Walking to the Longhouse:

A Deep Map of the Central New York Military Tract & its Indigenous History

by

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To my father,

who has shown me more of the world than can be put on one map.

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To the Onondaga Nation, whose lands I walked, photographed, researched, and mapped for this project — and on whose lands the residents of Syracuse still live: I acknowledge these lands are yours, currently and ancestrally, and thank you for your stewardship and care.

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Abstract

Since around the year 2000, the application of GIS has expanded. GIS has been increasingly embraced in other disciplines, including history and literature, and has gradually included qualitative approaches. This trend is embedded within the "spatial humanities", led by humanists and furthering what can be incorporated and visualized in a GIS platform. Concurrently, critically-engaged forms of map-making are prioritizing subaltern voices and idiographic methods in documenting place, especially for indigenous peoples. These initiatives, which weave narrative into GIS, are broadly known as deep maps. This thesis crafted a deep map of Central New York, drawing on historical maps of the region and archival documents of the history of the Iroquois League (Haudenosaunee). The working hypothesis was twofold: first, that archival texts can be translated into cartographic representations through georeferencing and a close reading of historical maps; second, that such texts generate new map layers that counter official maps. To accomplish this, archival maps were digitized and georeferenced, texts were organized to create an indigenous gazetteer, and a series of new maps were produced. Overlaying these archival maps and texts revealed aspects of regional history that are often ignored or sanitized by colonizers — thereby attempting to foreground indigenous history within the realm of the local cartography. Moreover, these maps demonstrate applications of deep mapping for broader approaches to critical cartography.

Chapter 1 Introduction

"The past is never dead. It isn't even past."

William Faulkner

"The past is the set of places made by human action.
History is a map of these places."

Philip Ethington

Human action in a place, according to Ethington (2007), defines its history — who lives in a place, how they live there, and what happens as a result of their being there weave a set of historical narratives. Of course, no set of narratives can ever be complete. Some texts are bound to leave out people or places that other versions of the narrative deem essential. As this project will explore, this idea becomes even more complicated when maps are involved. By the same token, maps can also be a way to tell histories that are not widely known. Specifically, "deep maps" are an emerging set of cartographic methods that focus on narratives and qualitative data in order to expand what can be visualized.

This project draws deeply and broadly from three areas of mapping practice: archives, critical cartography, and deep mapping. Taken together, they form a powerful set of questions: How can the development of a deep map of local history reveal narratives of marginalized or subaltern peoples typically not included in authoritative maps — and in so doing, how can deep mapping methods work in tandem with archival research and critical cartography? To what extent can deep mapping practices re-prioritize or re-place these lesser-known histories?

1.1 Study Area

What is now Central New York was once the center of government for what we know in English as the Iroquois League (by their own people called the Haudenosaunee, the name used hereafter). Their thriving society predated European settlement, and as such the region is a place of deep local history and legend. This same area was visited by numerous European groups — French Jesuit missionaries, Dutch traders, and English colonizers, mostly — and became a key area for events that established the territory of the United States in the aftermath of the American Revolution. Fig. 1.1 depicts modern-day Central New York with labels showing the approximate locations of the member nations of the Haudenosaunee: the Seneca,

the Cayuga, the Onondaga, the Oneida, the Mohawk, and the Tuscarora (another sixth Iroquoian group that joined the Haudenosaunee in 1722). More about the spatial extent of the Haudenosaunee and their contact with Europeans is detailed in Chapter 2.

Specifically, this study focuses on a tract of land demarcated by the new American Congress as the "Military Tract," shown in Fig. 1.2. The land was offered as incentive and payment to muster soldiers, even as the land was being taken from the Haudenosaunee under suspect — and outright violent — circumstances. By modern boundaries, the tract included all of Cayuga, Cortland, Onondaga, and Seneca counties, as well as portions of four others. While the tract eventually also included reservations for two of the Haudenosaunee nations (the Cayuga, whose reservation was never established, and the Onondaga, whose reservation is south of Syracuse), all of the land of the Military Tract had belonged to the Haudenosaunee, even when there was regular contact with European settlers to the east and south. Of note also, the names of the original Haudenosaunee nations — Cayuga, Onondaga, Seneca, Oneida, Mohawk — are all county names in New York State today.

Additionally, the lands of the Military Tract were the focal point for pivotal historical events, both for the Haudenosaunee and for American settlers. The founding of the Iroquois League (Haudenosaunee) into a single government happened on the shores of Onondaga Lake around 1400. But by 1800, European military action had "cleared" the land of the indigenous settlements, to be surveyed and divvied up to soldiers to use as farmland. After establishing sufficient historical context, this study focuses on events from 1722 (when the Tuscarora join the Haudenosaunee and the Treaty of Albany was signed with the British) to 1822 (the last sale of Onondaga land to New York State).

1.2 Motivation

This project assumes that work in archival and historical geography (and spatial humanities more broadly, elaborated below) deserve a firm grounding in the tools, technologies, and methods of GIS (in this case, the *s* standing for both the *systems* and the *science)*. In other words, while the majority of the data here come from archival maps and texts, the project demands the clarity and precision expected of any other kind of GIS project.

Consider, Miller and Goodchild (2015) refer to current trends in GIS as "data-driven." But more to the point, they stress how the increasing access to open data, the grassroots approaches to GIS (i.e., participatory GIS) and the pervasiveness of location-enabled technologies renew the tensions between

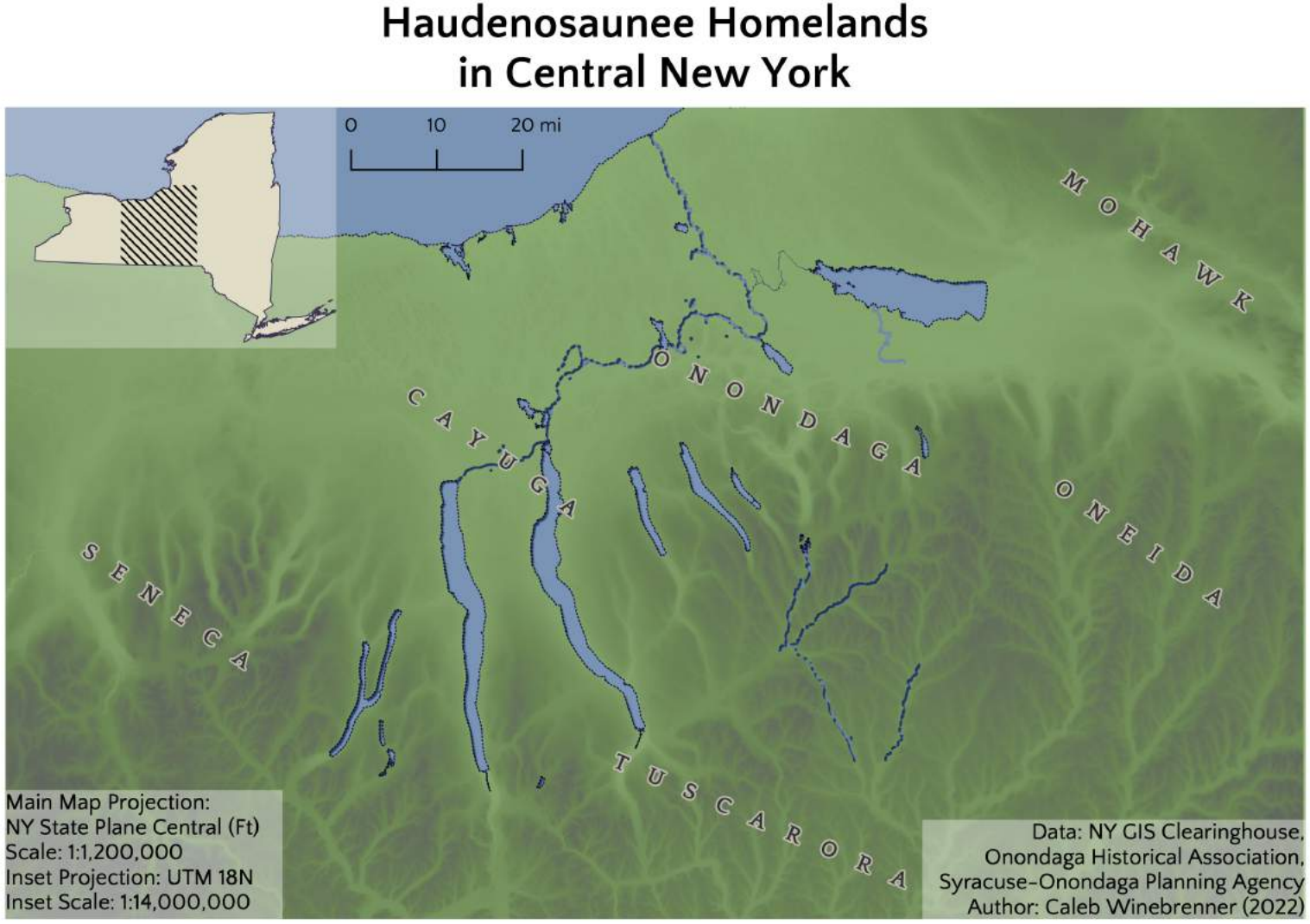


Figure 1.1: Haudenosaunee member nations in part of Central New York, circa 1725

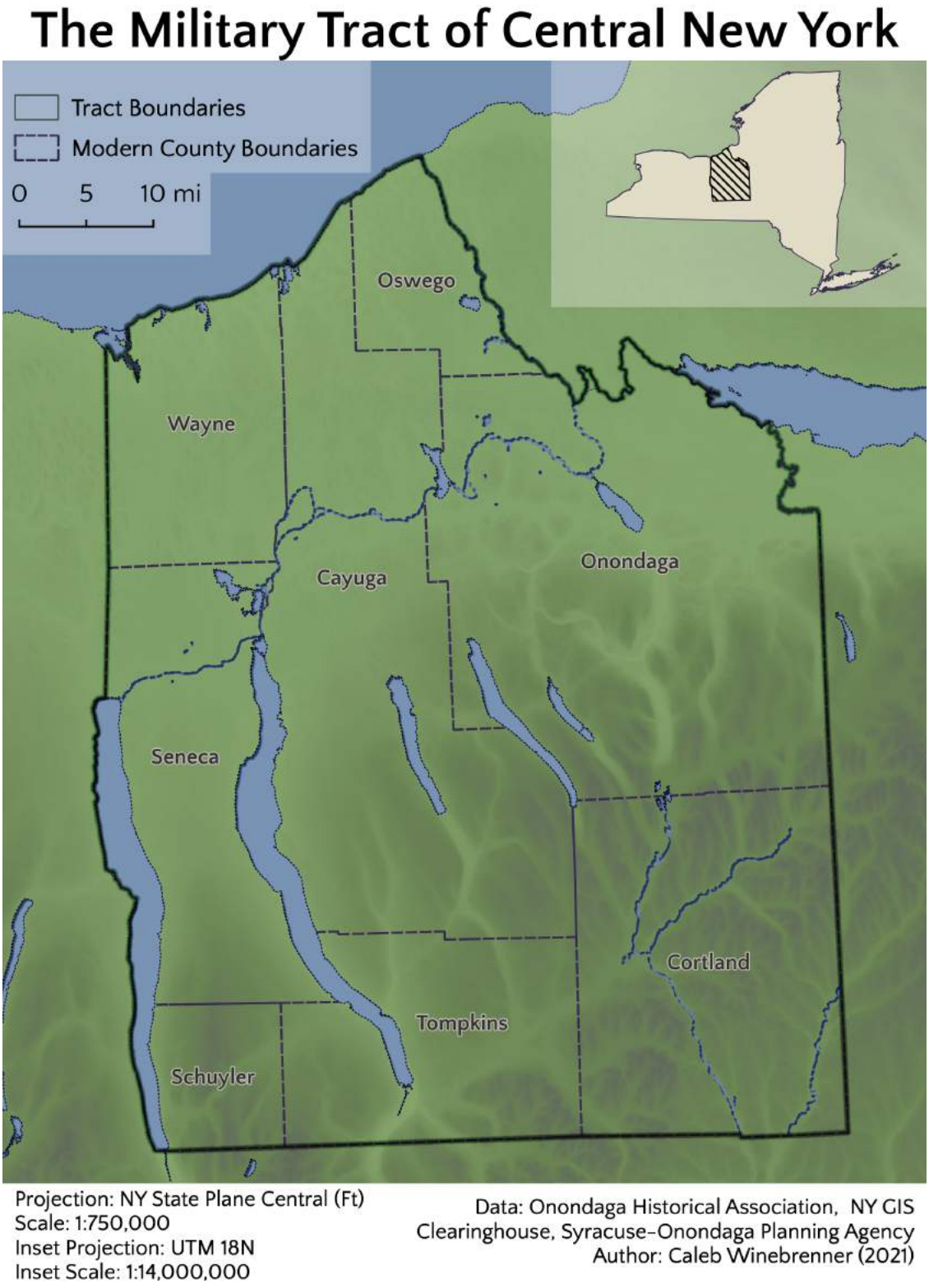


Figure 1.2: Military Tract within central New York, established in 1781 and surveyed by 1794.

nomothetic and *idiographic* approaches to geography. In other words, is geography a science of articulating universal laws of space, or of the unique textures, flavors, and ideas of a place? Historically speaking at least, geography has done a fair share of both (Tuan [1977] 2011), but in its most recent forms is articulated as "spatial humanities" (Bodenhamer et al. 2015; Bodenhamer et al. 2022). Simultaneously, scholars of digital humanities have embraced the spatial turn as a way of visualizing — perhaps even materializing — the texts they study (Barbaresi 2018). Ethnographic work is also increasingly finding ways to utilize available GIS technologies (Brennan-Horley et al. 2010; Kwan and Ding 2008). Moreover, humanistic approaches to databases remain focused on qualitative ways of knowing and meaning-driven ways in which knowledge is collected and organized (Warner 2010) — as contrasted with positivist and quantitative approaches. Note also that these humanist methods echo the same critiques made of GIS in the 1990s, outlined in the next section.

Into the gap between these two trends, this project considered the ontological processes required for a project in the spatial humanities (i.e., integrating textual data), but more importantly, to press on for concrete ways in which a deep map can practically be built. This project — though working with humanistic data — explores the applications of computational processes and modern cartography to interpret an historical narrative through maps. While many projects in deep mapping are undertaken by historians and other humanists with limited training in GIS and cartography, this approach foregrounds GIS technologies as a tool for inquiry and knowledge production.

1.3 A Working Definition of a "Deep Map" & Attendant Methods

Bodenhamer posits that the promise of deep maps is that they "are the means by which we represent the contested meanings of space and place, as well as the dynamics that produce them" (2015, p. 21). Nevertheless, what is a deep map and how is it distinct from so-called "thin" maps? Maps as we typically know them — thin maps — focus on spatial phenomena; deep maps seek to "map the unmappable" and offer a more nuanced and lived sense of a *place* (Bodenhamer et al. 2015, p. 33). Another definition argues for deep maps as being composed of text, space, and time (Dunn et al. 2013) — though such a definition assumes that a lived sense of place, at least on a map, can only be derived from textual data. In either definition, a deep map is not something easily contained within a GIS nor easily presented as clear and tangible maps.

By contrast, this project understands deep maps are multilayered maps (in a technical sense, as in a GIS) where one or more layers *must be qualitative or textual* and at least two layers represent different points in history. Doing so allows for a deep map, in presentation, to be separated out into a series of thin maps in order to tell the narrative of a place while also seeing the combination of these layers as a space for discovery of new patterns in the data and new threads of a narrative. In other words, a deep map relies not only on individual layers or on a single aspect (text or place or time) but the generative qualities that emerge as these layers and aspects overlay with each other.

While this definition will be reevaluated later (Chapter 6), this working definition also directs my choices of methods. The archival research for this project began not with texts but with historic maps, which were appropriately digitized and georeferenced. Overlaying these historic maps revealed new threads in the narrative history of the place. Second, texts from the archives provided additional layers through a process of generating a gazetteer. Finally, different combinations of these data layers led to the production of new maps. These new maps, taken as a set, are the deep map of the military tract.

1.4 What's a Longhouse?

A *longhouse* was the traditional architecture of the Haudenosaunee. It is useful to visualize what a longhouse is. According to Chief Irving Powless of the Onondaga Nation (2016), in each village would be several longhouses, and each longhouse represented a clan or extended family, perhaps up to 250 persons. In these houses — wrapped in bark and with doors at either end — each nuclear family would have a room along the side of the house, open to the central hallway. The middle of the longhouse was a place for fires, though outdoor fireplaces at the village center were also known. Each village would have high fences as protection, too, and wide gates to welcome friends and travelers. Of note, one commonality among the member Haudenosaunee nations was that each lived in longhouses.

The title of this thesis is "Walking to the Longhouse." The *walking* is intended to evoke the sense that Haudenosaunee people lived and met each other on these lands — and still walk them — while acknowledging that European travelers and settlers walked these lands, too. This deep map is an attempt to tell that history in the terms of human geography. Bearing in mind the image of a longhouse, the title of this thesis is one way to acknowledge that these lands were and are those of the Haudenosaunee. Any white visitors (Dutch, French, British, or American) would have walked to a longhouse where elders were gathered and shared conversation. The maps here are an attempt to continue those dialogues.

1.5 Outline of this Thesis

Chapter 2 gives a narrative account of the history of the region, starting with folkloric accounts of the founding of the Haudenosaunee (likely in the 1400s, though this is debated), then honing in on events of the American Revolution and concluding with land sales in 1822. Chapter 3 situates the aims of this project and the narrative of history within a framework of archival research, critical cartography, and emerging theories of deep mapping. Chapter 4 details the methods used in this project and the particular challenges encountered in proposing a new method of deep mapping. Chapter 5 showcases the outcomes of these methods, each map accompanied by a brief explanation of cartographic design choices. Lastly, Chapter 6 evaluates the project against its aims as a new method of deep mapping and its commitments to critical cartography. That chapter will also discuss ways in which the study could be further developed given the proper time and resources, as well as a reconsideration of the definitions of a "deep map."

Chapter 2 Local History

The depth of a deep map comes in part from its depth of history (Ethington and Toyosawa 2015). As such, this chapter offers a brief outline of the history of Central New York. At first, because the sources are primarily oral tradition or secondhand accounts, details remain unclear, though our story likely begins somewhere around 1400 CE. We conclude some 400 years later, with the removal of the Haudenosaunee from these lands (except the reservations) and the gifting of the land to American soldiers in payment for their work during and after the American Revolution.

As will be elaborated further in Chapter 3, I also take a critical stance toward this history, seeking out also what is missing in the official history, what is counter to it, and what historical threads may open up the archives to deeper exploration.

2.1 Hiawatha & The Great Peacemaker

Long before European settlers discovered what is now called New York State, the area was inhabited by local indigenous peoples, many of whom became known broadly to Europeans as the Iroquois. Five of these nations (later six) eventually unified, becoming the Iroquois League, or in their languages, the Haudenosaunee — "People of the Long House" (Powless 2016). The confederation of these nations was a turning point in their history, bearing now almost mythical proportions.

According to several versions of the story (Beauchamp 1892, Parmenter 2014, Powless 2016), each of the Five Nations — the Onondaga, the Oneida, the Mohawk, the Seneca, and the Cayuga — were at war, struggling with famine and disease. Then one day a warrior had a vision that each of these peoples, like the longhouses they lived in at the time, would unify so that the territory of their peoples was like one great longhouse. In spreading this idea, the warrior became known as the Great Peacemaker (his real name, as a sign of respect, being rarely used). He gathered many followers who helped to make this happen, notably Jigonsaseh (now called "Mother of Nations," later cited as an inspiration for the Women's Suffrage movement) and Hiawatha. Because the Great Peacemaker was said to have a speech impediment, Hiawatha became his speaker and emissary as they travelled across what is now New York to unify the Five Nations.

According to Jon Parmenter, a leading historian of the Haudenosaunee, "the emphasis on free, peaceful movement in the traditional story of the League's founding aligns well with what archaeological and documentary sources tell us of sixteenth-century events" (Parmenter 2014, p. 16). Figure 2.1 shows several places related to these events: most notably Hiawatha's home and where it is said that the League of

the Five Nations was founded. While these lands covered most of present-day New York, all records indicate that the Onondaga People — living in the county now bearing their name — were to be the central fire (i.e., a "council fire" or meeting place) of this new government. In the oral tradition (Beauchamp 1922), the choice of the Onondagas as the center of the Haudenosaunee was itself a choice to make peace: Tadodaho was one of the warring Onondaga chiefs who initially rejected the idea of peace, even killing Hiawatha's wife and daughters. Hiawatha and the Great Peacemaker planted a tree in Onondaga lands as a sign of putting peace above all else.

