Address Frame Enhancement with Administrative Data using an Interactive Mapping Dashboard

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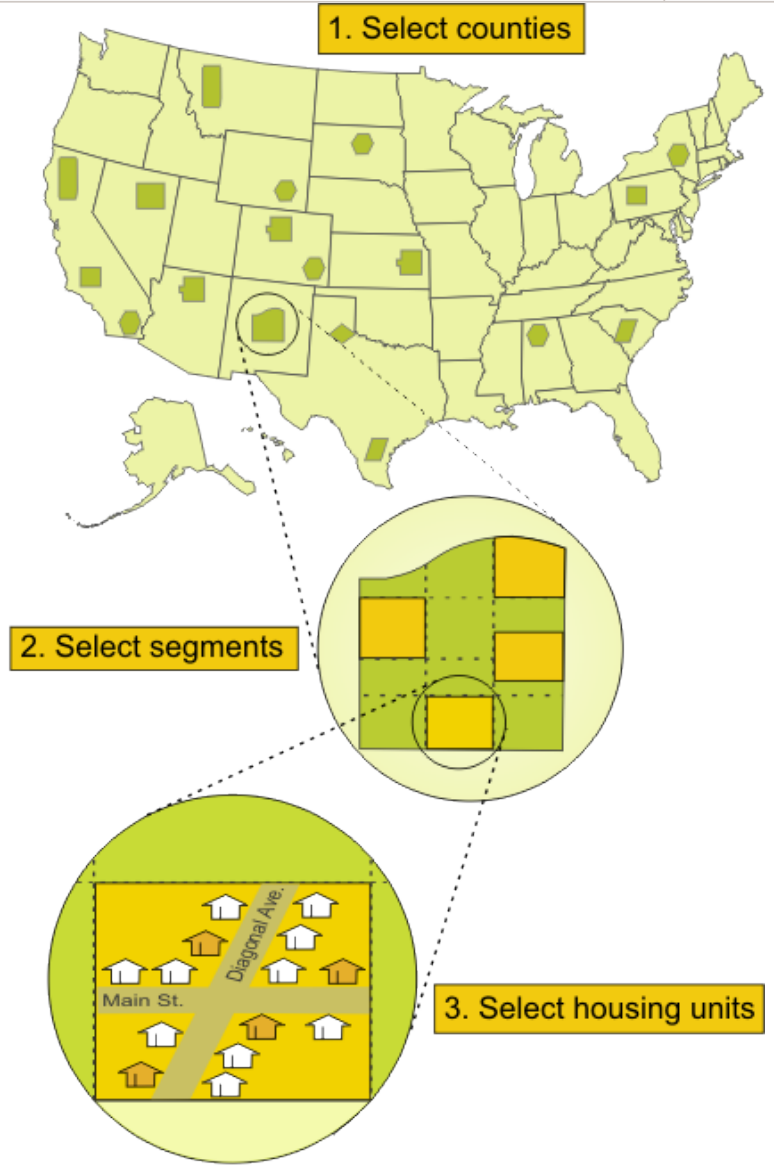
Steady progress in ABS Frame Construction

Area probability surveys require address lists

- Traditional Listing

O'Muircheartaigh et al. (2003):

- USPS Delivery Sequence Lists (CDS)
- Enhanced Listing



Source: U.S. Energy Information Administration, 2009 Residential Energy Consumption Survey

