US COASTAL RESEARCH PROGRAM 2020 ACADEMIC RESEARCH OPPORTUNITY

www.uscoastalresearch.org

Thank you for joining us.
We will begin at 2:05 pm ET.

- Please mute your phones.
- Submit questions via the chat feature of webex. Send to 'chat with all.'
- The webinar will not be recorded. Slides will be posted at the USCRP website.

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US COASTAL RESEARCH PROGRAM
2020 ACADEMIC RESEARCH OPPORTUNITY

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Goals: (1) summarize FY20 federal research priorities and (2) describe proposal process and timeline

Presenters:

Nicole Elko, American Shore & Beach Preservation Association
Leighann Brandt, Bureau of Ocean Energy Management
Lauren Schmied, Federal Emergency Management Agency
Mary Cialone, US Army Corps of Engineers (USACE)
Julie Rosati, USACE
Hilary Stockdon, US Geological Survey
Emily Russ, NOAA Knauss Fellow, USACE

US COASTAL RESEARCH PROGRAM
2020 ACADEMIC RESEARCH OPPORTUNITY

Agenda

- Introduction to USCRP
- FY20 Academic Awards Areas of Focus
- Federal Coastal Research Priorities & Science Questions - USGS, USACE, FEMA, BOEM, ASBPA
- Proposal process
  - 2 separate proposals with some of the same information
    - ASBPA & USACE rSOI (CESU*)
  - Criteria for proposal review
- Award process and approximate schedule

**Cooperative Ecosystem Studies Units (CESU)*
http://www.cesu.psu.edu/

US COASTAL RESEARCH PROGRAM
USCRP SUMMARY, MISSION, ORGANIZATION

Goals: Address national nearshore coastal research priorities of greatest societal relevance & build skilled US workforce.

Approach: Leverage & expand federal, academic, industry, & non-gov nearshore research to address consensus needs.

Mar 2014: Future of Nearshore Processes Workshop

Winter 2015: "Nearshore Report" identified 3 broad research themes:

(1) ***Long-term coastal evolution***
(2) Extreme events
(3) ***Human and ecosystem health***

Identified need to coordinate nearshore observations & modeling; mentor & train coastal community.

Future of Nearshore Processes Research
(Elko et. al, 2015)

US COASTAL RESEARCH PROGRAM
RECENT ACCOMPLISHMENTS

- Building a USCRP Coastal Community of Practice: 370 members
- Hosted 5 workshops/visioning sessions
  - Dune Management Challenges (2015)
  - Storm Processes and Impacts (2018)
- Funded Academic Awards
  - Dune Research Studies (5 projects; 2016; $265.6K)
  - Storm Research Studies (7 projects; 2018; $775K)
  - 12 priority topics (22 projects; 2019; $5M)
- Interagency Coordination
  - National Research Plan (2016)
  - Collaborative experiment DUNEX (2019, 2020)

US COASTAL RESEARCH PROGRAM
2020 AWARDS SUMMARY

Areas of Focus for FY20 Funding:

1. **Long-term processes** and coastal response along open coast shorelines (sea level changes; future storms; sediment supplies; land use changes), and

1. Processes influencing the ability of **estuarine ecosystems** to provide 1) storm protection, 2) economic benefit, and/or 3) critical habitat.

Coastal Research Priorities were identified by USCRP-affiliated federal agencies based on current research needs and scientific gaps.

US COASTAL RESEARCH PROGRAM
2020 AWARDS SUMMARY: General Process

- *Academic proposals should align with or support federal research priorities to address critical research needs within the coastal community and advance the state of knowledge.*
- Following this introductory webinar, indicate interest in specific research priorities via Google Form. Federal researcher will follow up.
- Federal PI for each research priority will host webinar to discuss science questions and technical details.
- USCRP will use a 2-part proposal process:
  - Full proposal (5 pg) submitted to ASBPA
  - SOI submitted to USACE via CESU
- Funding will be provided by the end of the fiscal year.

