

U.S. Coastal Research Program Quarterly Bulletin September 2019

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Please visit the USCRP website, <https://uscoastalresearch.org/> for more information on the motivation and goals of the USCRP as well as current initiatives.

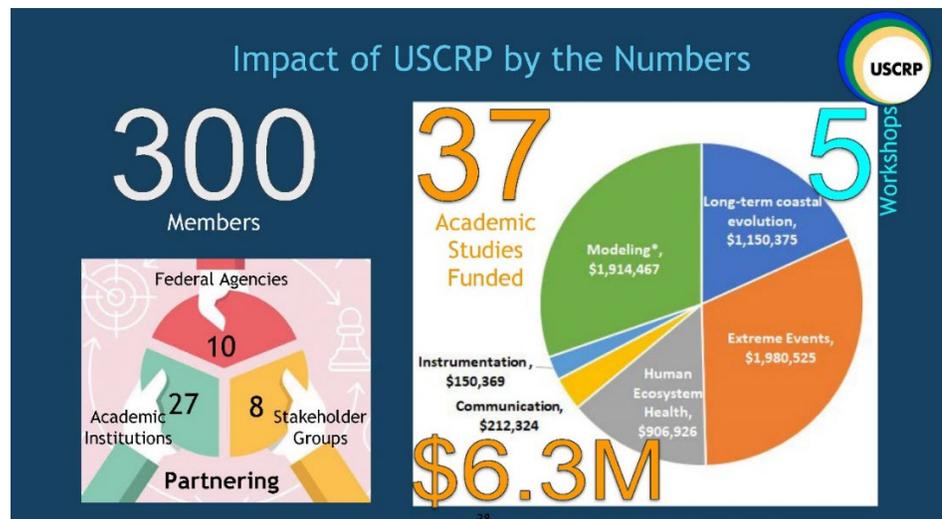
Federal Leadership Meeting Summary

On September 10, high-level representatives from Federal agencies with coastal missions (USACE, USGS, BOEM, NRL, NRC, and NASA), met with USCRP leadership (including Federal, Academic, and Stakeholder representatives) at the Main Interior Building in Washington, DC for the annual USCRP Federal Agency Leadership Meeting.

The purpose of this meeting was to:

1. Increase Federal awareness of the USCRP;
2. Invite Federal agencies to provide strategic oversight and steering;
3. Encourage membership for the Federal Team advisory group.

The meeting opened with presentations by USCRP leadership on the past accomplishments, ongoing activities, and future plans of the USCRP (see uscoastalresearch.org), which increased awareness of the Program as well as demonstrated the value of Federal support for sustaining this effort.



USCRP by the Numbers -- Membership, partners, academic studies, and workshops



A discussion with Federal representatives followed the USCRP presentations, in which participants were invited to share their agency’s near-term coastal priorities and identify opportunities for cross-agency collaborations to help provide strategic oversight and steering of the Program.

Furthermore, the USCRP would like to build up Federal participation, and asked for each of the agencies to help identify the appropriate liaison (someone with knowledge of coastal projects/programs within their agency) to represent their agency on the USCRP Federal Team advisory group.

During this meeting, the Federal participants commended the growth of the USCRP, applauded the Program for integrating Federal, Academic, and Stakeholder groups to address coastal needs, and recognized the importance of the Program in funding the future generation of coastal scientists, engineers, and managers. The main recommendations were to continue to increase USCRP visibility to encourage wider Federal participation and to collaborate with programs with similar missions that lack the coastal expertise (e.g. NSF Natural Hazards Engineering Research Infrastructure, NSF Coastlines and People, US Global Change Research Program).

The Federal leadership was excited to learn about the successes of the Program and look forward to future developments.



