

# **Property, ROW, & Easement Cleanup using Python**

# A reason to celebrate!

- Parcel data is becoming more accessible
- This freed us from needing to constantly update our own land-owner information.
  - We don't get alerted when land is split up or transferred
  - We had needed to keep a database of previous contacts in the past
    - Our database wasn't spatial, so what do we tie the ownership to?
      - Structure?
      - TRS?

# Sources

- North Dakota
  - Full state parcel dataset on state GIS portal
- Minnesota
  - Counties host data
    - Some have data available for download
    - Others only web viewers
      - Can try and request dataset

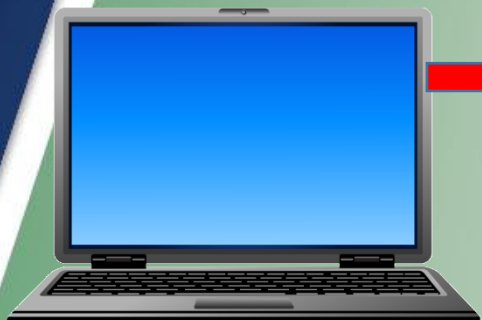
# There's a problem though

FID	Shape	OWNNAME_1	OWNADR1_1	OWNADR2_1	OWNADR3_1	OWNZIP5_1
91	Polygon	UNGERECHT JAMES	13047 TOWN RD 298	NORTHOME MN 56661		56661
92	Polygon	FISHER JEFFREY A. RO...	ROBERT E MALTERUD	ANDREW G FISHER	PO BOX 257	56628
93	Polygon	JAEGER TERRANCE	13108 HWY 1	NORTHOME MN 56661		56661
94	Polygon	ENGUM ELIZABETH & L...				0
95	Polygon	LUKENBILL CHRISTOPH...	ENGUM ELIZABETH MA...	6251 PAGEL DR SE	ROCHESTER MN 55904	55904
96	Polygon	JAEGER TERRANCE	13108 HWY 1	NORTHOME MN 56661		56661
97	Polygon	WINKLE J & DANINGER...				0
98	Polygon	UNGERECHT CRAIG P	46047 255TH AVE	LAPORTE MN 56461		56461

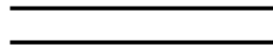
I can easily format  
THIS to  
THAT



This can't



Return Address



John Doe  
0000 Campus Box  
Elon, NC 27244

# Counties also aren't consistent

VENUESC	Name	PropertyAd	SchoolDist	FireDistri	WaterDistr	CountyPark	Subdivisio	UNIQUEID	LandCity
Fargo City	CALIDAK PROPERTIES L...	2601 12 ST N UNIT 400	S001		W060	PK01	Airport 1st	142584815	FARGO
Fargo City	KLH&J LAND LLC	2601 12 ST N UNIT 300	S001		W060	PK01	Airport 1st	142584814	FARGO
								142642623	
Fargo City	TRAILL PAINTING COM...	2629 12 ST N UNIT 5	S001		W060	PK01	Airport 1st	142584817	FARGO
Fargo City	ERIC & JILL STROMSB...	2817 1 ST N	S001		W060	PK01	Asp	142585484	FARGO
Fargo City	KEVIN OYER	1334 1 AVE S	S001		W060	PK01	Eddy & Fullers Outlots	142589362	FARGO
Fargo City	RONALD & NANCY LO...	333 FOREST AVE N	S001		W060	PK01	Edgewood 2nd	142589798	FARGO
Fargo City	VERAZITY RENTALS LLC	1621 3 AVE S	S001		W060	PK01	Fullers	142591098	FARGO

FID	Shape	OWNNAME_1	OWNADR1_1	OWNADR2_1	OWNADR3_1	OWNZIP5_1
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97	Polygon	WINKLE J & DANINGER...				0
98	Polygon	UNGERECHT CRAIG P	46047 255TH AVE	LADORTE MN 56461		56461