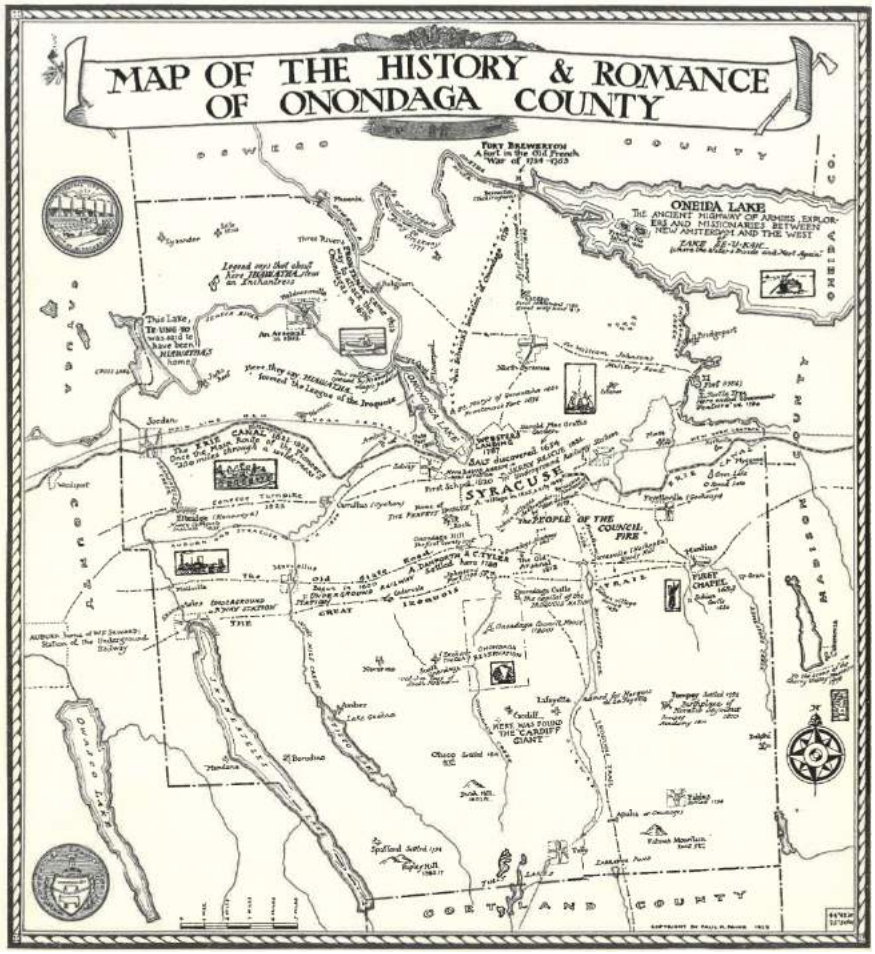


Figure 2.1: A map of Onondaga County depicting well-known places and events, by Paul Paine
Source: Onondaga Historical Association, c. 1929

Clear archaeological evidence shows that the Haudenosaunee had regular contact with European settlers by the 1700s (Tuck 1971), though early missionary records support contact happening as early as 1508 (Parmenter 2014). As such, there is debate as to when the Great Peacemaker and his followers

founded the confederacy, though some place this date as early as 1142, with 1400 being a commonly accepted date (Beauchamp 1922).

Figure 2.2 shows a number of documented archaeological sites in the area. Of note, the Indian Hill site (25) is where some of the earliest glass beads have been found, traded with early Dutch merchants and colonists. Of note, these European goods were often traded internally among the member nations of the Haudenosaunee, again supporting ideas of peace and freedom of movement within their lands (Parmenter 2014). Additionally, other sites are known to have been wiped out or abandoned due to smallpox epidemics in the late 1600s and early 1700s. In fact, Chief Powless (2016) tells that story that smallpox is the reason why his people no longer live in longhouses — the custom was largely abandoned to mitigate the spread of the disease.

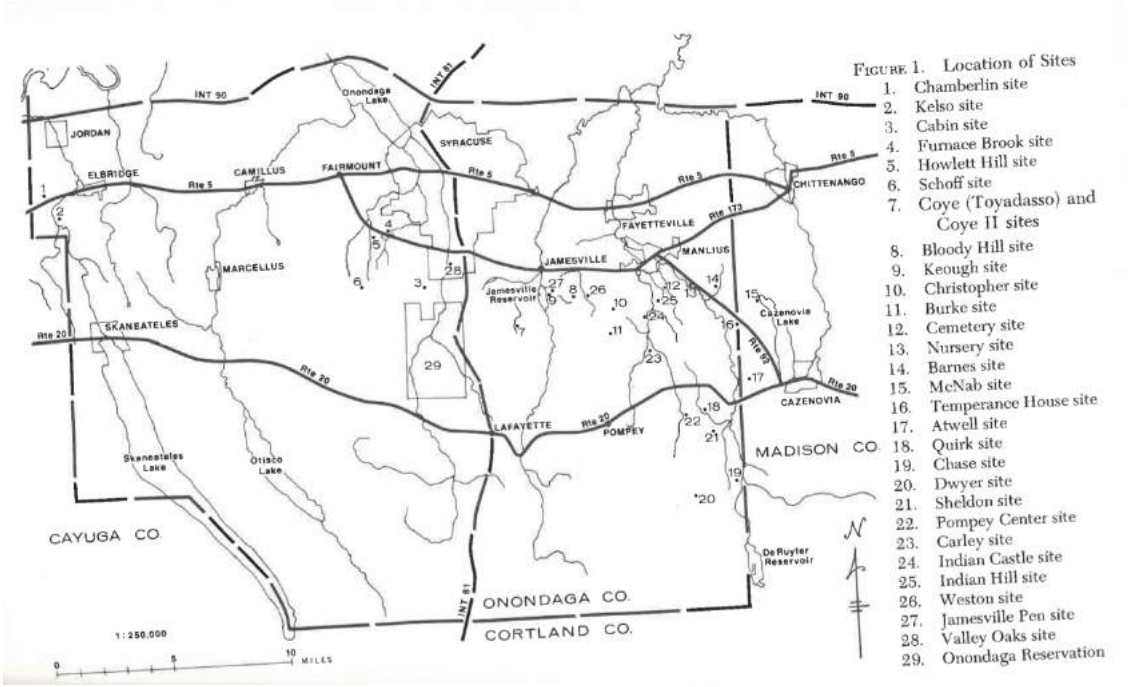


Figure 2.2: The sites of James Tuck's archaeological digs and related places.
Source: Tuck 1971

2.2 The Coming of Europeans

Such a story illustrates that a history of Central New York is no longer only indigenous history, as some of the events in Paine's map (Fig. 2.1) attest. Salt was discovered by Europeans near present-day Syracuse in 1654, and with it, more European settlements were founded. Early maps of the region (such as Fig. 2.3) clearly note the area as the territory of the Iroquois, who were duly treated as an independent and

sovereign government when being negotiated with. Early explorers and settlers seemed to understand that the primarily land claims were those of the Haudenosaunee. The Haudenosaunee were peaceful in their dealings with new neighbors. According to Parmenter (2014), records from French Jesuit missionaries show that Europeans were welcome to travel within Haudenosaunee lands using the same rituals of hospitality shared among member nations.

However, this began to change amid the unrest in American British colonies. While beyond the scope of a brief history here, the effects of the French and Indian War forged an alliance between the Haudenosaunee and the British, rather than the French in Canada (for more on Iroquois history prior to 1700, see Parmenter's *The Edge of the Woods*, 2014). One notable event is the Tuscarora War (1711-1713) between the Tuscarora (an Iroquoian people) and colonists in the Carolinas. In a move designed to ensure the safety of the Tuscarora and strengthen Haudenosaunee government, the Tuscarora moved north and, with Oneida sponsorship, joined the Haudenosaunee in 1722. The Onondaga and Oneida shared their lands with the Tuscarora, as seen in Fig. 1.1. The same year, the Haudenosaunee signed the Treaty of Albany with British representatives from the colonies of Pennsylvania, New York, and Virginia. In the treaty, the Haudenosaunee simultaneously emphasized peace with the British — including ongoing efforts to establish peace between the British and the Tuscarora — and asserted Haudenosaunee land claims. Establishing peace meant that practices of freedom of movement could be continued, but not allowing for encroaching settlement.

Nevertheless, British settlements continued to migrate north and west into Haudenosaunee lands. To ameliorate British concerns about conflicts with the French to the north, the Oneida permitted construction of Ft. Stanwix on their lands. In 1768, the Treaty of Ft. Stanwix demarcated an official Boundary Line between the Haudenosaunee and the British (see Fig. 2.4). The Boundary Line would not last long, however, as the American Revolution would soon be underway.

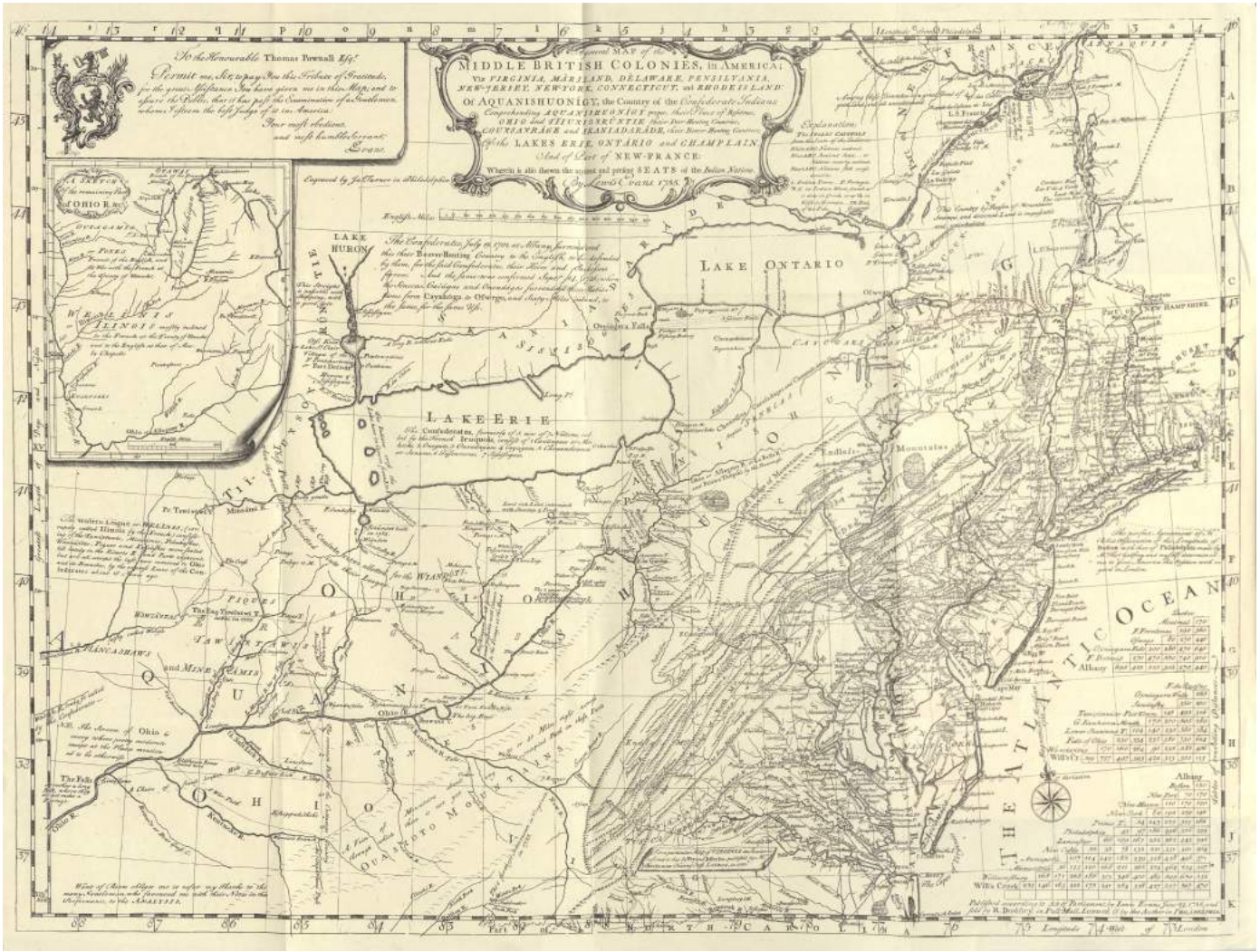


Figure 2.3: An early map of the colonies, circa 1755. Note that it shows several indigenous groups in New York, Pennsylvania, and Ohio. (Source: Bartram et al. 1973)

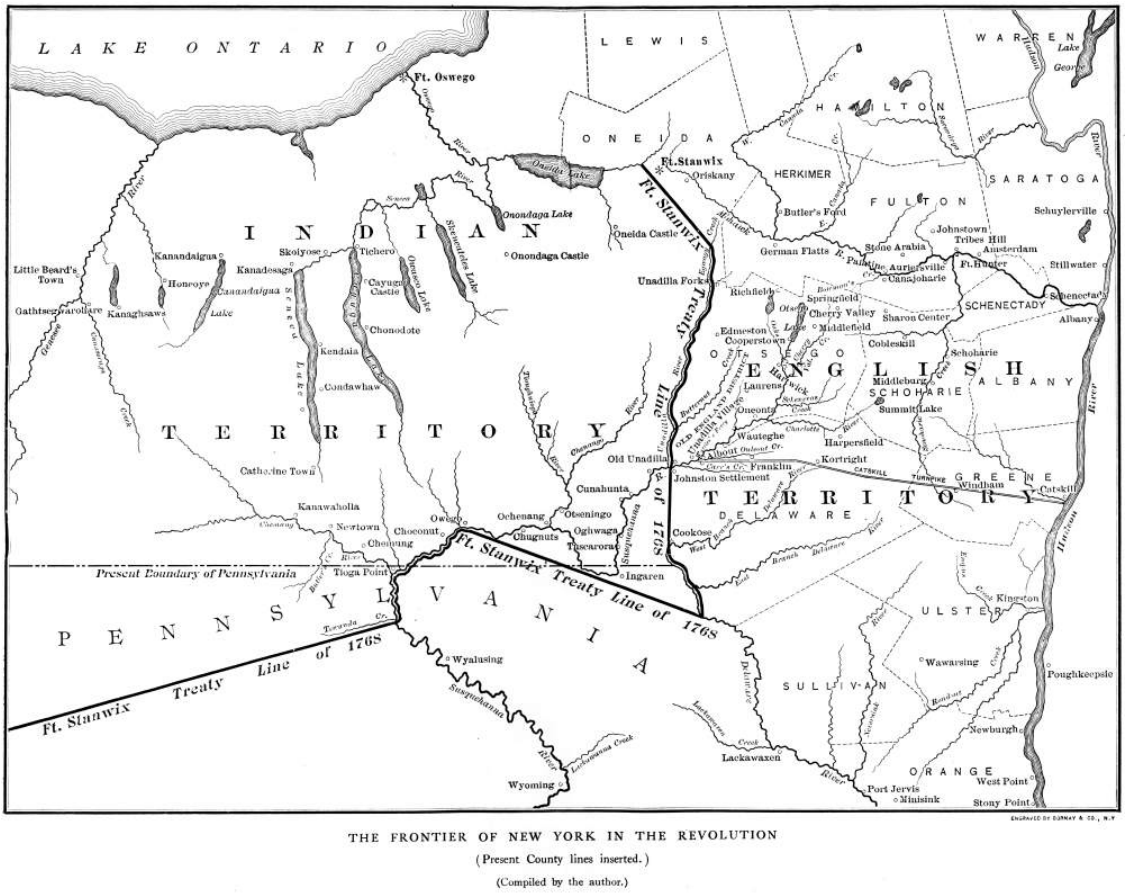


Figure 2.4: The first Treaty of Ft. Stanwix (1768) established the boundary line between the Haudenosaunee and the British. Source: Halsey 1901.

2.3 The American Revolution

As a sovereign nation, the Haudenosaunee for a time remained neutral in the American Revolution. However, their government also permitted individuals, clans, and their chiefs to form their own opinions. As such, some tribes took the side of the British, fearing that a new American government would mean that British treaties – including the Boundary Line — would be disregarded. Others felt that America, with its emphasis on freedom, would respect Haudenosaunee lands and customs (Powless 2016). Eventually, this revolutionary conflict divided the Haudenosaunee.

To make matters worse, some sources indicate that some of the "raids" on white settlements in the early years of the Revolutionary War may have in fact been Europeans dressed in Haudenosaunee clothing in order to agitate the conflict (Koehler 2018). Doing so led to the Haudenosaunee being blamed for both raids and an alliance with the British (i.e., against the Americans), even if such alliances were unclear in

reality. In 1777, the Battle of Oriskany near Ft. Stanwix resulted in members of different Haudenosaunee nations on opposite sides of the fighting.

American independence also meant that there was an assertion of American land claims. In claiming more of the State of New York, the new boundary between the US and British Canada divided Haudenosaunee lands into two different nations, ignoring the sovereignty of the Haudenosaunee in the process. The 1783 Treaty of Paris which ended the American Revolution made no mention of the Haudenosaunee, so in 1784 the Treaty of Ft. Stanwix ended the American conflict with the Haudenosaunee, declaring some of the member nations as "belligerents" (i.e., those who fought on the British side at Oriskany) and confining their settlements to reservations.

By 1794, various treaties and trade agreements had carved up Onondaga county into various towns and townships, as shown in Fig. 2.5. These township boundaries (at least approximately) persist to the present day, although the Cayuga Reservation was never fully established and the Onondaga Reservation would later shrink. In 1781, Congress established the Military Tract as land to pay the soldiers in the Revolution — but this land had previously been behind the Boundary Line. When land negotiations stalled by 1798, the Haudenosaunee were fighting to stop the encroachment of European settlement from the east. When the lands would not be given up, the US decided to use military force.

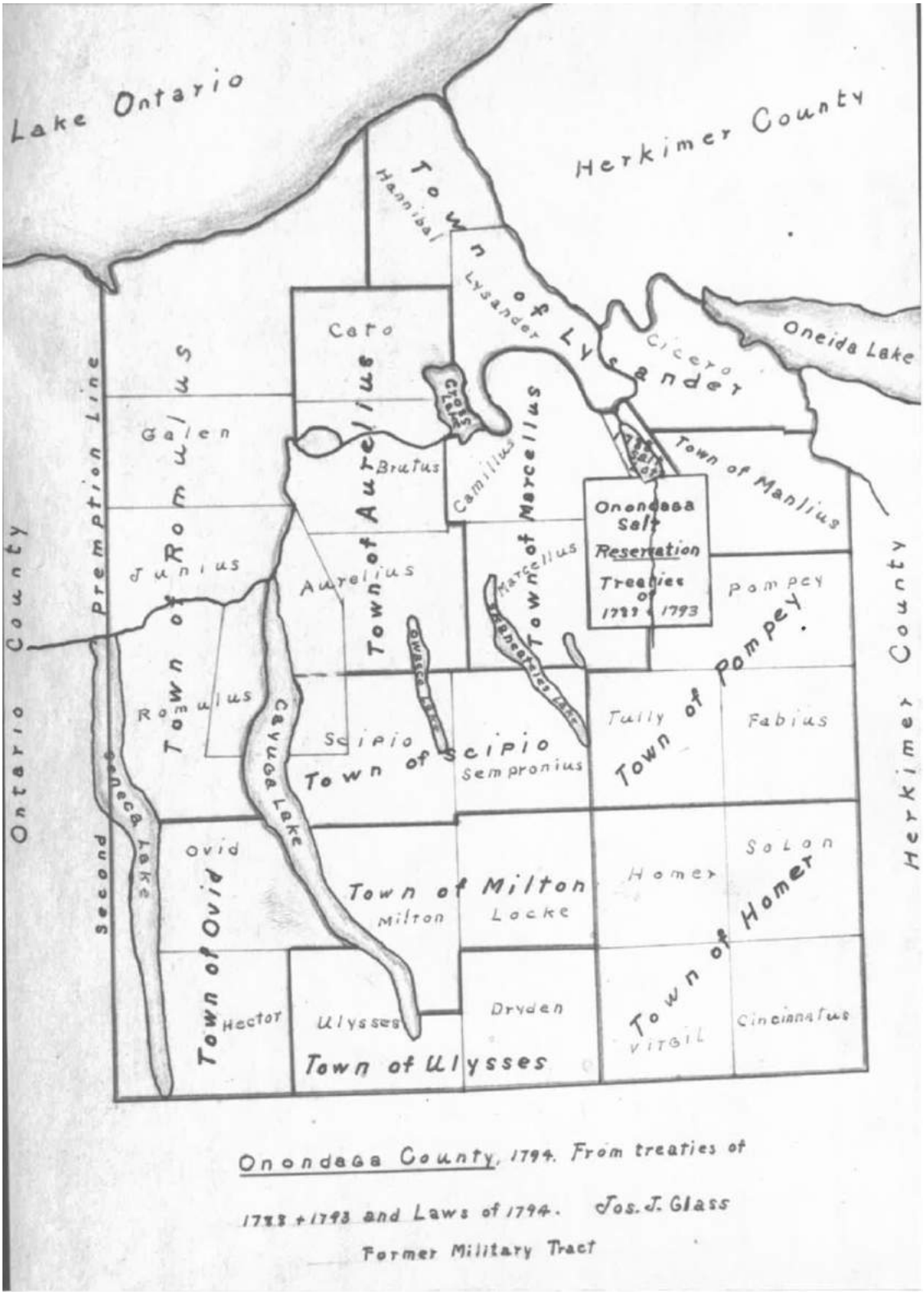


Figure 2.5: Onondaga County showing established townships and the Onondaga and Cayuga Reservations, c. 1794. (Source: Onondaga Historical Association)

2.4 The Clinton-Sullivan Campaign

President Washington authorized what is now known as the Clinton-Sullivan Campaign (Powless 2016). These campaigns were designed to assert American control of New York against British Canada, in the process dividing Haudenosaunee lands (an issue that persists today — the Haudenosaunee, there called Six Nations, also have reservations in Canada). Such an objective also included direct orders to eliminate the Onondaga people and their neighbors. In a letter to Gen. John Sullivan, President Washington wrote that the goal of the campaign was

> making the destruction of their settlements so final and complete as to put it out of their power to derive the smallest succor from them in case they should attempt to return this season (quoted in Koehler 2018, p. 433).

