



U.S. ARMY

DURING NEARSHORE EVENT EXPERIMENT (DUNEX)

A Collaborative Community Field Data Collection Effort

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US Army Corps of Engineers

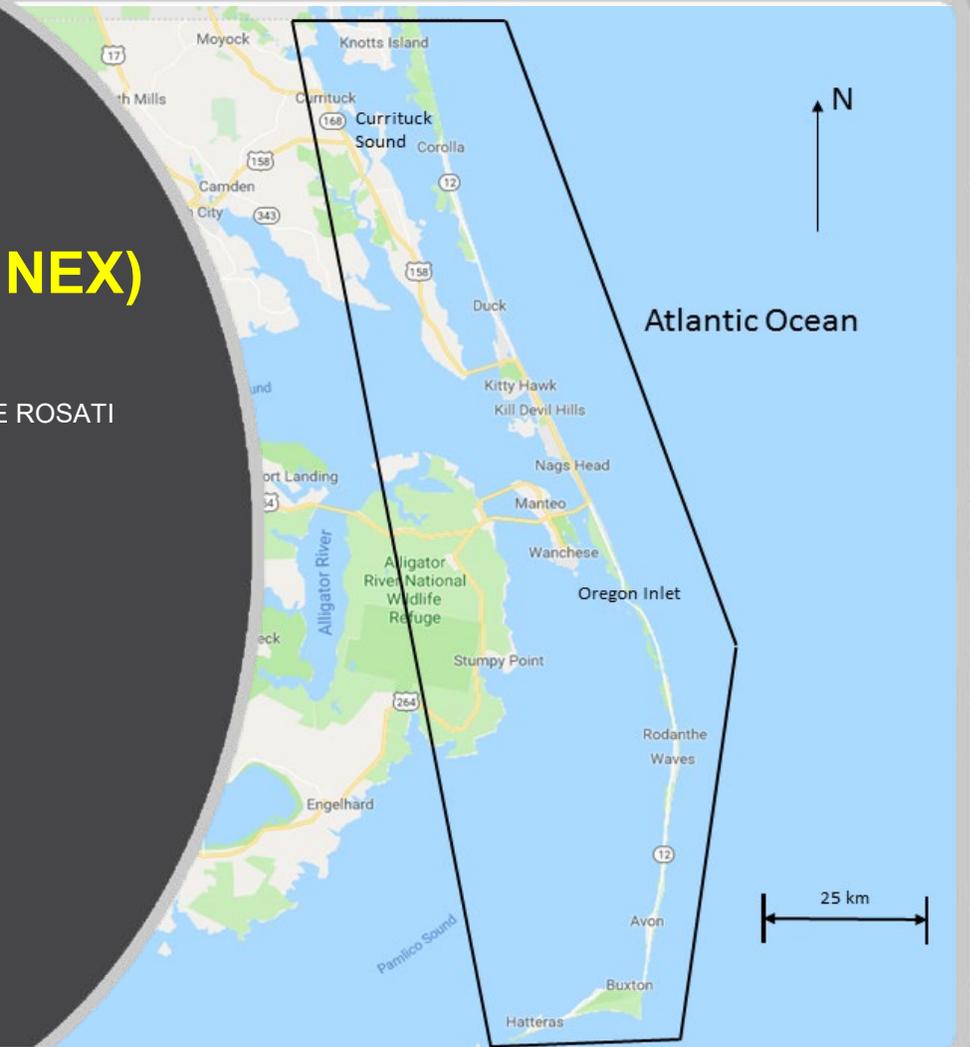
Engineer Research & Development Center

Coastal & Hydraulics Laboratory

Coastal Sediments 2019

St Petersburg, Florida

29 May 2019



US Army Corps
of Engineers



DISCOVER | DEVELOP | DELIVER

US Coastal Research Program (USCRP) Motivation

- Declining US coastal research graduates impacts US coastal work force
- Growing coastal population, increased “storminess”, aging infrastructure
- Declining coastal research funding - creative/innovative collaboration to stretch research dollars (leveraging)



USCRP Collaborative Efforts

- *Workshops*
- *Academic Challenges*
- *USCRP Programs Office*
- *Specific Research Topics*
 - *Including DUNEX*



Multi-agency, academic, and NGO collaborative community experiment to study nearshore coastal processing during storms

U.S. Coastal Research Program CALL FOR RESEARCH PROPOSALS

Academic Proposal Request (update)



The U.S. Coastal Research Program (USCRP) is a partnership of the coastal research community to coordinate Federal activities, strengthen academic programs, and build a strong workforce. As identified by its 'National Plan,' the USCRP addresses societal needs along the coast through a coordinated effort backed by researchers from Federal agencies, academia, industry, and non-governmental organizations.

