

**KEIM, LSU
DHS COASTAL RESILIENCE CENTER
RESEARCH PROJECT
YEAR 3 PERFORMANCE REPORT
AND
FINAL PROJECT REPORT**

Project Title: Disaster Science and Management Program at Louisiana State University (LSU)

Principal Investigator Name/Institution: Barry D. Keim, Professor in the Department of Geography and Anthropology, Louisiana State Climatologist, Principal Investigator of the Southern Climate Impacts Planning Program (SCIPP) at LSU.

Other Partners/Institutions: NOAA's Southern Climate Impacts Planning Program (SCIPP)

Project Start and End Dates: January 1, 2016–June 30, 2018

Short Project Description (“elevator speech”):

The Disaster Science and Management (DSM) Program at LSU is designed to train the next generation of Homeland Security Enterprise professionals. Students in the program gain knowledge and skills to address issues of natural coastal disasters and to build resilience to these disasters.

PROJECT NARRATIVE:

1. Introduction and project overview:

Louisiana has been heavily impacted by natural disasters in recent years, including the landfalling Hurricanes Katrina and Rita in 2005. These high profile hurricanes are in addition to other recent hurricanes (i.e., Hurricanes Ike 2008, Gustav 2008, and Isaac 2012). In addition, Louisiana was one of several states that was severely impacted by the Deepwater Horizon Oil Spill, adding a significant non-natural disaster to the list. The need and justification for a Disaster Science and Management (DSM) Program at Louisiana State University that focuses on coastal hazards and resilience is therefore unequivocal. The DSM program at LSU is training the next generation of Homeland Security Enterprise (HSE) professionals that will be able to respond to emergencies, work with partners at all levels of government, and ensure a swift and efficient recovery.

2. Project History:

The DSM program at LSU was founded in 2002 as a freestanding minor within the College of Humanities and Social Sciences, with a major in DSM added in 2007. However, the program lacked an official affiliation with an academic department and underwent several leadership transitions during this time, which led to instability of the program. In Year 1 of this CRC funded project, the DSM program was formally integrated into the Department of Geography and Anthropology, with students able to major in Geography (B.A. or B.S) with a concentration in

DSM or minor in DSM. Existing introductory level courses in hazards and emergency management plus several upper division courses under the previous DSM program were offered to students during Year 1.

Having integrated the program within the Geography degree program in Year 1, the focus of Year 2 was to revise the introductory courses, develop a new upper-division course in Hazard Risk Reduction, and grow enrollment in the program. The recruitment efforts were successful, with DSM course enrollment increasing by 31% in Year 2 as compared to Year 1. Three students who had been DSM minors under the previous program changed their majors to Geography with a concentration in DSM during year two, becoming the first cohort of students to enroll in the major.

Year 3 continued the success of Year 2. Overall course enrollment grew by 75% in Year 3 over Year 2 numbers, with over 500 students enrolled in DSM courses during the 2017–2018 academic year. An additional nine students became majors in Geography with a concentration in DSM, and seven students joined the DSM minor program. Finally, six students graduated with majors in Geography and the DSM concentration, with an additional six receiving a minor in DSM. Most of these students joined the DSM program due to recruiting efforts in Years 2 and 3 when they discovered they were one or two classes away from receiving the concentration or minor. Conversations with these students revealed that the additional skills gained in the concentration or minor greatly improved their job prospects and put them on a career path that gives them the opportunity to help their community. At the end of Year 3, we have 14 students majoring in Geography with a concentration in DSM and an additional 6 students minoring in DSM.

Throughout the project, end users were engaged by hosting DSM students as interns and by hiring DSM program graduates. The major obstacle during the three years of the program was translating our success at LSU to a proposed “feeder” program at Baton Rouge Community College. Despite some buy-in from the BRCC administration, the effort was unsuccessful due to low enrollment in the courses BRCC offered and staff turnover.

