



REQUEST FOR PROPOSAL #FY26-GRIT1

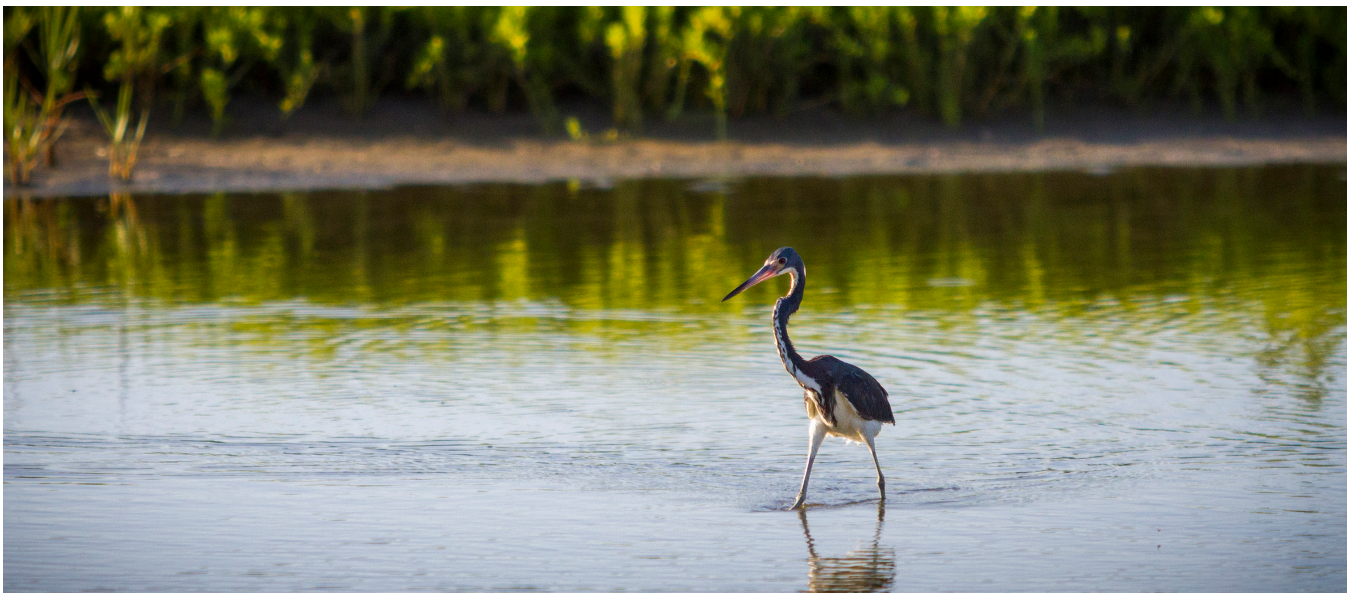
Guinea Resilience & Innovation for Tidal Wetlands (GRIT) - Phase I Project

Middle Peninsula Planning District Commission (MPPDC)

February 2026

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01

Cover Sheet



February 10, 2026

Mindy Strevig, Project Manager
Middle Peninsula Planning District Commission
4521 Lewis B. Puller Memorial Highway
Mattaponi, Virginia 23110

Re: **Guinea Resilience & Innovation for Tidal Wetlands (GRIT) – Phase I Project**

Dear Ms. Strevig and Members of the Selection Committee:

The Middle Peninsula Planning District Commission (MPPDC) continues to do great things for the community through your mission to promote the economic, social, and physical development of Virginia's Middle Peninsula. We are excited to have the opportunity to provide professional services to support you in this mission, and confident that selecting our team will give you the following key benefits:

Trusted Proven Leadership. All services delivered through this contract will be managed by a proven project management team led by Kevin Reichert and Erin Rooney, who are locally positioned in Virginia and have executed and managed a wide range of technical services encompassing planning, design, and construction of complex projects. Kevin is our Area Operations Manager who has extensive experience leading multi-disciplined project teams for Virginia-based clients. Erin is our Mid-Atlantic Coastal Lead and is a Board-Certified Coastal Engineer with a proven record of working with clients to manage coastal projects on-time and on-budget. They are personally committed to delivering first-class, professional engineering services.

Technical Experts. In addition to Erin, Dr. Maura Boswell will serve as a coastal and dredging senior technical leader with over 20 years of experience and a focus on nature-based solutions. She has extensive knowledge of the project area, including as part of her doctoral research in coastal engineering at Old Dominion University where she quantified the wave attenuation services of the Captain Sinclair Recreational Area marsh sill living shoreline and recommended opportunities for increasing land water connectivity for these hybrid nature-based solutions. We've also engaged Dr. Donna Bilkovic and her colleagues at the Virginia Institute of Marine Science for their extensive ecological expertise on the marshes in this area, and Carol Considine at Old Dominion University to provide additional local and complementary expertise to our team.

Full-Range Capabilities with Focused Service Offerings. Our staff has the experience and technical background to execute the assignments under this contract. We pride ourselves in having specific expertise and experience in many of the areas that MPPDC would value under this contract, including: Wetland Conservation and Restoration, Shoreline Protection, Dredged Material Placement, Tidal and Marine Studies, and related support services including Habitat Creation and Mitigation, Sea Level Rise, Beneficial Use of Dredged Material, Geotechnical Investigations, TMDL Compliance, and Permitting Services.

Selecting the HDR team will provide you with a trusted partner who can deliver professional technical services for the planning, design, feasibility and suitability assessments, and permitting of this important project. We appreciate your consideration of our submittal.

As the authority to bind the company, Kevin Reichert will have the responsibility for services to be provided and can be reached at HDR Engineering, Inc, 4880 Sadler Road, Suite 100, Glen Allen, VA 23060. Please contact Erin Rooney as the key representative with knowledge about the proposal at 703.342.1455, or erin.rooney@hdrinc.com.

Sincerely,

HDR Engineering, Inc.

Reichert,
Kevin Charles

Digitally signed by
Reichert, Kevin Charles
Date: 2026.02.09
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02

Project Understanding, Approach and Methodology



2 Project Understanding, Approach and Methodology

Project Goals

MPPDC is committed to preserving and restoring the important tidal marshes, dunes, and beaches within and around the Guinea Marsh Wildlife Management Area and adjacent Mobjack Bay marsh islands. This area is important for the flora and fauna that call these wetlands home. The area is also a valuable natural resource for the people of Virginia to hunt, fish, and view abundant wildlife and natural scenery, in addition to the storm surge and flood reduction benefits that wetlands provide. To achieve these goals, the use of nature-based and hybrid shoreline solutions will be critical to project success.

Scope

Our understanding of the scope of the GRIT – Phase 1 Project is to assess the identified area, determine if additional field data collection is needed, create and document conceptual designs and project locations with input from stakeholders, assess the feasibility and suitability of designs and project locations, and summarize related environmental and regulatory information. At the request of MPPDC, optional field services including elevation data collection, biological surveys, or more may be added to the scope. We've outlined our technical approach and methodology in the sections below.

Task 1: Project Initiation, Work Plan, Coordination, QA/QC, and Reporting

Upon receipt of Notice to Proceed, HDR will develop a detailed work plan and schedule that shows design milestones, submittals, and adequate review points throughout the project to be discussed during the kickoff meeting with MPPDC, Carlexson Consulting, DWR, and other project stakeholders. At this meeting the HDR team will verify the project understanding with the stakeholders agreeing on project timelines and approach. As part of this process we will begin review of existing data, reports, and surveys to assist in developing an appropriate schedule that includes any additional field data collection that we recommend.

Throughout the entirety of the project, HDR will provide monthly progress reports in electronic format that summarize key accomplishments, identify any issues with associated recommendations for resolution, and provide an updated project schedule.

MPPDC has identified the need for a minimum of two community or stakeholder events at which technical expertise will be necessitated. The HDR team will attend these events with the appropriate technical experts from our team and recommend any additional stakeholder

engagement events identified through the kickoff meeting and workplan process. The HDR team will work with the MPPDC Project Team to develop any necessary visual aids or handouts for these events. We have an in-house Strategic Communications team that provides public facing technical visual aids to effectively communicate project details at stakeholder events if there is a need for additional collaborative services with the MPPDC's project team outreach partners.

Captain Sinclair Recreational Area Living Shoreline

Dr. Maura Boswell will serve as the senior technical leader for coastal and dredging initiatives, bringing over 20 years of specialized experience with a strong emphasis on nature-based solutions. Her expertise is firmly grounded in extensive research and firsthand knowledge of the project area. As part of her doctoral work in coastal engineering at Old Dominion University, Dr. Boswell quantified the wave-attenuation performance of the Captain Sinclair Recreational Area marsh-sill living shoreline and identified opportunities to enhance land–water connectivity for hybrid nature-based systems. This experience directly supports the GRIT Phase 1 project goals and demonstrates her proven ability to evaluate, design, and optimize shoreline resilience strategies.



Captain Sinclair Marsh Sill at High Tide

Captain Sinclair Marsh Sill Post Construction



Captain Sinclair Marsh Sill Post Planting

Commitment to Quality and Subconsultant Coordination

HDR bases its QA/QC Program on a philosophy of continual improvement; a focus on the way things get done, not just on what gets done; and an emphasis on teamwork. Our Project Manager has the principal responsibility to confirm compliance with HDR's structured QA/QC programs. Production staff and support staff are responsible for adherence to quality control procedures to satisfy HDR's requirements and quality expectations. Compliance with these procedures and programs is mandatory at HDR and is the basis for which high quality workmanship is achieved. Repeat business, low insurance rates, minimal scope or cost changes, and recognition by industry peers are testaments of our past performance and quality of work. The following elements are part of HDR's QA/QC program:

- **Project Management Plan (PMP).** HDR will develop a PMP that details how tasks will be completed. Design standards and guidelines, schedule, budget, staffing, reporting procedures, quality control procedures, safety plan, and communication protocols are major components of the PMP.
- **Data Management.** HDR has a data management program, ProjectWise, that is adapted specifically for each project. This program allows the project team to electronically file, distribute and retrieve project documents expeditiously.
- **Quality Control Plan.** A Quality Control Plan (QCP) will be developed to confirm technical quality of every deliverable. The QCP will verify that appropriate project coordination and reviews are completed for the technical disciplines. We will schedule each review to provide ample time for review comments and changes to be addressed before the scheduled submittal date of the specific deliverable. Technical reviews are documented and filed and will be made available for review.

HDR has a long history of working with subconsultants and incorporating their work into our quality plan and deliverables. Each of our subconsultants will be required to develop a similar quality plan which will be incorporated into our project specific QCP. All subconsultant deliverables are reviewed by HDR team members for conformance with the project and quality.

TASK 1 DELIVERABLES

- Project Work Plan and Schedule
- Monthly Progress Reports
- Final Technical Data Package
- Attendance at a minimum of two (2) stakeholder engagement events

Task 2: Comprehensive Existing Conditions Report (ECR)

The HDR team will conduct a desktop study of publicly available data regarding the existing conditions throughout the project site to include prior shoreline studies, bathymetric maps, SAV mapping, aerial imagery, hydrologic models, climate projections, wind, wave, water level, and elevation data from sources such as NOAA, USACE, USGS, VIMS, and others. This data will be used to develop a comprehensive understanding of the rate of erosion along various portions of the Guinea Marsh system, the metocean conditions that affect the marsh system, existing habitat, and future anticipated water level scenarios which impact the design elements that can be considered for habitat protection and enhancement. The Virginia Institute of Marine Science (VIMS), a subconsultant to HDR, will also provide data and insight from their various data inventories related to shorelines and marshes in the area. Existing plans in the area would be reviewed, including the Coastal Wetlands Plan for the York River, Piankatank River, and Mobjack Bay from the York River & Small Coastal Basin Roundtable. As part of this desktop assessment, data gaps and additional needs will be identified that may require additional field services as outlined in Task 8 Optional Task – Field Services.



Data Collection at Nassawadox Creek Oyster Reef



Once the priority areas have been developed during this task, Troy Savage and other team members will conduct a site visit of these locations to field verify different elevations that will increase likelihood of success of obtaining a permit, to include mean low water, mean high water, and 1.5 times mean tide range that would be documented in the Environmental Review Summary. This data gathering phase would include discussions with the project team and relevant stakeholders to fully understand the uses of the project sites and how the conceptual designs would support those uses. To effectively guide these discussions we will utilize an interactive GIS platform to better visualize the different data sets and the environmental influences that may impact project site selection and design elements.

The findings discovered and developed during this task will be synthesized in an Existing Conditions Report that summarizes the site characteristics, geomorphology, habitat types, vulnerabilities, and restoration opportunities.

TASK 2 DELIVERABLES

- GIS and data files
- ECR outline and table of contents
- ECR draft data figures and maps
- ECR Draft Report
- ECR Final Report

Task 3: Conceptual Design Development

Using the findings of the ECR, conceptual design and layout alternatives would be developed. Numerical modeling of localized wave conditions using a two-dimensional wave model such as Mike 21 SW may be employed to develop structure layout in areas that have higher wave exposure to refine the concepts and understand impacts of wave-induced currents landward of proposed structures. Dr. Karinna Nunez will lead the marsh migration modeling efforts to correctly identify and prioritize the concept alternatives for the most successful opportunities for restoration. Priority locations and design features in the project area would be defined based on stakeholder priorities, areas most in need of protection or restoration, feasibility concerns, constructability, cost, performance, ecological enhancement, and other factors.

In particular, shoreline protection design concepts would consider the expected level of wave energy at the particular locations. For example, erosive shorelines in high wave energy environments may require multiple layers of defense or larger protection structures. Shorelines in lower wave energy environments may include smaller features.

The design process will also consider adaptive management and long-term multi-phased approaches as design tools to fulfill the project design needs. For example, multiple events of thin-layer placement of dredged material may be pre-

planned over a 25-year period to help the marsh elevation rise with expected sea level rise. These events would occur over many years to avoid overfilling the marsh early and disrupting the natural functioning of the wetland.

An Alternatives Summary report will be prepared to provide the constructability, cost, expected performance, maintenance schedules, and ecological enhancement opportunities for each of the three concept design alternative developed during this task. Leveraging the local technical expertise of Carol Considine, the HDR team will develop technical materials for use at a Design Review Workshop with the MPPDC Project Team and stakeholders. The workshop will address challenges and opportunities associated with the different alternatives and gather feedback on the preferred course of action. Our team will take notes during this workshop and provide these notes to MPPDC following the event.

TASK 3 DELIVERABLES

- Conceptual Design Drawings
- Alternatives Summary
- Design Review Workshop Notes

Task 4: Basis of Design Report (BOD)

A Basis of Design Report will be developed to document the selected design approach, design criteria, phased implementation recommendations, and supporting information. The selected concept(s) from Task 3 will have rough order of magnitude costs developed and presented in the report along with phasing recommendations for construction that incorporates both construction windows and opportunities for applying for outside funding sources. This report will be provided to MPPDC at the draft stage for review and comment and a follow-up meeting to review any questions or comments will be scheduled with MPPDC before the final BOD is submitted.

TASK 4 DELIVERABLES

- Draft Basis of Design Report
- Final Basis of Design Report

Task 5: Resilience Feasibility Assessment

Resilience will be considered and analyzed throughout the design process and documented in a Feasibility Assessment Report. Pamela Yonkin and Christopher Behr will work closely with the other members of the design team to consider the technical and economic feasibility of each alternative design. For example, understanding the availability, frequency, and quality of dredged material will inform the feasibility for a thin-layer placement and/or beneficial use design. Resilience to relative sea-level rise will be documented including the ability of each design to adapt to rising water levels through natural recruitment of sediment or fauna or if recurring events will be necessary. This report

will be provided to MPPDC at the draft stage for review and comment and a follow-up meeting to review any questions or comments will be scheduled with MPPDC before the final report is submitted.

TASK 5 DELIVERABLES

- Draft Feasibility Assessment Report
- Final Feasibility Assessment Report

Task 6: Land Conservation Suitability Assessment

Dr. Karinna Nunez will lead this task to assess land parcels in the project. This assessment would consider factors including land ownership, physical and ecological characteristics, and stakeholder considerations. These factors can have direct impact on the amount of funding that would be needed for construction, e.g., easements or land purchase, and likelihood of permit acquisition. The parcels would be reviewed, ranked, and discussed with the project team. Results of this analysis would inform the conceptual design alternative layouts and be documented in a Land Conservation Suitability Assessment Report.

