GeoAnalytics Case Study

- Beverage Service Distributor

Scarlett Zuo

2014.2.3

Outline

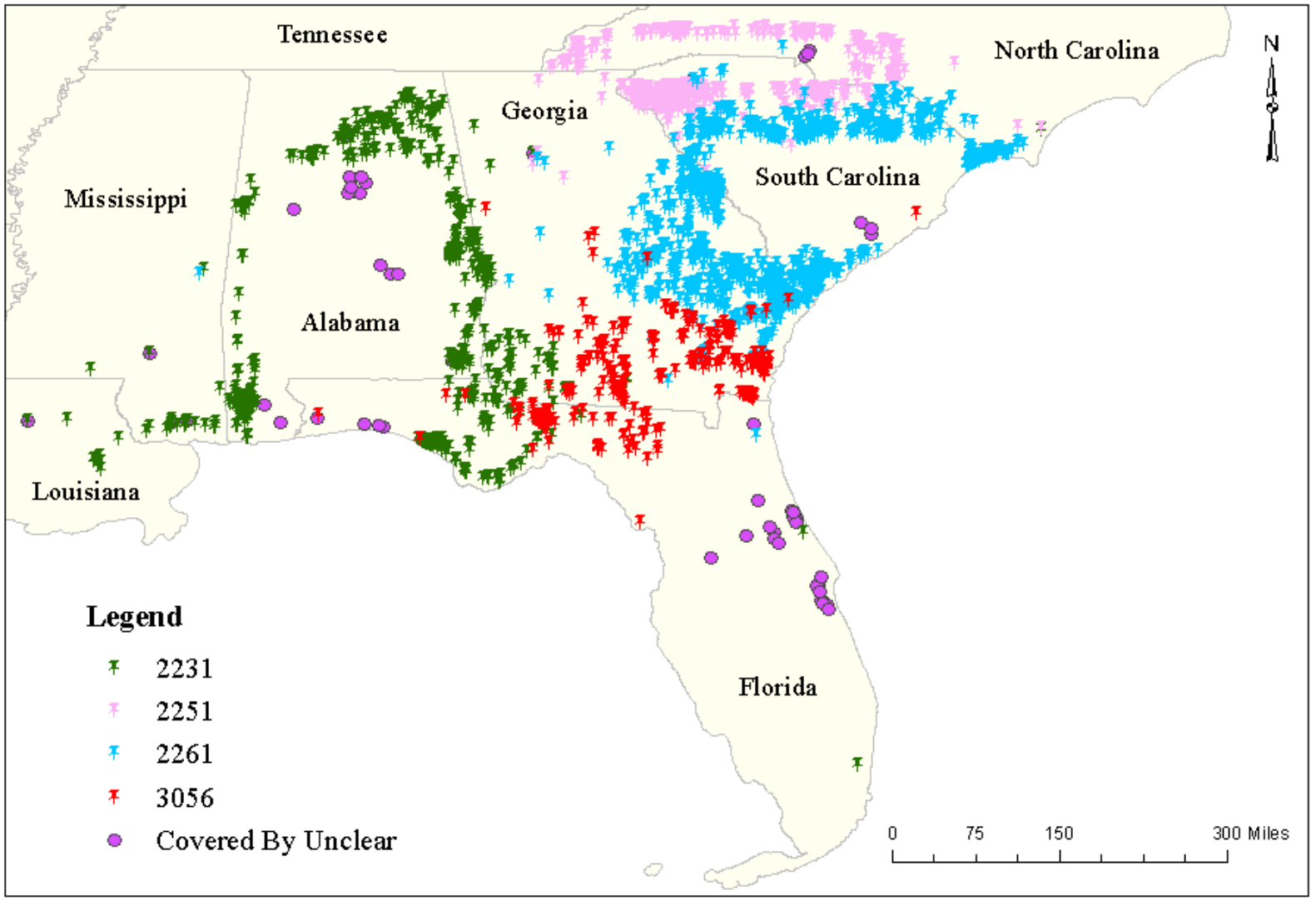
- **Executive Summary**
- **Exclude or Not – Decision Criteria**
- **Assumptions Overview**
- **Establish the Exclusions**
  - Thiessen Polygon Method
  - Standard Distance Method
  - Buffer Method
- **Cost Saving Analysis**
- **Recommendations**

Executive Summary

Shift accounts from TM to NAM	• Cost saving • Easy management
Special conditions	• Remote accounts remain with TM • No less than 20% of the accounts should be left with TM • Shift within division
Recommendation for exclusions	• Keep only 23% of total accounts with TM (Map next slide) • Saves ~20% to ~40% labor cost, depending on the wage ratio
Risk	• Aggressive: demote 40% and fire 20% of TM, if not fire and rehire • Customer services quality (visit frequency) may drop for some • Estimated saving is an upper bound

Note: Analysis is based on top 5 divisions, ~70% of total accounts.

