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Northfield, Minn. Est. 1855: An Experiment in Cartographic Environmental History

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HI7301: Methods and Debates in Environmental History
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Introduction:

The critical study of maps as enviro-historical documents provides unique insight into the organization and perception of space. On the surface a traditional map depicts a bounded place within a bounded time, but the existence of these boundaries is a tacet acknowledgement of what lies beyond them. The reader of a map understands that a railroad does not end as it meets the map's border but continues on into unmapped territory. When viewed as a historical object, the map shows that the railroad exists beyond the map's time. The rail was built some time before the map's making, its route determined by preexisting terrain and hydrology. After being registered by the map it may have been replaced by a highway or a bike trail, or may languish unused with plants growing up around its ties. The past, as Philip Ethington theorizes, is always grounded in *placeful spacetimes*, and the study of past time cannot exist without the acknowledgement of a past space that remains embedded in the spaces of the present and of other pasts.¹ The historical study of maps, examining the time and space within and beyond their boundaries, allows us to more clearly understand the spatial and environmental relationships they document.

Critical study of cartography also reveals biases and viewpoints involved in a map's creation.² That maps root these biases in physical spaces can tell us much about human-environmental relations: What is included and omitted in a map tells us what the cartographer or their patron found valuable or useless in a landscape. The prominence of roads and infrastructure in relation to rivers, mountains, or other environmental features reveals the perception of environmental control the author has over the landscape. Examining multiple maps of the same

¹ Ethington, Philip J. "Placing the Past: 'Groundwork' for a Spatial Theory of History." *Rethinking History* 11, no. 4 (2007): 487.

² Akerman, James R. and Robert W. Karrow. Introduction. In *Maps: Finding Our Place in the World*, 1–17. Chicago, IL: Univ. of Chicago Press, 2009. 5.

place over time shows how these perceptions influence landscapes and how the landscape in turn shape the perceptions.

In order to demonstrate these practices and the usefulness of Geographic Information Systems (GIS) to the study of maps as enviro-historical documents, I've conducted an experiment in critical cartographic analysis focusing on my hometown of Northfield, Minnesota, located on the ancestral land of the Wahpekute Dakota.³ I used GIS to visually analyze eight maps created between 1855 and 2016 for various uses including municipal property records, art, and ecological restoration. Analysis of these maps shows how the constructed place of Northfield is continuously co-created through the interaction of its hydrological, ecological, and infrastructural layers.

Methods:

The following maps were analyzed during the experiment:⁴

1. C.W. Iddings, *Map of Northfield*, Rice County, Minnesota Territory: This map was created after Minnesota was designated a United States Territory in 1498, around the time of Northfield's foundation in 1855. It is a plat map, dividing Northfield's square blocks into lots for sale. The map depicts the street grid and the Cannon River with a small bridge and dam around 4th Street. The city's lots and streets go directly up to the river's edge with no easements for public use or flood prevention.⁵
2. Chicago Lith. Co., *Bird's Eye View of Northfield*, 1869: This map shows an oblique view of the city oriented to the southeast and surrounded by rolling green hills. The town's

³ "NativeLand.ca - Wahpekute." Native Land Digital, 2021. <https://native-land.ca/maps/territories/wahpekute/>.

⁴ Map images are included in the appendix

⁵ Iddings, C. W. "Map of Northfield, Rice County, Minnesota Territory." St. Paul, Minnesota: Loyis Buechner, 1849.

square street grid is displayed prominently with buildings and people crowded near the center. The Cannon River is calm and lined with trees at regular intervals. The railroad depot is shown along the west side of the river with a steam engine moving north out of frame. Below the map, shields advertise Northfield's amenities and churches.⁶

3. E.B. Foote, *Plat map of Northfield, Minnesota*, 1915: This plat map was created around 50 years after the Iddings map and demarcates the original town plat from its three new wards. The map includes building footprints of churches, prominent businesses and public buildings. Like the Iddings map, lots are allocated directly to the river's edge, but more attention is paid to hydrology. A marsh is indicated on the property of A. Whilson, Spring Creek is drawn out in detail, and an area south of 7th street is marked as floodplain. The town's two railroads are drawn in detail, including a spur leading to the mill.⁷
4. Minnesota Department of Highways (MNDH), *Municipality of Northfield*, 1968: Developed by the Minnesota Highway Department, this map focuses on transportation networks: emphasizing roads, highways, and railroads. State Highways 19 and 3 are marked prominently and roads are colored by the source of their maintenance funding. In addition to the Cannon River, the map shows the dams on Spring Creek that create Carleton College's Lyman Lakes and Heath Creek to the south west.⁸
5. Markael Luterra & Nate Case, *Carleton Cowling Arboretum*, 2003: This map is part of Markael Luterra's guide to the arboretum's historical ecology. The numbers on the map

⁶ Chicago Lith. Co. "Bird's Eye View of Northfield Looking South East." Map. Madison, Wisconsin: Ruger and Stoner, 1869.

⁷ Foote, E B. "Plat Map of Northfield, Minnesota, 1905-1910." Map. Northfield, Minnesota: City of Northfield, 1915.

⁸ Office of Transportation Planning. "Municipality of Northfield." Map. St. Paul, Minnesota: Minnesota Department of Highways & U.S. Department of Transportation Federal Highway Administration, 1968.

correspond to posts in the arboretum marking important ecosystems, plants, and other features. The map shows ecological restorations and their planting year. Streets and building footprints for central Northfield are included along with areas to the north like the Viking Terrace trailer park, Sheldahl manufacturing plant, and the municipal wastewater treatment plant.⁹

6. St. Olaf College, *St. Olaf College Natural Lands*, 2012: Like Carleton's arboretum map, this map shows St. Olaf College's existing or restored forests, prairie, and wetlands. The map prominently features recreation, outlining trails through the natural lands and their distances. Footprints of college buildings as well as parking lots and major roads are depicted but buildings not owned by the college are omitted. Other than the MNDH map this is the only map surveyed that depicts Heath Creek, a tributary of the Cannon River. St. Olaf College's location at the far western edge of Northfield means this map has little overlap with other maps surveyed.¹⁰
7. Stuart Yurczyk, *Colleges, Cows & Contentment*, 2015: This screen printed art map shows Northfield as a monochromatic square of rivers and roads. The square extent of the map means some newer housing developments are omitted, and railroads are not depicted. The Cannon River and the Lyman Lakes are shown but the rest of Spring Creek is omitted. The monochromatic nature of the print does not distinguish between bodies of water and roads, instead contrasting the regular gridded squares of Northfield's streets with the irregular curves of the river.¹¹

⁹ Luterra, Markael, and Nate Case. "Carleton College Cowling Arboretum." Map. *Carleton College Cowling Arboretum: An Interpretive Guide*. Northfield, Minnesota: Carleton College, 2007.