COASTAL RESEARCH PRIORITIES
USGS

- Federal Program: USGS Coastal-Maine Hazards and Resources Program https://www.usgs.gov/natural-hazards/coastal-marine-hazards-and-resources
- CMHRP studies the current state and evolution of coastal landscapes and their response to natural- and human-driven processes in order to develop forecasting tools for mitigating dangers to communities or more effectively managing coastal resources.
- Users: Federal partners (ie. USFWS, NOAA, EPA, USACE); tribal groups; state and local agencies (ie. water management districts, resource managers, emergency response, coastal planning); and NGOs

COASTAL RESEARCH PRIORITIES

USGS - Long-term Processes - L1

PI: Davina Passeri

L1. Decadal-scale modeling of barrier island evolution under future storms and sea level rise
Fundamental Science Questions for Academics to Address/Advance
1. How can we integrate short- and long-term drivers (i.e., storms and sea level rise) into modeling approaches to evaluate long-term barrier island evolution? 2. How does post-storm recovery affect long-term barrier island evolution?

COASTAL RESEARCH PRIORITIES

USGS - Long-term Processes - L2

PIs: Christie Hegermiller and John Warner

L2. Role of nonlinear interactions of physical processes on long-term coastal evolution
Fundamental Science Questions for Academics to Address/Advance
1. With a warming ocean and changing atmospheric circulation, how will changes in storm tracks and storm intensity impact storm surge and wave energy signatures along the coast? 2. How does the initial state of the coast impact the magnitude of storm response? What are the factors, both in the oceanographic forcing and the subaerial and nearshore profile, that influence the magnitude and timescales of recovery? 3. Along hurricane-prone coasts, what are the dominant physical processes (e.g., storm surge, buoyancy fluxes to the coastal ocean by runoff, gradients in wave energy fluxes (impacted by bathymetry, position of the Gulf Stream, sea level anomalies)) that result in spatial variations in erosion or flooding? How will predicted changes in those processes impact coastal vulnerability in the future?

COASTAL RESEARCH PRIORITIES

USGS - Long-term Processes - L3

PIs: Kevin Kroeger and Meagan Gonneea

L3. Groundwater changes due to sea level rise and corresponding landscape response, particularly behind coastal defense structures. Focus on models and predictions.
Fundamental Science Questions for Academics to Address/Advance
1. How does groundwater level respond to sea level in areas with managed hydrology? 2. How do soil elevation trajectory, and habitat change respond to water level changes and future sea level?

COASTAL RESEARCH PRIORITIES

USGS - Long-term Processes - L4

PI: Chris Sherwood

L4. Barrier island survival during future climate conditions (changing sea level, storms), particularly as related to the long-term sand volume budget. Focus on monitoring nearshore bathymetry.

Fundamental Science Questions for Academics to Address/Advance

1. How is the morphology of barrier islands responding to changes in sea level and storm characteristics?
2. How does the nearshore profile change during beach recovery following storms?
3. What effect does the pre-storm nearshore profile have on barrier response to events?
4. Is barrier volume preserved as barriers roll over?
5. Is long-term shoreline change a good proxy for barrier volume?
6. How do we cost-effectively measure nearshore bathymetry on the time and space scales needed to resolve the short-term changes that, cumulatively, produce the long-term response?

COASTAL RESEARCH PRIORITIES

USGS - Long-term Processes L5

PI: John Pohlman

L5. Effects of land use and fresh water management practices on water quality and harmful algal blooms
Fundamental Science Questions for Academics to Address/Advance
1. How do groundwater pumping and land use practices affect the infiltration of nitrogen into karst subterranean estuaries (KSEs)? 2. How is nitrogen biogeochemically transformed within the KSE? 3. How do ecosystems within the KSE respond to these inputs and alterations? 4. How do chemical and biogeochemical transformations within KSEs affect the quantity and speciation of nitrogen discharged into the coastal ocean? 5. Does nitrogen emanating from diffuse or spring-fed submarine groundwater discharge differentially affect the persistence of harmful algal blooms in the coastal ocean of the West Florida Shelf?

COASTAL RESEARCH PRIORITIES

USGS - Estuarine Ecosystems - E1

PIs: Davina Passeri, Christopher G. Smith, and Kathryn Smith

E1. Estuarine and marsh evolution due to short- and long-term drivers. Focus on integrated data collection and modeling.
Fundamental Science Questions for Academics to Address/Advance
1. How do changes in sediment supply due to storms and sea level rise affect marsh evolution? 2. How can we improve models to assess feedback-mechanisms between estuaries and marshes? 3. How do long-term modeled accretion rates compare to field-based effective accretion rates?