Map of the Excluded Accounts
-- Thiessen Polygon Method



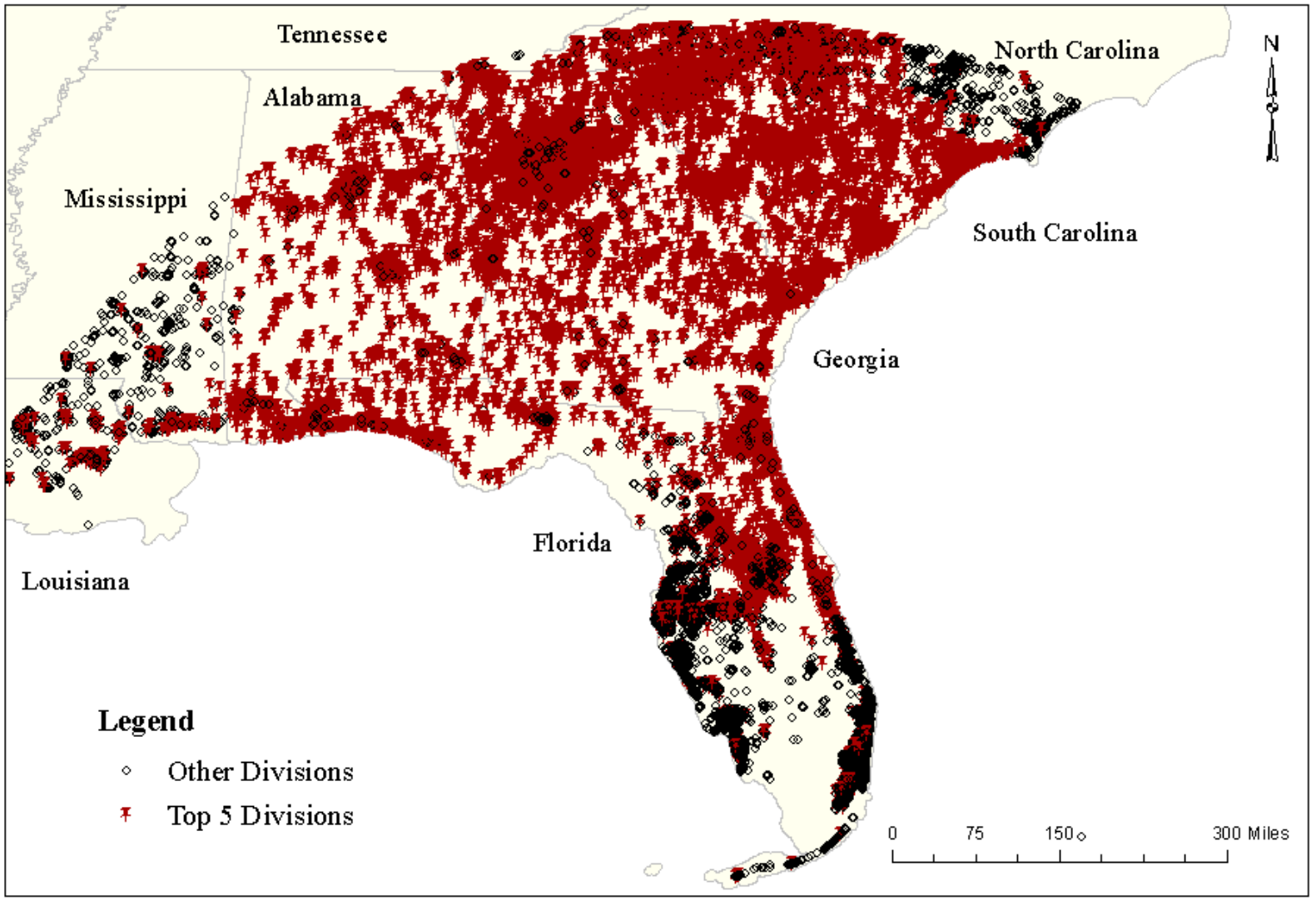
Exclude or Not – Decision Criteria

- **Geographic Feature**
  - Which division is it in? => *Choose sample divisions*
  - Is it remote? => ***Define being remote*, 3 methods**
- **Non-Geographic Feature**
  - Covered by which team? => *Define choice set*
  - Which segment?
    - *Do visiting frequency vary by customer segment?*
    - If so, can we maintain the same service level after the transformation?

Assumptions Overview

- ***Assumptions***
  - TM is Street Team, NAM is National Team
  - All accounts are treated as national accounts regardless Business Type. (Assp 3, pp1)
- **Choose sample divisions**
  - Rank divisions by account number
  - Top 5 divisions comprise ~70% of total accounts
  - Division 2261, 2221, 2251, 3056 and 2231

