**U.S. Coastal Research Program**

Request for Proposals

2023

January 18, 2023

The U.S. Coastal Research Program (USCRP) is a multi-agency led effort to coordinate federal activities, strengthen academic programs, and address coastal community needs by identifying coastal research priorities, enhancing funding for coastal academic programs, fostering collaboration, and promoting science translation. USCRP is guided by priorities of coastal leaders in federal agencies, academics, and non-governmental organizations and by the overarching framework and needs as identified in the seminal 2014 Nearshore Research Report (Elko et al. 2015)[1]. Past USCRP opportunities have funded university researchers across the U.S. to tackle coastal science and engineering questions in a variety of environments along all the nation's coastlines. The goal of the USCRP is to build a community of practice to address societal needs along the coast.

In fiscal year 2023 (FY23), the USCRP intends to provide up to $4M for competitive academic proposals addressing the ability to collaboratively predict sediment transport processes and morphologic response to coastal processes under highly controlled conditions at the U.S. Army Engineer Research and Development Center (ERDC) Coastal and Hydraulics Laboratory (CHL) facility (see appendix). These academic proposals should include funding for graduate students to help build their expertise in coastal research and develop the next generation of leaders. Researchers and students at U.S. institutions of higher education are invited to respond to this request for proposals (RFP). The period of performance for the awards is up to 4 years.

[1]*Elko, N., Feddersen, F., Foster, F., Hapke, C., Mcninch, J., Mulligan, R., Özkan-Haller, H.T., Plant, N., and B. Raubenheimer (eds.), 2015. "The future of nearshore processes research." Shore & Beach, 83(1), 13.*

**Application Process**

A research proposal describing the science/engineering questions to be addressed and planned work should be submitted to the USCRP in response to this RFP. The format and content of the research proposal is described below. Direct all questions to contact.uscrp@gmail.com. Instructions to register for an informational webinar that will provide an overview and opportunity for Q/A related to this opportunity will be posted on the USCRP website under Funding Announcements, 2023 Awards Info.

**Research Proposal Deadline**

**Research proposals are due by March 1, 2023, at 11:59 PM (EST).** The proposals should be submitted to the USCRP request for proposals posted on the USCRP website under Funding Announcements, 2023 Awards Info. Click on the submit proposal button.

**Award Information**

Total anticipated funding for all awards is up to $4 million for FY23 to support at least 4 awards, inclusive of indirect costs. Applicants must be in good standing with previous USCRP awards to receive FY23 funds. The amount of the individual awards should not exceed $1 million, inclusive of indirect costs. The exact amount of funds for each award will be finalized in pre award discussions/negotiations between the applicant and USCRP representatives.

Applicants may submit proposals with a period of performance of up to 4 years from the anticipated start date of January 1, 2024.

**Approximate timetable for proposals, awards, and planned laboratory research campaign:**

| **Anticipated Dates** | **Task** |
|---|---|
| March 1 2023 | Research proposals due to USCRP |
| March - April 2023 | Proposals reviewed |
| April 1 2023 | Proposals recommended for funding; researchers notified |
| April 15 2023 | Recommended proposals submitted through the USACE Broad Agency Announcement (BAA) process |
| December 31 2023 | Awards made |
| January 1 2024 | Anticipated start |
| Spring/Summer 2024 | Student and professional development week in the U.S. Army Engineer Research and Development Center Coastal and Hydraulics Laboratory facility |
| Spring 2025 | Full laboratory research campaign in the U.S. Army Engineer Research and Development Center Coastal and Hydraulics Laboratory facility |

**Eligible Applicants**

The PI should be a researcher in good standing at a U.S. institution of higher learning and in a role that includes educating and supervising graduate students. Supporting a graduate student who is developing research skills is a higher priority to the USCRP than supporting a post-doctoral researcher who already has expertise in these areas. The USCRP encourages support and leadership roles, as appropriate, for STEM undergraduates into the coastal field. Academic collaborations of interdisciplinary teams are highly encouraged. Disbursements of funding should be handled by the lead university, who will receive the USCRP award, and detailed in the proposed budget including overhead for the collaborating universities. Collaborations with international academics are acceptable.