COASTAL RESEARCH PRIORITIES

USGS - Estuarine Ecosystems - E2

PI: Neil Ganju

E2. Developing tools to assess future evolution of coastal habitats in response to sediment supply, sea-level rise, hydrodynamics, and bio-physical interactions

Fundamental Science Questions for Academics to Address/Advance

1. What processes initiate and drive salt marsh deterioration?
2. Can we model the processes of salt marsh deterioration?
3. How do sea-level rise, temperature, and light attenuation control seagrass densities and their wave attenuation services?
4. Can we model the processes of seagrass response to sea-level rise, temperature, and light attenuation?
5. What are the trajectories of salt marsh deterioration, and how do they vary regionally and nationally?
6. Can we use remote sensing to evaluate trajectories of salt marsh deterioration?

COASTAL RESEARCH PRIORITIES

USGS - Estuarine Ecosystems - E3

PIs: Kevin Kroeger and Meagan Gonneea

E3. Effects of hydrological management in coastal wetlands on the biogeochemical processes that drive soil accretion, and the implications for subsidence and diminished ecosystem services in response to sea level rise
Fundamental Science Questions for Academics to Address/Advance
1. How do biogeochemical conditions and processes respond to changes in hydrology? 2. How can elevation trajectories be predicted as an outcome of carbon cycle and related processes?

COASTAL RESEARCH PRIORITIES
USACE
Agency Mission Needs that this Research will Address

USACE Mission

- Military & Civil Works since 1800s
- Primary Civil Works Missions:
  - Navigation
  - Flood & Coastal Storm Risk Management
  - Environmental Stewardship
- Internationally…
  - Provide 100+ countries technical and construction support
- R&D to support Military & Civil Works

Enough sediment to fill 35 superdomes per year!

Flood & Coastal Storm Mission

Environmental Mission

Navigation Mission

US Army Corps of Engineers • Engineer Research and Development Center

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COASTAL RESEARCH PRIORITIES
USACE - Long-term Processes - L6

PIs: Tanya Beck & Katie Brutsche

L6. Coastal Inlets Research Program (CIRP) and Regional Sediment Management (RSM) Programs Sediment Budgets: Limitations on our predictive capability of sediment resource budgeting and long-term management practices
Fundamental Science Questions for Academics to Address/Advance
Determine components of a nationwide sediment budget that are challenging to compute and what new approaches can be taken to define them, e.g. Onshore/offshore transport between the shelf and coast.
Research the impact of long-term processes of water levels (including frequency of storm-induced water levels) on longshore sediment transport rates.
Research on the variability of sediment transport directions and magnitudes along the boundary between the depth of closure and the continental shelf, and, is it possible develop a model of this phenomenon that projects changes with water level change.
Research how changes in the depth of closure for coastlines impacts our computation of sediment budgets over the lifecycle of engineering projects (50-year planning horizons and greater)?
Research the regional implications of beach and nearshore nourishment over long-term (decadal to century scale) timeframes. What are the additional impacts to the computation of a sediment budget?
What are methods to include aeolian transport along the subaerial portions of coastlines in sediment budgets over decadal to century-scales?

COASTAL RESEARCH PRIORITIES
USACE - Long-term Processes - L7

PI: Tanya Beck

L7. Coastal Inlets Research Program (CIRP) Program **Tidal Inlets: Management of sediment resources in the vicinity of tidal inlets which must address uncertainty in the impacts of long-term processes such as sea-level change, land-use change, and sediment supply.**
Fundamental Science Questions for Academics to Address/Advance
When considering the correlation between the geomorphology (e.g. hypsometry, sediment type, ecomorphodynamics) of estuarine basins of the U.S. and their predicted relative sea level change rates, what is the impact on tidal inlet sedimentation and which management practices are best for Federally-maintained tidal inlets?
What are the benefits and costs of the sand management practice of recycling sediments between inlets and beaches given the state of practice within the U.S.; and, is this practice sustainable?
How might a sea level change model for Barrier-Inlet systems (such as those based on the Bruun Rule or Dean Equilibrium Model) be modified to address long-term cyclical inlet breaching and inlet management practice in the U.S.?
A need exists to refine sediment transport formulations for bed load transport in the form of migrating bedforms. Are there measurement capabilities for migrating bedforms within tidal inlets that can refine our understanding of bed load and suspended load transport between inlet sediment resources, and how might these measurements be applied to improve sediment transport formulations in long-term predictive models?