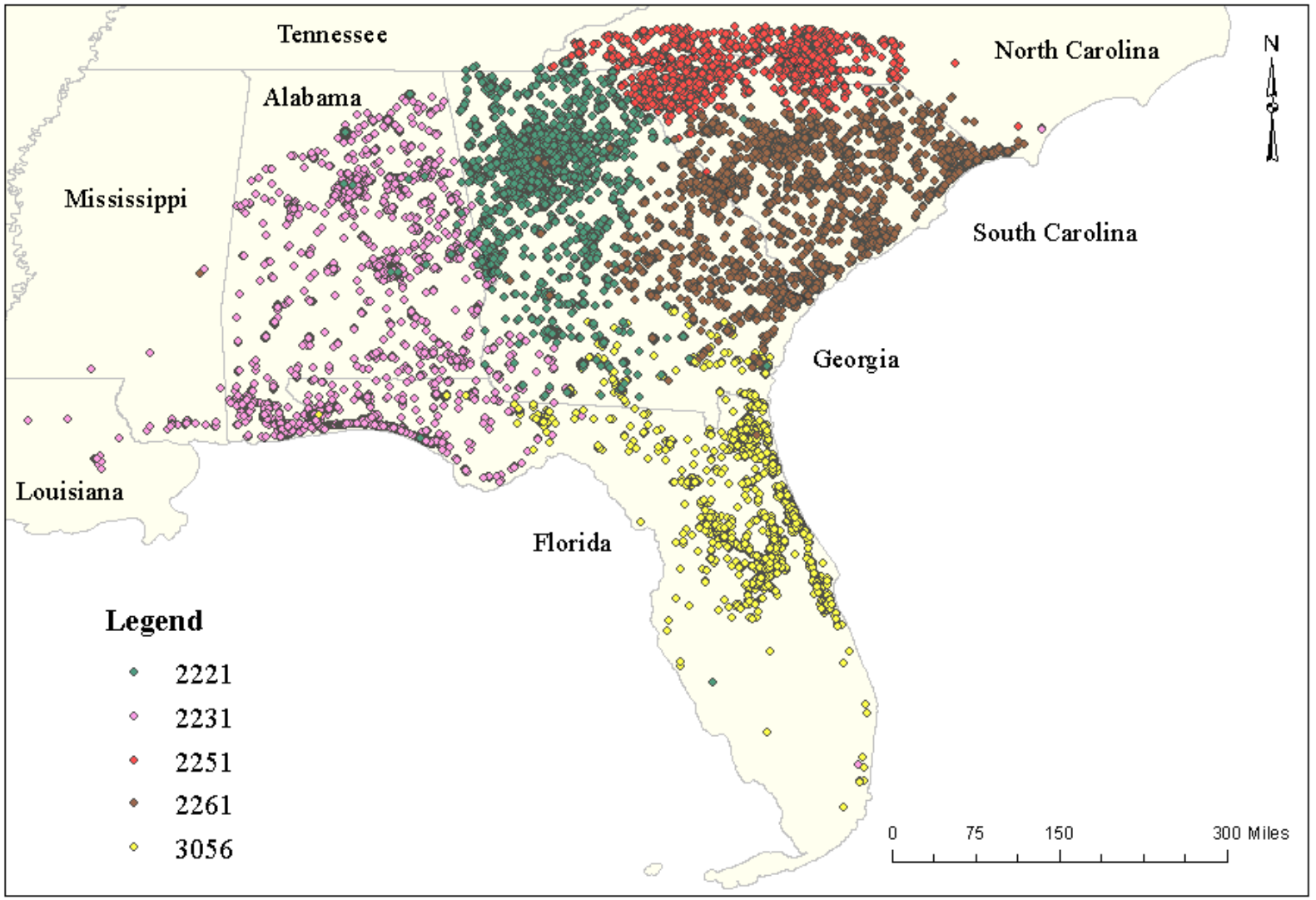
Accounts Coverage



Assumptions Overview (Cont.)

- **Define Choice Set**
  - Within sample divisions
  - Accounts covered by street teams
  - Accounts covered by unclear if they are NM
    - Total number of accounts: 56,073
    - Accounts in choice set: 33,881, ~60%

Choice Set By Division



Assumptions Overview (Cont.)

- **<u>Do visiting frequency vary by segment?</u>**
  - Unobservable
- **Assume not – Thiessen Polygon Method**
- **Assume yes – Standard Distance and Buffer Method**
  - Do visiting frequency vary by team? (Yes, see next pg)
  - Is there any segment that observably covered by Street Team? (Yes, see next pg) We should exclude them for consistent service level.
  - *Assumptions*
    - 4 accounts per day per salesperson (Assp 1, pp 1)
    - NCH covered by National Teams are excluded (Assp 5, pp1)

Assumptions Overview (Cont.)

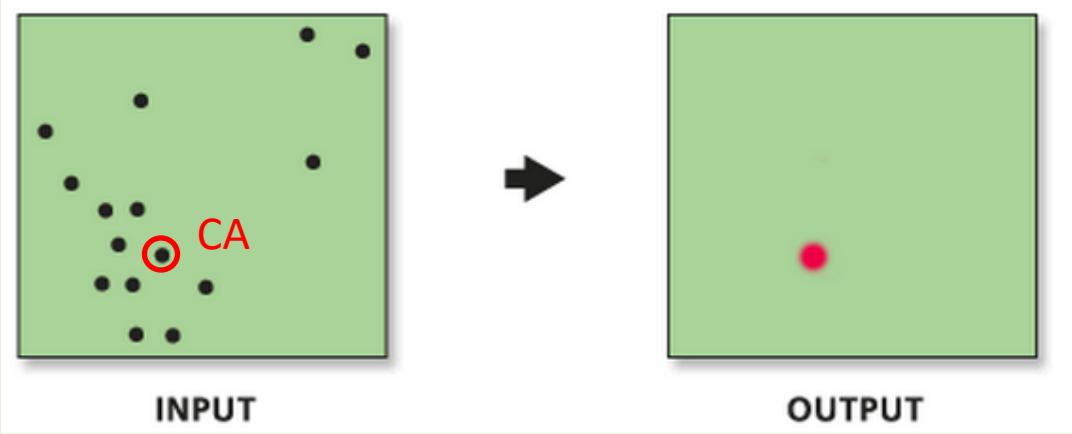
	Total Number of Account	Number of Salesperson	Average Account per Salesperson	Attending Frequency
Street Team	33765	950	36	9 days
National Team	12674	158	80	20 days

Segment	National Team	Street Team	Street Percent	Total
IND	64	18,661	98.40%	18,965
RTL	225	2,888	91.62%	3,152
HOS	1,719	4,514	71.78%	6,289

For Standard Distance and Buffer Methods, segment IND and RTL should also be excluded.

