Damours possèdent sur la rivière Saint-Jean, à l'Acadie," 6 November 1695, R11577-28-5-f, numéro 17, MIKAN no. 2319371, LAC. For d'Amours, see Villebon, "Letter of M. de Villebon to Count Pontchartrain," in Webster, *Acadia,* 86-7, and Saint-Vallier, *Estat present de l'Eglise*, 32. For works that attribute the fields to d'Amours, see Marie-Claire Pitre and Denise Pelletier, *Les Pays Bas: Histoires de la région Jemseg-Woodstock sur la rivière Saint-Jean pendant la période française, 1604-1759* (Fredericton: Société d'histoire de la rivière Saint-Jean, 1985), 95, and William O. Raymond, *The River St. John: Its Physical Features, Legends and History from 1604 to 1784*, ed. J.C. Webster (Sackville, NB: Tribune Press, 1950), 271-2. For epidemics, see Gyles, *Memoirs,* 21.

plants to locate good farmland. This suggests that Native plant sites may have provided a foundation for settler agriculture throughout Acadia.[39]

Maps and surveys of the St. John River in the mid-18th century reveal that Acadians and Maliseet cultivated the same stretches of intervale land. The first detailed British map of the watershed, which was drawn by Joseph Peach in 1762, depicted several miles of cultivated fields, gardens, and houses on the south shore of the river above St. Anne's Point (present-day Fredericton) (see Figure 1). The fields extended upstream to within a half-mile of Aukapaque, a large Maliseet village where maize was grown. The French fields were a patchwork of irregular trapezoids extending back from the river two and three fields deep, and many, quite unlike the long narrow fields along the St. Lawrence, were without river frontage. In contrast, the Maliseet fields adjacent to Aukapaque directly bordered the river, and had more rounded edges that followed the contours of the intervales. The presence of small stream valleys between the Maliseet fields suggests that they continued to favour cultivating raised intervales that channelled frost into surrounding hollows. Unlike at Meductic in the 1690s, Maliseets and their French neighbours cultivated the same stretch of land here in the mid-18th century and perhaps even worked some fields together, or at least were on hand to share their cultivation knowledge. Major Gilfred Studholme's 1783 survey of settlements on the St. John River revealed that in Burton Township Israel Kinney's "15 acres of cleared land . . . was chiefly done by the French and Indians." When Scottish traveller Patrick Campbell visited Fredericton in 1791, he noted that Lt. Governor Thomas Carleton's potato fields and the rest of the infrequently flooded soil of the town was poor and had "been long cultivated by French and Indians." Raymond claimed Maliseets had traditionally camped at the site that became Fredericton, which they "tilled in very early times," but he did not substantiate his claim.[40]

Not all British colonists and travellers acknowledged that Maliseets played an important role clearing some of the land that British settlers first farmed along the river. Hannah Ingraham, who narrated one of the most widely read accounts of early

39 See Marc Lescarbot, "Relation Dernière de ce qui s'est Passé au Voyage du Sieur de Potrincourt," in Thwaites, *Jesuit Relations*, 2:169, 181; Pierre Biard, "Relatio Rerum Gestarum in Nova-Francica Missione, Annis 1613 &1614" in Thwaites, *Jesuit Relations,* 2:245; and Biard, "Biard's Relation, 1616," in Thwaites, *Jesuit Relations,* 3:257-9. Colonists' replanting suggests they valued their vulnerable foreign annual grain more than Mi'kmaq's hardy perennial tubers. See also William Wicken, "Mi'kmaq Decisions: Antoine Tecouenemac, the Conquest, and the Treaty of Utrecht," in *The "Conquest" of Acadia, 1710: Imperial, Colonial, and Aboriginal Constructions,* ed. John G. Reid et al. (Toronto and Buffalo: University of Toronto Press, 2004), 86-100; Mémoire de Bonaventure, 1701, C11D, 4, 84-5, LAC. For colonizers favouring Native cultivation sites in British Columbia, see Turner et al., "Plant Management Systems," 127. Abraham Gesner noted that "Shubenacadie" in Nova Scotia was derived from the Mi'kmaw name for "ground nuts." See Abraham Gesner, *The Industrial Resource of Nova Scotia* (Halifax: A & W. MacKinlay 1849), 2.

