

**HORNEY, TAMU  
DHS COASTAL RESILIENCE CENTER  
RESEARCH PROJECT  
YEAR 3 PERFORMANCE REPORT  
AND  
FINAL PROJECT REPORT**

Project Title: Implementing the Disaster Recovery Tracking Tool

Principal Investigator Name/Institution: Jennifer Horney, Associate Professor, Texas A&M University Health Science Center School of Public Health, Department of Epidemiology and Biostatistics

Co-Principal Investigators and Other Partners/Institutions: Phil Berke, Professor, Texas A&M University, College of Architecture, Department of Landscape Architecture and Urban Planning

Project Start and End Dates: 1/1/2016 – 6/30-2018

Short Project Description (“elevator speech

Valid and reliable quantitative and qualitative measures of community disaster recovery are needed in order to be able to track recovery in different geographic locations, from different types of disasters, and over time. The Disaster Recovery Tracking Tool is a web-based tool that enables end users (e.g., planners, emergency managers, long-term recovery committees) to track the progress and quality of post-disaster recovery by comparing baseline and post-disaster data.

Summary Abstract:

Without monitoring recovery and comparing post-recovery status with pre-disaster benchmarks, it is difficult for communities to assess whether or not they are achieving a quality recovery, improving disaster resilience, or building back better. The Disaster Recovery Tracking Tool provides a framework for end users (e.g., planners, emergency managers, long-term recovery committees) to track progress on metrics of disaster recovery. The metrics were identified and content validated through a literature review, recovery plan review, case studies, focus groups, key informant interviews, and pilot tests with communities impacted by Hurricane Sandy. The metrics include both quantitative and qualitative measures of recovery organized in four themes and ten focus areas. Practitioners using this tool can compare pre- and post-disaster status using baseline and current data. Reports generated by the tool can provide end users with a useful means of prioritizing recovery goals and activities and identifying elements important to include in recovery planning, potentially making recovery more effective and efficient and communities more resilient.

## **PROJECT NARRATIVE**

### 1. Research Need:

This project contributed to Goal 5.4 of the Department of Homeland Security’s Strategic Plan (FY 2014-18) by providing an online tool to measure and monitor post-disaster changes in habitability, the environment, the economy, and geography that emerge from the recovery process.

### 2. Project History

The Disaster Recovery Tracking Tool was first released in open Beta form in 2016. The completed website was made available for public access in the summer of 2017. An initial horizon scan of similar

web-based tools dedicated to disaster recovery tracking and pre-disaster recovery planning revealed that this product was uniquely positioned. Horizon scans performed in the fall of 2016 by 3 undergraduate honors marketing teams at Texas A&M University similarly yielded no significant competitors; however, similar products were later identified.

End user outcomes included completed data sets from recovery for at least two pilot communities in Texas identified by Dr. Cooper and Ms. Masterson of Texas Target Communities. Representatives of Bastrop County, Texas and Liberty County, Texas agreed to serve as pilot communities to evaluate the Disaster Recovery Tracking Tool. However, we were unable to collect evaluation data from pilot communities, as communities engaged in nearly continuous response to multiple disasters over the grant period. Therefore, opportunities for alternative research milestones were pursued.

Potential applications and opportunities to leverage the Tool were discussed previously with Project Manager at the U.S. Coast Guard R&D Center in March 2016. However, the Coast Guard's Office of Research, Development, Test and Evaluation, located at Headquarters in Washington, DC, determined that the Tool would not be appropriate to meet established needs.

Lisa Schiavinato, Director of Extension at California Sea Grant, provided a connection to an affiliated extension agent for advisement on natural resource data sources. We also worked with Oil Spill Science Outreach and Extension Specialists at Texas Sea Grant College Program to determine whether the Disaster Recovery Tracking Tool could be used to measure recovery progress in oil spill-affected communities. Potential applications for the Tool were also discussed with Alabama Sea Grant. A conference call with Hank Hodde at the NOAA Disaster Response Center in Mobile, AL was held to determine where integration/support would be possible.

Working with the Department of Homeland Security Coastal Resilience Center of Excellence and the Office of the Assistant Secretary for Preparedness at the Department of Health and Human Services in December 2016, a project proposal to deploy the Disaster Recovery Tracking Tool in several communities in North Carolina affected by Hurricane Matthew was developed. To maximize the impact of available resources given the urgent needs of local practitioners, the deployment of the proposed project was delayed indefinitely.

A meeting was held with FEMA's Community Planning and Capacity Building Division in January 2018. Items discussed included planning capabilities and interests of researchers at Texas A&M University, as well as best practices for recovery- and resilience-related planning, capacity building, and workshops.