USCRP Leadership (L to R: Mary Cialone (USACE), Nicole Elko (ASBPA), Hilary Stockdon (USGS), Britt Raubenheimer (WHOI), Leighann Brandt (BOEM), Julie Rosati (USACE). (Photo Credit Nicole Elko, ASBPA)

USCRP 2020 Funding Opportunity planning

In **late 2019**, the USCRP will be hosting two “virtual workshops” to inform our 2020 Call for Academic Proposals and communicate the high priority coastal R&D that is ongoing in federal agencies. We will focus on areas within 2 of the 3 broad research themes identified in the Nearshore Report:

- Long-term processes and coastal response (sea level changes; future storms; sediment supplies; land use changes), and
- Biological and chemical interactions with the physical processes that influence healthy estuarine ecosystems’ ability to provide 1) storm protection, 2) economic benefits (fisheries, tourism), and/or 3) critical habitat.

Stay tuned to our website and the mailing list for more information.



<p>USCRP Leadership featured on podcast</p>	<p>Listen to the latest “Capitol Beach” podcast featuring your USCRP co-executive directors, Drs. Julie Rosati, Hilary Stockdon, and Nicole Elko, explaining the USCRP, noting some highlights of the first 5 years, and giving their perspective on where the program is heading: http://asbpa.org/2019/09/13/uscrp-podcast/.</p> <p>Listen over your lunchbreak or subscribe to “American Shoreline Podcast Network” on your favorite podcast platform (Spotify, Apple, Google, etc), download and listen on your way home from work. It’s just under 40 minutes long. Please share with others who might benefit from learning about the U.S. Coastal Research Program.</p>
<p>USCRP 2019 Research Awards</p>	<p>The USCRP is in the process of providing nearly \$5M in competitive awards for 22 academic proposals addressing 11 topical research areas that were considered of high priority to the USCRP. Awards were made with the intent of assisting academic institutions in funding coastal and nearshore processes graduate students to address critical research needs within the coastal community, advancing the state of knowledge, and building the future U.S. workforce. Two types of awards were given: (1) Academic Research: 2-3-year awards addressing strategic needs; and (2) Student Challenges: 1-2-year awards targeting short-term, focused, student-driven initiatives. Proposed funding amounts varied, depending on work planned for each of the project.</p> <p>Research proposals addressed the USCRP priorities including:</p> <ol style="list-style-type: none"> 1. Identify and communicate coastal impacts 2. Coastal structure design and rehabilitation incorporating stochastic risk and uncertainty 3. Understanding the crossroads of human and ecosystem health 4. Evaluation the distribution and geotechnical properties of Outer Continental Shelf (OCS) sand resources and coupled environmental responses to dredging 5. Nearshore sediment transport and sediment budgets over decadal scales 6. Long-term implications of coastal restoration 7. Quantifying and communicating numerical model uncertainty 8. Develop community resilience guidance for recovery, mitigation, and adaptation 9. Applied storm and recovery studies as part of the DURING Nearshore Event EXperiment (DUNEX) 10. Coastal adaptation pathways for barrier island communities 11. Quantitative model for optimizing coastal community systems performance <p><i>Contribution from Mary Cialone (USACE-ERDC)</i></p>
<p>DUNEX – Project Updates and Hurricane Dorian</p>	<p>Recent and ongoing activities</p> <p>Before Dorian began churning the Atlantic, research teams began gathering ground-truth data in support of the USCRP During Nearshore Event eXperiment (DUNEX). A team from the University of Southern Mississippi's Coastal Hazards Laboratory and the U.S Army Corps of Engineers’ Coastal and Hydraulics Lab conducted a field campaign to initiate a study of the interaction between regional dune geomorphology and washover for varying timescales from storm events to daily tidal washovers. To address these research questions, they collected cm-scale terrestrial lidar scans; installed water-level loggers and monitoring cameras; and collected Ground Penetrating Radar (GPR) transects and sediment cores on four washover fans along the Northern Outer Banks of North Carolina. The team also used</p>



the opportunity to ground truth the auto-extracted features from a June over-flight survey conducted by the Joint Lidar Bathymetry Technical Center of Expertise (JALBTCX). JALBTCX plans to re-survey the DUNEX region again in early October. The USGS also completed a photogrammetric flight in late August, during a week of mid-day low tide for maximum coverage.