40 See Joseph Peach, "Plan of the River of St. Johns from Fort Frederick in the Bay of Fundy to the River of St. Lawrence" (1762), R12567-15-9-E, online MIKAN no. 4150988, LAC, www.archivescanada.ca/. For Studholme, see W.O. Raymond, ed., "Sunbury County Documents," *Collections of the New Brunswick Historical Society* 1, no. 1, (1894): 100-18. For Campbell, see Patrick Campbell, *Travels in the Interior Inhabited Parts of North America in the Years 1791 and 1792* (Edinburgh: John Guthrie, 1793), 38. See also Raymond, *River St. John,* 24.

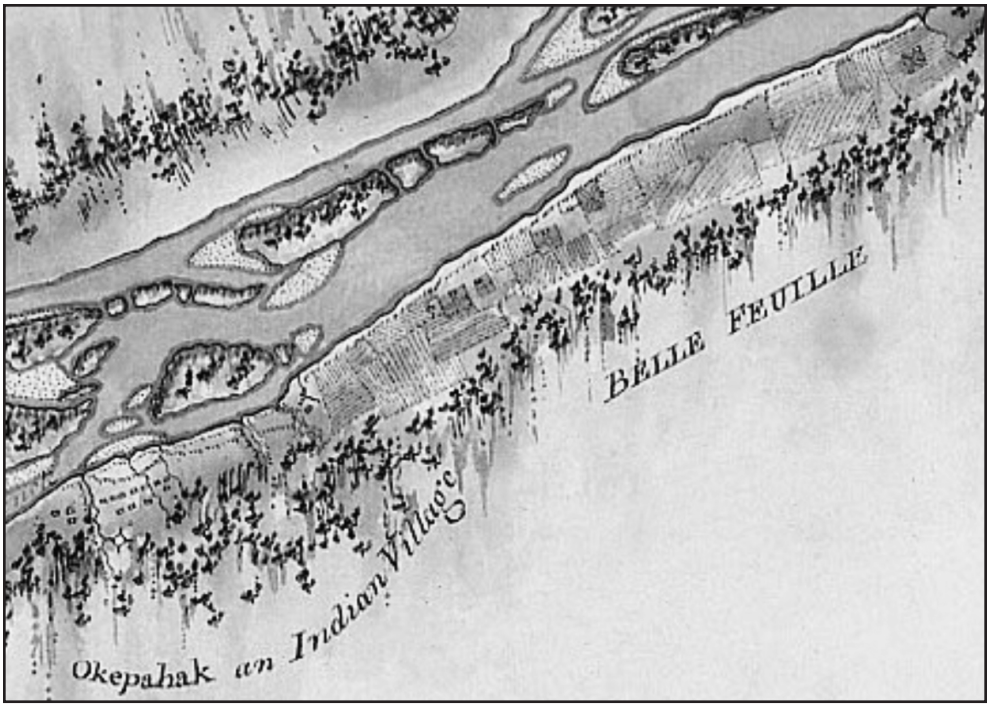

Figure 1: Detail from Joseph Peach, "Plan of the River of St. Johns from Fort Frederick in the Bay of Fundy to the River of St. Lawrence Surveyed by Lieut. Joseph Peach of the 47th Regiment" (1762).
Source: R12567-15-9-E, CARTO24855, online MIKAN no. 4150988, item 8, Archives Canada.

Loyalist Fredericton, based in part on her childhood memories, recalled that Scottish settlers had cleared the original town site "but the Indians had killed them all and burned up their houses." While Jerusalem artichokes still grow in abundance on the islands and riverbanks near Fredericton, the city is usually not considered a former Maliseet cultivation site. Moreover, while Campbell noted that Fredericton Loyalists layered their fields on top of earlier Maliseet cultivation sites, he overlooked changes Maliseet had made to the landscape further upstream. When he visited Captain Atwood's farm at Meductic, where Maliseets had temporarily abandoned their village and fields, Campbell thought that the ruined fort there, and the clearing that Atwood farmed, were made by earlier French colonists and soldiers. He seems not to have realized that they were the product of Maliseet labour. Not surprisingly, agricultural historian Karl Rasmussen subsequently overlooked Maliseet cultivation when he sought to understand the origins of provincial agriculture.[41]

41 R.P. Gorham, ed., "The Narrative of Hannah Ingraham, Loyalist Colonist at St Anne's Point," http://atlanticportal.hil.unb.ca/acva/loyalistwomen/en/documents/ingraham/; Campbell, *Travels in the Interior,* 93; Karl Rasmussen, *Trail Blazers of Canadian Agriculture* (Ottawa: Agricultural Institute of Canada Foundation, 1995), 53-5.

