



Homeland Security

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



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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



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)



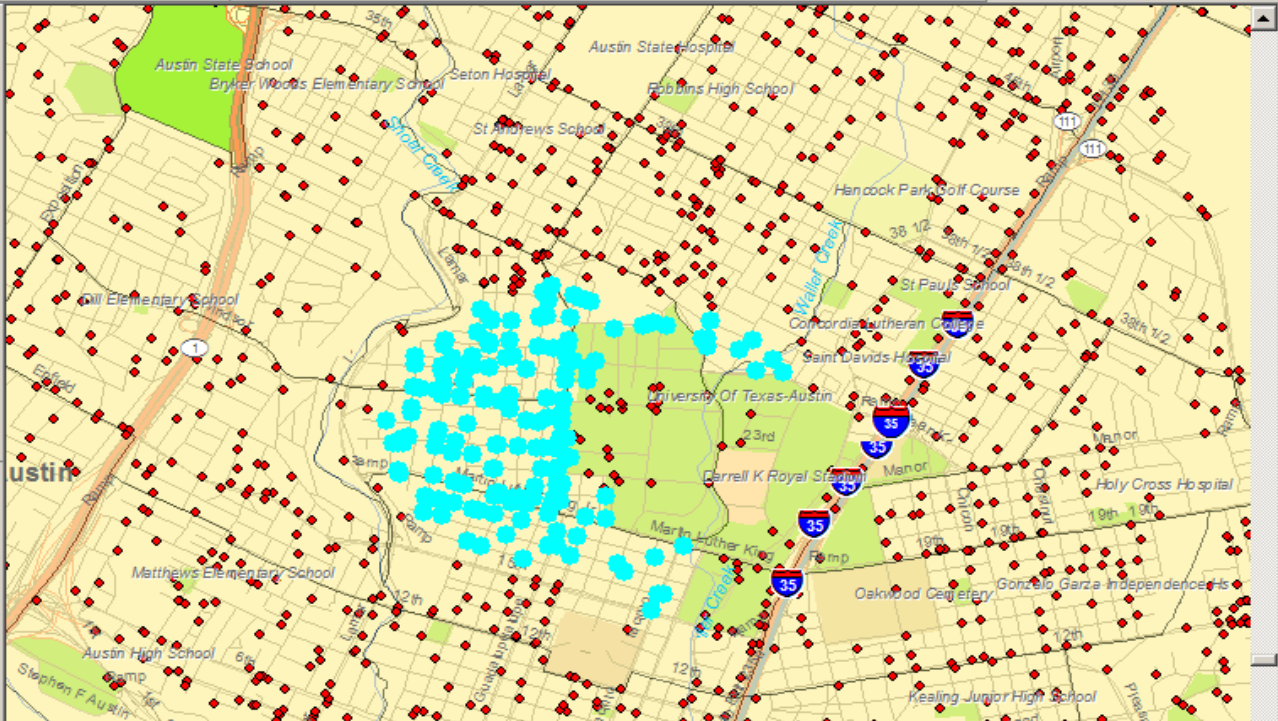
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UT Austin

- cnt_fires_0305 Ev
- Block Group Bound
- Census Tract Boun
- Named Streams a
- US Census Popula
- Water bodies (Lak
- Freeway System t
- Major Roads
- streets
- Landmarks
- US Census Popula
- State Boundaries