DUNEX field sampling (USM and USACE). (Photo Credit: Eve Eisemann, USACE-ERDC)

Prior to and throughout the experiment and field activities, communications have been encouraged through weekly video meetings and an email-based forum. This media has fostered collaborative communications among the teams, and has provided enhanced understanding of each team's research and data collection plan.

Upcoming Activities

In conjunction with the pilot experiment, a one-week training program consisting of 2-1/2 days of formal classroom modules geared towards introductory level coastal engineering and 2-1/2 days of field trips and topical "tech talks," is scheduled for the week of 23-27 September, in Duck N.C. Registered attendees include participants from universities, several federal agencies, and local town managers.

The National Science Foundation's Natural Hazards Reconnaissance Facility, known as RAPID, (<http://rapid.designsafe-ci.org/>) provides investigators with the equipment, software, and support services needed to collect, process, and analyze perishable data from natural hazard events. On October 7 - 11, RAPID will host a hands-on training and deployment opportunity in collaboration with DUNEX pilot activities at the U.S. Army's Field Research Facility (FRF) in Duck, NC and at the more southerly experiment area on Pea Island NC. RAPID's equipment portfolio and RAPID staff have been made available free of charge for deployment and data collection by research teams during this period. This provides participants with the opportunity to develop expertise in using RAPID equipment to collect, process, and integrate the collected data using the RAPID mobile software application.

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Field methods demonstration during workshop. (Photo Credit: Jen Irish, Virginia Tech)

For further information, please contact Alex Renaud at alexander.d.renaud@usace.army.mil

Hurricane Dorian Update

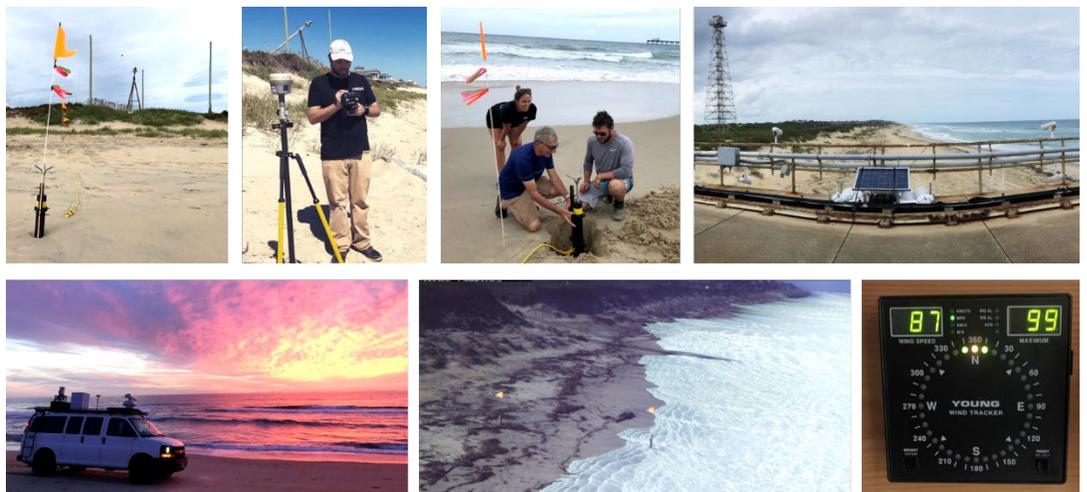
Hurricane Dorian made landfall in Cape Hatteras, NC (the southern boundary of the DUNEX study site) at 0935 EDT on September 6th, 2019 as a category 1 hurricane, 70 miles south of the U.S. Army Engineer Research and Development Center's Field Research Facility (FRF) in Duck, NC. Sustained winds on the FRF pier exceeded category 1 strength for just under 2 hours, peaking at 36.5 m/s (82mph) from the north at 1050 EDT with a maximum gust of 43.8 m/s (98 mph). Wind sensors deployed 5-m above the dune crests recorded maximum gusts of 37 m/s (83 mph). Offshore significant wave heights measured in 26-m depth peaked at 6.9 m at 1133 EDT, making Dorian the 4th largest wave event at the FRF since 1985. At the FRF, wave heights peaked 3 hours before high tide (1414 EDT), 4 hours before the peak surge of ~ 1 m (1542 EDT), and exceeded 4 m for 8 hours (0830-1630 EDT).