COASTAL RESEARCH PRIORITIES
USACE - Long-term Processes - L8

PI: Brandon Boyd

L8. Flood & Coastal Systems (F&CS) Program **1) Dune Dynamics and 2) Human reaction to repetitive flood loss**
Fundamental Science Questions for Academics to Address/Advance
Dune Dynamics: Need for additional model testing and exploration across a wide morphodynamic continuum using available morphologic, meteorological, and oceanographic datasets. Any incremental advancing understanding of model uncertainty, process or numerical limitations, and assessment of model performance on simulating dune dynamics across various beach types could lead to direct benefits in predictive capabilities for USACE, especially considering the importance of dunes for coastal protection and the increasing need to factor in dunes into project designs.
In order to better characterize future condition risk we need to understand how people respond to repetitive flood loss conditions. Currently, the availability and reliability of data is lacking for a clear understanding of the social behavior associated with rebuilding after flood losses. Without this information, it is impossible to evaluate what the exposed inventory will realistically be under climate change scenarios. We need better data to support our ability to model the future condition for consequence assessments.

COASTAL RESEARCH PRIORITIES
USACE - Long-term Processes - L9

PI: Jeff Waters

L9. Coastal Field Data Collection Program **Linking short-term (seconds to seasons) nearshore morphologic variability, sediment transport, waves, and water levels to long-term morphology change**
Fundamental Science Questions for Academics to Address/Advance
Morphology modeling on any time scale suffers from a lack of sediment transport measurements in the nearshore/surf zone. What are new and innovative methods to measure sediment transport in the surf zone (e.g. bed load and suspended sediment)?
When do alongshore sediment transport processes dominate over cross-shore sediment transport processes for the development of nearshore morphologic features (e.g. sand bars) and shoreline change?
What mechanisms trigger tipping points in beach-dune morphologic evolution (e.g. runaway erosion, overwash regime, etc.)? How does sub-aerial morphologic evolution relate to changes in nearshore sub-aqueous morphology (e.g. shoreface steepening, net offshore bar migration)?
Can we link inter-annual/multi-decadal trends in morphologic evolution to climate forcing?
What new insights into long-term morphologic evolution can be gained from using new advances in data analytics (e.g. neural networks, empirical dynamic modeling, dynamic mode decomposition, etc.)?
How does hydrodynamic and morphologic measurement uncertainty affect analysis of long-term morphology data sets?
How do you isolate effects of sea level change in long-term morphologic evolution?

COASTAL RESEARCH PRIORITIES
USACE - Estuarine Ecosystems - E4

PI: Trudy Estes

E4. Ecosystem Management and Restoration Research Program (EMRRP) **Restoring and Sustaining Ecological Function in Coastal Marshes Affected by Sea Level Rise and Assessing and Improving the Resilience of Bay and Coastal Marshes and Islands**
Fundamental Science Questions for Academics to Address/Advance
More data is needed to inform/design material placement strategies for proposed thin layer placement sites. The combined rate and magnitude of consolidation for a site given specific foundation and placement material characteristics, number of material lifts and depth, placement frequency, manner and rate of placement, needs to be quantified for a variety of sites and site conditions, in order to design placements achieving desired final target elevations (fundamental to establishing desired ecological function, specific vegetation/habitat, etc.)
More/better data is needed regarding the ability of vegetation to recover from thin layer placement in coastal marshes, the length of time required to recover, and the species-specific interdependence of vegetation recovery to type and depth of material placement.
More work needs to be done to match specific mechanisms of vulnerability to recommended management or restoration measures that will be not only successful but also sustainable.
More usage data for shoreline dependent species from which “impacts” of placement, and design, can be inferred. Opportunistic data acquisition informing design and risk reduction associated with natural features such as coastal marshes. Expanded social and decision-science inputs to benefits assessments (which may require external collaboration in order to tap into appropriate expertise).

COASTAL RESEARCH PRIORITIES
USACE - Estuarine Ecosystems - E5

PI: Trudy Estes

E5. Ecosystem Management and Restoration Research Program (EMRRP) **Quantifying the inundation effects on marsh vegetation with focus on field data collection**
Fundamental Science Questions for Academics to Address/Advance
EMRRP researchers are evaluating the combined effects of freshwater diversions on coastal marshes, which are intended to provide sediment and nutrients but which also – due to salinity alteration and prolonged inundation – may have equally detrimental effects on the marshes intended to benefit. There is a great need for additional field data acquisition (by academic researchers) that would benefit this research project.

COASTAL RESEARCH GAPS
FEMA - Long-term Processes

"Helping people before, during, and after disasters."