Guidance was provided from the Texas A&M Engineering Extension Service (TEEX) to develop a Disaster Recovery Tracking Tool training course targeted to local government officials, city and county planners, and other community stakeholders. A course design document was drafted and reviewed by TEEX; however, time constraints imposed by Hurricane Harvey response activities restricted further course development. The utility of the Tool to TEEX was subsequently reduced following the adoption of a new disaster inventory system by FEMA and continued collaboration ceased in January 2018.

### 3. Results:

Working with pilot partners (local planners and emergency managers in two Texas jurisdictions), we expected to determine the validity, timeliness, and completeness of the recovery data entered into the tool.

End user capabilities needed: 1) A commitment by end users to engage throughout the life of the project.

End user problems addressed: 1) Lack of ability to measure and document different aspects of the

recovery process to a) characterize recovery (e.g. through longitudinal metrics or metrics that address unique community factors); b) detect problems with recovery (e.g., housing recovery is lagging or businesses are slow to re-open in the downtown business district); and c) improve future recovery and progress towards resilience / building back better; 2) Lack of ability to compare recovery from different types of events over time to identify similarities, difference, and lessons learned; 3) Lack of end user capacity to develop recovery plans (and in particular, high-quality recovery plans) or improve / revise existing pre-disaster recovery plans.

To enhance the usefulness of the tool for local and federal end-users, the needs, insights, and expertise of FEMA partners were incorporated throughout the decision-making process. Lisa Stillwell, a research software developer at RENCI, provided technical assistance during the development of the Disaster Recovery Tracking Tool. The results of this assistance include an improved user interface, the inclusion of additional tracking functions, and a greater number of automatically-populated metrics. In response to end-user feedback generated using surveys and key informant interviews, the number of metrics that are automatically populated from publically-available datasets was increased from 17 to 39.

Recognizing the need for a rapid means of assessment for time- and resource-limited end-users, a concise metric checklist was created. The checklist was smaller (15-18 metrics) and geared towards a concrete outcome – a draft of a pre-disaster recovery plan, something that many communities need / want but may not have the planning capacity to develop.

In February 2018, CDR inquired about the utility of the disaster recovery metrics for the U.S. Virgin Islands Department of Health's health and social services recovery surveillance efforts. The potential uses were discussed via email and a conference call, following which a sample user account was provided for demonstration purposes. Subsequent application of the Tool was hindered by a lack of regular data collected on an annual basis for the region (e.g., U.S. Census data).

A request for information describing the purpose and potential applications of the Tool was received in February 2018 from the nonprofit Rebuild North Bay Foundation, which was established to assist in the rebuilding efforts of the fire-affected Counties of Napa, Lake, Mendocino and Sonoma, California. This request was fulfilled and additional assistance was offered.

In April 2018, a graduate student researcher at the University of Connecticut expressed interest in leveraging the Tool to investigate ongoing recovery efforts in Puerto Rico. Unfortunately, the publically-available datasets used to automatically populate the Tool's metrics contain sparse information about Puerto Rico. A document describing the disaster recovery metrics and associated data sources was provided along with links to federal data repositories. Additional assistance and information were offered.

#### 4. End Users and Transition Partners:

The Disaster Recovery Tracking Tool ([trackyourrecovery.org](http://trackyourrecovery.org)) currently has over 730 registered users. These include Federal (EPA, FEMA, NOAA (ERMA), Small Business Administration, US Air Force Academy, Cooperation for National and Community Service); Regional (FEMA Regions 2, 6, and 8); Local Governments; Ga. Tech University; National Non-Profits (Red Cross, Natural Resources Defense Council); Other Non-Profits (SeaPlan.org); and private consultants. Additional end users include: 1) Municipal- and county-level planners, emergency managers, and members of long-term recovery committees; 2) FEMA national (Matt Campbell) and regional-level recovery division staff; 3) Department of Health and Human Services, Assistant Secretary for Preparedness, Office of Emergency Management, Recovery; 4) Los Angeles County Emergency Management (John Chung, Emergency Planner); 5) Department of Homeland Security S&T Flood APEX.

The research team also worked with the Federal (FEMA) and Regional (FEMA 2, 6, and 8 end users to determine additional ways in which collected data may be used (e.g., to develop a checklist to assist in the development of a fact base of a recovery plan). To promote the checklist and other findings and tools, we also linked with the American Planning Association's Post-Disaster Recovery Section (James Schwab), the new Hazard Mitigation and Recovery Planning APA Division (Gavin Smith), and the Community Resilience Planning Guide for Buildings and Infrastructure developed by NIST (Walt Peacock at Texas A&M HRRC is a Co-PI of NIST). We had a conference calls with Larissa Graham, Oil Spill Science Extension Specialist with the Mississippi-Alabama Sea Grant Consortium, in April and May of 2017 and contacted the Extension Director of Sea Grant California to request a conference call to discuss the Tool.