TaxName	TaxAddr	TaxCity	TaxState	TaxZip	Section	Township	Range
STATE OF MINNESOTA	500 LAFAYETTE RD BOX...	ST PAUL	MN	55155	1	157	30
STATE OF MINNESOTA	500 LAFAYETTE RD BOX...	ST PAUL	MN	55155	2	157	30
RED LAKE BAND RESER...	PO BOX 574	REDLAKE	MN	56671	3	157	30
STEPHEN D LECLAIRE	7529 25TH AVE SE	BAUDETTE	MN	56623	3	157	30
STATE OF MINNESOTA	500 LAFAYETTE RD BOX...	ST PAUL	MN	55155	3	157	30
RED LAKE BAND RESER...	PO BOX 574	REDLAKE	MN	56671	3	157	30
STEPHEN D LECLAIRE	7529 25TH AVE SE	BAUDETTE	MN	56623	4	157	30
STATE OF MINNESOTA	500 LAFAYETTE RD BOX...	ST PAUL	MN	55155	4	157	30

# So, what are we to do?

Keep in mind we're dealing with millions of records

- Brute Force
  - Manually go through and format
    - Dataset is Massive
    - Updates Regularly
- Map everything to bunch of fields and leave it a mess
  - We're suppose to be a service department

# Did someone say...

If you didn't, I did





# It's not as complicated as it looks, and we can leverage a library to do most of the heavy lifting

- usaddress
  - Available on github
  - I downloaded directly through the pip installer
  - Parses addresses into an organized list

```
import arcpy
import usaddress

import itertools
from itertools import groupby
from itertools import chain
from datetime import datetime

#Print the start time
# Getting the start current date and time
dt = datetime.now()

print("Start Date and time is:", dt)

#####
# Define Output file to put dataset#####
#####

outputFC = r'C:\Users\pmetzger\Desktop\ParcelOutput.gdb\MergedParcels'

#####
# Define Input parcel dataset and the fields to run the script on#
#####

#Input Parcel Dataset
Parcel_Dataset = r"C:\Users\pmetzger\Desktop\NDParcelsFGDB.gdb\ND_joined"

#Define Name and Address Variable these will be set to getparameter
Name1 = 'OwnerName'
Name2 = ''
Name3 = ''

Add1 = 'OwnerMailingAddress'
Add2 = 'OwnerCity'
Add3 = 'OwnerState'
Add4 = 'OwnerZip'
Add5 = ''
Add6 = ''
Add7 = ''

#Define Other variables to go into the fields to be appended to output these will be set to getparameter
Township = 'Township'
Range = 'Range'
Section = 'Section'
County = 'CountyName'
ParcelID = 'UniqueParcelID'
LegalDesc = 'LegalDescription'

#####
#####

parcels = arcpy.conversion.FeatureClassToFeatureClass(Parcel_Dataset, 'in_memory', 'parcels')

#create fields to populate in script
arcpy.management.AddField(parcels, "OutParcelID", "TEXT")
arcpy.management.AddField(parcels, "OutName", "TEXT")
arcpy.management.AddField(parcels, "OutAddress", "TEXT")
arcpy.management.AddField(parcels, "OutCity", "TEXT")
arcpy.management.AddField(parcels, "OutState", "TEXT")
```



# We need to do some prep work

- The arcpy tools this script uses are from ArcPro so make sure you have python 3 installed
- Create a virtual python environment
  - We don't want to screw up anything with ArcPro
    - Creates an isolated environment
    - You will need to run the script from the virtual environment otherwise it won't find the needed libraries
- Install the library from pip
  - Done from windows cmd
  - `python3 -m pip install usaddress`

# usaddress

- If we put in an address in it's longest form we'll get a list of tuples

```
>>> import usaddress
>>> usaddress.parse('Minnkota Power Cooperative 5301 32nd Ave S, Grand Forks, ND 58201')
[('Minnkota', 'Recipient'), ('Power', 'Recipient'), ('Cooperative', 'Recipient'), ('5301', 'AddressNumber'), ('32nd', 'StreetName'), ('Ave', 'StreetNamePostType'), ('S,', 'StreetNamePostDirectional'), ('Grand', 'PlaceName'), ('Forks,', 'PlaceName'), ('ND', 'StateName'), ('58201', 'ZipCode')]
>>> |
```