**Research Topics & Prioritized Needs**

The USCRP seeks academic proposals that align with or support federal research priorities in sediment transport processes to address critical research needs within the coastal community and advance the state of knowledge of coastal science. Successful proposals will form interdisciplinary collaborative teams and leverage and share data and research plans with other selected projects in the research campaign. Proposals should detail collaborations, the planned laboratory scaling, and how the work will aid in validating and testing future numerical models. Capabilities and information on the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory 2D Wave Flumes and Coastal Basin with Directional Spectra Wave Generator (DSWG) are detailed in the appendix.

For purposes of this effort, sediment transport will be limited to non-cohesive sediment including for example suspended and/or bedload transport, scour, or liquefaction. The sediment transport processes may be affected by a range of hydrodynamic processes from turbulence to waves/surf zone currents and coastal flooding and may include a range of spatial scales. Proposals are encouraged to address one or more of the USCRP objectives:

- ***Understanding fundamental processes of sediment transport***
    - Understanding fluid-sediment dynamics in nearshore environments
- ***Improving numerical modeling of sediment transport***
    - Furthering the development of existing numerical models by incorporating novel or better physics formulations derived from laboratory tests
    - Identifying and prioritizing parameters that cause uncertainty in numerical modeling of sediment transport processes
- ***Improving instrumentation and advances in experimental techniques***
    - Applying previously tested and validated sensors and instrumentation
    - Piloting novel approaches for sediment-transport and related phenomena
    - Advances in experimental techniques related to sediment transport, including scaling laws

The proposed plan must include funding and support for at least one graduate student to attend a week-long training and professional development in 2024 at the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory in Vicksburg, MS.

**Research Proposal Content**

The proposal should describe the research plan, show how the work aligns with prioritized needs, specify the graduate student(s) role, present a detailed budget, and outline a laboratory facility and scaling plan. The proposals will be ranked on individual merit. There is no limitation on how many proposals a Principal Investigator (PI)/co-PI can submit. A PI can submit different proposals addressing one or more prioritized needs. Please avoid submitting blanket proposals that address several needs or topic areas.

Research proposals must be no more than ten pages (single-spaced, 12- point font). Work cited, CVs, cross-team collaboration, and letters of support can be included as appendices and do not count towards the page limit. Proposals must be submitted electronically as a single pdf file. Only material that is submitted as a single pdf will be reviewed. The total electronic file size of the proposal narrative and appendices combined should not exceed 4 megabytes in storage space. Files that are larger than 4MB may not be properly downloaded, uploaded, or received by USCRP or the reviewers. Files that cannot be opened or downloaded will not be reviewed. You will be notified of receipt of your proposal via email.

Collaboration across multiple disciplines and research proposals is encouraged. Proposals will be evaluated on individual merit and also on the collective benefit to funding proposals in the same topic area that can leverage the experimental research facilities at CHL through shared use of laboratory setup or numerical modeling framework or graduate student interactions. Cross-team collaboration should be identified at the proposal stage (see item 11 below).

***Do not name your proposal USCRPresearchProposal.pdf.***

Name the file as follows: [Lastname_University.pdf] eg. Smith_Purdue.pdf.

The research proposal should include the following sections:

1. **Research Proposal Overview:**
    - PI Name, Title, Organization and Contact Information
    - Research Proposal Title
    - Research Topic and Prioritized Need Addressed (i.e., Improving numerical modeling of sediment transport, Furthering understanding of numerical model uncertainty, Improving instrumentation)
    - Proposed project performance period (start and end dates)
    - Funding request by year, as appropriate, and total funding
    - Geographic location (ie. state) where research will take place (in addition to the laboratory experiment facilities in Vicksburg, MS), if applicable
    - Project Abstract

2. **Goal and Objectives:** Include statements describing the basic or applied goals and objectives of the working hypothesis. Goals and objectives should be specific for each year of the work plan presented. Note: Recipients will be required to submit quarterly progress reports and an annual in progress review (IPR) presentation at a USCRP monthly community meeting in which progress against these goals and objectives will be reported.

3. **Societal Relevance:** Provide sufficient background information for reviewers to independently assess the significance of the proposed project. Summarize the problem, gap or need to be addressed and the status of ongoing efforts and coordination to address the identified needs or gaps. Summarize how the research aligns with prioritized needs. Describe benefits to coastal communities and/or federal agencies as applicable.

