East Carolina University  
Annual Progress Report: Academic Units  
2015-2016  

Unit: The Center for Natural Hazards Research

Chairs and Program Directors should send Unit/Program Annual Reports (max. 10 pages) electronically (Word document) to Denise Miller (millerde@ecu.edu) in the Dean’s Office by May 31. One hard copy should also be sent to 1002 Bate.

Part One: Accomplishments

In response to each item in part one, provide no more than five bulleted points and brief descriptions of accomplishments:

1. **Teaching:** Summarize unit highlights in teaching during the reporting period. Indicate how these achievements support the unit’s goals and objectives for the academic year.
   - 8 Courses dealing with natural hazards as follows: Geography/Planning (4), Economics (2), Geology (1), and Biology (1). Natural Hazards continues to be a subject with a strong interdisciplinary presence at ECU.
   - Dr. Andy Keeler (ECON/CSI) taught a new course *Coastal and Marine Economics and Policy* (ECON 7010) now a core course in the CRM PhD program.
   - Dr. Tom Allen, (GEOG) taught a new hazards-related course: *(Spatial Analysis of Coastal Environments)* (GEOG 6440). This course continues the development of natural hazards-related courses offered at ECU, a goal of CNHR.
   - Dr. Anuradha Mukherji (PLAN) continues to teach *Emergency Management Planning* (PLAN 4015), a course that strengthens our relationship with the North Carolina Emergency Management, a crucially important relationship and complementary to the Annual NCEM/ECU Hurricane Conference.
   - Dr. D. Reide Corbett, (GEOL/ICSP/CSI) taught *Coastal GeoScience* (GEOL 7002), a core course in the CRM PhD program that includes tidal creek sedimentation and the dynamics of the beach-dune system along a Human-modified Coast as well as Coastal Strategic Planning.

2. **Improvement of student learning:** Highlight 3-5 documented improvements in student learning/performance resulting from pedagogical or curriculum actions taken based on analysis of assessment results in your unit.
   - The CNHR does not have courses housed within the center. However, the addition of a new courses (noted above) continues to grow the number of active natural hazards-related courses provided by CNHR research associates.
   - The CNHR provides both state- and grant-funded support to undergraduates and graduate students. Students supported in AY 2015-2016:
     - Christina Wiegand (CRM doctoral program, Economics Concentration) supported by state funds and NOAA-NCDENR grant.
     - Zaneta Adme (CRM doctoral program, Economics concentration) supported by UNC Research Initiative (ROI) Grant.
     - Josh Sanders (Economics Masters) supported by state funds and NSF grant.
     - Andrew Bower (Economics undergrad) supported by NSF grant.
     - Susan Flanagan (English doctoral program) support from Provost.
     - Kim Thompson (English doctoral program) supported by CNHR operating.
Abigail Morris (English doctoral program) supported by NASA sub award through University of Colorado.

- Attendees from the emergency management community to the Annual NCEM/ECU Hurricane Conference that register through the NC Department of Public Safety Training and Exercise Registration Management System (TERMS) receive training credits. Last year 210 of the 250 attendees registered through TERMS for the 2015 conference.

- The NCEM/ECU Hurricane conference dovetails with other training opportunities in Greenville. An ARC GIS short course is offered May 23-24, 2016 before the Wednesday conference. The NC ArcUser GIS group Eastern Symposium is Thursday, May 26, 2016 in the Willis Building (65-80 attendees) following the Hurricane Conference.

3. **Research/creative activity:** Summarize unit highlights in research/creative activity during the reporting period. Indicate how these accomplishments support the unit’s goals and objectives for the academic year. Attach (where appropriate) the unit’s one page graphical results from the Academic Analytics.

- CNHR & their Associates have submitted 9 natural hazards-related proposals, and received funding for $211,110 hazards-related awards in AY 2015-2016. The continued activity of CNHR Research Associates in seeking external funding is essential to our goal of identifying relevant opportunities for successful awards and growing the number of proposals submitted and grants funded in the field of natural hazards.