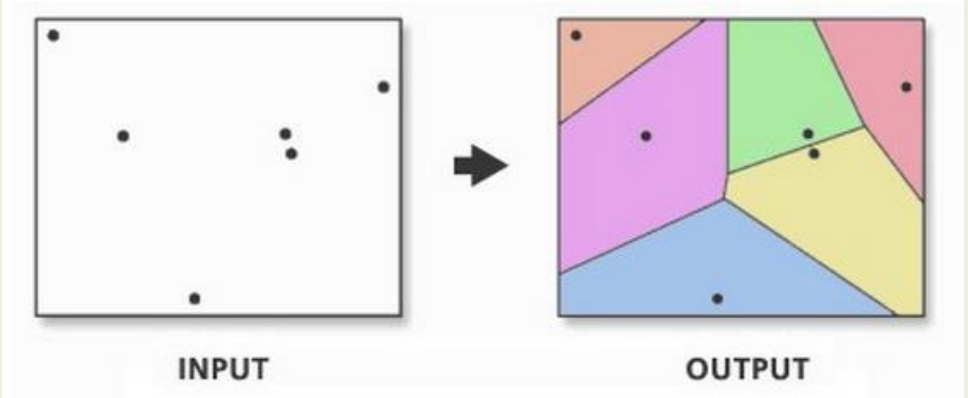
Establish the Exclusions
Thiessen Polygon Method

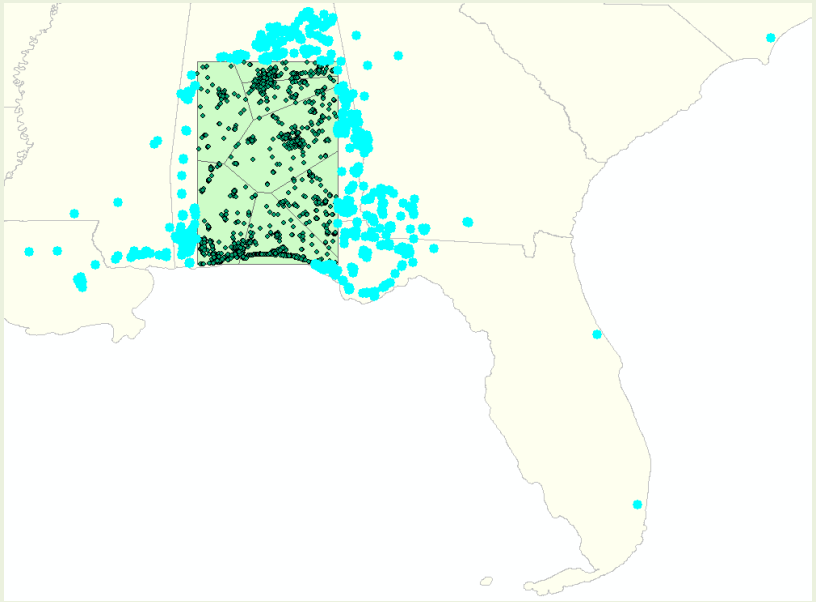
- **Define Being Remote**
  - Accounts that are out of Coverage Zone for any of the current National Team in the division
- **Procedure**
  - Select accounts with regular National Team coverage
  - For each National Team salesperson, find the account that most centrally located among his coverage, define this account as his **Center Account (CA)**



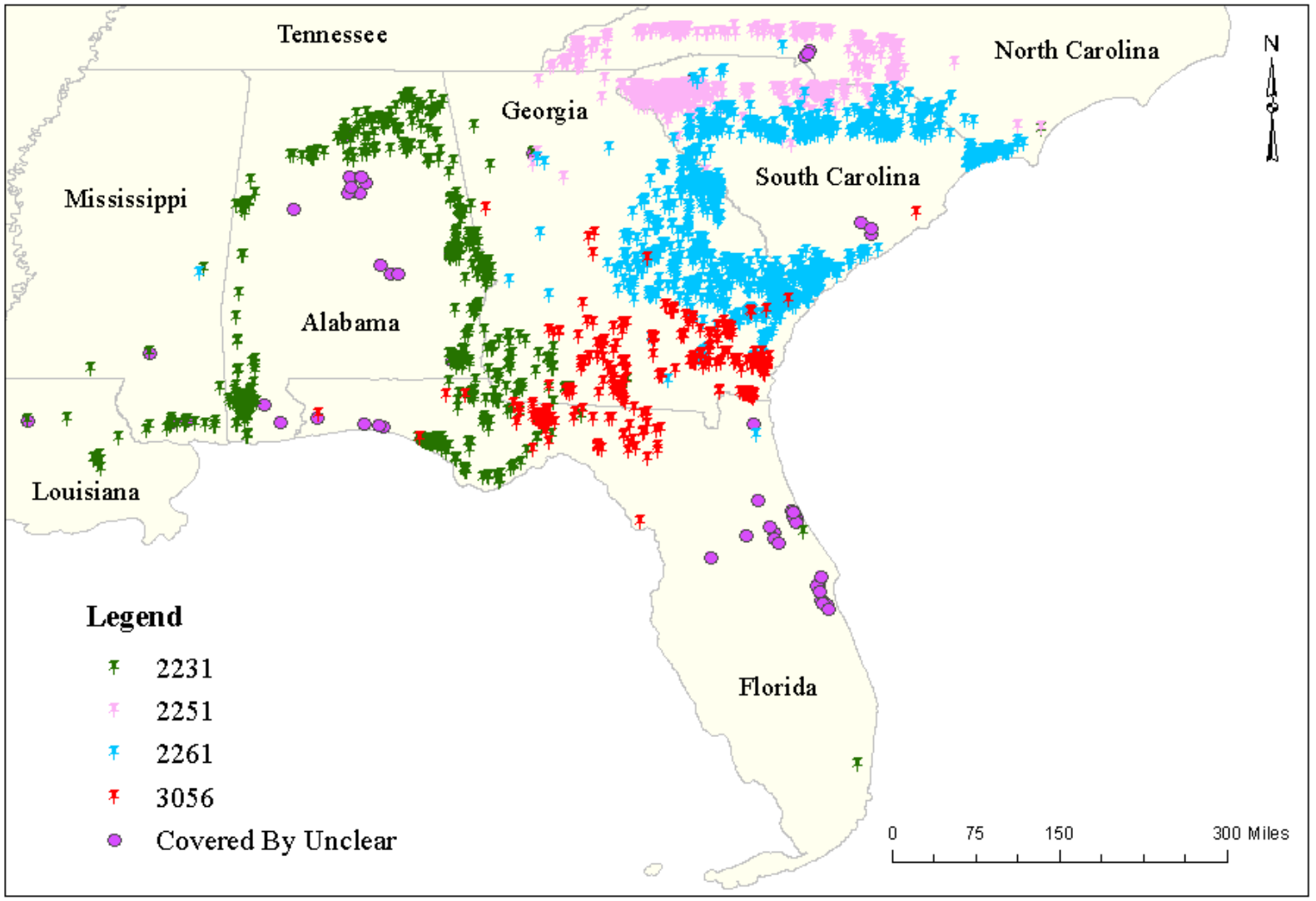
Establish the Exclusions Thiessen Polygon Method

