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Location Based Analysis and the National Fire Incident Reporting System

(NFIRS)

What is Location Based Analysis?

- Spatial component
- Where something happened
- Other places like it?

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How do we do it?

- Data available in each incident report
- Geocode
- Join NFIRS dataset with other datasets
  - Census
  - Cadastral
  - Rural/Urban continuum
  - ???
- Analyze

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Why Geocode?

- Additional Data
  - Census
  - Cadastral
  - Rural/Urban
- Small Area Analysis
- Specialized Incident identification
- Apples to Apples
- Identification of Apples, Oranges and Pears

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Geocoding basics

- Concatenated Address Fields from Basic module
- NFIRS 4.1 vs. 5.0, CAD
- Proxy zip code

Geocoding Tools

- Within your Geographic Information System (GIS) i.e., ArcGIS
  - Integrated within system
  - “simple” to use
  - Summary accuracy score
- Standalone geocoding application (FEMA uses Centrus)
  - External to GIS, although could be integrated
  - Finicky
  - Detailed result description
- Reference Dataset

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Issues/Concerns

- Privacy of information
  - Address is public record
  - Only present aggregated results

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Issues/Concerns

- Accuracy of geocode
  - Limit of precision/area of analysis
  - Street/Address based geocode
  - Zip code centroid based geocode
  - Case by case suitability
  - Few cases may be reviewed manually

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Geocoding Results

- NFIRS 2005 Public Data Release file, Location Type 1, Version 5.0
- 1,537,682 records processed
- 96% geocoded to Zip centroid or better
- 72% geocoded to a street section

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Current Applications

- Fire Experience in Student Dominated Residential Areas near Colleges/Universities (aka Off Campus Fires)
- NFIRS Representativeness study (OMB)