TASK 6 DELIVERABLES

- Draft Land Conservation Suitability Assessment Report
- Final Land Conservation Suitability Assessment Report
- GIS Package

Task 7: Environmental and Regulatory Documentation

A regulatory and environmental review would be conducted to document the preferred alternative, other alternatives considered, mitigation concerns, and other compliance-related data. The team would initiate a pre-application

meeting with the regulatory agencies to discuss project specifics, which would reduce the number of additional information requests and expedite the permitting timeline when MPPDC submits the permit application. HDR would also coordinate with the federal and state regulatory agencies for impacts within the Chesapeake Bay Critical Area, for protected species, and for activities within a floodplain. As an entity involved in the Virginia regulatory process, VIMS would be firewalled from any work regarding the draft JPA to avoid potential future conflicts of interest during the permit review process.

TASK 7 DELIVERABLES

- Draft Environmental Review Summary
- Draft JPA Package

Task 8: Optional Task – Field Services

Data gaps would be identified and used to create a field data collection plan for review and approval from the project team. Fieldwork may include biological surveys of flora and fauna, elevation surveys using topographic, bathymetric, and/or LiDAR methods, and sediment sampling of select locations. Biological surveys, including eDNA, would be led by the local experts at VIMS and would also include local HDR environmental scientists. Elevation surveys would be conducted by Precision Measurements, Inc. (PMI). Any field data collection would be preceded by a field data collection plan for review by the project team.

TASK 8 DELIVERABLES

Collected field data in an appropriate format, e.g., data files, GIS maps, etc.



Pugsley Creek Ecosystem

Example Graphics

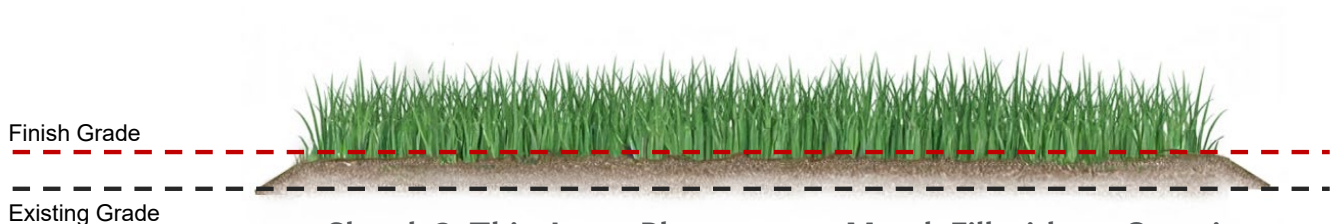
The proposed project area is large with many potential locations for conservation and restoration of marshes, dunes, and beaches. Depending on the results of an existing conditions assessment, several different conceptual designs would be considered. Considerations would include wave energy at the specific project location and sediment characteristics for placement. Below are four example design sketches for various scenarios.



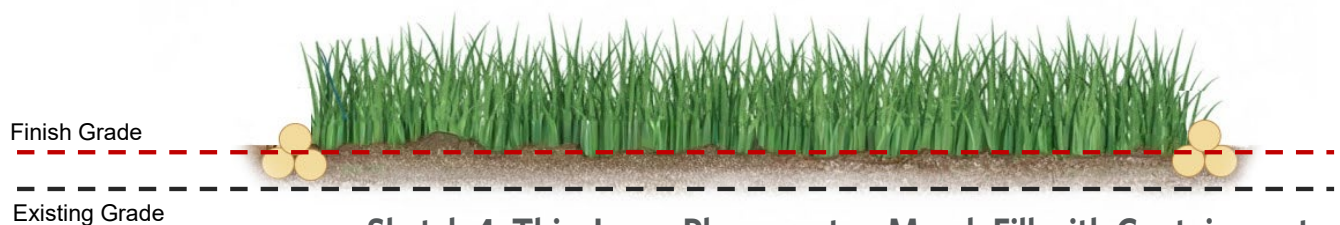
Sketch 1: Shoreline Cross-Section for a High Wave Energy Environment



Sketch 2: Shoreline Cross-Section for a Low Wave Energy Environment



Sketch 3: Thin-Layer Placement or Marsh Fill without Containment



Sketch 4: Thin-Layer Placement or Marsh Fill with Containment

03

Innovation and Resilience Integration



3 Innovation and Resilience Integration

Integration with Regional Plans and Programs

Coastal systems are constantly changing including subsidence, sea level rise, sediment deposition, shoreline erosion or accretion, salinity changes, seasonal growing patterns, and more. Innovative and resilient designs that allow engineered projects to adapt and integrate with these natural processes are vital for the success of any project in these areas.

We understand that many stakeholders have dedicated tremendous amounts of time and effort to review these concerns and document them. For example, the Coastal Wetlands Plan for the York River, Piankatank River, and Mobjack Bay identified a regional approach to these wetland strategies. Two members from the writing team of that plan are included in our org chart to provide consistency with Dr. Donna Bilkovic (VIMS) as a Technical Advisor and Dr. Karinna Nunez (VIMS) as the lead for GIS services and a member of the modeling team.



Coastal Wetlands Plan for the York River, Piankatank River, and Mobjack Bay.

The Middle Peninsula has 13 federal channels, 12 non-federal channels in creeks with Aids to Navigation (ATONs), and 94 creeks without ATONs according to the Dredging Implementation Prioritization and Management Plan for Middle Peninsula Shallow Draft Channels (VIMS, 2021). While this plan goes into further detail about the suitability, need, and feasibility of dredging within these areas, it is an important statistic to note the potential for large-scale and primarily small-scale dredging operations in the area. This material has the potential to be used beneficially to nourish wetlands in the area. Information from this regional plan would be integrated into the design process to the potential availability, type, location, and recurrence of dredged material for nourishment purposes.



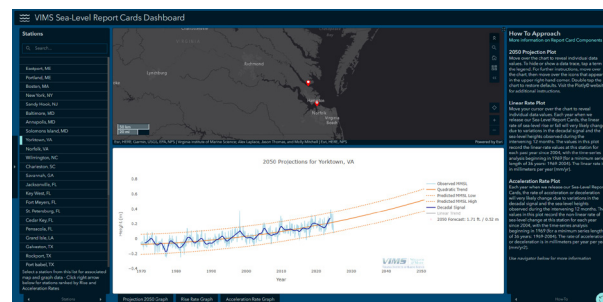
NETWORK FOR ENGINEERING WITH NATURE

HDR's membership in the **Network for Engineering With Nature (N-EWN)** reinforces our commitment to integrating natural systems into infrastructure solutions. Through this collaboration, we enhance our **Restoration, Adaptation, and Resilience** expertise - leveraging multidisciplinary research and innovative strategies to deliver sustainable, equitable, and climate-resilient projects.

Resilience and Adaptive Management

As discussed in the Technical Approach, changing sea levels over time present an important design challenge. Initial guidance to accommodating SLR is to preserve marsh migration pathways. In many locations now this option is not possible due to existing infrastructure or other issues. Additionally, it is not always feasible to elevate a wetland in anticipation of long-term sea level rise over just one construction event without inadvertently converting the wetland to upland habitat. Also, while sea level rise projections are based in science, they are a risk-profile subject to change over time based on a variety of factors. Instead, an adaptive management approach is recommended to evaluate whether project features are keeping up with sea level rise or if another maintenance event is necessary. Maintenance events may include thin-layer placement of dredged material

to renourish a marsh or placement of additional shoreline protection materials to reduce erosion and loss of habitat in critical areas. In addition to planned adaptive maintenance, the initial projects should consider including features to encourage self-sustaining elevation growth through build-up of vegetative biomass or oyster growth or sediment capture on shoreline protection features.



VIMS Sea-Level Report Cards Dashboard.

04

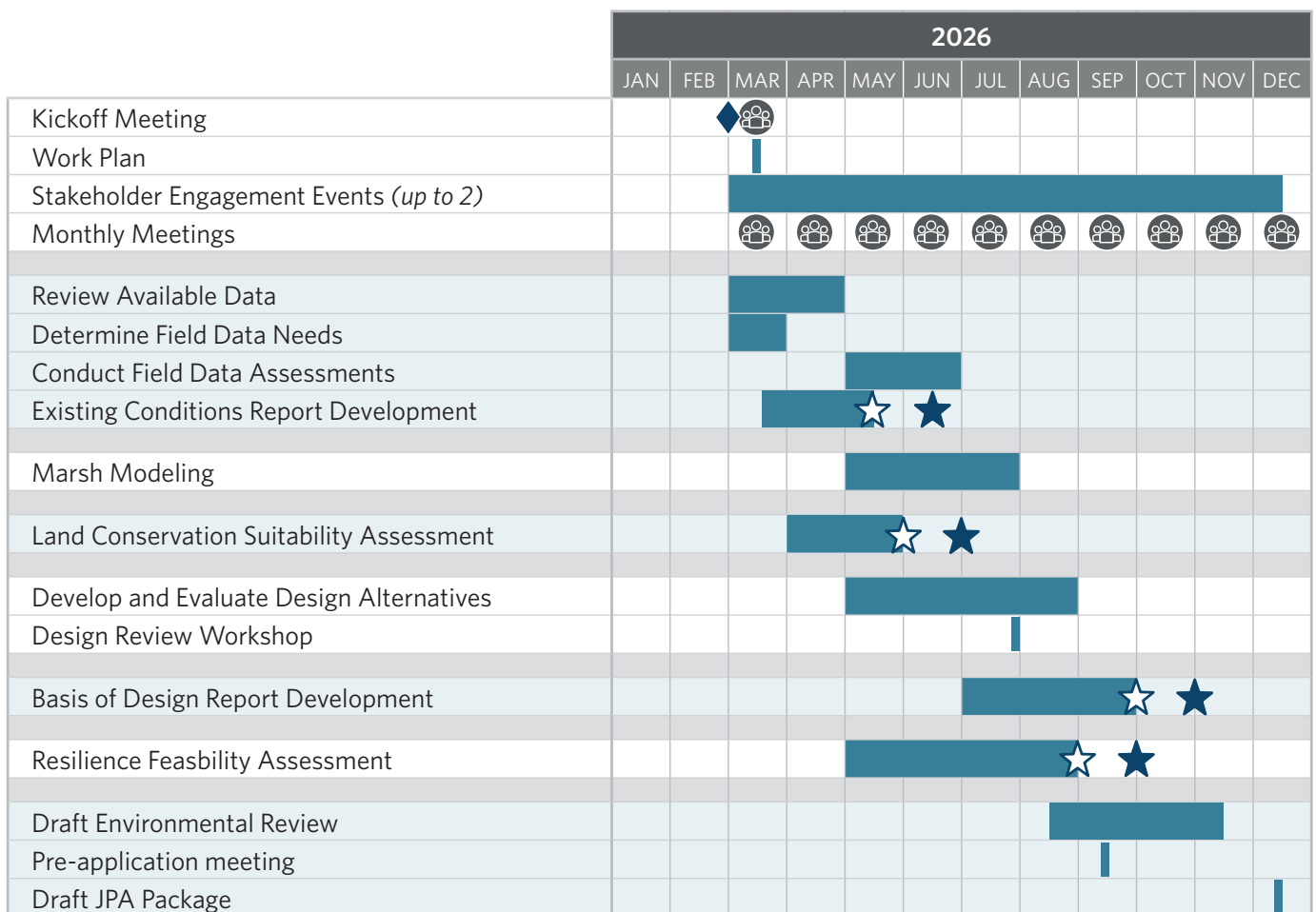
Schedule and Deliverables



4 Schedule and Deliverables

A draft proposed schedule for the project is included below. As with any schedule, there can be schedule risks for which mitigation strategies may help the project to remain on time. The project team has identified the following schedule risks for this project.

- Field Data Collection:** As with any project involving field work, schedules may be delayed due to weather or environmental considerations. Also, biological fieldwork is often dependent on the timing of growing seasons and temperature. Mitigation strategies include identifying field data needs early, ideally before or at the beginning of spring, to maximize the available window to schedule data collection that best meets the needs of that specific dataset. The project team will also determine which project tasks can continue to be conducted without the field data to keep the project progressing.
- Coordination with Stakeholders:** Stakeholder events can often take time to coordinate and schedule, especially with larger numbers of stakeholders. Mitigation strategies include making a clear list of required and optional stakeholders for meetings and pre-planning target dates for these meetings.
- Coordination with Regulatory Agencies:** As with any coordination with outside entities, scheduling pre-application meetings and collecting feedback from regulatory agencies may be outside the control of the project team. Mitigation strategies include using previous experience and connections with regulatory team members to prioritize scheduling these meetings and to continue the project work in anticipation of regulatory feedback.



◆ NTP ● Meetings ☆ Draft Report ★ Final Report

05

Qualifications and Experience of the Firm and Project Team



5 Qualifications and Experience of the Firm and Project Team

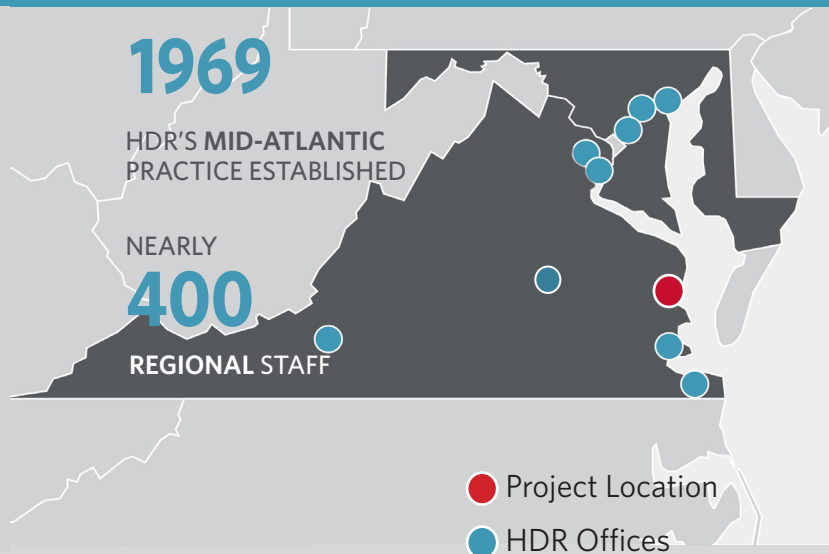
Our Story

HDR was established in 1917 and has been working in the Mid-Atlantic since 1969. We are a full-service engineering firm with a strong history of providing resilient and cost-effective restoration projects. Our coastal practice includes multidisciplinary teams of engineers, scientists, archaeologists, and economists that have developed multiple award winning projects. We have over 30 coastal engineers,

in addition to civil, water resources, and landscape architects. We have worked on a wide variety of coastal projects ranging from shoreline protection and beach nourishment, to oyster reef and marsh habitat restoration. We also have freshwater ecosystem expertise in fishery habitat restoration, stream and wetland restoration, floodplain restoration, and stormwater management.



Our Team by the Numbers



326

VIRGINIA STAFF

47

MARYLAND STAFF

25

DC STAFF

9

OFFICES

Technical Areas

PROJECT MANAGEMENT TOOLS

HDR has well established internal project management tools, trainings, and best practices to help project managers track the availability and commitment of their project teams. These tools integrate scope-of-work activities with schedule, resources, and budget details. The tools give our project management team a vivid picture of accomplishments, work-in-progress, milestones, and future activities and allow staff to quickly and easily communicate them with our project partners. They also allow our team to identify variances and plan corrective actions to maintain schedule and budget targets. This process also includes regular project reviews where variations and recovery plans are developed.

QUALITY AND RISK MANAGEMENT

HDR's goals for project quality is to meet our industry standard of care and deliver on the requirements or expectations of our clients and the stakeholders they serve. Quality is woven into each project, regardless of type or and size, to safeguard you, and ourselves, from errors and omissions; reducing the amount of rework to meet project schedules and budgets; and providing quality engineering, design services and construction documents that avoid contractor claims and supplements. Key components of this process include independent experienced design reviewers, constructability reviews, and Bluebeam Studio Sessions for QC reviews. HDR believes that quality isn't a box that is checked, but an opportunity to make each project its best by engaging qualified staff, at the right time, to enhance the project.

HDR's approach to risk management is based on proactive solutions over reactive recovery. We will work collaboratively with MPPDC to identify, assess, and prioritize risks across various domains, including financial, schedule, safety, environmental, operational, regulatory, technological, and reputational risks.

EXPERIENCE WITH COASTAL ECOSYSTEMS PROJECTS

Coastal marsh restoration projects must be designed to surmount challenges related to sediment source location, soft soils, erosion, subsidence, and sea level rise. These challenges can significantly affect the success of a project due to marsh features being extremely sensitive to changes in elevation. We apply our in-depth understanding of these factors in combination with close interaction with project stakeholders to develop restoration techniques that adapt to specific site conditions. As an example, under contract with Texas General Land Office (TGLO), we sought input from wetland ecologists at Texas Parks and Wildlife (TPWD) to develop and improve marsh mound construction at several restoration sites along the Galveston Island bay shoreline.