Such "final" destruction is part of what is documented in the counter-maps made from this study (such as Fig. 5.3). Nevertheless, this was celebrated as a victory for the US as if fighting belligerent enemies. Fig. 2.6 shows the troop movements, included in a brochure circa 1929 commemorate the sesquicentennial of the campaign. Note that no indigenous settlements are shown.

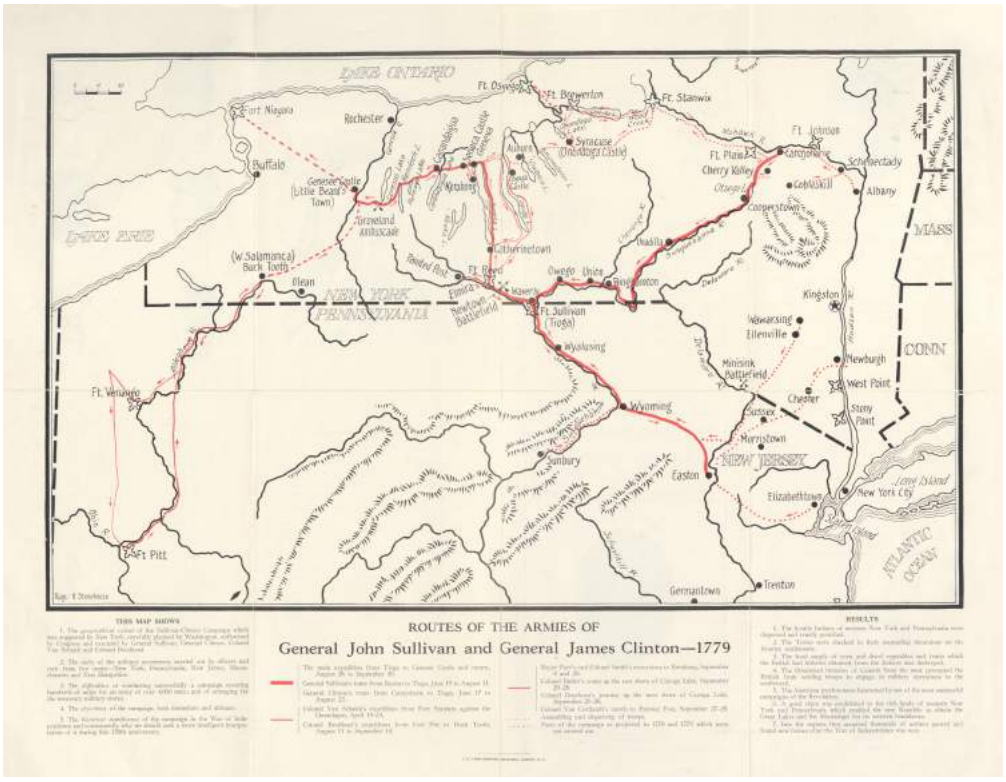


Figure 2.6: The movements of the Clinton-Sullivan campaign throughout New York State
Source: Cortland County Historical Society and Onondaga Historical Association

2.5 Ossahinta's Account

Newspaper clippings revealed that it was common practice to commemorate the Clinton-Sullivan Campaign, such as with the brochure depicting the map shown in Fig. 2.6. The following is excerpts from an article in the *Syracuse Post-Standard* from April 4, 1929. The account is interesting for its focus on Ossahinta, an Onondaga who witnessed the attacks and later was elected chief of the Onondaga Nation. While more sympathetic than most accounts, it still toes the line of the official account in problematic ways:

> **Next Sunday Anniversary of Attack by Van Schaick's Men on Onondaga Indians**
> *Battle Fought and Village Burned April 21, 1779, Under Order of Washington in Reprisal for Raids and Assistance to British Forces*
>
> Ossahinta was 19 years old.
>
> On the morning of April 21, 1779, he heard down the Onondaga valley the sound of many guns.
>
> A runner came into the village. Washington's men were on the march. They were near at hand. Even then they were coming up the valley from the lake, hundreds of them.
>
> Women and children run for the hills. Men prepare to fight for your homes. Ossahinta arm yourself. The American rebels are coming. Already there is blood on the trail which leads to Kan-ne-en-da on the lake shore. Fight, men, fight for your squaws, your papooses, and your homes! Ossahinta go forth and fight!
>
> It was morning in the Onondaga valley. It was April 21, 1779.
>
> **Village Burned**
>
> Ossahinta did not know that by nightfall there would be not a home left in the valley, that nothing but ashes and curling smoke would mark where he had lived. He did not know that when the sun set 12, or was it 15, men of the tribe of Onondaga would be lying dead, pierced by musket balls of Van Schaick's soldiers. He did not know that death and desolation were to be spread from one end of the Onondaga valley to the other.
>
> That night Indian mothers cuddled fatherless babies to their breasts back in the hills, among the trees, while down below could be seen the still-smoldering fires set by Van Schaick and his men. The night was cold, but colder were their hearts, for hope was dead. Wives crooned and wailed and rocked, arms clasped to knees, for their men had not come back from the fight, and they never would return.
>
> **Indians Loyal to Friends**
>
> Indians are loyal to their friends. They are loyal to the memory of Sir William Johnson. He was dead when the American revolution began, Sir Guy Johnson succeeded in his loyalty to his king and to the friendship of the Indians.

Yet there was a division of sentiment. Some of the Indians openly joined in the warfare with their English allies. Some there were who professed neutrality, and others who were friendly to the colonists and their cause.

In 1778 there were many Indian raids on the white settlers, and in November of the year the bloody Cherry Valley massacre with its 32 dead.

It was decided there must be reprisal. More than that, the Indians must be subdued. They must be taught such a lesson they would no longer aid the English. The lessons were given, but the Indians were not subdued. There were raids on the settlements long after the burning of the Onondaga village.

Ordered by Washington

It was because of the attacks of 1778 that Washington ordered the expeditions against the Iroquois. He could not separate the sheep from the goats. The innocent suffered in the punishment of others. It has often been contended that there never should have been the attack on the Onondagas.

They claimed to have been a peaceful and neutral people, if anything friendly to the American cause, but the capitol of the Iroquois confederacy was the Onondaga long house. The Iroquois must be punished. They were.

The Onondagas asked: "Whether all this was done by design, or mistake," and Colonel Van Schaick said, "They were cut off not by mistake, but by design. I was ordered to do it, and it is done."

. . .

In the days following the Indians came down from the hills and the woods. They buried their dead, and moved farther up the creek to rebuild their homes.

Ossahinta had seen the Onondaga's last stand. . . . Ossahinta was 19 years old when VanSchaick's expedition came against his people. He lived until his 86th year, to die the year before Syracuse became a city, head chief then of the Onondagas. . . . The pipe of peace has been smoked these 150 years in the valley of the Onondagas, but the memory of Van Schaick's expedition has not been forgotten as it was told by Ossahinta and those who fled to the hills, and as it has been told and retold since April 21, 1779.

Roughly a century after the campaign, local historian and ethnographer William Beauchamp was working to collect local history of the Haudenosaunee, adding his findings to the archives of the Onondaga Historical Association (OHA). Aside from tribal elders and oral histories, Beauchamp's work remains some of the most detailed for Haudenosaunee history and toponymy. Figure 2.7 shows his map of Onondaga County. Of note, the map includes native place-names, including place-names for Haudenosaunee villages that were supplanted by nearby European settlements. However, as other maps suggest, many of these settlements were gone after the Clinton-Sullivan campaign.

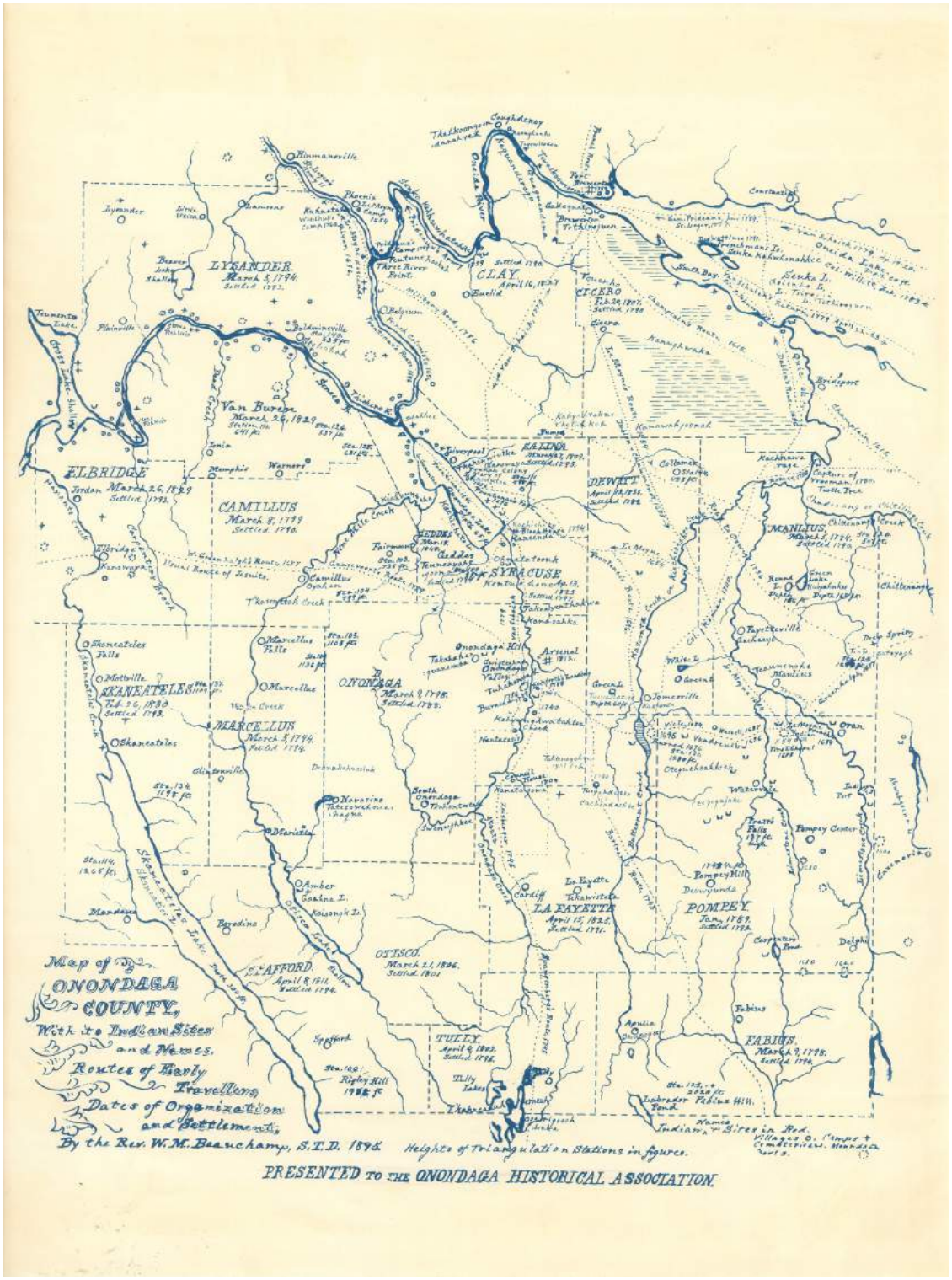


Figure 2.7: Map of Onondaga County showing indigenous settlements, by W. M. Beauchamp
Source: Onondaga Historical Association, c. 1895

As such, indigenous history quickly fades from the maps and the landscape in the aftermath of the American Revolution. The Haudenosaunee were no longer a unified people, either in terms of their political opinions about neighboring nations (i.e., America and Canada) nor their status as independent nations alongside the new North American powers. Even the small reservation designated for the Onondaga Nation was later reduced by additional land sales.

Of note, one of the first permanent white settlers in the area, Ephraim Webster, was married to an Onondaga woman and considered a close ally. He helped to facilitate peaceful relations between the Onondaga and settlers, but by 1817 included a private homestead for himself in one such treaty. This was seen as an act of final betrayal and yet another loss of land and sovereignty.

A critical view of history reveals sad ironies. In 1790, Congress had passed the Nonintercourse Act, stating that only the federal government could make treaties with indigenous nations. Yet, this did not stop New York State — working with Ephraim Webster — from buying pieces of the reservation (the legality of these sales is continuously challenged, unsuccessfully, to this day). Moreover, in 1988 Congress acknowledged the example of the Haudenosaunee for their influence in the creation of America's democratic government.

In the next chapter, I establish the theoretical background through which I can approach these other narrative threads of history, continuing to seek indigenous perspectives and counter-narratives.

Chapter 3 Theoretical Foundations

There is an irony in writing a thesis about a deep map, as such a method is an uncharted space where few have gone. The materials from which deep maps draw — historical archives and texts, in this case — lend themselves easily to a discussion of deep mapping, while the scholarship in this area remains nascent. As such, a discussion of related work for deep maps really considers *adjacent* work: scholarship that has led to the turn toward deep mapping. This chapter begins with a statement on open scholarship, which is foundational to this work. I then offer a critical review and synthesis of scholarship on historical GIS and the use of archives, critical cartography, and indigenous cartography.

These sections establish the lenses through which I will later discuss my methods for deep mapping and interpret the history narrated in Chapter 2. To that end, the sections below on mapping text and cartographic design both focus on methods that can be signaled to in developing a deep map. Like a deep map, these sections also overlap and circle back to each other, creating a richer narrative than what one approach alone may offer.

3.1 Statement on Open Scholarship

Every aspect of this thesis project has been made using Free and Open-Source Software (FOSS) and related tools for open and reproducible research. This was done for two reasons. First, as an acknowledgement that cost can be a barrier of entry to research, especially for marginalized communities, every tool used is freely available to all. The Haudenosaunee government was profoundly participatory and democratic; the tools used here reflect those same values. Secondly, FOSS tools were used so that, in the spirit of critical inquiry, anyone can review my maps, code, and data — including putting key components of this work in a GitHub repository.

While it was not possible to avoid archive research fees, I am also committed to making several of the archival maps publicly available (with appropriate permissions) through the publication of this thesis (and later, its companion website). As with the use of FOSS tools, this is done so that anyone can access, evaluate, and perhaps expand upon this work.

Finally, until the work of this thesis, no polygon existed of the Military Tract. That shapefile will be made available in the GitHub repository for this project for anyone wishing to continue historical GIS research of the region.

3.2 Archives & Spatial History

Working with historical maps poses several unique challenges. Cartographically, these maps create difficulties when integrating them into a GIS due to issues of scale and projection (Rumsey and Williams 2002). These issues will be addressed fruther in Chapter 4. From a more theoretical and critical perspective, archives produce challenges of three unique kinds. This is what Mills (2013) terms "fragments," "objects," and "ghosts." Fragments refer to the idea that any text in an archive is fragmentary. "Objects" refer to the physical objects which serve as literal pieces of history, while "ghosts" give a poetic name to the historical voices one can finds in biographies and other first- and second-hand account.

First, the fragments: like sampling of data in physical geography, it is impossible to have the entire narrative, no matter how well-researched. These lacunae in the archive — whether a literal missing line or page of a given text or a gap in the available data — force the possibility that some detail may be missing. For deep mapping, this generates the fundamental epistemological challenge: that a map can always be made "deeper" or more complete. As David Bodenhamer says in the preface to his forthcoming book on deep mapping, "We must insist that the map acknowledge the incompleteness and ambiguity of our [i.e., humanists'] data and be open to new information as we discover it" (Bodenhamer et al. 2022, p. xiv). When history, in maps, is approached as a humanistic discipline, it becomes clear that humanities scholars, unlike GIS technicians, are interested in a different kind of spatial question. Bodenhamer writes elsewhere, "[T]he goal is not proof but meaning. The goal of scholarship is less to produce an authoritative or ultimate answer than to prompt new questions, develop new perspectives, and advance new arguments or interpretations" (2015, p. 11). All of this is to say that by entering the archives — and with it, the world of fragments, objects, and ghosts — geographers have to renegotiate the certainty of the maps they read.

In the same way, the "objects" of the archive, like the beads and arrowheads found in Tuck's (1971) archaeological digs (see Fig. 2.2) again create a spatial history, but not one that lends itself easily to the precise conclusions of typical GIS (Mills 2013). The objects represent both space and time, but without necessarily giving clear answers as to either one. In the same vein, Ethington (2007) has articulated time in history as a "metaphoric entanglement with space" as he laid the groundwork for a study of history in explicitly spatial terms. Glass beads cannot be put on a map, only the place where they were found — and thus the map (at least in a conventional sense) is not the complete history. Nevertheless, it is the layers of such objects, and the corresponding villages and trading posts, the slowly structure a place into being —

making a place a "historically-contingent process" evolved out of the peoples and institutions there (Pred 1984). To be clear, the town of Syracuse would be one such example, as suggested by the fragments and objects here: repeated human activity has allowed for the growth of multiple societies and the placing of a village here.

Finally, the "ghosts" in the archives are the biographies of people who can no longer speak directly. They are the people who influenced the "structuration" of place, but can only be spoken *about*, not *to*. For the Haudenosaunee, these are the spirits of the Great Peacemaker, Hiawatha, and Ossahinta (whose story is told in §2.5) walking the land but leaving many questions unanswered. However, that does not mean that such ghosts offer no value. Indeed, Barbaresi (2018) has shown how toponyms can be "entry points" for the mapping of a text. By knowing — even partially — where the ghosts may have wandered, geographers can, in Mills's term, "animate" the ghosts. Such animation and revitalization of the past reveals the tantalizing possibilities of archival work for many forms of historical GIS (Kemp 2009), but especially for deep mapping. At the same time, even the ghosts of the archive may be limited in what they can say, based on what choices were made to preserve (or not) those voices.

In the next section, I situate deep mapping and archival research within a framework of Critical GIS before turning my attention to indigenous cartographies and ultimately *how* such a critical deep map depends on both Qualitative GIS and sound mapmaking principles.

3.3 Critical Cartography

Just because Haudenosaunee peoples were displaced and European settlements established does not mean, of course, that indigenous history in the area has ended. In fact, the illusion that indigenous peoples are gone — or were never there in the first place — is partly an argument made by maps. Consider, for example, the contrast between Glass's map (Fig. 2.5) and Beauchamp's (Fig. 2.7).