UNC Chapel Hill

UI Champaign



Identify

Identify from: **Block Group Boundaries**

Block Group Boundaries

48

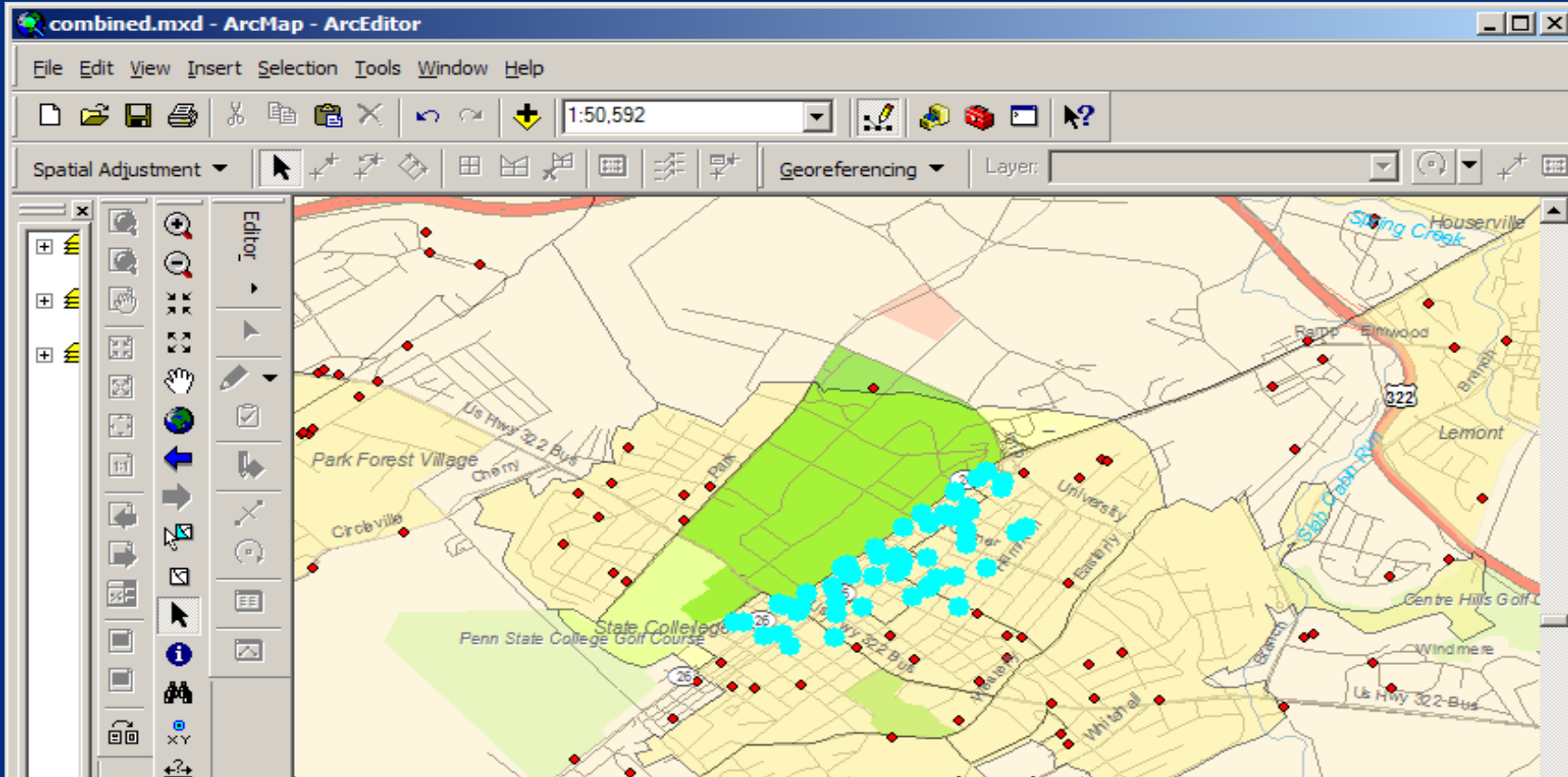
Field	Value
MARHH_NO_C	13
MHH_CHILD	1
FHH_CHILD	0
FAMILIES	27
AVE_FAM_SZ	2.07
HSE_UNITS	661
VACANT	19
OWNER_OCC	22
RENTER_OCC	620
SQMI	0.07
Shape	Polygon

Block Group 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





Identify

Identify from: **Block Group Boundaries**

Block Group Boundaries
42

Location: -77.859423 40.792157 Decimal Degrees

Field	Value
HSEHLD_1_F	168
MARHH_CHD	2
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