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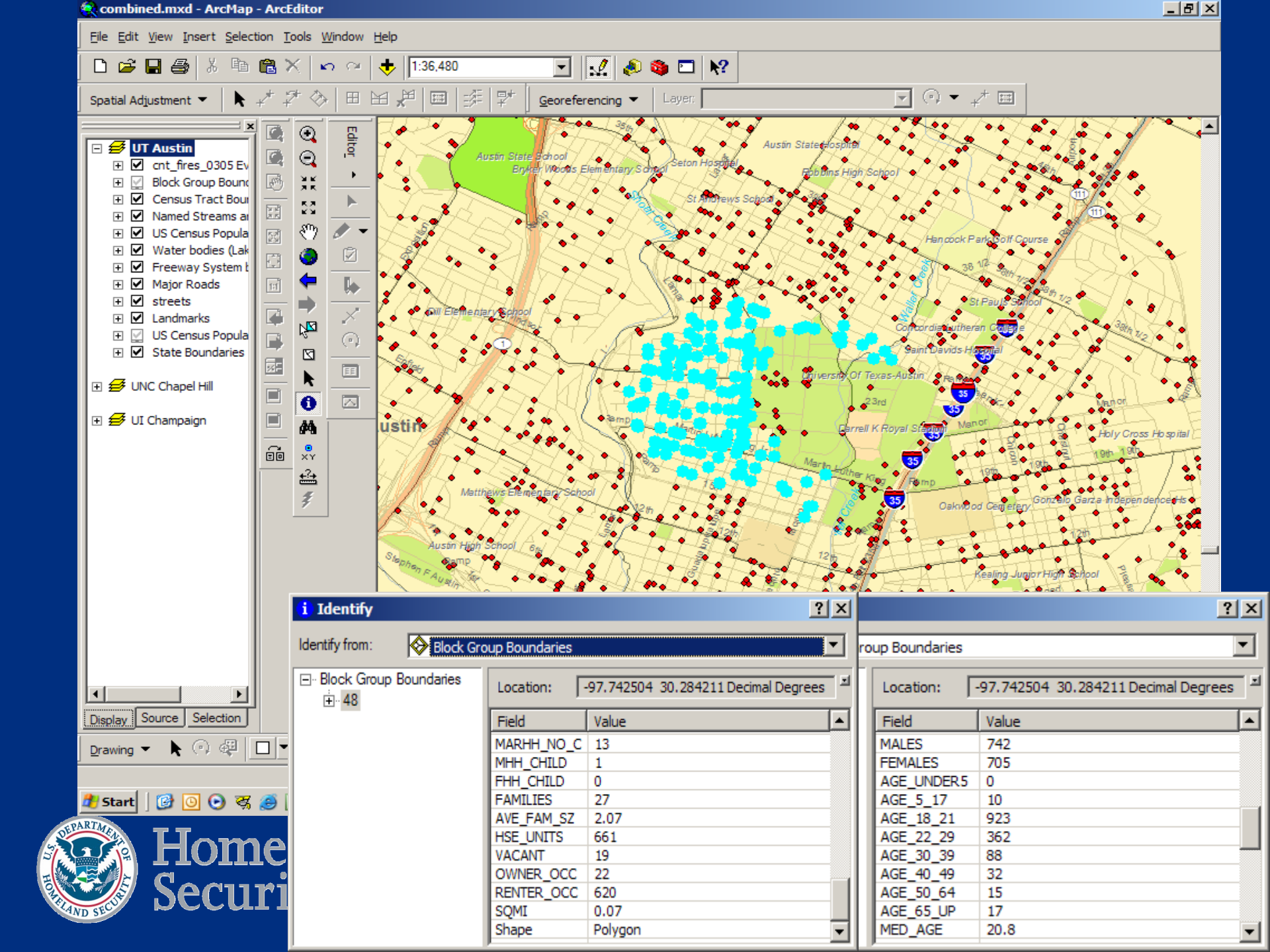
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Spatial Adjustment
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Freeway System b
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Landmarks
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Austin State School
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Seton Hospital
Austin State Hospital
Robbins High School
St Matthews School
Hancock Park Golf Course
St Paul's School
Concordia Lutheran College
Saint Davids Hospital
University Of Texas-Austin
Darrell K Royal Stadium
Holy Cross Hospital
Oakwood Cemetery
Gonzalo Garza Independence Hs
Matthews Elementary School
Austin High School
Kealing Junior High School
Identify
Identify from:
Block Group Boundaries
Block Group Boundaries
48