3. Results:

The major result of the three-year project was the development of a DSM program that is fully integrated within the Department of Geography & Anthropology at LSU. Students majoring in Geography with a concentration in DSM now make up approximately 25% of undergraduate Geography majors. Course development was a major aspect of the project. The core courses within the concentration and minor were either developed or completely revised during the course of the project.

4. Students:

The DSM program at LSU is focused on undergraduate education. During the course of the project, six students graduated from the DSM program developed under this grant with a major in Geography and a concentration in DSM, and six students earned a minor in DSM.

Approximately half of the graduates from this year are employed or seeking employment in the HSE, with the rest seeking employment in careers related to their major.

5. Institutionalization:

The DSM project at LSU is already a major component of the Department of Geography & Anthropology. The project will be supported in the future by resources provided by the Department of Geography & Anthropology and College of Humanities and Social Sciences at LSU. Dr. Barry Keim will continue to coordinate DSM activities.

6. Interactions with research projects:

The interaction between the DSM Program at LSU and the CRC research programs was excellent. Two students participated in the CRC SUMREX program. Dr. Don Resio at the University of North Florida hosted Rudy Bartels, Ph.D. candidate and DSM instructor during Year 1. They collaborated on research projects involving rainfall across the United States. Stephen Kreller, M.S. student at LSU was hosted by Dr. Brian Blanton at RENCI at UNC-Chapel Hill to work on a project focused on ADCIRC storm surge modeling during Year 2.

Other interactions include:

Dr. Barry Keim presented to 9 delegates from Brazilian environmental agencies to discuss “Environmental Licensing in the United States.” He presented on environmental recovery following extreme events in Louisiana.

A lecture by Dr. Don Resio at LSU on March 17, 2017 as part of the ReTalk series.

Dr. Barry Keim, Principal Investigator on this project, was invited by Gavin Smith to give a lecture for a course via Skype at UNC-Chapel Hill. The course was part of the Graduate Certificate program in Natural Hazards Resilience sponsored by the CRC.

Dr. Barry Keim gave presentation at the Louisiana Governor’s Office of Homeland Security and Emergency Preparedness (GOHSEP) to researchers from South American countries as part of the USAID program which was hosted by Brant Mitchell from the Stephenson Disaster Management Institute (SDMI) and is a part of the CRC research project spearheaded by Dr. Robert Twilley.

7. Publications:

Xue, G.Z., D.J. Gochis, W. Yu, B.D. Keim, R.V. Rohli, Z. Zang, K. Sampson, A. Dugger, D. Sathiaraj, and Q. Ge. 2018. Modeling Hydroclimatic Change in Southwest Louisiana Rivers. *Water* 10(5), Article No. 596. <https://doi.org/10.3390/w10050596>.

Keim, B.D., W.D. Kappel, G.A. Muhlstein, D.M Hultstrand, T.W Parzybok, A.B. Lewis, E.M. Tomlinson, and A.W. Black. 2018. Assessment of the Extreme Rainfall Event at Nashville, Tennessee and the Surrounding Region on May 1-3, 2010. *Journal of American Water Resources Association*. <https://doi.org/10.1111/1752-1688.12657>.

Gilliland, J.M., and B.D. Keim. 2018. Position of the South Atlantic Anticyclone and its impact on Surface Conditions across Brazil. *Journal of Applied Meteorology and Climatology* 57(3):535-553. DOI: [10.1175/JAMC-D-17-0178.1](https://doi.org/10.1175/JAMC-D-17-0178.1)

Gilliland, J. M., and B.D. Keim. 2018. Surface Wind Speed: Trend and Climatology of Brazil from 1980–2014. *International Journal of Climatology* 38(2):1060-1073.

Shao, W., S. Xian, B. Keim, K. Goidel, N. Lin. 2017. Understanding Perceptions of Changing Hurricane Strength Along the U.S. Gulf Coast. *International Journal of Climatology* 37(4):1716-1727. DOI:10.1002/joc.4805.