A DEMO session of the Tool, called Can We Measure Successful Disaster Recovery? at the National Association of County and City Health Officials Annual Preparedness Summit in April, 2016 was attended by 67 federal, state, and local public health and emergency management staff. In the same month, a case study of measuring disaster recovery in six Texas communities was described in an oral presentation at the Texas Public Health Association Annual Conference and a poster presentation at the Texas A&M Public Health Week Delta Omega Student Poster Contest. A discussion of the Tool during the 2016 NACCHO Preparedness Summit by Natalie Grant, Program Analyst at ASPR, was recorded and featured in the NACCHO Podcast Series (<http://naccho.libsyn.com/disaster-recovery-tracking-tool-with-natalie-grant>). The Tool was also mentioned during a presentation given at the 2018 NACCHO Preparedness Summit by representatives of the Public Health Commission Office of Public Health Preparedness and the Del Valle Institute for Emergency Preparedness ([https://delvalle.bphc.org/pluginfile.php/3215/mod\\_wiki/attachments/2/NACCHO%202018%20Recovery%20Presentation.pdf](https://delvalle.bphc.org/pluginfile.php/3215/mod_wiki/attachments/2/NACCHO%202018%20Recovery%20Presentation.pdf)).

- The following organizations placed the Disaster Recovery Tracking Tool link on their respective websites:
  - Association of Schools and Programs of Public Health (<https://www.aspph.org/texas-am-faculty-receives-funding-from-both-the-national-academies-and-homeland-security-for-disaster-recovery-research/>)
  - Coastal Resilience Center (<http://coastalresiliencecenter.unc.edu/crc-project-tracks-long-term-recovery-in-communities/>)
  - Institute for Sustainable Communities at Texas A&M University (<http://ifsc.tamu.edu/Discovery/Health-and-Environment>)
  - Texas Sea Grant College Program (<http://texasseagrant.org/programs/community-resilience-collaborative/crc-online-resources/>)
  - Federal Emergency Management Agency (FEMA)
  - North Carolina Planning Journal
  - Office of the Assistant Secretary for Preparedness and Response (ASPR) Technical Resources, Assistance Center, and Information Exchange (TRACIE) – Technical Resources (<https://asprtracie.hhs.gov/technical-resources/resource/2092/disaster-recovery-tracking-tool-measuring-recovery-through-healthy-community-indicators>)
  - Texas A&M Foundation
- The Disaster Recovery Tracking Tool was referenced as a resource in the following publications:
  - Texas A&M College of Architecture's ArchOne electronic newsletter (<https://one.arch.tamu.edu/news/2016/2/24/prof-evaluate-effects-vulnerability/>)

- Texas A&M Health Science Center’s Vital Record (<https://vitalrecord.tamhsc.edu/developing-systematic-ways-of-measuring-disaster-recovery-process/>)
- Texas A&M School of Public Health’s annual magazine (<https://sph.tamhsc.edu/communications/docs/public-health-magazine-2016.pdf>)
- *Emergency Preparedness and Recovery: A Toolkit for Rural Communities*, a guidance document developed by the Texas Chapter of the American Planning Association and Texas Public Health Association ([https://docs.wixstatic.com/ugd/c536a4\\_5fd232d359f54b3ea96e505c3d84308c.pdf](https://docs.wixstatic.com/ugd/c536a4_5fd232d359f54b3ea96e505c3d84308c.pdf)).
- *Resources for Building Resilience in the Puget Sound Region, WA*, proceedings of the Puget Sound Knowledge Exchange: Resources for Building Resilience Workshop co-hosted by the Resilient America Roundtable and the Puget Sound Regional Council ([https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga\\_185859.pdf](https://sites.nationalacademies.org/cs/groups/pgasite/documents/webpage/pga_185859.pdf))
- Texas Public Health Journal Supplement Spring 2018, titled *Planners4Health: A Renaissance between Planning and Public Health to Confront Disasters in Rural Areas* (<https://www.txplanning.org/media/files/files/bfa1cf8e/apa-tpha-supplemental-journal-edition-final2.pdf>)

## 5. Project Impact:

The National Disaster Recovery Framework (NDRF) calls for communities to develop tools and indicators that can be used to assess progress toward achieving established goals, objectives, or milestones. The Disaster Recovery Tracking Tool provides an accessible means for resource-limited end users to readily measure and evaluate progress over time. The validated metrics that comprise the Tool’s tracking function were developed in accordance with the Recovery Support Functions and Recovery Mission Area Core Capabilities that are defined in the NDRF. The Disaster Recovery Tracking Tool facilitates data collection and management, allowing systematic measurement of the disaster recovery process in various locations, across events, and over time.