4. **Scientific and Technical Approach:** Explain the technical approach to be taken in the course of the research that will advance coastal science related to the topical area. Include a description of the scope of the testing program, the key assumptions to be made, the scientific basis for the analysis, and the numerical procedures to be used. Describe expected outcomes and potential breakthroughs that should/may arise from this research to improve the state of knowledge or understanding of sediment transport processes. Provide a research timeline to ensure the scope of work can be completed in the stated period of performance. Include a brief data sharing plan to describe how your research plan will be shared with other teams prior to the campaign and how data will be shared during and after the experiment. Note: Models and scaling for this funding call should be made available in year 1 to be shared among the research teams and used to design the laboratory experiment and data collection.

5. **Deliverables:** Provide a brief description of and timeline for products, such as publications, tools, services, metadata, data sharing plan, communication of results to federal partners, etc. Acknowledge willingness to meet USCRP performance assessment and communication requirements, including annual presentation of research findings, quarterly progress reports, and a research highlight for program communications.

6. **Qualifications:**
   Include the following:
   - Brief biographical sketch. The amount of information provided about co-investigators, if applicable, should be relative to the amount of work they will contribute to the total effort.
   - Relevant past projects and experience as they relate to the present effort.
   - Description of the role of the student(s), explain the differences between the roles of the PI and the student, and outline opportunities for student research leadership. Include funding for the student in the detailed budget. USCRP program priorities include funding graduate students and undergraduates in STEM fields.
   - Brief description of existing capabilities that will help you to successfully complete the project (e.g. equipment, etc.).

7. **Partners:** If applicable, list partners and describe their expected role and responsibilities. Describe how the project implements strategies that align with USCRP and the partner(s) goals. Describe the approach to cost-sharing and leveraging available resources such as programs, partnerships, data, and tools across the government, industry, and NGOs. There are no restrictions on hiring subcontractors.

8. **Diversity Statement:** Describe how well the proposed activity broadens the participation of historically underrepresented or under-resourced groups (e.g., race/ethnicity, gender, sexual orientation, disability, geography, etc.) and how these groups are given a voice in the project. Examples could include (but are not limited to) the full participation of women, persons with disabilities, and underrepresented minorities in conducting this work or benefitting from its outcomes.

9. **Project Budget:** Provide a detailed table of estimated costs with a narrative justification. Indirect costs should be included in your budget estimates. Overhead amounts are generally set by the university. Note all of the facilities, instrumentation, sediment, laboratory specialist and technicians available at the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory that are listed in the appendix. These items should be listed as experiment needs for planning purposes (see laboratory facility and scaling plan section), but costs associated with these items should not be included in your budget. Please note, if not using in-house sediment (0.15 mm), costs should be included separately in the proposal and budget. There are no restrictions on USCRP funds supporting international travel for science meetings and/or collaborations. Do not submit a full university budget with signature pages. Identify the cost of separable elements of the proposed work and identify the elements of the project that could be revised or eliminated if sufficient funding is not available for all proposed activities. **USCRP encourages applicants to include funding for at least one graduate student to attend a week-long training and professional development in 2024 at the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory in Vicksburg, MS.**

10. **Laboratory Facility and Scaling Plan:** USCRP intends to cover reasonable costs of ERDC CHL laboratory facility fees. Please provide an estimate of the number of days requested in the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory facility, laboratory technician support needed, and a range of acceptable grain sizes and scaling parameters. Include an acceptable range of each of the following scaling parameters: Froude, Dean, Rouse, Reynolds, Iribarren, Shields, Stokes, Sleath, Mobility, and Bagnold. See the appendix for detailed capabilities and information on the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory 2D Wave Flumes and Directional Spectra Wave Generator (DSWG). All tanks will use in-house 0.15 mm sediment for the duration of the experiment. The use of sediment other than the in-house 0.15 mm in the DSWG facility will have a significant cost and time impact to the study. It is encouraged to limit other grain sizes and/or heterogeneities to the flume facilities to reduce cost if possible.

11. **Cross-Team Collaboration:** (optional, 1 page limit, does not count toward 10-page limit) Describe how this project may be leveraged with other potential proposals submitted to this funding opportunity. Identify other proposal(s) by title and name of principal investigator.