CDS provides quality coverage, but listing can be costly for ABS surveys

2010 NORC National Master Sample

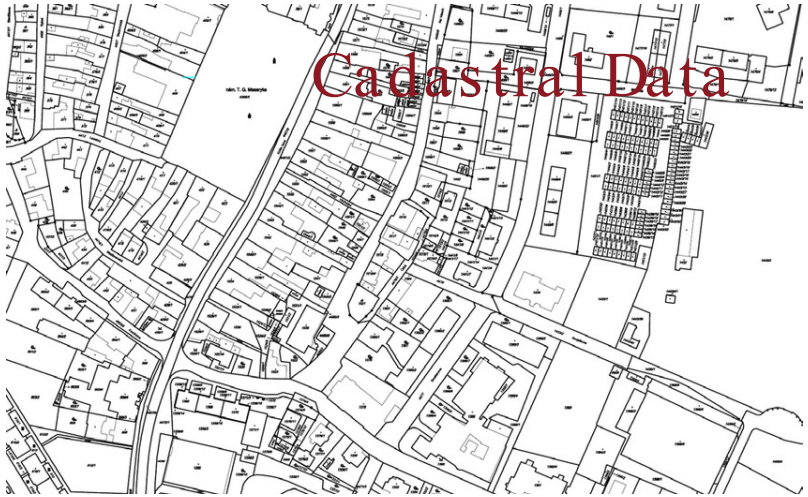
- 1,514 selected segments (Census tracts or Census block groups)
- 123 segments required enhanced listing due to CDS under-coverage

2020 NORC National Master Sample

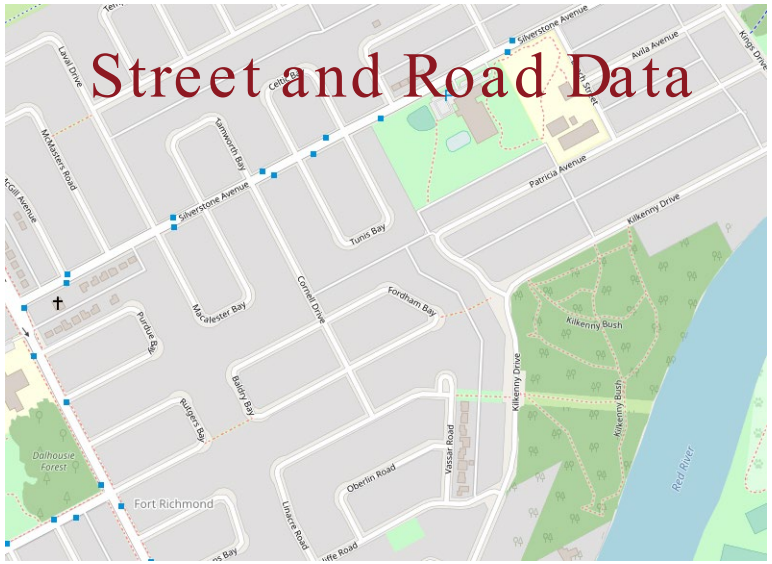
- 1,536 selected segments
- CDS coverage continually improving
- Need to list 34 segments due to CDS under-coverage

Can we list low coverage segments without visiting them in the field?

Integrating CDS with spatial data



Source: Zamarova (2020)