The NDRF further recommends that measures of recovery be developed in tandem with pre- and post-disaster planning functions and activities. Data collected for the 84 recovery metrics may be used to guide the development of a recovery plan element as part of a larger plan, or the development of a stand-alone recovery plan. Results may also contribute to increases in the number and improvements in the quality of pre-disaster recovery plans. For example, one of the primary indicators of a high-quality plan is a strong community fact base. It often difficult for smaller communities with limited capacity for recovery planning to develop a robust fact base focused appropriately on high-priority issues. The integration of recovery metrics in community plans and planning processes can aid decision makers in identifying resilience-building opportunities and developing evidence-based policies and priorities. For this purpose, a recovery planning checklist based on the Disaster Recovery Tracking Tool’s metrics has been drafted. This resource can be leveraged by practitioners to update plans or begin the process of developing a fact base for a pre-disaster recovery plan.

## 6. Student involvement:

- In the fall of 2016, undergraduate students of the Mayes Business School at Texas A&M University were recruited to assist in the completion of a horizon scan and the development of draft marketing materials, training module, and user guide.
- Degrees attained
  - Caroline Dwyer, Masters of Urban Planning
  - Bhagath Chirra, Masters of Public Health in Epidemiology

- Katy Stone, Masters of Public Health in Epidemiology
- Awards, publications, posters, presentations (\*indicates student)
  - Kirsch, K., Sullivan, E., Horney, J., and Goidel, K. (2018, July). Are slow-onset disasters well represented in hazard mitigation plans? Poster presentation at the 43rd Annual Natural Hazards Research and Applications Workshop, Broomfield, CO.
  - Kirsch, K. (accepted for publication). Session summary. Equitable and resilient design: Past and present infrastructure challenges. Proceedings of the 43rd Annual Natural Hazards Research and Applications Workshop, Broomfield, CO.
  - Horney JA, Dwyer C\*, Chirra B\*, McCarthy K, Shafer J, Smith G. (2018) Measuring successful disaster recovery. *International Journal of Mass Emergencies and Disasters*. 36(1): 1-22.
  - Horney JA, Dwyer C\*, Aminto M\*, Berke P, Smith G. (2017) Developing indicators to measure post-disaster community recovery. *Disasters*. 41(1):124-149. DOI: 10.1111.disa.12190.
  - Kirsch, K., & Masterson, J. (2017, September). Tool for tracking an equitable recovery [Blog post]. Retrieved from <http://disasterphilanthropy.org/blog/hurricanes-typhoons/tool-tracking-equitable-recovery/>
  - Kirsch, K. R., & Horney, J. (2017). Steps toward recovery: A tool for disaster recovery planning, management, and tracking. *Carolina Planning Journal*, 42, 104-109.
  - Chirra, B., & Horney, J. (2016, April). Measuring disaster recovery: A case study of six communities in Texas. Poster presentation at the 11th Annual Dr. Jean Brender Delta Omega Research Symposium and Student Poster Contest, Texas A&M University School of Public Health, College Station, TX.
    - i. Awarded Third Place in Dr. Jean Brender Student Research Poster Contest
  - Chirra, B., & Horney, J. (2016, April). Measuring disaster recovery: A case study of six communities in Texas, United States. Oral presentation at the Texas Public Health Association's 92nd Annual Education Conference, Galveston, TX

## 7. Interactions with education projects:

We supported the successful application of Dr. Sonia Gilkey from Texas A&M Kingsville, a minority serving institute in Texas, to the U.S. Department of Homeland Security (DHS) Summer Research Team Program for Minority Serving Institutions. Although Dr. Gilkey and her student were selected to participate in the program, they subsequently declined to participate due to a scheduling conflict.