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COASTAL RESEARCH PRIORITIES
FEMA - Long-term Processes - L10

POC: Lauren Schmied

L10. Change in focus from the 1-percent-annual-chance condition to a better understanding of the graduated risk due to coastal hazards at the structure level.
Fundamental Science Questions for Academics to Address/Advance
Need to reframe coastal erosion and the impact on coastal flood risk and associated losses. This reframing needs to focus on the update of erosion methodology currently used in FEMA assessments as well as the development of scalable nationwide processes that assess the impact of erosion on graduated risk due to coastal hazards.
Need to reframe overland wave propagation and the impact on coastal flood risk and associated losses. This reframing needs to focus on the update of overland wave assessment currently used in FEMA assessments for a 1-percent-annual-chance condition as well as the development of scalable nationwide processes that incorporate the impact of overland waves on structure level risk.
Understanding our structure level risk in probability space that hasn't traditional been FEMA's focus (high and low frequency) and potentially integrating physical flood risk components like tsunamis that haven't been the focus for the 1-percent-annual-chance condition into a national graduated risk framework.
Understanding structure level risk associated with combined flooding including coastal, fluvial, and pluvial conditions.
Development of systems that allow for scalable and adaptable integration of potential changes to flood risk as the program moves forward.

COASTAL RESEARCH PRIORITIES

ASBPA - Long-term Processes - L11

POC: Nicole Elko

L11. Human influence on long-term coastal erosion trends and sediment budgets
Fundamental Science Questions for Academics to Address/Advance
1. What has driven states and/or communities to address long-term coastal change with interventions such as beach nourishment? 2. Were the significant beach nourishment investments coupled with historic natural processes? How did they impact regional sediment budgets? How can we expect mitigation strategies to couple with natural processes and sediment budgets in the future? 3. How have U.S. nourishment strategies evolved as physical, economic and policy forcings changed? 4. Can the ASBPA National Beach Nourishment Database (https://gim2.aptim.com/ASBPANationwideRenourishment/) help to address these questions?

COASTAL RESEARCH PRIORITIES

BOEM- Long-term Processes - L12

POC: Leighann Brandt

L12. Long-term feedbacks of dredging and environmental habitat
Fundamental Science Questions for Academics to Address/Advance
1. Which configuration would result in a lesser impact to benthic resources or the shoal ecosystems in general: a larger area with a shallower cut, or a smaller area with a deeper cut? 2. With repeated reuse of large borrow areas over the long-term, which configuration would promote the most rapid benthic recovery? 1. What percentage of federally managed fish species present in the offshore use adjacent estuarine environment as nursery grounds? 2. What is the potential for impact on the larval, juvenile and adult stages from a single nourishment project? 3. How can these potential impacts to the life cycle of federally managed fish species be minimized?

COASTAL RESEARCH PRIORITIES

BOEM- Long-term Processes - L13

POC: Leighann Brandt

L13. Implications of adding sediment from outside the littoral system on the sediment budget of a coastal system and long-term coastal resiliency
Fundamental Science Questions for Academics to Address/Advance
1. Does adding sediment into a system (from the outer continental shelf or upland mine) have a long-term effect on the local or regional sediment budget? 2. As a result, does this increase coastal resiliency beyond what is possible using material from within the littoral system?

CONNECTING WITH FEDERAL RESEARCHERS

Please indicate your interest in submitting a proposal to one of the research topic areas using the Google Form, **before January 24**.

- The PI for each federal research theme will contact you regarding a topic-specific meeting where you can discuss science questions and more technical aspects of the research.
- Please do not immediately contact the PIs at this time. Wait for follow up instructions regarding meeting date/time/format.
- Link to the google form is available on the USCRP website. https://uscoastalresearch.org/2020-awards-info

US COASTAL RESEARCH PROGRAM
2020 ACADEMIC RESEARCH OPPORTUNITY

- FY20 Funding
  - Total available: up to $5M
  - Individual awards: Has not been finalized. Range in previous years has been $40K - $400K.

- Period of performance
  - Up to 3 years

TWO-PART PROPOSAL PROCESS

Research Proposal

- Five-page research proposal describing planned work, submitted to ASBPA

Statement of Interest (SOI)

- 2-page statement of experience and qualifications to POC identified by request for Statements of Interest (rSOI) on CESU Network. (Contains the same information as first two pages of research proposal.)