- One command just did all most of the heavy lifting

# Additional Tools

- arcpy
  - We're going to work with a files in a geodatabase so we need tools to access it
  - Will help us do some data cleanup
- itertools
  - usaddress tuples output a key, this will allow us to work with them

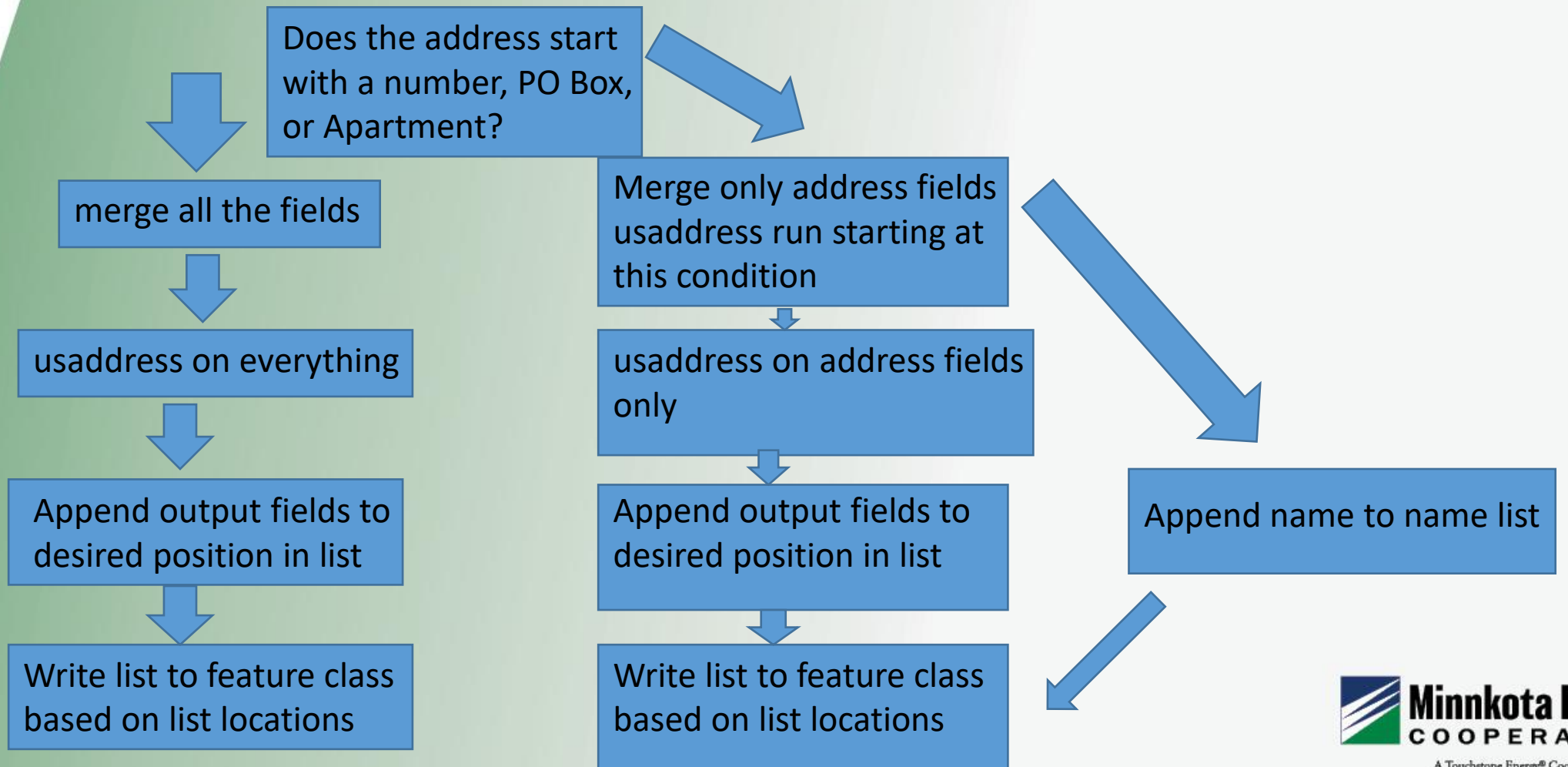
# Tear it down and put it back together

- Mash all the Names and addresses together in one string
- Run that string through usaddress
- Put the output in the correct location in a list
- Write that list to the feature class
- Some final cleanup
  - Get rid of empty fields so they don't raise errors
  - Delete old fields