The broad range of Native cultivation in Acadia suggests that the land use patterns of Natives and settlers were not always as separate as scholars have previously argued. Settlers and Natives sometimes used the same microenvironments for cultivation on the Wəlastəkw and elsewhere in Acadia. French and British colonists gravitated to the rich soils and clearings that characterized Mi'kmaw and Maliseet cultivation sites; thus, pioneering settlers sometimes displaced Natives from important food production niches. In other cases, colonists peacefully shared the same fertile microenvironments as Indigenous peoples.[42]

The starting point for understanding the fit between Native land use and settler land use on the Wəlastəkw lies with a better understanding of Native plant cultivation. Maliseets managed to grow maize successfully during the height of the Little Ice Age by combining intimate understanding of local environments with plant management knowledge that they had gleaned from centuries of experience tending edible and medicinal plants, such as Jerusalem artichoke and ground nut. This knowledge made it possible for the Maliseet to add maize to the array of flora that they tended and cultivated and, in doing so, to extend Indigenous maize traditions northeastward to the Wəlastəkw, despite the challenges posed by cool weather and a short growing season. Maliseet success was grounded in part in their use of the warmest microclimates of the Wəlastəkw to cultivate maize, but as well in their selection of good soils, their use of cold hardy maize varieties, and their strategies for harvesting maize before it reached maturity. Although climatic change may have tipped the scales against maize cultivation in the Maritimes during the Little Ice Age, Maliseets' extensive cultivation skills and nuanced local environmental knowledge tipped them back. Their achievements with maize, and with other crops, set the stage – and prepared the fields – for the European agriculture that followed.

42 For the argument that Acadian settlement did not significantly disrupt Native land use as colonial farmers and that Mi'kmaw hunters focused on different environmental niches, see Andrew Hill Clark, *Acadia: The Geography of Early Nova Scotia to 1760* (Madison, WI: University of Wisconsin Press, 1968), 377; N.E.S. Griffiths, *From Migrant to Acadian: A North American Border People 1604-1755* (Montreal and Kingston: McGill-Queen's University Press, 2005), 11; Harald E.L. Prins, *The Mi'kmaq: Resistance, Accommodation, and Cultural Survival* (Fort Worth, TX: Harcourt Brace College Publishers, 1996), 69, 92; and Heather L. MacLeod, "Responding to the Land: Experiencing Nature in Nova Scotia, 1607-1900," in *Land & Sea: Environmental History in Atlantic Canada*, ed. Claire Campbell and Robert Summerby-Murray (Fredericton: Acadiensis Press, 2013), 16, 19. MacLeod notes that settlers took over the lands the Mi'kmaq began to cultivate in the 19th century after losing their hunting grounds. Wicken and Kennedy suggest that Acadians and Mi'kmaq initially practiced different and complementary resource use patterns and got along well. Then relations deteriorated as the growing settler population expanded its resource use and gradually displaced Mi'kmaq from their homelands. See Gregory Kennedy, "Marshland Colonization in Acadia and Poitou During the 17th Century," *Acadiensis* XLII, no. 1 (Winter/Spring 2013): 58-9, and William C. Wicken, "Re-examining Mi'kmaq-Acadian Relations," in *Habitants et Marchands, Twenty Years Later: Reading the History of Seventeenth- and Eighteenth-Century Canada,* ed. Sylvie Dépatie et al. (Montreal and Kingston: McGill-Queen's University Press, 1998), 94, 96, 99, 108. On the Wəlastəkw, Maliseet and Acadian interaction appears to have grown closer during the 18th century – at the same time that Mi'kmaw and Acadian inhabitants were moving apart in present-day Nova Scotia.

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