12. **Works Cited:** (required, does not count towards page limit)

13. **CVs:** (required, does not count towards page limit, 2-page limit per CV). Each person's CV is required for lead investigator and co-investigators. CVs for graduate and/or undergraduate students are permitted but not required and should not be longer than 2 pages. Excess pages will not be included in the review.

14. **Letters of Support:** (optional, 2-page limit per letter (does not count towards page limit). Letters should address specific areas of collaboration to support the project objectives. Letters that provide broad encouragement for funding are not necessary.

**Proposal Process**

**Applicants should submit their proposal to USCRP by March 1, 2023**. Successful proposals will receive a letter of recommendation from the USCRP and then will be asked to submit their proposal with any suggested revisions through the USACE Broad Agency Announcement (BAA) process. Details on how to apply through the BAA process will be described in the letter of recommendation from USCRP, however the BAA process can be accessed at any time[1]. Anyone, with or without a USCRP letter of recommendation can submit a proposal to the USACE BAA program, but a letter of recommendation from USCRP will identify that the proposal has been endorsed by the process described herein. **Awards from this request for proposals will be made by 31 December 2023.**

[1] *2022 ERDC Broad Agency Announcement (BAA)*

**Evaluation Criteria**

The evaluation method and selection criteria for awards will include:

**1. Scope - 25%**

- Does the proposal address research topics and priority needs outlined in the RFP?
- How does the research improve the state of knowledge or understanding of sediment transport processes?

**2. Scientific and Technical Merit - 25%**

- Are the goals, objectives, and deliverables clearly stated and described?
- Is an adequate laboratory facility and scaling plan included?
- Are the methods novel and creative?

- Does the research advance fundamental or applied science to improve knowledge or understanding of sediment transport processes?
- Is a reasonable laboratory facility and scaling plan included?

**3. Experience / Research Team / Partners - 20%**

- Do the project teams demonstrate the appropriate experience, qualifications and skill for successful completion of the project?
- Do the project teams have the capacity and resources such as equipment and staff necessary to complete the work?
- Have collaborations and partnerships been pursued? If so, does it tie back to the objectives and tasks of the proposed plan?

**4. Deliverables - 10%**

- Are deliverables such as publications, open-source numerical models, advancements in improving instrumentation, products, tools, services, metadata, etc described?
- Are USCRP requirements of an annual presentation of research findings, quarterly progress reports, and a research highlight for program communications understood?
- Is a data sharing plan to describe how the research plan will be shared with other teams prior to the campaign and how data will be shared during and after the experiment included?

**5. Graduate Student - 5%**

- Does the project support a graduate student and have opportunities for undergraduates in STEM fields?
- Are there leadership opportunities for the student?
- Is there support for at least one graduate student? Does the budget include funding for at least one graduate student to attend a week-long training and professional development in 2024 at the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory?

**6. Timeline - 5%**

- Is a research timeline to ensure the scope of work can be completed in the stated period of performance provided?
- Are the project phases and milestones clearly described?
- Is the proposed workload feasible given the project duration?

**7. Budget - 10%**

- Are a detailed budget table and justification provided?
- Are salaries and contractor costs, travel, and equipment/ publication costs justified and appropriate to project needs?
- Is there in-kind support or leveraging?

**Appendix to FY23 Request for Proposals**

**The U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory 2D Wave Flumes and Directional Spectra Wave Generator (DSWG)**

U.S. Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory (CHL) has two directional-spectra wave generator basins and three wave flumes of different scales.

The two wave basins have the capability to conduct sediment studies and longshore currents.

- Basin 1 measures 100 x 100 ft by 3.3 ft deep
- Basin 2 measures 100 x 160 ft by 3.3 ft deep and is equipped with an instrumentation bridge to allow for cross-shore measurements

The directional spectra wave generator is moveable and can be set up in either basin. The directional spectra wave generator is composed of 56 individual paddles for a total length of 96-ft.

The three wave flumes are designed to accommodate a range of scales:

- Flume 1: The 3-ft flume measures 3-ft wide, 150-ft long, and 3-ft deep. The entire flume is glass. This flume can be used for laser-based velocity measurements like PIV.
- Flume 2: The 5-ft flume measures 5-ft wide, 200-ft long, and 5-ft deep. There is a 50-ft long, flat testing area. This flume is also capable of generating both opposing and following currents.
- Flume 3: The 10-ft flume measures 10-ft wide, 200-ft long, and 5-ft. There is a 50-ft long, flat testing area.

