The National Academies of
SCIENCES
ENGINEERING
MEDICINE

GULF RESEARCH PROGRAM

Project Title: Community Cohesion and Recovery after the Deepwater Horizon Oil Spill
Award Amount: $590,462
Awardee: University of Kansas
Award Start Date: 12/01/2016
Award End Date: 05/31/2019
NAS Grant ID: 2000007629

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Project Key Personnel:
- Larry Crowder, Stanford
- Jacob Model, Stanford
- Kristi Lewis, George Mason University

I.   PROJECT SUMMARY (from proposal)

This project brings together data, methods, and concepts from different disciplines inclusive of geography, marine ecology, and management and sectors such as oil, fisheries, tourism and nonprofits to address the Coastal Communities theme. The proposed research uses environmental data in combination with community-level social and economic data to generate novel insights on community impact from a major disruption, the Deepwater Horizon oil spill. It examines the ways in which community cohesion - a community's capacity to self-organize and mobilize - reduces negative impact and improves recovery of coastal communities in Louisiana. Project objectives include 1) an investigation of the social-ecological drivers of community response and recovery; 2) an examination of the role of nonprofits in mobilizing community responses to the spill; and 3) an assessment of nonprofit networks in enhancing community cohesion after the spill.

This project provides an innovative data synthesis by coupling 1) exploratory data analysis using multidimensional scaling plot, canonical analysis of principal coordinates, and geovisualization; and 2) hypothesis testing regarding the role of nonprofits in community cohesion. The anticipated results and impacts of the proposed project include an integrate database (Community Response Inventory), predictive models on community responses to disruptions from oil and gas operations, assessments of nonprofit networks and community cohesion, and intervention strategies targeted at communities with lower levels of nonprofit networks and cohesion. It fills an important gap in social capital and community resilience literature by bringing attention to organizations and nonprofits, and helps develop community skills to mobilize and coordinate.

II.   PROJECT SUMMARY (from final report)

The project's aim was to examine community recovery from extreme events in the Gulf by synthesizing multiple secondary data that had not been put together before.

The project combined social and ecological data, employing 70 variables in total that required data cleaning, processing, and alignment at the zip code level. Machine learning and principle component analytic tools were used. Harvey-relevant Tweeter dataset was also used to articulate the reasons and processes of 'almost fake news.' Lastly, big data from mobile phone apps that identified geocoded check-ins of smart phones in milliseconds is a novel dataset we acquired from a company. We used a variety of methods to illustrate human mobility patterns during and after Hurricane Harvey and assessed predictability of mobility patterns using hidden Markov Model.

Project results include:
1) visualization of social-ecological data by zip code in Louisiana affected by the Deepwater Horizon oil spill;
2) academic papers that illustrate novel findings such as cohesion's dark side in recovery from the spill, attention to contentious and ambiguous tweets during Harvey, and detailed/changed mobility patterns regarding Harvey; and
3) outreach activities including a workshop, presentations, and dissemination via the project website.

The significance of the project is twofold. One is advancing research in data synthesis in the Gulf. In particular, computational analysis using previously unknown large datasets contributes to understanding the same problem in a different way and generating a new perspective. The other is the provision of detailed and finer-scale information at the individual, neighborhood, and zip code levels that were not available before. They are useful to people and policymakers who can formulate specific policies and prepare for themselves against adverse events in the Gulf. You can also refer to this response for benefits of project outcomes.

III.   PROJECT RESULTS

Accomplishments
Problem: How do communities and individual respond/recover after extreme events in the Gulf? How can they do better?
To address the problem: Two cases were selected - Deepwater Horizon oil spill and Hurricane Harvey - to examine 1) community recovery using integrated social-ecological data and individual surveys in the case of the Deepwater Horizon oil spill and 2) individual/community responses using Tweeter dataset as well as smart phone apps to document people's discourse and mobility patterns after Harvey.