Texas General Land Office, Dickinson Bayou Marsh Restoration

Monitoring, design reviews, and collaboration with TPWD scientists resulted in highly successful projects that were completed on budget. HDR also used other innovative restoration techniques throughout coastal areas such as confined placement, habitat mounds, terracing, and upland scrape-down to create resilient marsh systems.

Protection of eroding shorelines can be accomplished by varying means. Hard and soft solutions consisting of beach nourishment, marsh restoration, revetments, breakwaters, groins, oyster reefs, and living shoreline projects have been designed

by HDR. These projects have included small, low-crested breakwaters and living shorelines to protect marsh habitat, large marsh ridges to reduce surge, and large-scale revetments and breakwaters for protecting critical upland infrastructure. Our designs include extensive work in soft soil environments, and we have developed award winning projects using innovative lightweight aggregate core breakwaters to address erosion in areas where conventional measures wouldn't be feasible.

REGULATORY EXPERIENCE

HDR has extensive experience navigating complex federal, state, and local permitting frameworks for coastal restoration projects. Our philosophy is based on one critical factor: early and integrated involvement of our permitting and regulatory professionals. We focus on the delivery of quality submittals needed for permits in a variety of natural and manmade environments. We've developed an integrated design approach bringing regulatory strategy and cross-discipline collaboration to each step of planning and design to advance the program with an optimal strategy without having to backtrack when change occurs. We have successfully secured authorizations for a range of habitat restoration, shoreline stabilization, and hybrid infrastructure projects.

HDR's long-term relationships with regional regulators have enabled streamlined permitting of projects that balance public access, ecological restoration, and resilience enhancement. These relationships allow us to plan and actively coordinate on federal concerns such as Section 7 Endangered Species consultations. The HDR team will identify potential ESA concerns through defining critical habitat areas to guide design efforts and avoidance. These methods apply not only to the immediate project area but to potential borrow areas (marsh restoration), staging areas, and access corridors. Documenting this process assists with the process of Section 7 reviews with U.S. Fish & Wildlife Service, National Marine Fisheries Service, and local regulatory agencies.

Section 106 consultations requiring cultural resource studies of the project area using terrestrial and marine archeology surveys, have increased significantly over the past decade, especially in coastal restoration projects. These surveys can be costly due to the dense survey coverage requirements. To offset these costs HDR performs initial desktop assessments to map out potential impacts and options for avoidance.

From there, as the design area progresses and reduces in size, HDR works with USACE and regional historical commissions to define an Area of Potential Effect (APE) and establish survey methodologies, which can be adapted as project details solidify. Especially with marine archaeology, we will establish survey methodologies that can pivot for construction means and methods, so additional surveys are not required at later points in the project.

HABITAT ASSESSMENTS

Having completed many habitat mapping and monitoring studies, we have extensive experience with achieving assessment efficiencies, identification of potential pitfalls, agency coordination, and process improvement. For coastal projects we have performed wading and boat-based marsh grass, seagrass, and oyster surveys. During these surveys, we are documenting species, quality of seagrass or oyster beds, percent cover, and general information on the habitat such as water quality, and soil type.

Habitat assessments and monitoring are performed by foot, wading, boat, snorkeling, aerial photography, and with topographic data. When monitoring by boat our team uses poles, oyster dredges, and small rakes along transects or at points to find and document species and percent cover. The information in the field (photographs, GIS data, species type, habitat quality) is documented in a habitat assessment report and for monitoring studies, results are compared to the baseline line or previous monitoring events to gauge success or the need for adaptive management.

Our Team

To address the needs of this project, we have assembled key staff from across the region. To supplement our HDR team and to provide bench strength across the many lines of service, HDR has partnered with the Virginia Institute of Marine Science (VIMS), Old Dominion University (ODU), and Precision Measurements, Inc. (PMI). These organizations will be our main partners for the contract.

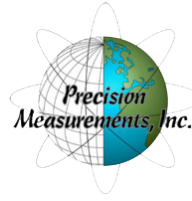


Virginia Institute of Marine Science (VIMS) is one of the largest marine research facilities focused on estuarine

and coastal environments. The Institute is multidisciplinary with over 500 faculty, students, and staff working in everything from fisheries science, to genetics, to hydrodynamics, and to coastal resource management. As part of VIMS, the Center for Coastal Resources Management (CCRM), has dedicated GIS laboratory space that can be used for science synthesis, training, education, and outreach activities. CCRM/VIMS hosts a coastal community resiliency website (www.adaptva.org) and several other web-based interactive tools and portals for information dissemination tailored to specific clients. VIMS/CCRM maintains all the field equipment (e.g., drones, GPS) necessary to complete the research associated with the proposed study. VIMS maintains a fleet of field trucks and vessels that will be available for the proposed study. The Fisheries Genetics Laboratory at the Virginia Institute of Marine Science has applied environmental DNA (eDNA) techniques, including both directed quantitative polymerase chain reaction (qPCR) assays and DNA metabarcoding, to address a range of questions.



From **Old Dominion University's (ODU) Institute for Coastal Adaptation and Resilience (ICAR)**, **Carol Considine** will serve as a technical advisor. Her depth of knowledge and experience in the region and with local stakeholders will provide a unique perspective on the technical and social challenges of the project.



Precision Measurements, Inc. (PMI) is a small, woman-owned (DBE/SWaM #5346) land surveying firm established in 1995, with extensive experience providing precise and reliable surveying services for complex environmental and civil infrastructure projects. The team specializes in delivering

technologically advanced surveying solutions to support the planning, design, and construction of resilient natural and hybrid shoreline systems, tidal marshes, dunes, and other sensitive coastal and riparian environments. PMI's capabilities include topographic surveys, plan & profile surveys, construction layout, as-built surveys, volumetric surveys, hydrographic (single & multi-beam) surveys, geodetic surveys, SUE services, 3D scanning, UAV (drone) surveys, GIS mapping, and plat preparation. With approximately 85 technical, field, and administrative professionals—including 12 licensed land surveyors, 1 LSIT, 4 FAA-licensed drone pilots, 15 CADD/survey technicians, 20 fully digital field crews, and 2 specialized SUE crews—PMI is fully equipped to meet the demanding scope of environmentally sensitive and resilient infrastructure projects.

Local Economic Participation

Our team is composed primarily of professionals rooted in Virginia and the Middle Peninsula, including local subcontractors and academic collaborators. By engaging experts who live and work in the region, we are directly investing in the local economy and advancing the capabilities of the coastal resilience community. This approach ensures that project decisions reflect the lived experience, scientific understanding, and long-term priorities of those who know the area best.

HDR Local Offices

4880 Sadler Rd., Suite 100, Glen Allen, VA 23060

701 Town Center Drive, Suite 704, Newport News, VA 23606

249 Central Park Ave., Suite 201, Virginia Beach, VA 23462

2650 Park Tower Drive, Suite 400, Vienna, VA 22180

Virginia Institute of Marine Science

1375 Greate Rd., Gloucester Point, VA 23062

ODU Institute for Coastal Adaptation and Resilience

800 W. 46th St., Norfolk, VA 23508

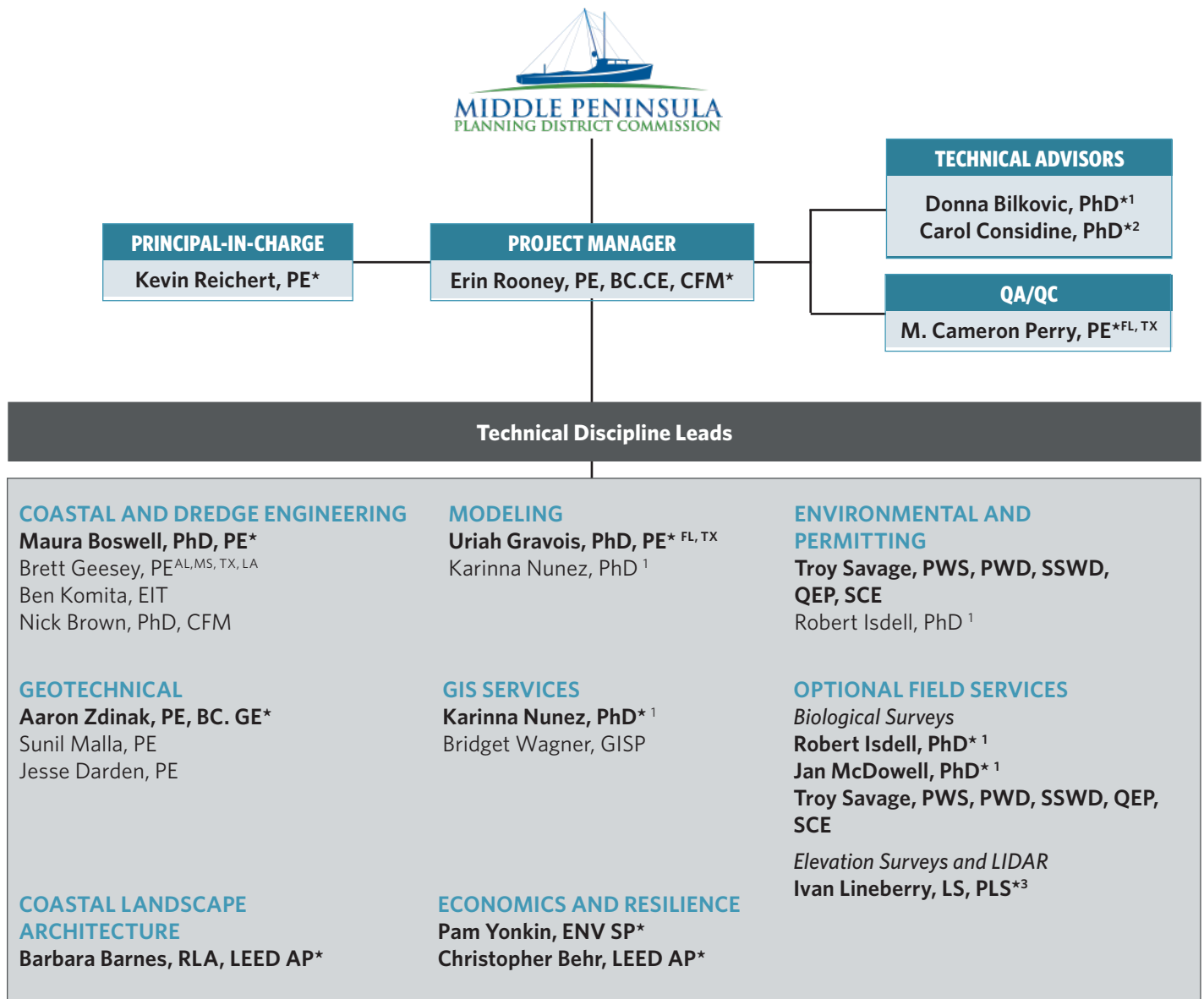
Precision Measurements, Inc.

11835 Canon Blvd., Suite B-103, Newport News, VA 23606

PROJECT LEADERSHIP

Our **Project Manager, Erin Rooney**, is a Board-Certified Coastal Engineer with over 15 years of experience on coastal projects across the US, including large-scale marsh restoration projects. She has been managing projects for 12 years including shoreline protection, marsh creation, and marsh restoration projects. She is also the national Coastal Representative on the Governing Board of the Coasts, Oceans, Ports, and Rivers Institute (COPRI) of the American

Society of Civil Engineers (ASCE). Our **Coastal and Dredge Engineering Lead, Maura Boswell**, has over 20 years of experience on coastal projects and has a PhD from Old Dominion University. She has direct research experience in the Middle Peninsula and currently serves as President of the Mid-Atlantic Chapter of the American Shore and Beach Preservation Association (ASBPA). **Project Principal, Kevin Reichert**, will connect resources across the business groups as needed.



* Resume Included

¹ VIMS Staff

² ODU Staff

³ PMI Staff



Erin Rooney, PE, BC.CE, CFM

PROJECT MANAGER

FIRM

HDR

EDUCATION

Masters, Civil Engineering,
Texas A&M University

Bachelors, Civil Engineering, Virginia Tech

REGISTRATIONS

Professional Engineer, VA, AL, MS, MD,
LA, NC, TX, DE, MI, CA

Certified Floodplain Manager

Board Certified Coastal Engineer

INDUSTRY TENURE

16 Years

HDR TENURE

14 Years

Erin is skilled with several types of coastal engineering projects including shoreline protection, wave analysis, marsh creation, numerical modeling, storm surge analysis, feasibility studies, dredging, and metocean studies. She has participated in and led the delivery of nature-based solutions including salt marshes, beach re-nourishment, and reefs for bivalves and other invertebrates. Through her work, Ms. Rooney has completed designs, conducted hydrodynamic modeling, prepared plans and specifications, and conducted coastal construction administration activities. Her years of providing post-construction monitoring of living shoreline projects' structural and biological success informs her practical designs. She recently served on the board of the American Shore and Beach Preservation Association (ASBPA) Mid-Atlantic Chapter and currently serves on the national board of ASCE's Coasts, Oceans, Ports, & Rivers Institute (COPRI).

RELEVANT PROJECT EXPERIENCE

Coastal Protection and Restoration Authority, Terrebonne Basin Ridge and Marsh Creation Project, Bayou Terrebonne Increment (TE-0139), Terrebonne Parish, LA

Coastal Engineer. Serving as lead engineer for marsh and ridge design. Project includes design of 126 acres of earthen ridge and 1,370 acres of marsh creation along 8 to 10 miles of existing ridge. Design challenges include soft and variable foundation soils, open water conditions providing challenges for containment and erosion, and design of efficient dredge pipeline routes. Additional project challenges include the potential for cultural resource sites due to the proximity to the bayou.

National Oceanic and Atmospheric Administration, Alabama Swift Tract Living Shoreline, Bon Secour Bay, AL

Project Manager/Design Engineer. Designed a low-crested living shoreline breakwater project. Produced construction documents, provided construction phase support. Erin coordinated seven years of post-construction monitoring (five years under contract to NOAA and two years under contract to TNC). Completed MIKE 21 SW numerical modeling during design to determine efficiency and effects of potential living shoreline design alternatives at the project location in Bon Secour Bay.

National Oceanic and Atmospheric Administration, Pensacola Bay Living Shoreline, Escambia County, FL

Coastal Engineer. Design of a living shoreline project in Pensacola Bay using low-crested reef breakwaters and dredged material placement to create and protect emerging salt marsh habitat. Used MIKE 21 SW to determine anticipated wave field characteristics at the proposed project locations. Developed project design, construction drawings, and technical specifications.

Confidential Client, PA

Lead Coastal Engineer. Conducting a coastal resiliency study of public utility infrastructure on a tidally-influenced river. Study includes assessment of coastal-related vulnerabilities under existing conditions and with future relative sea level rise. Project includes a stakeholder workshop and feasibility level design of upgrade alternatives.

Coastal Protection and Restoration Authority, Rockefeller Refuge Gulf Shoreline Stabilization (ME-0018), Cameron Parish, LA

Coastal Engineer. Project challenges include erosion rates of greater than 40 feet per year and extremely soft soils. Analyzed hydronamic data to determine the wave dissipation efficiency of three test shoreline stabilization structures and documented in a final demonstration project monitoring report. Used this data as part of the design team for the full three-mile shoreline protection structure. During the full project design, used MIKE 21 SW to study wave field dissipation and circulation patterns near the proposed structure, prepared contract documents, provided bid phase support, and construction phase services.



Kevin Reichert, PE

PRINCIPAL IN CHARGE

FIRM

HDR

EDUCATION

Bachelors, Civil Engineering, Virginia Tech

REGISTRATIONS

Professional Engineer, VA

INDUSTRY TENURE

22 Years

HDR TENURE

5 Years

Kevin is a seasoned transportation professional with over 22 years of experience managing and delivering complex infrastructure projects. As Principal in Charge, he provides strategic leadership and ensures successful outcomes for large-scale transportation and site development initiatives. Kevin has a proven track record of guiding multidisciplinary teams and fostering collaboration among stakeholders, including the Virginia Department of Transportation (VDOT), local governments, and consulting partners. His portfolio includes interstate widening, bridge replacements, trail systems, and intricate intersection improvements. Kevin brings extensive expertise in design-build procurement and has served as VDOT's primary liaison for locally administered projects, ensuring alignment with client goals and regulatory requirements.