All wave machines make use of the latest wave generation technology and include active wave absorption.

**Example projects that have used the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory facilities include:**

*Note: The below reference examples that mention wave making capabilities have since received an upgrade to the facility. Please reference the fact sheets for current accurate facility information.*

- 5 ft Flume:
  - Wave attenuation by flexible, idealized salt marsh vegetation: https://doi.org/10.1016/j.coastaleng.2013.10.004
  - The response of vegetated dunes to wave attack: https://doi.org/10.1016/j.coastaleng.2019.103506
  - The Role of Belowground Biomass on Short Term Dune Evolution: https://doi.org/10.1142/9789811204487_0105
  - Walter Marine and Atlantic Reef maker wave Attenuator: wave transmission testing results: https://hdl.handle.net/11681/43303;

- 10 ft Flume:
    - Wave attenuation of coastal mangroves at a near-prototype scale: https://hdl.handle.net/11681/45565
- Large-Scale Sediment Transport Facility (LSTF):
    - Capabilities of the Large-Scale Sediment Transport Facility: https://apps.dtic.mil/sti/pdfs/AD1007544.pdf

Current instrumentation available for proposers to apply in their experiment includes 80 capacitance wave gauges, 12 ADVs, PIV system, Qualisys motion tracking (both above and below water), Faro Focus terrestrial LiDAR, and various other instruments (IMUs, force transducers, flow meters, etc.). LabVIEW is primarily used for data acquisition.

There is a fully functional sediment properties laboratory on-site including sieve analysis, laser diffraction for fine grains, wave-current boundary layer simulator, and a SEDFLUME. Specialized shop capability includes custom model bathymetry; 5-axis CNC machining for plastics, wood, metal; 3D printing; acrylic molding; in addition to common needs like carpentry, welding, and plumbing. Also, heavy machinery like forklifts and telehandlers are available.

**U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory General Sediment Testing Guidance:**

- In house sediment available for use by awardees is well sorted, 0.15 mm. Other sizes would need to be sourced independently by the participants including material costs and costs associated with transport to the U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory facility.

- Transporting material in/out of flumes/basins can add significant time to a project
    - 5ft and 10 ft flume: ~1-2 weeks
    - 3ft flume: ~1 week
    - Wave Basins: ~ 3-4 weeks (for material other than the in place 0.15mm sediment)
    - Larger flumes and basins will require more material and labor, so scaling to the 5ft or 3ft flume, if possible, within design would be advisable

- Materials that will **NOT** be allowed in the flumes/basins:
    - Salt water and salt
    - Cohesive sediment
    - Any sharp edged, mobile material that may permanently damage viewing glass during testing (flumes)
    - Any hazardous materials that cannot be safely drained from the facility

ERDC

CHL COASTAL & HYDRAULICS LABORATORY

# WAVE FLUMES

The U.S. Army Engineer Research and Development Center (ERDC) Coastal and Hydraulics Laboratory (CHL) houses three state-of-the-art wave flumes that are ideally suited for addressing a wide range of applications across a broad range of geometric scales. These flumes support research and site-specific studies of both government organizations and non-government organizations, including academia and the public sector.

## APPLICATIONS

All 2D flumes are for coastal applications, ranging from fundamental research of water wave propagation physics, wave interaction with natural and nature-based features, and sediment transport in wave-current environments to designing and testing military infrastructure and coastal structures to include armor stability, wave runup, reflection, transmission, and overtopping.

## RECENT PROJECTS

- Measuring response of floating military causeway systems in the surf zone
- Assessing the effectiveness of proprietary wave attenuation technologies and systems
- Quantifying wave attenuation of natural and nature-based features including wetlands, mangroves, and reefs
- Dune breaching, overtopping, and erosion in the presence of vegetation
- Generalized breakwater deterioration and stability studies
- Testing of instrumentation under controlled conditions prior to field deployment

## WAVE FLUME SPECIFICATIONS

| | 0.9-m Flume | 1.5-m Flume | 3.0-m Flume |
|---|---|---|---|
| Length (m) | 45.7 | 63.0 | 63.0 |
| Width (m) | 0.9 | 1.5 | 3.0 |
| Depth of test area (m) | 0.9 | 1.5 | 1.5 |
| Additional Features | glass walls along entire lengh of flume | 15.2-m long, flat testing area with viewing glass<br>following and opposing currents | 15.2-m long, flat testing area with viewing glass |