Identify

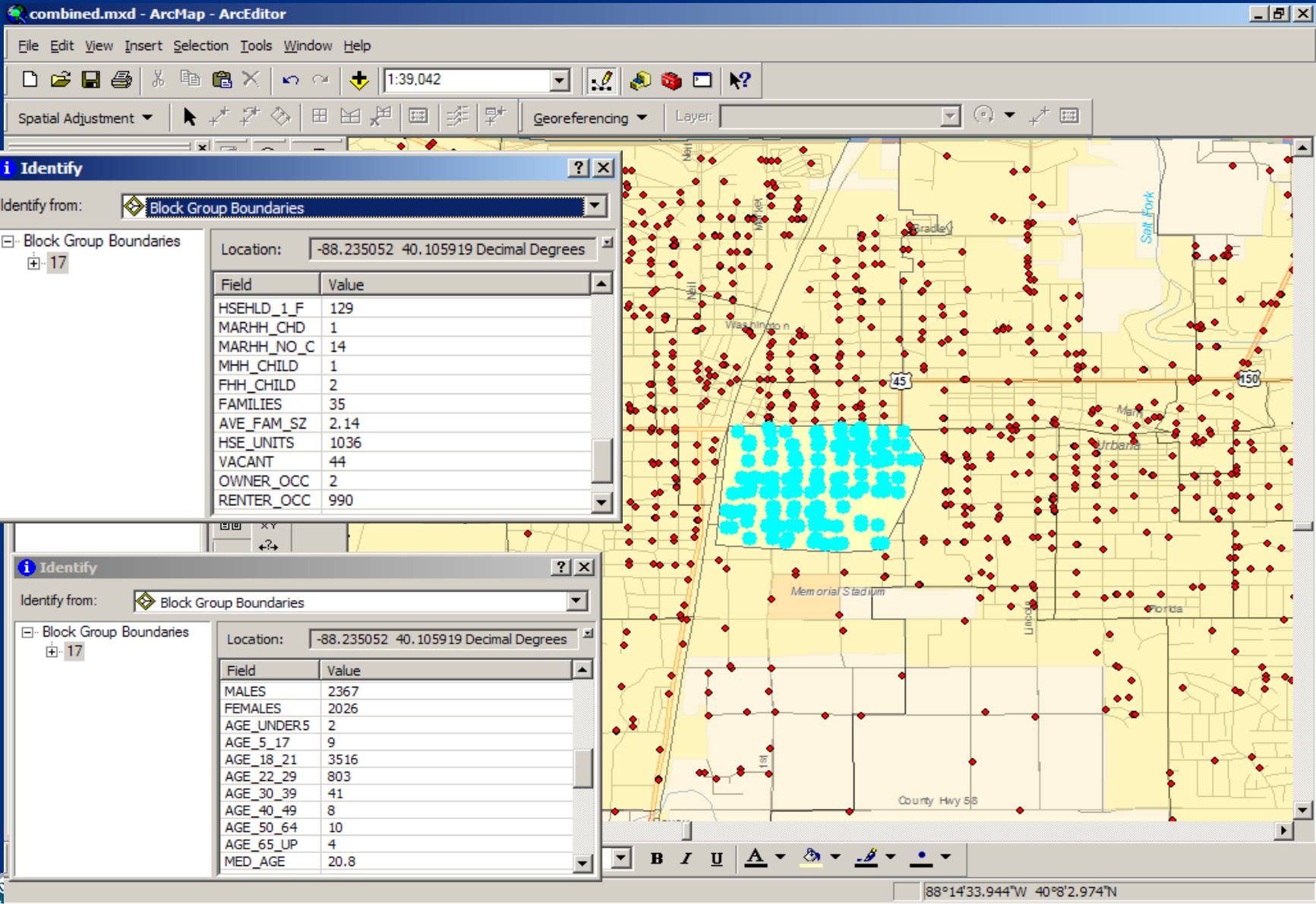
Block Group Boundaries

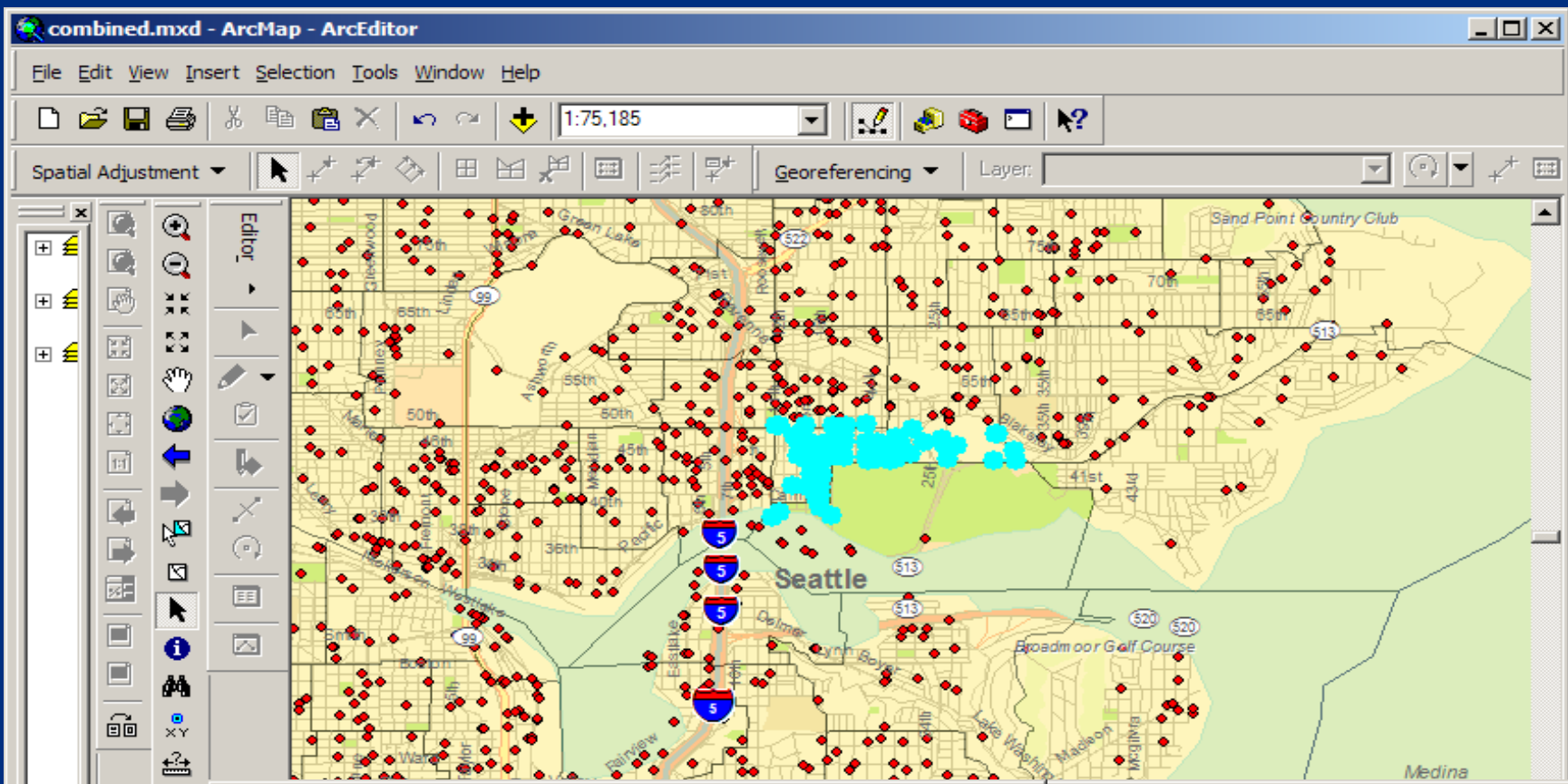
Location: -77.859423 40.792157 Decimal Degrees

Field	Value
MALES	609
FEMALES	656
AGE_UNDER5	2
AGE_5_17	2
AGE_18_21	543
AGE_22_29	490
AGE_30_39	52
AGE_40_49	33
AGE_50_64	61
AGE_65_UP	82
MED_AGE	22.3



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Identify

Identify from: **Block Group Boundaries**

Location: -122.306699 47.662961 Decimal Degree:

Field	Value
HSEHLD_1_F	196
MARHH_CHD	27
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

