

Evaluation of Two Different Interviewing Protocols to Test a Mobile Mapping Instrument for the June Area Survey

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June Area Survey (JAS)

- Sample (segments) selected from area sampling frame
- Collects detailed information on farms and ranches
- Different from other NASS surveys; field enumerators collect data using 24" x 24" aerial photo and paper questionnaires
- Enumerators outline fields for unique land operating arrangements (tracts) on aerial photo and collect field-level data via paper questionnaire



Example: Segment with 8 Tracts



JAS Pencil & Paper Data Collection – Tract F

- Detailed information is collected for all land within the segment
- Field boundaries are drawn in red on the aerial photo



- Numbers are assigned that correspond to columns within Section D of the questionnaire

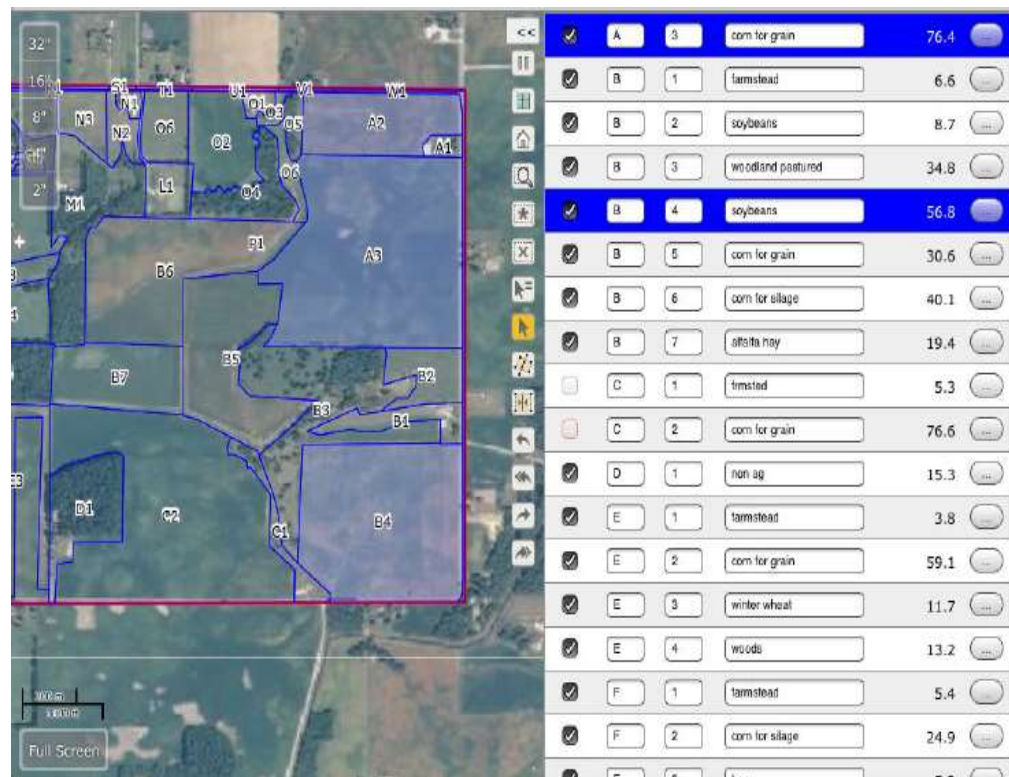
How many acres are inside this blue tract boundary drawn on the photo (map)?..... 70.0

Now I would like to ask about each field inside this blue tract boundary and its use during 2017.