> Maps are never value-free images; except in the narrowest Euclidean sense they are never in themselves true or false. Both in the selectivity of their content and the signs and styles of their representation maps are a way of conceiving, articulating, and structuring the human world which is biased towards, promoted by, and exerts influence upon particular sets of social relations. (Harley 2002a, p. 53)

As a critique, Critical Cartography (and relatedly, Critical GIS) seeks to uncover the power relationships hidden on maps, along with their accompanying ontologies (Elwood 2010). Whether intentional or not, colonial maps of New York that neglect indigenous settlements can give the impression

that such lands are open and free for the taking (and sadly, the removal of Haudenosaunee in the Clinton-Sullivan campaign rendered such maps "true" after the fact). Maps that depict European settlements but not those of Haudenosaunee also make an ontological claim that indigenous settlements no longer exist (such as Glass's map of townships, Fig. 2.5). On the other hand, even maps like Beauchamp's that show indigenous villages are not beyond critique: representing the indigenous villages alongside European ones still risks avoiding the bloody truth about why some of those villages are gone now, reinforcing the gaps (fragments) in the archives and selectively silencing the ghosts. As Harley wrote in his essay on colonial cartography in New England, "he polemic of cartographic discourse should never surprise us" (Harley 2002b, p. 187).

More to the point on such fragmentary records, because maps are also a tool for governmental organizations (such as the United States Geological Survey), by erasing indigenous history from official maps the indigenous presence is erased from "official records." Outside of the US, such a view has had devastating consequences even today. In Ecuador for example, oil and natural gas companies were given permission to drill and extract from "uninhabited" forests, thus contaminating local aquifers and lakes (Sletto et al. 2020). When indigenous peoples in the forests attempted to stop the extraction and mitigate the damage, initially they were told they had no claim to the lands because there was no record of their settlements. Subsequently, mapping has become a tool for protecting indigenous lands precisely because of the production of "official" records. To be clear, this in not to say that the tribe in question did not have their own spatial knowledge of their lands, only that there was no "map" of their people in the Western sense. When the map was created, it became an archival object (Mills 2013) from which to assert land rights and establish a historical record of their existence.

3.4 Indigenous Cartography

Continuing in the dialogues of critical cartography, indigenous cartography emerged as a way for native peoples to have a voice in the "negotiation of how to be in and on the map" (Preci 2020, p. 21). Such mapping practices are often part of a larger political movement around ancestral lands, ecological knowledge, and political representation (Eddy et al. 2017; Delgado-Aguilar et al. 2019; Sletto et al. 2020). These maps, while critical to the environmental crises of today and essential for the political futures of indigenous peoples, do not always focus on the past.

Nevertheless, indigenous peoples throughout the world often have a keen sense of their own lands and local history, especially as seen through toponyms (Cole and Hart 2021). Morphy et al. (2020) have shown that toponyms encode the history of an indigenous group, even when such a group is no longer the primary culture of a region. For example, the Yonglu group of Australia had records of earlier coastlines (before the effects of sea-level rise) encoded in their stories of how long it took to travel to places and the corresponding toponyms. As with other indigenous toponyms, the name of a place served both a narrative function and a geographical one, embedding spatial knowledge of indigenous homelands within the traditional stories (Pearce 2014). Moreover, indigenous oral histories also serve as a record of specific spatial events. McMillan (2002), for example, showed that oral history of the Coastal Salish peoples contained records of prehistoric earthquakes that could be verified in the geological record, even thousands of years later! To date, however, such maps have not become common practice with existing GIS technologies, aside from deep maps that use landscape topography as an anchoring layer (Bodenhamer et al. 2015) in the way that Morphy et al. or Barbaresi use toponyms. In this way, critical and indigenous cartography could benefit from the growing scholarship for deep mapping.

3.5 Mapping Text & Narrative

Given the current technologies, how can spatial knowledge and history that has been erased from authoritative maps and only fragmentarily maintained in archives and oral histories be given its rightful place in deep maps? The question is essentially one of what can be incorporated into a GIS in meaningful, albeit qualitative, ways. As with other work discussed here, deep mapping as a branch of cartography remains on a leading edge of what is possible here, such as Dunn et. al's (2013) museum-like exhibit. Nevertheless, their definition of a deep map as the intersection of "*text*, *space*, and *time*" is a useful one for thinking about the qualitative dimensions required.

For *text*, Kwan and Ding (2008) emphasize that textual data can be used to verify other findings and thus establish greater rigor in the visualizing of an ethnography. By positioning maps as a way to visualize the findings of textual data, they anticipate Mills's (2013) assertions about animating the ghosts in the archive through the paths travelled — and thus offer GIS as an explicit tool for cultural and ethnographic research. In terms of *space*, we can again turn to specific places:

> Histories representing the past represent the places (*topoi*) of human action. History is not an account of 'change over time,' as the cliché goes, but rather, change through space. Knowledge

> of the past, therefore, is literally cartographic: a mapping of the places of history indexed to the coordinates of spacetime. (Ethington 2007, p. 466)

By indexing place to space and time, we thus integrate the knowledge of history, even when recorded in textual artifacts, into a single cartographic mechanism. That's not to say, however, that such mechanisms are simple or straightforward. When Taylor et al. (2020) attempted to document a community's resilience to flooding, where specific emotions and attitudes about flood events were documented as a qualitative layer within a GIS, such qualitative data were indexed much like Ethington described: people recalled how they felt, and what they anticipated, because of specific events. Still, Taylor called such maps "messy" and devoted considerable energy to how such qualitative layers might be visualized alongside and on top of more typical GIS data.

Likewise, Jung and Elwood (2010) have explored the linking of Qualitative Data Analysis (QDA) with the analytic capabilities of GIS, coding a text with specific markers to establish relationships between the text, space, and time. But as Ethington (2007, p. 483) clarifies, "every past is a place" — not was, because of how history indexes itself to specific places, both in memory and in material places. More precisely, "All action and experience *takes place*, in the sense that it requires place as a prerequisite, and *makes place*, in the sense of inscription." Fundamentally then, Qualitative GIS — and historical GIS in particular — requires consideration of the construction of the database behind the map. Beyond being an archive of fragments, this database must consider the relations — or in Ethington's term, the *indexes* — between the layers of the map. To the point, it is such indexes of relation that give deep mapping its depth, pushing the boundaries of what is ontologically possible within a GIS.

In this way, too, deep maps return GIS to its older roots in cartography, concerned with layers of meaning and symbols. Bodenhamer articulates deep mapping as being simultaneously a platform, a product, and a process — wherein those qualitative indexes can be made clear:

> As a process, [deep mapping] engages evidence within its spatio-temproal context, and traces paths of discovery that lead to a spatial narrative and ultimately a spatial argument. As a product, it is the way we make visual the results of our enquiry and share the spatially contingent argument enabled by the deep map (p. 7)

To do so, however, requires careful consideration also of the map as a designed *product*.

3.6 Cartographic Design

At a basic level, a deep mapping project is a cartographic one. Questions of the best ways to represent narrative data (like archival texts) on a map do not preclude the principles of good mapmaking. Simply putting a historical map and an oral-historical narrative together does not automatically make a deep map; care must be taken to meaningfully construct the deep map itself. In this spirit, Field (2018) defines cartography as "the kinds of thinking that lead to better mapmaking." That is, making a map is the goal; cartography serves as the "handbook" of such an endeavor. Specifically, this deep mapping project, especially situated within critical cartography, needs to consider cartographic design. As such, let's consider the practical ways in which deep map elements can be symbolized in maps.

Semiotics — or the study of meaning via signs and symbols — offers theoretical frameworks for understanding the meanings of culture and history in symbolic terms (Lotman 2000) — though as an aside, some semiotic theory focuses not on *symbols* (which symbolize) but *indexes* (which indicate), much as Ethington used the term above. Nevertheless, the structures used in particular narratives and the histories with which they intertwine can be understood as semiotic means of conveying culture (and, incidentally, also means for coding textual data for analysis). In fact, one such literary theory offers a useful tool here. Propp (1968) introduced the terms *fabula* and *syuzhet* as a way of distinguishing between the chronological events of a history and the episodic and dramatic telling of it, respectively. Specifically, the *fabula* is the historical arc (as given in Ch. 2), but the maps produced from researching the history can employ *syuzhet* and focus intensely on specific moments. The order and design of a map series will tell a story.

While such studies like Propp's are often part of linguistics or literary analysis, Bertin ([1967] 2010) painstakingly applied semiotic theory to graphics, including maps. In such an approach, attention is given to the kinds of symbols used in making a map and the means (including text, but in this case primarily focused on visual elements) whereby meaning is conveyed on the map. Consider again, for example, how Pearce (2014) navigated using symbols and text when producing an indigenous map of the Penobscot Nation. Use of a semiotic lens also illustrates a major shortcoming of the Beauchamp map (Fig. 2.7): by only representing settlements as circles, there is no other distinction made between indigenous and colonizer villages, nor a record of when they were founded or destroyed. In other words, while there is value in representing both groups together on a map, there are persistent issues of how history is represented (or not) on a map and the power structures pointed to by Harley (2002). Likewise, such a

semiotic lens can be used as a tool to reconnect indigenous history to the landscape, as explored above (§3.4, Indigenous Cartography). In terms of map design, these symbols can themselves be an expression of community ideals and the relationships between different places (Sletto et al. 2020). However, use of only semiotics still does not fully consider elements of map design.

Beyond symbology, the maps required for a project like this must carefully construct how to represent qualitative data. Even if qualitative data are successfully integrated into a GIS (though this is not always guaranteed), depicting such *qualia* on a map is a different matter. There is not only a challenge to convey this data in a way that is clear, but also to "escape flatland" — to convey a depth of knowledge and information within the confines of two dimensions on paper (Tufte 1990). For this, considerations of color — like "ash grey" or "blood red" (Syme and Werner 2018) – can intensify the qualities deemed essential by the mapmaker.

Finally, it's essential to consider that maps themselves are not only tools for power (as Harley (2002) says) or even only presenting information. Maps themselves can be tools for theorizing (Pavlovskaya 2006). In this way, cartographic design of a deep map returns to where this chapter began: depicting history in space. New narratives of local history will emerge from the mapping process itself. New combinations of archival maps and textual data will produce new results. I detail how these new combinations will be made in Ch. 4, Methods.

Chapter 4 Methods

Perhaps the most exciting prospect of this thesis is that deep mapping, as a kind of cartography, is still being developed. As such, while individual components of the methods herein have precedent — such as georeferencing historical maps (Rumsey and Williams 2002) or geocoding texts in order to map them (Barbaresi 2018) — combining various components for the making of a "deep map" remains open for debate and experimentation. Of note, the first volume with an explicitly *methodological* focus in deep mapping is still forthcoming (Bodenhamer et al. 2022); however I was able to acquire an advance copy.

Nevertheless, deep mapping also remains grounded (at least by some) in cartographic practices, especially the kinds of mapping insights resulting from overlay in a GIS. In short, these methods are an attempt to make a deep map through the overlay of geocoded textual data onto historic maps. Fig. 4.1 shows a sketch of the proposed workflow, while Fig. 4.2 highlights the overlay analysis (building off of Fig. 4.1). Subsequently, §4.1 outlines the sources of data for these analyses and maps and §4.2 explains each step of the workflow in detail.

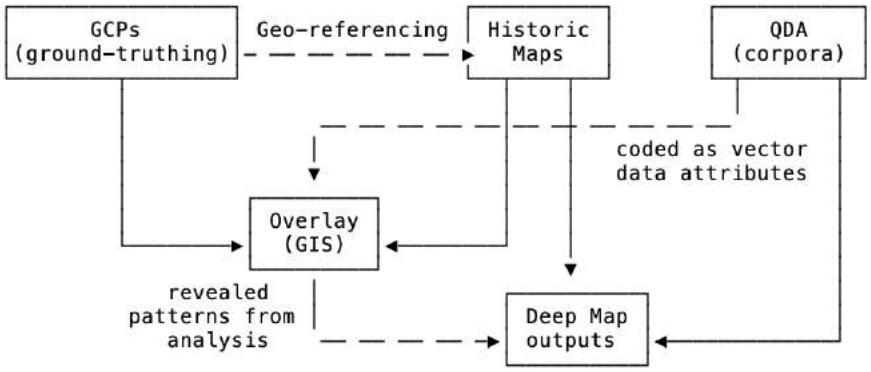


Figure 4.1: Workflow for the creation of a deep map.
(Dotted lines represent specific processes described below.)

4.1 Data

Data for this deep map will come primarily from the sources summarized in Table 4.1 below. The county planning office of various counties (Onandaga, Cayuga, Cortland, and Oswego) have provided vector data for boundaries (i.e., the county, townships), water bodies, streams, 10m contours, and land parcels. The majority of the archival data (both maps and texts) come from the research center at the Onondaga Historical Association (OHA), though another local archive (the Cortland County Historical

Society, or CCHS) provided additional maps and corroborated some textual findings. Table 4.2 lists the historic maps scanned at the archives for use in these methods.

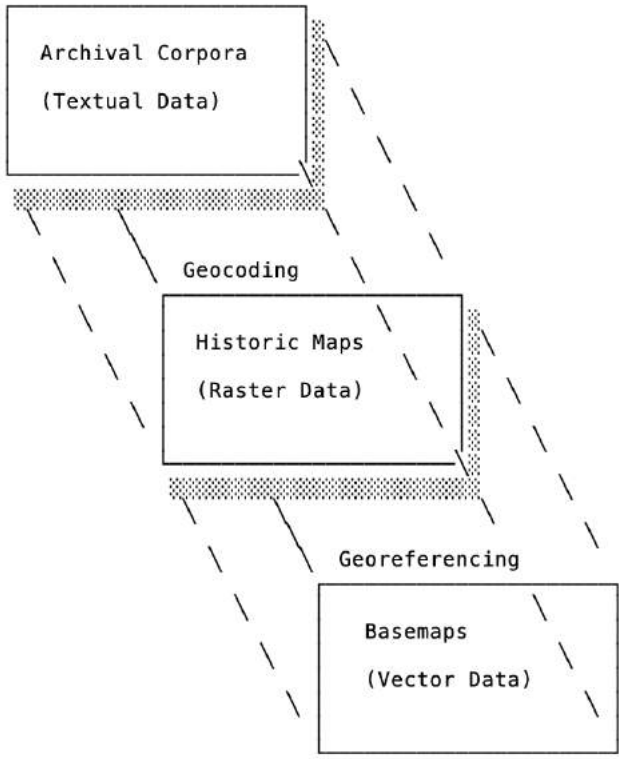


Figure 4.2: Overlay components for making of this deep map.
(Note the use of geocoding and georeferencing in the overlay.)

Source	**Description**	**Use**	**Availability**
Counties of Central NY	Modern parcel, river data	Georeferencing, ground control points	Sent by the county GIS technician
OHA	Historical Maps	Map Overlay	At the archives[a]
OHA	Textual Archives	Cultural/political history, biographies, & toponymy	At the archives[a,b]
CCHS	Historical Maps	Map Overlay	At the archives[a]

Table 4.1: Data Sources, Use, and Availability

[a] Scans of maps are made at the archives for a nominal fee. Books cannot be checked out, so textual data must be worked with at the archive's research center.

[b] Textual data was worked into a usable dataset. See §4.2.2

Map Description	Author	Year
First European Expedition	Lewis Evans	1751
Indigenous Settlements	W.M. Beauchamp	1895
The Boundary Line Treaty	F. W. Halsey	1901
Clinton-Sullivan Campaign	Unknown	1929
Romance of Onondaga County	Paul Paine	1929
The Military Tract	J. Glass	1948
Archaeological finds	J. Tuck	1971
Reservation Boundaries	*Syracuse Post-Standard*	1991

Table 4.2: Maps Digitized from the OHA

4.2 Workflow Description

As mentioned above, the workflow for this thesis (and the resulting deep maps) relies primarily on *overlay*. While this technique is relatively straightforward, the historical nature of this project posed unique challenges. Before considering the specifics of each component to these methods, it is necessary to outline a key component of doing such an overlay, registering the layers of data within the GIS to each other. As shown in Fig. 4.2, this requires both georeferencing and geocoding, which I will elaborate on below. In short, both require that the coordinates of each layer correspond to each other as precisely as possible. Fig. 4.3, borrowed from O'Sullivan and Unwin (2010), demonstrates the error that can arise in overlay processes.

My hypothesis was that deep mapping as a textual and humanistic enterprise can reveal patterns not found in the "official" record of historical maps. Thus, great care must be taken to properly align and project all layers.

4.2.1 Digitizing & Georeferencing Historic Maps

The archives of the OHA hold multiple historic maps of interest for this project. However, because of the wide range of dates for these maps, many of them are hand-drawn and only available in paper form. Therefore, the first step in being able to use these maps in further analyses was to request a high-resolution scan be made (Rumsey and Williams 2002). For a small fee, these are done either by the archivist at the OHA, or in the case of large maps, sent out by the archives to a scanning service. The scans were made at a minimum of 300 DPI, allowing for the images to be converted into TIFF files.

In order to georeference the map images (which are functionally treated as raster files), the scan of each map was input as layers into QGIS. Using the vector data provided by respective county GIS offices, a

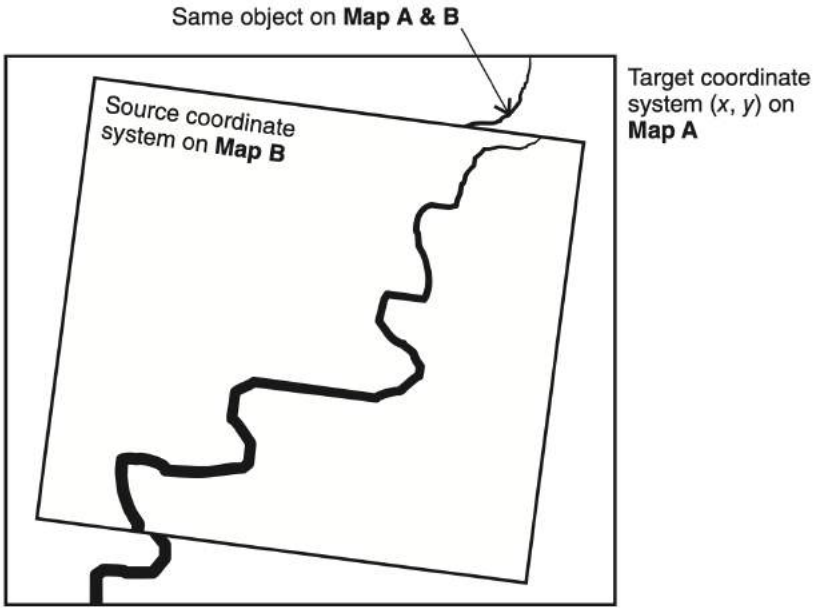


Figure 4.3: Properly coregistering layers allows for precise analysis.
(From O'Sullivan and Unwin (2010), Fig. 11.2)

set of ground control points (GCPs) was determined individually for each map. Both the vector data used as the basemap and the GCPs are in the New York State Plane (Central) coordinate system. Even though the basic steps are the same for each map, it is necessary to note that the specific points chosen for each map were unique. For example, when georeferencing Beauchamp's map (see Fig. 2.7), the GCPs selected were all based upon either bodies of water (Onondaga Lake, Oneida Lake) or the boundaries of towns (i.e., the polygons which function as sub-counties within Onondaga County). For Glass's map (Fig. 2.5), points for town boundaries are the only realistic option. Finally, the selection of GCPs was iterative — a set of points was created, the georeferencing algorithm run, and additional points added as needed in order to increase the accuracy of the georeferencing.

Multiple georeferencing methods are possible, depending on the nature of the data at hand (Lippitt 2020). Factors in deciding upon a georeferencing algorithm include the accuracy and precision of the data, the availability of GCPs, and the intended outcome of the georeferencing process (QGIS Project 2021). For example, a Helmert transformation is good for registering rasters to the same coordinate system, but only works for high-quality data. While the scans of historical maps were high quality, the maps themselves were not highly accurate by modern standards, so this algorithm was not a good choice. As another example, various polynomial transformations risk introducing distortion. Since historical maps often have

distortions or inaccuracies by virtue of being hand-drawn or printed with a lithograph (i.e., not generated with the precision of a computer), this method was also not feasible — the goal was to improve inaccuracies, not introduce new ones.