RELEVANT PROJECT EXPERIENCE

VA DOT, Piedmont Avenue Bridge Rehabilitation, VA

Principal in Charge. The scope of work includes providing all professional engineering services for the rehabilitation of the Piedmont Avenue Bridge over Beaver Creek (Fed ID 20001), in the City of Bristol, VA, and Bristol, TN. The goal of the construction project is to remove the load posting from the structure and improve the General Condition Ratings (GCR) of all elements to 6 or higher. Preliminary Engineering (PE) services shall include but are not limited to: structural engineering, geotechnical engineering, material evaluation, roadway and traffic engineering, maintenance of traffic, utility identification and coordination, constructability reviews, and project management duties associated with complex urban projects. The PE shall be performed in three (3) phases. Work through the Preliminary Design Phase (Phase I) will be negotiated with the original contract; this will include engineering services through Stage I Design of the bridge structure and Design Approval for the highway design. The level of design support services from other disciplines will be consistent with these stages of development. Phase I services will include developing the existing pre-scoping work and conceptual plans to advance the design through the scoping phase to the Preliminary Field Inspection (PFI) phase, in alignment with the VDOT Project Development Process and Electronic Plan Submission Process. This will include evaluation of alternatives and respective life cycle assessments. Key activities will include conducting a Scoping meeting and the Preliminary Field Inspection (PFI). The project scope will address a range of needs using a multi-unit design concept, which may include the following scope items based on the condition: Complete replacement of certain sections of the structure; Rehabilitation of certain sections by performing a superstructure replacement

with substructure repairs; and Rehabilitation of certain sections by performing superstructure and substructure repairs based on the condition. Staged construction will be required to complete the work in order to accommodate the environmental requirements, and businesses, vehicular and pedestrian traffic along the corridor.

National Park Service, Water Line Replacement-East Potomac Park, VA

Principal in Charge. Design phase services for the water line rehabilitation (replacement) at East Potomac Park, Hains Point. PD-SD services as well as supplemental field investigations were completed under two separate task orders. This task order is for the next phase - final design.

VA DOT, VDOT CFO Programmatic, VA

Principal in Charge. Virginia Department of Transportation (VDOT) executive leadership has requested HDR to perform a multiphased programmatic evaluation of factors, both past and present, impacting the allocation and availability of resources for the delivery of Maintenance and Operations (M&O) programs as well as the resulting impact on the Highway Construction program ("Evaluation").

VA DOT, Courthouse Road Pedestrian Improvements, Hopewell, VA

Principal in Charge. Kevin is serving as the Principal in Charge as HDR provides engineering services for the preliminary design, final design, plan development, and post-award services for the Courthouse Road Pedestrian Improvements project in the City of Hopewell, Virginia.

Donna Bilkovic, PhD

TECHNICAL ADVISOR

FIRM

VIMS

EDUCATION

PhD., Marine Ecology, Virginia Institute of Marine Science

Masters, Biology, University of Michigan

Bachelor, Biology, University of Michigan

APPOINTMENTS

2020-present Research Professor, William and Mary (VIMS), Gloucester Point, VA

2020-present Assistant Director, Center for Coastal Resources Management, VIMS

2019-2023 W. Taylor Reveley, III Interdisciplinary Faculty Fellow

2014-2020 Research Associate Professor, William and Mary (VIMS), Gloucester Point, VA

2008-2014 Research Assistant Professor, William and Mary (VIMS), Gloucester Point, VA

2001-2007 Post-Doctoral Researcher, VIMS, Gloucester Point, VA

Donna is a coastal ecologist with extensive experience advancing restoration and conservation strategies for coastal ecosystems. Her research focuses on the ecological dynamics of coastal habitats, emphasizing the impacts of natural and human-driven disturbances, habitat loss, and marine debris. Donna has led influential studies on shoreline development and its effects on nearshore communities, shaping Chesapeake Bay management practices and legislation to reduce shoreline hardening. She also co-managed a statewide derelict fishing gear removal program, fostering collaboration among researchers, policymakers, and industry stakeholders. Currently, Donna is driving research on nature-based shoreline solutions, social-ecological resilience, decision-support tools for habitat conservation, and global reforms in marine debris management.

ABBREVIATED LIST OF PUBLICATIONS

- Bilkovic, D.M., Scheld, A., Isdell, R., Mason, P., Stafford, S., Mitchell, M., Gonzalez, C., Chambers, R., Leu, M., Musick, S. Gregory, S., Hendricks, J., Dada, O.*, and Benson, G*. 2025. Valuing present and future benefits provided by coastal wetlands and living shorelines. *Nature-Based Solutions*, p.100243.
- Mason, P. D.M. Bilkovic, A.G. Guthrie*, K. Nunez, S. Jones, C. Boyd. 2026. (online Dec 2025). Encouraging living shorelines in the United States- a review of state definitions and policies. *Marine Policy*, 185,106973. <https://doi.org/10.1016/j.marpol.2025.106973>
- Scheld, A.M., Bilkovic, DM., Stafford, S., Powers, K.*, Musick, S. and Guthrie, A.G. 2024. Valuing shoreline habitats for recreational fishing. *Ocean & Coastal Management*, 253, p.107150.
- Guthrie, A.G.*, Stafford, S., Scheld, A.M., Nunez, K. and Bilkovic, DM., 2023. Property owner shoreline modification decisions vary based on their perceptions of shoreline change and interests in ecological benefits. *Frontiers in Marine Science*, 10, p.1031012.
- Leu, M., Isdell, R.E., Galvin III*, R.M., Rapp, A.J., Mason, S.D.*, Bilkovic, DM. and Chambers, R.M., 2023. Comparable use of tidal living shorelines and natural-fringe marshes by herons and shorebirds. *Ecosphere*, 14(11), p.e4683.

ABBREVIATED LIST OF FELLOWSHIPS AND GRANTS

- 2025 VACZM. Economic Benefits of Nature Based Solutions. Pls: Bilkovic, Scheld, Nunez.\$80,000.
- 2024-2027 EPA. Evaluating the Benefits of Living Shoreline Stabilization Projects (subcontract to Maryland Department of the Environment). Pls: Nunez, Mason, Isdell, Bilkovic. \$190,190
- 2023-2026 NOAA. Estimating enhanced fish density and production derived from natural and restored salt marsh edge habitats in Chesapeake Bay. Pls: Isdell, Bilkovic, Thompson (CNU). \$401,541
- 2021-2024 National Oceanic and Atmospheric Administration (NOAA) Chesapeake Bay Fisheries Research Program. Valuation of ecological and social benefits provided by natural and restored nearshore habitat for communities and fisheries. Pls: Bilkovic, Scheld. \$248,476
- 2021-2024 National Fish & Wildlife Foundation (NFWF). Accelerating Water Quality Improvements in the James River through the Living Shoreline Collaborative. Subaward to James River Association, pending final award at VIMS. Pls: K. Duhring, D. Bilkovic, M. Mitchell. \$1M; ~\$150,000 direct funds to VIMS.

SELECT SYNERGISTIC ACTIVITIES

- 2008-present Significant contributor to Chesapeake Bay Program and Albemarle-Palmico National Estuary Partnership (APNEP) Restoration programs. Chesapeake Bay Program's Scientific and Technical Advisory Committee (STAC) Alternate Member (2008-2010); At-large Appointee (2010-2018), Fish Habitat Workgroup Member (2015-), Climate Resiliency Workgroup Member (2014-present). APNEP's Scientific and Technical Advisory Committee (2021-present) and Executive Board (2023-present)
- 2016-2017 Lead editor and contributor to the volume *Living Shorelines: The Science and Management of Nature-based Coastal Protection*. D.M. Bilkovic, M. Mitchell, M. La Peyre, and J. Toft (eds), CRC Press, Taylor & Francis Group (published 2017).

Carol Considine

TECHNICAL ADVISOR

FIRM

Old Dominion University

EDUCATION

Masters, Civil Engineering, University of California, Berkeley

Bachelor, Civil Engineering, Old Dominion University

APPOINTMENTS

May 2021-Present Director of Applied Projects & Professor of Engineering Technology, Institute for Coastal Adaptation & Resilience, Old Dominion University

May 2017-May 2021 Assistant Dean, Batten College of Engineering & Technology, Old Dominion University

May 2005-May 2021 Associate Professor of Engineering Technology, Batten College of Engineering & Technology, Old Dominion University

Carol Considine serves as Director of Applied Projects and Professor of Engineering Technology at Old Dominion University's Institute for Coastal Adaptation & Resilience. She brings extensive experience in leading applied research and collaborative initiatives that address climate adaptation and resilience challenges for government, industry, and communities. Carol has successfully managed multi-million-dollar projects and secured significant external funding to advance coastal resilience strategies, including nature-based solutions and infrastructure adaptation. With advanced degrees in Civil Engineering from UC Berkeley and Virginia Tech, and a strong record of publications and partnerships, she offers proven expertise in translating research into actionable solutions that deliver measurable impact.

ABBREVIATED LIST OF PUBLICATIONS

- Ismael, Dalya & Hutton, Nicole & Erten-Unal, Mujde & Considine, Carol & Vandecar-Burdin, Tancy & Davis, Christopher & Chen, Yin-Hsuen. (2024). Community-Centric Approaches to Coastal Hazard Assessment and Management in Southside Norfolk, Virginia, USA. *Atmosphere*. 15. 372. 10.3390/atmos15030372.
- Yusuf, J., Nicula, J., St. John III, B., Jordan, M., Covi, M., Considine, C., Saitgalina, M., & Behr, J. Developing an Institutional Arrangement for a Whole-of-Government and Whole-of-Community Approach to Regional Adaptation to Sea Level Rise: The Hampton Roads Pilot Project, *International Journal of Public Administration*, 2021, DOI: 10.1080/01900692.2020.1866601.
- Andrews, M., Erten-Unal, M., and Considine, C.C, "Charting a Path to Trans-disciplinary Collaborative Design for Adaptation to Sea Level Rise", *Journal of Higher Education Theory and Practice*, Vol. 20(15), pp. 187-192, 2020.

ABBREVIATED LIST OF FELLOWSHIPS AND GRANTS

- Erten-Unal, M., Considine, C., Ismael, D. Building Coastal Resilience in Underserved Communities: A Nature-Based Solution Approach in Southside Norfolk. National Fish and Wildlife Foundation. \$706,790. August 2024 - July 2026.
- Considine, C. VA State WIP - Old Dominion University. Virginia Department of Environmental Quality. \$75,000. February 1, 2024 - December 31, 2024.
- Considine, C., Whitehead, J., McNab, R., Yusuf, J., Allen, T. Virginia Beach Stormwater Bond Initiative Assistance. City of Virginia Beach. \$103,500. July 2021 - December 2021.
- Considine, C., Whitehead, J., Erten-Unal, M. "Launching a Coastal Resilience & Adaptation Economy." Go Virginia. \$456,570. April 2021 - March 2025. ODU subcontracted to Virginia Institute of Marine Science, Total award amount \$2.9 million.

M. Cameron Perry, PE

QA/QC

FIRM

HDR

REGISTRATIONS

Professional Engineer, FL, TX

INDUSTRY TENURE

27 Years

EDUCATION

Bachelors, Maritime Systems Engineering, Texas
A & M University

HDR TENURE

21 Years

Cameron brings deep expertise in coastal engineering and resilience, having directed the full lifecycle of coastal design projects for diverse shoreline environments throughout the United States. In his role as HDR's Coastal Business Class Director, he leads technical practice development, mentors emerging coastal engineers, and ensures delivery of high-quality, science-based solutions. His portfolio includes significant ecosystem restoration initiatives—such as living shorelines, tidal marsh restoration, and engineered oyster reefs—that strengthen natural defenses and improve ecological function. Cameron's commitment to advancing coastal resiliency is further demonstrated by his leadership as a Vice President on the American Shore & Beach Preservation Association Board and his service on the Texas General Land Office Technical Advisory Committee supporting long-term coastal planning.

RELEVANT PROJECT EXPERIENCE

Coastal Protection and Restoration Authority, Terrebonne Basin Ridge and Marsh Creation - Bayou Terrebonne Increment (TE-0139), Terrebonne Parish, LA

QA/QC. Cameron provided QA/QC services to this project which is intended to restore 126 acres of earthen ridge and create 1,370 acres of marsh in Terrebonne Basin. HDR is providing overall project management and lead the engineering and design.

Coastal Protection and Restoration Authority, Rockefeller Refuge Gulf Shoreline Stabilization (ME-0018), Cameron Parish, LA.

QA/QC. Cameron led QA/QC for the Rockefeller Refuge shoreline protection project, addressing severe marsh erosion of 35–50 feet per year. He oversaw development of four design alternatives and post-construction monitoring of the demonstration features. The project is now constructing approximately 9.2 miles of lightweight aggregate core breakwaters along the Gulf shoreline.

Coastal Protection and Restoration Authority, Isle au Pitre Restoration Project (PO-0190), St Bernard Parish, LA

QA/QC. HDR is designing a bird island restoration including fill material placement and shoreline protection. Project challenges include rapidly eroding shoreline, remote location, and limited remaining island footprint.

Port Authority of New York and New Jersey (PANYNJ); LaGuardia Landing Wetland Mitigation, Bronx, NY

QA/QC. Design of two wetland mitigation locations that included removal of historic fill to restore tidal hydrology and upland enhancements. Construction of Westchester Creek was completed in 2018, while Pugsley Creek is in design development with 100% drawings in early 2019.

National Oceanic and Atmospheric Administration, Restoration Center, Swift Tract Living Shoreline, Mobile Bay, AL

QA/QC. Development of living shoreline features along 1.6 miles of shoreline to protect existing marsh habitat. The project includes low, intertidal breakwaters that provide oyster habitat and reduce wave energy. HDR completed data collection, habitat mapping, coastal modeling, design, plan development, and bidding and construction phase services.

National Oceanic and Atmospheric Administration, Pensacola Bay Living Shoreline, Pensacola Bay, FL

Coastal Engineer. Cameron served as engineer-of-record for design of the marsh creation and low crested oyster reef breakwaters. Services included data collection, habitat mapping, design, regulatory coordination, and construction administration.

Louisiana Department of Wildlife and Fisheries, Rockefeller Wildlife Refuge Marsh Creation, Cameron Parish, LA

QA/QC. Cameron led the quality assurance and control for the design of 170 acres of intertidal marsh complex within the Rockefeller Wildlife Refuge. The restoration areas were confined by low containment berms and filled with hydraulically dredged soils from nearby oil field canals. Construction of the berms provided a pathway for tidal creeks post construction.

Coastal Protection and Restoration Authority, Orleans Landbridge Shoreline Protection (PO-0036), Orleans Parish, LA

QA/QC. Cameron led the QA/QC for the design of approximately eight miles of shoreline protection, which includes filling marine mattresses with crushed concrete resulting from the demolition and beneficial reuse of I-10 twin span bridge over Lake Pontchartrain..



Maura Boswell, PHD, PE

COASTAL AND DREDGE ENGINEERING

FIRM

HDR

Bachelors, Ocean Engineering, Florida
Institute of Technology

INDUSTRY TENURE
24 Years

EDUCATION

PhD, Civil and Environmental Engineering, Old
Dominion University
Masters, Coastal and Oceanographic Engineering,
University of Florida

REGISTRATIONS

Professional Engineer, VA, MD, ME, FL,
MA, DE, SC, OH

HDR TENURE
1 Year

Dr. Maura Boswell has more than 20 years of experience providing expertise in coastal engineering and urban waterfronts planning and design. She has focused her interests the last 15 years on resilient coastal shorelines and projects concerned with managing coastal flooding and sea level rise, including providing expertise on development of Nature-based Solutions design guidance documents at both a state and national level. Maura's interest in understanding and applying the latest technical research, combined with her experience locally, nationally, and globally, allows her to provide the most up-to-date approaches to coastal resilience design. As the Vice-Chair of the EBC Ocean and Coastal Resources Committee and as a member of the Board of Directors for the American Shore and Beach Preservation Association, Maura's professional interests service allows her to maintain a rich technical network and advocate for science-backed policies that enable successful design and implementation of resilient projects along our coastlines.

RELEVANT PROJECT EXPERIENCE

Captain Sinclair Living Shoreline Wave Attenuation Study, Gloucester, VA*

Principal Investigator. Principal Investigator who designed a field experiment and collected wave, pressure, and survey data at the Captain Sinclair Recreational Area marsh-sill living shoreline for assessment of hydrodynamic aspects of the designs and quantification of attenuation services provided. Utilized field data in a non-hydrostatic wave model, NHWAVE, to evaluate potential areas for design optimization and effectiveness of the designs to accommodate changes due to sea level rise.

Knitting Mill Creek Shoreline Protection, Norfolk, VA*

Project Manager. Project manager who conducted a site assessment of the existing shoreline conditions and provided multiple protection alternatives with associated opinions of probable cost. Provided design and permitting support and prepared bid documents for improvements that incorporated a combination of bulkheads, revetments, and living shorelines. The project shoreline is located in a cove across from a marina and adjacent to a recently constructed bulkhead; improvements to the surrounding areas had highlighted the erosion and failed armoring structures along the project shoreline. Coordinated and facilitated public outreach meetings to incorporate community feedback into the selected shoreline erosion protection design.