¹⁰ Shea, Kathleen. "St. Olaf College Natural Lands." Map. *The Natural Lands and Sustainable Agriculture at St. Olaf College*. Northfield, Minnesota: St. Olaf College, 2012.

¹¹ Yurczyk, Stuart. "Colleges, Cows & Contentment." 2015. Map.

8. David Lefkowitz & Doug Bratland, *Selected Segments of the Inferior Hiking Trail*, 2016:

This art map was created as part of David Lefkowitz's exhibition "NRTHFLD: The Nirthfolde Visitors' Bureau" which welcomed visitors to the parallel universe of Nirthfolde, one that closely resembles the town of Northfield.¹² The map is oriented to the east and shows only roads and the Cannon River. Special attention is given to the newer cul-de-sac heavy housing developments at the town's periphery to create the map's fragmented hiking trail. This depiction of Nirthfolde almost exactly mirrors the roads of contemporary Northfield, except for the omission of Carleton College's campus and the Viking Terrace trailer park.¹³

Analysis was conducted using the free open source GIS platform QGIS 3.10. All maps were georeferenced using the helmert transformation type except the Chicago Lith. Co. map whose oblique perspective required the thin plate spline transformation type. In order to aid visual analysis of the maps' waterways, a vector layer was created with polygons tracing the shape of the Cannon River and other water bodies depicted in each map. The georeferenced maps and waterway vector layer were visually compared with 2020 satellite imagery from Bing, a regional DEM (digital elevation model) from the Minnesota Department of Natural Resources (DNR), and vector data from Francis J. Marschner's map of Minnesota's pre-settlement vegetation.

¹² "Art Professor David Lefkowitz Explains 'Nirthfolde' and Other 'Quasi-Fictional Places.'" Carleton College News. Carleton College, January 27, 2013. <https://www.carleton.edu/news/stories/art-professor-david-art-professor-david-lefkowitz-explains-nirthfolde-and-other-quasi-fictional-places/>.

¹³ Lefkowitz, David, and Doug Bratland. "Selected Segments of The Inferior Hiking Trail." 2016. Map. *Inferior Hiking Trail Official Map and Souvenir Guide*.

Results:

The most consistently depicted feature across the maps is Northfield's square street grid, especially the area bounded by 5th, Nevada, 1st, and Water streets which appears on every map except the map of St. Olaf's Natural Lands. This central area includes many of Northfield's most enduring structures including Bridge Square, the first crossing of the Cannon River on Water St., the Division St. commercial corridor, and Central Park, which has been a public square since the town's foundation according to the 1855 Iddings map, and retains the same x-shaped paths today as depicted on the 1915 Foote map.¹⁴

Consistent depiction of the Cannon River is limited to this central area. With the exception of the Inferior Hiking Trail art map, all maps surveyed agree on the extent of the Cannon River between 1st and 5th St. This area of consistent depiction correlates with Northfield's floodwall which was built in 1900.¹⁵ Variability in river footprint increases with greater distance from the floodwall. This variability partially results from a combination of cartographic and analytical error. Without nearby structures and street grids at the town's margins, cartographers would have had greater difficulty accurately depicting the scale of the river. Likewise, without these same structural reference points, there is greater potential for error in the georeferencing process.

Aside from error, variability in the depiction of the Cannon's outer extremities depicts actual change in the river's footprint. One area where the survey reveals this change is the confluence of Spring Creek and the Cannon River (fig. 1). The 1968 Minnesota Department of Highways map shows two islands at the confluence of the Cannon and Spring Creek, but 21st

¹⁴ Iddings.; Foote.

¹⁵ Craig, Zoe, Matt Jaquette, Colleen Stewart, and Jia Yang. "Wading through the Muddy Floodwaters: Social Vulnerability to Flooding in Northfield, MN, a Case Study." Carleton Digital Commons. Carleton College, March 12, 2014. 11.

century maps show the southernmost island as being joined to the shore.¹⁶ This change is most likely due to sediment deposition from Spring Creek as it reaches the Cannon. Spring Creek was dammed in 1916 to create Carleton College's Lyman Lakes.¹⁷ It's possible that reduction of Spring Creek's flow by the dams in combination with efforts to maintain the lakes through dredging could have increased deposition rates and led to the merging of the southern island with the shore. Remediation efforts of the former garbage grounds, depicted at the site on the 1915 Foote map, could have also played a role in altering the river's extent.¹⁸



Figure 1: Confluence of Spring Creek and Cannon River. Foote map (left) indicating “city garbage grounds” and Spring Creek before Lyman Lakes dam, MNDH map (center) showing Lyman Lakes and two islands in the Cannon River, and Carleton Arboretum map (right) showing the southern island joined with the shore.

A second area of river change lies to the south, between 6th and 7th street. The 1869 Chicago Lith. Co. map shows an island in the middle of the river at this location, but the island is missing in the 1855 Iddings map.¹⁹ No such island exists in this part of the river today and the interpretive style of the Chicago Lith. Co. map could discount the island as a bucolic flourish. However, the 1915 Foote map also shows an island in relatively the same position and notes that the island's lots were owned by the Chicago Great Western Railway.²⁰ When the river extent of

¹⁶ Office of Transportation Planning.; Luterra.

¹⁷ Hillemann, Eric. *Celebrating 125 Years, Carleton College 1866-1991*. Northfield, Minnesota: Carleton College, 1991. 5.

¹⁸ Foote.

¹⁹ Chicago Lith. Co.; Iddings.