Thin Plate Splines (TPS), however, proved an effective choice of transformation algorithm. First, it is the established choice of method for georeferencing within Historical GIS (Rumsey and Williams 2002, Bodenhamer et al. 2010). This is because TPS allow for local polynomial transformations around each GCP, rubber-sheeting the georeferenced map to the vector basemap. It is best used on inaccurate or damaged maps as well as maps where the original projection or coordinate system is unknown (QGIS Project 2021) — all of which applied to the archival maps used in these methods.

Because of the nature of the transformation, TPS requires numerous control points, ideally upwards of 20. While more time consuming, this means GCPs are more precisely matched and the areas further from a GCP to be more distorted, so increasing the number and spread of GCPs minimizes the overall errors in georeferencing (O'Sullivan and Unwin 2010). This method also creates a rotated and warped look to the original scans, as shown in Fig. 4.4. Each historic map that was used in this step is listed in Table 4.2.

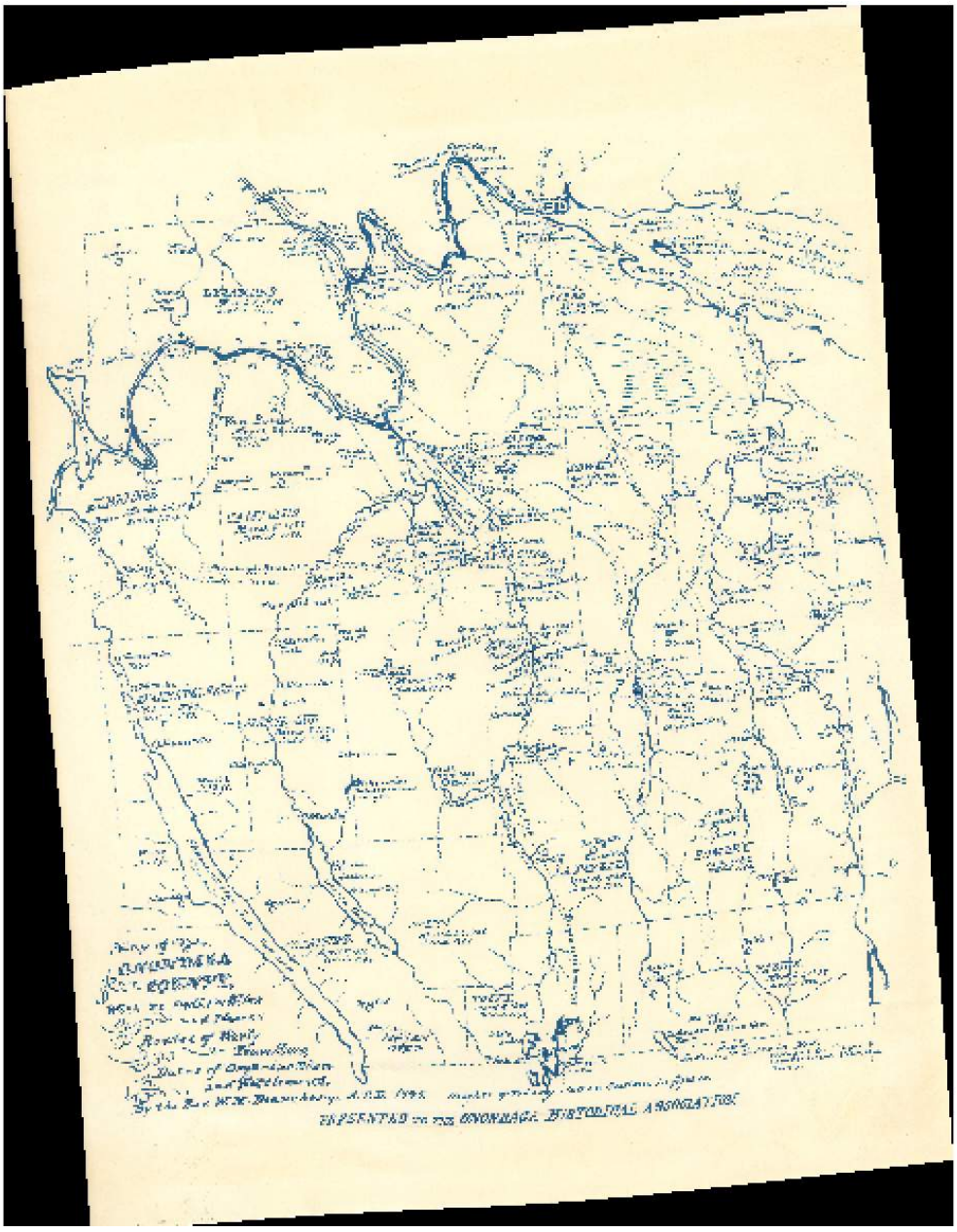


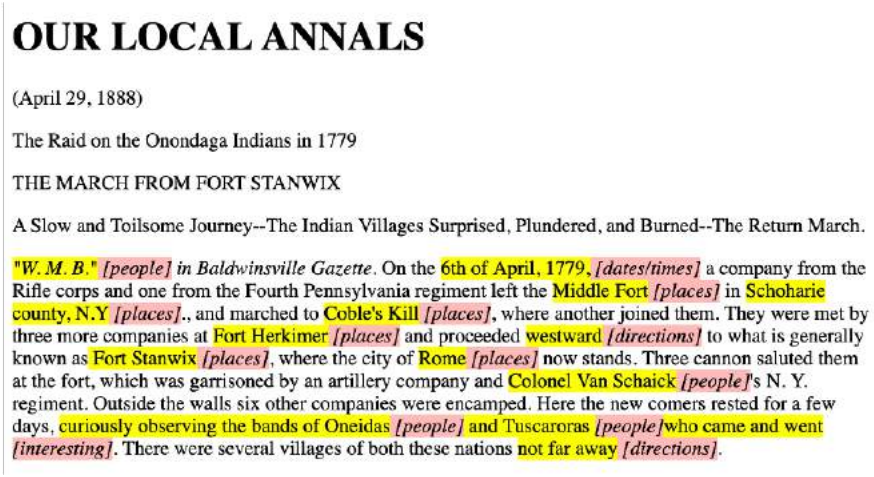
Figure 4.4: Screenshot of the georeferenced map using thin plate splining

In order to complete the analyses performed later, a polygon of the study area had to be created in QGIS. This was done by first georeferencing Glass's map and then carefully tracing the polygon. The polygon was then updated to more closely align with vector data provided by local counties. For example, Chittenango Creek divides Onondaga and Madison counties, just south of Oneida lake (forming part of the eastern border of the Military Tract. The original traced polygon from Glass's map was updated to follow the creek more closely.

4.2.2 Working with Textual Data

The coding and geocoding of textual data follow the methods outlined by Saldaña (2021). These data, extracted from the OHA, fall broadly into three categories: (1) biographies and travelogues of early explorers, as primary data — following Mills (2013), these "animate the ghosts" of the archive; (2) newspaper clippings, as secondary sources recounting historical events; and (3) researched volumes of history, such as Amrhein's (2016) book on land rights and treaties in the area, as tertiary sources. These textual sources were extracted into a gazetteer which was, as with other steps, iteratively added to during the research. Originally, this gazetteer was intended to be used for automated geocoding processes; this step was determined to be beyond what was feasible and is offered as a continuation of the study in Ch. 6.

Nevertheless, coding schemata allowed for a systematic way to approach the archival texts. See Fig. 4.5 for an example. For this newspaper clipping, I coded for specific people and dates, relative spatial information like direction, and (most importantly) places. While many codes proved to be less useful once the additional step of automating some of the QDA was set aside, the organization still proved useful in the making of later maps.



OUR LOCAL ANNALS

(April 29, 1888)

The Raid on the Onondaga Indians in 1779

THE MARCH FROM FORT STANWIX

A Slow and Toilsome Journey--The Indian Villages Surprised, Plundered, and Burned--The Return March.

"W. M. B." [people] in Baldwinsville Gazette. On the 6th of April, 1779, *[dates/times]* a company from the Rifle corps and one from the Fourth Pennsylvania regiment left the Middle Fort *[places]* in Schoharie county, N.Y *[places]*., and marched to Coble's Kill *[places]*, where another joined them. They were met by three more companies at Fort Herkimer *[places]* and proceeded westward *[directions]* to what is generally known as Fort Stanwix *[places]*, where the city of Rome *[places]* now stands. Three cannon saluted them at the fort, which was garrisoned by an artillery company and Colonel Van Schaick *[people]*'s N. Y. regiment. Outside the walls six other companies were encamped. Here the new comers rested for a few days, curiously observing the bands of Oneidas *[people]* and Tuscaroras *[people]*who came and went *[interesting]*. There were several villages of both these nations not far away *[directions]*.

Figure 4.5: A coded portion of a newspaper clipping, leading to the construction of the database for textual information.

These coding schemata, then, support two parallel processes: *coding* and *geocoding*. Where coding allows for the analysis of text based on semantic items (such as names and dates), geocoding is a separate process that allows for the connection of a toponym to a specific set of coordinates. In this way, following Barbaresi (2018) and Morphy (2020), geocoded toponyms can "anchor" a qualitative layer onto other maps — in essence, a specialized kind of overlay.

Additionally, as these textual corpora are overlaid with the georeferenced historical maps, other processes were used to search for patterns. For example, when troop movements of the Clinton-Sullivan campaign are described as being within a certain distance of a lake's edge, a buffer zone for the lake can be created in order to more precisely map troop movements.

4.2.3 Designing Maps and Map Layers

Ken Field (2018) asserts that even as the technologies of cartography have evolved, fancy tools should never be a crutch when making a good map — sound principles of map design endure. As such, cartographic development and design merit a separate section in these methods. In the same spirit, Lloyd (2010) claims that in some ways a map is the first step in an analysis rather than only an output. In this way a close examination of georeferenced historic maps shall serve as a starting point for my deep map. Additionally, while the term "deep map" is becoming accepted for these and related methods, my output here would be more properly termed an atlas: specific maps in the series will each serve a specific goal in "narrating the depth" of local history (Ethington and Toyosawa 2015).

Of note, this thesis offers an opportunity to publish some of these historic maps for the first time beyond the archives of the OHA. As a part of my commitment to critical cartography and a critical-cartographic approach to deep mapping, I believe it to be necessary that the historic maps become more widely available. It is also my intention to give a printed copy of my thesis and the associated atlas to the OHA archives for use in further research.

The primary goal of these new maps is to reveal narrative threads of local history and to re-*place* the stories of this land's first inhabitants. As such, these maps will focus on two themes: (1) significant events for the Haudenosaunee, and (2) the displacement of the Haudenosaunee by European settlers and settler politics. For example, some existing maps show indigenous settlements (Figs. 2.4 or 2.7), others show the marches for the Clinton-Sullivan campaign (Fig. 2.6). Texts tell of villages burned but give no specifics. Therefore, overlay analysis can produce a new map showing villages burned. In the same spirit, descriptions of the landscape can become a hillshade map, which can also be used to verify and redraw maps of troop movements. A related and secondary goal is to remake archival maps and into a more useful and accessible format. For example, there is no timeline of these events in a concise and graphic format, as gleaned from historical sources. Additionally, maps of the reservation boundaries, while they exist in newspaper archives, are poor quality and hard to find.

In the next chapter, I retell the local history through maps, including the example maps mentioned above.

Chapter 5 Results

The deep map of the Military Tract is presented as a series of five static maps and a timeline graphic. Each (including the timeline) is designed to focus on a specific aspect of the history — and how the effects of these events are still seen and felt today. Doing so requires constructing the narrative in two ways: the historic narrative and the cartographic one. The cartographic narrative, by virtue of being visual, does not have to abide by a sense of chronological order, instead focusing on communicating salient details in a compelling but nonlinear way. On the other hand, the historical narrative (already outlined in Chapter 2) is told chronologically, linearly, and textually. As discussed in §3.6, neither the historical narrative (corresponding to Propp's *fabula*, or the chronological narrative) nor the cartographic narrative (corresponding to the *syuzhet*, or delivered story) can fully exist without each other and they often overlap (Propp 1968). Additionally, the timeline is where the two sides of the narrative most directly meet. These narratives, woven together, are part of what lends these maps their "depth."

5.1 Deep Mapping as a Process

Recall that Bodenhamer articulates deep maps as being both a *product* and a *process*. Specifically, the process is "responsive in its form to the questions asked, the evidence gathered, and the limits of the technologies used to create it" (Bodenhamer et al. 2022, p. 7). Framed in this way, the maps in this chapter reflect not only the enquiry of exploring Haudenosaunee history in local archives but reflect my own lived experience of coming to know the place. The maps begin with the land. Turn by turn, the maps reveal the movements of people, significant events that caused changes to the built environment, and finally the indigenous toponyms unknown to American settlers — indigenous history that, even incomplete, has taken considerable time to excavate from archives. In other words, my own deep mapping *products* reflect my *process of enquiry* not only in abstract ways but direct ones as well, intimately connected to my experiences of learning the land and its history.

At a more granular level, cartography forms a visual language unto itself, capable of narratives just as much as any language. This attempt at deep mapping can therefore also be seen as translating an historical, archival narrative into the language of maps. "Approaching cartographic language as narrative also allows us to structure the map deliberately to express the particular shape of the narrative we seek to map by combining the language of graphic variables and their grammar with narrative technique" (Pearce 2008, p. 21). While no translation can be perfect and nuances are always lost in translation, every choice of symbol,

color, weight, and transparency have all been deliberate, in the service of crafting a thoughtful visual story of these events.

In the sections that follow, a brief explanation is given highlighting the main focus of the map or graphic, key objectives, and the most salient of my design choices.

5.2 The Original Inhabitants

The initial map of this thesis (first shown in Fig. 1.1) is an essential part of the series. First, it acknowledges the Haudenosaunee as the original (and ongoing) inhabitants of this land. Moreover, the layers of the map forms the basemap upon which other maps were built, especially for color and shading. In terms of colors, most color choices came from *Werner's Nomenclature of Colors* (Syme and Werner 2018) — land is "emerald green" and water is "ultramarine blue." Additionally, there is a slight hillshading in the map. The lands of Central New York are described in European accounts (circa 1743) as being hilly, verdant, but still excellent land for farming and hunting (Bartram et al. 1973). Even today, such a description holds true.

Perhaps most important, the map exists without modern labels. As an exercise in counter-mapping, this is to remove colonial names (some of which seem absurd, like the lakes being named for different constituent nations of the Haudenosaunee — Seneca, Cayuga, Onondaga, Oneida). Including indigenous names comes later in the series, paralleling my process of inquiry and discovery.

These cartographic choices, taken as a whole, are meant to make way for deeper (often textual) inquiry into the place, as if to say, "Here's this piece of land, now what?" The maps that follow serve as responses to this implied question.

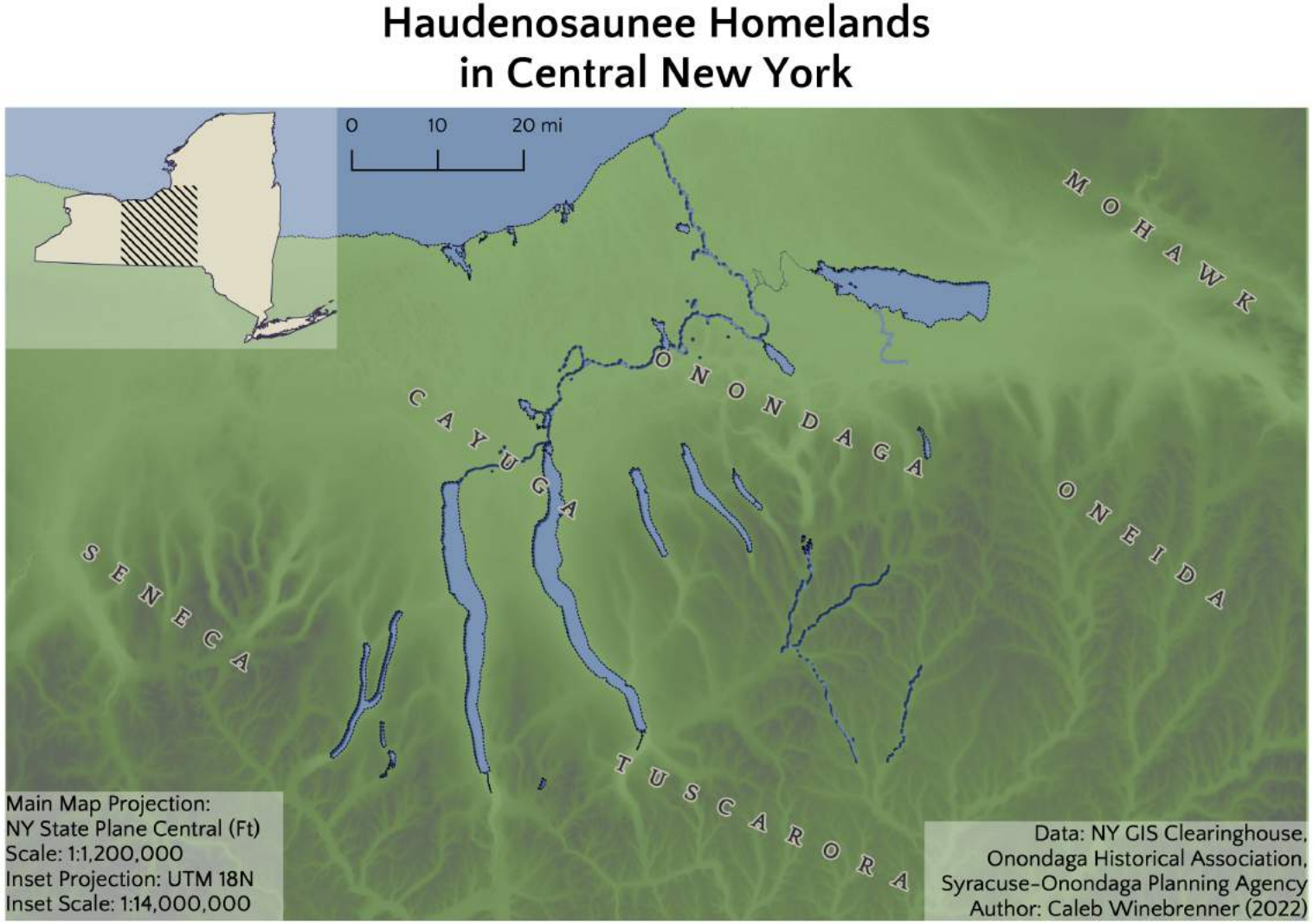


Figure 5.1: Haudenosaunee member nations in part of Central New York, circa 1715

5.3 The Hillshade Map

This map was originally planned to be a hachure map, but hachures are best done at a larger cartographic scale (Field 2018). Nevertheless, the richness of the physical landscape here and the strong connections between indigenous cartographic knowledge and landscape (Pearce 2014) mandated that some map of the landscape be made. In so doing, I made a slight adjustment to the azimuth (to 337.5 degrees) to accentuate the smaller hills and created multiple layers of the raster data, each with a slightly different color palette, attempting to emulate Imhof's colored hillshades (Tufte 2001).

This work proved especially important for two later maps. First, for the troop movements during the Clinton Sullivan Campaign (see Map 3, Fig. 5.3), archival sources suggested that marches followed the course of rivers, and when this was not possible, kept to level ground. As such, the hillshade layers helped to clarify or correct troop movements referenced from other maps. Second, when Ephraim Webster claimed his homestead (see Map 4, Fig. 5.4), the hillshade reveals that this selection was not arbitrary — but rather a small, fertile valley between two hills.

Additionally, this map — as well as two others later in the chapter — include an outline of the Military Tract as a dotted line. The tract boundary was presented in this way so as to give a common focus on the study area in the maps while not over-emphasizing an artificial and colonial boundary. Instead, the emphasis is on the other contents of each map.