Craney Island Eastward Expansion Mitigation Area at Paradise Creek, Portsmouth, VA*

Coastal Engineer. Coastal engineer who prepared plans and specifications to assist in developing this wetland mitigation project as part of the Craney Island Eastward Expansion project. An appropriate site for mitigation was

identified along Paradise Creek and a plan incorporating tidal and non-tidal emergent, forested, shrub, and open water vegetation was developed. The design incorporated pedestrian walkways and viewpoints to enhance the use of the area.

Hampton Roads Sea Level Rise Preparedness & Resilience Intergovernmental Pilot Project Private Infrastructure Committee, Hampton Roads, VA*

Coastal Subject Matter Expert. The Intergovernmental Pilot Project (IPP) was chartered to create a framework for intergovernmental strategic planning with regard to sea level rise and recurrent flooding planning that, once implemented in the Hampton Roads region of Virginia, could be utilized outside of the region. The IPP included stakeholders from the Department of Defense, federal agencies, the White House, private industry, infrastructure, non-profits, and the community in a series of working groups and leadership meetings to develop a whole of government mitigation and adaptation planning process and an integrated regional recommendation. Maura provided technical expertise on the Private infrastructure Advisory Committee as part of this process and served as a contributor and editor on the final deliverables.

Resilience Adaptation Feasibility Tool (RAFT), Chincoteague, VA*

Coastal Engineer. RAFT is a process-based tool available to at-risk communities to leverage a multi-disciplinary team to increase community resilience. Dr. Boswell collaborated with multiple stakeholders, from government and the community, in Chincoteague, VA to provide management and technical services to the collaborative team implementing RAFT in eastern Virginia.

*Denotes previous experience



Uriah Gravois, PHD, PE

MODELING

FIRM

HDR

Bachelors, Civil Engineering, University of Florida

INDUSTRY TENURE

13 Years

EDUCATION

Doctor of Philosophy, Coastal and Oceanographic Engineering, University of Florida
Masters, Coastal and Oceanographic Engineering, University of Florida

REGISTRATIONS

Professional Engineer, FL, TX

HDR TENURE

5 Years

Dr. Gravois is a lead coastal modeler at HDR. He is licensed as a professional engineer in Florida and Texas and has project experience across the country. His expertise is in hydrodynamic and wave modeling for applications including flood defense, water supply/control structures, breakwater evaluation/design, navigation channel improvement, tidal flooding, ecosystem restoration, sediment transport, and sea level rise planning. He is well-versed in applying data from FEMA, NOAA, USACE, and USGS to support coastal modeling projects, and implementing numerical models using high-performance computing (HPC).

RELEVANT PROJECT EXPERIENCE

Louisiana Department of Transportation and Development (LaDOTD), Louisiana Watershed Initiative (LWI), Region 5, LA Coastal Engineer and Numerical Modeling Review.

The LWI is a multi-agency funding program that aims to use a watershed-based approach to better understand and reduce flood risk in Louisiana. HDR was tasked with developing hydrologic and hydraulic (H&H) modeling using HEC-HMS and HEC-RAS software for HUC 8 Regions that includes Atchafalaya, Bayou Teche, Mermentau, Mermentau Headwaters and Vermillion. Dr. Gravois is advising as a subject matter expert for the Coastal Transition Zone, where the H&H modeling and the coastal modeling overlap, and to help inform the modeling framework to apply. This work developed a new modeling framework which used data from existing ADCIRC coastal storm surge models and coupled them together with H&H models assessing compound flooding risk in the CTZ.

Texas General Land Office (TGLO), McFaddin Beach Nourishment Construction Administration and Beach Monitoring, McFaddin National Wildlife Refuge, TX Coastal Engineer and Numerical Modeling Review.

HDR completed detailed design and engineering services and permitting for the largest beach nourishment in Texas history. HDR was also tasked with construction administration and project monitoring. Dr. Gravois responsibilities included updates to dredging template design, processing surveys for dredge payments, conducting site visits, and writing monitoring reports..

Port Freeport, Hurricane Levee Stabilization Design, Freeport TX, 2022, 17, TO 11

Modeling Engineer. HDR provided planning, engineering, and design services for the Hurricane flood protection levee stabilization so that navigation channel can be widened.

Section 203 Feasibility Study for Channel Widening, Sabine Neches Navigation District, Sabine Neches Waterway, TX Lead Hydrodynamic Modeler. HDR partnered with David Miller and Associates to support the Sabine Neches Navigation District in studying potential improvements to the Sabine Neches Waterway and preparing a Section 203 Integrated Feasibility Report with required environmental analyses. Dr. Gravois served as lead hydrodynamic modeler, conducting vessel wake analysis with supporting field data collection and providing technical expertise in MIKE21 tide and hurricane storm surge modeling.

Virginia Department of Transportation (VDOT), Hampton Roads Bridge Tunnel (HRBT) Expansion, Virginia Beach, VA Lead Hydrodynamic Modeler. HDR and Mott MacDonald formed a Design JV for overall management of the Hampton Roads Bridge Tunnel (HRBT) Expansion design. HDR is responsible for roadway; structural (23 bridge replacements and widenings); geotechnical; drainage; ITS, lighting and signal design; utilities support; and environmental compliance. Dr. Gravois developed a Mike 21 Boussinesq Wave model to investigate changes induced in the wave conditions because of introducing a vertical seawall at the South Island of the HRBT expansion. These wave modeling results were detailed into a memo and used to update load calculations that were supplied to the bridge design team.

Bird Island Cove Phase II Construction Administration and Monitoring, Texas General Land Office (TGLO), Galveston, TX Modeling Engineer.

HDR is providing construction administration and monitoring services for Bird Island Cove shoreline protection phase II project. Dr. Gravois captained HDR's small vessel for multiple field site visits for environmental and shoreline monitoring. His responsibilities also included RTK GPS surveys, GIS mapping, and reporting.(ADCIRC).



Troy Savage, PWS, PWD, QEP, SCE

ENVIRONMENTAL PERMITTING

FIRM

HDR

EDUCATION

MS, Biology, Old Dominion University
Bachelors, Biology, Old Dominion University

REGISTRATIONS

Professional Wetland Scientist
Professional Wetland Delineator
Qualified Environmental Professional
Senior Certified Ecologist

INDUSTRY TENURE

27 Years

HDR TENURE

<1 Year

Troy is a senior environmental scientist with 27 years of experience in environmental consulting, natural resource mitigation, habitat restoration, and regulatory compliance. He specializes in federal, state, and local permitting; threatened and endangered species surveys; and habitat assessments across coastal, marine, and inland environments. As a listed surveyor with the U.S. Fish & Wildlife Service and National Marine Fisheries Service, Troy brings deep expertise in evaluating sensitive species and critical habitats that influence coastal resiliency design and permitting. His work includes mitigation and nutrient bank development, ecological restoration, and compliance with major environmental regulations such as the CWA, VWP, CBPA, NEPA, RCRA, and ESA. Troy has supported a wide range of infrastructure and restoration projects, contributing technical leadership that strengthens climate adaptation, shoreline protection, and resilient infrastructure planning.

RELEVANT PROJECT EXPERIENCE

Route 35 Bridge and Causeway Replacement, Southampton County, VA

Environmental Scientist and Endangered Species Biologist. Troy provided complete environmental management for the US Route 35 bridge replacement in Courtland, VA. The structurally deficient steel trestle bridge and 1500' causeway was prioritized for replacement under a short turn around design build lap contract. The project was further complicated by the presence of several endangered species and located in an ecologically high value bald cypress and tupelo swamp. Troy performed a Wetland delineation, Joint Permit Application, multiple endangered species surveys to include: anadromous fish, salamanders, migratory bird and bat surveys. The one-year time from contract to individual permit was met.

Federal Facilities NEPA Audits, Natural Resource Inventories, Multiple locations

Environmental Scientist and Endangered Species Biologist. Troy provided endangered species habitat assessments and species searches on multiple facilities in Virginia including Naval Surface Warfare Center Dahlgren, Quantico Marine Base, Fort Belvoir, Jefferson Labs, Fort A.P. Hill, Langley Airforce Base and others. Threatened and endangered species and habitat searches included: canebrake rattlesnake; swamp pink; small whorled pogonia; Mabee's and tiger salamanders; New Jersey rush; as well as Indiana, northern long-eared, and tricolor bats. Troy also participated in several avian, shorebird and fish studies where appropriate.

I-64 Gap Widening, Newport News to Henrico County, VA

Endangered Species Biologist. Troy was responsible for threatened and endangered species habitat assessment and searches for small whorled pogonia, swamp pink, New Jersey rush, northern long eared bat, Indiana bat, Mabee's salamander, and state listed spadderdock and yellow pond lilly.

Baltimore District of the Army Corp of Engineers, Anacostia River Watershed Value Engineering Review Panel, Washington DC

Technical Reviewer. Troy served as a federal project technical reviewer on behalf of the Army Corp of Engineers value add engineering process. Troy served as the committee ecologist and biologist for the review of stream restoration projects in the Anacostia River Watershed.

Route 60 Bridge Replacement, Newport News, Virginia

Environmental Scientist and Endangered Species Biologist. Troy provided complete environmental management for the historic Warwick Bridge replacement. His services included delineation, state and federal endangered species surveys, NEPA compliant environmental assessment, and a successful joint permit application.

Idlewood Stream Restoration Phase I and II, Fredericksburg Virginia

Environmental Scientist. Troy lead Waters of US and State Surface Water Delineation, Endangered Species Surveys, Perenniality determinations and USM prioritization for stream restoration and nutrient credits.



Aaron Zdinak, PE, BC.GE, NCEES

SENIOR GEOTECHNICAL ENGINEER

FIRM

HDR

EDUCATION

Masters, Civil Engineering (Geotechnical), Virginia Tech University
Bachelors, Civil Engineering, University of Virginia

REGISTRATIONS

Professional Engineer: VA, AR, FL, NC, DC, TX, MD

INDUSTRY TENURE

32 Years

HDR TENURE

16 Years

Aaron is a senior geotechnical engineer based in Richmond, VA, with over 32 years of global consulting experience and currently serves as HDR's Geotechnical Services Director. He specializes in complex subsurface characterization, geohazard mitigation, advanced laboratory testing, embankment design, and ground improvement, with a strong focus on applying context-sensitive and nature-based solutions to enhance project resilience. He is highly experienced in reliability-based methods for evaluating subsurface variability, slope stability, settlement, and pavement performance. Mr. Zdinak is also an NHI-certified instructor and co-facilitator for the national climate resilience course 142085(A), serving as subject matter expert for geohazards and pavement design and leading instruction on integrating climate resilience and changing climate conditions into project development.

RELEVANT PROJECT EXPERIENCE

ICF, Performance Measurement and Program Evaluation: Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Discretionary Grant Program for FHWA, National Geotechnical Advisor.

As part of a team, and in collaboration with FHWA, Aaron provided support to develop and refine the geohazard portion of the Change in Annualized Natural Hazard Risk procedure to the PROTECT project metric to estimate the Threat Probability for Rockfall, Landslide (rockslide, debris flow, mudslide), Earthquake, Volcano, and Wildfire. Mr. Zdinak is providing input on methods for measuring project impacts and establishing monitoring procedures to track outcomes over time with respect to the identified geohazards to generate insights on how well the program is supporting transportation infrastructure resilience.

National Highway Institute (NHI) Addressing Climate Resilience in Highway Project Development and Preliminary Design Training Course, FHWA-NHI-142085(A) Deployment, Nationwide

Instructor and SME. As an NHI-certified instructor and subject matter expert, Aaron supported Iteris, Inc. in delivering the NHI climate resilience course (142085/142085A) to multiple state DOTs, providing hands-on instruction in project-level climate risk assessment and integration of resilience concepts into engineering analysis. He facilitated modules on geohazards, pavement design, course fundamentals, and climate change integration, coordinating with host DOTs and lead instructors to conduct 2.5- to 3-day sessions. Leveraging more than 30 years of consulting experience, Aaron consistently earned high participant ratings for his ability to clearly explain technical concepts, tailor discussions to varying levels of resilience knowledge, and connect adaptive project development with environmental and climate-driven considerations.

National Park Service, Task Order #0002 Preliminary, Schematic Design and D-B RFP for Seawalls Phase I, Washington DC

Senior Geotechnical Engineer. HDR, as lead partner of a joint venture, supported the National Park Service in repairing and rehabilitating approximately 1.8 miles of historic seawalls along the Tidal Basin and West Potomac Park to restore their functional height, alignment, and resilience. Serving as the JV's senior geotechnical engineer and technical subconsultant coordinator, Aaron managed scope and oversight of four geotechnical subconsultants and contributed to investigations, engineering, schematic design, and the Design-Build RFP. He led design-charrette discussions on strategies to reduce future settlement and lateral loading, including soil-movement barriers and lightweight backfill concepts, and advised on micropile sacrificial steel requirements. Aaron also supported procurement by responding to RFIs and reviewing contractor submittals during construction, coordinating on foundation risks and validating subsurface parameters through the contractor's instrumentation program.

EFLHD Puerto Rico Hurricane Maria Highway/Bridge Assessments, Puerto Rico

Senior Geotechnical Engineer. Aaron provided guidance on rapidly characterizing site conditions and identifying triggering mechanisms for damage caused by Hurricane Maria, which generated more than 40,000 landslides, widespread flooding, and major infrastructure failures across Puerto Rico. HDR led assessments, technical reporting, and construction scope development for 81 storm-impacted sites in the island's most severely damaged regions. Based on field reconnaissance, 22 critical locations were selected for geotechnical drilling investigations to support long-term recovery planning.

Karina Nunez, PHD

GIS

FIRM

VIMS

EDUCATION

PhD, Marine Science, College of William & Mary
Masters, Marine Science, College of William & Mary
Bachelor, Biochemistry, School of Science, University of the Republic,
Uruguay

APPOINTMENTS

2020-Present Geospatial Modeling Manager & Senior Research Scientist. VIMS, William & Mary, Virginia
2005-2020 Professional, GIS Analyst. VIMS, William & Mary. Virginia, USA
2004-2005 Laboratory & Research Specialist. VIMS, William & Mary. Virginia, USA
1999-2003 Research Assistant. Department of Oceanography, University of the Republic. Montevideo, Uruguay

Karina is an expert in coastal systems analysis and resilience planning, specializing in spatial analysis and modeling using GIS technology and remote sensing. Her work integrates machine learning to map shoreline features and coastal habitats, and applies cross-scale modeling to understand creek, river, estuarine, and ocean interactions. With deep expertise in tidal marsh ecology, living shorelines, and wetland restoration, Karinna conducts coastal vulnerability assessments related to sea-level rise and flooding. Her research addresses land use and land cover change, adaptation and mitigation strategies, and sustainable development management in coastal areas, delivering innovative solutions for resilience and environmental stewardship.

ABBREVIATED LIST OF PUBLICATIONS

- Nunez, K., Mason, P., Rudnicki, T., Tombleson, C., Duning, C., Hendricks, J., Lv, M., Hill, E., Graulich, J., Schatt, D., Duhring, K. (2025). Advancing the use of spatial data in implementing adaptive management to support coastal resilience. In *Proceedings of Coastal Dynamics 2025* (Springer Nature). [in press].
- Mason, P. A., Bilkovic, D. M., Guthrie, A. G., Nunez, K., Jones, S., & Boyd, C. (2026). Encouraging living shorelines in the United States: A review of state definitions and policies. *Marine Policy*, 185, 106973. <https://doi.org/10.1016/j.marpol.2025.106973>
- Twomey, A. J., Nunez, K., Carr, J. A., Crooks, S., Friess, D. A., Glamore, W., Orr, M., Reef, R., Rogers, K., Waltham, N. J., & Lovelock, C. E. (2024). Planning Hydrological Restoration of Coastal Wetlands: Key Model Considerations and Solutions. *Science of The Total Environment*, 915, 169881. <https://doi.org/10.1016/j.scitotenv.2024.169881>
- Lv, Z., Nunez, K., Brewer, E., Runfola, D. (2023). Mapping the tidal marshes of coastal Virginia: a hierarchical transfer learning approach. *GIScience & Remote Sensing*. 61:1, DOI:10.1080/15481603.2023.2287291
- Lv, Z., Nunez, K., Brewer, E., Runfola, D. (2023). pyShore: A deep learning toolkit for shoreline structure mapping with high-resolution orthographic imagery and convolutional neural networks. *Computers & Geosciences*. Vol 171. <https://doi.org/10.1016/j.cageo.2022.105296>
- Nunez, K., Rudnicki, T., Mason, P., Tombleson, C., Berman, M. (2022). A geospatial modeling approach to assess site suitability of living shorelines and emphasize best shoreline management practices. Special Issue: Nature-based coastal defense: developing the knowledge needed for wider implementation. *Ecological Engineering*, 179, 106617. <https://doi.org/10.1016/j.ecoleng.2022.106617>
- Nunez, K., Zhang, Y., Bilkovic, D.M., and C. Hershner (2021). Coastal setting determines tidal marsh sustainability with accelerating sea-level rise. *Ocean & Coastal Management*, 214, 105898. <https://doi.org/10.1016/j.ocecoaman.2021.105898>
- Nunez, K., Zhang, Y.J., Herman, J., Reay, W., Hershner, C. (2020) A multi-scale approach for simulating tidal marsh evolution. *Ocean Dynamics*, <https://doi.org/10.1007/s10236-020-01380-6>

ABBREVIATED LIST OF FELLOWSHIPS AND GRANTS

- 2024-2027 EPA-VADEQ. Enhancing Wetland Management in Virginia: Tools and Community Engagement. PI: Nunez, Co-PI: Havens, Mitchell, Bilkovic. \$462,297.
- 2024-2027 EPA-MDE. Evaluating the Benefits of Living Shoreline Stabilization Projects. PI: Nunez, Co-PI: Bilkovic, Isdell. \$190,190.
- 2023-2026 NOAA. Advancing the use of spatial data and coastal modeling in implementing adaptive management to support coastal community resilience. PI: Nunez. \$372,800.
- 2022-2023 NOAA. Site recommendations and design options for nearshore oyster structures, specific to Mobjack Bay, Virginia, and its tributaries. PI: Nunez, Co-PI: Bilkovic, Isdell. \$89,905. Project webtool: "Nearshore Oyster Restoration Siting and Prioritization Tool" - <https://cmap22.vims.edu/OysterRestoration/index.html>
- 2021-2023 EPA-VADEQ. Tools for Improving Protection of Wetland Resources in Virginia - PI: Havens, Co-PI: Mason, Bilkovic, Nunez. \$667,620.
- 2021-2023 EPA-MDE. Improved siting of living shorelines and restoration guidance for stream/wetland complexes in support of Maryland's Wetland Program Plan Development. PI: Nunez. \$200,000.

