Two-Year Post-Hurricane Matthew Field Study in Lumberton, North Carolina Housing/Household Recovery Survey Wave 5

U.S. Department of Commerce
National Institute of Standards and Technology
Generic Clearance for Community Resilience Data Collections
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For each proposed request using this generic clearance, NIST will submit the actual instrument and related documents (letters, emails to respondents, scripts, etc.), as well as proposed statistical methods to be employed to OMB along with responses to the following questions:

1. Explain who will be surveyed and why the group is appropriate to survey.

The Center of Excellence (CoE) field studies team in conjunction with NIST researchers will conduct another round of data collection as part of the field study in Lumberton, North Carolina, which experienced major flooding damage due to Hurricane Matthew in early October 2016. The purpose of this field study is to explore the interconnectivity between structural damage (buildings, roads, bridges, power, water) and social-economic impacts to the community. The goal of the current survey collection is to determine the status of recovery for these households. Furthermore, Lumberton was also impacted by another significant flooding event in September 2018 with Hurricane Florence. The information collected in this household survey instrument will augment findings from December 2016, January 2018, March 2019, and July 2021. The data from this longitudinal collection will contribute to the housing recovery modeling in the IN-CORE community resilience modeling environment, as well as to NIST research on community resilience.

The new household survey instrument is written to assess the continued housing recovery, dislocation, work, and school impacts for households in Lumberton, NC following Hurricane Matthew (October 2016). From the initial household survey conducted in December 2016, we are aware that the structural damage from Hurricane Matthew was significant in its impact to the population in terms of leading to dislocation and associated social and economic impacts. In January 2018 a one-year post-Hurricane Matthew Housing/Household Recovery Survey was conducted in addition to further exploration of the structural damage, school closures, and housing dislocation and recovery patterns. At that time most household survey respondents had not yet completed recovery from Hurricane Matthew. Approximately six years since the initial collection, the team aims to collect information on the recovery of these housing units and the associated households. The team expanded the collection to assess impacts and recovery from the latest flood event in September 2018 due to Hurricane Florence. The team has once more expanded the data collection to 1) assess the impacts of the COVID-19 pandemic generally as

well as on the recovery process and 2) better understand adoption of mitigation and preparedness actions in Lumberton.

We will be surveying randomly sampled households that are part of the sample previously used in both 2016, 2018, 2019, and 2021 studies in Lumberton, NC; the goal for 2022 will be to survey 454 households. The 2016 sample design relied on a cluster sample of households within the most heavily impacted school attendance zones. The sampling strategy is outlined in Response 3.

There is minimal quantitative primary data collection on housing recovery following a large-scale natural hazard event. Additionally, there is minimal primary data on longitudinal housing recovery to understand factors that affect long-term recovery of housing units and households affected by hurricane events. Lumberton provides a unique case for analyzing medium- and long-term recovery in the face of multiple hurricane events (i.e., Hurricane Matthew – 2016 and Hurricane Florence—2018). Survey respondents are household members, and when no one in the household is present, a neighbor or a property manager. Some of these households will have been directly affected by Hurricane Matthew and/or Hurricane Florence (e.g., structural damage, dislocation, utility outages, employment/school impacts) while others were not. At this point in time, household members will still retain information about recovery activities from Hurricane Matthew immediately before Hurricane Florence hit the community and immediately after Hurricane Florence, which can be meaningfully recorded and collected for data analysis.

PII is collected in this instrument, but information is not retrieved by personal identifiers in the system. Therefore, this is not a Privacy Act System and SORN and Privacy Act Notice are not applicable.

2. Explain how the survey was developed including consultation with interested parties, pretesting, and responses to suggestions for improvement.

The survey instrument was developed by the NIST funded Resilience Center of Excellence in collaboration with NIST researchers. Many sections of the survey focus on recovery financing, while the timing of return and mitigation actions draw from the 2018, 2019, and 2021 surveys. Similarly, sections on household dislocation and associated social and economic impacts of Hurricane Florence were drawn from the initial survey instrument used in 2016. New sections on mitigation actions and impacts from the COVID-19 pandemic were added. The former was based in part on the CoE/NIST damage assessment conducted after Hurricane Florence in October 2018, while the latter is based on the present-day events. Additionally, the survey draws from the rich experience of the CoE and NIST researchers in disaster studies.