²⁰ Foote.

the Foote and Iddings maps are viewed together, it becomes apparent that the river in the Iddings map lies along the southern edge of the Foote map's island (Fig. 2). Two photos from the early 20th century confirm the existence of this island.²¹ The omission of the island from the Iddings map could be cartographic error, but record of a flour mill created on the site soon after the town's foundation opens the possibility that the island was created by digging a millrace on the west side of the river.²²

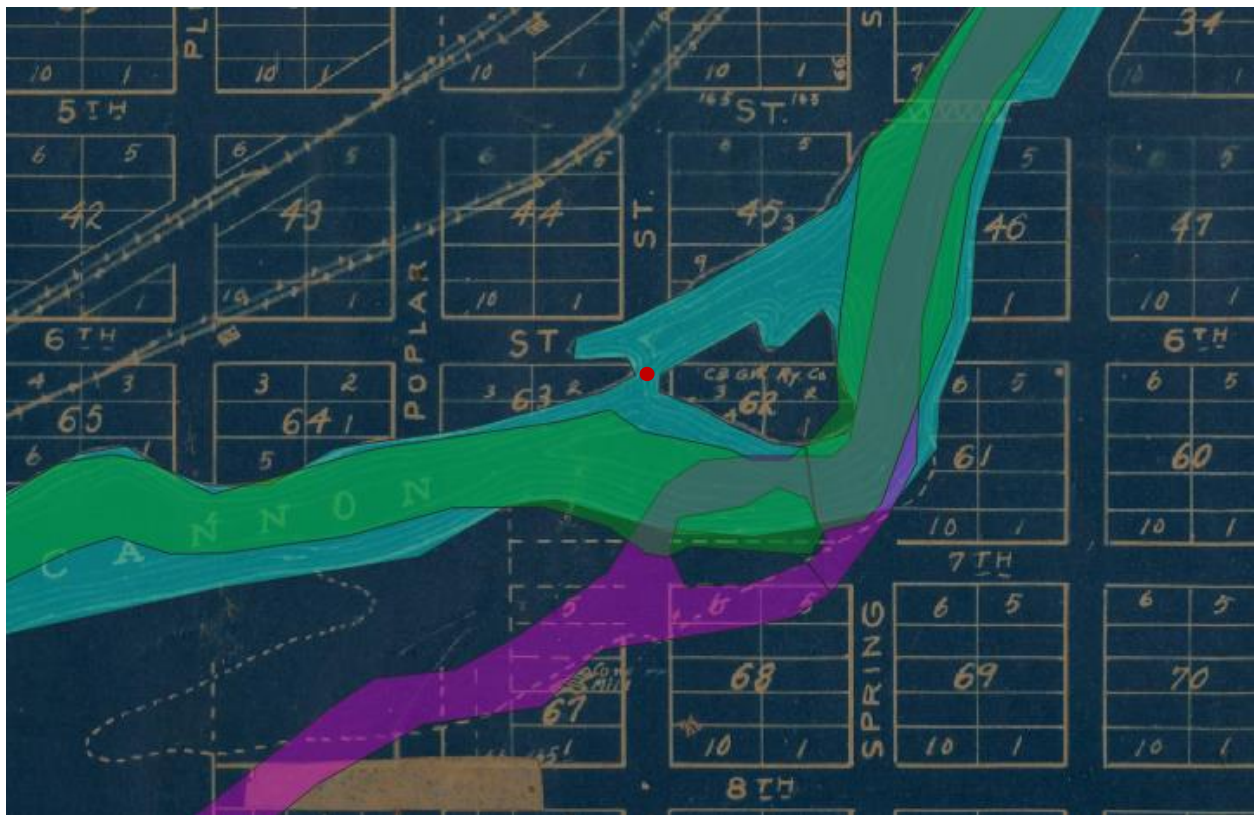


Figure 2: Former island in the Cannon River as depicted on the Foote map (basemap, blue). The island is also depicted on Chicago Lith. Co. map (pink). The Iddings map (green) depicts the river as going around the southern edge of the island where Riverside Park is today. The dotted line to the south west could indicate floodplain. A red dot indicates where a millrace could have been cut.

²¹ *Fifth Street Bridge, Northfield, Minnesota*. Photograph. Northfield, MN, 1900. Northfield Historical Society.; *Dam Scene, Northfield, Minn.* Photograph. Northfield, MN, 1920. Northfield Historical Society.

²² Bierman, Emily A. Sargent. "Diamond Jubilee: First Methodist Episcopal Church." In *Northfield Organizations Scrapbook*, 73-105. Northfield, Minnesota, 1939. 78.

Though I was unable to find any information on what happened to the island, GIS can help form an initial hypothesis. The bend in the Cannon river depicted in both early plat maps overlays present day Riverside Park. The Foote map also marks out the river's floodplain which cuts across several marked out lots. It's possible that at some point between the creation of the Foote map and the 1968 MNDH map which aligns with the river's contemporary footprint, the island was removed and the river dredged in order to control flooding and create land for development.

Additional insights came from the comparison of historical maps to other GIS datasets. The 1869 Chicago Lith. Co. map depicts a small pond at the intersection of 7th and Union St. but given the interpretive quality of the map, this pond could be an invention of the cartographer. Similarly, the Foote map depicts a marsh on the property of A. Whilson. Comparison with the Minnesota DNR's 2007 DEM shows that both former bodies of water are located in slight depressions within the landscape (Fig. 3). The location of Chicago Lith. Co.'s pond at a lower elevation and the appearance of the Foote map's marsh in a similar depression lends credibility to Chicago Lith. Co. map. Using GIS to generate a flow accumulation model from the DEM would further elucidate this claim and give a better understanding of the area's contemporary and historical hydrology.²³

²³ Chicago Lith. Co.; Foote.; AeroMetric, Inc. "Lidar Elevation, Rice County Minnesota, 2007." St. Paul: Minnesota Geospatial Information Office, April 27, 2007.