Source: OpenStreetMaps

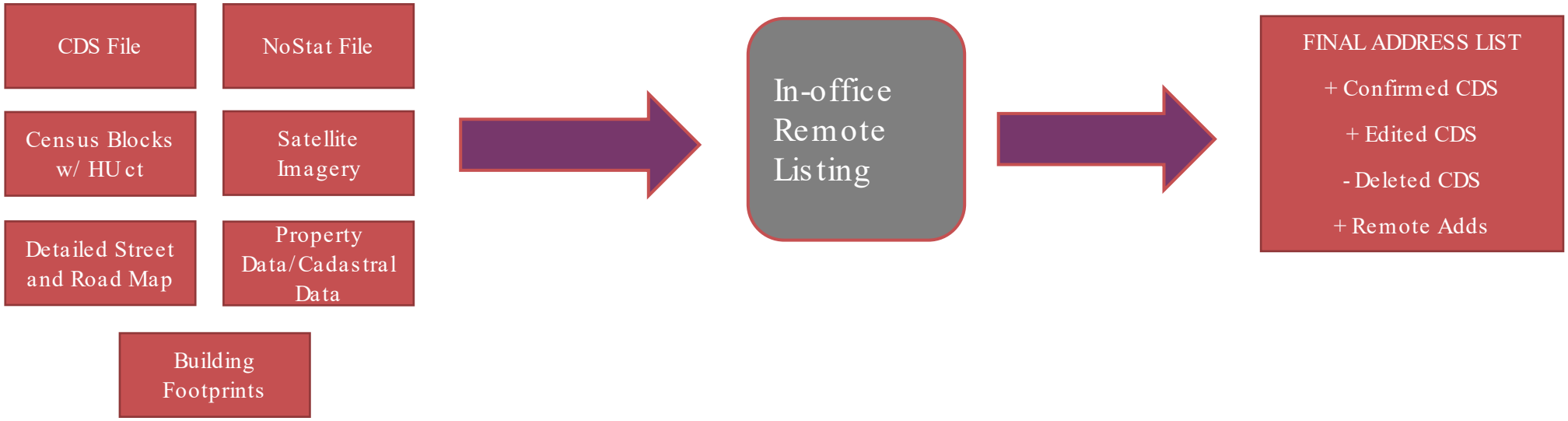
Source: WikiCommons

Source: OpenStreetMaps

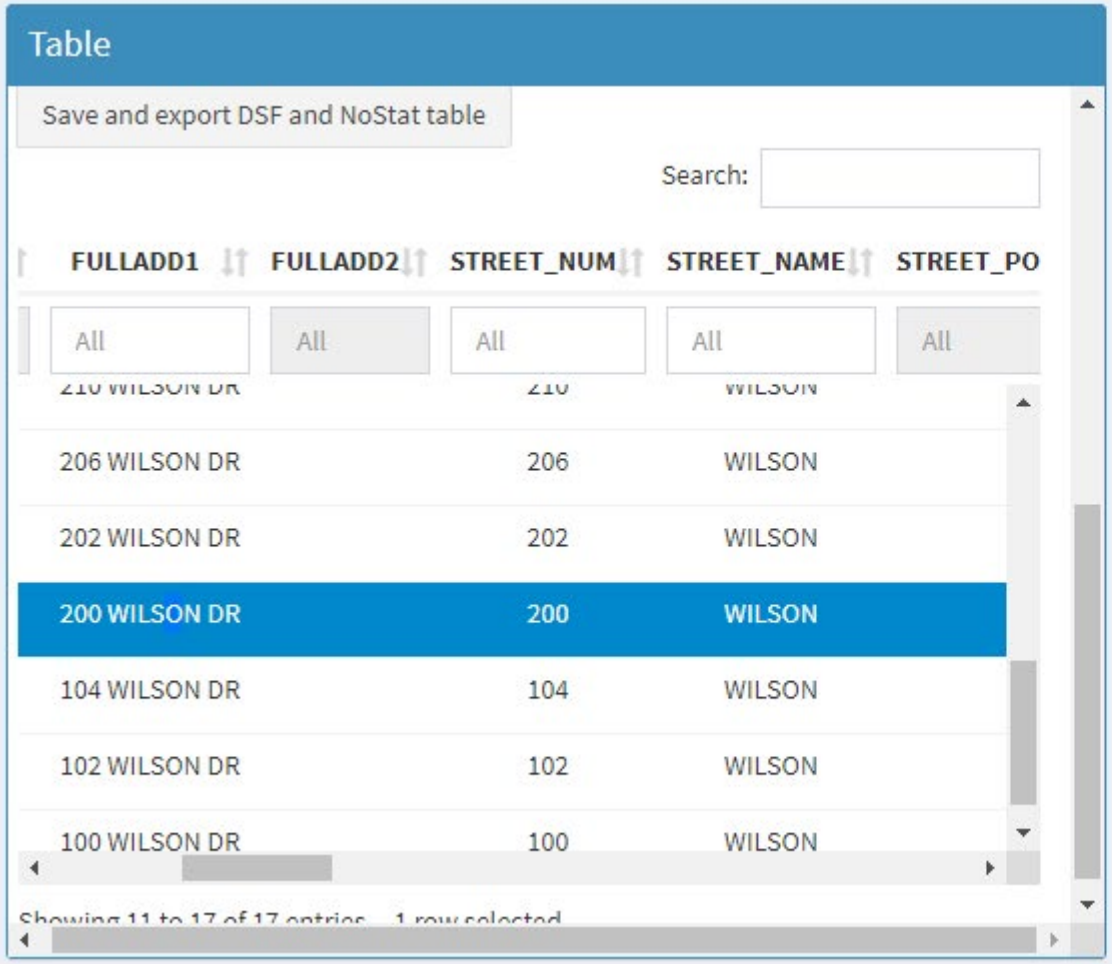
Conceptualization

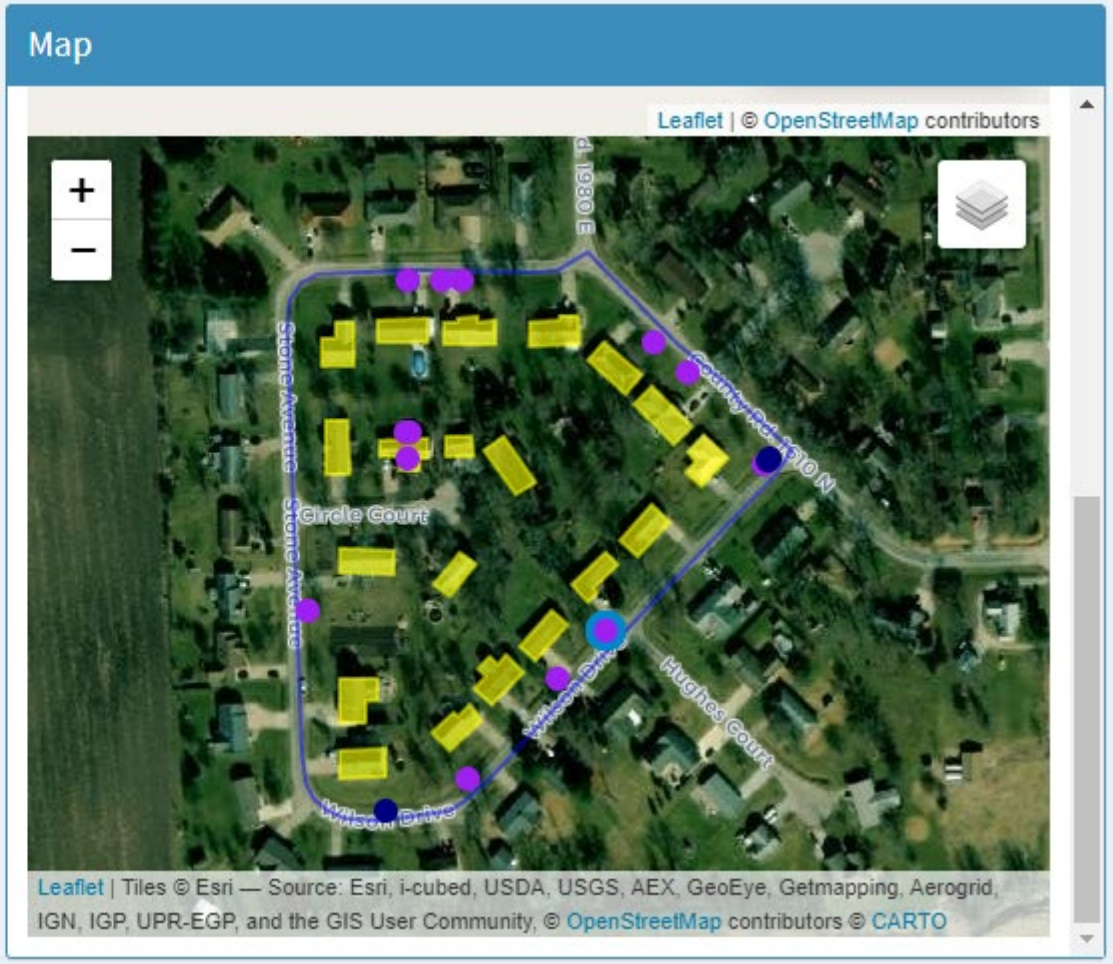
Enhanced Listing

In-office Remote Listing



NORC In-office Interactive Mapping Listing Tool





For the 2020 Decennial Master Sample, 26 segments were listed with the Remote Listing Tool

34 segments with low CDS Coverage

- 26 listed with Remote Listing Tool
- 8 listed in the field

What is the accuracy of the lists produced with the Remote Listing Tool?

1. What percentage of Remote Adds correspond to valid, locatable HUs?
2. After accounting for valid CDS addresses and valid Remote Adds, what percentage of HUs remain missing?
3. How does list accuracy vary across context?