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FHH_CHILD 0
FAMILIES 27
AVE_FAM_SZ 2.07
HSE_UNITS 661
VACANT 19
OWNER_OCC 22
RENTER_OCC 620
SQMI 0.07
Shape Polygon
roup Boundaries
Location:
-97.742504 30.284211 Decimal Degrees
Field
Value
MALES 742
FEMALES 705
AGE_UNDER5 0
AGE_5_17 10
AGE_18_21 923
AGE_22_29 362
AGE_30_39 88
AGE_40_49 32
AGE_50_64 15
AGE_65_UP 17
MED_AGE 20.8
Start
Home
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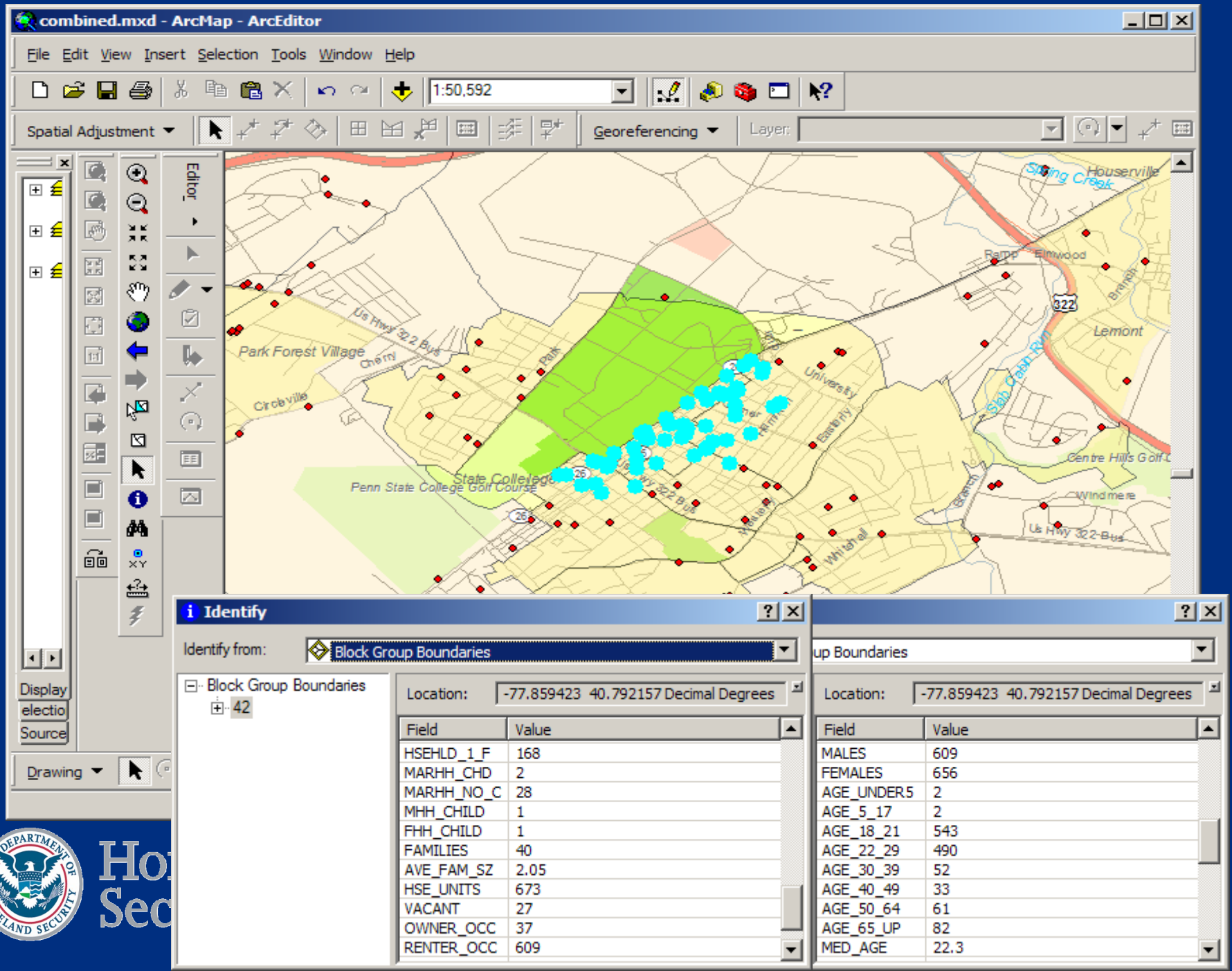
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Spatial Adjustment
Georeferencing
Layer:
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electio
Source
Drawing
Park Forest Village
Circleville
Cherry
Us Hwy 322 Bus
Park
State College
Penn State College Golf Course
University
Easterly
Whitehall
Spring Creek
Houserville
Ramp
Elmwood
Branch
322
Lemont
Slab Cabin Run
Centre Hills Golf C
Windmere
Us Hwy 322 Bus
Identify