## WAVE GENERATORS

| | 0.9-m Flume | 1.5-m Flume | 3.0-m Flume |
|---|---|---|---|
| Max Stroke (m) | 2.0 | 2.0 | |
| Max Paddle Velocity (m/s) | – | 0.6 | |
| Period Range (s) | 0.5 - 5.0 | 0.5 - 5.0 | |
| Max Regular Wave Height | 0.45 m between wave periods of 1.7 – 3.5 s [1] | 0.6 m at a wave period of 2.0 s [2] | |
| Max Significant Wave Height | 0.23 m between peak wave periods of 1.7 – 3.5 s [1] | 0.3 m at a peak wave period of 2.0 s [2] | |

[1] - water depth of 0.76 m
[2] - water depth of 1.6 m

All wave flumes are equipped with piston-type wavemakers with modern wave generation capability, including active wave absorption. These wavemakers can create regular waves, irregular waves for commonly used (e.g., JONSWAP, TMA, Pierson-Moskowitz) and user-specified spectra, and solitary waves.

## SUPPORT

An extensive variety of precise instrumentation complements the state-of-the-art capability of the flumes. The instrumentation includes capacitance wave gauges, acoustic Doppler velocimeters (ADVs), particle image velocimetry systems (PIV), underwater and surface motion tracking systems, and terrestrial LiDAR. Shop capability includes custom model bathymetry; 5-axis CNC machining for plastics, wood, and metal; 3D printing; acrylic molding; and skilled trades like carpentry, welding, and plumbing.

# Directional Spectra Wave Generator (DSWG)

The U.S. Army Engineer Research and Development Center's Coastal and Hydraulics Laboratory houses a state-of-the-art Directional Spectra Wave Generator (DSWG) that is ideally suited for simulating realistic nearshore, coastal environments. The DSWG supports research and site-specific studies of both government and non-government organizations, including academia and the public sector. The DSWG is uniquely suited for addressing needs in both civil and military programs by reproducing littoral processes and surf zone characteristics, such as soil type, beach slope, water depth, longshore currents, and sea states, that are critical to decision-making and infrastructure design, testing, and operation.

**Applications and recent projects:**

- Nearshore hydrodynamics and sediment transport research including nearshore placement
- Surf zone morphodynamics and change including channel infilling
- Testing of coastal structures (e.g., breakwaters, groins, geotextiles, jetties) to include armor stability, wave runup, reflection, transmission, overtopping, and harbor resonance
- Testing and certifying flood mitigation and barrier products
- Assessing engineering performance of natural and nature-based features
- Bathymetry inversion and indirect bathymetry estimation
- Testing amphibious and bottom crawling vehicles for surf zone operations such as autonomous bathymetry measurements and mine detection

**DSWG specifications and capabilities:**

*Basin*

- 30 m wide, 50 m long, and 1.4 m deep
- Variable water depth between 0.3 and 1.0 m
- Modifiable beach slope (existing 1:30)

*Wave Generation System*

- Comprised of 56 individual wave paddles
- Piston-type waveboards with modern wave generation capabilities, including active wave absorption and generation of regular waves, irregular waves, solitary waves, and multidirectional waves
- Wave period range: 1.0 to 10.0 seconds
- Max regular wave: 0.5 m between the wave periods of 2.0 – 3.0 seconds at 1.0 m water depth
- Max significant wave: 0.26 m between the wave periods of 2.0 – 3.0 seconds at 1.0 m water depth
- Max paddle stroke and velocity: 1.1 m and 0.7 m/s

*Supporting Infrastructure*

- Cross-shore instrumentation bridge
- Onsite sediment supply comprised of fine, well-sorted sand ($d_{50}$ = 0.15 mm)
- Specialized instrumentation including acoustic Doppler velocimeters (ADVs), wave gauges, flow meters, variable speed pumps to supplement wave-driven currents, beach profiling LiDAR, underwater and surface motion tracking systems to measure six degrees of freedom (6DoF)

**Payoff:** The DSWG accurately reproduces surf zone processes found on natural beaches in a finite-length wave basin and offers controlled, systematic testing of civil and military infrastructure in known and anticipated coastal environments.