Address lists produced with the remote listing tool were validated in a sample of blocks

Total Remote Listed

26 Segments

1,460 Blocks

~20,000 anticipated HUs (2020 Census)

~7,000 CDS addresses (35% coverage)

+11,500 Remote Adds

Total coverage: 93%

Sample

8 Segments

74 Blocks

1,185 anticipated HUs (2020 Census)

415 CDS addresses (35% coverage)

+951 Remote Adds

Total coverage 115%

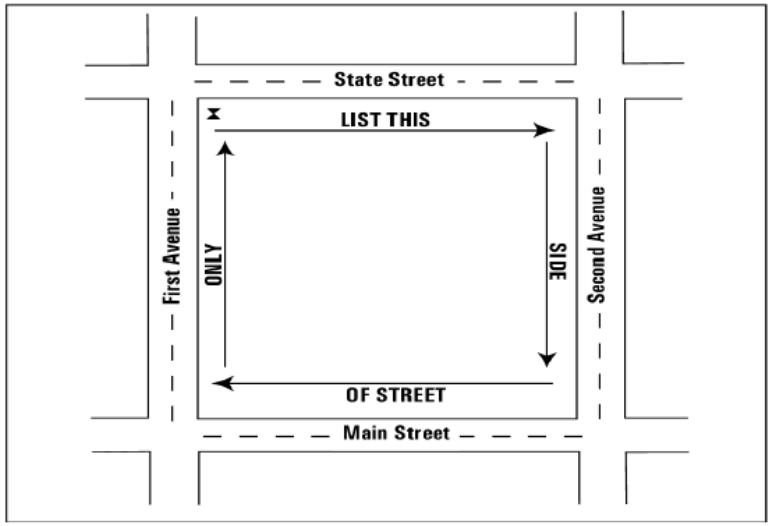
NORC Field Staff used standard NORC 'Enhanced Listing' procedure to validate remote lists in-person

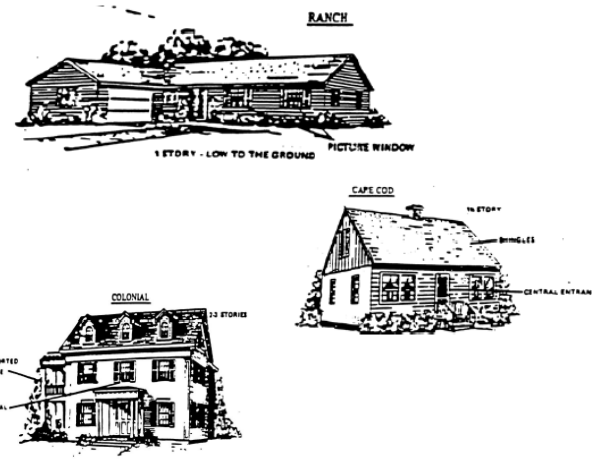
Two FIs traveled to each segment

- Driver
- Note-taker

Reviewed lists block by block

- Starting in NW corner
- Traveling in clockwise direction
- Confirming existing addresses
- Deleting non-existent or non-valid addresses
- Adding missing addresses





Summary Findings

Initial Address List

415 CDS lines

951 Remote Adds

1,366 Total addresses

Field-Validated Address List

389 validated CDS lines (accuracy 94%)

889 validated Remote Adds (accuracy 93%)

+100 Field additions (7% miss rate)

1,378 Total addresses

- In aggregate, CDS and Remote Adds were validated at a similar rate
- Similar number of addresses added by field as deleted (i.e. marked not valid)

Do these rates vary by type of segment?

Vacation Areas

2 of 8 segments (California; high income)