Field Number	01	02	03	04	05
1. Total acres in field	828 2.2	828 18.0	828 14.3	828 34.0	828 .
2. Crop or land use. [Specify]	house	CORN	Wheat	SOYBEANS	
3. Occupied farmstead or dwelling	843 2.2				
4. Waste, unoccupied dwellings, buildings and structures, roads, ditches, etc.	841 .	841 .	841 .	841 0.9	841 .
5. Woodland NP = Not Pastured (831) P = Pastured (832) [Check (✓) type]	83_ <input type="checkbox"/> NP <input type="checkbox"/> P	83_ <input type="checkbox"/> NP <input type="checkbox"/> P	83_ <input type="checkbox"/> NP <input type="checkbox"/> P	83_ <input type="checkbox"/> NP <input type="checkbox"/> P	83_ <input type="checkbox"/> NP <input type="checkbox"/> P
6. Pasture Permanent (not in crop rotation)	842 .	842 .	842 .	842 .	842 .
Cropland (used only for pasture)	856 .	856 .	856 .	856 .	856 .
8. Idle cropland – idle all during 2017	857 .	857 .	857 .	857 .	857 .
9. Two crops planted in this field or two uses of the same crop. [Specify second crop or use.]	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
Acres	844 .	844 .	844 .	844 .	844 .
10. Acres left to be planted	610 .	610 .	610 .	610 .	610 .
11. Acres irrigated and to be irrigated [If double cropped, include acreage of each crop irrigated.]	620 .	620 .	620 .	620 .	620 .
16. Winter Wheat (include cover crop)	540 .	540 .	540 14.3	540 .	540 .
17. For grain or seed	541 .	541 .	541 14.3	541 .	541 .
24. Corn [exclude popcorn and sweet corn]	530 .	530 18.0	530 .	530 .	530 .
25. For grain or seed	531 .	531 18.0	531 .	531 .	531 .
29. Other uses of grains planted (Abandoned, silage, green chop, etc.)	Use	Use	Use	Use	Use
Acres
30. Alfalfa and Alfalfa Mixtures	653 .	653 .	653 .	653 .	653 .
31. Hay [Cut and to be cut for dry hay]	656 .	656 .	656 .	656 .	656 .
33. Other Hay	654 .	654 .	654 .	654 .	654 .
34. Soybeans Planted and to be planted	600 .	600 .	600 .	600 33.1	600 .
35. Following another harvested crop	602 .	602 .	602 .	602 .	602 .

Computer Assisted Personal Interviewing for the June Area Survey

- NASS partnered with Iowa State University
- Developed prototype mobile mapping instrument
- Converted 24" x 24" aerial photo and field-level paper questionnaire to electronic format
- No Internet connection is necessary
- A cache routine stores aerial imagery in the iPad memory