- **Procedure (Cont.)**
  - Create Thiessen polygon based on Center Accounts for all the National Team salespersons. Define each polygon to be the **Coverage Zone** for its associated salesperson. **Any location within a Coverage Zone is closer to its associated CA than to any other CA –** suggesting switch TM accounts to the associated salesperson
  - TM accounts that fall outside of all the Thiessen polygons should be excluded from shifting





Map of the Excluded Accounts
-- Thiessen Polygon Method

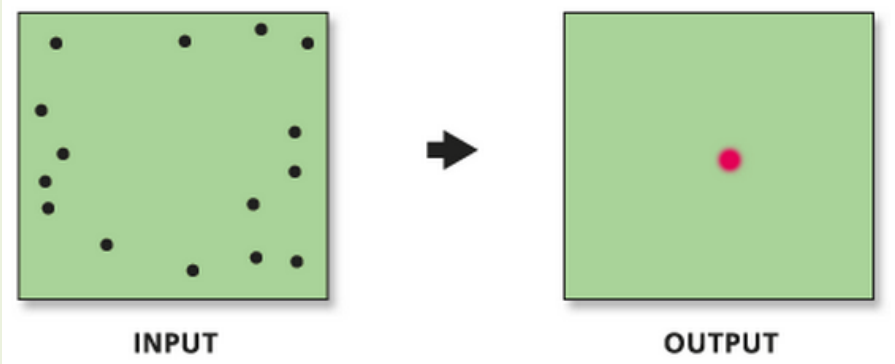


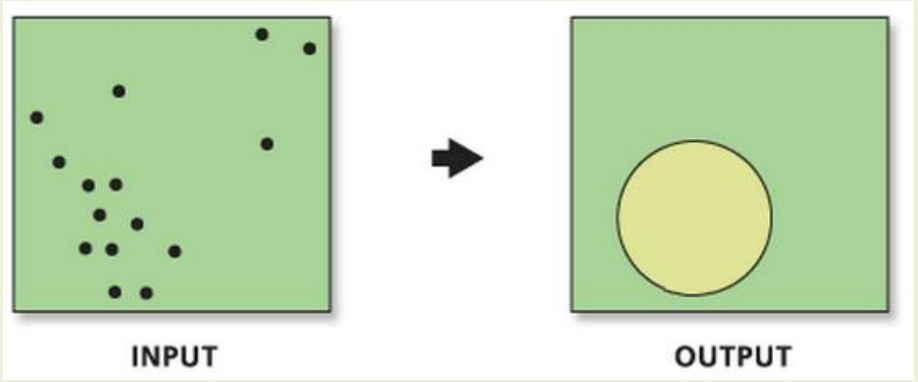
Establish the Exclusions Thiessen Polygon Method

- **Pros**
  - Exclude only 23%, most likely to save cost
  - Suggest to whom each TM account may transfer, and/or which area may need new hire
- **Cons**
  - Accounts locate near the edges of Thiessen polygon may be unfairly judged
  - Aggressive: 60% cut in TM
  - May end up hiring more NAM to maintain the same level of customer services, which offsets the cost saving