Results:
1) Community cohesion can hinder external search for help and information, and thereby undermine recovery effectiveness.
2) The government and reporters play an important role in stemming the spread of contentious or false information.
3) Debunking specific tweets works to a greater extent than vague or more general responses containing confusing or misinformed elements in the tweets.
4) People's mobility patterns changed during the hurricane. This is the first time thousands of individual movements have been documented in the height of a hurricane.

Implications
1) Implications for us: Our findings are novel, data new, and data integration unique. They help advance our fields and garner opportunities for interdisciplinary research. The use of new methodologies to solve the problems of the Gulf and elsewhere can also lead to new collaborations and funding.
2) Implications for others: As the findings/data/data synthesis are novel, we hope to have a high impact in the field in terms of providing alternative perspectives and new methods to study the same phenomena.
3) Implications for society: Our results provide fine-grained information that policymakers and the public can apply more concisely and tailor to specific needs because the information is more detailed with higher spatial and temporal resolutions.

Unexpected Results
N/A

Project Relevance
The following audiences would be most interested in the results of this project:
- Researchers
- Community Leaders
- Local Government Officials
- State Government Officials
- Non-Profit Private Sector

They provide fine-grained information that were not identifiable before to guide the public and policymakers. The local governments can use it to design customized solutions by neighborhood or even at the level of an individual to prepare for adverse events in the Gulf. The state governments can put more efforts to align their responses with the local government based on the findings. The nongovernmental organizations can identify specific locations where they can set up assistance of varying kinds.

Education and Training
Number of students, postdoctoral scholars, or educational components involved in the project:
- Undergraduate students: 3
- Graduate students: 2
- Postdoctoral scholars: 3
- Other educational components: 1

Other education components is a workshop in New Orleans.

IV.   DATA AND INFORMATION PRODUCTS
This project produced data and information products of the following types:
- Data
- Information Products
- Scholarly publications, reports or monographs, workshop summaries or conference proceedings

- Websites or data portals

DATA

Data Management Report:
See attached Data Management Report.

Relationships Between Data Sets:
1) Social-ecological data integration: The integrated dataset comes from multiple data listed in the data table. They are integrated at the zip code level and visualized in the data map you see in the project website. The data is downloadable if you click on a location on the map.
2) Tweets data integration: Fake or controversial tweets with respect to Hurricane Harvey are integrated by topic. Three topics – evacuation, immigration, and donation are uploaded to the project website.
3) Human mobility data integration: Individual visit data by hour to commercial locations before/during/after Hurricane Harvey in Houston are identified and integrated by zip code, flood level, most visited location, and travel distance. Because this dataset is not open access, the data are not uploaded to the project website.

Additional Documentation Produced to Describe Data:
N/A

Other Activities to Make Data Discoverable:
Built a project website with links to data through a data map and actual downloadable data files. Sent the project website to relevant stakeholders and parties interested in this type of work.

Sensitive, Confidential, or Proprietary Data:
Yes. We added a new dataset from a company called Place IQ, and have gone through the IRB process. Because it caused low risk, it was exempt. However, they are not to be open access because the data are geocoded in spite of the fact that they are anonymized.

INFORMATION PRODUCTS

Information Products Report:
See attached Information Products Report.

Citations for Project Publications, Reports and Monographs, and Workshop and Conference Proceedings:

Peer-Reviewed Publications
- Cheong, S., Qu, S. and Holme, P. Sensing changed human mobility. IEEE Access in prep
- Cheong, S. and Assenova, V. Cohesion and recovery after disasters: Evidence from the Deepwater Horizon Oil Spill. Environmental Research Letter. - In review

- Cheong, S, and Babcock, M. Attention to misleading and contentious tweets in the case of Hurricane Harvey. Information, Communication, and Society. - In review

Workshop summary
Community-level social-ecological data and recovery after the Deepwater Horizon oil spill (April 2018)

Websites and Data Portals:

http://cheonglab.com/gulf-projects/

Data map of social-ecological data in Louisiana re: DWH spill - It takes several minutes to upload because of the data size (http://cheonglab.com/deepwater-horizon-oil-spill-and-recovery/)

The project will be maintained for two years with open access data. After two years, we will archive the data in the PI's website.