## 8. Publications:

- a. Horney, J., Dwyer, C., Chirra, B., McCarthy, K., Shafer, J., & Smith, G. (2018). Measuring successful disaster recovery. *International Journal of Mass Emergencies and Disasters*, 36(1), 1-22.
- b. Kirsch, K., & Horney, J. (2017). Steps toward recovery: A tool for disaster recovery planning, management, and tracking. *Carolina Planning Journal*, 42, 104-109.
- c. Horney, J., Dwyer, C., Aminto, M., Berke, P., & Smith, G. (2017). Developing indicators to measure post-disaster community recovery in the United States. *Disasters*, 41, 124-149. DOI: 10.1111/disa.12190

9. Tables:

**Table 1: Documenting CRC Research Project Product Delivery**

<b>Product Name</b>	<b>Product Type</b> (e.g., software, guidance document)	<b>Delivery Date</b>	<b>Recipient or End User</b>
Are slow-onset disasters well represented in hazard mitigation plans?	Poster Presentation	July 2018	43rd Annual Natural Hazards Research and Applications Workshop, Broomfield, CO
Disaster preparedness and public health challenges	Panel Presentation	December 2017	National Institutes of Environmental Health Sciences Superfund Research Program Annual Meeting, Philadelphia, PA
Training Module	Guidance Document	June 2017	Local government officials, city and county planners, and other community stakeholders or web users
User Guide	Guidance Document	June 2017	Local government officials, city and county planners, and other community stakeholders or web users
Draft TEEEX Disaster Recovery Tracking Tool Course	Course Document	June 2017	Local government officials, city and county planners, and other community stakeholders
Trackyourrecovery.org	Conference DEMO Session	April 2016	Various; 67 attendees from federal, state, and local  NACCHO Public Health Preparedness Summit, Dallas, TX
Measuring successful disaster recovery: A case study of six communities in Texas, United States.	Oral Presentation	April 2016	Texas Public Health Association's 92nd Annual Education Conference, Galveston, TX
Measuring successful disaster recovery: A	Poster Presentation	April 2016	11 <sup>th</sup> Annual Dr. Jean Brender Delta Omega Research Symposium and Student Poster Contest, Texas

case study of six communities in Texas.			A&M University School of Public Health, College Station, TX
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**Table 2A: Documenting External Funding**

Title	PI	Total Amount	Source
NA			

**Table 2B: Documenting Leveraged Support**

Description	Estimated Total Value
NA	



**Table 3: Performance Metrics:****HORNEY – PERFORMANCE METRICS**

<b>Metric</b>	<b>Year 1 (1/1/16)</b>	<b>Year 2 (7/1/16)</b>	<b>Year 3 (7/1/17- 6/30/18)</b>
HS-related internships (number)	0	0	0
Undergraduates provided tuition/fee support (number)	0	0	0
Undergraduate students provided stipends (number)	0	0	0
Graduate students provided tuition/fee support (number)	0	1	0
Graduate students provided stipends (number)	1	1	0
Undergraduates who received HS-related degrees (number)	0	0	0
Graduate students who received HS-related degrees (number)	0	1	0
Graduates who obtained HS-related employment (number)	1	0	0
SUMREX program students hosted (number)	0	0	0
Lectures/presentations/seminars at Center partners (number)	0	0	0
DHS MSI Summer Research Teams hosted (number)	0	0	0
Journal articles submitted (number)	1	1	1
Journal articles published (number)	1	1	1
Conference presentations made (number)	3	0	2
Other presentations, interviews, etc. (number)	4	7	3
Patent applications filed (number)	0	0	0
Patents awarded (number)	0	0	0
Trademarks/copyrights filed (number)	0	0	0
Requests for assistance/advice from DHS agencies (number)	1	3	2
Requests for assistance/advice from other agencies or governments	3	2	2
Total milestones for reporting period (number)	3		
Accomplished fully (number)	3		
Accomplished partially (number)	0		
Not accomplished (number)	0		

10. Year 3 Research Activity and Milestone Achievement:

**Research Activities and Milestones: Final Status as of 2018  
Reporting Period 7/1/2017 – 6/30/2018**

<b>Research Activities</b>	Proposed Completion Date	% Completed	Explanation of why activity/ milestone was not reached
Track reach of website, marketing materials, requests for information, usage of tool	12/31/17	100%	
<b>Research Milestones</b>			
Final marketing materials, training module, and user guide	8/31/17	100%	

11. Year 3 Transition Activity and Milestone Status:

**Transition Activities and Milestones: Final Status as of 2018  
Reporting Period 7/1/2017 – 6/30/2018**

<b>Transition Activities</b>	Proposed completion date	% completed	Explanation of why activity / milestone was not reached
Track reach of website, marketing materials, requests for information, usage of training, user guide and tool	12/31/2017	100%	
<b>Transition Milestones</b>			
Post final marketing, training, and user guide materials online	6/30/17	100%	
Release of updated version of the Disaster Recovery Tracking Tool website	12/31/17	100%	