Robert Isdell, PhD

BIOLOGICAL SURVEYS

FIRM

VIMS

EDUCATION

PhD, Marine Science, College of William & Mary

Masters, Biology, College of William & Mary

Bachelor, Biology, University of North Carolina, Greensboro

APPOINTMENTS

2024 - Present Senior Research Scientist, Virginia Institute of Marine Science

2022 - 2024 Associate Research Scientist, Virginia Institute of Marine Science

2019 - 2022 Assistant Research Scientist, Virginia Institute of Marine Science

2018 - 2019 Post Doctoral Research Associate, Virginia Institute of Marine Science

2017 - 2017 Lecturer, College of William & Mary, Williamsburg, VA, USA 2014 - 2018 Graduate Research Assistant, Virginia Institute of Marine Science, College of William & Mary

Robert is studying the interactions between humans and the environment at multiple scales throughout the Chesapeake Bay. His current projects include spatial distribution of diamondback terrapins, modeling shoreline structure growth over time, and effects of sea level rise on marsh fragmentation and distribution. His interests include spatial ecology, coastal resource conservation and management, and the impacts of climate change.

ABBREVIATED LIST OF PUBLICATIONS

- Isdell R, Bilkovic D, Guthrie A, Mitchell M, Chambers R, Leu M, Hershner C. Living shorelines achieve functional equivalence to natural fringe marshes across multiple ecological metrics. *PeerJ*. 2021 August 13; 9:e11815-. Available from: <https://peerj.com/articles/11815> DOI: 10.7717/peerj.11815
- Isdell R, Chambers R, Bilkovic D, Leu M. Effects of terrestrial-aquatic connectivity on an estuarine turtle. *Diversity and Distributions*. 2015 June; 21(6):643-653. Available from: <https://onlinelibrary.wiley.com/doi/10.1111/ddi.12289> DOI: 10.1111/ddi.12289
- Isdell R, Bilkovic D, Hershner C. Shorescape-level factors drive distribution and condition of a salt marsh facilitator (*Geukensia demissa*). *Ecosphere*. 2018 October; 9(10):e02449-. Available from: <http://doi.wiley.com/10.1002/ecs2.2449> DOI: 10.1002/ecs2.2449
- Bilkovic D, Isdell R, Stanhope D, Angstadt K, Havens K, Chambers R. Nursery habitat use by juvenile blue crabs in created and natural fringing marshes. *Ecological Engineering*. 2021 November; 170:106333-. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0925857421001889> DOI: 10.1016/j.ecoleng.2021.106333
- Bilkovic D, Isdell R, Guthrie A, Mitchell M, Chambers R. Ribbed mussel *Geukensia demissa* population response to living shoreline design and ecosystem development. *Ecosphere*. 2021 March 08; 12(3):-. Available from: <https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.3402> DOI: 10.1002/ecs2.3402
- Donna Marie Bilkovic, Andrew M. Scheld, Robert Isdell, Pamela Mason, Sarah Stafford, Molly Mitchell, Cirse Gonzalez-Dorantes, Randolph Chambers, Matthias Leu, Susanna Musick, Sean Gregory, Jessica Hendricks, Oluwakemi Dada, Gabriel Benson. Valuing present and future benefits provided by coastal wetlands and living shorelines. *Nature-Based Solutions*. 2025 December. DOI: 10.1016/j.nbsj.2025.100243
- Chambers R, Gorsky A, Isdell R, Mitchell M, Bilkovic D. Comparison of nutrient accrual in constructed living shoreline and natural fringing marshes. *Ocean & Coastal Management*. 2021 January; 199:105401-. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0964569120303082> DOI: 10.1016/j.ocecoaman.2020.105401
- Leu M, Isdell R, Galvin R, Rapp A, Mason S, Bilkovic D, Chambers R. Comparable use of tidal living shorelines and natural-fringe marshes by herons and shorebirds. *Ecosphere*. 2023 November 12; 14(11):-. Available from: <https://esajournals.onlinelibrary.wiley.com/doi/10.1002/ecs2.4683> DOI: 10.1002/ecs2.4683
- Guthrie A, Bilkovic D, Mitchell M, Chambers R, Thompson J, Isdell R. Ecological equivalency of living shorelines and natural marshes for fish and crustacean communities. *Ecological Engineering*. 2022 March; 176:106511-. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S0925857421003669> DOI: 10.1016/j.ecoleng.2021.106511
- Gabriel W. Benson, Melinda J. Donnelly, Lori J. Morris, Robert E. Isdell, Linda J. Walters. Examining the Relationship Between Nearshore Seagrass and Living Shorelines in a Subtropical Estuary. *Estuaries and Coasts*. 2025 November. DOI: 10.1007/s12237-025-01595-0

Jan McDowell, PhD

BIOLOGICAL SURVEYS

FIRM

VIMS

EDUCATION

PhD, Marine Science, Virginia Institute of Marine Science
Bachelor, Biology, University of Iowa

APPOINTMENTS

2019-Present Research Associate Professor, Virginia Institute of Marine Science, School of Marine Science, William & Mary
2012-2018 Research Assistant Professor, Virginia Institute of Marine Science, School of Marine Science, William & Mary
2005-2012 Associate School of Marine Science Faculty, Virginia Institute of Marine Science, School of Marine Science, William & Mary

Jan is a dedicated researcher specializing in population genetics, conservation genetics, systematics, molecular ecology, and evolutionary biology. Her work focuses on using molecular markers to investigate the forces that shape and maintain population structure in marine environments. Jan's research aims to understand how genetic structure influences the management and conservation of marine species, contributing valuable insights to sustainable practices and biodiversity preservation.

ABBREVIATED LIST OF PUBLICATIONS

- Martinez*, J.L., J.E. Graves and J.R. McDowell (2025) Stock Composition of Striped Marlin (*Kajikia audax*) in the Central North Pacific Ocean Inferred by Analyses of Genome-Wide Molecular Markers. ICES Journal of Marine Science Volume 82, Issue 9, September 2025, <https://doi.org/10.1093/icesjms/fsaf156>.
- Mamoozadeh*, N.R., J.R. McDowell and J.E. Graves. (2023) One species or two? Genomic data resolves long-standing uncertainty about the relationship of two large pelagic fishes, white marlin (*Kajikia albida*) and striped marlin (*K. audax*). ICES Journal of Marine Science, Volume 80, Issue 6, Pages 1802-1813, <https://doi.org/10.1093/icesjms/fsad114>.
- Ropp*, A.J., K.S. Reece, E.E. Biesack, J.R. McDowell (2023) Fine-scale population structure of the northern hard clam (*Mercenaria mercenaria*) revealed by genome-wide SNP markers. Evolutionary Applications, 16, 1422-1437. <https://doi.org/10.1111/eva.13577>.
- Nelson* L.N., Jones C.M., McDowell J.R. (2022) Range-wide Population Structure of the Clearnose Skate (*Rostoraja eglanteria*). Transactions of the American Fisheries Society. 151(3) 356- 372. <https://doi.org/10.1002/tafs.10351>.
- McDowell, J.R., Bravington, M., Grewe, P.M. et al. (2022) Low levels of sibship encourage use of larvae in western Atlantic bluefin tuna abundance estimation by close-kin mark-recapture. Sci Rep 12, 18606. <https://doi.org/10.1038/s41598-022-20862-9>
- Youtsey L.S., K.S. Reece, R.A. Snyder, J.R. McDowell (2025) Transcriptomic profile of the northern hard clam (*Mercenaria mercenaria*) in response to short-term low salinity exposure. Frontiers in Marine Science 12:1574486. <https://doi.org/10.3389/fmars.2025.1574486>
- Schatz*, K.A., J.R. McDowell, E.E. Biesack, E. Rivest. (2024) Relative importance of environmental-tolerance mechanisms in response to typical salinity shifts during oyster aquaculture production. Aquaculture Volume 581, 740432 <https://doi.org/10.1016/j.aquaculture.2023.740432>.
- McCarty A.J., J.R., McDowell, K.S., Reece, R.A., Snyder, K. Hudson (2025) Application of genetic technology in support of the northern hard clam (*Mercenaria mercenaria*) aquaculture industry. Front. Aquac. 4:1556440. doi: 10.3389/faq.2025.1556440
- Askin* S.E., Fisher R.A., Biesack E.E., Robins, R., McDowell J.R. (2022) Population Genetic Structure in Channeled Whelk, *Busycotypus canaliculatus*, Along the U.S. Atlantic Coast. Transactions of the American Fisheries Society. 151(5) :543-558. <https://doi.org/10.1002/tafs.10374>
- Song*, J., McDowell, J.R. (2020). Comparative Transcriptomics of Spotted Seatrout (*Cynoscion nebulosus*) Populations to Cold and Heat Stress. Ecology and Evolution. 2020; 00:1-16. doi:10.1002/ece3.7138

* Indicates a graduate student

RELEVANT E-DNA-BASED PROJECTS

- J.R. McDowell, Tuckey, T., Fabrizio, M., Snyder, R., Bi, H.S. Combining environmental DNA (eDNA) and adaptive resolution imaging sonar (ARIS) to assess restoration-mediated changes in habitat use by fishes. VIMS Strategic Initiative Funding. \$21,382.
- J.R. McDowell Application of environmental DNA protocols for black-banded sunfish (*Enneacanthus chaetodon*) detection in Virginia. DWR. Project Research Costs: \$10,000. April 1, 2024 - July 1, 2024.
- D. Rudders, J. McDowell, S. Roman. Understanding Biological and Environmental Drivers of Shell Blister in the sea scallop, *Placopecten magellanicus*. National Marine Fisheries Service Year 2022/2023 Atlantic Sea Scallop Research Set-Aside Program. Project Research Costs: \$331,749 (25% of total). Vessel Compensation Cost: \$756,964 (75% of total). Total Project Cost: \$1,088,713.
- D.B. Rudders, J.R. McDowell. Understanding the feeding ecology of the sea scallop, *Placopecten magellanicus*, through DNA metabarcoding: is prey type correlated with condition and reproductive success? National Marine Fisheries Service Year 2022/2023 Atlantic Sea Scallop Research Set-Aside Program. Project Research Costs: \$291,749 (25% of total). Vessel Compensation Cost: \$874,346 (75% of total). Total Project Cost: \$1,166,945. April 1, 2022, to March 30, 2025.
- K. Hudson, R. Fisher, J. McDowell. Development of eDNA tools for early detection of two main fouling organisms of oyster aquaculture farms, *Cliona* sp. and *Polydora websterii*. NOAA. 01 September 2019- 31 August 2022. Total: \$139,696 Direct: \$92,829 Match: \$46,867.



Barbara Barnes, RLA, LEED AP

COASTAL LANDSCAPE ARCHITECTURE

FIRM

HDR

EDUCATION

Bachelors, Landscape Architecture, University of Washington

REGISTRATIONS

Professional Landscape Architect: VA, NC, NY
Restoration Ecology Certificate

INDUSTRY TENURE

24 Years

HDR TENURE

11 Years

Barbara is a registered Landscape Architect specializing in sustainable urban landscapes that integrate community needs and recreational opportunities with natural habitats. She has managed numerous multi-million-dollar projects from design through construction and maintenance, bringing comprehensive expertise to anticipate permitting and scheduling challenges. Her experience covers a wide variety of projects; those projects and the lessons learned allows Barbara to translate complex systems and issues into solutions that meet the high demands of public projects.

RELEVANT PROJECT EXPERIENCE

NYSOGS / NYSDEC: Fireplace Neck: Tidal Wetland Hydrologic Connectivity Improvement Project, Brookhaven NY

DSDC Project Manager. Fireplace Neck appears, upon first impression, to be a well-established functioning marsh system in the Town of Brookhaven, New York. The approximately 108 acre New York State Department of Environmental Conservation (DEC) property sits on Bellport Bay, on the Great South Bay of Long Island, and is dominated by low marsh habitat. However, forty years ago, this same system was primarily high marsh. Like other marshes in Long Island, Fireplace Neck is a grid ditched marsh exhibiting water logging, changes in marsh vegetation over time, and an increase of invasive species cover. It is showing signs of habitat degradation as high marsh transitions to low marsh and eventually to mudflat and open water. HDR completed extensive field data collection to understand the site dynamics influencing the changes documented. Testing at Fireplace Neck showed exceedances of typical ranges for salinity and dissolved oxygen, resulting in a low marsh mat that cannot withstand the pressures of sea-level rise within a low sediment system. HDR advanced 100% contract documents that focused on increasing tidal exchange by widening existing channels, removing ditch plugs and adding new plugs to size sub-watersheds to the tidal channels draining them. HDR supported construction, providing daily field observation to direct the contractor. Year One monitoring showed vegetation improvements in mudflats, naturally maintained tidal creek openings, and increased tidal connectivity.

National Parks Service (NPS); Fort Raleigh Shoreline Stabilization Project, Outerbanks, NC

Landscape Architect. HDR assisted the National Park Service with an evaluation of stabilization measures to control shoreline erosion that poses an immediate threat to culturally significant sites and related infrastructure at Fort Raleigh National Historic Site (FORA) on the north end of Roanoke Island, North Carolina. HDR's evaluation characterized potential environmental impacts to ensure the proposed shoreline stabilization measures are compliant with National Environmental Policy Act (NEPA). Potential remedies such as revetments, breakwaters, living shorelines, and beach nourishment were evaluated for priority areas where shoreline protection is consistent with National Park Service (NPS) Management Policies.

Control Commission, Ossining Living Shoreline, Ossining, NY.

Senior Landscape Architect. HDR was awarded a NYSDEC Hudson River Estuary Program grant to investigate, design and support stakeholder engagement for a proposed shoreline improvements concept in Ossining, New York. HDR was tasked with synthesizing the results of a site investigation into conceptual design for a coastal resiliency feature that will meet the overarching project goals to improve the resiliency of the existing shoreline, develop intertidal and sub-tidal habitat features to benefit fish, shellfish and other wildlife within the project area, and maintain and enhance recreational access to the river and its shoreline habitats while including educational and interpretive elements that effectively engage the public. HDR staff led stakeholder engagement meetings with NYSDEC and the Village and Town of Ossining, as well as completing an engineering feasibility and cost assessment, a restoration constraints analysis and the advancement of conceptual plans for shoreline improvements to a level of detail suitable for obtaining local, state (NY) and federal permits.



Pam Yonkin, ENV SP

RESILIENCE

FIRM

HDR

REGISTRATIONS

Envision Sustainability Professional

INDUSTRY TENURE

31 Years

EDUCATION

Bachelors, Mathematics, Hobart and William
Smith College
Masters, Economics, University of Virginia

HDR TENURE

16 Years

Pamela Yonkin, Sustainability & Resiliency Cross Sector Services Director for HDR, has more than 23-years-experience in infrastructure, primarily focused on transportation. In this capacity, she leads or is a key contributor to a variety of sustainability analyses, third-party rating system assessments, and climate-focused initiatives. Prior to this role, Pam was a part of HDR's Economics and Finance group where she focused on monetizing environmental, social (e.g., health, equity, safety), transportation and other public benefits, as well as using economics to make decisions and support infrastructure funding applications.