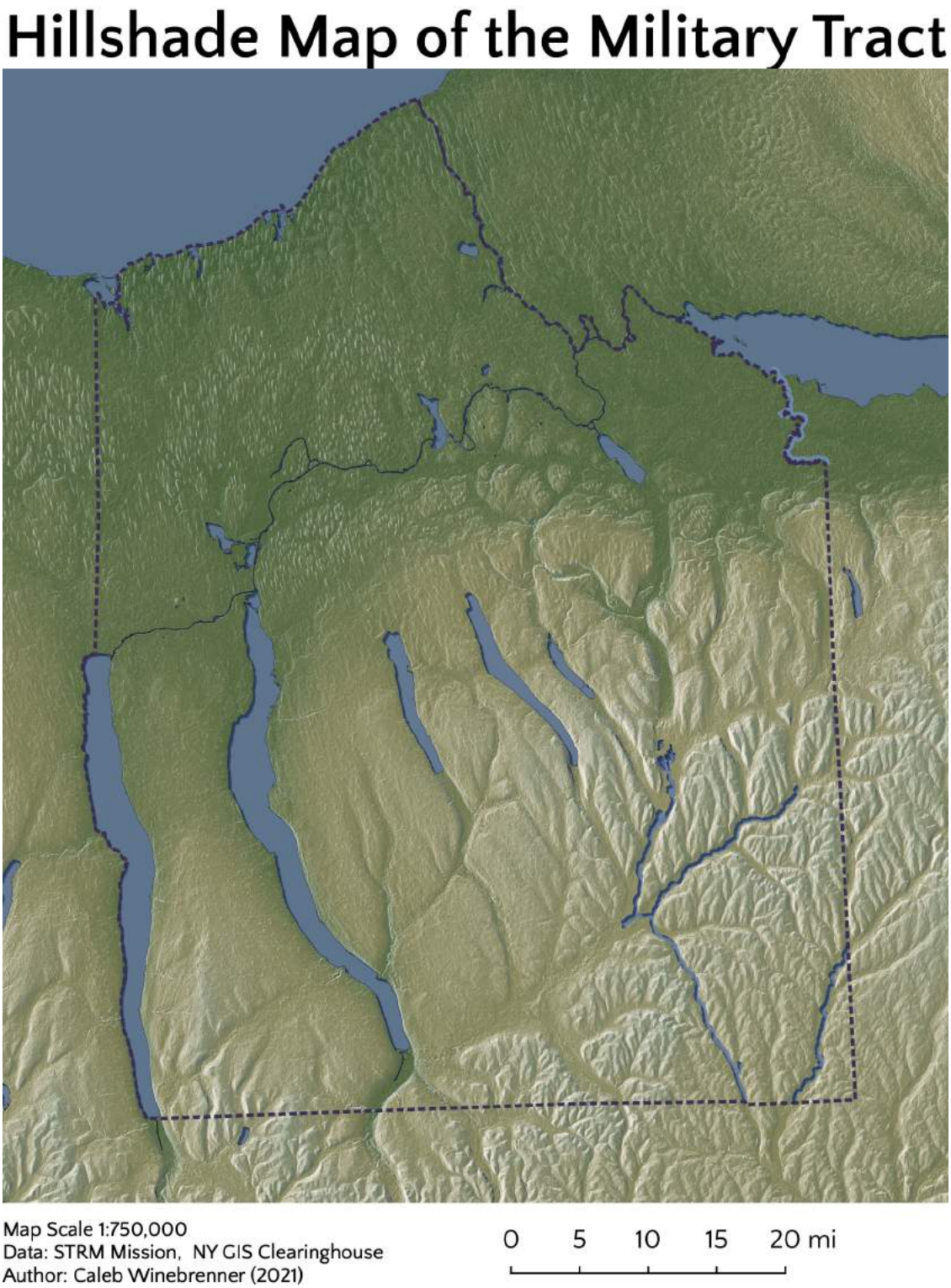


Figure 5.2: Knowing the landscape features is essential to understanding what happened here

5.4 Troop Movements

Mapping the troop movements for the Clinton-Sullivan campaign was inspired by the Menard Map of Napeoleon's march to Russia (Tufte 2001). In this case, however, the goal was not to show the numbers of *troops* lost, but rather to suggest the number of Haudenosaunee cities or villages lost. This map required careful overlay of a highly-generalized map of the campaign (see Fig. 2.6), Beauchamp's map of Onondaga County (see Fig. 2.7), and Halsey's map of the boundary line (which included several Haudenosaunee settlements; see Fig. 2.4). As with other overlay analyses herein, the historic maps often had generalized features (like for lake boundaries) that made them less reliable than, say, a corner of the boundary of New York State, while also requiring that some of these less-reliable features be used as ground control points. As such, the spirit of this map was to be close enough to tell the needed story: the goal was to be accurate, but high precision was not always possible.

The map furthermore required judicious choices about what to include. For example, maps of the campaign in archival sources included movements beyond the boundaries of New York State (such as troops gathering in New Jersey and Pennsylvania); these were omitted. In the finished map, much of eastern New York is also not shown, based on the idea that it lies beyond the Boundary Line established by the eponymous 1768 Treaty.

The planned map design included arrows showing where the surviving Haudenosaunee fled. Unfortunately, data here are severely limited. As such, this was discarded. Instead, the front of the campaign focused specifically on the Onondaga Nation is highlighted. To the point, the Onondaga were seen as the "central fire" (that is, the leadership) of the Haudenosaunee — and were later called "belligerents" to the United States in the Treaty of Ft. Stanwix (1784), signaling that the Onondaga Nation was a specific target in the campaign.

Color choices also subtly supported this: villages were colored "ash grey" (having been burned down) and troop lines and forts in "arterial blood red" (Syme and Werner 2018)

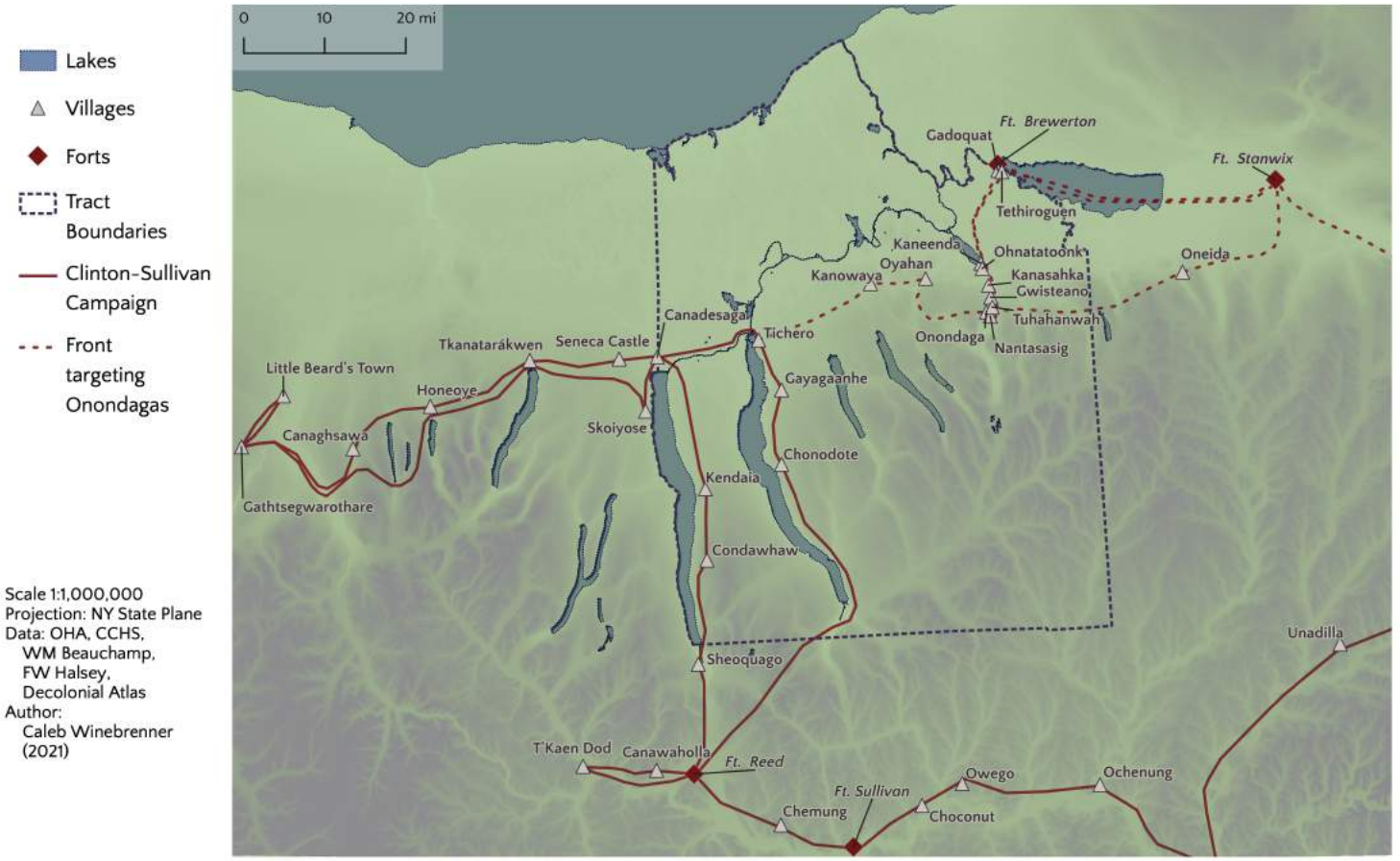


Figure 5.3: Troop movements of the campaign clearly targeted the Onondaga Nation

5.5 The Shrinking of the Reservation

From 1794 to 1822 a series of treaties and sales with New York State led to (first) the establishment of a reservation for the Onondaga people, quickly followed by shrinking the reservation. This included a loss of access to the lands around Onondaga Lake — a place sacred to the Haudenosaunee as where the Great Peacemaker founded their government. Moreover, the legality of these sales to New York State has been repeatedly challenged on the grounds that an act of Congress in 1790 required that any dealings with indigenous peoples in America be done by the federal (i.e., not state) governments. Ephraim Webster also played a key role in these events. As someone married to an Onondaga woman and living among the people, he was considered one of them. As such, when the 1814 sale of part of the reservation also included a 300-acre plot of land that he would now privately own, the Onondaga saw this as a betrayal.

Since Onondaga land claims are a part of their political activism even today, including a map of the reservation boundaries seemed fitting. However, the only map found in the archives was from a newspaper article, poorly drawn, and quite noisy — also showing highways, town boundaries, and other landmarks. Admittedly, such boundaries and landmarks proved useful in georeferencing the original map, but did not have much value from a design perspective. Fig 5.4 shows the redrawn map. Of note, this map is also extensively referenced in the timeline (Map 6, Fig. 5.6).

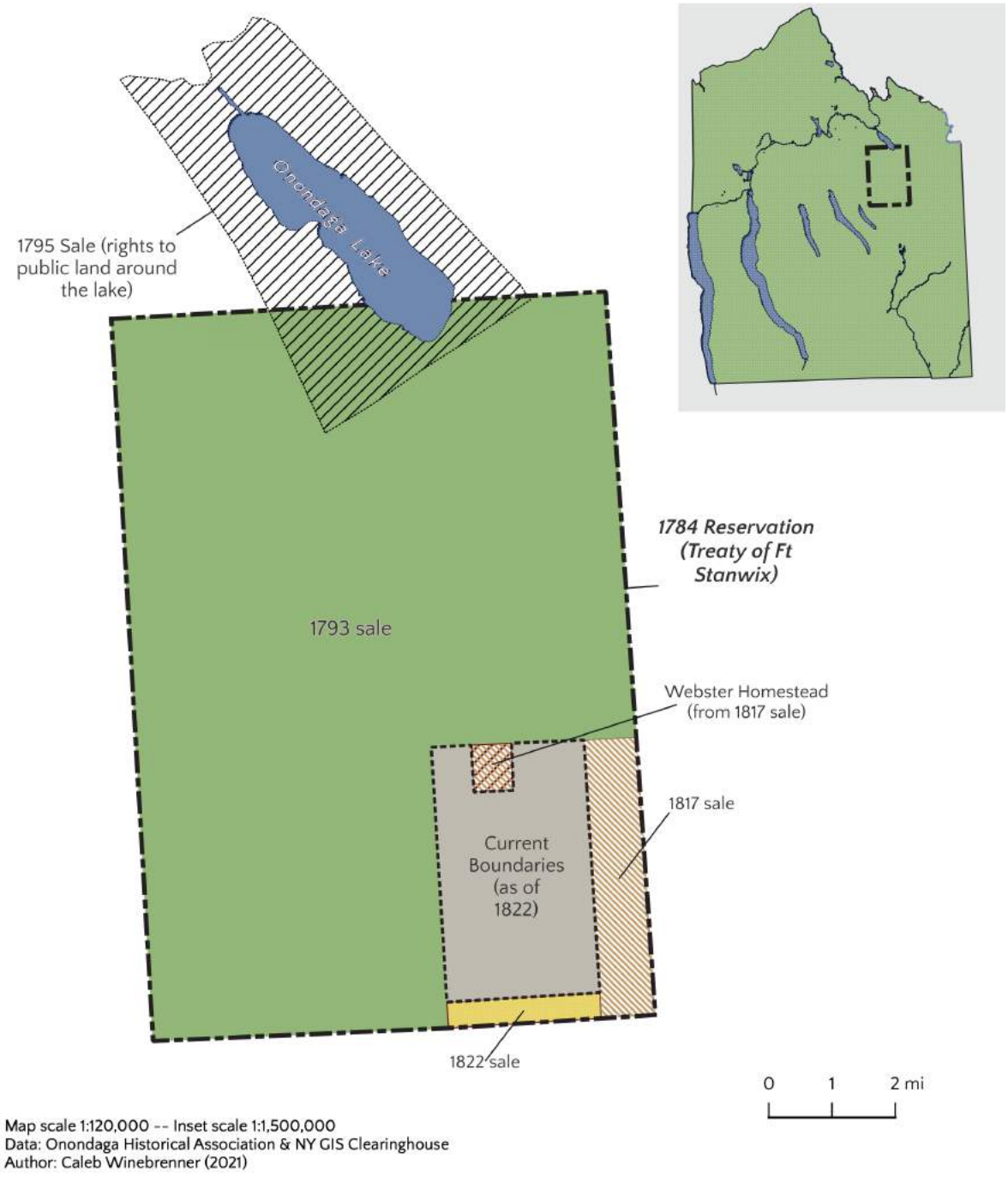


Figure 5.4: Numerous treaties and "sales" shrunk the Onondaga Reservation, first established in 1784 by the Treaty of Ft. Stanwix

5.6 Indigenous Toponymy

Finally, a handful of archival text fragments and multiple maps were consulted to reconstruct as much of the indigenous toponymy as possible, shown in Fig.5.5. While the names of villages could often be found on Halsey's map (Fig. 2.4, the same source used to construct part of the villages layer in the troop movement map), bodies of water posed different challenges. Where Onondaga names for lakes could not be found (such as those depicted on Paul Paine's map, Fig. 2.1 or Beauchamp's map, Fig. 2.7), the Decolonial Atlas (Delaronde and Engel 2015) offered names in Mohawk. Since the Mohawk are another member nation of the Haudenosaunee and the languages are generally mutually intelligible, it can be reasonably assumed that the Mohawk toponyms, even if not identical to the Onondaga ones, would be understood by speakers of those languages. On the map, if a name was available in both Onondaga and Mohawk, the Mohawk name is given in parenthesis. Where no additional toponym for a lake was known, the commonly-used one was given — as these names typically derived from Haudenosaunee languages, according to Beuachamp's gazetteer based on his ethnographic research of the Haudenosaunee, Delaware, and other peoples of New York (Beauchamp 1907). Note, the discussion of researching indigenous toponymy is resumed in Chapter 6.

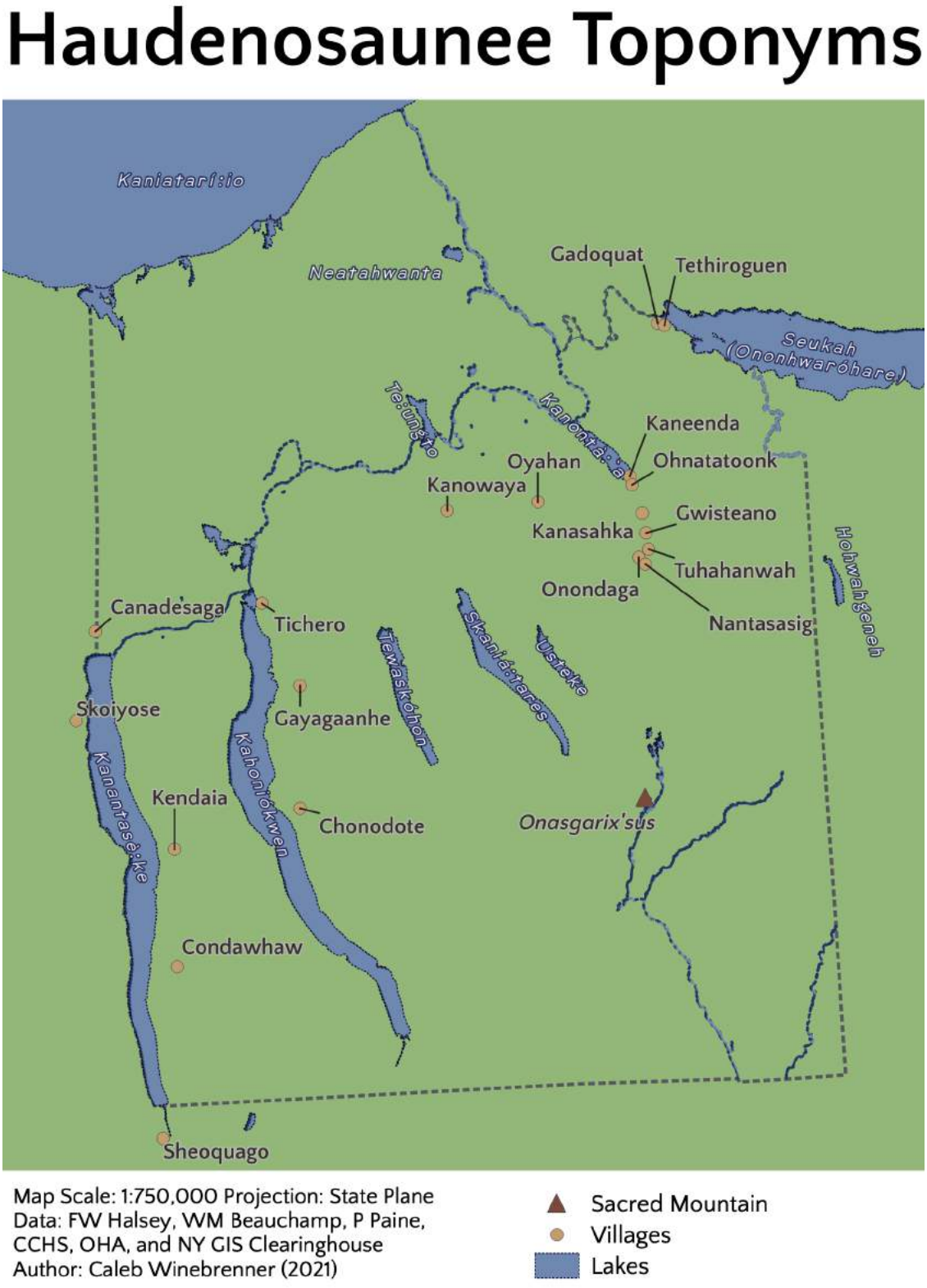


Figure 5.5: Toponyms for villages, lakes, and the sacred mountain

5.7 Timeline of Indigenous History

At the recommendation of Dr. David Bodenhamer (*pers. comm.* 2021), a deep map need not be limited to map visualizations alone. Indeed, other visualizations add depth by showing threads of inquiry or argument that maps alone cannot. To this end, I constructed a timeline to accompany the other maps. It was impractical to give a complete timeline, especially since a more detailed history has a dedicated chapter (see Chapter 2). Instead, I selected 21 key events over a hundred-year period (1722-1822). To understand the chosen events, it is necessary to invoke Tobler's Second Law: "the phenomenon external to an area of interest affects what goes on in the inside" (Tobler 1999). In other words, some of these events — the Treaty of Albany, two treaties at Fort Stanwix, the Battle of Oriskany, and the Treaty of Canandaigua — did not happen *on* the land of the Military Tract, but directly affected life *within it*, especially for the Onondaga people. For these events, an inset map shows their locations in New York State.

Many of these events, including the Clinton-Sullivan Campaign, can easily be cross-referenced to other maps here. Such cross-references are given within the timeline itself. Additionally, the code for plotting the timeline is given in Appendix A.