Allard, J.M., J.V. Clarke, and B.D. Keim. 2016. Spatial and Temporal Patterns of In Situ Sea Surface Temperatures within the Gulf of Mexico from 1901–2010. *American Journal of Climate Change* 5:314-343. DOI:10.4236/ajcc.2016.53025.

Shao, W., J.C. Garand, B.D. Keim, and L.C. Hamilton. 2016. Science, Scientists, and Local Weather: Understanding Mass Perceptions of Global Warming. *Social Science Quarterly* 97(5):1023-1057. DOI:10.1111/ssqu.12317.

Hamilton, L.C, J. Hartter, B.D. Keim, A.E. Boag, M.W. Palace, F.R. Stevens, M.J. Ducey. 2016. Wildfire, Climate and Perceptions in Northeast Oregon. *Regional Environmental Change* 16:1819-1832. DOI:10.1007/s10113-015-0914-y.

Shankman, D., and B.D. Keim. 2016. Flood Risk Forecast for China's Poyang Lake Region. *Physical Geography* 37(1):88-91.

8. Lessons Learned:

As a whole, we feel that the project has been a success. The DSM program is fully integrated into an academic department at LSU where it can be sustained into the future. Recruitment efforts have been successful, leading to growing enrollments in courses and in terms of students in the major and minor. The biggest change we would make includes getting stronger support for the program at BRCC at higher levels of administration, which perhaps would have increased our chances of success. We believe this might have allowed us to succeed despite high turnover in the department offering the courses. This would have also allowed us to do more to recruit students to the DSM courses that were offered at BRCC. However, I note that our main contact at BRCC resigned over 6 months ago and her replacement has already resigned. This is a clear sign of the instability we were coping with at BRCC and it is likely that this effort was set up to fail from the very beginning.

Table 1: Documenting CRC Education Project Courses and Enrollments

Courses Developed and Taught by Louisiana State University under Project Disaster Science and Management Program at LSU				
<u>Course</u>		<u>Developed (D), Revised (R), and/or Taught (T), by Project Year</u>		
<u>Number</u>	<u>Title</u>	<u>1</u>	<u>2</u>	<u>3</u>
DSM/ GEOG 2000	Hazards, Disasters, and the Environment	T	R,T	T
Offering: Elective (E), Concentration (C), Minor (M)		E,C,M	E,C,M	E,C,M
Enrollment		150	164	300
DSM / GEOG 2010	Fundamentals of Emergency Management	T	R,T	R,T
Offering: Elective (E), Concentration (C), Minor (M)		E,C,M	E,C,M	E,C,M
Enrollment		54	135	212
GEOG 4200	Hazards Risk Reduction		D	D,T
Offering: Elective (E), Concentration (C), Minor (M)			C,M	C,M
Enrollment				11
DSM 3910	Hazards Seminar	T		
Offering: Elective (E), Concentration (C), Minor (M)		C,M		
Enrollment		10		

DSM 4000	Practicum in Disaster Science and Management	T		
Offering: Elective (E), Concentration (C), Minor (M)		C,M		
Enrollment		5		
DSM 4600	Crisis Management	T		
Offering: Elective (E), Concentration (C), Minor (M)		C,M		
Enrollment		8		

Table 2: Documenting External Funding and Leveraged Support

2A: External Funding			
<u>Title</u>	<u>PI</u>	<u>Total Amount</u>	<u>Source</u>
Southern Climate Impacts Planning Program (SCIPP)	Keim	\$358,000	NOAA
2B: Leveraged Support			
<u>Description</u>			<u>Estimated Annual Value</u>
NONE			

Table 3: Performance Metrics

<u>KEIM PROJECT METRICS</u>	<u>Year 1</u> (1/1/16 – 6/30/16)	<u>Year 2</u> (7/1/16 – 6/30/17)	<u>Year 3</u> (7/1/17- 6/30/18)
HS-related internships (number)	5	1	6
Undergraduates provided tuition/fee support (number)	0	0	0
Undergraduate students provided stipends (number)	0	0	0
Graduate students provided tuition/fee support (number)	2	2	2
Graduate students provided stipends (number)	2	2	2
Undergraduates who received HS-related degrees (number)	4	5	5
Graduate students who received HS-related degrees (number)	0	0	0
Certificates awarded (number)	0	0	6
Graduates who obtained HS-related employment (number)	2	3	4
Lectures/presentations/seminars at Center partners (number)	1	0	0
DHS MSI Summer Research Teams hosted (number)	0	0	0
Journal articles submitted (number)	1	3	5
Journal articles published (number)	5	1	3
Conference presentations made (number)	2	17	11
Other presentations, interviews, etc. (number)	4	132	104
Trademarks/copyrights filed (number)	0	0	0
Requests for assistance/advice from DHS agencies (number)	2	1	2
Requests for assistance/advice from other agencies or governments (number)	5	8	10
Total milestones for reporting period (number)	6	6	13
Accomplished fully (number)	6	6	10
Accomplished partially (number)	0	0	2
Not accomplished (number)	0	0	1

9. Year 3 Education Activity and Milestone Achievement:

Education Activities and Milestones: Final Status as of 2018

Reporting Period 7/1/17 – 6/30/18			
Education Activities	Proposed Completion Date	% Complete	Explanation of why activity/milestone was not reached
Continue to deliver DSM courses within the newly implemented DSM Concentration in Geography BS/BA.	8/1/2017	100%	
Implement approved Certification Program.	8/1/2017	100%	
Implement one (1) or more course curricula for Baton Rouge Community College (BRCC).	9/1/2017	100%	
Education Milestones			
Offer at least three (3) DSM courses during the Fall 2017 and Spring 2018 semesters.	5/31/2018	100%	
Promote and enroll four (4) students into the DSM Certificate Program	6/30/2018	100%	
Deliver one (1) or more course curricula for Baton Rouge Community College (BRCC) during the Fall 2017 and Spring 2018 semester.	5/31/2018	50%	Course enrollment targets not reached at BRCC so courses not offered; Curriculum is developed and could be implemented at any time if enrollment targets met.

10. Year 3 Transition Activity and Milestone Achievement:

Transition Activities and Milestones: Final Status as of 2018

Reporting Period 7/1/2017 – 6/30/2018			
Transition Activity	Proposed Completion Date	% Complete	Explanation of why activity/milestone was not reached
Further promote DSM social media page (Facebook) to further capture DSM Student Post-Graduation activities.	8/31/2017	100%	Rather than use Facebook, an alumni tracking page was implemented through Google.
Continue with the American Red Cross Baton Rouge Chapter to offer service learning project for DSM 2010 course. Through HSE end users, identify additional community service projects for DSM students and DSMA members to participate in.	8/31/2017	100%	
Contact each HSE end user listed on the working document to capture end user input on internship program via one-on-one phone calls and email.	9/1/2017	100%	
Transition Milestone			
Continue DSM Student Post-Graduation tracking method and document post-graduation activities in Homeland Security enterprises or continued grad school of 60- 75% of Fall 2017 and Spring 2018 students	5/31/2018	100%	See new alumni tracking page as listed above.
Through the partnership with the ARC, 75-80% students completing Spring 2016 DSM 2010 Fundamentals of Emergency Management will complete the service learning portion of that class.	5/31/2018	90%	Reaching a full 75-80% service learning was impossible due to growing enrollment in GEOG 2010. However, many students did still volunteer for the ARC.
DSMA student organization will participate in at least two (2) community service project: one with ARC and one with another HSE with at least five (5) students participating in each activity.	5/31/2018	0%	DSMA student organization was re-formed but membership was insufficient to meet criteria.
Partner with three (3) additional end users in order to secure internships for DSM students	5/31/2018	100%	