Additional Documentation Produced to Describe Information Products:
N/A

Other Activities to Make Information Products Accessible and Discoverable:
We have disseminated information through a workshop and conference presentations. Stakeholders also have access to the website with all the project-relevant descriptions and data. We use the Kinder Institutes at Rice University and a community leader/SSPEED Center director, Jim Blackburn's listserv to disseminate to nonprofits, local governments, and neighborhood groups.

Confidential, Proprietary, Specially Licensed Information Products:
N/A

V. PUBLIC INTEREST AND COMMUNICATIONS

Most Unique or Innovative Aspect of the Project
The most unique/innovative aspect of the project is using novel datasets to generate detailed and fine-grained information and findings.

Most Exciting or Surprising Thing Learned During the Project
The most exciting thing I've learned is the immense possibility of synthesizing different data sources. The synthesis enables the generation of detailed and specific information at a higher spatial resolution that we have not seen previously.

Most Important Outcome or Benefit of Project
The most important outcome/benefit of the project is a set of new findings that help policymakers, nonprofits, and the public address cohesion and recovery, treatment of false or controversial news on social media, and identification of suitable locations for supplies, aids, and evacuation.

Urbanization, globalization, and climate change contribute to raising the frequency and intensity of disasters. Effective community recovery after disasters, therefore, has become more critical than ever. The effectiveness of recovery hinges on access and use of provided resources including information in a timely and satisfactory manner. Based on the recovery and Deepwater Horizon oil spill study, without the ability to conduct external search for help and information, community cohesion can undermine recovery effectiveness. This means that community cohesion alone is not sufficient for a good recovery. Communities open to external input are as important. This needs to be considered when the government and nonprofits formulate and implement disaster recovery programs.

Project findings also focus on strategies for who instead of what policy should be implemented. Identifying key users that can stem the spread of fake and ambiguous tweets during and after Hurricane Harvey is a good example. We were able to identify key types of users to help debunk and stem the spread of misinformation. They originated stories that referenced government actions or, in the case of reporters, directly retweeted government originated tweets. Their performance will improve if different government agencies coordinate better to correct 'specific' misinformation.

To minimize loss of life and property, the ability and capacity to prevent and respond in a timely and effective manner has always been a central issue. The government faces the challenge of coordinating well responses such as evacuations and provision of supplies. To be effective, responders must be able to identify people including evacuees' locations in real-time and predict their future movements. Results on changed mobility patterns during and after Hurricane Harvey provide useful information such as the stores individuals visit, the time of visits, travel distances, and prediction of people's movement during a disaster. They allow for effective prevention and response. Policymakers can determine the most popular path of travel, control better traffic flow and predict where more assistance would be needed. Information on population distribution before and after a disaster can also be valuable when assessing exposure risk.

Communications, Outreach, and Dissemination Activities of Project
http://cheonglab.com/gulf-projects/