In 2019, the USCRP is providing approximately \$5M in competitive awards for academic proposals addressing the topics described below. Awards will be 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 are available:

- (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.

In January 2019, the US Coastal Research Program will advertise 12 Requests for Statements of Interest (rSOI) through the Cooperative Ecosystems Study Unit (CESU) National Network (<http://www.cesu.psu.edu>). There will be one rSOI advertised for each research topic described below, and will detail the approximate total funding available in that topical area.

If interested in a particular topical area, academic researchers will submit two-page statements of interest (SOI)* to the point of contact (POC) identified in the rSOI. SOIs will be reviewed and ranked by the USCRP team. Top SOIs will then submit full proposals for review, selection, and awarding following the general schedule below. For questions about submitting, please contact Julie Rosati Julie.D.Rosati@usace.army.mil or Mary Cialone, Mary.A.Cialone@usace.army.mil.

Schedule

1 Nov 2018:	Call for USCRP 2019 Academic Proposals
19 Dec 2018:	Informational webinar on proposal process, hosted by USCRP – webinar info to follow
25 Jan 2019:	12 rSOIs advertised
early Feb 2019:	2-page Statements of Interest* submitted by researchers to the POC identified in the rSOI
Feb 2019:	Top selected candidates will be notified to submit full proposals (tentative)
Mar 2019:	Full proposals due
end June 2019:	Proposals awarded

Updated

* U.S. Coastal Research Program (2016): "U.S. Nearshore Community Integrated Research Implementation Plan – The National Plan." Available at http://ashpa.org/wp-content/uploads/2016/03/Nearshore_National_Plan_complete.pdf
* Proposed funding amounts can vary by year depending on the work planned for that year of the project.

DUNEX: DURING Nearshore Event eXperiment

Short-term goal:

- Make high-quality field measurements to better understand:
 - DURING-STORM processes & impacts
 - POST-STORM recovery



Long-term goals:

- Improved representation of physical processes during extreme events in models
- Improve prediction of storm processes & impacts
- Validate numerical models for storm processes
- Identify & reduce sources of error for storm processes predictions
- Improve strategies for short- and long-term coastal resilience
- Develop effective communication methods for communities impacted by storms

DUNEX: Fixed Site or Storm-Chasing Site?

- Region prone to frequent storms
- Specific storm landfall location
- Consider:
 1. Aspects to target for data collection
 - Nearshore processes (improved understanding)
 - Frequent dune collisions
 - Overwash
 - Infrastructure impacts
 2. Types of measurements
 3. Modeling/measurement comparisons

Selection: Fixed Site



DUNEX: Fixed Site

Targeted Experiment Location

- **Northern Outer Banks, NC**
 - Cape Hatteras National Seashore to VA Border
 - 160 km
 - Prevalence of impacts from annual coastal storms
 - Improve during-storm, nearshore processes prediction capabilities
- **Fixed Site Advantages**
 - Controlled environment for deployment
 - Opportunity to develop during-storm data collection skills
 - Apply knowledge gained to storm-chasing experiment



DUNEX Fixed Site: Northern Outer Banks, NC

Wide Range of Storm Impacts



**Dune Collision/Erosion
Atlantic Ocean (Looking South)**

Road Collapse



Flooding from Rain



- Overwash
- Breaching
- Flooding from overtopping

Currituck Sound



Inundation/Marsh Erosion

Photos by Matt Lusk

DUNEX Fixed Site: Northern Outer Banks, NC

USACE Field Research Facility (FRF)

East Carolina University's Coastal Studies Institute (ECU-CSI)

Multi-decadal morphology and physical processes

Bathymetry/topography

Real time observations:

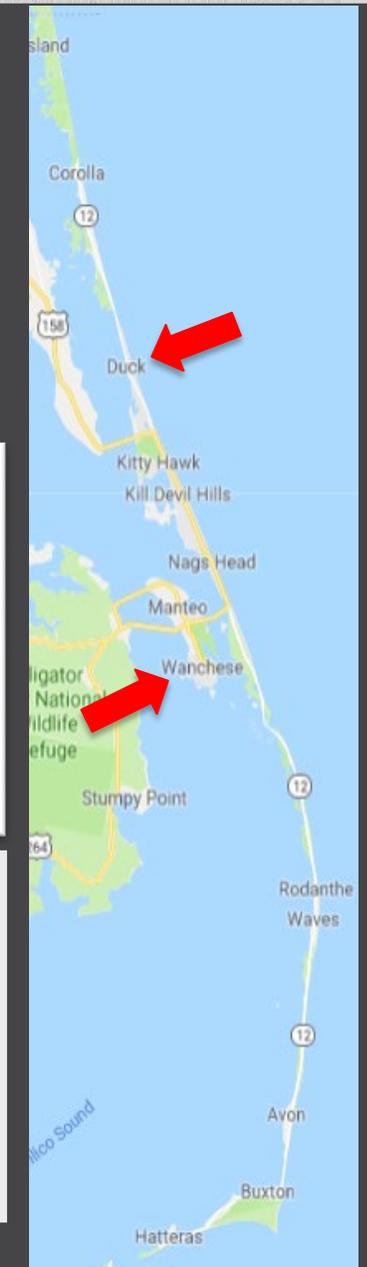
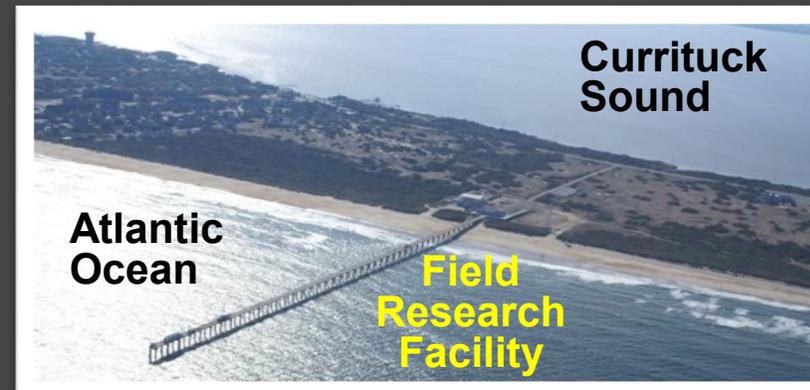
- Waves shoreward of 26-m
- Current measurements (to 17-m)
- Frequency-directional waves (8-m array)
- LIDAR
- Pier measurements

Lab/office space

Equipment

Vessels for deployment/retrieval

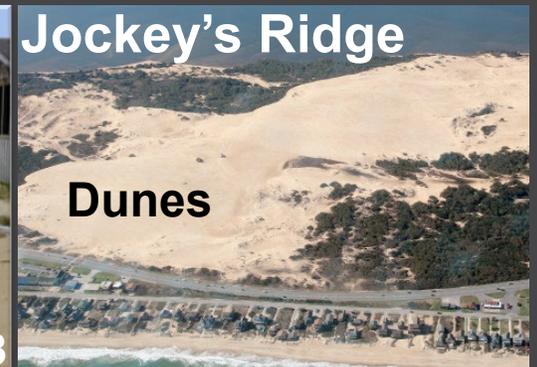
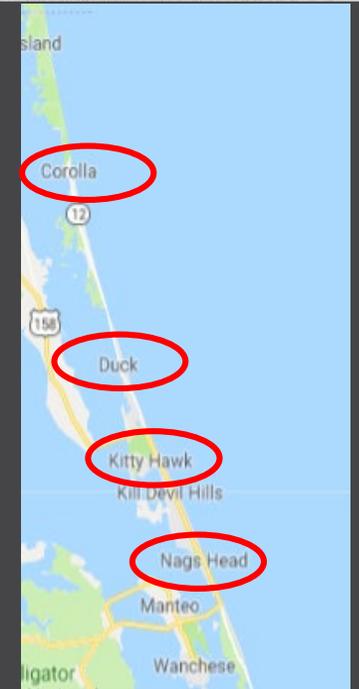
Leverage measurements to supplement multiple experiment needs



DUNEX Fixed Site: Northern Outer Banks, NC

Region includes:

- Wide, dissipative flat beach (Corolla)
- Field Research Facility (Duck)
- Built environment, overwash (Kitty Hawk, Rodanthe, Buxton)
- Developed beach, 2010 nourishment (Nags Head)