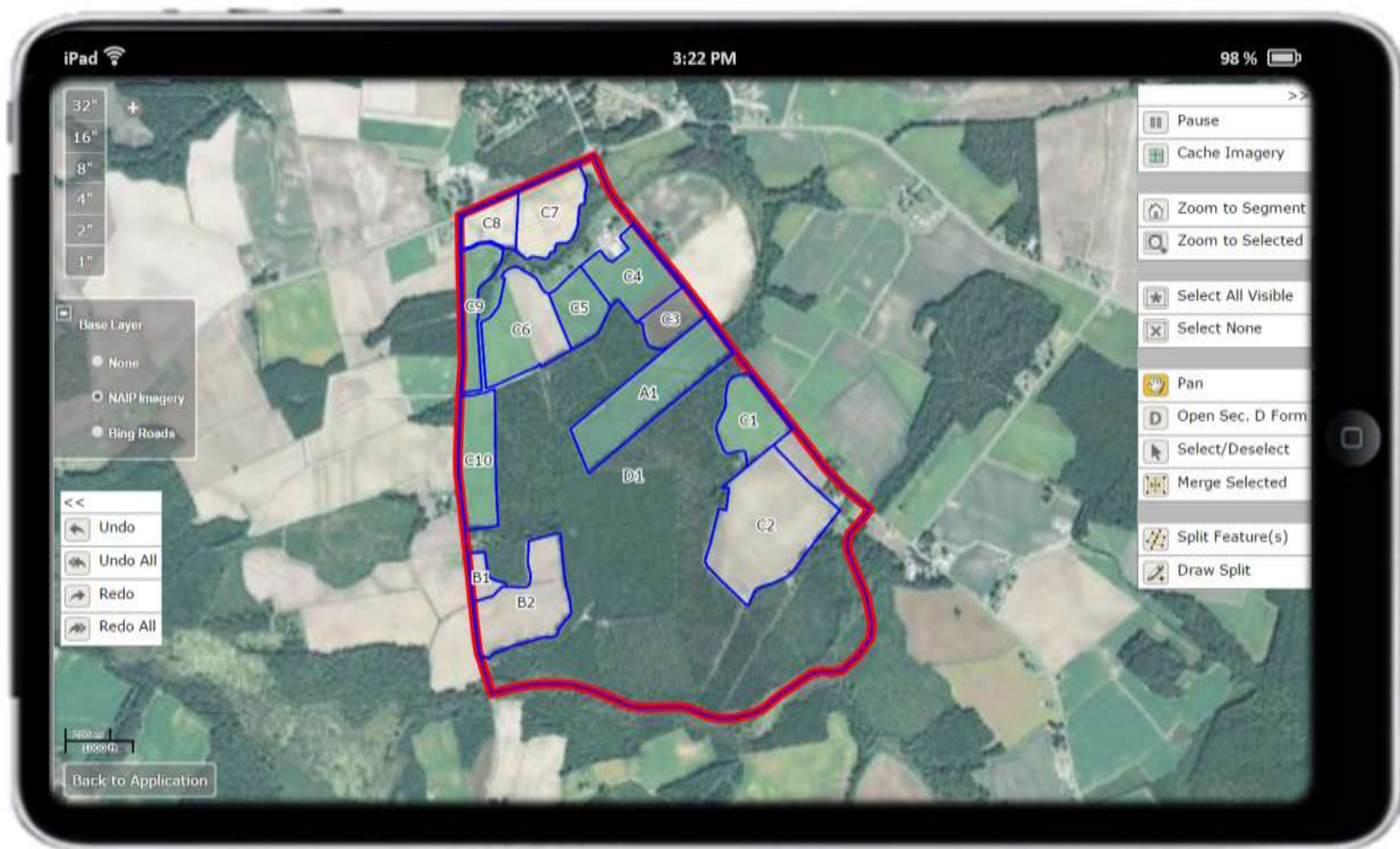


↑
Aerial Imagery

↑
Section D

Prototype Mobile Mapping Instrument

full screen mode



Previous Mobile Mapping Research

- Mobile mapping instrument has been tested for over 5 years
- Tested in states with different agricultural makeup
 - Large rectangular row crop fields often found in South Dakota
 - Smaller irregularly shaped fields with more woods in North Carolina
- Obtained extensive enumerator feedback
- Identified issues associated with mobile mapping data collection
- Made substantial instrument enhancements to improve usability
- Continuous improvements to training materials and procedures

Previous Mobile Mapping Research

Key Findings

- 2012 Study - Evaluated the possibility of relying solely on the instrument to provide the field acreages
 - Results showed that the acreage calculated within the instrument using Geographic Information Systems was comparable to JAS acreage reported by farm operators
 - Use of instrument reduces respondent burden because we no longer need to ask respondents to report acreage of each individual field
- 2014 Study – Feasibility of using the instrument to conduct actual interviews with farm operators
 - Results indicated that it took too long to draw the field boundaries while conducting the interview
 - Interview times per tract were 24.5 minutes in North Carolina, 20.8 in Pennsylvania and 9.7 in South Dakota

Previous Mobile Mapping Research

- In 2015, compared interview times using the mobile mapping instrument with prepared pre-delineated field boundaries to times with current paper data collection method
 - Results were confounded due to the lack of randomization in the enumerator assignment of study segments



Without any Delineations



With Pre-delineated Boundaries

Sources Used to Delineate JAS Segments

- Two years of NASS Cropland Data Layer
- National Aerial Imagery Program
- Farm Service Agency Common Land Units
- Topology maps

2016 Mobile Mapping Research

Research Objective

- To design a mock experiment to compare interview times using the mobile mapping instrument with the prepared pre-delineated boundaries to times using the current paper data collection method
- To validate the results of a mock interview process under real-life situations

Research Questions:

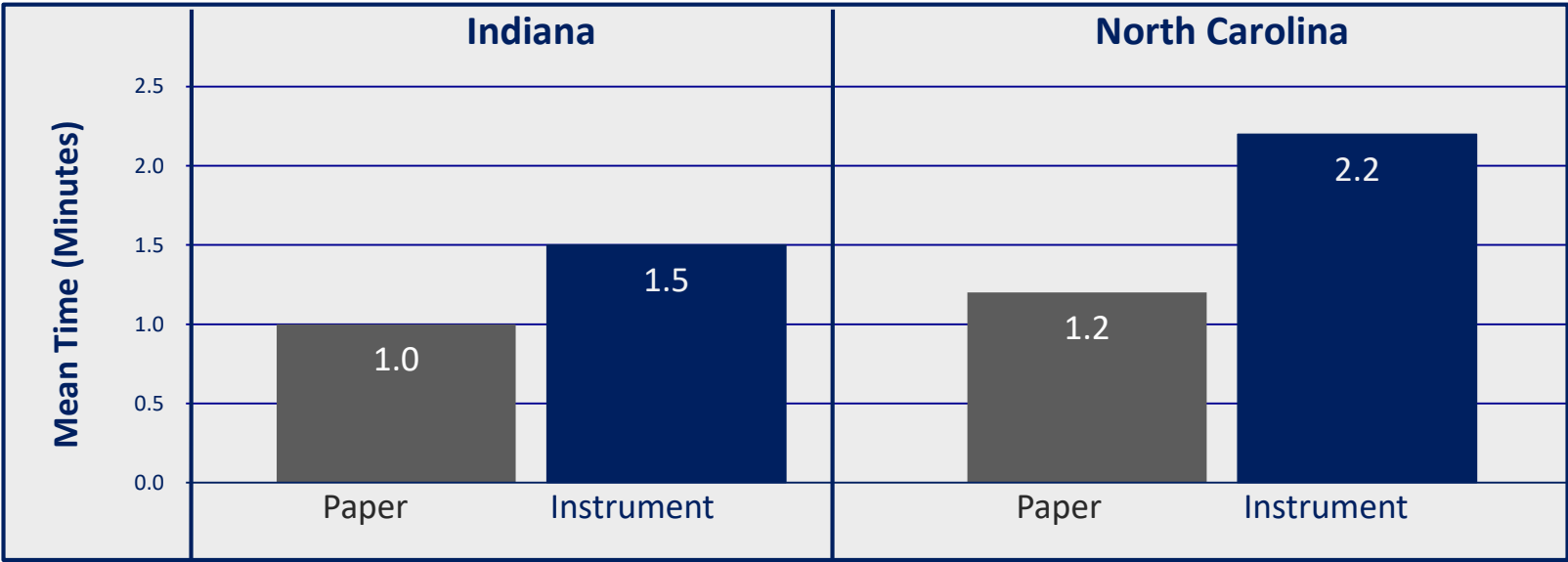
- Are instrument interview times comparable to current paper methods when pre-delineated boundaries are provided?
- Are the interview times significantly different if the interviews are conducted indoors or outdoors? For either method?
- Are the interview times reasonable under real-life situations (i.e., live interviews)?

2016 Mobile Mapping Research – Mock Interviews

- Compared interview times using the mobile mapping instrument with the prepared pre-delineated boundaries to times with the current paper data collection method in Indiana and North Carolina
- The experiment was designed to account for variation amongst enumerators, segments, and indoors/outdoors conditions -- used replicated Latin Square design
- All interviews conducted using a mock interview format
- Additional enumerators and field office staff acted as respondents
- Trained enumerators on the functionalities of the instrument prior to start of actual mock interviews

