Evaluation of Land Trusts in Wisconsin

By

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Abstract
This paper examines how lands conserved by land trusts are spatiotemporally arranged in the state of Wisconsin. To analyze this question, these lands were mapped out in ArcGIS Pro and bar graphs were creating depicting the acreage of lands in three categories. The first is lands that started being conserved through the end of the year 2000, the second is lands whose conservation start date is between January 1, 2001 through September 30, 2019, and the third of which is those with unknown start dates. A Multi-Distance Spatial Cluster Analysis (Ripley’s K Function) was used to determine any clustering of landscapes across the state. The results fit the null hypothesis and did not show any significant increase in acreage of land that started being conserved from 2001-2019 compared to that which began being conserved in 2000 or earlier, and also did not show any significant clustering of land trust parcels in Wisconsin. More research needs to be done in order to determine if these results were only obtained due to the lack of data or if it is true that there is no significant difference in acreage conserved between the two categories of start dates and that there is no significant clustering of Wisconsin’s land trust sites.
1. Introduction

The natural habitats of the state of Wisconsin are being lost and replaced with human development. There are multiple organizations within the state and across the country with the sole intention to conserve the natural landscape. The Nature Conservancy, the Wisconsin Department of Natural Resources, Gathering Waters — Wisconsin’s Alliance for Land Trusts, and local and county governments all fit into this grouping. Despite their efforts, the extent of conservation in Wisconsin is unclear. This is partially due to some of the conservation organizations keeping the data private, but it is also due to the fact that each organization stores their data in a different place and possibly in a different format than the other organizations. The goals of this study are to display the locations of land trusts across the state of Wisconsin and to determine if there has been a statistically significant increase in the acreage that land trusts cover since the year 2000.

2. Literature Review

2.1 Conservancy Lands

Conserved lands in Wisconsin are managed for natural vegetation, habitat, water quality, and passive recreation. They can vary in size, vegetative communities, landscape features, management priorities, and uses, but most conservancies share some key characteristics. They usually have unique plant communities, wildlife, or geology, provide an important ecological function, are restored to native plant communities, or provide opportunities for passive recreation, education, and volunteering (Middleton, 2016). Natural landscapes are vital for water quality and supply, wildlife, and tourism; however, land degradation increased during the 20th century (World Health Organization, 2019). New conservation areas tend to cluster around pre-existing conserved areas, although existing conservancy lands appear to have no effect on
development in the surrounding area. In one study, there was significantly greater development in regions with greater amounts of protected lands in two thirds of the study area. Thus, it was concluded that conservation actions should not be made with the hopes of larger conservation effects because it may cause the opposite (McDonald et al, 2007).

2.2 Conservation Easements

Conservation easements are voluntary legal agreements between landowners and land trust or government agencies that limit land uses in order to protect conservation values (Land Trust Alliance, 2018). They are seen as “sticks in a bundle of rights,” (Rissman, 2013) and are becoming an increasingly popular mechanism in the protection and conservation of private land (Farmer et al, 2011). The landowner remains the landowner of the private land, but they give some rights of the property away in the conservation easement such as right to use the real estate, to sell it, to lease it, or to enter it. There still seem to be many flaws with conservation easements including little quantitative data available on what they actually protect and little information on the pattern of protected lands. There appear to be very few site-specific values of land in the easements and other documents; instead, they use general terms that could describe a plethora of land parcels. The landowners in conservation easements have a variety of factors that motivated them to place the easements on their properties. The results from a survey of The Nature Conservancy staff showed that a personal connection to the property was the greatest motivation. Contributing to the public good was also seen as a strong motivational factor for many of them. The researchers believe that these factors could be seen anywhere in the world that the land is dominated by uses such as wild animal habitats, recreation, and ecosystem service protection, and other purposes that do not involve extraction (Farmer et al, 2011). The Nature Conservancy is an environmental organization that supports conservation throughout the United States. They are
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a charitable group with a mission to conserve America’s lands and waters. The Nature Conservancy and Land Trust Alliance both take advantage of conservation easements in their work. From a survey of staff of The Nature Conservancy, it was found that 80% of their easements had the aim to provide core habitat to protect communities or species at the site, and almost all of the easements aimed to reduce development on that parcel.