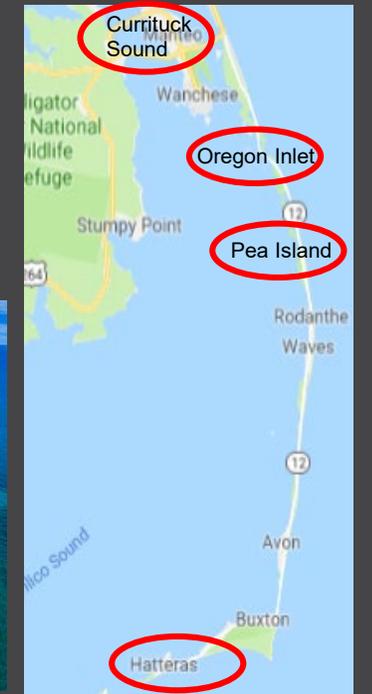


DUNEX Fixed Site: Northern Outer Banks, NC

Region includes:

- Wide, dissipative flat beach (Corolla)
- Built environment, overwash (Kitty Hawk, Rodanthe, Buxton)
- Developed beach, 2010 nourishment (Nags Head)
- **Inlet system, prograding spit (Oregon Inlet)**
- **Hummocky dunes, 2011 breach, aeolian transport (Pea Island)**
- **Rapid evolution & along-coast variation (Hatteras Point)**
- **Marsh Erosion (Currituck Sound)**

Marsh Erosion



Oregon Inlet



Hummocky Dunes

Pea Island



2011 Breach



Hatteras Point

DUNEX Steering Committee

- SUPPORT researchers in conducting field studies to improve knowledge and understanding of nearshore processes before, **DURING**, and after storm events
- Federal agencies and academic researchers
- Facilitate/guide **subcommittees** to a successful field experiment
 - **Logistics**
 - **Data management**
 - **Training/Student volunteers**
 - **Interagency collaboration**
 - **Communications**
- Academic Research Forum



DUNEX Subcommittees – meet monthly

Logistics

Communications

- Identify group needs, individual PI needs, and schedule resources
- Office space, training space, ocean/sound access, permitting
- Science Team PIs
- Collaborate with NSF-funded Convergence-RAISE grant researchers
- **Logistics Survey** – assist the Logistics Team to organize the experiment: common data needs to facilitate collaboration, instrument fabrication, deployment/retrieval, and training topics of interest to the participants

Due: 31 Dec 2019

DUNEX Subcommittees

Logistics

Communications

**Data
Management**

- Sensor Catalog
- Web Accessible Experiment Map (DUNEX Map)
- Data Sharing Plan
- Data Discoverability (*data.gov, google dataset, ArcGIS Hub*)

**Interagency
Collaboration**

- Lectures/exercises focused on coastal processes
- Technical talks about on-going DUNEX experiments



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- Hands-on training on field methods
 - Hands-on numerical modeling sessions



Offered to academic researchers/students, federal agency staff, and local town managers

Training



DUNEX Timeline

- **Fall 2019: DUNEX Pilot Project**
 - Test methods, equipment, and logistics
 - Northern Outer Banks, NC
 - Training Week: 23-27 Sep 2019
- **2019 – 2020: Planning Meetings & PI Coordination**
 - Dec 31 2019: Full DUNEX Logistics Survey
 - Coordination Meeting: 2020 Ocean Sciences
- **Fall 2020: Full DUNEX Experiment**
 - Collect measurements prior to, during, and following one or more storms



Teamwork
Multi-agency/Academic/NGOs

Opportunities to Participate

- **PI as part of the Pilot & Full Experiments**
 - **Must secure your own funding (NSF, DoD, SeaGrant, DoT, USCRP, etc)**
 - **Fill out a Logistics Survey**
 - **Agree to a data sharing policy**
- **Attend training sessions (field and classrooms)**
- **Be a training session instructor!**
- **Be a student volunteer**
 - **Assist in fieldwork, etc.**



Summary

DUNEX 2019 Pilot & 2020 Full Experiment

<https://uscoastalresearch.org/dunex>

- **Researchers**

- Collaborate/Learn from each other
- Leverage limited research budgets – collaborating/data sharing
- Scientific advancements – coastal storm processes knowledge and prediction
- Develop during storm data collection expertise
- Renewed academic interest in coastal processes

- **Communities**

- Improve strategies for short- and long-term coastal resilience
- Develop effective communication methods for protecting themselves from storm impacts

Thank You!

DUNEX 2019 Pilot & 2020 Full Experiment
<https://uscoastalresearch.org/dunex>

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