During development, the survey instrument underwent several rounds of review by researchers on both the CoE team and at NIST, specifically in the Community Resilience Group of NIST's Engineering Laboratory (EL). Finally, the survey instruments were reviewed by the broader, interdisciplinary team that participated in the first and second data collection efforts in Lumberton, NC. This iterative collaboration created a relatively brief and thorough instrument. Interviewer guidance has been added throughout the revision process to support the proper

elicitation of responses when in the field. Lessons learned from both years of data collection have informed both the form of the questions and the guidance to surveyors.

3. Explain how the survey will be conducted, how customers will be sampled if fewer than all customers will be surveyed, expected response rate, and actions your agency plans to take to improve the response rate.

The survey will be conducted by an interviewer as a face-to-face survey for up to 454 households. A consent script will be used. Each survey should require no more than 15 minutes. The surveying will take place across several long weekends to maximize the response rate by surveying at times when householders are more likely to be present.

For the previous household surveys, we conducted a cluster sample of households within the most heavily impacted school attendance zones. The sampling strategy for the Wave 5 effort will be the same as previous efforts.

The expected response rate is 80%. It should be noted that responding to any or all the survey is considered as a survey response. Assuming an 80% response rate, the total burden hours for this collection would be 113 hours (Burden estimate: 454 households x 15 minutes = 113 hours).

Although resources (staff, time, and funds) will be limiting factors, several actions will be taken to improve the outcomes of the field study data collection. These actions have proven successful in prior field studies. To ensure a higher response rate, the team will:

- Train surveyors for maximum efficiency in the field,
- Concentrate surveying on weekends and evenings,
- Make repeat visits to households (if no one was present at the time of the initial visit),
- Arrange scheduled follow up times for households not available for surveying during initial visit (if willing to participate), and
- Adjust the field work plan and team composition based upon daily evaluation of results.

4. Describe how the results of the survey will be analyzed and used to generalize the results to the entire customer population.

It is expected that the findings of this survey will inform the understanding of the CoE field studies team in conjunction with NIST researchers in terms of housing recovery and best practices and circumstances for recovery over medium- and long-term timeframes and when households face multiple extreme flooding events (i.e., Hurricanes Matthew and Florence).

The data will be analyzed as a case study in the specific context of Lumberton, NC, and the existing social, economic, and built infrastructure elements to the community. Statistical analysis will be used to determine trends and correlations in the data, as well as relationships between factors that contributed to housing recovery, dislocation, work, and school impacts. There are seven main survey sections in the household survey tool that related to both Hurricane Matthew and Hurricane Florence. The sections are:

1) Occupancy and eligibility
2) Housing damage and repair
3) Financial assistance for housing recovery
4) Impacts of Hurricane Florence and Hurricane Matthew (utilities, dislocation, work)
5) Recovery
6) Mitigation
7) Impacts from COVID-19
8) Household demographics

Analyzing these types of data singularly and in conjunction is expected to extend understanding of housing recovery alone and in relation to the recovery of the community, more broadly. Of particular interest to NIST researchers are the dependencies between housing recovery and household recovery along with the interconnections of housing, business, and school recovery following a hazard event.

Research on housing and household recovery to date has been limited by a lack of over time data following a single event in a community as well as an absence of cases that collect the same data across events and communities. Nor are there a great deal of geographic areas studied in detail that were affected by multiple extreme hurricane hazards in relatively quick succession. Several factors that impact the timeline associated with the recovery of housing and households have been identified in prior research. In this field study, these factors are expected to be quantified for a model of housing recovery. The data from this collection will continue to refine the housing recovery modeling in the IN-CORE community resilience modeling environment. Additionally, these data in combination with the business recovery data will be analyzed to understand the dependencies between these two critical sectors.

The data will also be used to inform conceptual and quantitative modeling of the community as a system, including interdependencies between housing, business, and school recovery, the timing of aspects of community recovery, and the resources available versus those needed. Furthermore, it is expected that administering the survey tool will continue to provide useful information on best practices for field research on housing recovery following a natural disaster. The survey tool itself is one that has been designed to be applicable for field studies in other communities for a range of hazard events.