22% initial CDS coverage

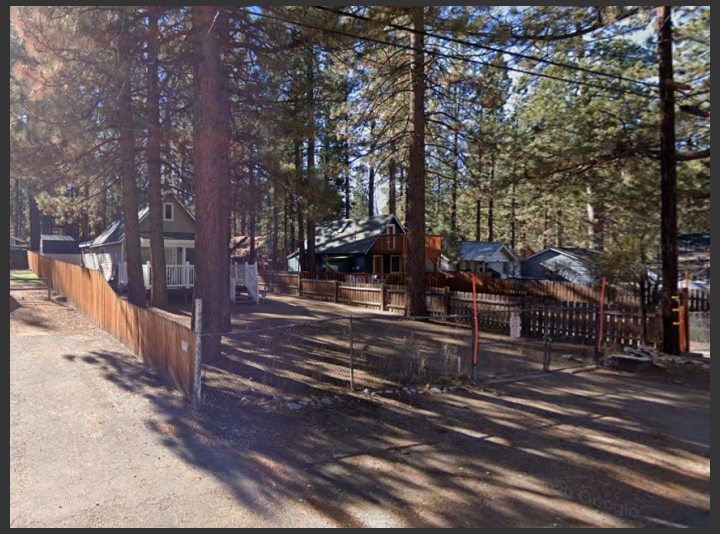
417 Remote Adds

97% Remote Add accuracy rate

5% Miss Rate

Issues

- Multi-Family Housing (condos)
- New Construction
- Short-term Rentals
- Tree Cover



© Google Streetview

Small Town Rural/Exurban

3 of 8 segments (California & Nevada; low/middle income)

45% initial CDS coverage

307 Remote Adds

93% Remote Add accuracy rate

6% Miss Rate

Issues

- Multi-Family Housing (trailers, apartment buildings)
- Accessory Dwelling Units
- Data Quality (administrative data)

Mountainous Areas

2 of 8 segments (Colorado & Cali.; low/middle income)

44% initial CDS coverage

122 Remote Adds

90% Remote Add accuracy rate

11% Miss Rate

Issues

- Dispersed
- Data Quality (administrative data)
- Accessory Dwelling Units
- Tree Cover

Small Town Texas

1 of 8 segments (Texas; low income)

25% initial CDS coverage

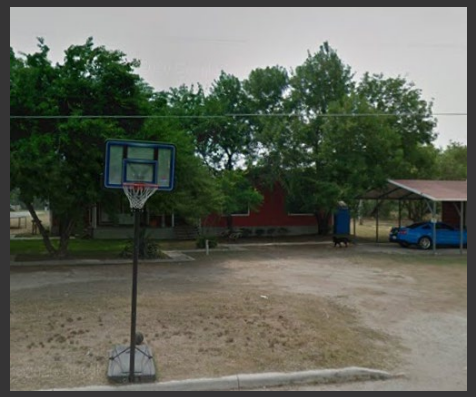
105 Remote Adds

84% Remote Add accuracy rate

14% Miss Rate

Issues

- Data Quality (administrative data)
- Geocoding Error (CDS)
- Accessory Dwelling Units (multiple DUs on property)



Remote Listing Tool produces high quality address lists

Using a custom interactive mapping tool, NORC combined CDS with administrative data to generate complete address lists in 26 low CDS coverage tracts and block groups

- In-person field validation was conducted in a sample of blocks in 8 of 26 segments
  - 35% initial CDs coverage; added 951 addresses remotely
  - 93% of all remote adds reviewed were located and deemed to be valid HUs
  - 7% of the final field-validated list were comprised of addresses missing from both CDS and administrative data
  - Some variation by context, with remote address lists performing best in vacation areas and small towns

Benefits of Remote Listing

Considerably more cost-effective and less time-consuming than field listing

Will perform better than field listing when:

- House numbers are posted on mail-boxes rather than HUs or are otherwise not visible
- Access to HUs is limited (e.g. gated mountain road)

It is easier to refresh remote lists (i.e. field lists are 'frozen' for the duration of the frame)

Limits of Remote Listing

Quality is highly dependent on accuracy of administrative data

- Does not work well at all in places where administrative data contain limited or inaccurate address information

Multi-family HUs and accessory dwelling units remain an issue

- Getting an accurate count of units in a multi-unit building is difficult
- Hard to accurately reference accessory dwelling units even if we can see them in satellite imagery

Next Steps

- Multi-unit HUs – how well did remote lists perform in situations with multi-family housing or accessory dwelling units?
- Improve remote listing tool and protocol – reduce ambiguous comments left by listers
- Identify covariates associated with accuracy of remote lists– using segment level data from ACS on demographics and socio-economic characteristics to model list accuracy (if sample size not too small)

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NORC at the University of Chicago