PROPOSAL PROCESS: PART 1

Five-page research proposal submitted to ASBPA

- RFP will be available early next week at https://uscoastalresearch.org/2020-awards-info
- Content:
  - Pages 1 & 2: Qualifications (same as SOI)
  - Pages 3 - 5: Description of how research aligns with federal research priorities & feds' stakeholders, research plan & technical approach, graduate student(s) role, detailed budget
- Submit online: http://asbpa.org/us-coastal-research/
- Deadline: February 26, 2020 at 11:59 PM (EST)

PROPOSAL PROCESS: PART 2

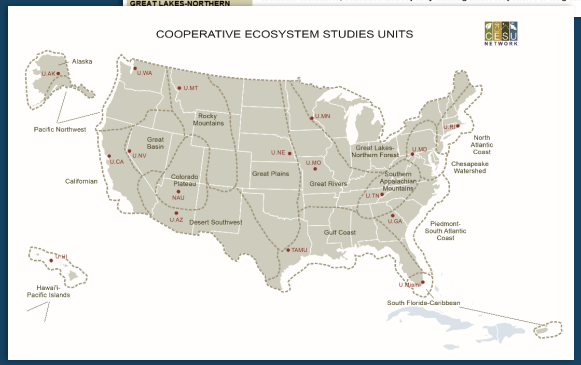
Cooperative Ecosystem Studies Units (CESUs)

- CESU Network: consortium of federal agencies, tribes, academic institutions, state & local governments, nongovernmental organizations

If your university is not currently in the CESU Network:

- Join *http://www.cesu.psu.edu/about/join.htm*
- Partner with an existing CESU organization

http://www.cesu.psu.edu/



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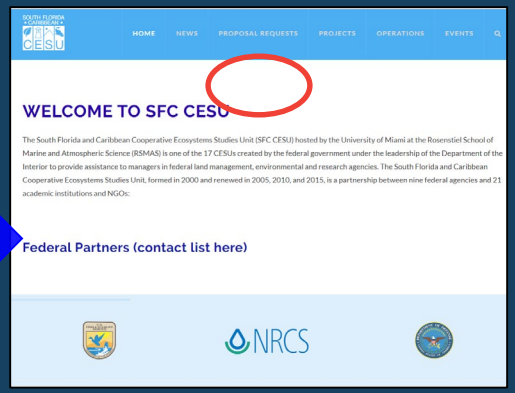
PROPOSAL PROCESS: PART 2 cont.

Cooperative Ecosystem Studies Units (CESUs)

Request for Statements of Interests (rSOI) Process:

1. Go to http://www.cesu.psu.edu/
2. On the left hand side, choose your “Regional CESU Network”
3. On the Regional page, click on the website
4. rSOIs will be posted on this regional website (ie. S. Florida and Caribbean)



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PROPOSAL EVALUATION CRITERIA

1. **Importance and/or relevance and applicability of proposed project to the USCRP goals**
   - Aligns with current Federal research priorities
   - Shows a clear connection between science and application
   - Supports a graduate student and provides an opportunity for research leadership

1. **Technical and scientific merit**
   - Research advances fundamental science
   - Goals, objectives, and deliverables are clearly stated and described
   - Methods are novel and creative; enable future breakthrough technologies

1. **Likelihood for success**
   - Applicant demonstrates the experience and capacity to lead proposed work
   - The appropriate federal partners and their stakeholders are included
   - The scope of work can be successfully completed within the stated period of performance

1. **Project costs**
   - A detailed budget is provided. Costs are reasonable and well justified
   - Optimizes the cost effectiveness by leveraging federal resources or in-kind matches

APPROXIMATE TIMETABLE

for proposals and awards

Timing	Task
now	Webinar announcing funding opportunity
next week	RFP announced
January 24	**Submit interest in research topic via google form**
late January	Topical meetings to discuss science with PIs
early February	Request for SOIs announced on CESU Network
February 26	**Full proposals due to ASBPA**
mid to late February	**SOIs due (Deadline will be 10 days after posting)**
March	Proposals reviewed
Summer	Funded proposal selected and researchers notified
Fall	Awards made

US COASTAL RESEARCH PROGRAM
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What can you do now?

- Indicate interest in Federal Research Priority by completing Google Form. PI-led topical meetings to discuss science questions will follow.
- Stay connected. Sign up for USCRP mailing list.
- Learn about the CESU process (www.cesu.psu.edu).
- Look out for the RFP next week and rSOIs in early February.

Still have questions?

USCRP: https://uscoastalresearch.org/2020-awards-info
email: Emily.R.Russ@usace.army.mil