Identify from:
Block Group Boundaries
Block Group Boundaries
42
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Field Value
HSEHLD_1_F 168
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MARHH_NO_C 28
MHH_CHILD 1
FHH_CHILD 1
FAMILIES 40
AVE_FAM_SZ 2.05
HSE_UNITS 673
VACANT 27
OWNER_OCC 37
RENTER_OCC 609
up Boundaries
Location: -77.859423 40.792157 Decimal Degrees
Field Value
MALES 609
FEMALES 656
AGE_UNDER5 2
AGE_5_17 2
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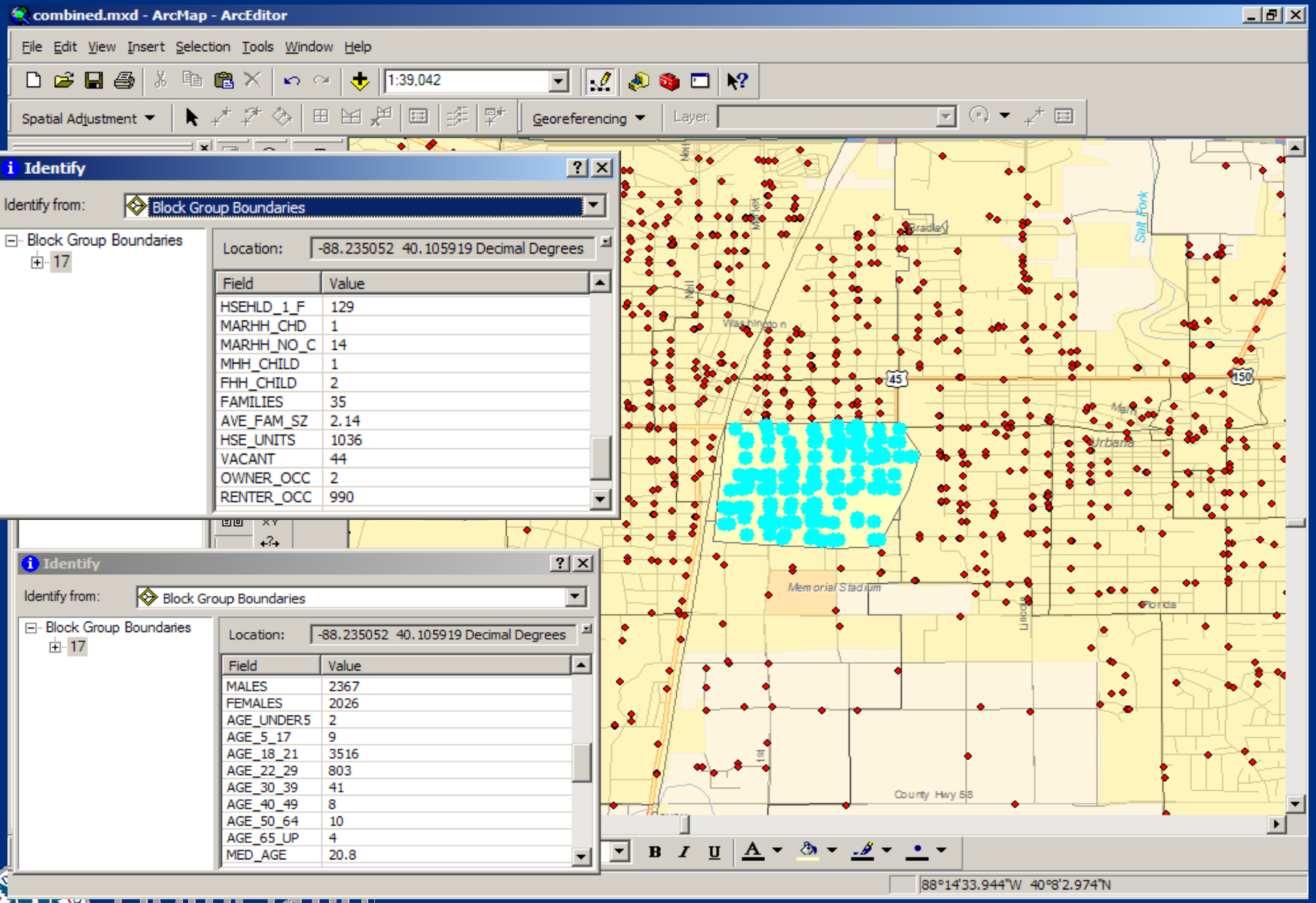
AGE_40_49 33
AGE_50_64 61
AGE_65_UP 82
MED_AGE 22.3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Georeferencing
Layer:
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Block Group Boundaries
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Value
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MARHH_NO_C 14
MHH_CHILD 1
FHH_CHILD 2
FAMILIES 35