# Stream lining

- P.O. Box and apartments are a clear indicator that's where the address starts
  - Keywords used as a basis "if else"
    - If keyword present
      - Name is Name, run only on address
    - Else
      - Run on everything
  - Reasoning
    - Names are sometimes placed in address fields
      - Names do not start with numbers, PO BOX, or Apartment
    - Some street names would confuse usaddress
      - Is that a street name or someone's name?

TAO_NAME	ADDR_1	ADDR_2	ADDR_3
ABBOTT, ARTHUR & ROSELLA TRUSTEES	10409 S TRIPP ST	OAK LAWN IL 60453	
BROUWER FAMILY CABIN LLC	17379 310TH ST	APLINGTON IA 50604	
BROUWER FAMILY CABIN LLC	17379 310TH ST	APLINGTON IA 50604	
FORMANEK FAMILY LC	C/O KATHA RICCIARDI	PO BOX 1150	ST JOHN, VI 00831
FORMANEK FAMILY LC	C/O KATHA RICCIARDI	PO BOX 1150	ST JOHN, VI 00831
T & M LOON HAVEN LC	805 FLORENCE ST	PARKERSBURG IA 50665	
T & M LOON HAVEN LC	805 FLORENCE ST	PARKERSBURG IA 50665	





# Exception Handling

- There's going to be a lot fields that come back empty both in the input and output
- Try, Except, Pass
  - Instead of IF this happens do this we tell it to TRY, if it can't just skip it
    - Otherwise, it will crash almost immediately
- “if not none”
  - Also tells the script to ignore empty data but not in a loop

# Running and Results

- Modified the script for each county and ran as a batch
- Quality is good, but not perfect
  - We run the data against the national change of address database
  - Will flag bad addresses
    - More conditions than just syntax

# Output

PS	Owner Name	Owner Mailing Address	Owner City	Owner State	Owner Country	Owner Zip	Owner Zip 4	Owner2 Name	Owner2 Mailing Addr...
	SONDRESON LOREN S	7317 136TH AVE NE	HOOPLE	ND	<Null>	58243	9476	<Null>	<Null>
	DOMBEN ELLEN BETH & TODD CONRAD	420 2ND AVE N	EDINBURG	ND	<Null>	58227	<Null>	<Null>	<Null>
	FIEDLER KATHRYN H & KRAEMER	FRANCES B % KATHRYN FIEDLER, 6622 WOODCREST RD	GRAND FORKS	ND	<Null>	58201	<Null>	<Null>	<Null>
	ZIDON DONALD T	12825 COUNTY ROAD 7	EDINBURG	ND	<Null>	58227	<Null>	<Null>	<Null>
	RUSTAN JASON L & ETAL	38475 TAMWORTH AVE	NORTH BRANCH	MN	<Null>	55056	<Null>	<Null>	<Null>
	MAYO FAMILY PARTNERSHIP LLP	PO BOX 310	CAVALIER	ND	<Null>	0310	<Null>	<Null>	<Null>
	RUSTAN JASON L & ETAL	38475 TAMWORTH AVE	NORTH BRANCH	MN	<Null>	55056	<Null>	<Null>	<Null>
	SONDRESON LOREN S	7317 136TH AVE NE	HOOPLE	ND	<Null>	58243	9476	<Null>	<Null>
	BRANDVOLD WAYNE & BARBARA L-E	BRANDVOLD STEFANIE ETAL, 12651 75TH ST NE	EDINBURG	ND	<Null>	58227	9331	<Null>	<Null>
	KEARNEY LOUISE LIFE EST &	BREVIK MICHAEL LIFE EST ETAL, 314 RAILROAD AVE E	PARK RIVER	ND	<Null>	58270	<Null>	<Null>	<Null>
	BACH TRAVIS & MEGAN	2635 32ND AVE NE	ARDOCH	ND	<Null>	58261	<Null>	<Null>	<Null>
	BRANDVOLD WAYNE & BARBARA L-E	BRANDVOLD STEFANIE ETAL, 12651 75TH ST NE	EDINBURG	ND	<Null>	58227	9331	<Null>	<Null>
	BRANDVOLD WAYNE & BARBARA L-E	BRANDVOLD STEFANIE ETAL, 12651 75TH ST NE	EDINBURG	ND	<Null>	58227	9331	<Null>	<Null>
	KEARNEY LOUISE LIFE EST &	BREVIK MICHAEL LIFE EST ETAL, 314 RAILROAD AVE E	PARK RIVER	ND	<Null>	58270	<Null>	<Null>	<Null>
	EINARSON LLOYD A	PO BOX 84	EDINBURG	ND	<Null>	58227	<Null>	<Null>	<Null>