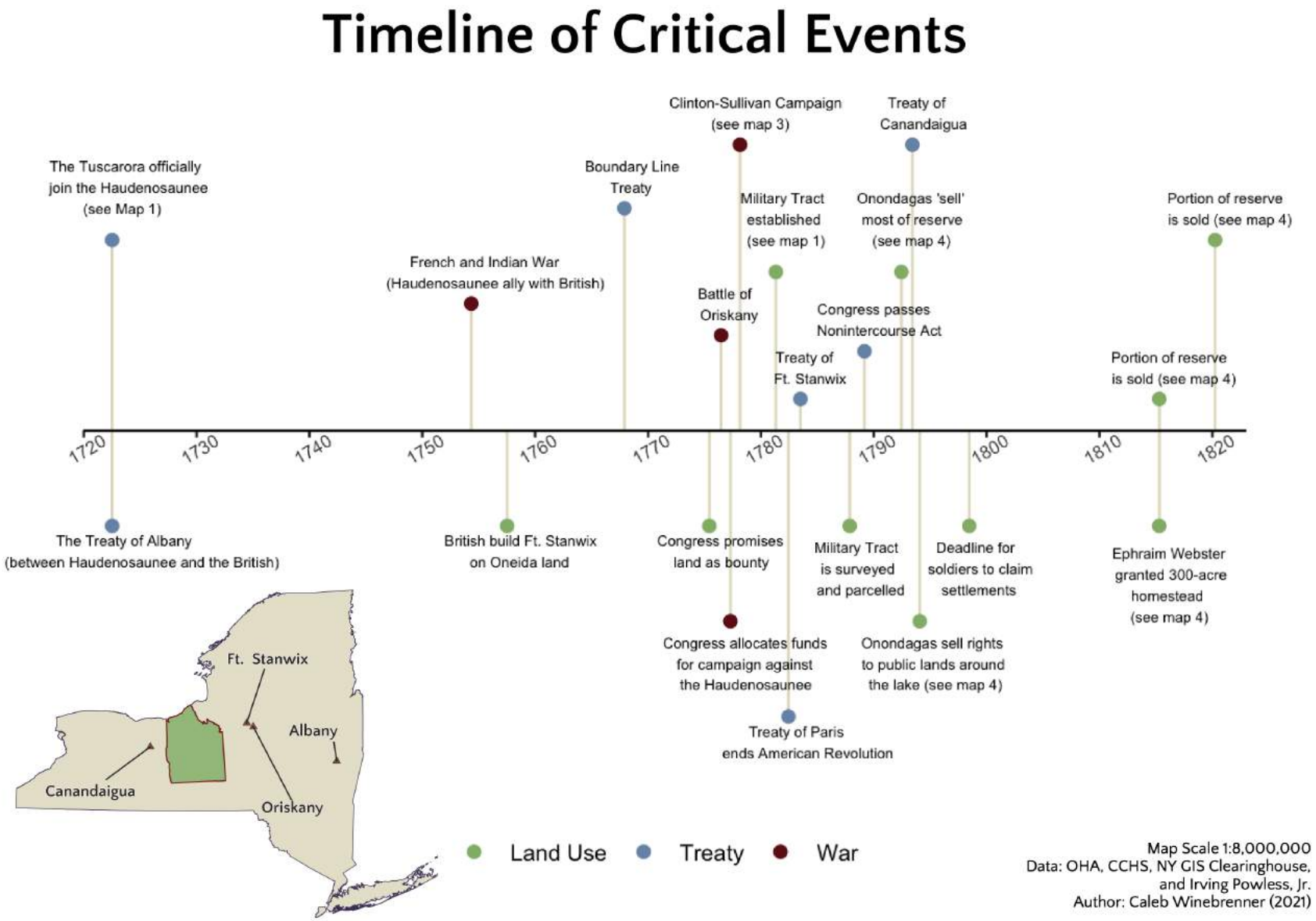


Figure 5.6: Twenty-one events, circa 1722-1822, form the salient narrative of the Military Tract and its effect on the Onondaga Nation

5.8 A Note on Mapping Texts

The question of how to handle textual data within a GIS is the hard problem of deep mapping (Bodenhamer et al. 2022). The methods outlined in the previous chapter expressed my desire to automate some of these processes using various computer functions; in the end this was set aside in order to focus this project on cartographic design and visual storytelling (I pick up the threads of this problem of deep mapping, and my subsequent shift in focus, in Chapter 6). Nevertheless, a close reading of the archival fragments used in creating the maps found in this chapter resulted in a gazetteer — an intermediate step to any sort of automation in mapping textual data. This gazetteer is included as Appendix B.

In my final chapter, I shall turn my attention back to the premises of deep mapping given in Chapter 1 and the theoretical debates outlined in Chapter 3 in order to critically evaluate the maps produced. I shall assess the degree to which my research questions were answered, and whether or not they were consistent with what was originally hypothesized. Finally, I also shall consider the ways to expand upon this project, such as further applications of the gazetteer.

Chapter 6 Discussion & Further Study

Critical cartography raises questions on "how to express the geographies of human experience and place in the map" (Pearce 2008). Arguably, deep mapping asks the same question, even pushing the question for precise and concrete answers. In this chapter, I evaluate my project against this criterion for critical cartography and against different possible understandings of spatial humanities and deep mapping practices. I also speak to my lingering concerns about archival research and offer four ways in which the study might be continued or expanded. Next, I evaluate my project against its original research questions. Finally, I close with a statement on the politics of my project (and perhaps by extension the politics of deep maps).

6.1 What counts as a deep map?

First, where does this work sit within spatial humanities as a whole? First, there is a long tradition of geographers writing detailed work about their research in ways that borders more on the humanistic than the scientific. *Listening to the Wind* (2019) is a deeply moving book about the Irish countryside written by Tim Robinson. As an amply detailed text, it could easily lend itself to maps of his walking journeys. Robert MacFarlane's *Underland* (2020) is an extended meditation on the subterranean, by turns ecological, apocalyptic, and intensely local and intimate. Both authors are trained as geographers — so do such writings count as deep maps in the narrative sense?

Such texts are no doubt geographic, and certainly within the geohumanities. At the same time, spatial humanities seems in part distinct because of its integration of *spatial science* and its understanding of text as a medium, not a product, for the construction of narratives and arguments. Robinson's text alone may not be a deep map; the maps he made during the same time he wrote the book, carefully reconstructing Celtic toponyms from mythology and oral tradition, might be.

In either case, the promise and great potential of deep maps remains its unique (and still-developing) ways of combining text and visuals, with a clear understanding that capturing "the geographies of human experience and place in the map" (Pearce 2008) requires a discerning use of both. Geography will most thrive when allowed to be both the science of GIS and the arts of cartography and place-based storytelling — and hopefully deep mapping plays a role in that thriving in the coming decades.

In my project, I sought to situate GIS technologies, and especially overlay analyses, as a toolset with which to engage archives, and from that engagement, to tell a story through beautiful maps. The complete

narrative requires both the historical narrative and the visual results, and in this basic way satisfies the requirements of spatial humanities. What then of deep mapping?

6.2 Deep Mapping and Mapping Deeply

In Chapter 1, I defined a deep map as requiring qualitative or textual data for at least one layer, and requiring that layers exist at different points in time. Contrasted with Bodenhamer's conceptualization of deep mapping as *both* "platform, product, and process," (2022, p. 7), my definition seems inelegant but not incorrect. Moreover, I now see that my project was *not* trying to engage in deep mapping as a platform (though this is addressed as a likely next step in section 6.4.1), and in the end was most focused on deep mapping as a *process*. Therefore, as either a process or as a product, did I meet my goal of successfully creating a deep map?

As a *process*, I believe wholly that I did. As discussed in the last chapter, deep mapping as a process is focused on constructing a narrative. Both the narrative of my own learning of local history and the narrative of violated treaties and stolen lands during and after the Clinton-Sullivan campaign are clear in my work. When combined with the history narrated here (Ch. 2), the narrative makes room for spatial claims and arguments, a hallmark of deep mapping as a part of humanistic rhetorical traditions. For any flaws that may exist in my data or resulting maps, I stand by the arguments I have been able to craft from the process.

As a *product*, the results may be less clear. I did not create a deep mapping product in the sense that a museum exhibit might be a deep mapping product, but that's not to say that the groundwork for such endeavors are not here. On the other hand, in *Beautiful Evidence* 2006, Edward Tufte offers six principles for analytic design, which can easily be applied to cartography. They are as follows:

1. Show comparisons, contrasts, differences
2. Show causality, mechanism, explanation, systematic structure
3. Show multivariate data; that is, show more than one or two variables
4. Completely integrate words, numbers, images, diagrams
5. Thoroughly describe the evidence. Provide a detailed title, indicate the authors and sponsors, document the data sources, show complete measurement scales, point out relevant issues.
6. Analytical presentations ultimately stand or fall depending on the quality, relevance, and integrity of their content

Against these, and especially criteria 2, 4, and 5, I count my work successful — partially by virtue of being process-oriented deep maps, where causality and description of evidence was central to translating archival data into maps. Moreover, the evidence I found was rarely, in fact, in numbers and yet could be integrated

into compelling maps (criterion 4). Specifically for criterion 6, my maps at times may appear simple by virtue of stripping away all that seemed inessential for the moment of the narrative the map and hand must tell. However, "quality," "relevance," and "integrity" should be the goal of any cartographer's work; such goals must be kept fully in mind when extracting narratives buried in the dust of history as with this project. In other words, deep mapping need not look noisy of complicated. Arguably, the depth of my map series comes in no small part from the clear focus on especially salient details, like the villages burned shown in Map 3, Fig. 5.3. Integrity of my maps requires discernment in what to include in each map and how to do so. In this way, I also believe I have met my goals.

More generally speaking, just because a map constructs a compelling narrative and required extensive research, does not immediately justify calling it a deep map. Denis Wood (2015) compellingly argues that creative mapping practices can be seen as "mapping deeply." He calls for the spatial humanities to include an understanding of cartography as an art form as a way for it to not require the empirical constraints of GIS. While I used a GIS program to make my maps, his challenge about cartography as an art is still an important one. Against this final criterion, I also believe I was successful. While perhaps not worthy of glossy magazines and hopefully not the most beautiful maps of my career, I did pay careful attention to those aspects of cartography that come closer to art than to design. I sought to give my maps depth in the sense that a reader would spend time with each of them. To be clear, I don't think "mapping deeply" in this way is limited only to maps in the spatial humanities, but I do maintain that a concern with the art and design of maps is a quintessential part of deep mapping.

6.3 Gaps in the Archive

The first potential issue with any archival study is the possibility of *missing something*, or perhaps *something missing*: no archive can ever be perfect or complete. There is the risk, therefore — and for myself as a researcher, at times a sense of dread — that some key detail remained undiscovered among the thousands of newspaper fragments, or that some part of the historical-cartographic narrative I've composed here would be radically reinterpreted by the discovery of some other letter or diary entry. In good faith, I've done the best I can to be thorough. As discussed in Ch. 3, Mills's (2013) framework of "fragments," "objects," and "ghosts" allowed me to follow specific narrative threads in the archive: the first meetings between the Haudenosaunee and Europeans, the treaties, the establishment of the Military Tract, the

aftermath of the Clinton-Sullivan Campaign, and life of Ephraim Webster. Perhaps other stories should be on these maps also; nevertheless the narratives here were and are worthy of exploration.

What's more, while this thesis gathered data primarily from archives, its goal was a series of maps — so at some point, the archives had to be left behind in order to make maps with the data already collected. The work of translating from archival texts to maps was arduous. Like any translator, it is always possible that a more complete text comes along that piques curiosity for a new translation. Were such to occur, I see it as an opportunity to make another map in this series, not a replacement or modification of those here. In the same spirit, I devote the next section to the ways in which I might expand upon the study.

6.4 Expanding the Study

This project offers several unique ways in which the study might be further expanded if given the proper resources, especially time. While I do not yet know if this project will be the focus of the deep mapping I conduct for future scholarship (such as a PhD), I am at the very least committed to the first of the four following avenues to grow the study.

6.4.1 A Website

If this project ends up buried in archives, then in at least one major way it has failed to meet its goals. As such, in the spring of 2022 a website for this project will be developed. Using the Scalar platform for digital humanities projects that was developed at USC, the website will also signal to Bodenhamer's notion of deep mapping as a platform, not just a product or process (Bodenhamer et al. 2022). The primary goal is to allow users a more fluid way to interact with important archival pieces, to metaphorically exhume them from archives. For example, pending permissions from the OHA, Beauchamp's map of Onondaga County (Fig. 2.7) will be on the site, making the map widely available for the first time. Multimedia work from the Skä-noñh Center (dedicated to Haudenosaunee history and culture) will also be included, again pending permissions.

Additionally, a website will allow for augmented forms of some of my original maps. Map 4 (Fig. 5.4) is ripe to be made into an animation showing the shrinking of the reservation; this could easily be created in the app Flourish.studio and embedded in a website using HTML. A web-embedded version of the timeline could also include hyperlinks to the other maps. Naturally, the site will also offer a place for

high-resolution PDFs of each of the maps and the timeline to be publicly available, should interest arise in the use of my work.

6.4.2 Additional Archives & Site Visits

One simple way to address the limitations of archival research discussed above is to visit additional archives and cultural sites. In its present form, the project only included visits to three: the Onondaga Historical Association, the Cortland County Historical Society, and the Skä-noñh Center. However, several others are worthy of mention. In the Seneca Falls area, there is a small museum and historical center for the Seneca people, a member nation of the Haudenosaunee, called Ganandogan. Fort Stanwix is on the National Register of Historic Places. Both of these, while perhaps not providing hard "data" would deepen understanding of local history and culture in qualitative ways. Finally, the New York State Archives, in Albany, have copies of several of the treaties as well as other documents (such as letters from President Washington) that for this study were only found in secondary sources. Visiting the state archive would provide access to these materials as primary sources, as well as offer the possibility of discovering other materials directly in support of my mapping efforts.

6.4.3 Ethnographic Fieldwork

Early in the research process, it became clear that a deep mapping project could pair well with ethnographic research. In order to limit the scope, the decision was made to use archives as a primary source of data and put interviews aside (though to be clear, archives and ethnographic interviews would be intended as complementary, not competing, sources of data). Nevertheless, the benefits of ethnographic interviews with members of the Onondaga Nation for this study are self-evident as direct sources of knowledge about toponyms, land sales, and tribal history. More important, as a non-indigenous person, ethnography would make space for indigenous voices to take a central role in the gathered texts used to make maps.

To be clear, using only archives as a source of data risks (implicitly at least) reinforcing the biases of the archive and the history of an archive's formation — in this case, archives made by colonial settlers and their descendants. If the archive does not include contributions from Haudenosaunee sources and instead only has material *about* the Haudenosaunee (as is the case with Beauchamp's writings and maps), then archival work alone is insufficient. To address this, ethnographic interviews are a required next step for the expansion and continuation of this project.

6.4.4 Robust Coding & Automation

The original intent of the gazetteer (included in Appendix B) was as an intermediate step between a sample of archival texts and other mapping outputs. Similar methods are, as explored in Ch. 3, a part of growing research in spatial humanities and the digital humanities more broadly. For this project, the decision was made to focus on producing the series of maps — and so writing code to examine the gazetteer and plot results was deemed to be beyond the scope of the current work. That said, it remains a promising option, especially in conjunction with visits to additional archives or conducting ethnographic work. The point of such code would be to automate some of the textual processing and thereby allow for a greater number of texts to be used, which in turn could produce additional new maps or visualizations.

Of note, any of the possible means listed here to expand this study are deserving of a place among deep mapping methods. As the field continues to grow, experiment, and mature into a branch of humanistic cartography in its own right, the skills required for multimedia exhibitions (such as with Scalar), archival research, ethnographic fieldwork, and coding for textual analysis will all be enhanced by research in deep mapping — the variety of methods in Bodenhamer's edited collections on deep mapping are testament to this (2010, 2015, and 2022).

6.5 The Original Research Question

In Chapter 1, I posed these questions: how can the development of a deep map of local history reveal narratives of marginalized or subaltern peoples typically not included in authoritative maps — and in so doing, how can deep mapping methods work in tandem with archival research and critical cartography? To what extent can deep mapping practices re-prioritize or re-place these lesser-known histories?

The first portion, on deep mapping reveealing local histories while working in tandem with archives and critical cartography, is already answered above. Indeed, deep mapping will hopefully play a more active role in archival geography and critical cartography as its methods mature.

The second question, however, deserves more attention. I believe that my maps began revealing subaltern narratives (that is, from a Euro-American perspective, where Indigenous history is still not widely known). That said, such narratives should be further elaborated, emphasized, and empowered by including ethnographic fieldwork. This point cannot be made strongly enough: prioritizing indigenous perspectives means listening to indigenous people. Anything less risks perpetuating colonial biases. Consider, the narratives given in these maps were unable to get to the level of an individual person, an individual

indigenous voice. The only possible exception herein could be Ossahinta's account (§2.5), but even his story was told secondhand and third person, by a journalist some 150 years later. Indigenous people and their voices deserve a direct role in this kind of mapping, including authoring or co-authoring of maps (Sletto et al. 2020). For any other strengths of this project, the lack of direct inclusion of indigenous voices remains a lingering scholarly concern and ethical limitation.

The original question also articulated a hope to re-*place* these narratives. Certainly, I have tied the history of the Haudenosaunee to the Military Tract. Less certain is how permanent such a place for Haudenosaunee voices in maps of these places will be. The work of decolonization is hard. Placing narratives on a map will not — indeed, cannot — be a one-time act. Critical cartography and deep mapping of these people and these stories is an ongoing commitment. Part of that ongoing commitment is also why this work will be shared with the OHA and built as a platform in Scalar. Only if this work is openly available, and open to critique, can the process of restoring a narrative to its home place on a map continue.

6.6 Politics and Place

The opening pages of this thesis began with an implicit land acknowledgement (Fig. 1.1). Explicitly: the lands of New York, including the Military Tract, are the home of the Haudenosaunee. To really explore the depths of these lands and their narratives requires learning indigenous history.

In this way, critical cartography and deep mapping are political acts — or at least ought to be. The Clinton-Sullivan Campaign and its devastating impacts on the Haudenosaunee was not the only story in the archives, but it was the one that most compellingly called out for more investigation and new maps. To be blunt, I was angry that "official" narratives in textbooks and curricula omitted these events or, when they were acknowledged, it was in celebration. Imagine how different the physical and cultural landscape of New York State would look, if in fact the sovereignty of the Haudenosaunee as a political power had been properly respected.

But speculations aside, historical geography is not only about the past, it is also about understanding our present moment. Rightfully so, our present moment is still reckoning with indigenous rights. In Syracuse, many places (such as the University) fly the Haudenosaunee flag (see Fig. 6.1) as a way of acknowledging the ancestry of these lands. Such an acknowledgement requires a willingness to see the wrongs of the past and the potential of the present. It requires channeling that anger into something productive:

> I have a right to be angry, to show it and to use it as a motivational foundation for my struggle, just as I have a right to love and to express my love to the world and to use it as a motivational foundation for my struggle, because I live in history at a time of possibility and not of determinism. If reality were pure determinism, because it was thus decided or planned, there would be no reason at all to be angry. My right to be angry presupposes that the historical experience in which I participate tomorrow is not a given but a challenge and a problem. My just anger is grounded in any indignation in the face of the denial of the rights inherent in the very essence of the human condition. (Freire 2001, p. 52)

Like Freire, I am indignant at the denial of Haudenosaunee rights to land and personhood. I cannot change the past, but I can offer these maps as a small way to correct in the present what others know of these events. I can offer my knowledge and skills in the service of public debate and practice being an ally to indigenous peoples.