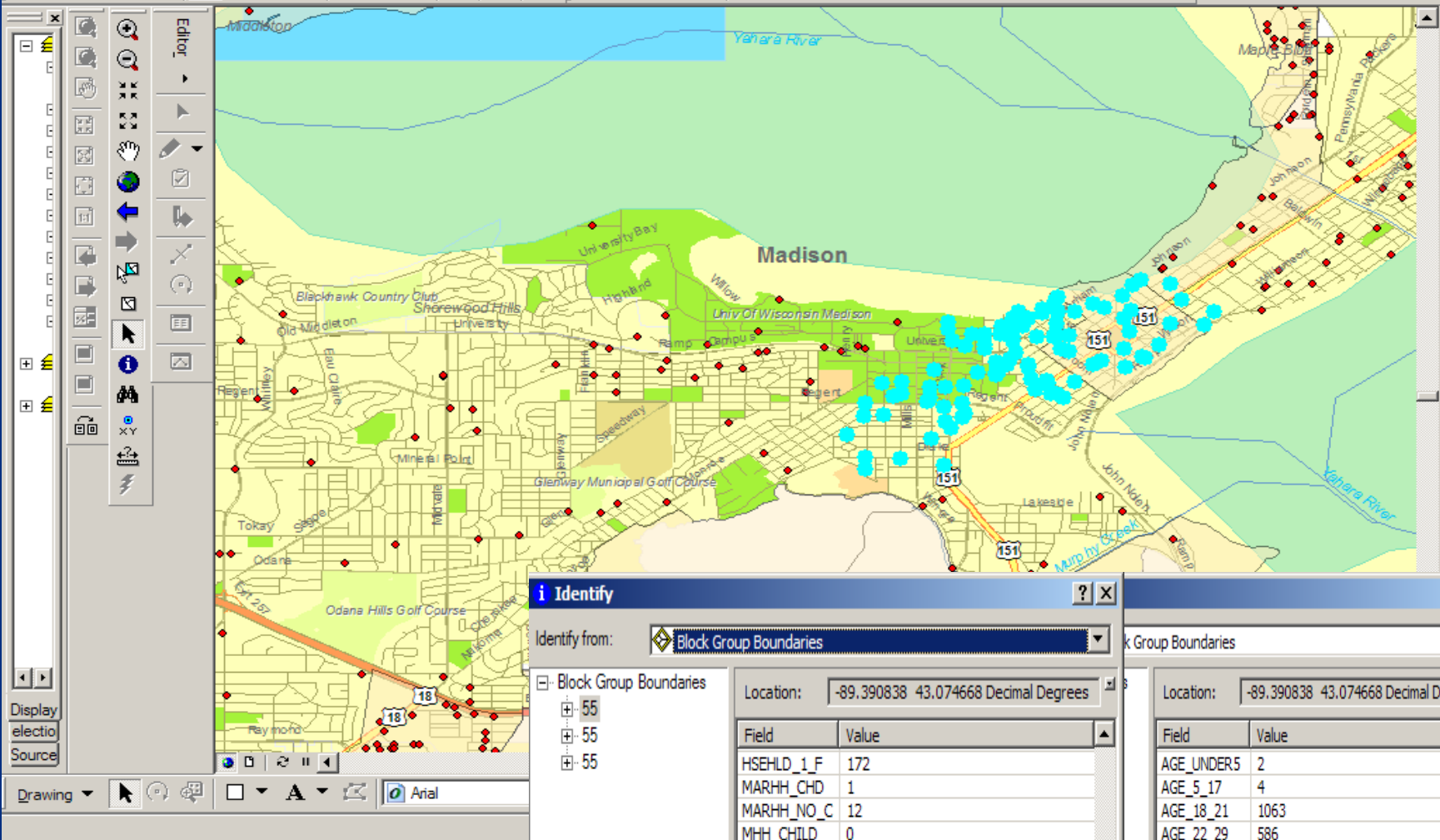
Block Group Boundaries

Location: -122.306699 47.662961 Decimal Degree:

Field	Value
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



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Identify

Identify from: Block Group Boundaries

- Block Group Boundaries
- 55
- 55
- 55

Location: -89.390838 43.074668 Decimal Degrees

Field	Value
HSEHLD_1_F	172
MARHH_CHD	1
MARHH_NO_C	12
MHH_CHILD	0
FHH_CHILD	1
FAMILIES	26
AVE_FAM_SZ	2.19
HSE_UNITS	968
VACANT	72
OWNER_OCC	4
RENTER_OCC	892

Block Group Boundaries

Block Group Boundaries

Location: -89.390838 43.074668 Decimal Degrees

Field	Value
AGE_UNDER5	2
AGE_5_17	4
AGE_18_21	1063
AGE_22_29	586
AGE_30_39	86
AGE_40_49	27
AGE_50_64	18
AGE_65_UP	7
MED_AGE	21.6
MED_AGE_M	22
MED_AGE_F	21.2



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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



Questions



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Thank you!

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