

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

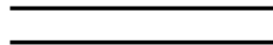
I can easily format
THIS to
THAT



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
91	Polygon	UNGERECHT JAMES	13047 TOWN RD 298	NORTHOME MN 56661		56661
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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	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

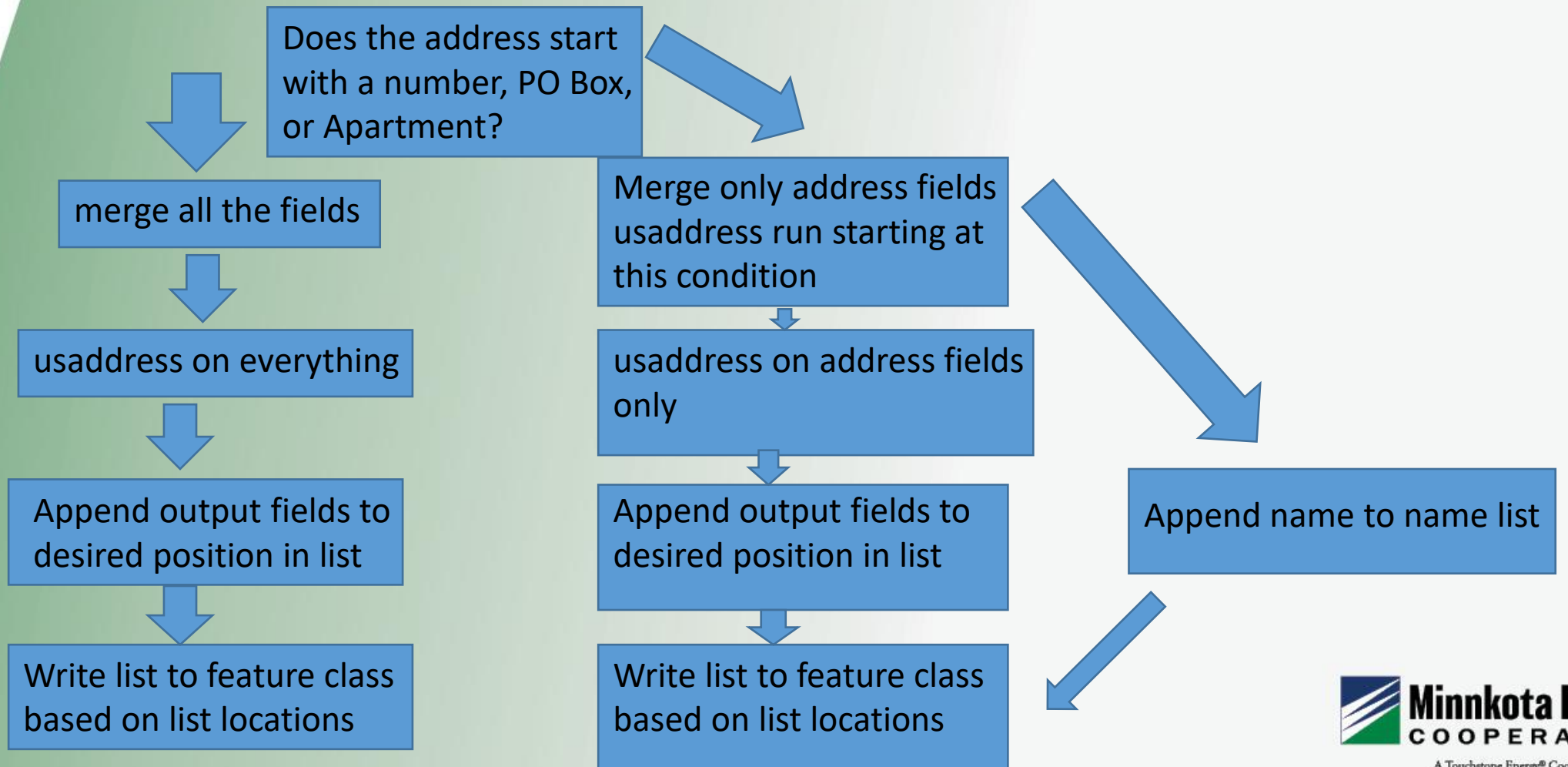
Tear it down and put it back together

- 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
- 701-795-4329
- I tried to comment out as best I could if you want to make any changes