Data Report

DataType	DigitalResourceType	Title	FileName	Creators	PointofContact	PublicationYear	RepositoryName	DOIorPersistentURL	Keywords	Publications	Ranges between 0 and 1 per community (lower values are more egalitarian)
						2015					
Social/Cultural	Tabular/Spreadsheet	Gini coefficient of income	ASC2010databyzip.csv	ACS	Model, Jacob		US Census Bureau	https://www.census.gov/programs-surveys/acs/	Gini coefficient of income		
Social/Cultural	Tabular/Spreadsheet	# of people on some form of public assistance	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	Public assistance		Per capita
Social/Cultural	Tabular/Spreadsheet	# of people with < HS degree	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	high school degree		Per capita
Social/Cultural	Tabular/Spreadsheet	# of people with HS degree	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	high school degree		Per capita
Social/Cultural	Tabular/Spreadsheet	# of people with some college or associate's degree	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	collage degree, associate degree		Per capita
Social/Cultural	Tabular/Spreadsheet	# of people with a 4-year college degree	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	4-year collage degree		Per capita
Social/Cultural	Tabular/Spreadsheet	# of people with a Master's degree, Professional Degree, or Doctorate	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	Master's degree, Professional degree, Doctorate degree, Graduate degree		Per capita
Social/Cultural	Tabular/Spreadsheet	# of households with household Income < $25K	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	household income		Per household
Social/Cultural	Tabular/Spreadsheet	# of households with household Income $25K-$40K	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	household income		Per household
Social/Cultural	Tabular/Spreadsheet	# of households with household Income $40K-$60K	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	household income		Per household
Social/Cultural	Tabular/Spreadsheet	# of households with household Income $60K-$100K	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	household income		Per household
Social/Cultural	Tabular/Spreadsheet	# of households with household Income over $100K	ASC2010databyzip.csv	ASC	Model, Jacob	2015	US Census Bureau	https://www.census.gov/programs-surveys/acs/	household income		Per household
Social/Cultural	Tabular/Spreadsheet	# of nonprofit organizations	bmfNonprofitsByZip.csv	National Center for Charitable Statistics at the Urban Institute Business Master File	Model, Jacob	2008	National Center of Charitable Statistics	http://nccs-data.urban.org/data.php?ds=bmf	NPO		Per capita
Social/Cultural	Tabular/Spreadsheet	# of businesses	cbpBusinessByZip.csv	CBP	Model, Jacob	2010	US Census Bureau	https://www.census.gov/programs-surveys/cbp/data.html	bussiness		Per capita
Social/Cultural	Tabular/Spreadsheet	# of oil-related businesses	cbpBusinessByZip.csv	CBP	Model, Jacob	2010	US Census Bureau	https://www.census.gov/programs-surveys/cbp/data.html	oil, oil related business, business		Per capita
Social/Cultural	Tabular/Spreadsheet	# of fishing related businesses	cbpBusinessByZip.csv	CBP	Model, Jacob	2010	US Census Bureau	https://www.census.gov/programs-surveys/cbp/data.html	fishing, fishing-related business, business		Per capita
Social/Cultural	Tabular/Spreadsheet	# of tourism related businesses	cbpBusinessByZip.csv	CBP	Model, Jacob	2010	US Census Bureau	https://www.census.gov/programs-surveys/cbp/data.html	tourism, tourism-related business, business		Per capita
Social/Cultural	Tabular/Spreadsheet	# of social clubs/orgs	cbpBusinessByZip.csv	CBP	Model, Jacob	2010	US Census Bureau	https://www.census.gov/programs-surveys/cbp/data.html	social clubs, social organization		Per capita
Social/Cultural	Tabular/Spreadsheet	# of religious establishments	cbpBusinessByZip.csv	CBP	Model, Jacob	2010	US Census Bureau	https://www.census.gov/programs-surveys/cbp/data.html	religious establishment, religious		Per capita
Social/Cultural	Tabular/Spreadsheet	# of political establishments	cbpBusinessByZip.csv	CBP	Model, Jacob	2010	US Census Bureau	https://www.census.gov/programs-surveys/cbp/data.html	political establishment, political		Per capita