2016 Mobile Mapping Research – Mock Interviews

Mean Interview Time per Field – Paper vs Instrument



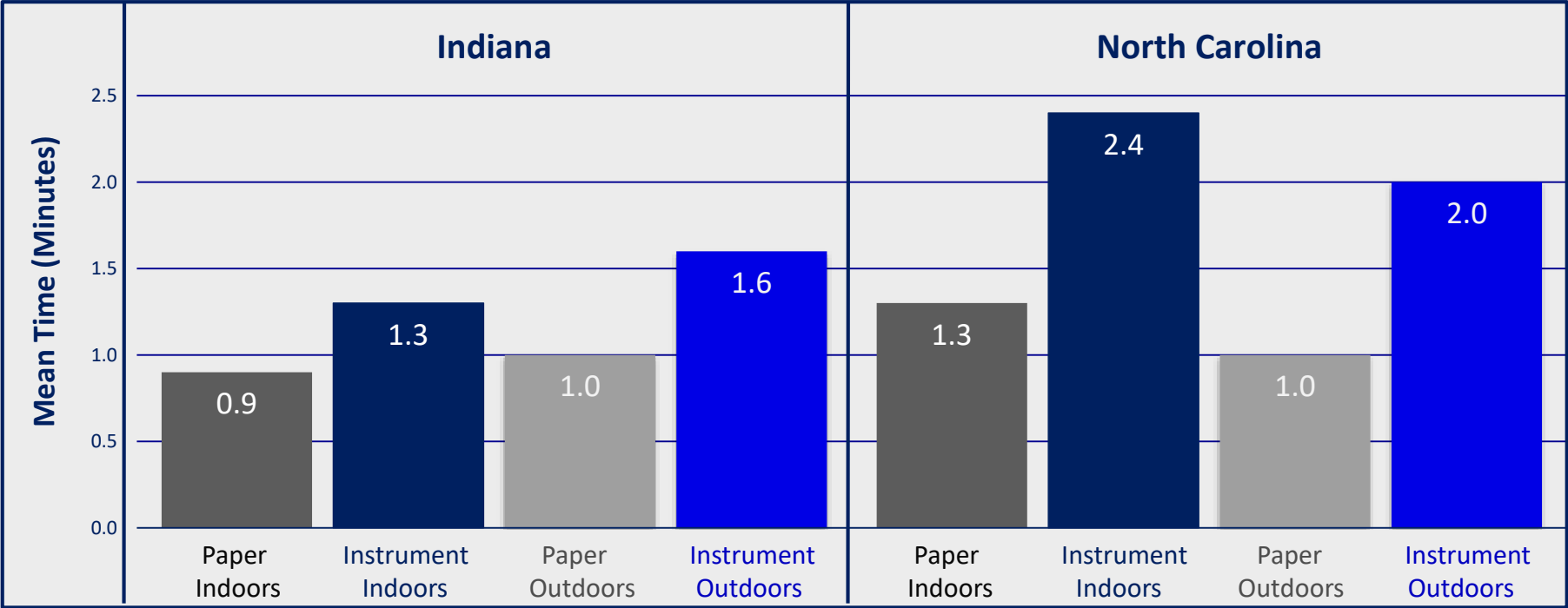
There were differences by state

- Higher interview times in North Carolina due to complexity of fields



2016 Mobile Mapping Research – Mock Interviews

Mean Interview Time per Field Paper vs Instrument and Indoors vs Outdoors



No significant difference between interviews conducted indoors vs outdoors



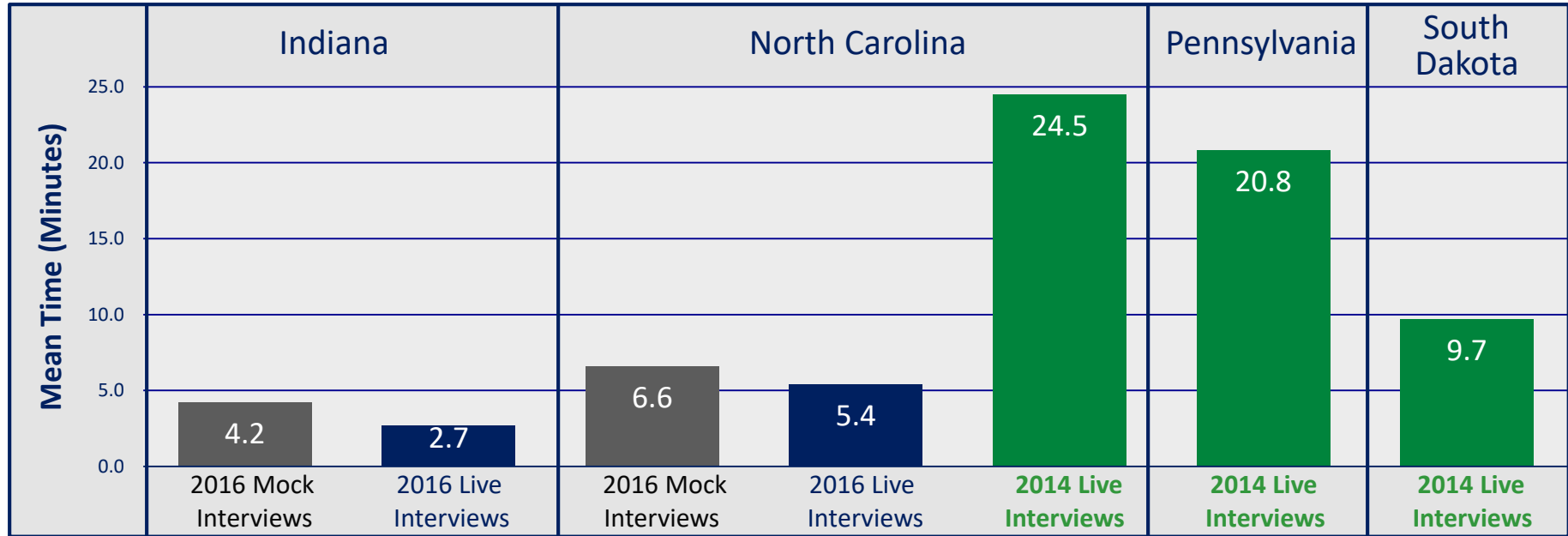
2016 Mobile Mapping Research – Live Interviews

- 20 segments per state that had not been enumerated previously
- Segments contained pre-delineated boundaries
- Enumerators were assigned segments in their local vicinity
- Enumerators pre-screened all segments prior to conducting interviews
- Live segments were not part of a controlled experiment
- 197 interviews conducted – 115 North Carolina & 82 Indiana