Establish the Exclusions
Standard Distance Method

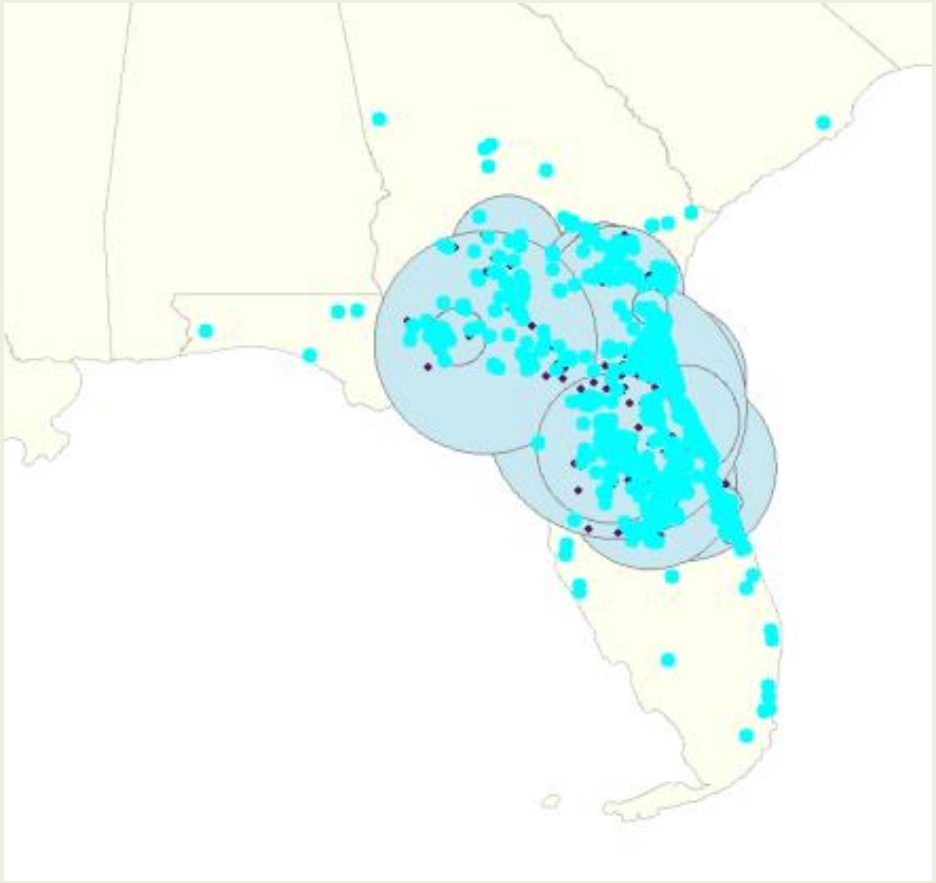
- **Define Being Remote**
  - Accounts that fall out of its salesperson's **standard distance**.
- **Procedure**
  - Consider Street Team accounts (the choice set)
  - For all the accounts handled by one specific salesperson, there is a geometric mean center. **Standard distance** is a measure of average distance of all the accounts to this center.
  - For each TM salesperson, standard distance indicates how concentrated or disperse his accounts are.



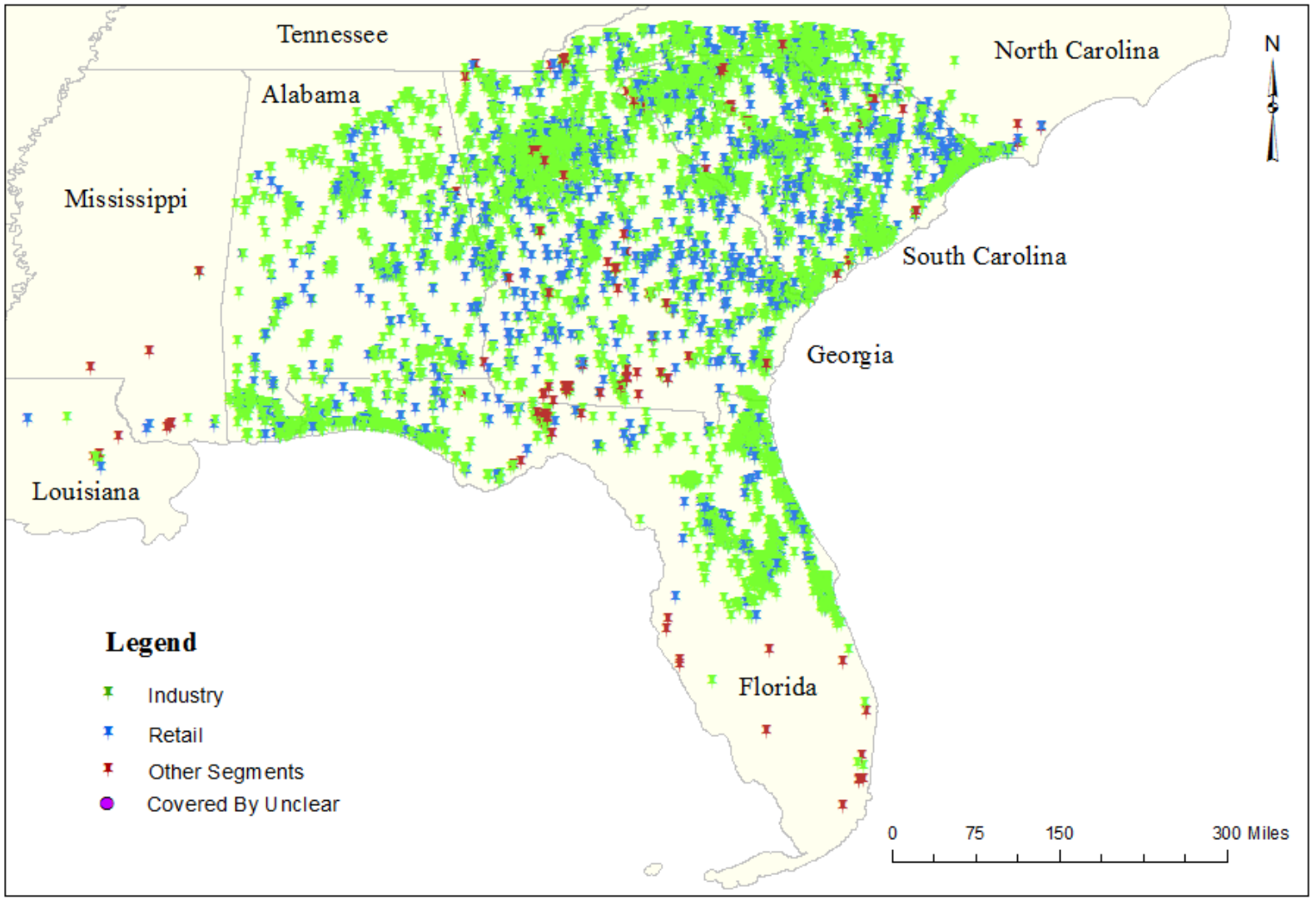


Establish the Exclusions Standard Distance Method

- **Procedure (Cont.)**
  - Accounts that fall outside the standard distance are excluded
  - IND and RTL accounts are excluded by assumption