Social/Cultural	Tabular/Spreadsheet	# of housing units	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	housing units	Per capita
Social/Cultural	Tabular/Spreadsheet	# of people	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	people, population	Total amount (Untransformed)
Social/Cultural	Tabular/Spreadsheet	% of housing units owned	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	owned house	Percent
Social/Cultural	Tabular/Spreadsheet	% of housing units that are rentals	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	rental house	Percent
Social/Cultural	Tabular/Spreadsheet	% of housing units that are vacant	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	vacant house	Percent
Social/Cultural	Tabular/Spreadsheet	% population female	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	female population	Percent
Social/Cultural	Tabular/Spreadsheet	% population white	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	white population, white	Percent
Social/Cultural	Tabular/Spreadsheet	% population black	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	black population, black	Percent
Social/Cultural	Tabular/Spreadsheet	% population native american	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	native american population, native american	Percent
Social/Cultural	Tabular/Spreadsheet	% population asian	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	asian population, asian	Percent
Social/Cultural	Tabular/Spreadsheet	% population other race	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	other race population, other race	Percent
Social/Cultural	Tabular/Spreadsheet	% population identifing as hispanic	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	identifing, identifing-as hispanic, hispanic	Percent
Social/Cultural	Tabular/Spreadsheet	Herfinal index of diversity of race	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	racial diversity	Index ranges from 0 to 1 with lower numbers being more diverse
Social/Cultural	Tabular/Spreadsheet	# of people under 18 yrs old	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	age, population	Per capita
Social/Cultural	Tabular/Spreadsheet	# of people 18-24 yrs old	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	age, population	Per capita
Social/Cultural	Tabular/Spreadsheet	# of people under 25-44 yrs old	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	age, population	Per capita
Social/Cultural	Tabular/Spreadsheet	# of people under 45-64 yrs old	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	age, population	Per capita
Social/Cultural	Tabular/Spreadsheet	# of people under 65+ yrs old	census2010databyzip.csv	Decennial Census	Model, Jacob	2010	US Census Bureau	https://api.census.gov/data/2010.html	age, population	Per capita
Social/Cultural	Tabular/Spreadsheet	total land area in zip (in sq miles)	pdbZip.csv	Census Planning Database	Model, Jacob	2015	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	land, zipcode	Total area (Untransformed)
Social/Cultural	Tabular/Spreadsheet	Population living in a densely settled area containing 2,500 to 49,999 people	pdbZip.csv	Census Planning Database	Model, Jacob	2015	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	population density, area	Per capita
Social/Cultural	Tabular/Spreadsheet	Rural population	pdbZip.csv	Census Planning Database	Model, Jacob	2015	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	rural population	Per capita
Social/Cultural	Tabular/Spreadsheet	Number of addresses in a 2010 Census mailback area that were confirmed as vacant housing units (Mailout/Mailback and Update/Leave areas)	pdbZip.csv	Census Planning Database	Model, Jacob	2015	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	vacant house	Per household
Social/Cultural	Tabular/Spreadsheet	Number of addresses in a 2010 Census mailback area deleted because it was determined to not correspond to a valid housing unit (Mailout/Mailback and Update/Leave areas)	pdbZip.csv	Census Planning Database	Model, Jacob	2015	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	deleted census, census	Per household