RELEVANT PROJECT EXPERIENCE

ICF, Performance Measurement and Program Evaluation: Promoting Resilient Operations for Transformative, Efficient, and Cost-Saving Transportation (PROTECT) Discretionary Grant Program, National

Task Lead. As part of a team, Pam is evaluating the effectiveness and long-term impacts of projects funded through the PROTECT Discretionary Grant Program. In collaboration with FHWA, the team is developing and refining resilience metrics that align with identified resilience goals. Pam is also helping to design methods for measuring project impacts and establishing monitoring procedures to track outcomes over time. Additionally, she is supporting data collection efforts for selected PROTECT-funded projects, to generate insights on how well the program is supporting transportation infrastructure resilience.

Boston Planning and Development Agency (BPDA), Flood Resiliency Zoning Overlay District & Resiliency Design Guidelines, Boston, MA

Principal Economist. As part of the Utile team, HDR developed a decision tree to help BPDA better understand the trade-offs that developers and redevelopers face when trying to determine whether to incorporate more resilient features into a new building design and/or update an existing building in a more resilient way. Pam led the development of an Excel-Based Risk and Resiliency Model to help quantify and monetize these trade-offs. Based on building typologies and other data, the model calculates a cost-effectiveness score. A case study project was also included in the model to illustrate how it can be used to inform decision- and policy-making.

California Department of Transportation (Caltrans), Special Economic Services Contract, Los Angeles, CA

Principal Economist. Working with consultants, Caltrans developed the California Life-Cycle Benefit/Cost Analysis (Cal-B/C) model, which is used by agencies, consultants and researchers to perform benefit-cost analysis of transportation projects. It combines the ability to estimate benefits of highway and transit projects into one easy-to-use tool. HDR has been supporting the enhancement of this tool over time and is presently working with Caltrans to incorporate new considerations, such as climate change adaptation, electric and zero emissions vehicles (EVs/ZEVs), and newly updated sources of information for use in analyses. Pam is leading the climate change adaptation update for the team, to enable the tool to consider the implications of climate change and how best to incorporate resilience into designs and the economic evaluation of proposed infrastructure.

Monroe County Roadway Vulnerability Analysis and Capital Plan, Monroe County, FL

Sustainability and Resilience. Pam was a key contributor to the prioritization of roadway segments based on a vulnerability assessment that is being conducted in the Florida Keys. She helped develop the prioritization framework, which was used to define the 300 (25% of 1,202) highest ranked roadway segments/locations that will be recommended for concept development evaluation. In addition, she supported the economics team in the development of economic analyses to help measure the benefits and costs of roadway investments to support resiliency.



Chris Behr, ENV SP

ECONOMICS

FIRM

HDR

EDUCATION

Masters, Civil Engineering, Cornell University
Masters, Economics, University of Wisconsin
Bachelors, Economics, University of Vermont

REGISTRATIONS

LEED Accredited Professional
ISI Envision Sustainability Professional

INDUSTRY TENURE

31 Years

HDR TENURE

17 Years

Christopher Behr is an economist and engineer who specializes in evaluating system risk and reliability and economic consequences to improve client decision making. His diverse set of analytical skills (involving financial, cost-benefit, cost-risk analyses, environmental valuation and statistics) has been applied on a wide range of infrastructure including transportation (seaports/railroads/highway), water/wastewater, energy (production and transport) and buildings in the U.S. and overseas. Often, his projects include workshops in which he facilitates discussions on topics such as technical engineering solutions and economic forecasts.

RELEVANT PROJECT EXPERIENCE

Utah DOT, Mountain View Corridor Program Management UT

Economist. Chris performed a series of cost risk analyses through all stages of design of a new highway in a rural area west of Salt Lake City. This project was implemented in an innovative project context: as part of an alternative delivery process. Risk analysis was conducted during a series of workshops to provide a vehicle for the state and contractor to reach a consensus on risk and risk allocation

NYCDEP, Water Supply Alternatives Analysis, NY

Principal Economist. Chris developed a model and tool to determine the value of projects that would temporarily replace, and eventually, supplement water supplies during tunnel rehabilitation efforts. The model included data and assumptions on the probability of a major shortfall, the quantity of a water shortfall, the value of lost water, and the type and cost of a series of construction projects to supplement water.

NYCDEP, Risk Analysis - Newtown Creek Wastewater Treatment Plant, NY

Principal Economist. Chris led a cost analysis of construction at new treatment facilities at the Newtown Creek Wastewater Treatment Plant, in New York City. This plant is one of the largest facilities in New York City and is under a consent order to implement upgrades within a specified time-frame. This cost analysis accounted for uncertainty in escalation, the impact of limited bidders, and cost line items and event risks.

Brookfield Properties, Economic Analysis - Power Production Impacts (\$316 (b))

Principal Economist. Chris prepared economic model to assess a comparison of costs and benefits, and cost-effectiveness of a suite of intake technologies to bring the facilities' cooling water intake into compliance with §316 (b). Evaluated technologies including exclusion, separate and remove, flow reduction and behavioral systems. Compared costs of the technologies to their effectiveness and the benefits that would be derived to determine the most practicable and cost effective approach to §316(b) compliance.

Hydroelectric Generation Feasibility Study, City of Bend, OR

Principal Economist. Chris supported development of a sophisticated evaluation model to help determine the feasibility and optimal configuration for a hydroelectric generation facility that would be installed with the City's new surface water treatment plant. The model included alternative forecasts of capital improvements, potential incentives/external funding, operations and maintenance cost forecasts, and projected revenue from power sales. The model was solved in a risk analysis context.

Economic Feasibility Analysis - Flood Control Dam Alternatives. Chehalis Basin Flood Study, WA

Principal Economist. Chris led the economic analysis of flood control structures that could limit the flood damage to local properties and transportation networks but potential impair migratory patterns of salmon species. The economic analysis was performed on the combined effects of suite of actions, and costs were allocated under federal cost-allocation principles. Work was conducted with stakeholder committees.



Ivan Lineberry, LS, PLS

ELEVATION SURVEYS AND LIDAR

FIRM

Precision Measurements, Inc.

EDUCATION

Career Studies Certificate, Tidewater Community College

REGISTRATIONS

LEED Accredited Professional
ISI Envision Sustainability Professional

INDUSTRY TENURE

22 Years

Ivan serves as our Virginia Beach Office Manager, as well as Director of our Unmanned Aerial Systems (UAS) department. Ivan has 22 years of surveying experience which includes extensive knowledge in boundary, geodetic control, GPS, leveling, topographic, location, route, utility location, hydrographic, bridge situation, and construction layout surveys. His day-to-day responsibilities include project management, client consultation, project estimation, project setup, and quality control/quality assurance. In addition to his general surveying experience, he is fully versed in the operations of several software packages. These packages include AutoCAD, AutoCAD Civil 3D, MicroStation, Cyclone, Carlson Point Cloud, TopoDOT, HYPACK, ArcMAP, Leica Infinity, and Trimble Business Office.

RELEVANT PROJECT EXPERIENCE

Bay Dune Outfall, Norfolk, VA

As a subconsultant, PMI provided topographic surveying services for the Bay Dune coastal outfall project, including field data collection within a 100' x 400' project area extending 150 feet beyond the existing pipe invert. Survey features included horizontal and vertical control, storm drain structures and piping, edge-of-water delineation, rock breakwater barrier mapping, and a 25-foot cross-section grid with digital terrain modeling and one-foot contours.

documented included buildings, paved and unpaved surfaces, drainage structures, stormwater facilities, utilities, fences, retaining walls, docks and bulkheads, vegetation, elevation cross-sections, property parcels and rights-of-way, piers, and wetland flag locations. PMI also developed a one-foot contour digital terrain model with break lines, contours, and points exported in .xml format.

Buckeye Living Shoreline, Chesapeake, VA

As a subconsultant, PMI provided topographic and utility surveying services in support of a living shoreline project. Services included establishment of horizontal and vertical control, comprehensive planimetric and topographic mapping, and preparation of 2D and 3D AutoCAD deliverables in accordance with PMI CAD standards. Survey features included buildings, paved and unpaved surfaces, drainage features, utilities, shoreline and water features, vegetation, elevation cross-sections, wetlands flag locations, and delineation of mean low and mean high water contours using NOAA VDATUM. PMI also developed a one-foot contour digital terrain model, performed property research and boundary ties, and conducted Quality Level B utility designation in accordance with CI/ASCE 38-02, with designated utilities integrated into the final survey files.

Living Shoreline Survey @ Pretty Lake, Norfolk, VA

As a subconsultant, PMI provided surveying services for the Living Shoreline Project at Pretty Lake under the City of Norfolk Civil Engineering Services Contract. Survey limits included water (50' beyond MHW), land (50' beyond top of bank), pier (50' beyond MHW), and 20' into the kayak launch. Services included property and utility research, horizontal/vertical control, property ties, planimetric and topographic mapping, hydrographic soundings, and QL-B underground utility designation. Results were processed, merged, and delivered as 2D topo, 3D contours, points, and existing condition sheets in AutoCAD.

Hermitage Museum Shoreline, Norfolk, VA

As a subconsultant, PMI provided topographic surveying services for a shoreline restoration project encompassing approximately 6 acres and 12 parcels. Services included establishment of horizontal and vertical control, comprehensive planimetric and topographic mapping, and preparation of 2D and 3D AutoCAD deliverables at a 1"=25' scale using PMI CAD standards. Survey features

BUDGETED COST:

\$3,128,726 (E&D only)

COMPLETED COST:

\$2,880,261 (E&D only)

SCHEDULED**COMPLETION DATE:**

Not yet constructed

**ACTUAL COMPLETION
DATE:**

Not yet constructed

**RELEVANT ASPECTS**

- Wetland Restoration
- Geotechnical
- Elevation Surveys
- Shoreline Protection
- Dredged Material Placement
- Ecological Enhancement
- Environmental Surveys
- Regulatory

Terrebonne Basin Ridge and Marsh Restoration - Bayou Terrebonne Increment

TERREBONNE PARISH, LA

Office Location Responsible for Delivering this Project: Metairie, LA**Key Team Members:** Erin Rooney, M. Cameron Perry, Brett Geesey

The Terrebonne Basin Ridge and Marsh Creation Project is one of the six selected projects in the Final Restoration Plan as set forth by the Louisiana Trustee Implementation Group. The Bayou Terrebonne Increment (TE- 0139) of the project is a ridge restoration and marsh creation project located in western Terrebonne Parish. The ridge restoration feature of this project will restore 126 acres of earthen ridge along Bayou Terrebonne and the marsh creation feature of this project will use material dredged from Lake Barre to create 1,370 acres of marsh.

HDR was selected by the Coastal Protection and Restoration Authority (CPRA) of Louisiana to perform project management and engineering design. The scope of services included field data collection, numerical wave and hydrodynamic modeling, permitting and environmental compliance documentation, engineering and design of the ridge and marsh creation, development of the construction bid package, and monitoring plan development. Design challenges include soft and variable foundation soils found along the edge of the bayou, open water conditions providing challenges for containment and erosion, incorporation of relative sea level rise in ecological and physical design, and design of efficient dredge pipeline routes. Additional project challenges include the potential for cultural resource sites due to the proximity to the bayou and numerous oil and gas wells and pipelines requiring avoidance.

BUDGETED COST:

\$176 M

COMPLETED COST:

\$181.55 M (bid price - project not complete)

SCHEDULED**COMPLETION DATE:**

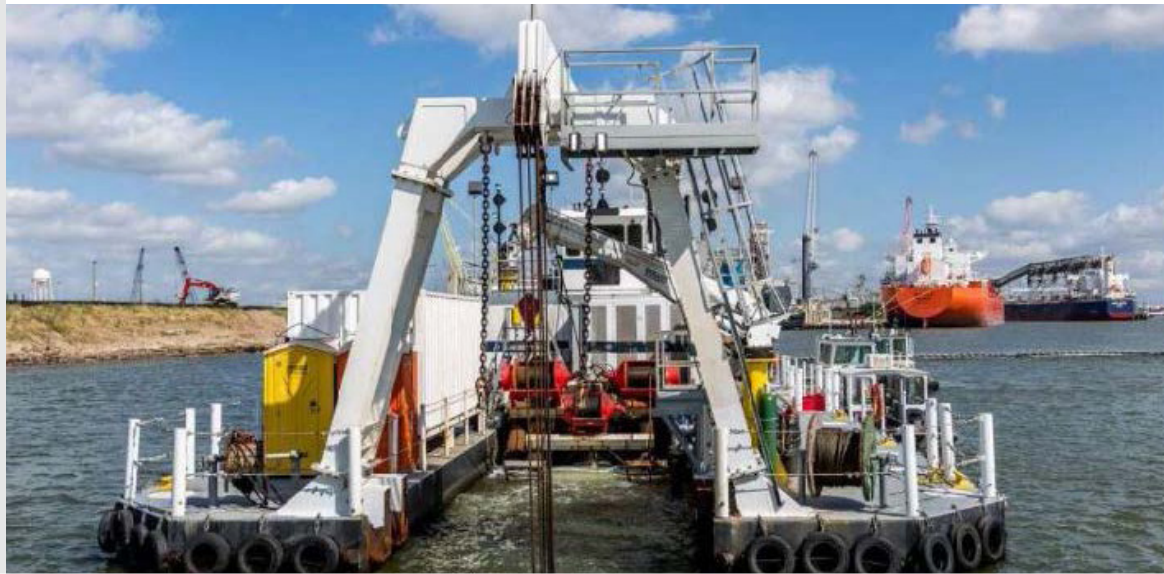
June 2027

ACTUAL COMPLETION DATE:

Ongoing (on schedule)

RELEVANT ASPECTS

- Wetland Restoration
- Geotechnical
- Elevation Surveys
- Dredged Material Placement
- Ecological Enhancement
- Regulatory



Port of Houston Beneficial Uses of Dredged Material Support

HOUSTON, TX

Office Location Responsible for Delivering this Project: Houston, TX

HDR provided support for the Port of Houston Authority (PHA) navigation projects along the Houston Ship Channel (HSC) involving dredging, dredged material disposal, beneficial use of dredged materials, channel design, dredged area management activities, construction oversight and coordination with the USACE. We served as an 'extension of staff' to provide these on call service, sometimes on short notice and with a quick turnaround. Primary services include:

HDR provided comprehensive dredging, navigation, and beneficial-use support services for the Port of Houston Authority (PHA) along the Houston Ship Channel (HSC). Services included representing PHA in coordination with the U.S. Army Corps of Engineers (USACE) on Dredged Material Management Plans (DMMPs), participation on Project Delivery Teams (PDTs), and development of a five-year channel maintenance plan. HDR performed capacity analyses for the LASH Dock to evaluate existing serviceability and assess potential impacts associated with channel deepening, as well as evaluations of new and existing dredged material placement areas for capacity, site development, and overall usefulness. Additional coordination support was provided to the Texas Ports Association to align dredging and dredged material placement activities with USACE initiatives. Technical efforts included sediment sampling and chemical analyses in support of PHA dredging activities, design reviews of USACE construction projects along the HSC, and participation in the Dredge Club to assess alternative dredging methods and teaming strategies aimed at improving program efficiency.

HDR also delivered design and planning services, including capacity estimates for Beneficial Use sites, dewatering plans for upland placement areas, dredge plans and evaluations for CARE Dock, LASH Dock, and Jacinto Port, and definition of discharge corridors for upland dredging operations. Field investigations and analyses included shoaling surveys at Bayport, Barbours, CARE Dock, and Jacinto Port; annual reviews of confined placement areas; and preliminary stability analyses to support upper-channel deepening activities. Additional services included support for Section 217(b) projects, development of an Assumption of Maintenance Report for Bayport Basin, design of a new Aid to Navigation (ATON) tower to support channel improvements at the Bayport Ship Channel, oyster reef design, and conceptual marsh development for the San Jacinto River Basin.

BUDGETED COST:

\$4.5 M

COMPLETED COST:

\$4.5 M

SCHEDULED**COMPLETION DATE:**

June 2019

ACTUAL COMPLETION DATE:

April 2019

RELEVANT ASPECTS

- Oyster Restoration
- Geotechnical
- Elevation Surveys
- Ecological Enhancement
- Environmental Surveys
- Regulatory



The Nature Conservancy, Copano Bay Oyster Reef

COPANO BAY, TX

Office Location Responsible for Delivering this Project: Corpus Christi, TX**Key Team Members:** Erin Rooney, M. Cameron Perry, Brett Geesey

TNC received project funding from the NRDA trustees to design, permit, construct, and monitor two 30-acre parcels, located north and south of Lap Reef in Copano Bay, TX. HDR conducted a review of existing oyster and habitat studies, a site visit, and coordinated with Texas Parks & Wildlife Department (TPWD) fisheries staff to identify priority areas for field investigations. We conducted surveys, geotechnical investigations, and benthic assessments to develop criteria for site assessment and to evaluate various layouts and construction methodologies for the proposed reef.