AVE_FAM_SZ 2.14
HSE_UNITS 1036
VACANT 44
OWNER_OCC 2
RENTER_OCC 990
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Block Group Boundaries
Block Group Boundaries
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Value
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FEMALES 2026
AGE_UNDER5 2
AGE_5_17 9
AGE_18_21 3516
AGE_22_29 803
AGE_30_39 41
AGE_40_49 8
AGE_50_64 10
AGE_65_UP 4
MED_AGE 20.8
Bradley
Salt Fork
Washington
45
150
Urbana
Memorial Stadium
Florida
Lincoln
1st
County Hwy 58
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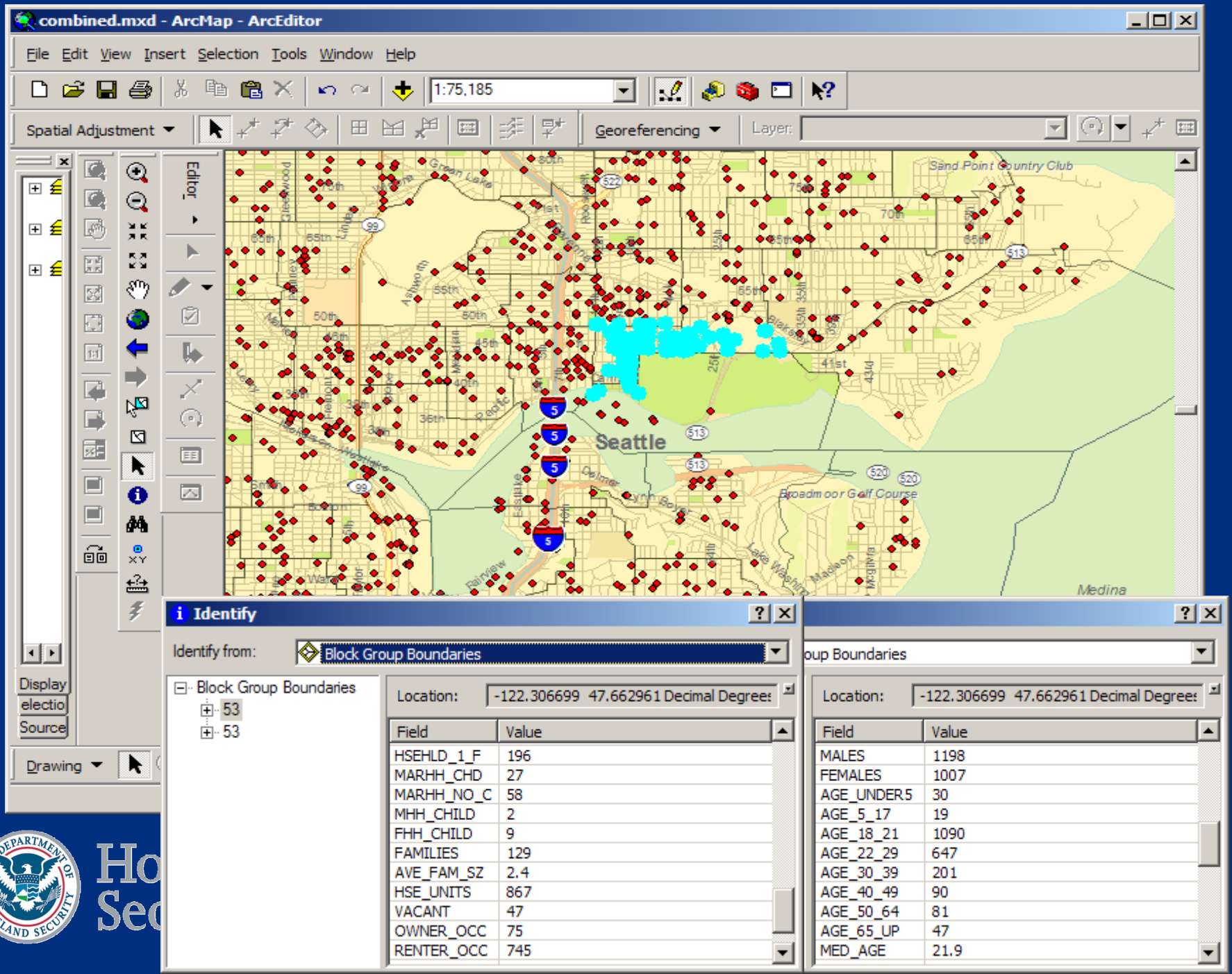
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Spatial Adjustment
Georeferencing
Layer:
Editor
Seattle
Sand Point Country Club
Broadmoor Golf Course
Lake Washington
Medina
Identify
Identify from:
Block Group Boundaries
Block Group Boundaries
53
53
Location:
-122.306699 47.662961 Decimal Degrees