2016 Mobile Mapping Research – Results

Mean Interview Time per Tract

2016 Mock vs Live Interviews Compared to 2014 Live Interviews

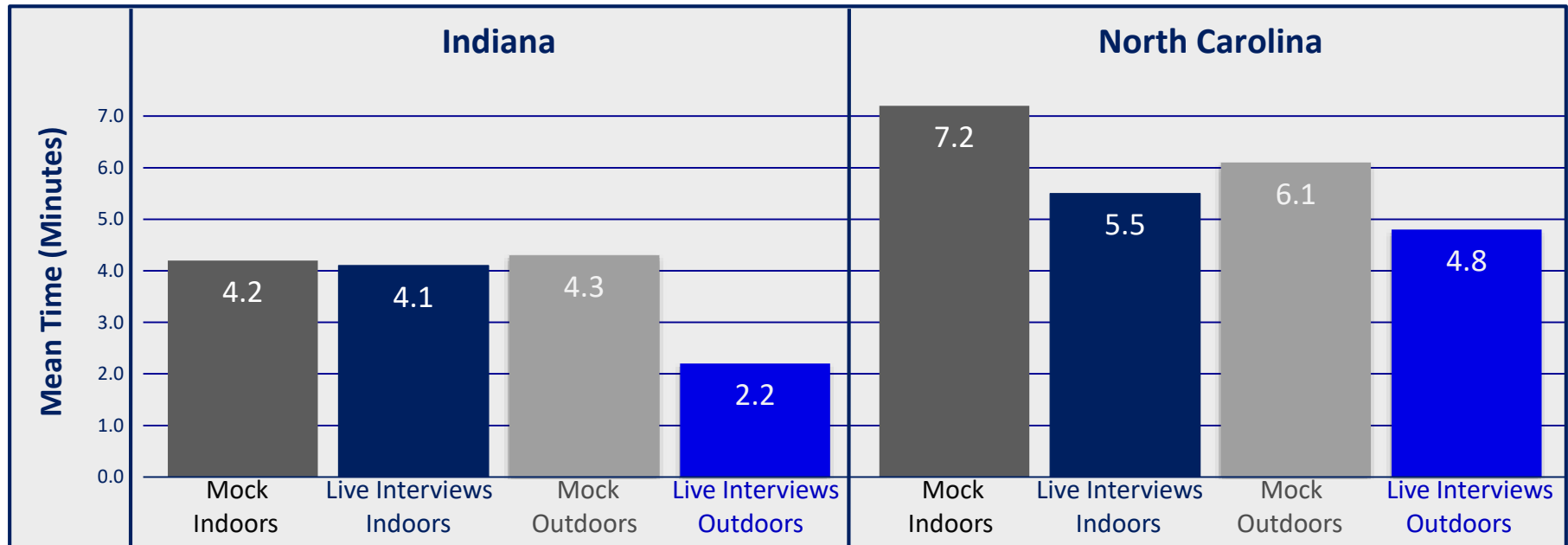


2016 interview times much improved from **2014** live interview times

- Pre-delineated boundaries provided for all mock and live interviews in **2016**
- Field boundaries had to be drawn during the interview in **2014**
- No pre-screening done in **2014**, all **2016** live interviews were pre-screened
- Several instrument improvements by **2016**, such as drawing with a pencil tool

2016 Mobile Mapping Research – Results

Mean Interview Time per Tract Mock vs Live Interviews and Indoors vs Outdoors



Live interview times were less than mock times

- Enumerators were more proficient with instrument after completing all mock
- No prior knowledge of mock segments whereas live segments were pre-screened

Conclusions

- Mock interviews showed that providing pre-delineated boundaries resulted in interview times comparable with paper
- There were differences by state
 - Higher interview times in North Carolina due to complexity of fields
- There was no difference between interviews conducted indoors vs outdoors
- Live interview times showed that the mobile mapping instrument could be used operationally

Benefits of Mobile Mapping Data Collection

- **Data Quality and Accuracy**
 - Dynamically routes questions in Section D
 - Embedded edit checks
 - More Recent Imagery
 - Eliminates Acreage Estimation of Non-Response
- **Reduce Respondent Burden**
 - Do not need to ask acreage questions
- **Flexibility**
 - Extend data collection window
 - Field enumerator workloads can be transferred electronically
 - Supervisor can easily review enumerators work at any time
- **Cost Savings**
 - Paper printing and mailing of photos and questionnaires
 - Time and mileage saved on locating UPS office to ship photos
 - Regional Field Office staff hours hand edit and data entry

Thank You!

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