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<tr>
<th>Category</th>
<th>Totals</th>
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<tr>
<td>Articles in Refereed Journals</td>
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<tr>
<td>Books, Monographs, Compilations, Manuals, Supplements, Chapters, Cases and Readings</td>
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<tr>
<td>Publications in Refereed Conference Proceedings</td>
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<td>Presentations of Refereed Papers</td>
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<tr>
<td>Presentations of Non-Refereed Papers</td>
<td>37</td>
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<tr>
<td>Research Report, Refereed and Publically Available</td>
<td>15</td>
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4. **Service:** Summarize unit highlights in service during the reporting period. Indicate how these accomplishments support the unit’s goals and objectives for the academic year.

- The 7th Annual NCEM/ECU Hurricane Conference is planned for May 25, 2016. The Sixth Annual Hurricane Conference was staged on May 27, 2015. Topics included:
- Evacuation sheltering with emphasis on special needs evacuees with representatives from the disabled community;
- Understanding and improving public response to NWS coastal flooding forecasts by Dr. Burrell Montz;
- An overview of the DHS-funded Coastal Resilience Center by Dr. Gavin Smith, UNC-CH;
- Needs of non-US expats by the British Vice Consul;
- NWS Seasonal Forecast by National Weather Service;
- A keynote speech by Dr. Rick Knabb, Director of the National Hurricane Center; and
- A presentation to WCTI Channel 12 honoring the memory of Skip Waters and dedicating the conference to him.

- The 2015 conference had 250 attendees, representing North Carolina (NC) Department of Natural Resources, NC Department of Agriculture, NC Department of Public Instruction, NC State Highway Patrol, NC National Guard, North Carolina Sea Grant, Civil Air Patrol, US Army Corp of Engineers, National Weather Service, Amateur Radio Emergency Service, Salvation Army, American Red Cross, Community Emergency Response Teams, SKYWARN (volunteer program of trained severe weather spotters), Vidant hospital, local city/county planners, local fire department, local emergency medical services, local/regional/state emergency management, universities, and community colleges.

State & Federally Funded Ongoing Projects:

2015. **Corbett, D. R. & Walsh, J.** Influence of Submarine Groundwater Discharge on Nearshore Water Quality: Student Training & Research. Surfrider, $1,000

2015. **Corbett, D. R., Walsh, J., White, N., & Richards, N.** Research to support design & siting of deposition areas for dredge material. NC Department of Transportation, $371,010

2015. **Manda, A. K. & Bean, E.** Coastal Sustainable Storm water Management. Resilience through Spatially Distributed Infiltration, Principal Investigator. Center for Sustainability 2015 Interdisciplinary Summer Research Award competition, $11,608

2015-2018. **Mitra, S.** Collaborative Research: Dissolved pyrogenic organic matter dynamics in the environment. *National Science Foundation*, $89,815


**Total Ongoing Funded Research Projects:** $

Pending Grant Proposals Submitted to State & Federal Agencies:


2016-2020 **Pending, Kruse, J.(PI).** CRISP Type 2: Collaborative Research: Scalable Decision Model to Achieve Local and Regional Resilience of Interdependent Critical Infrastructures Systems and Communities, Collaborative Proposal with Texas A&M, Colorado State University, University of Illinois at Urbana-Champaign, ECU budget $132,987.


2015-2017: [Year 1 of 2]: Walsh, J.P. Corbett, D.R., Dynamics of the Beach Dune System along a Human Modified Coast, Northern Outer Banks, NC, Co-Principal Investigator, Army Corps of Engineers.


**Total Pending Grant Proposals:** $ 3,668,324

**ECU Courses that include natural hazards content (2015-2016):**

- ATMO/GEOL1300 Weather & Climate, Allen, Curtis
- ATMO2510/GEOG3510 Physical Meteorology, Rickenbach
- BIOL4300 Ecosystem Ecology, Reyes
- BIOL4301 Ecosystem Ecology, Reyes
- BIOL4320 Ecological Responses to Global Climate Change, Reyes
- COAS2025 Coastal/Marine Resources Management, Allen
- ECON 3855 Environmental Economics, Bin, Howard
- ECON 6300 Economics of Coastal Populations- Bin
- ENGL 7765 Risk Communication, Kain, Frost
- ECON 7010 Coastal and Marine Economics and Policy, Keeler
- GEOL 5350 Marine Geology, Mallinson
- GEOL 7002 Coastal GeoScience, Corbett
- GEOG4440 Coastal Applications of GIS, Allen
- GEOG4580 Radar & Satellite Meteorology, Rickenbach
- GEOG 6440 Spatial Analysis of Coastal Environments, Allen
- GEOG 6540 Advanced Coastal Storms, Curtis
- GEOG/COAS Independent Research, Allen
- GEOL 5300 Geology of Coastal Processes, Mallinson
- HNRS Global Warming & Climate Change, Curtis
- PLAN 4015 Emergency Management Planning, Mukherji
- SUTO 06100 Environmental Systems & Sustainability, Allen
Part Two: Unit Strategic Plan Update