Map of the Excluded Accounts
-- Standard Distance Method



Establish the Exclusions Standard Distance Method

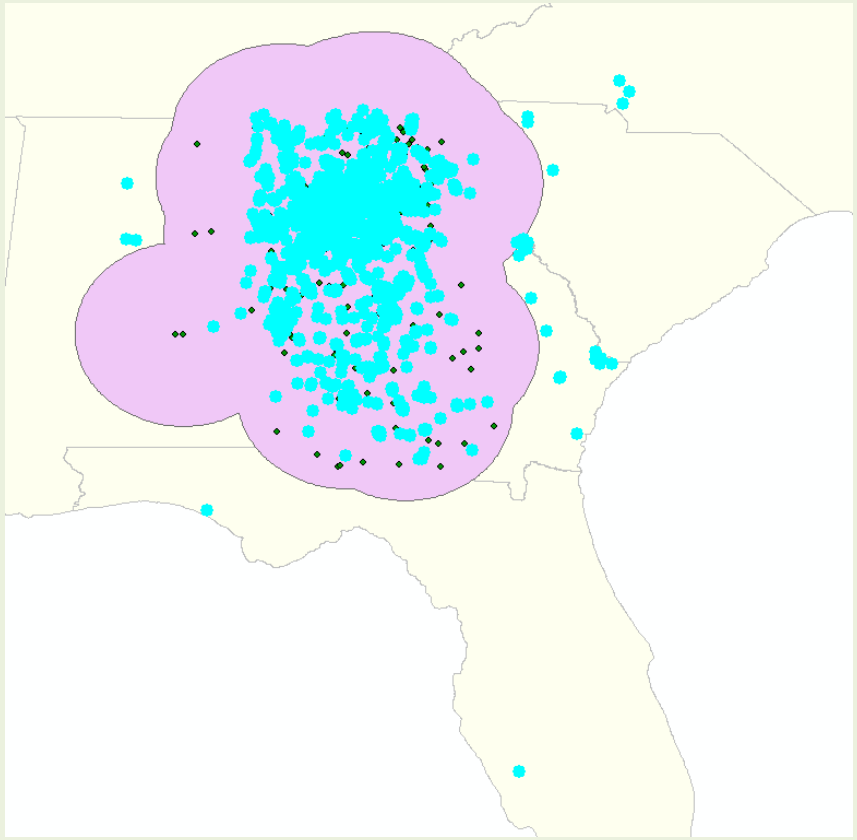
- **Pros**
  - Exclude 43%, indicating less than 20% of change
  - Maintain relatively stable customer service
  - Provide information on how disperse certain salesperson's coverage
- **Cons**
  - Fewer shift leads to less cost saving; rehiring process will further offset saving
  - Exclusions are selected more rely on segment property than location
  - The assumption of customer service may be incorrect

Establish the Exclusions Buffer Method

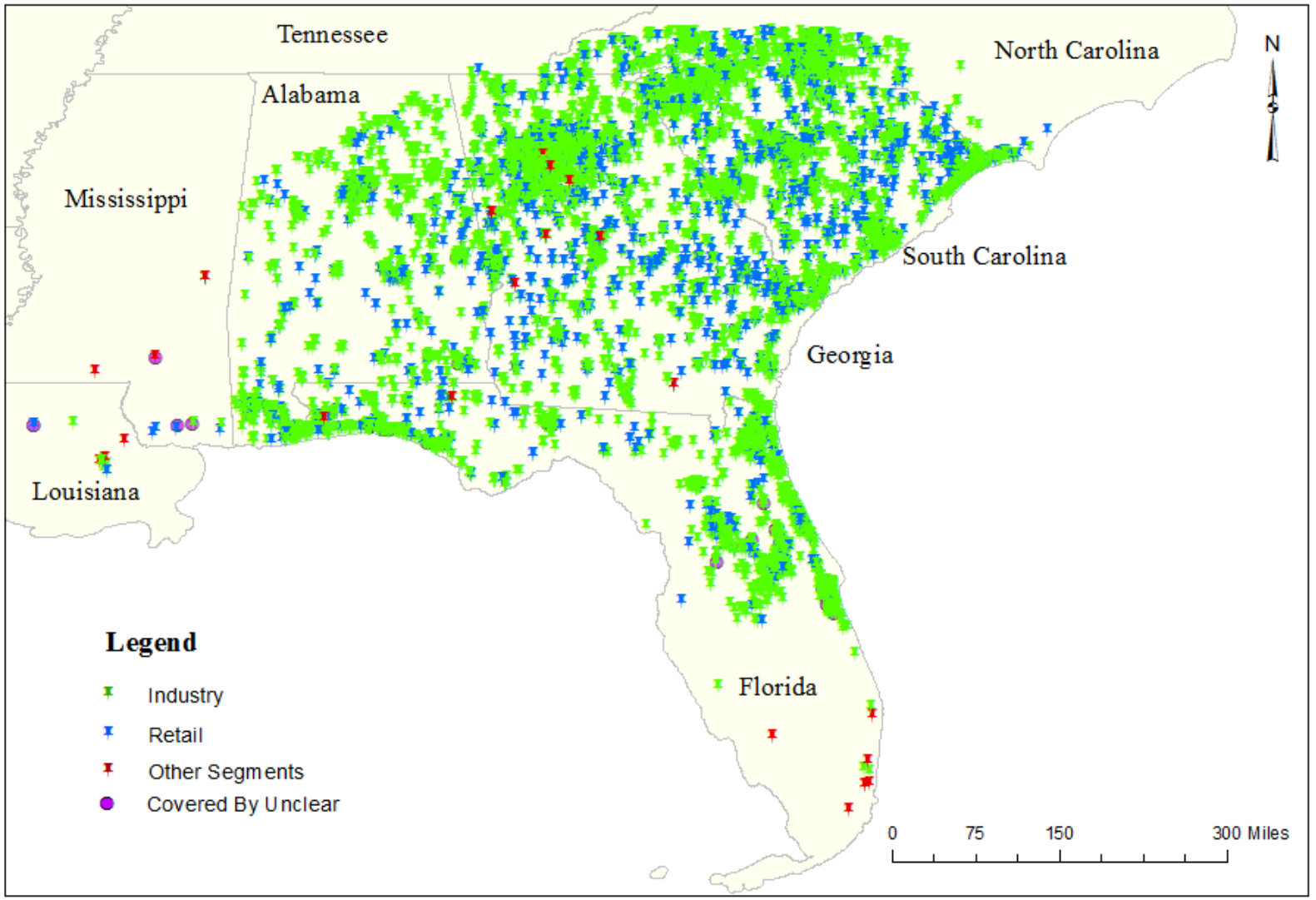
- **Define Being Remote**
  - Accounts that fall out of the 77-mile buffer zone
  - 77-mile is the distance between the geocenter of Key West cluster and the geocenter of its nearest cluster
- **Procedure**
  - Find the Center Account for each TM salesperson
  - Create 77-mile buffer zone for each salesperson