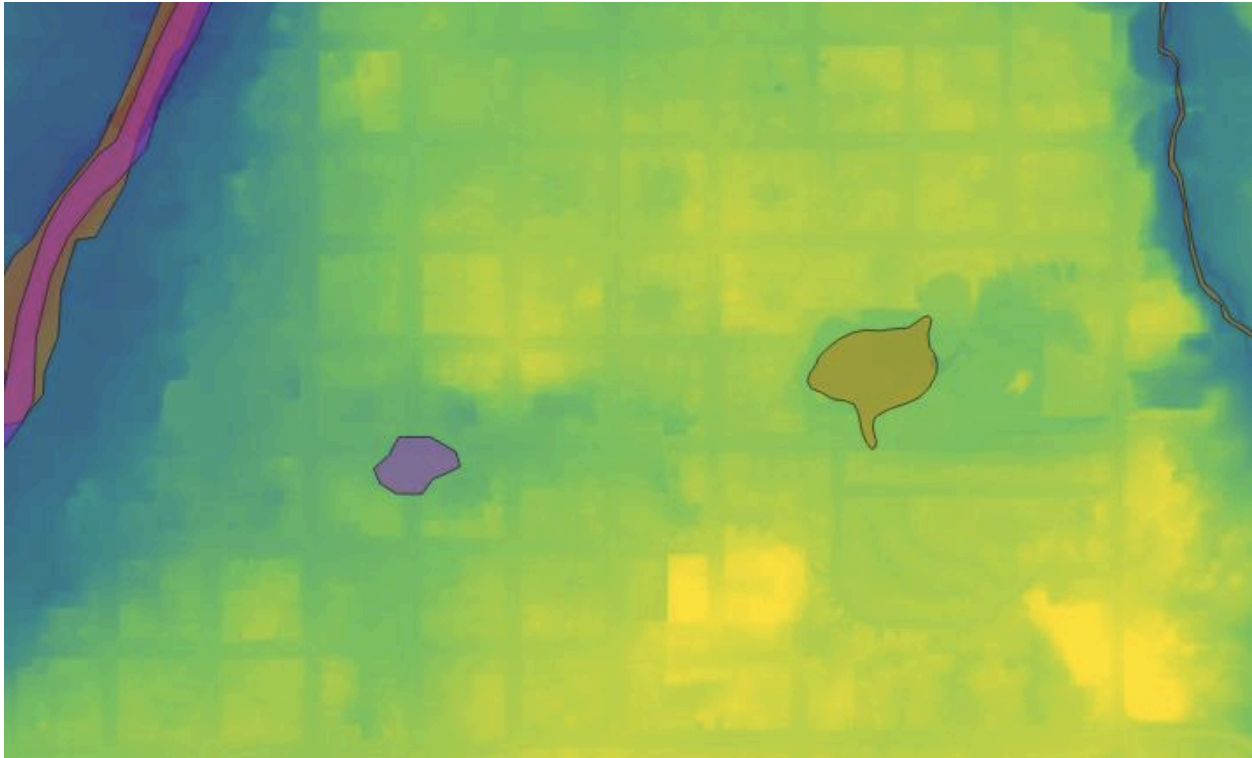


Figure 3: DEM of Northfield bounded by the Cannon River on the far left and Spring Creek on the far right. Lower elevations are darker blue and higher elevations are lighter yellow. Pond depicted on Chicago Lith. Co. map (pink polygon on left) and wetland depicted on Foote map (orange polygon on right) are both located in areas of slightly lower elevation.

Another external source, Marschner's map of pre-settlement vegetation, compiled from land surveys conducted between 1848 and 1907, shows that Northfield was established on the border between the big woods forest (maple-basswood forest) and tallgrass prairie. The original extent of the town exists largely within the big woods biome. The Carleton Arboretum and St. Olaf Natural Lands maps show the importance of the Marschner map as a restoration baseline as both include extensive restored prairie and big woods. Carleton's Arboretum map also notes the location of the "Postage Stamp Prairie," a small patch of remnant prairie within the arboretum which predates the land surveys Marschner compiled.²⁴

²⁴ Marschner, Francis J. "Presettlement Vegetation." St. Paul, Minnesota: Minnesota Natural Resources Department, November 8, 2014.; Luterra.; Shea.

Discussion:

All maps surveyed prominently display the town's transportation network and the Cannon River or its tributaries. This prominence demonstrates their importance, not only as physical features but as symbols of Northfield. The road network's importance could be explained by the maps' use as wayfinding devices, but the town's street grid is prominently displayed in maps clearly not intended for wayfinding, such as the Yurczyk and Lefkowitz art maps and the Chicago Lith. Co. map. This shows the importance of the street grid to the constructed idea of the town.²⁵

Arteries connecting Northfield to other places also play a prominent and dynamic role. The Chicago Lith. Co. map shows the town from an oblique angle looking southeast. This mimics what visitors and migrants to Northfield would have experienced, entering the town via railroad from the Twin Cities. The railroad features prominently in the foreground of the map as well as on the Foote map where we can see the much expanded rail network. Later maps diminish the rail and, beginning with the MNDH 1968 map, emphasize highways 3 and 19 as the key arteries. The St. Olaf Natural Lands and Carleton Arboretum maps both label the highways clearly and the Yurczyk and Lefkowitz maps omit the railroads entirely. Another of David Lefkowitz's maps for the Nirthfolde Visitor Center, "Nirthfolde/Dandus Postcard" goes even further, projecting Nirthfolde and neighboring town Dandus (Dundas) onto melting piles of snow with red lines traced across them labeled only "3" and "19" (Fig 4.)²⁶

²⁵ Yurczyk.; Lefkowitz.; Chicago Lith. Co.

²⁶ Lefkowitz, David. *Nirthfolde/Dandus Postcard*. 2012. David Lefkowitz. <https://www.davidlefkowitz.net/projects-installations/nrthfld-nirthfolde-visitors-bureau/>.