In response to each item in part two, provide an update on the unit’s progress toward implementing its 2014-19 Unit Strategic Plan:

5. **Actions taken:** Include only the **Unit Objectives** that were addressed by the unit in 2015-16. For each Unit Objective:
   a. Describe new or expanded actions implemented by the unit. Include budgetary or other resource investment/reallocation, if applicable.
      i. CNHR Website was overhauled. Academic affairs provided 2015 summer II money to Susan Flanagan (English doctoral student) and CNHR provided partial support for Kim Thompson (English doctoral student).
      ii. A new initiative on valuation of Geo-spatial information was developed. USGS and NASA have supported this effort. CNHR now has a memorandum of understanding with USGS. NASA ($45,131) and USGS ($30,000) both provided support for an international workshop, “Data to Decisions; social and economic benefits of earth observations,” held March 2016 at OECD in Paris, FRANCE. A book is in process on the subject and ECU participated in a consortium grant proposal (pending) led by RAND following from this initiative. (ECU share of budget $788,351)

   b. Provide data for the **metrics** associated with each Unit Objective addressed.

6. **Actions planned:** Describe the **Unit Objectives and Actions** to be implemented for the next reporting year.
   a. CNHR plans a retreat for Fall 2016 to identify our priorities, select performance metrics, set goals, renew our strategic plan, and draft the third iteration of the CNHR strategic plan. This will also afford an opportunity to invite new research associates to replace some of the talented colleagues that are leaving or have left.

7. **Reflection:** Provide brief descriptions and **no more than five bulleted points** of key opportunities, uncertainties, or challenges that may have impacted or will impact the implementation of the unit’s strategic plan.

   **Key opportunities**
   a. **FEW Nexus-NSF** has initiated a new interdisciplinary/cross directorate thrust addressing the interrelationship of Food, Energy and Water (FEW) Systems that will challenge our ability to feed a burgeoning population and support our high technology world that is undergoing climate change. ECU and research associates of the CNHR are well positioned to propose relevant integrative research projects to address this challenge. Dr. Scott Curtis has a 2016 course release to conduct a literature review and examine FEW issues for the Caribbean and eastern North Carolina.
      i. Uncertainty-the demands on faculty time are increasing. We simply have fewer researchers with knowledge of each other’s research interests and capabilities.
      ii. Challenge-we must regenerate and expand the circle of collaborators.

   b. **School of the Coast**—The original plan for the CNHR to become one of the pillars of the School of the Coast has been part of every draft plan going back five or more years.
      i. Uncertainty-With the change and restructuring of administration at the general administration and the university level, the fate of an initiative to amalgamate institutes, centers, certificates and programs into a School of the Coast is highly uncertain.
      ii. Challenge-CNHR will carefully examine two scenarios going forward. 1. As part of a viable School of the Coast and 2. As a stand-alone “big C” center.
c. **Hurricane Research to Operations to Research (R2O2R)** – Recent collaborations with the hurricane modeling group at North Carolina A&T University will be cultivated. Specifically, CNHR is interested in a project that leverages the strengths of the two UNC institutions to explore how to use new data collection techniques at the citizen level to calibrate and refine hurricane models and produce communication products to make the model results usable by private individuals and emergency responders. This responds to recent NSF calls for citizen science and crowd sourcing

i. **Uncertainty** - working with partners at other institutions is time consuming. Additional face-to-face meetings are desirable.

ii. **Challenge** - CNHR will continue to modify the proposal that was recently declined by UNC-ROI and seek other funding opportunities.