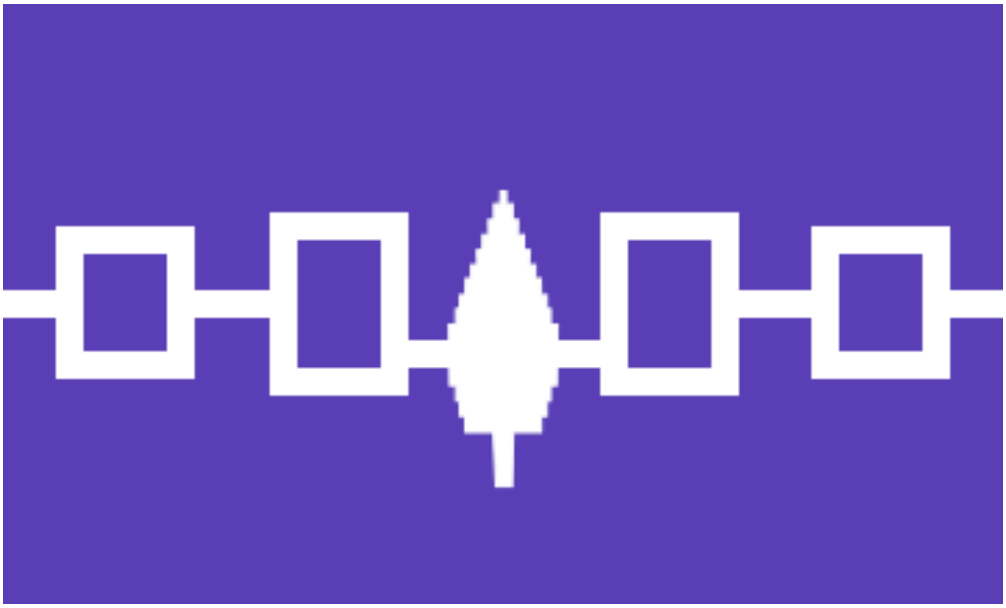


Figure 6.1: Modern Flag of the Haudenosaunee

References

Amrhein, C. 2016. *A History of Native American Land Rights in Upstate New York.* Charleston, SC: The History Press.

Barbaresi, A. 2018. “Toponyms as Entry Points into a Digital Edition: Mapping Die Fackel.” *Open Information Science* 2, no. 1 (March 1, 2018): 23–33.

Bartram, J., L. Evans, and C. Weiser. 1973. *A Journey from Pennsylvania to Onondaga in 1743.* Barre, Mass: Imprint Society.

Beauchamp, W. M. 1892. *The Iroquois Trail: Footprints of the Six Nations in Customs, Traditions, and History.* Fayetteville, NY: H. C. Beauchamp, Recorder Office.

———. 1907. *Aboriginal Place Names of New York.* Albany: New York State Education Department.

———. 1922. *Iroquois Folk Lore: Gathered from the Six Nations of New York.* Syracuse, NY: Dehler Press.

Bertin, J. (1967) 2010. *Semiology of Graphics: Diagrams, Networks, Maps.* 1st ed. Translated by W. J. Berg. Redlands: Esri Press.

Bodenhamer, D. J., J. Corrigan, and T. M. Harris, eds. 2010. *The Spatial Humanities: GIS and the Future of Humanities Scholarship.* Spatial Humanities. Bloomington: Indiana University Press.

———, eds. 2015. *Deep Maps and Spatial Narratives.* The Spatial Humanities. Bloomington: Indiana University Press.

———, eds. 2022. *Making Deep Maps: Foundations, Approaches, and Methods.* The Spatial Humanities. London: Routledge.

Brennan-Horley, C., S. Luckman, C. Gibson, and J. Willoughby-Smith. 2010. “GIS, Ethnography, and Cultural Research: Putting Maps Back into Ethnographic Mapping.” *The Information Society* 26, no. 2 (February 18, 2010): 92–103.

Cole, D. G., and E. R. Hart. 2021. “The Importance of Indigenous Cartography and Toponymy to Historical Land Tenure and Contributions to Euro/American/Canadian Cartography.” *ISPRS International Journal of Geo-Information* 10, no. 6 (June 8, 2021): 397.

Delaronde, K., and J. Engel. 2015. “Haudenosaunee Country in Mohawk.” Decolonial Atlas, February 4, 2015. Accessed November 18, 2021. https://decolonialatlas.wordpress.com/2015/02/04/haudenosaunee-country-in-mohawk-2/.

Delgado-Aguilar, M. J., L. Hinojosa, and C. B. Schmitt. 2019. “Combining Remote Sensing Techniques and Participatory Mapping to Understand the Relations between Forest Degradation and Ecosystems Services in a Tropical Rainforest.” *Applied Geography* 104 (March): 65–74.

Dunn, S., L. Kadish, and M. Pasquier. 2013. "A Religious Centre with a Civic Circumference: Towards the Concept of a Deep Map of American Religion." *International Journal of Humanities and Arts Computing* 7, nos. 1-2 (October): 190–200.

Eddy, I. M. S., S. E. Gergel, N. C. Coops, G. M. Henebry, J. Levine, H. Zerriffi, and E. Shibkov. 2017. "Integrating Remote Sensing and Local Ecological Knowledge to Monitor Rangeland Dynamics." *Ecological Indicators* 82 (November): 106–116.

Elwood, S. 2010. "Thinking Outside the Box: Engaging Critical Geographic Information Systems Theory, Practice and Politics in Human Geography." *Geography Compass* 4, no. 1 (January): 45–60.

Ethington, P. J. 2007. "Placing the Past: 'Groundwork' for a Spatial Theory of History." *Rethinking History* 11, no. 4 (December): 465–493.

Ethington, P. J., and N. Toyosawa. 2015. "Inscribing the Past: Depth as Narrative in HIstorical Spacetime." In *Deep Maps and Spatial Narratives,* edited by D. J. Bodenhamer, J. Corrigan, and T. M. Harris, 72–101. Indiana University Press, February 4, 2015. JSTOR: 10.2307/j.ctt1zxxzr2.

Field, K. 2018. *Cartography: A Compendium of Design Thinking for Mapmakers.* Redlands: Esri Press.

Freire, P. 2001. *Pedagogy of Freedom: Ethics, Democracy, and Civic Courage.* Translated by P. Clarke. Critical Perspectives Series. Lanham: Rowman & Littlefield Publishers.

Halsey, F. W. 1901. *The Old New York Frontier: Its Wars with Indians and Tories, Its Missionary Schools, Pioneers and Land Titles, 1614 – 1800.* New York: Charles Scribner's Sons.

Harley, J. B. 2002a. "Maps, Knowledge, and Power." In *The New Nature of Maps: Essays in the History of Cartography,* edited by P. Laxton, 51–81. Johns Hopkins Paperbacks. Baltimore, Md.: Johns Hopkins Univ. Press.

———. 2002b. "New England Cartography and the Native Americans." In *The New Nature of Maps: Essays in the History of Cartography,* edited by P. Laxton, 169–195. Johns Hopkins Paperbacks. Baltimore, Md.: Johns Hopkins Univ. Press.

Jung, J., and S. Elwood. 2010. "Extending the Qualitative Capabilities of GIS: Computer-Aided Qualitative GIS." *Transactions in GIS* 14, no. 1 (February): 63–87.

Kemp, K. K. 2009. "What Can GIS Offer History?" *International Journal of Humanities and Arts Computing* 3, nos. 1-2 (October): 15–19.

Koehler, R. 2018. "Hostile Nations: Quantifying the Destruction of the Sullivan-Clinton Genocide of 1779." *American Indian Quarterly* 42 (4): 427.

Kwan, M., and G. Ding. 2008. “Geo-Narrative: Extending Geographic Information Systems for Narrative Analysis in Qualitative and Mixed-Method Research*.” *The Professional Geographer* 60, no. 4 (September 16, 2008): 443–465.

Lippitt, C. 2020. “Georeferencing and Georectification.” Edited by J. P. Wilson. *Geographic Information Science & Technology Body of Knowledge* 2020, no. Q3 (July 1, 2020).

Lloyd, C. D. 2010. *Spatial Data Analysis: An Introduction for GIS Users.* Oxford: Oxford University Press.

Lotman, Y. M. 2000. *Universe of the Mind: A Semiotic Theory of Culture.* Bloomington: Indiana Univ. Press.

Macfarlane, R. 2020. *Underland: A Deep Time Journey.*

McMillan, A. D. 2002. “When the Mountain Dwarfs Danced: Aboriginal Traditions of Paleoseismic Events along the Cascadia Subduction Zone of Western North America.” *Ethnohistory* 49, no. 1 (January 1, 2002): 41–68.

Miller, H. J., and M. F. Goodchild. 2015. “Data-Driven Geography.” *GeoJournal* 80, no. 4 (August): 449–461.

Mills, S. 2013. “Cultural-Historical Geographies of the Archive: Fragments, Objects and Ghosts.” *Geography Compass* 7, no. 10 (October): 701–713.

Morphy, F., Morphy, H., Faulkner, P., and Barber, M. 2020. “Toponyms from 3000 Years Ago? Implications for the History and Structure of the Yolngu Social Formation in North-east Arnhem Land.” *Archaeology in Oceania* 55 (3): 153–167.

O’Sullivan, D., and D. Unwin. 2010. *Geographic Information Analysis.* 2nd ed. Hoboken, N.J: John Wiley & Sons.

Parmenter, J. 2014. *The Edge of the Woods: Iroquoia, 1534-1701.* East Lansing: Michigan State University Press.

Pavlovskaya, M. E. 2006. “Theorizing with GIS: A Tool for Critical Geographies?” *Environment and Planning A: Economy and Space* 38, no. 11 (November): 2003–2020.

Pearce, M. W. 2008. “Framing the Days: Place and Narrative in Cartography.” *Cartography and Geographic Information Science* 35, no. 1 (January): 17–32.

———. 2014. “The Last Piece Is You.” *The Cartographic Journal* 51, no. 2 (May): 107–122.

Powless, I. 2016. *Who Are These People Anyway?* Edited by L. Forrester. The Iroquois and Their Neighbors. Syracuse, NY: Syracuse University Press.

Preci, A. 2020. “Fixing the Territory, a Turning Point: The Paradoxes of the Wichí Maps of the Argentine Chaco.” *The Canadian Geographer / Le Géographe canadien* 64, no. 1 (March): 20–31.

Pred, A. 1984. “Place as Historically Contingent Process: Structuration and the Time- Geography of Becoming Places.” *Annals of the Association of American Geographers* 74 (2): 279–297. JSTOR: 2569284.

Propp, V. 1968. *Morphology of the Folktale.* 2d ed. Publications of the American Folklore Society v. 9. Austin: University of Texas Press.

QGIS Project. 2021. “Georeferencer.” QGIS Documentation. Accessed January 5, 2022. https://docs.qgis.org/3.16/en/docs/user_manual/working_with_raster/georeferencer.html?highlight=georeference#available-transformation-algorithms.

Robinson, T. 2019. *Listening to the Wind.* First US edition. The Connemara Trilogy, Part 1. Minneapolis, Minnesota: Milkweed Editions.

Rumsey, D., and M. Williams. 2002. “Historical Maps in GIS.” In *Past Time, Past Place: GIS for History,* edited by A. K. Knowles. Redlands: ESRI Press.

Saldaña, J. 2021. *The Coding Manual for Qualitative Researchers.* 4th ed. Thousand Oaks: SAGE Publishing.

Sletto, B., A. W. B. de Almeida, J. Bryan, and C. R. Hale, eds. 2020. *Radical Cartographies: Participatory Mapmaking from Latin America.* First edition. Austin: University of Texas Press.

Syme, P., and A. G. Werner. 2018. *Werner’s Nomenclature of Colours: Adapted to Zoology, Botany, Chemistry, Mineralogy, Anatomy, and the Arts.* Washington, DC: Smithsonian Books.

Taylor, F. E., Millington, J. D.A., Jacob, E., Malamud, B. D., and Pelling, M. 2020. “Messy Maps: Qualitative GIS Representations of Resilience.” *Landscape and Urban Planning* 198:103771.

Tobler, W. 1999. “Linear Pycnophylactic Reallocation Comment on a Paper by D. Martin.” *International Journal of Geographical Information Science* 13, no. 1 (January): 85–90.

Tuan, Y. (1977) 2011. *Space and Place: The Perspective of Experience.* Minneapolis, Minn.: Univ. of Minnesota Press.

Tuck, J. A. 1971. *Onondaga Iroquois Prehistory: A Study in Settlelement Archaeology.* Syracuse, NY: Syracuse University Press.

Tufte, E. 1990. *Envisioning Information.* Cheshire: Graphics Press.

———. 2001. *The Visual Display of Quantitative Information.* 2nd ed, Cheshire: Graphics Press.

Tufte, E. 2006. *Beautiful Evidence.* Cheshire: Graphics Press.

Warner, J. 2010. *Human Information Retrieval.* History and Foundations of Information Science. Cambridge: MIT Press.

Wood, D. 2015. “Mapping Deeply.” *Humanities* 4, no. 3 (August 6, 2015): 304–318.

Appendices

A R code for Timeline

The code for the timeline (Fig. 5.6) is given below. Note, the inset map for the timeline was made in QGIS.

```
# Call these libraries
library(ggplot2)
library(dplyr)
library(ggalt)
library(cowplot)
library(tibble) # allows for dataframes to be created by typing in rows, as below
library(lubridate) # allows for data in cleaner date formats

# Timeline data manually entered (this makes reading dates easier)
data <- tribble( ~start_date, ~event, ~displ, ~cats,
           # ‘displ‘ indicates display height above or below the axis
           # categories (‘cats‘) set up the legend on the timeline
           # ‘\n‘ creates a new line in the label text in the plot
ymd(17220815), "The Tuscarora officially
                \n join the Haudenosaunee \n (see Map 1)", 0.6, "Treaty",
ymd(17220815), "The Treaty of Albany
                \n (between Haudenosaunee and the British)", -0.3, "Treaty",
ymd(17550115), "French and Indian War
                \n (Haudenosaunee ally with British)", 0.4, "War",
ymd(17580415), "British build Ft. Stanwix \n on Oneida land", -0.3, "Land Use",
ymd(17681115), "Boundary Line \n Treaty", 0.7, "Treaty",
ymd(17760715), "Congress promises \n land as bounty", -0.3, "Land Use",
ymd(17770806), "Battle of \n Oriskany", 0.3, "War",
ymd(17780611), "Congress allocates funds
                \n for campaign against \n the Haudenosaunee", -0.6, "War",
ymd(17790421), "Clinton-Sullivan Campaign \n (see map 3)", 0.9, "War",
ymd(17820715), "Military Tract \n established \n (see map 1)", 0.5, "Land Use",
ymd(17830905), "Treaty of Paris \n ends American Revolution", -0.9, "Treaty",
ymd(17841005), "Treaty of \n Ft. Stanwix", 0.1, "Treaty",
ymd(17890315), "Military Tract \n is surveyed \n and parcelled", -0.3, "Land Use",
ymd(17900715), "Congress passes \n Nonintercourse Act", 0.25, "Treaty",
ymd(17931115), "Onondagas 'sell'
                \n most of reserve \n (see map 4)", 0.5, "Land Use",
ymd(17941115), "Treaty of \n Canandaigua", 0.9, "Treaty",
ymd(17950715), "Onondagas sell rights
```

```
                \n to public lands around  \n the lake (see map 4)", -0.6, "Land Use",
ymd(17991231), "Deadline for \n soldiers to claim \n settlements", -0.3, "Land Use",
ymd(18170225), "Portion of reserve \n is sold (see map 4)", 0.1, "Land Use",
ymd(18170225), "Ephraim Webster
                \n granted 300-acre \n homestead \n (see map 4)", -0.3, "Land Use",
ymd(18220315), "Portion of reserve \n is sold (see map 4)", 0.6, "Land Use",
             )

# Function to shift x-axis to 0
shift_axis <- function(p, xmin, xmax, y=0){
      g <- ggplotGrob(p)
      dummy <- data.frame(y=y)
      ax <- g[["grobs"]][g$layout$name == "axis-b"][[1]]
      p + annotation_custom(grid::grobTree(ax,
                            vp = grid::viewport(y=1, height=sum(ax$height))),
                            ymax=y, ymin=y) +
        annotate("segment", y = 0, yend = 0, x = xmin, xend = xmax) +
        theme(axis.text.x = element_blank(),
              axis.ticks.x=element_blank())
      }

# Conditionally set whether label text will be above or below the point
vjustcond = ifelse(data$displ > 0, -1, 0.8)

# Plot
p1 <-
  ggplot(data, aes(start_date, displ, col=cats)) +
    geom_segment(aes(start_date, displ), xend = data$start_date,
                 yend =0, color="#e2ddc6", lwd=0.5) +
    geom_point(size=2) +
    scale_color_manual(values =
                 c("Land Use"="#93b778", "Treaty"="#7994b5", "War"="#711518")) +
                 # assigns color values to the categories
    geom_text(aes(x = start_date, y = displ, label = event), data = data,
                 hjust = 0.4, vjust = vjustcond+0.5, size = 2, col="black") +
  theme(
            # these lines adjust the data/ink ratio of the timeline
    panel.background = element_rect(fill="transparent"),
    plot.background = element_rect(fill="transparent", color=NA),
```

```
    panel.grid.major = element_blank(), # remove major gridlines
    panel.grid.minor = element_blank(), # remove minor gridlines
    legend.background = element_rect(fill='transparent'), #transparent legend bg
    legend.title = element_blank(), # no legend title
    legend.key=element_blank(), # legend key has no background
    legend.direction = "horizontal",
    legend.position = "bottom",
    axis.title = element_blank(), # remove axis titles
    axis.text.y = element_blank(), # no text on y-axis
    axis.ticks.y = element_blank(), # no ticks for y-axis
    axis.line = element_blank(), # remove axis line itself
    axis.text.x = element_text(size = 7, angle = 30)) +
            #size and angle of years on timeline
  expand_limits(x = c(ymd(17170101), ymd(18221231)), y=c(-1, 1)) +
            # adjusts limits of x-axis
  scale_x_date(breaks = scales::pretty_breaks(n = 10))
            #adjusts scale of x-axis, especially breaks

# Then run the shift_axis function from above
 timeline <- shift_axis(p1, ymd(17200101), ymd(18241231))

# Finished plot
timeline
```

B An Incomplete Gazetteer of Indigenous Placenames

In the process of researching the local history, I began to compile a list of places, along with Haudenosaunee names where I could find them. Unfortunately, the meaning of many of these names could not be found. With more time and additional research, more places could be added to this list, especially for indigenous toponyms.

B.1 Natural Features

First, the indigenous names for the lakes and the sacred mountain. See also Fig. 5.5

European Name	**Indigenous Names**
Cayuga Lake	Kahoniókwen
Cayuta Lake	Ganiatarenge
Cazenovia Lake	Hohwahgeneh
Cross Lake	Te:ungto
Lake Neatahwanta	Neatahwanta
Lake Ontario	Kaniatarí:io
Oneida Lake	Seukah (Ononhwaróhare)
Onondaga Lake	Kanontà
Otisco Lake	Usteke
Owasco Lake	Tewaskóhon
Seneca Lake	Kanantasè:ke
Skaneateles Lake	Skaniá:tares
Tully Lake	Tekaneadahe
Mt. Toppin	Onasgarix'sus

B.2 Forts & European Settlements

The forts listed here played key roles in events of the Military Tract. Also included here are three European settlements that used names derived from Haudenosaunee languages.

Name	**Notes**
Fort Stanwix	Built with Oneida permission after the French & Indian War
Fort Brewerton	Used as a supply point in the Clinton-Sullivan Campaign
Fort Reed	Used as a supply point in the Clinton-Sullivan Campaign
Canandaigua	Means "a chosen place", the town was resettled by Europeans after being destroyed in the Clinton-Sullivan campaign
Oriskany	Previously the site of the Oneida village Oriska, Battle of Oriskany fractured the Haudenosaunee government. Meaning unknown.
Schenectady	From "skahnéhtati", Mohawk meaning "beyond the pines"

B.3 Haudenosaunee Settlements

A number of villages were destroyed in the Clinton-Sullivan Campaign (see Fig. 5.3. The meaning of these names could not be found.

Haudenosaunee villages (now destroyed)
Skoiyose
Canadesaga
Sheoquago
Gayagaanhe
Onondaga [a]
Kendaia
Condawhaw
Chonodote
Tichero
Gadoquat
Tethiroguen
Oyahan
Gwisteano
Kanasahka
Kaneenda [b]
Ohnatatoonk
Kanowaya
Nantasasig
Tuhahanwah

[a] Later rebuilt near the reservation

[b] This village was mentioned in Ossahinta's account in §2.5

B.4 Military Tract administrative towns

The names of the towns of the Military Tract came to dominate local toponyms. Largely drawn from ancient history, these are the names of soldiers, generals, statesmen, founders, and emperors — including several who were rewarded land for their service to the Roman Empire. Others are poets who established the national ethos for their country. Taken together, they give a glimpse of how the surveyors of the tract understood their work.

Settler Town Names
Lysander
Hannibal
Cato
Brutus
Camillus
Cicero
Manlius
Aurelius
Marcellus
Pompey
Romulus
Scipio
Sempronius
Tully
Fabius
Ovid
Milton
Locke
Homer
Solon
Hector
Ulysses
Dryden
Virgil
Cincinnatus
Junius
Galen
Sterling