Social/Cultural	Tabular/Spreadsheet	Number of addresses in a 2010 Census Mailout/Mailback area where the initial mail form was returned to the Census with the postal code "Undeliverable as Addressed"	pdbZip.csv	Census Planning Database	2015	Model, Jacob	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	returned, returned censes, census		Per household
Social/Cultural	Tabular/Spreadsheet	Number of housing units that returned initial form in 2010 Census	pdbZip.csv	Census Planning Database	2015	Model, Jacob	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	returned, returned censes, census		Per household
Social/Cultural	Tabular/Spreadsheet	Number of housing units that returned replacement form in 2010 Census	pdbZip.csv	Census Planning Database	2015	Model, Jacob	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	returned, returned censes, census		Per household
Social/Cultural	Tabular/Spreadsheet	2010 Census Mail Return Rate	pdbZip.csv	Census Planning Database	2015	Model, Jacob	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	returned, returned censes, census	doi: 10.1162/003465304323023822	Percent
Social/Cultural	Tabular/Spreadsheet	Prediction of low census mail return rate	pdbZip.csv	Census Planning Database	2015	Model, Jacob	US Census Bureau	https://www.census.gov/research/data/planning_database/2015/	returned, returned censes, census		Untransformed (Score ranges from 0 to 100)
Social/Cultural	Tabular/Spreadsheet	# of donations to national political candidates	politicalDonationsByZip2006.csv	Stanford DIME database	2006	Model, Jacob	US Census Bureau	https://data.stanford.edu/dime	donation, political		Per capita
Social/Cultural	Tabular/Spreadsheet	amount of money donated to national political candiates	politicalDonationsByZip2006.csv	Stanford DIME database	2006	Model, Jacob	US Census Bureau	https://data.stanford.edu/dime	donation, political		Per capita
Social/Cultural	Tabular/Spreadsheet	# of donations to national political candidates	politicalDonationsByZip2008.csv	Stanford DIME database	2008	Model, Jacob	US Census Bureau	https://data.stanford.edu/dime	donation, political		Per capita
Social/Cultural	Tabular/Spreadsheet	amount of money donated to national political candiates	politicalDonationsByZip2008.csv	Stanford DIME database	2008	Model, Jacob	US Census Bureau	https://data.stanford.edu/dime	donation, political		Per capita
Social/Cultural	Tabular/Spreadsheet	# of donations to national political candidates	politicalDonationsByZip2010.csv	Stanford DIME database	2010	Model, Jacob	US Census Bureau	https://data.stanford.edu/dime	donation, political		Per capita
Social/Cultural	Tabular/Spreadsheet	amount of money donated to national political candiates	politicalDonationsByZip2010.csv	Stanford DIME database	2010	Model, Jacob	US Census Bureau	https://data.stanford.edu/dime	donation, political		Per capita
Social/Cultural	Tabular/Spreadsheet	minimum subsidence rate by zipcode mm/yr	SubsidenceByZip_Lei_25June2017.csv	Lei et al. 2015	2016	Lei Zou			subsidence rate	Lei Zou et al., Evaluating Land Subsidence Rates and Their Implications for Land Loss in the Lower Mississippi River Basin, 8 Water 10 (2015)	Multiplied by negative 1 so that higher numbers mean more subsidence
Social/Cultural	Tabular/Spreadsheet	maximum subsidence rate by zipcode mm/yr	SubsidenceByZip_Lei_25June2017.csv	Lei et al. 2015	2016	Lei Zou			subsidence rate	Lei Zou et al., Evaluating Land Subsidence Rates and Their Implications for Land Loss in the Lower Mississippi River Basin, 8 Water 10 (2015)	Multiplied by negative 1 so that higher numbers mean more subsidence
Social/Cultural	Tabular/Spreadsheet	range between min and max values of subsidence rate by zipcode mm/yr	SubsidenceByZip_Lei_25June2017.csv	Lei et al. 2015	2016	Lei Zou			subsidence rate	Lei Zou et al., Evaluating Land Subsidence Rates and Their Implications for Land Loss in the Lower Mississippi River Basin, 8 Water 10 (2015)	Untransformed (Score ranges from 0 to 100)
Social/Cultural	Tabular/Spreadsheet	average subsidence rate by zipcode mm/yr	SubsidenceByZip_Lei_25June2017.csv	Lei et al. 2015	2016	Lei Zou			subsidence rate	Lei Zou et al., Evaluating Land Subsidence Rates and Their Implications for Land Loss in the Lower Mississippi River Basin, 8 Water 10 (2015)	Multiplied by negative 1 so that higher numbers mean more subsidence