2.3 Land Trusts

Non-profit organizations that conserve environmental amenities on private land are known as land trusts. They typically conserve land through the use of conservation easements, but will also purchase the land outright if they deem it necessary. Conservation easements lead to higher costs but promote more commodities on the land. Most trusts use conservation easements to preserve scenic views over large parcels of agricultural land (Parker, 2004). Land trusts are seen as important when it comes to land conservation and protected open space. They allow the public many benefits, including clean water and scenic views, that would have otherwise been contained on private land. It has been found that nearly 80% of land trusts provide public access to at least some of the property, but that public access is not the top priority for most. Most of the acreage under conservation easements do not allow any public access and only a small percentage of land trusts are in urban areas where the demand for public access would be expected to be greater than in rural areas. Land trusts are good for ecological protection and should continue to strive toward that goal but should also focus more on land conservation in urban areas for recreation and public access. It is expected that more public access could help build support for land trusts (Lieberknecht, 2009). Some land trusts have management that is less than ideal and are in need of financial input (Chenevix-Trench and Philip, 2001). In Wisconsin, the Land Trust Alliance has 34 land trusts totaling 538,290 acres of protected land. The main
goal of this organization is to support land trusts in order to save and secure more lands for the present and future generations. They strive to increase the rate of land conservation, build healthy land trusts that improve the quality of land conservation nationally, and defend the land trust community from threats that threaten specific conserved lands and the growth of the entire community.

2.4 Wisconsin Natural Areas

Wisconsin has 687 state natural areas, according to the Wisconsin Department of Natural Resources. These 402,000 acres protect areas with native landscapes of natural communities, archeological sites, and significant geological formations. These lands are owned by the state and its partners, including land trusts, private citizens, and local and county governments. These natural areas are unique places for low-impact recreation and are valuable for various things, including research and educational use, preservation of genetic and biological diversity, providing benchmarks for determining impact of use on managed lands, and refuges for rare plants and animals. There are 16 areas in Wisconsin with different ecological attributes and management opportunities known as Ecological Landscapes. They can be identified by their different natural communities, key habitats, aquatic features, and native plants and animals. The specific landscapes are Superior Coastal Plain, Northwest Sands, Northwest Lowlands, North Central Forest, Northern Highland, Northeast Sands, Northern Lake Michigan Coastal, Western Prairie, Forest Transition, Western Coulee & Ridges, Central Sand Plains, Central Sand Hills, Central Lake Michigan Coastal, Southwest Savanna, Southeast Glacial Plains, and Southern Lake Michigan Coastal (Figure 1).
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Figure 1: The spatial location of the 16 Ecological Landscapes of Wisconsin. They each have unique natural communities, key habitats, aquatic features, and native plants and animals.

2.4.1 Superior Coastal Plain

The Superior Coastal Plain landscape represents 2.5% of the area of the state at 1416 square miles. The climate of this landscape consists of cool summers, deep snows, strong winds, and high humidity. Historically, the landscape has been dominated by boreal forest, which took up about 50% of the ecological landscape. In the mid-1800s, only about 2% of the Superior Coastal Plain was covered by non-forest communities. In 1992, however, 33% of the landscape was nonforested and 12% was wetlands. This ecological landscape is important to wildlife that use Lake Superior, its islands, coastal estuaries, sandpits, wetlands and shrub swamps, forests, and streams. It also has grasslands that support rare birds and mammals. It is important for breeding and migratory birds, forest mammals, and other wide-ranging mammals.
2.4.2 Northwest Sands

The Northwest Sand landscape represents 3.5% of the land area in the state of Wisconsin at 1956 square miles. The climate of this landscape consists of cold winters and warm summers. During the mid-1800s, the landscape was dominated by Jack pine-scrub oak-barrens with 62% of the land being covered by such areas. There have been great reductions in the amount of pine trees and loss or suppression of native plants and animals that require more open conditions. Northwest sands used to be home to bison, moose, and caribou. Numerous rare plants and animals are strongly associated with pine barrens, which is a globally rare ecosystem.

2.4.3 Northwest Lowlands

The Northwest Lowland landscape represents 1.2% of the land area of Wisconsin at 675 square miles. Although it is Wisconsin’s smallest Ecological Landscape, it is considered part of a much larger ecoregion that extends to the west into Minnesota. The climate is that typical of northern Wisconsin, with cool temperatures and short growing season not adequate to support agricultural crops. The climate, however, is favorable for forests, which cover almost 70% of the Ecological Landscape. There are also numerous and large acid peatlands which result in almost boreal-like conditions. Historically, the Northwest Lowlands were dominated by a mixture of different forested communities. According to the data from the federal General Land Office’s public land survey, 1% of the landscape was water, 4% was barrens, and the remaining 95% was forested in the mid-1800s. The Northwest Lowlands was important historically for mixed deciduous-coniferous forest and peatland species, such as the gray wolf, moose, American black bear, American beaver, and North American river otter.
**2.4.4 North Central Forest**

The North Central Forest Ecological Landscape covers 9543 square miles, representing 17.1% of the total land area of the state. It has the shortest growing season of all the Ecological Landscapes in the state and a climate typical to that of northern Wisconsin. In the low-lying areas, summer temperatures can be cold or freezing at night, which limits the occurrence of some biota. The climate is especially favorable for the growth of forests, which cover roughly 75% of the Ecological Landscape. In the mid-1800s, the landscape was covered about 95% by forests. The North Central Forest was historically important for forest birds and large, wide-ranging forest mammals such as the American black bear, gray wolf, and bobcat.

**2.4.5 Northern Highland**

2081 square miles of Wisconsin is covered by the Northern Highland Ecological Landscape, representing 3.7% of the total land area of the state. The climate is typical to that of northern Wisconsin, and the Northern Highland has the lowest mean annual temperature of any Ecological Landscape in the state and the second largest amount of mean annual snowfall in the state. The climate is favorable for the forests that cover over 76% of the Ecological Landscape. The Northern Highland landscape has historically been important for species requiring aquatic, peatland, or coniferous forest habitats such as the Bald Eagle, Osprey, American Beaver, and American marten. White-tailed deer have become more populous in this Ecological Region since Euro-American settlement.

**2.4.6 Northeast Sands**

The Ecological Landscape of Northeast Sands covers 1542 square miles in Wisconsin, representing 2.8% of the land area of the state. It is the fifth smallest of Wisconsin’s Ecological Landscapes. It has a short growing season that limits yield potential for agriculture. The average
August maximum temperature is the third coolest of any Ecological Landscape in Wisconsin. In the mid-1800s, the Northeast Sands contained a range of plant communities from dry to very wet. Each type occupied less than one-third of the total landscape area. In 1992, 20% of the landscape was made up by wetlands, with forested wetlands totalling around 80% of that. In 2004, it was estimated that 79% of the total area in the Northeast Sands Ecological Landscape was forested and about 21% nonforested.

### 2.4.7 Western Prairie

1.9% of the land area of the state of Wisconsin is covered by the Western Prairie Ecological Landscape. It spans 1090 square miles in Wisconsin, but is part of a much larger ecoregion that extends west into Minnesota. The climate and topography was favorable to frequent fires that resulted in prairie vegetation occurring in almost one-third of the area in the mid-1800s. The amount of precipitation, favorable temperatures, and length of the growing season make this landscape favorable for agriculture, which is prevalent in the Western Prairies of Wisconsin. As of 1992, 47% of the land area of this Ecological Landscape is used for agriculture, the largest of any one land use. The Western Prairies of Wisconsin have historically been important for wildlife species that use prairies and associated lakes, ponds and wetlands, oak savannas, and large river systems. Such species include elk, American bison, white-tailed deer, and Sandhill Crane.

### 2.4.8 Forest Transition

The fourth largest Ecological Landscape in Wisconsin is Forest Transition. It covers 7279 square miles and represents 12.9% of the land area of the state. It extends east-west across much of Wisconsin, making the climate variable. It also straddles the “Tension Zone,” a major eco-climatic zone that runs southeast-northwest across the state. The growing season is long enough
that agriculture is viable, but conditions are more favorable for more crops in southern Wisconsin. The vegetation type covering the most land in the mid-1800s was Northern hardwoods, which covered 72% of the landscape. In 1992, the vegetation type that covered the most amount of land was Forested upland at 37% followed by Agriculture 31%. The Forest Transition Ecological Landscape was historically important for wildlife species such as forest birds, wide-ranging large mammals, neotropical migrant birds, and forest raptors.

2.4.9 Northern Lake Michigan Coastal

The Ecological Landscape that spans 2004 square miles and represents 3.6% of the land area of Wisconsin is Northern Lake Michigan Coastal. This landscape has cold winters and warm summers that are moderated by the thermal mass of Lake Michigan. It can have significant lake effect snow, and its climate is adequate to support agriculture. The warmer temperatures near the lake in the fall and early winter and the slightly cooler temperatures during the spring and early summer are favorable for growing cherries, apples, and other fruits. The landscape was historically dominated by Northern hardwoods covering 65% of the landscape, but in 1992 the dominating vegetation type was Agriculture at 51%. The Northern Lake Michigan Coastal landscape has historically been important for northern forest wildlife species. White-tailed deer population size has increased by around 150,000 from 1981 to 2010.

2.4.10 Western Coulee & Ridges

The largest of Wisconsin’s 16 Ecological Landscapes is Western Coulee and Ridges. This landscape covers 9642 square miles and represents over 17% of the land area in the state. It has a climate typical to that of southern Wisconsin. It extends over a considerable latitudinal area causing the climate to vary from north to south. The climate is favorable for agriculture, but steep slopes limit intensive agricultural uses. There is a high diversity of plants and animals in
the Western Coulee and Ridges due to the climate variability, numerous microhabitats, rugged ridge and valley topography, and large rivers with broad and complex floodplains. The vegetation that dominated the landscape in mid-1800s was oak species, with 53% of the Ecological Landscape forested or partially forested with oaks. In 1992, only 43% of the entire landscape was forested and 36% of Western Coulee and Ridges was used for agriculture. This Ecological Landscape has been important historically for wildlife species that use oak savanna and oak openings, oak and floodplain forests, prairies, bluffs, caves and rock outcroppings, and large river systems. Such species include elk, American bison, Wild Turkey, and timber rattlesnake. When Euro-Americans settled in the mid-1800s, wildfires were prevented and controlled, and wildlife populations changed.

2.4.11 Central Sand Plains

3420 square miles of Wisconsin, or 6.1% of the land area of the state, is covered by Central Sand Plains. The climate of this Ecological Landscape is typical of southern Wisconsin, but it has a growing season almost 3 weeks shorter than other southern Wisconsin ecological landscapes. Summer temperatures can drop below freezing at night which restricts the distribution of some native plants. The short growing season and summer frosts limit agriculture, but there is an apparent difference between the west and east sides of the Wisconsin River. West of the river, commercially grown cranberries are an important crop, but east of the river the agriculture is focused primarily on cool season crops like potatoes and vegetables. In the mid-1800s, the vegetation types were varied with no one vegetation overpowering the others. In 1992, the dominating vegetation type was forested upland covering 42% of the landscape. The Central Sand Plains landscape was historically important for wildlife species using wetlands, oak and pine barrens, oak openings, oak forests, and pine forests.
2.4.12 Central Sand Hills

Central Sand Hills represent 3.9% of the land area of Wisconsin at 2170 square miles. The climate is typical to that of south central Wisconsin. The climate is suitable for agricultural row crops, small grains, and pastures. However, the sandy soils somewhat limit agricultural potential. In the mid-1800s, the dominating vegetation was oak forests, which covered 56% of the total land area of Central Sand Hills. In 1992, only 33% of the Ecological Landscape was forested with any type of tree, and the dominating landscape was Agriculture at 34%. Central Sand Hills have been historically important for wildlife species using wetlands, particularly sedge meadows, oak openings, prairies, and oak and oak-pine forests. Wildlife populations changed in the late 19th and early 20th century following logging of forests, Euro-American settlement, draining of wetlands, wildfire prevention and control, and plowing of prairies.

2.4.13 Central Lake Michigan Coastal

2742 square miles in Wisconsin belong to the Central Lake Michigan Coastal Ecological Landscape, which represents 4.9% of the total land area of the state. The climate in the eastern part of this Ecological Landscape is moderated by Lake Michigan, which causes warmer temperatures in the fall and early winter and cooler temperatures during the spring and early summer. These temperature fluctuations influence vegetation and other aspects of the ecology. It has the second longest mean growing season and the second lowest amount of mean annual precipitation in Wisconsin. Agricultural row crops, pastures, and small grains are prevalent land uses in Central Lake Michigan Coastal landscapes. This Ecological Landscape was primarily a maple-basswood-beech forest interspersed with forested and nonforested wetlands historically. It had a mixture of southern and northern wildlife due to its location along the Tension Zone.
2.4.14 Southwest Savanna

3.5% of the land area of Wisconsin is represented by the Southwest Savanna Ecological Landscape. This landscape, which covers 1950 square miles, has a climate typical to southern Wisconsin. However, it has the fourth longest growing season, the third lowest snowfall, the most precipitation, and the second warmest January low temperature among the 16 Ecological Landscapes in Wisconsin. The climate tends to be warmer in the southwestern part of the state, which makes it suitable for most agricultural uses. As of 1992, around 80% of Southwest Savanna land in Wisconsin has been devoted to small grains, row crops, and pastures. This Ecological Landscape has historically been important for elk, American bison, Northern Bobwhite, and other wildlife species that use prairies, oak forests, oak savannas, and streams.

2.4.15 Southeast Glacial Plains

13.8% of the land area of Wisconsin belongs to the Southeast Glacial Plains Ecological Landscape. The 7725 square miles of Southeast Glacial Plains have a climate typical of southern Wisconsin, which is suitable for small grains, agricultural row crops, and pastures. Historically, the vegetation of the Southeast Glacial Plains was dominated by maple-basswood forest in the northeast and oak forest, oak openings, prairie, wetlands, and savanna in the west and south. This made the landscape important for a mixture of grassland, wetland, and southern forest species. Such species include American bison, elk, Northern Bobwhite, and Wild Turkey. Wildlife populations changed drastically in the mid-1800s when grasslands were plowed and forests were cleared for agriculture.

2.4.16 Southern Lake Michigan Coastal

The Ecological Landscape of Southern Lake Michigan Coastal covers 843 square miles and represents 1.5% of the land area of the state of Wisconsin. The climate consists of cold
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winters and warm summers that are moderated by the thermal mass of Lake Michigan. Lake effect snow can be significant, but rainfall and growing degree days are able to support small grains, agricultural row crops, and pastures. Thus, these are prevalent land uses in the non-urbanized parts of this Ecological Landscape. American bison, elk, gray wolf, American beaver, and North American river otter are all historically significant species in the Southern Lake Michigan Coastal landscape.

2.6 Geographic Information Systems

Spatial data analysis has gone from the physical display of spatial information to management based on spatial relationships. Coinciding with that, maps have gone from descriptive to perspective with the increase and improvement of technology. Geographic Information Systems (GIS) represent a powerful set of tools for collecting, storing, retrieving, transforming, and displaying spatial data. It is used as a decision-support tool for research management, planning and impact studies. Remote sensing and geographic information systems have been seen to increase the value of imagery with faster and more precise classification (Droj, 2012).

2.7 Hypothesis

H₀: It cannot be proven that there is a significant increase in acreage conserved by land trusts from 2001 through the present compared to that which began being conserved in the year 2000 or earlier, and there is no significant clustering of land trusts in Wisconsin.

H₁: Each of the land trusts will have a significant increase in parcel acreage established after the year 2000, in comparison to that which has a start date no later than December of 2000. There will be significant clustering of land trusts across the state of Wisconsin.
3. **Data & Methods**

3.1 Study Area

Land trusts throughout the entire state of Wisconsin are analyzed in this project. The land trusts fall within the Wisconsin Natural Areas mentioned above of Northern, Central, and Southern Lake Michigan Coastal, Southeast Glacial Plains, Southwest Savanna, Western Coulee & Ridges, Central Sand Hills, Northern Highland, North Central Forest, Northwest Lowlands, and Western Prairie. Humans have altered the surrounding areas with practices such as urbanization and agriculture.

3.2 Data Sources

All data was retrieved were individual shapefiles for each land trust from David Holman, who did a project for Gathering Waters: Wisconsin’s Alliance for Land Trusts. The land trusts involved in this study are Driftless Area Land Conservancy, Drumlín Area Land Trust, Geneva Lake Conservancy, Groundswell Conservancy, Kinnickinnic River Land Trust, Milwaukee Area Land Conservancy, Madison Audubon Society, Ridges Sanctuary, River Revitalization Foundation, Seno K/RLT, and The Nature Conservancy.

3.3 Data Analysis

The objective of this analysis was to create one map for each of the land trusts depicting which areas were gained by the land trust through the year 2000 and which started being protected by the land trust in any of the years between 2001 and 2019. Each of the maps also contain a bar graph illustrating the total acreage of the land trust that was established during each of the time periods.

The land trusts were added into GIS as individual layers, each of which I added a new “Time” field to and entered “2000 or Before,” “After 2000,” or “Unknown” into it, depending on
the date that each parcel was added to the land trust. The parcels were symbolized navy blue if the land trust began conserving that land in 2000 or earlier, a medium green color if conservation began after the year 2000, and in a lighter blue color if the start date is unknown. These colors were chosen so that individuals with color vision deficiency will be able to tell the difference between the three. The light gray basemap was used in order to make the dark symbology of the land trusts stand out on the maps. One map of the state as a whole was also produced using a cluster analysis to determine any clustering of land trusts across Wisconsin.

A Multi-Distance Spatial Cluster Analysis (Ripley’s K Function) was used to determine whether the land trust parcels exhibit statistically significant clustering or dispersion over a range of distances. This was performed using the tool in ArcGIS Pro. A paired, one-tailed T-test was performed in Microsoft Excel on all of the land trusts to determine if the acreage that was established after the year 2000 was significantly greater than that from 2000 or earlier.

4. Results

The eleven land trust maps show the total acreage of land that is conserved by that particular land trust, how that land is spatially arranged, and how much of that land had begun being conserved by the land trust within each of the time periods. The maps are arranged in alphabetical order. Two of the land trusts, Driftless Area Land Conservancy (Figure 2) and Milwaukee Area Land Conservancy (Figure 8), do not have any land that they began protecting prior to the year 2001; thus, one hundred percent of their land trusts were established after 2000. The same goes for River Revitalization Foundation (Figure 10), although they do have land with an unknown start date, so it is impossible to know for sure that they did not protect any in 2000 or earlier. Groundswell Conservancy (Figure 5) did not keep any data on when they began conserving the parcels they maintain, so it is impossible to determine whether they have had a
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significant increase since 2000. Fitting with the null hypothesis, a t-value of .201 and a p-value of .422 were found, illustrating that the land trusts did not have a statistically significant amount of their total conservation acreage starting from the year 2001. It also was found using a Multi-Distance Spatial Cluster Analysis (Ripley’s K Function) that there were no areas of statistically significant clustering in the state.
Driftless Area Land Conservancy

Figure 2. Map depicting the parcels that Driftless Area Land Conservancy works to protect and bar chart illustrating that conservation of all of those parcels began post-2000.
Figure 3. Map depicting the parcels that Drumlín Area Land Trust works to protect and bar chart illustrating that conservation of 87.94% of those began post-2000.
Figure 4. Map depicting the parcels that Geneva Lake Conservancy works to protect and bar chart illustrating that conservation of 47.79% of those parcels began post-2000.
Groundswell Conservancy

Figure 5. Map depicting the parcels that Groundswell Conservancy works to protect and bar chart illustrating that it is unknown conservation began for all of their parcels.
Figure 6. Map depicting the parcels that Kinnickinnic River Land Trust works to protect and bar chart illustrating that conservation of 67.16% of those parcels began post-2000.
Figure 7. Map depicting the parcels that the Madison Audubon Society works to protect and bar chart illustrating that conservation of 41.02% of those parcels began post-2000.
Figure 8. Map depicting the parcels that Milwaukee Area Land Conservancy works to protect and bar chart illustrating that conservation of all of those parcels began post-2000.
Figure 9. Map depicting the parcels that The Ridges Sanctuary works to protect and bar chart illustrating that conservation of none of those parcels with known dates began post-2000.
Figure 10. Map depicting the parcels that River Revitalization Foundation works to protect and bar chart illustrating that conservation of all of those parcels with known dates began post-2000.
Figure 11. Map depicting the parcels that Seno K/RLT Conservancy works to protect and bar chart illustrating that conservation of 77.30% of those parcels began post-2000.
Figure 12. Map depicting the parcels that The Nature Conservancy works to protect and bar chart illustrating that conservation of 3.84% of those parcels definitely began post-2000.
5. Discussion

This thesis project would have been improved if I had gotten more land trust data. Of the 43 I reached out to, only 11 were willing and able to send their data to me to use for this project. As I only received data from just over 25% of the land trusts in the state of Wisconsin, there is a lot of room for improvement. That missing 75% of the land trust data across the state could have changed the result of the spatial cluster analysis. It also could have truly shown whether there has been a significant increase in the acreage of land conserved by land trusts statewide.

Going forward, this project could be enhanced by taking the data further. If there were a way to receive data from more of Wisconsin’s land trusts, that would be an advancement on its own. Furthermore, if the same analyses were completed on a project with that data and areas with higher versus lower concentrations of conserved land under land trusts were found, it may beg the question as to whether there are any natural resources in the coldspots that are not currently being conserved in any of the areas that are maintained by land trusts. In a broader sense, this project could be replicated state-by-state or even on a nationwide level, as long as the land trusts have the data and are willing to share it.
6. References