Immediately prior to landfall a team from Woods Hole Oceanographic Institution (WHOI) and the FRF deployed a battery of instruments that, with additional long-term sensors, quantified surf-zone hydrodynamics, morphology change, meteorological conditions, and water levels at the FRF. The team measured shoreline wave heights with terrestrial lidar, stereo imagery, and in-situ pressure sensors at four transects along the FRF property. Four Acoustic Doppler Velocimeters (ADV) also measured inner-surf zone currents at the northern two transects. At the northern transect, total water level (wave runup, tide, and surge) peaked near 4 m NAVD88 between 1200-1330 EDT. The FRF also collected vessel-based GPS and sonar surveys of morphologic response 2 days before and 3 days after the storm on the FRF property, as well as continuously monitored dry-beach evolution with automated, fixed terrestrial lidars. Regional mobile terrestrial lidar surveys were also performed 2 days before and 4 days after the storm along a 40-km stretch of coastline surrounding the FRF. The USGS deployed 530 water level sensors along the open coast and inland areas (15 inside the DUNEX study area) and completed a post-storm photogrammetric flight (to match with the pre-storm flight). Research teams from WHOI

and East Carolina Universities Coastal Studies Institute deployed water level sensors along the sounds of the Outer Banks study area.

Despite the large offshore waves, impacts to the dunes at the FRF were minimal. Beach response varied spatially, with some locations experiencing erosion of up to 1 m vertically (removing the summer berm almost entirely) and other locations near the dune toe accreting approximately 0.1 m. In some places, initial recovery of the lower beach (0.5 m accretion) was rapid, occurring within 48 hours of the storm peak. Several of the CHL/USM study sites on Pea Island to the south of the FRF (closer to the landfall location) experienced severe dune-erosion and some overwash. Local advocates noted minor ocean overwash in 9 locations between Oregon Inlet and Buxton, NC. Increased sound-side flooding occurred to the south of the DUNEX study site on the southern tip of Hatteras Island and on Ocracoke Island, with 3 total breaches. The CHL/USM team anticipates excellent opportunities to utilize their pre-storm terrestrial lidar as well as continuous water-level and photographic data collected during the storm, to observe overwash processes.

Logistically, Dorian provided a great opportunity for pilot participants to practice responding to an extreme event. Specifically, lessons learned included: (1) access to National Park Service and Fish & Wildlife regions to the south gets cutoff early—deployment of instruments will need to occur more than 4 days prior to landfall, which could present challenges given that hurricane tracks are uncertain more than a few days out; (2) emergency access passes need to be applied for early – more than 3 days before the first evacuation is called; and (3) emergency access passes are required to operate during a curfew.



Clockwise from left: Additional sensors deployed in front of the FRF's continuously scanning lidar; ERDC's Dr. Nicholas Cohn surveys in instruments before the storm; ERDC's Dr. Katherine Brodie and WHOI's Dr. Steve Elgar and Levi Gorrell installing a supplemental ADV pre-storm; Solar-powered stereo photogrammetry cameras designed by ERDC's Dr. Brittany Bruder ready to observe dune impacts from Dorian; FRF wind gauge showing the current gust (87 mph) and maximum observed gust (99 mph) during the peak storm conditions; During-storm observations of wave runup near the peak of the storm from Dr. Bruder's cameras; ERDC's Dr. Ian Conery and Nicholas Spore conduct an early morning pre-storm survey with FRF's Coastal Lidar and Radar Imaging System (CLARIS). (Photo Credit: Kate Brodie, USACE)

Contributions from Steve Deloach (USACE) and Kate Brodie (USACE)



Overview

As described in Stockdon et al. (2019), the USCRP envisions receiving input from three distinct advisory teams: stakeholders, Federal personnel, and coastal academics. These advisory groups inform the Federal Leadership Council on broad topic areas for research funding, program priorities, and other issues relevant to coastal research. The inaugural Academic Team (affectionately known as the A-Team) was appointed in February 2019 and tasked with developing the framework for this academic advisory group. Our collective efforts to date and planned activities are further described below.