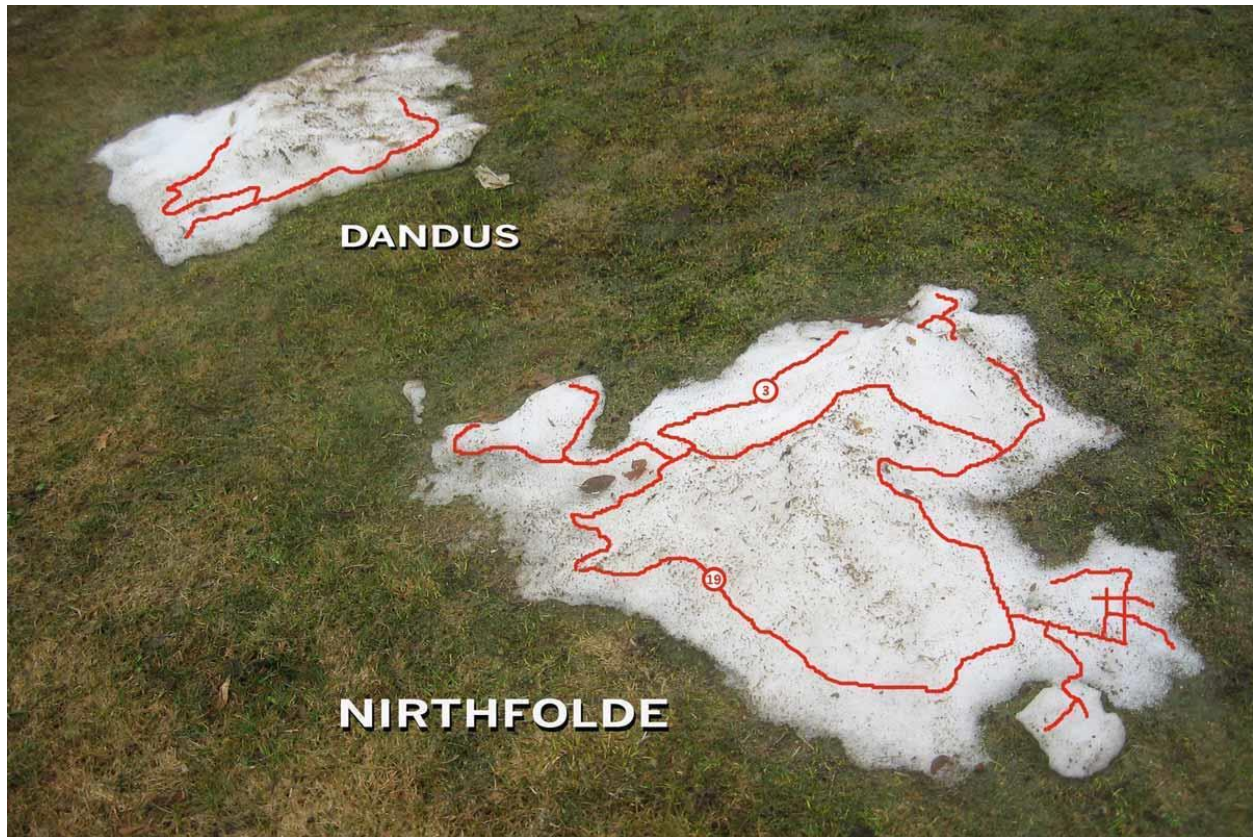


Figure 4: “Nirthfolde/Dandus Postcard” by David Lefkowitz, 2012. This parallel universe map of Northfield and neighboring city Dundas reduces them to melting piles of snow labeled with highway numbers “3” and “19.”²⁷

The Cannon River and its tributaries are the other constant across the maps surveyed, though they are not depicted consistently. The river has changed through human intervention: Spring Creek was dammed, the river dredged, and flood walls were built in the town center, but it has also meandered and overflowed its expected banks throughout Northfield’s history.²⁸ The history of Northfield these maps tell could be read as a conversation between the town’s two primary symbols, the river and the road. The town was established along the Cannon and its dynamic character allowed for the establishment of mills to convert the big woods into lumber and the prairie into wheat flour. Wetlands and ponds were drained and lots were sold right up to the river’s edge. When the river flooded onto the streets, floodwalls were built and the colleges

²⁷ Ibid.

²⁸ Craig, Zoe et al. 14.

restored wetlands, forest, and prairie to hold water from flowing to the Cannon. Meanwhile, climate change exacerbated flooding as rails gave way to highways and the flour mill pulled away from the river to become an electric factory.²⁹ On first glance these maps show Northfield as a static place: a collection of buildings, roads and bridges established in 1855. But examined collectively they betray that the town has always been a negotiation, between the river and its banks, between the people and the land, between Northfield and itself.

Conclusion:

As this experiment shows, the use of maps as historical documents and GIS software as a comparative tool is highly fruitful for the work of environmental historians. Layering maps of Northfield using GIS software uncovers dynamics of the river and the town not accessible from a single map. This comparative layering also allows us to see cartographic anomalies like islands and ponds not visible in other archival resources. These insights are especially helpful in generating new questions and research topics, such as the influence of damming on the rate of sediment deposition at Spring Creek's confluence or the formation and destruction of the island near Riverside Park.

Environmental historians can also add critical insight into key cartographic resources. For instance, the land survey records compiled by Francis J. Marschner to create his map of pre-settlement vegetation were the same survey records that organized the Minnesota Territory into townships and further into the plats that outline towns like Northfield today.³⁰ An exploration of

²⁹ "Spoons Must Be Busy Mornings— They Scoop Up Thirty to Forty-Two Tons of Malt-O-Meal Every Day." *The Northfield Independent*, April 22, 1954, Vol 67. No. 16.

³⁰ Rodgers, Charles. "Land Survey Records: Museum Collections Up Close." MNHS.ORG. Minnesota Historical Society, June 30, 2008. <http://discussions.mnhs.org/collections/2008/06/land-survey-records/>.

the dual role these surveyors play in both documenting and shaping the landscape would inform the extensive restoration ecology and geography work that uses Marschner's map as a baseline.

A final reason why mapping is important to the practice of environmental history is that it ties history to specific places. Markael Luterra's guide to the Carleton Arboretum does this by tagging pieces of natural history to specific places that can be accessed from the map or on the ground. Andy Sturdevant's exhibition *The Via Northfield* also places history: taking the form of a "way station" along the route the artist walked from Minneapolis to Northfield. The exhibition included historic photographs and documents from along the route and invited viewers to contribute their own personal histories traveling The Via Northfield to the archive by filling out "pedestrian reports." If history is grounded in Ethington's *placeful spacetimes*, there are some historical data that escape written archives and can only be experienced *in situ*.³¹

Maps lie, whether in their author's biases or their need to simplify and generalize, but in lying they reveal different versions of truth.³² Combining and comparing the lies different maps tell allows a new picture to emerge, not necessarily one closer to any sort of truth, but a picture of a more complicated and interesting place.

³¹ Luterra and Case.; Sturdevant, Andy. *The Via Northfield*. Flaten Art Museum, February 19, 2016. <https://wp.stolaf.edu/flaten/vianorthfield/>. Ethington. 487.

³² Karrow. 5.