17 of 532,585 selected

Filters: 100%

PRDDBO.ROW\_Parcels

Id: Add Calculate Selection: Select By Attributes Zoom To Switch Clear Delete Copy Highlighted: Unselect Reselect Zoom To Switch Clear Delete

OutName	OutAddress	OutCity	OutState	OutZIP	OutCounty	OutTownship	OutRange	O
SONDRESON LOREN S	7317 136TH AVE NE	HOOPLE	ND	58243	Walsh	158	056	05
DOMBEN ELLEN BETH & TODD CONRAD	420 2ND AVE N	EDINBURG	ND	58227	Walsh	158	056	05
FIEDLER KATHRYN H & KRAEMER FRANCES B KATHRYN FIEDLER	6622 WOODCREST RD	GRAND FORKS	ND	58201	Walsh	158	056	05
ZIDON DONALD T	12825 COUNTY ROAD 7	EDINBURG	ND	58227	Walsh	158	056	05
RUSTAN JASON L & ETAL	38475 TAMWORTH AVE	NORTH BRANCH	MN	55056	Walsh	158	056	10
MAYO FAMILY PARTNERSHIP LLP	PO BOX 310	CAVALIER	ND	0310	Walsh	158	056	10
RUSTAN JASON L & ETAL	38475 TAMWORTH AVE	NORTH BRANCH	MN	55056	Walsh	158	056	10
SONDRESON LOREN S	7317 136TH AVE NE	HOOPLE	ND	58243	Walsh	158	056	10
BRANDVOLD WAYNE & BARBARA L-E BRANDVOLD STEFANIE ETAL	12651 75TH ST NE	EDINBURG	ND	58227	Walsh	158	056	15
KEARNEY CRAIG ETAL & BREVIK MICHAEL L-E	PO BOX 815	JOHNSTON	IA	50131	Walsh	158	056	15
EVENSON COLTON J	PO BOX 4	EDINBURG	ND	58227	Walsh	158	056	15
BRANDVOLD WAYNE & BARBARA L-E BRANDVOLD STEFANIE ETAL	12651 75TH ST NE	EDINBURG	ND	58227	Walsh	158	056	15
BRANDVOLD WAYNE & BARBARA L-E BRANDVOLD STEFANIE ETAL	12651 75TH ST NE	EDINBURG	ND	58227	Walsh	158	056	15
KEARNEY CRAIG ETAL & BREVIK MICHAEL L-E	PO BOX 815	JOHNSTON	IA	50131	Walsh	158	056	16
EINARSON LLOYD A	PO BOX 84	EDINBURG	ND	58227	Walsh	158	056	16

# Future Developments

- Will look to pull the fields in programmatically in the future, needing less user input.
- Automatically download from primary sources
- Publish directly to Enterprise GDB and portal
- Alert users to changes in ownership or geometry in the web map
- Check manually updated tables against parcel table
  - Sometimes we need to contact a lessee or other non-owner

# Do you want a copy?

- Feel free to contact me
- [pmetzger@minnkota.com](mailto:pmetzger@minnkota.com)
- 701-795-4329
- I tried to comment out as best I could if you want to make any changes