Our Mission and Vision

The mission of the USCRP Academic Team is to provide an academic voice and strengthen the communication among academics, USCRP federal agencies, and stakeholders. The vision of the USCRP Academic Team is to enable agency, stakeholder, and academic collaborations that will lead to significant advances in our fundamental understanding, predictive skill, and engineering solutions within coastal systems.

Membership

Working collaboratively with the USCRP Program Office, the Academic Team developed a membership registration system and distributed a request for membership signup. As of Aug 25, 2019, USCRP has 296 members with 196 academic members. The initial goal of membership is to create a targeted USCRP email list for future communications. Membership also will further the USCRP mission of strengthening communication between stakeholders, funding agencies, and academic researchers.

Academic Survey

The USCRP Academic Team developed and conducted a national survey of coastal academics during the months of April and May 2019. Survey questions elicited information about university and research programs, student advising and teaching, current employment for students (retention within coastal research), and the status and trends of coastal research funding. Of the 83 survey respondents, 62 were from US academic institutions. The Academic Team is synthesizing the survey results and will distribute those results later in 2019.

Ongoing and Upcoming Activities

The Academic Team is working with the USCRP Program Office to develop ideas for future USCRP workshops and funding needs, while also considering an update to the Future of Nearshore Processes Report. The team is also working to define our organizational structure, including determining election methods for new members, drafting our by-laws, and determining term limits. Community input will be key to define future Academic Team activities, and the Team is working to develop a formal community input mechanism. Meanwhile, please contact your Academic Team representatives (below) if you have input to improve or expand our efforts.

Continued on the next page



Your A-Team Representatives



Britt Raubenheimer is a Senior Scientist at Woods Hole Oceanographic Institution. Raubenheimer's career in coastal oceanography began in 1988 working with the USGS on studies of the Isle Dernieres Barrier Islands, LA. This work inspired her to get a Ph.D., which she received from Scripps Inst. Oceanography in 1996. Raubenheimer's research interests include surf and swash-zone processes, morphological evolution of beaches, tidal flats, and inlets, and feedbacks between oceanographic, morphological, hydrogeological, biological, and geo-technical processes. Raubenheimer participated on the Nearshore Future Meeting steering committee (Kitty Hawk, NC, Apr 2014), was a co-editor of the Future of Nearshore Research report (2015), is leading the development of the NSF-funded Nearshore Extreme Events Reconnaissance (NEER) Association, and has served on the Leadership Council for the National Nearshore Implementation Plan (2016-2019), the ASBPA Technical Advisory Committee (2017-present), the DUNEX steering committee (2018-present), and the Leadership Corps for the CONVERGE initiative (<https://converge.colorado.edu>, 2018-present), as well as on the USCRP Academic Team (2019-present). Contact Britt at britt@whoi.edu or (508) 289-3614 for more information.



Joe Long received his PhD in Civil Engineering with a focus on coastal engineering from Oregon State University in 2009. He was a USGS Mendenhall postdoctoral fellow from 2009-2012 and a research oceanographer at the USGS St. Petersburg Coastal and Marine Science Center from 2012-2018. In this role, he led projects related to the development of models for storm-impacts, barrier island resilience and habitat availability for coastal ecosystems. Presently, he is an Assistant Professor in the Department of Earth and Ocean Sciences at the University of North Carolina Wilmington. His research background and interest is in the prediction and observations of nearshore hydro- and morphodynamics and the hazards, both long- and short-term, generated by these processes. Contact Joe at (910) 962-2904 or longjw@uncw.edu for more information.