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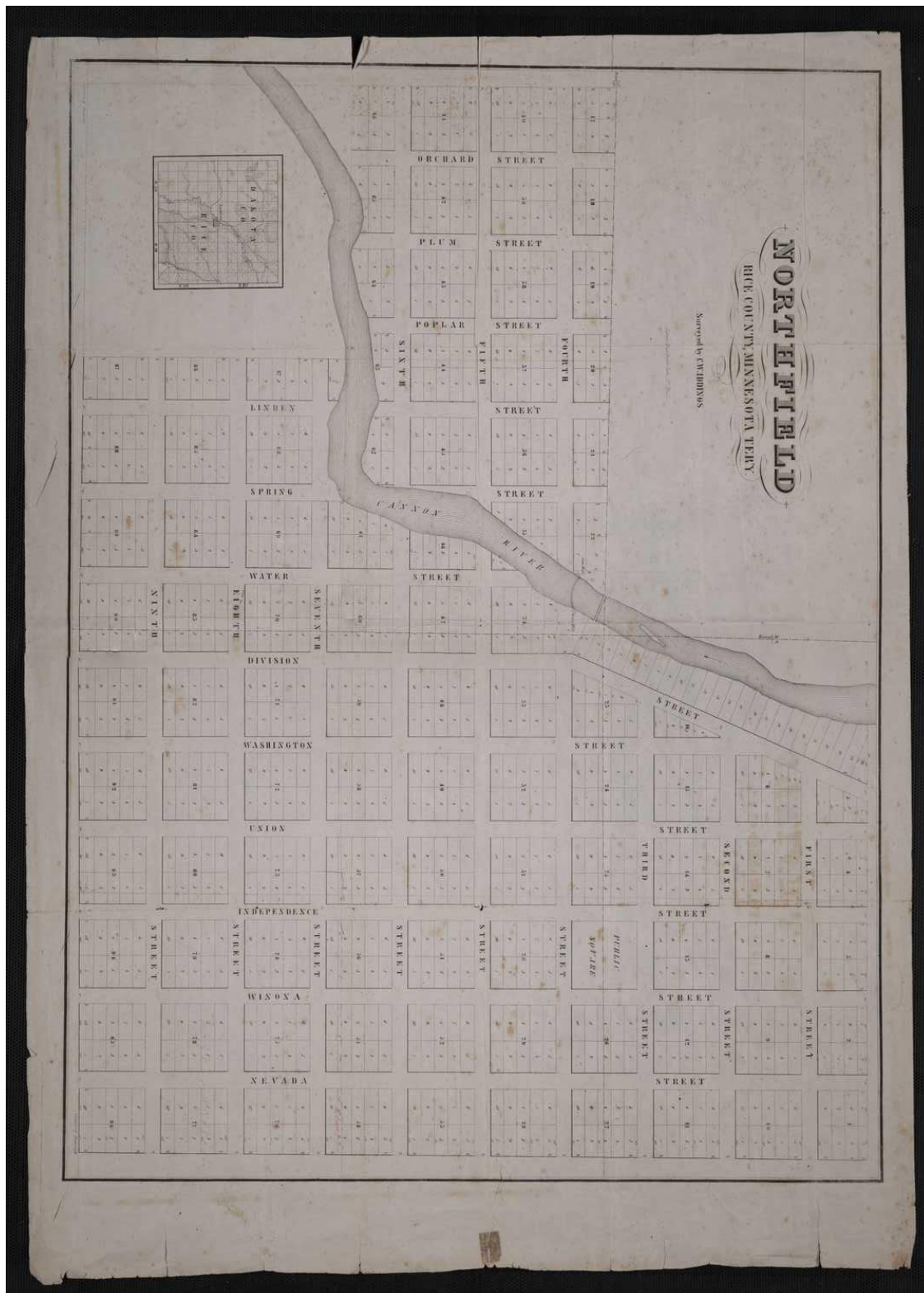
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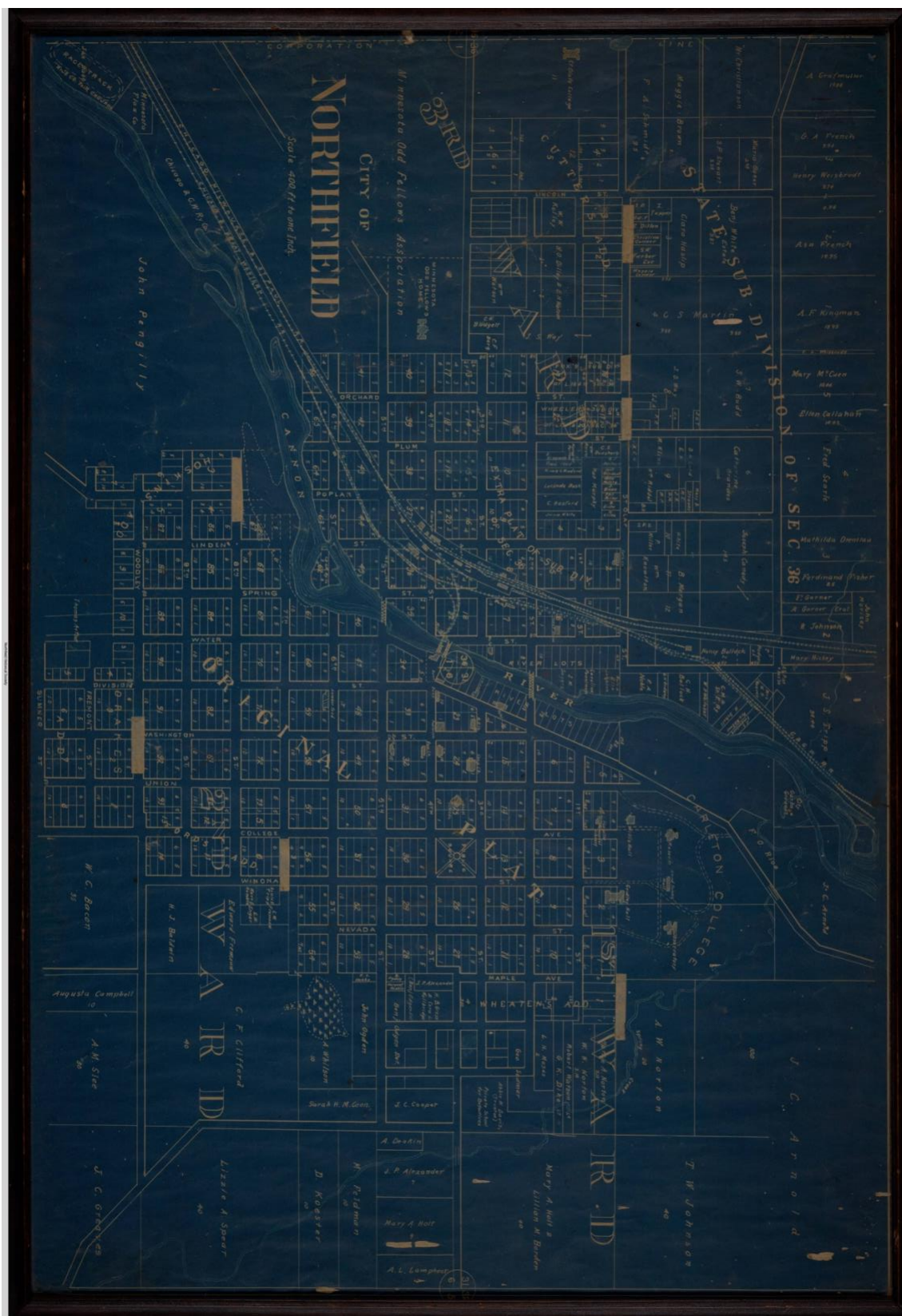
Appendix