Discipline	Type	Description	Filename	Source	Creator	Year	Status	URL	Keyword	Citation	Transformation
Social/Cultural	Tabular/Spreadsheet	summed subsidence rates by zipcode mm/yr	SubsidenceByZip_Lei_25June2017.csv	Lei et al. 2015	**Lei Zou**	2016			subsidence rate	Lei Zou et al., Evaluating Land Subsidence Rates and Their Implications for Land Loss in the Lower Mississippi River Basin, 8 Water 10 (2015)	Multiplied by negative 1 so that higher numbers mean more subsidence
Social/Cultural	Tabular/Spreadsheet	Thousands of dollars of landings in Louisiana from 1993 - 2009	FishUsBeforeZipDollars.csv	Fisheries of the United States		2015	published	https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus15/documents/FUS2015.pdf	landing		Untransformed
Social/Cultural	Tabular/Spreadsheet	Millions of pounds of landings in Louisiana from 1993 - 2009	FishUsBeforeZipLBS.csv	Fisheries of the United States		2015	published	https://www.st.nmfs.noaa.gov/Assets/commercial/fus/fus15/documents/FUS2015.pdf	landing		Untransformed
Earth and Environmental Sciences	Tabular/Spreadsheet	NOAA recorded oil, gas, chemical spills recorded from 1957 - 2009, count over time period	NOAASpillCountByYear.csv	NOAA		2017	public	https://incidentnews.noaa.gov/	oil spills, gas spills, chemical spills	Emergency Response Division, Office of Response and Restoration, National Ocean Service, National Oceanic and Atmospheric Administration (USA). 2017. NOAA Incident News.	Untransformed
Earth and Environmental Sciences	Tabular/Spreadsheet	NOAA recorded oil, gas, chemical spills recorded from 1957 - 2009, max gallons released over time period	NOAASpillGalByYear.csv	NOAA		2017	public	https://incidentnews.noaa.gov/	oil spills, gas spills, chemical spills	Emergency Response Division, Office of Response and Restoration, National Ocean Service, National Oceanic and Atmospheric Administration (USA). 2017. NOAA Incident News.	Untransformed
Geospatial	Tabular/Spreadsheet	Total acres of oyster leases by zip code from a 2010 GIS map	OysterLeaseAcres_2010data.csv	LDWF	Marc Maniscalco	2010		Louisiana Department of Wildlife and Fisheries	oyster lease		Untransformed
Ecological/Biological	Tabular/Spreadsheet	Total number of archelogical sites by zipcode, if not in zipcode, then nearest zipcode used	archsitesbyzipcode.csv	NOAA ESI			public	https://response.restoration.noaa.gov/maps-and-spatial-data/environmental-sensitivity-index-esi-maps.html	archelogical site		Untransformed
Ecological/Biological	Tabular/Spreadsheet	Total number of bird nesting sites by zipcode, if not in zipcode, then nearest zipcode used	birdnestingbyzipcode.csv	NOAA ESI			public	https://response.restoration.noaa.gov/maps-and-spatial-data/environmental-sensitivity-index-esi-maps.html	bird nesting		Untransformed
Earth and Environmental Sciences	Tabular/Spreadsheet	Total number of oil platforms found wtihin 10 miles of a zipcode	oilplatformsbyzipcode.csv	NOAA ESI			public	https://response.restoration.noaa.gov/maps-and-spatial-data/environmental-sensitivity-index-esi-maps.html	oil platform, oil		Untransformed
Earth and Environmental Sciences	Tabular/Spreadsheet	Total number of CRMS sites by zipcode or nearest zipcode (Coastal Monitoring stations)	CRMSmonitoringbyzipcode.csv	CPRA		2017	puiblic	https://www.lacoast.gov/crms2/home.aspx https://www.lacoast.gov/crms_viewer2/Default.aspx	Wetland, coastal monitoring data	Coastal Protection and Restoration Authority (CPRA) of Louisiana. 2017. Coastwide Reference Monitoring System-Wetlands Monitoring Data. Retrieved from Coastal Information Management System (CIMS) database. http://cims.coastal.louisiana.gov.	Untransformed
ecological/Biological	Tabular/Spreadsheet	All recreational fishing licenses from 2004 - 2009 summed by parish and then assigned to zip code	summary_rec_license_before2010_for_merge.csv	LDWF		pre-2010	public	Louisiana Department of Wildlife and Fisheries http://www.wlf.louisiana.gov/licenses/statistics	fishing license		Untransformed