Bret Webb is a Professor in the University of South Alabama's Department of Civil, Coastal, and Environmental Engineering. Bret earned his Ph.D. in Coastal & Oceanographic Engineering from the University of Florida in 2008. Bret's research focus is on coastal resilience to extreme events including long-term sea level rise. In his work, Bret considers resilience of both the constructed and natural environments and aims to describe ways in which natural and nature-based features can provide risk reduction benefits to coastal infrastructure. Bret is a registered professional engineer in Alabama and Florida and is recognized by the Academy of Coast, Ocean, Port, and Navigation Engineers as a

Board Certified Coastal Engineer. Contact Bret at (251) 460-7507 or bwebb@southalabama.edu for more information.



Diane Foster has recently been appointed the Director for the School of Marine Sciences and Ocean Engineering at the University of New Hampshire. She is a Professor of Mechanical and Ocean Engineering and holds the Class of 1940's Professorship. Diane's has spent her career unraveling the mysteries within combined flow boundary layers over mobile sediment beds to advance our understanding of sediment transport, munition mobility, and benthic nutrient fluxes in our nearshore and estuarine environments. Diane is a passionate advocate for underrepresented minorities and has received the Ohio State University Diversity Excellence Award (2008) and UNH's Graduate Faculty mentor award (2017). Prior to serving on the USCRP Academic Team, Diane also participated on the Nearshore Future Meeting steering committee (Kitty Hawk, NC, Apr 2014), served on the Nearshore Advisory Council (2014-2017), was a co-editor of the Future of Nearshore Research report (2015), and is currently leading the development of a NSF CoPe effort to develop a coastal flooding lending library and citizen science teams. Contact Diane at (603) 862-3089 or at Diane.Foster@unh.edu for more information.



Dan Cox is the CH2M Hill Professor in Civil Engineering at Oregon State University. He also is the Associate Director of the Center for Risk-Based Community Resilience Planning. Dr. Cox's research focuses on community resilience to coastal hazards, including tsunami and hurricane surge and waves inundation in the built and natural environments. He conducts research on tsunami and wave impacts on near-coast structures, tsunami evacuation and life safety, sediment transport and erosion, and nature-based solutions for coastal hazards mitigation. Contact Dan at dan.cox@oregonstate.edu for more information.

Stockdon, H., Brandt, L., Cialone, M., Elko, N., and Rosati, J. (2019). U.S. Coastal Research Program: Building a Research Community to Support Coastal Stakeholders. Coastal Sediments '19. Tampa/St. Pete, FL.

Nearshore Processes Community (2015). The Future of Nearshore Processes Research, Elko, N., Feddersen, F., Foster, D., Hapke, C., McNinch, J., Mulligan, R., Ozkan-Haller, H.T., Plant, N., and Raubenheimer, B. (Eds.), *Shore and Beach*, 83(1): 13-38.

Contribution from the USCRP Academic Team



<p>Announcements & Upcoming Events</p>	<p>ASBPA 2019 National Coastal Conference, “Where Coasts and Rivers Meet,” October 22-25, 2019 Myrtle Beach, South Carolina http://asbpa.org/conferences/</p> <p>Coastal and Estuarine Research Federation (CERF) 25th Biennial Conference, Responsive Relevant Ready,” November 3-7, 2019 Mobile, Alabama https://www.cerf.science/cerf-2019</p> <p>2019 American Geophysical Union (AGU) Fall Meeting, December 9-13, 2019 San Francisco, California https://www.agu.org/fall-meeting</p> <p>Ocean Sciences Meeting (OSM) 2020, February 16-21, 2020 San Diego, California https://www.agu.org/ocean-sciences-meeting</p> <p>37th International Conference on Coastal Engineering (ICCE) 2020, September 13-18, 2020 Sydney, Australia http://icce2020.com/</p>
<p>Credits</p>	<p>Editor: Emily Russ, USACE ERDC-CHL Assistant Editors: Julie Rosati, USACE ERDC-CHL and Mary Cialone, USACE ERDC-CHL Contributing Members: Leighann Brandt, BOEM Marine Minerals Branch, Nicole Elko, ASBPA Science Director, and Hilary Stockdon USGS Coastal and Marine Geology Program</p> <p>USCRP website: https://uscoastalresearch.org/ USCRP email: info@uscoastalresearch.org</p>