1. C.W. Iddings, *Map of Northfield, Rice County, Minnesota Territory:*

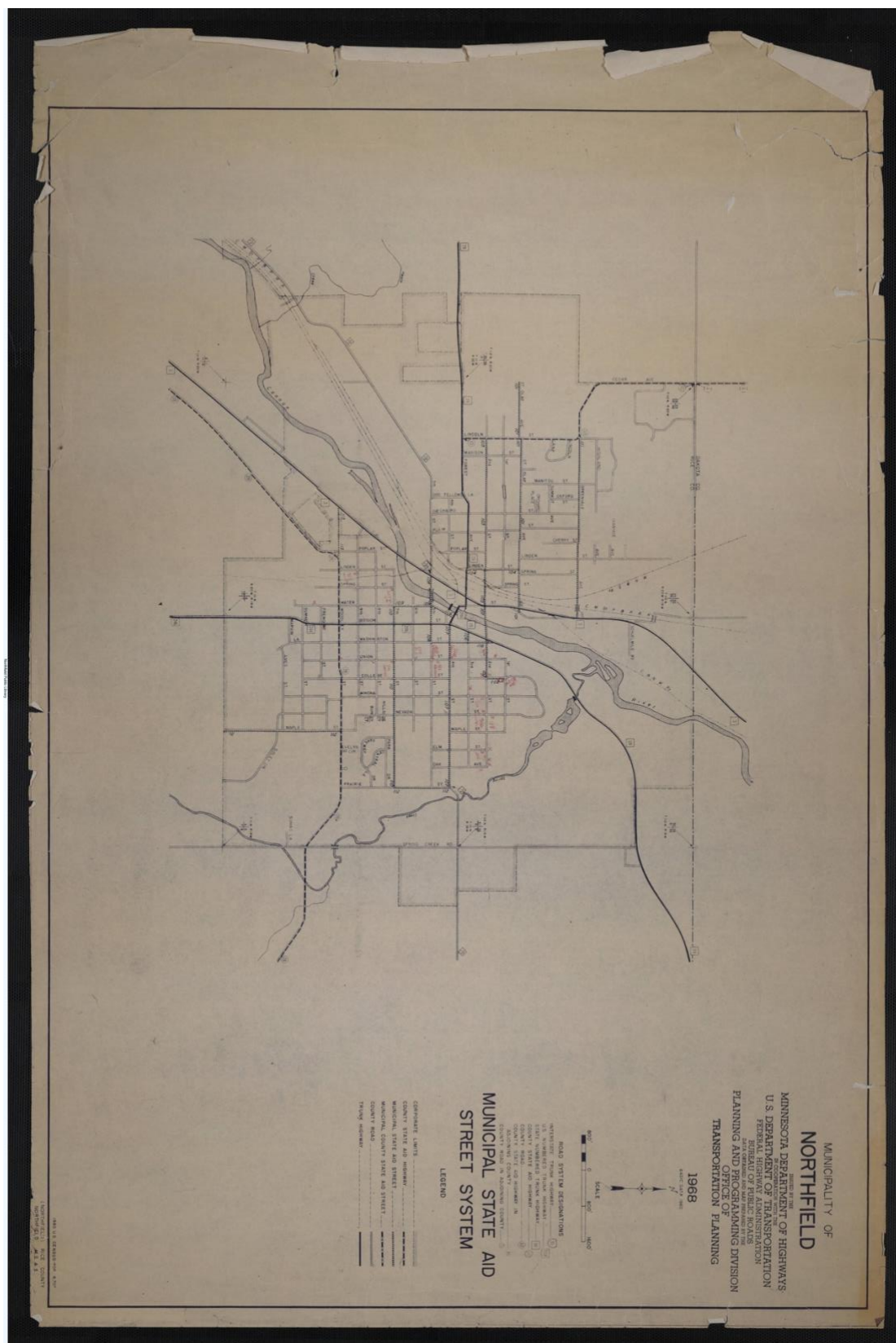
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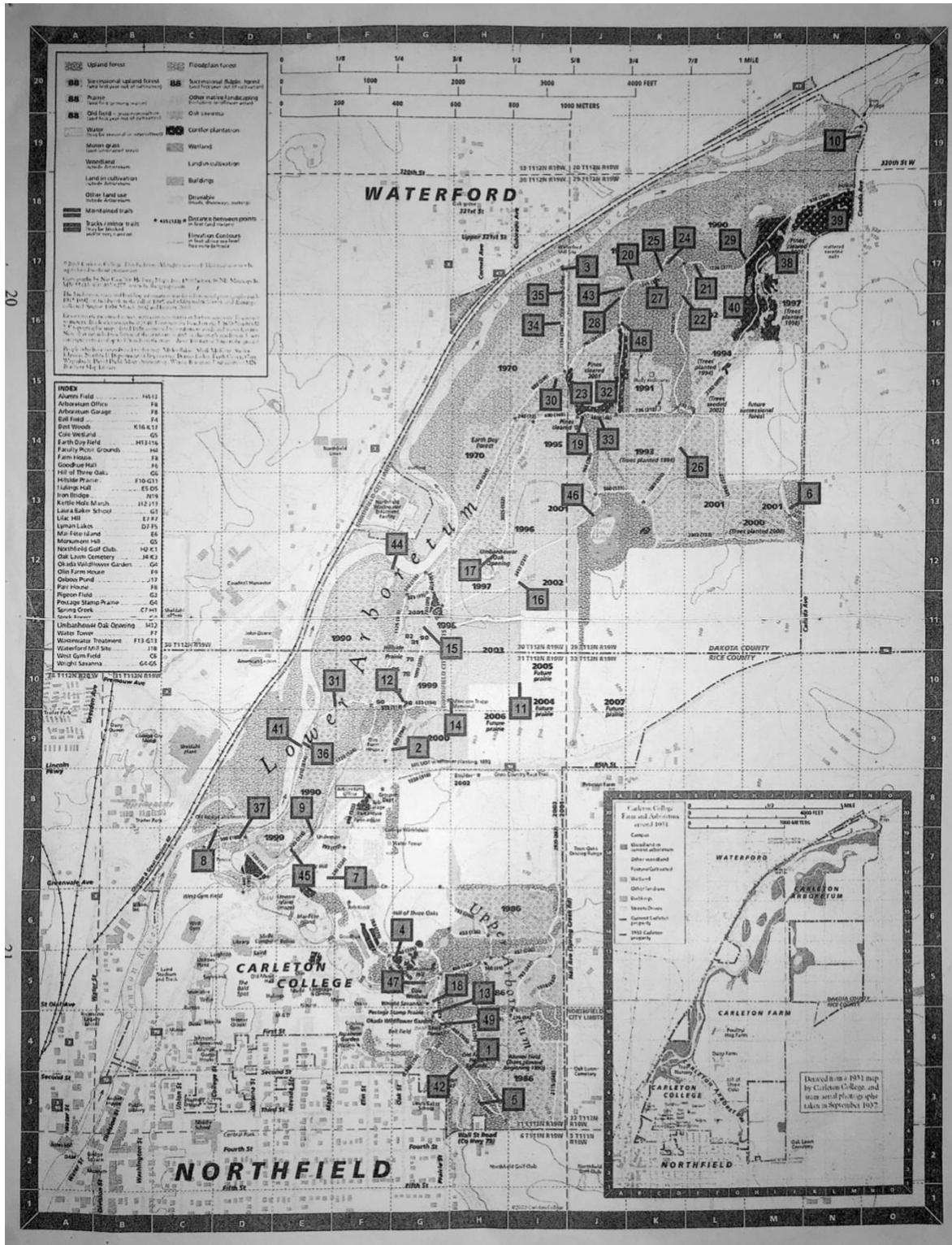
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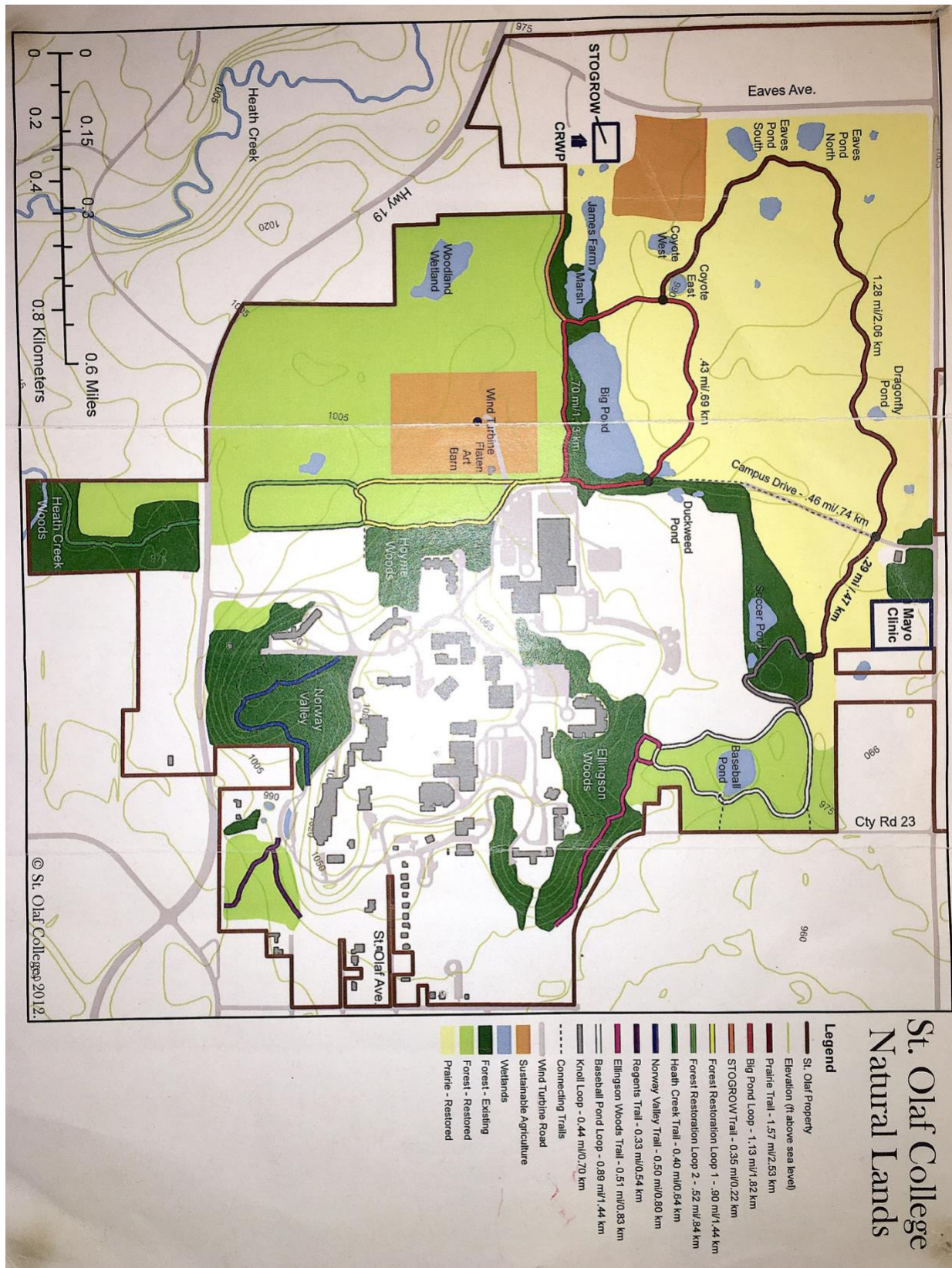
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5. Markael Luterra & Nate Case, *Carleton Cowling Arboretum*, 2007:



6. St. Olaf College, *St. Olaf College Natural Lands*, 2012:



7. Stuart Yurczyk, *Colleges, Cows & Contentment*, 2015:



8. David Lefkowitz & Doug Bratland, *Selected Segments of the Inferior Hiking Trail*, 2016:

