

# Parcels to Properties



## Project Goal:

Create a nation-wide dataset of **consolidated properties** by converting existing tax parcel polygons into properties based on **ownership** and location.

## Why Properties?

A tax parcel represents one piece of land held by an owner. By consolidating parcels through entity-matching, we create a cohesive ownership unit. This consolidation enables property-level analyses, which can produce more insightful results than those with pixels or parcels in isolation. While some land owners may only own one parcel, many - especially agricultural - own more than one adjacent or disparate set of parcels.

## What is a Tax Parcel?

A tax parcel is a polygon representation of a **property boundary** which includes ownership attributes. Municipal assessors assign a land value and classification to parcels every one to ten years. Some states publish annual, statewide parcel data, but it is more common for it to be county-controlled and at varying publishing times. Some counties only house their parcel data at a county assessor's office.

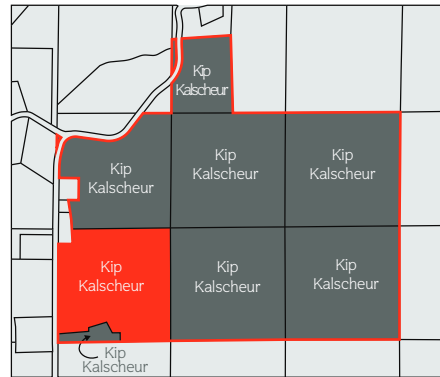
## Is a parcel not the same as a property?

**Many parcels might make up one owners' property or holding.**

Because of the history of private land ownership in the United States, land in the US has a 'checkerboard' nature. The Land Ordinance Act of 1785 established a system of land surveying called the Public Land Survey System (PLSS) to plat land acquired from the Treaty Of Paris into 6-square-mile townships for sale and settlement. Thomas Jefferson came up with the idea in 1784 as a way to offset war debts. This system made it easier for the government to transfer western land to private ownership. Each county in the United States collects parcel data, but because owners can have more than one parcel, the ownership usually looks piecemeal rather than cohesive.

## Definitions: 'Property' vs 'Holding'

So far, we are looking at two types of land ownership: properties and holdings. We define a property as a group of parcels with the same owner whose boundaries are contiguous or within a specified distance. A holding has the same owner, but the parcel boundaries may not all be touching, like a farmer living in a different location from their farm, or a person owning a house in a city and a cabin up north.



An example of a **property**, where the same owner owns multiple parcels whose boundaries are either touching or separated by a road.

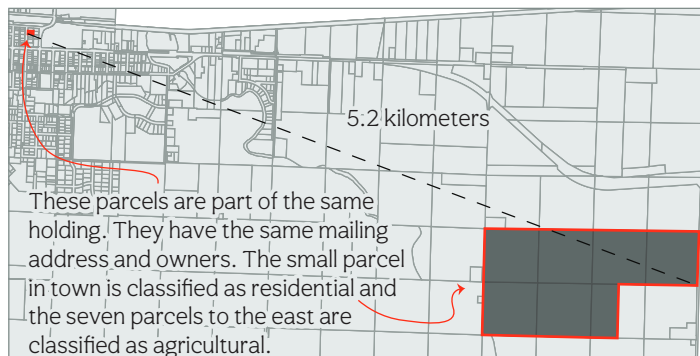


An example of a **holding**, where an owner owns a group of contiguous parcels, as well as a parcel (or parcels) that is spatially distinct from another group.

Summary Statistics	Value	Description
Using the 2023 WI parcel database	3,540,000	Approximate number of <b>individual parcels</b>
	2,400,000	Approximate number of distinct <b>properties</b>
	1,940,000	Approximate number of distinct <b>holdings</b>

## Holding Dispersion

The database includes a table showing the dispersion of the holdings, calculated using the radius of the holding's minimum bounding circle.



## Limitations

### Human data-entry

The polygons and attributes we see in the parcel data are hand-written/drawn, typed and coded processes, each tied to a human source, making error or inconsistency -- especially at a statewide or national scale -- inevitable. Example) The same name having different versions: Rice Ltd Partnership vs Rice Ltd Prtnrshp or

### Assessor interpretation

The data also represents an assessor's interpretation of land, which may miss nuances like field rentals, family management and non-normative ownership types.

### Common names/Redacted Owner Names

Especially with holdings, the scripts (currently) may interpret common names (i.e. Mark Johnson, Andrew Miller) to be a 'holding' when in fact they are not related. Owners are also allowed to ask for their names to be redacted from the parcel database. One version of the holdings script only uses the mailing address to address this issue.

## Tools and Data

- Wisconsin Statewide Parcel Database (which has 10 consecutive years of parcels)
- Postgresql (database management and queries)
- Visual Studio Code (code editor)
- ArcGIS Pro (qa/qc and visual representations)
- Regrid (national parcel data -- in progress)

Wisconsin has one of the most accessible, annually aggregated, updated, and published statewide parcel databases in the US. It has been our starting case study for the matching processes.

## Main Steps

- Write matching rules
- Match parcels based on the rules
- Assign the matched parcel a new match ID
- Create new property or holding attribute/polygon

## Process

### Write matching rules

#### Properties

1. Owner Name = Owner Name AND within 100m
2. Mailing Address = Mailing Address AND within 100m
3. Owner names are 'Not Available' BUT Mailing Address = Mailing Address AND within 100m

#### Holdings

1. Owner Name = Owner Name
2. Mailing Address = Mailing Address
3. Owner names are 'Not Available' BUT Mailing Address = Mailing Address

This distance is easily adjustable. Right now, the parameter is set to be less than 400m (the length of a square agricultural parcel) but larger than the width of a six-lane highway like I-94 (~ 50m)

Same name, Same mailing address

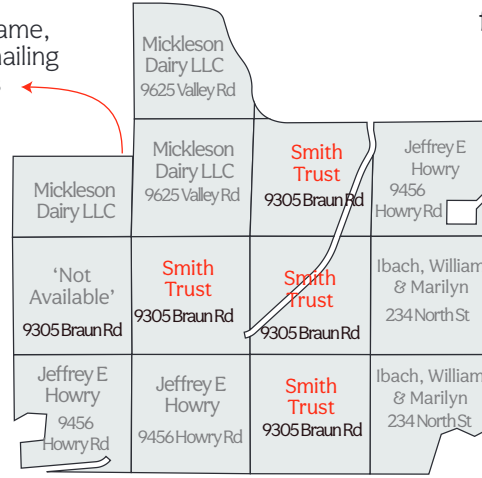
Example: Smith Trust & Not Available have the same mailing address

Same name, Same mailing address

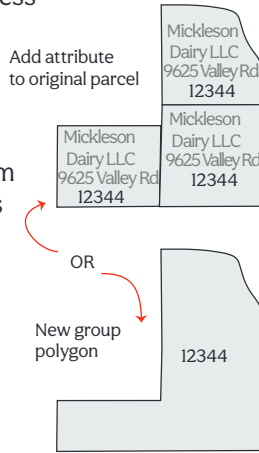
### Match parcels from rules

Same name, Same mailing address, Greater than 100m from other matches

Same name, Same mailing address

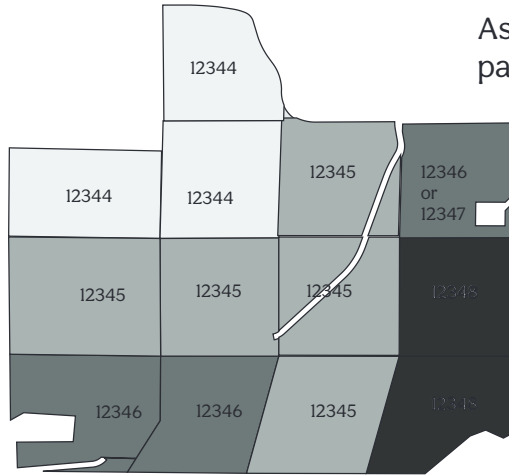


We have the final database in multiple formats. One version is where the 'group id' created from matching the parcels is added as a new field that can be dissolved or selected. The other format is as a shapefile where each polygon only includes the new property's groupid.



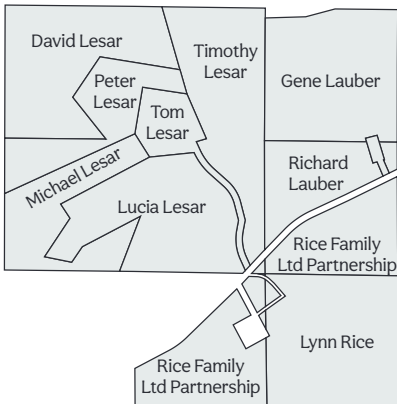
### Assign matched parcels to a group

Classified as either a property or a holding

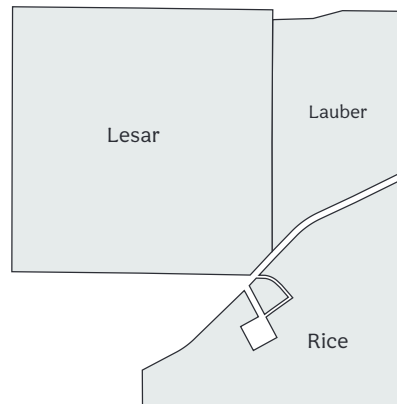


## Family Surnames

The database includes a family surname field, achieved by parsing out components of the attribute string value.



- |                             |        |
|-----------------------------|--------|
| Gene Lauber                 | Lauber |
| Richard Lauber              | Lauber |
| Timothy Lesar               | Lesar  |
| Tom Lesar                   | Lesar  |
| Peter Lesar                 | Lesar  |
| Lucia Lesar                 | Lesar  |
| Michael Lesar               | Lesar  |
| David Lesar                 | Rice   |
| Lynn Rice                   | Rice   |
| Rice Family Ltd Partnership | Rice   |
| Rice Family Ltd Partnership | Rice   |



## What's Next?

Using data from regrid.com, the next project goal is to adjust the scripts to run on a national parcel database.



### Why proprietary data?

Wisconsin's assemblage of publicly accessible state-wide parcels is unique. Some states collect their data on a state level but most are only available for certain counties or by contacting a local assessor.