Establish the Exclusions Buffer Method

- **Procedure**
  - Accounts that fall outside the buffer zone are excluded
  - IND and RTL accounts are excluded by assumption



Map of the Excluded Accounts
-- Buffer Method



Establish the Exclusions Buffer Method

- **Pros**
  - Exclude 43%, indicating less than 20% of change
  - Maintain relatively stable customer service
- **Cons**
  - Fewer shift leads to less cost saving; rehiring process will further offset saving
  - The definition for being remote is not precise
  - Exclusions are selected more rely on segment property than location
  - The assumption of customer service may be incorrect

Cost Saving Analysis

R	Thiessen Polygon	Standard Distance	Buffer
0.9	21.97%	3.29%	3.66%
0.8	25.85%	5.57%	5.96%
0.7	29.81%	7.88%	8.31%
0.6	33.84%	10.25%	10.71%
0.5	37.96%	12.66%	13.15%

R is the wage ratio between NAM and TM.

$$C_0 = (\#_{TM,0} + \#_{NAM,0} * R) * W_{TM}$$
$$C_1 = (\#_{TM,1} + \#_{NAM,1} * R) * W_{TM}$$
$$CostSaving\% = \frac{\Delta\#_{TM} - \Delta\#_{NAM} * R}{\#_{TM,0} + \#_{NAM,0} * R}$$

Recommendation

- **Using Thiessen Polygon Method to exclude 23% of total accounts**
  - Saves ~20% to ~40% labor cost
  - Provide implementation for next step: to whom each TM account should be transfer
- **Better management**
  - Division 2261 - HZXXX6Z and Division 3056 - VCV3Z55 are listed as both National Team and Street Team

Thank you!

Appendix

Division Accounts Number (top 6)

division	Freq.	Percent	Cum.
2221	3,545	27.97	27.97
3136	1,811	14.29	42.26
2251	1,421	11.21	53.47
3056	1,195	9.43	62.90
2261	1,102	8.69	71.60
3104	1,046	8.25	79.85

Segment by Covered_by

segment	National..	Street	Unclear	Street%	Total
IND	64	18,661	240	98.40%	18,965
RTL	225	2,888	39	91.62%	3,152
HOS	1,719	4,514	56	71.78%	6,289
GOV	242	589	9	70.12%	840
REG	629	1,028	25	61.12%	1,682
HC	1,619	1,159	37	41.17%	2,815
OTH	365	2,194	3,505	36.18%	6,064
EDU	7,811	2,388	663	21.98%	10,862
NCH	4,998	344	62	6.37%	5,404

Thiessen Polygon Method

						before transform			after transform	
division	total # of acc	# potential transforable	exclusion #	TM%	transform #	# of TM	# of NAM	current NAM non NCH acc	est # of TM needed, assuming national level of avg acc# per TM， 36	est # of NAM needed, assuming national level of avg acc# per NAM， 80
2261	10872	7823	3865	35.55%	3958	150	13	1102	107	63
2221	9550	5738	1803	18.88%	3935	130	19	3545	50	94
2251	6324	4603	1251	19.78%	3352	130	12	1421	35	60
3056	5751	3897	1226	21.32%	2671	110	7	1195	34	48
2231	5374	3404	693	12.90%	2711	91	13	661	19	42
sum	37871	25465	8838	23.34%		611	64		246	307

Note: Ignore unclear. Treat (2261) HZXXX6Z_NAM and HZXXX6Z_TM as two person; similar for (3056) VCV3Z55.