Field
Value
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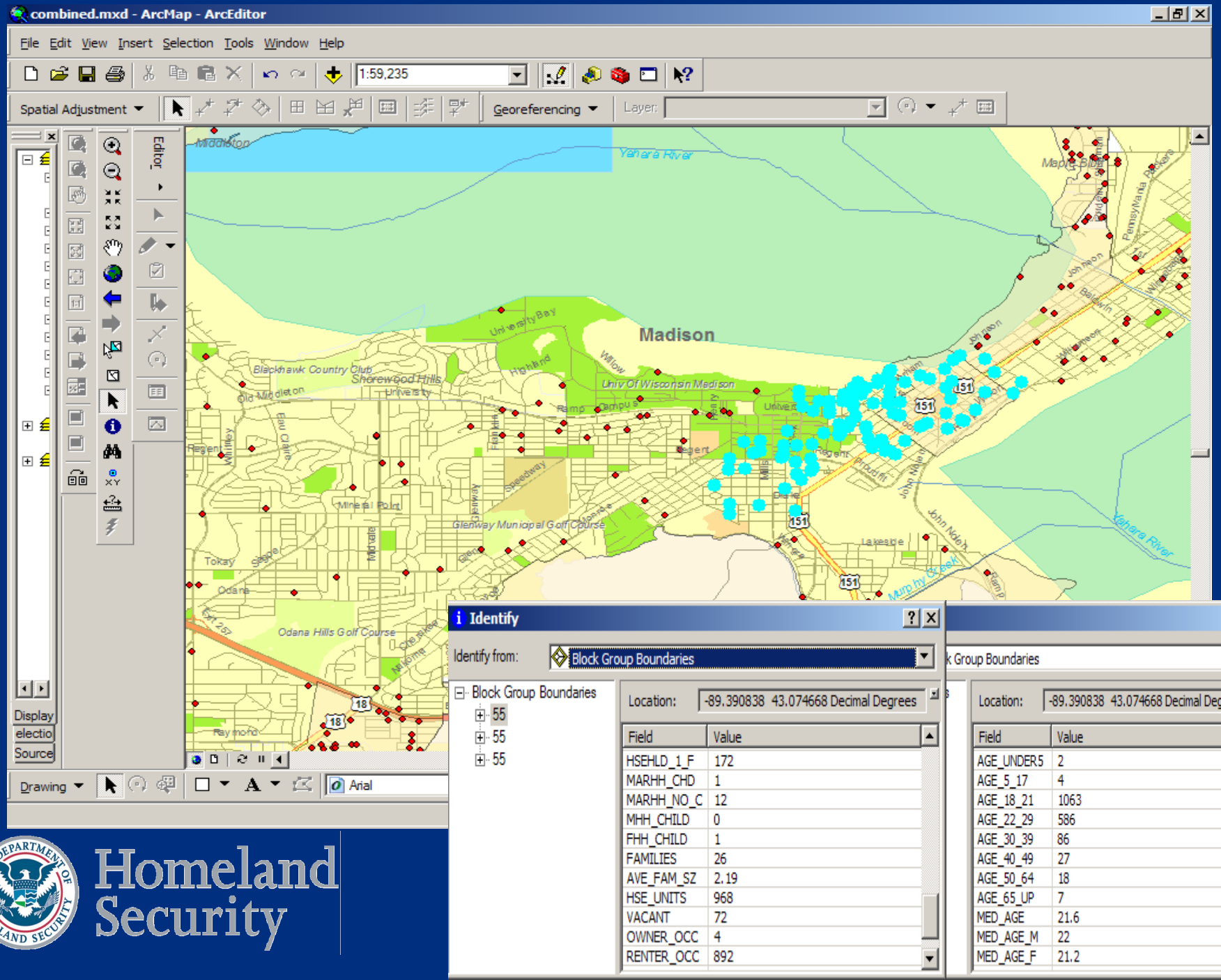
MARHH_NO_C 58
MHH_CHILD 2
FHH_CHILD 9
FAMILIES 129
AVE_FAM_SZ 2.4
HSE_UNITS 867
VACANT 47
OWNER_OCC 75
RENTER_OCC 745
MALES 1198
FEMALES 1007
AGE_UNDER5 30
AGE_5_17 19
AGE_18_21 1090
AGE_22_29 647
AGE_30_39 201
AGE_40_49 90
AGE_50_64 81
AGE_65_UP 47
MED_AGE 21.9
Drawing



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NFIRS Representativeness

- OMB directed
- Geographic representation of NFIRS dataset
- Methodology:
  - Match NFIRS reporting Fire Departments to the USFA Fire Department Census
  - Break FDs into NFIRS/non-NFIRS groups
  - Compare and contrast by Location, Population Protected, and other variables of interest

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Questions

Thank you!

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