ecological/Biological	Tabular/Spreadsheet	All commercial fishing licenses from 2004 - 2009 summed by parish and then assigned to zip code	summary_com_license_before2010_for_merge.csv	LDWF	public	pre-2010	Louisiana Department of Wildlife and Fisheries	http://www.wlf.louisiana.gov/licenses/statistics	fishing license		Untransformed
Social/Cultural	Tabular/Spreadsheet	2012 Master Plan Comments	gcmp2012comments.csv	Santana, Francisca; Model, Jacob	Model, Jacob	2012	Louisiana Coastal Protection and Restoration Authority	http://sonris-www.dnr.state.la.us/dnrservices/redirectUrl.jsp?dID=4379731	comments, master plan, coast	Louisiana's 2012 Comprehensive Master Plan for a Sustainable Coast	Untransformed
Social/Cultural	Tabular/Spreadsheet	2007 Master Plan Comments	gcmp2007comments.csv	Santana, Francisca; Model, Jacob	Model, Jacob	2007	Louisiana Coastal Protection and Restoration Authority	http://sonris-www.dnr.state.la.us/dnrservices/redirectUrl.jsp?dID=4063376	comments, master plan, coast	Louisiana's 2007 Comprehensive Master Plan for a Sustainable Coast	Untransformed
Social/Cultural	Tabular/Spreadsheet	NRDA Proposed Project Submissions	NRDA_ProposedPrjZipcode.csv	NRDA	Lewis, Kristy	2016	Deepwater Horizon Natural Resource Damage Assessment Trustees Gulf Spill Restoration	http://www.gulfspillrestoration.noaa.gov/restoration/give-us-your-ideas/view-submitted-projects	projects, restortation, gulf, spill		Untransformed
Social/Cultural	Tabular/Spreadsheet	CPRA Restoration Projects (2010 and beyond)	RestProjects_after2009_by_zip.csv	Louisiana Coastal Protection and Restoration Authority	Lewis, Kristy	2016		NA	coastal master plan		
Social/Cultural	Tabular/Spreadsheet	CPRA Restoration Projects pre 2010)	RestProjects_before2010_by_zip.csv	Louisiana Coastal Protection and Restoration Authority	Lewis, Kristy	2016	CPRA-Dave Lindquist	NA	coastal master plan		

InfoProductType	DigitalResourceType	Title	FileName	Creators	PublicationYear	Publisher	RepositoryName	DOIorPersistentURL	DatasetReference
InfoProductType	*Software and Source Code*	*Gravity Simulations*	*AppleFalling.gravsim*	*Galieli, Galileo; Newton, Isaac*	*1701*	*Royal Society*	*Really Big Digital Repository for Models and Simulations*	*doi: 10.1000/grav.2000*	*doi: 10.1000/grav.1000, http://www.nodc.noaa.gov/cgi-bin/OAS/prd/accession/details/ 000000*
Scholarly Publication	Text	social-ecological drivers of community response	NAS_ERL final	Cheong, Model, Lewis, Santana, and Crowder	under review	Environmental Research Letters	N/A	n/A	n/a

InfoProductType	DigitalResourceType	Title	FileName	Creators	PublicationYear	Publisher	RepositoryName	DOIorPersistentURL	DatasetReference
InfoProductType						*Royal Society*	*Really Big Digital Repository for Models and Simulations*	*doi: 10.1000/grav.2000*	*doi: 10.1000/grav.1000, http://www.nodc.noaa.gov/cgi-bin/OAS/prd/accession/details/ 000000*