The final project design included an area of harvestable reef to be constructed from small cultch placed in mounds within the south reef area. We developed a segmented reef, or sanctuary reef, utilizing large, graded riprap in linear reef rows, for the north reef area. We also developed project plans, specifications, and contract documents, and provided regulatory coordination, including cultural resource surveys. We provided bidding assistance and construction administration services.

BUDGETED COST:

\$2.9 M

COMPLETED COST:

\$1.7 M

SCHEDULED**COMPLETION DATE:**

February 2017

**ACTUAL COMPLETION
DATE:**

February 2017

**RELEVANT ASPECTS**

- Geotechnical
- Elevation Surveys
- Shoreline Protection
- Ecological Enhancement
- Environmental Surveys
- Regulatory

NOAA, Swift Tract Living Shoreline Restoration

MOBILE, AL

Office Location Responsible for Delivering this Project: LA**Key Team Members:** Erin Rooney (EOR and PM), M. Cameron Perry, Brett Geesey

The project encompasses approximately 615 acres along the eastern shore of Mobile Bay at the northern end of Bon Secour Bay and included the design of living shoreline features along approximately 1.6 miles of shoreline. HDR designed a low-crested breakwater system to provide substrate for oyster and bivalve recruitment, create nursery habitat for commercially and recreationally important finfish and shellfish species, reduce wave energy and shoreline erosion, stabilize sediments, and decrease turbidity, while also protecting existing marsh habitat and adjacent freshwater marsh and forested wetlands located landward of the shoreline.

Design and implementation were informed by unique site conditions, including the extremely shallow bay bathymetry, which posed challenges for construction access and sequencing. Following construction, HDR supported seven years of post-construction monitoring in coordination with NOAA, initially with The Nature Conservancy (TNC) as a subcontractor and later with HDR serving as a subcontractor to TNC. Monitoring activities included detailed topographic surveys to evaluate structural performance and shoreline response, as well as biological monitoring to assess habitat utilization by bivalves and other infaunal and epifaunal communities, providing long-term data to document project performance and ecological benefits.

BUDGETED COST:

\$1.2 M

COMPLETED COST:

\$876 K

SCHEDULED**COMPLETION DATE:**

July 2016

**ACTUAL COMPLETION
DATE:**

August 2016

**RELEVANT ASPECTS**

- Wetland Restoration
- Geotechnical
- Elevation Surveys
- Shoreline Protection
- Dredged Material Placement
- Ecological Enhancement
- Environmental Surveys
- Regulatory

Texas General Land Office and Texas Parks and Wildlife, Dickinson Bayou Marsh Restoration

TEXAS CITY, TX

Office Location Responsible for Delivering this Project: Corpus Christi, TX

Lower reaches of the Dickinson Bayou watershed have lost a considerable amount of its historical marsh acreage due to erosion from waves, subsidence, sea level rise, degraded water quality, and other factors. To help offset these losses, the Texas General Land Office and Texas Park and Wildlife spearheaded a marsh restoration and living shoreline project to protect 17.7 acres of existing marsh and create 10 acres of new intertidal marsh.

HDR performed design and construction administration for the marsh restoration and protection project. The new marsh was constructed through hydraulic placement of material dredged from areas in Dickinson Bayou that were in need of improved flow to improve water quality. The dredged material was contained through construction of low-crested perimeter berms, and the dredging effluent was controlled with decant structures. Protection to the marsh from wave erosion was provided through construction of over 2,000 linear feet of living shoreline. Planting of the marsh was performed through volunteers organized by Texas Parks and Wildlife.

Following construction HDR provided monitoring services for 2 years including surveying and engineering assessment. At the completion of monitoring TPWD engaged HDR to perform design and construction administration for additional thin layer placement of hydraulic dredge material into one of the cells to help enhance a section that had not performed as well as adjacent areas associated with losses from Hurricane Harvey. Construction of the thin layer placement project was completed in January, 2022.

BUDGETED COST:

\$7.7.M

COMPLETED COST:

\$5.6 M

SCHEDULED**COMPLETION DATE:**

February 2022

ACTUAL COMPLETION DATE:

March 2022 (Includes time for additional work)

**RELEVANT ASPECTS**

- Wetland Restoration
- Geotechnical
- Elevation Surveys
- Shoreline Protection
- Dredged Material Placement
- Ecological Enhancement
- Environmental Surveys
- Regulatory

National Oceanic and Atmospheric Administration (NOAA), Pensacola Bay Living Shoreline

PENSACOLA, FL

Office Location Responsible for Delivering this Project: Pensacola, FL**Key Team Members:** Erin Rooney , M. Cameron Perry (EOR), Brett Geesey (QC)

The Pensacola Bay Living Shoreline Project is located at Project GreenShores Site II along the urban Pensacola Bay shoreline near the Port of Pensacola. The National Oceanic and Atmospheric Administration (NOAA) and the Florida Department of Environmental Protection (FDEP) are implementing this project as a component of the Natural Resource Damage Assessment (NRDA) recovery for the Deepwater Horizon (DWH) oil spill. The intent of this project is to establish 9.2 acres of salt marsh habitat and 3.5 acres of oyster reef breakwater.

The HDR team performed detailed field investigations, including bathymetric surveys, habitat/benthic assessments, geotechnical investigations, and cultural resource surveys. These investigations led to the development of low crested breakwaters to protect the new salt marsh habitat and to promote reef development for bivalves and other invertebrates. Challenges on this project include locating a suitable borrow site for the marsh restoration component, working within the historic Pensacola bayfront area that required archeological surveying and avoidance of areas of historical importance, and working within the community to balance the reduction of wave energy, ecological benefit and aesthetics of the features.

FDEP contracted with HDR to perform construction administration and inspection services.

BUDGETED COST:

\$1.18 M

COMPLETED COST:

\$995 K

SCHEDULED**COMPLETION DATE:**

April 2024 (End of guarantee period)

ACTUAL COMPLETION DATE:

April 2024 (End of guarantee period)

RELEVANT ASPECTS

- Hydraulic Analysis
- Wetland Restoration
- Elevation Surveys
- Ecological Enhancement
- Environmental Surveys
- Regulatory



NYS Office of Government Services/NYS Department of Environmental Conservation, Fireplace Neck: Tidal Wetland Hydrologic Connectivity Improvement

BROOKHAVEN, NY

Office Location Responsible for Delivering this Project: Woodcliff Lake, NJ**Key Team Members:** Barbara Barnes

Fireplace Neck appears, upon first impression, to be a well-established functioning tidal marsh system in the Town of Brookhaven, New York. The approximately 108 acre New York State Department of Environmental Conservation (DEC) property sits on Bellport Bay, on the Great South Bay of Long Island, and is dominated by low marsh habitat. However, forty years ago, this same system was primarily high marsh. The ditched marsh is experiencing significant habitat loss and degradation, as seawater is trapped on-site, evaporates and results in increased soil salinity and reduced dissolved oxygen levels in the soils.

NYSDEC engaged HDR to complete a Hydrologic Study to identify the potential root causes of habitat loss and provide cost-effective solutions. Investigations identified that significant shoreline erosion of 100-200 feet has resulted in a narrowing of the tidal channels, which combined with mosquito ditching and sea-level rise in a low sediment / high nutrient system, is compromising the site. HDR developed a plan to widen tidal outlets and link appropriately sized subdrainage areas to the outlets by installing and removing ditch plugs. Right-sizing the sub-watersheds will facilitate the exchange of tidal water through the system. Additionally, waterlogged interior areas will be micro-graded with shallow pools to support fish that prey on mosquito larvae, as well as shallow runnels to drain waterlogged areas.

The site will be monitored post-construction by NYSDEC to determine how the site performs long-term and what lessons are transferable to other State-owned properties experiencing similar habitat losses.

BUDGETED COST:

\$8.4 M

COMPLETED COST:

\$6.3 M

SCHEDULED**COMPLETION DATE:**

October 2025 (End of
Monitoring and Permit
Closeout)

**ACTUAL COMPLETION
DATE:**

September 2025 (End of
Monitoring and Permit
Closeout)

RELEVANT ASPECTS

- Wetland Restoration
- Geotechnical
- Elevation Surveys
- Shoreline Protection
- Dredged
Material Placement
- Ecological
Enhancement
- Environmental Surveys
- Regulatory



Port Authority of New York & New Jersey, Pugsley Creek and Westchester Creek Ecosystem Restoration and Mitigation

BRONX, NY

Office Location Responsible for Delivering this Project: Manhattan, NY

Key Team Members: Barbara Barnes

HDR supported the Port Authority of New York & New Jersey in preparing an environmental assessment and mitigation strategy for runway safety enhancements at LaGuardia Airport. This work involved evaluating natural resources, floodplains, and potential project impacts under NEPA, including an Essential Fish Habitat assessment and wetland delineation. To understand how shading and filling of aquatic areas would affect marine life, HDR conducted a detailed aquatic sampling program, collecting fish, larvae, and benthic organisms at multiple stations in Flushing Bay near the airport.

As impacts to aquatic resources became clear, HDR helped identify suitable restoration sites to fulfill mitigation requirements. Working closely with federal, state, and local stakeholders, two Bronx locations—Westchester Creek and Pugsley Creek Park—were selected for restoration. HDR developed conceptual designs based on field data, including tidal benchmarks and native plant references, and submitted these plans for regulatory approval. Once approved, HDR prepared full construction documents covering grading, planting, shoreline protection, erosion control, and cost estimating.

During construction, HDR provided oversight for both restoration sites, addressing field challenges such as sand migration at Westchester Creek and elevation revisions at Pugsley Creek. Solutions included strategic wave attenuation and design modifications to accommodate updated resilience requirements. Despite COVID-19–related limitations, HDR ensured proper planting and managed contaminated soil issues. Westchester Creek was completed in 2018 and Pugsley Creek in 2020, each supporting diverse marsh habitats and long-term ecological resilience. HDR continues to assist with monitoring and permit close-out activities for both sites.

06

Response Capability



6 Response Capability

Current and Anticipated Workload

HDR has assembled a dedicated team of engineers, biologists, and communications professionals for this project. The personnel selected for this opportunity possess extensive experience from years of working closely together. As a result, there are no learning curves or challenges associated with staff integration. Our proposed team is available and fully prepared to start immediately.

In case of any potential scheduling conflicts or availability issues with team members, the project manager and project principal will coordinate to assign the appropriate staff to meet timelines.

Our regional and national team of coastal engineers and environmental scientists collaborates effectively, drawing on our deep experience in delivering similar projects. Our ability to allocate resources from various offices, reinforce our capacity to meet this project's requirements.

07

Insurance



7 Insurance

Per the RFP, if selected, HDR will provide a Certificate of Insurance that complies with the Standard Terms & Conditions in Appendix A. This will be accomplished after contract award, and prior to contract execution.

08

References



8 References

HDR is pleased to provide contact information for three references for whom similar work has been performed. For more details about the project scope, please see the full project description on the page noted in the table below.

Owner, Project, Location NOAA, Alabama Swift Tract Living Shoreline Restoration, Mobile, AL		
Featured On Page 32	Address 465 Weathervane Rd., Calera, AL 35040	
Representative Name Judy Haner	Representative Phone Number 251-433-1150	Representative Email Address jhaner@tnc.org
Description of Services provided The project spans approximately 615 acres along the eastern shore of Mobile Bay and includes the design of living shoreline features along 1.6 miles of shoreline to reduce erosion, dampen wave energy, and protect adjacent marsh and wetland habitats. The low-crested breakwater system also provides critical habitat for oysters, bivalves, and finfish, with HDR supporting long-term success through seven years of post-construction topographic and biological monitoring in coordination with NOAA and TNC.		
Owner, Project, Location Coastal Protection and Restoration Authority, Terrebonne Basin Ridge and Marsh Restoration - Bayou Terrebonne Increment, Terrebonne Parish, LA		
Featured On Page 29	Address 150 Terrace Ave., Baton Rouge, LA 70802	
Representative Name Thomas McLain, CPRA	Representative Phone Number 225-342-6307	Representative Email Address thomas.mclain@la.gov
Description of Services provided The Bayou Terrebonne Increment of the Terrebonne Basin Ridge and Marsh Creation Project is a large-scale restoration effort in western Terrebonne Parish that restores 126 acres of earthen ridge and creates 1,370 acres of marsh using dredged material from Lake Barre as part of Louisiana's Final Restoration Plan. Selected by CPRA, HDR provided project management and full engineering design, addressing challenges such as soft foundation soils, open-water containment and erosion, sea-level rise adaptation, dredge routing, and avoidance of cultural resources and existing oil and gas infrastructure.		
Owner, Project, Location Texas General Land Office and Texas Parks and Wildlife, Dickinson Bayou Marsh Restoration, Texas City, TX		
Featured On Page 33	Address 4200 Smith School Rd., Austin, TX 78744	
Representative Name Christy Seals	Representative Phone Number 512-217-9056	Representative Email Address christy.seals@tpwd.texas.gov
Description of Services provided HDR provided full design and construction administration for the marsh restoration and living shoreline project, including hydraulic dredge material placement, perimeter berm and shoreline protection design, and coordination of construction activities. Following completion, HDR conducted two years of performance monitoring and later designed and administered additional thin-layer sediment placement to enhance underperforming marsh areas impacted by Hurricane Harvey.		

09

Other Supporting Data



9 Other Supporting Data

HDR Engineering, Inc. (HDR) is an employee-owned architectural, engineering, and consulting firm that excels at planning, designing, and managing diverse projects while solving complex challenges for clients. As one of the largest providers of engineering and infrastructure programs in the country, HDR has established itself as a leader in the industry. Founded in 1917, HDR has grown from a small municipal engineering company into a multidisciplinary firm consistently ranked among the best. In 2024, Engineering News-Record ranked HDR as No. 6 among the Top 500 Design Firms, No. 6 in Water, No. 4 in Environmental Science, and No. 7 in General Building.

For MPPDC, HDR brings the strength of local expertise, accessibility, and a shared commitment to success. Our Mid-Atlantic offices include over 400 full-time employees offering a full range of planning, design, inspection, and construction management services. Our local team comprises civil, coastal, and water resource engineers; GIS and data acquisition specialists; environmental scientists and National Environmental Policy Act (NEPA) specialists; and construction management personnel. National HDR specialists are available to support our local team as needed.

HDR's biological and ecological sciences professionals include environmental planners, wetland scientists, wildlife biologists, ecologists, and environmental scientists. They have extensive experience conducting plant and animal surveys, habitat surveys, wetland delineations, biological assessments, and ecosystem evaluations.

Our permitting specialists navigate the complex environmental permitting process with a streamlined approach, ensuring compliance with state and federal regulations while expediting approvals.

Our team also offers advanced numerical modeling capabilities, including hydrologic forecasting, hydraulic modeling (1D, 2D, and 3D), water quality analysis, and sediment transport modeling. HDR's senior hydraulic modeling staff has been using the HEC-RAS unsteady flow

model since its beta release in 2000 and has continued as a beta tester for RAS 2-D improvements. We have applied these tools to simulate flood events on highly complex systems, helping to improve resilience and flood risk management. HDR's coastal modeling team has been using industry-standard models including MIKE 21 SW and other for decades.

Strategic communications play a crucial role in our projects. Our experts confirm that the public understands project objectives and that community feedback reflects a broad range of perspectives rather than only the loudest voices. By facilitating balanced public discussions, we help decision-makers gain confidence that their choices are well-supported and aligned with community needs.

Data acquisition is a cornerstone of HDR's work, providing clients with essential insights for navigating complex environmental regulations, infrastructure planning, and security challenges. Our Geographic Information Systems (GIS) team consists of over 100 GIS professionals and 1,600 GIS users, including 25 application developers. We assist local governments with data management, mobile application development for data collection and editing, interactive dashboards, and GIS technology roadmaps that align with organizational goals. Additionally, we provide virtual engagement applications that enable the public to submit feedback on projects using interactive mapping tools.

HDR's cultural resources professionals have extensive experience with regulatory policies and historic preservation requirements. Our team, which meets the Secretary of the Interior's Historic Preservation Professional Qualifications Standards, guides projects from initial planning through regulatory review and mitigation. We support private, federal, state, and local clients with expertise in archaeology, history, architectural history, and ethnography, ensuring compliance with cultural resource regulations while facilitating project success.



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Glen Allen, VA 23060
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hdrinc.com

We practice increased use of sustainable materials
and reduction of material use.

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