

Sediment Placement Regulations of U.S. Coastal States and Territories: Towards Regional Sediment Management Implementation

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Key Contributions

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- Critical coordination between local, tribal, state, territorial and federal government agencies
- Lead Project Manager for Great Lakes and Pacific Island sediment regulations analysis.
- Workshop design, agenda development, facilitation
- Drafting case studies and policy analysis in conjunction with report co-authors
- Coordinating the incorporation of recommendations for Great Lakes states into other regionwide initiatives such as the Great Lakes Coastal Resiliency Study.

Executive Summary

United States Army Corps of Engineers (USACE) initiated an assessment of relevant federal, state, and territorial policies and regulations related to Regional Sediment Management (RSM) and Beneficial Use of Dredged Material (BUDM). The focus of this report is to (1) enhance USACE understanding of state and territorial sediment management policies from the state and territorial perspective, and (2) elevate best practices for advancing RSM and BUDM. The USACE Institute for Water Resources (IWR) provided funding to the American Shore and Beach Preservation Association (ASBPA) and Coastal States Organization (CSO) as part of the National Shoreline Management Study. ASBPA and CSO formed a research team; consulted with federal and state partners, regulators, project managers; conducted regional workshops; and developed a comparative analysis of state and territorial RSM and BUDM policies, including case studies that highlight successful approaches and state- and federal-level recommendations. The report represents the perspectives of the state and territorial entities that contributed to the workshops, analysis, and reporting. The perspectives presented may not be congruent with current USACE guidance, policies, and procedures. However, these perspectives will help USACE identify opportunities to improve communication and coordination with state and territorial partners to advance RSM and BUDM under existing law.

Engagement of state and federal policy makers, regulators, and project managers was a high priority during this project. In addition to a desktop review of policies and regulations and interviews with coastal regulators, the project involved seven regional workshops that included a total of nearly 250 participants, 28 presentations, and 25 breakout sessions.

Sediment placement regulations, and related state and federal policies, are frequently cited as a significant limitation to implementing RSM. Meanwhile, confined disposal areas for the placement of dredged coastal sediment are at or near maximum capacity. At the same time, the demand for finite sediment resources is increasing to respond to climate change and restore eroding shorelines. Congress has responded to the need for improved sediment management with several important authorizations, including the Water Resources Development Act (WRDA) of 2020, Section 125, which establishes a national policy to maximize the beneficial use of sediment obtained from USACE projects. USACE has also recently set a goal to increase BUDM to 70% by 2030 (Coleman 2022).

Coastal stakeholders have expressed a strong desire to collaborate with federal agencies and devote additional resources to coordinate short- and long-term sediment management. With only three exceptions (Alaska, the U.S. Virgin Islands (USVI), and the Commonwealth of the Northern Mariana Islands [CNMI]), all U.S. coastal states and territories have adopted policies to encourage, or even require, that suitable dredged sediments are used in a beneficial manner. All U.S. coastal states regulate the percent of fine-grained sediment (“fines”) in general shoreline placement projects through either qualitative (similar to native) or quantitative (measurable) policies.

The state- and federal-level recommendations of this report emphasize collaborative efforts. While the most appropriate tools for a jurisdiction will depend on the state’s or territory’s statutory authorities, capacities, priorities and needs on the ground, the following recommendations summarize options for coastal states and territories.

- Policy and regulatory: Incentivize BUDM through funding, regulatory, and planning requirements, testing

waivers, streamlined permitting, and clear technical guidance.

- Interagency collaboration: Proactively and frequently host participatory planning and implementation discussions among BUDM champions at a regional scale to discuss pilot projects and permitting efficiency and develop collaborative guidance and plans.
- Funding: Collaboratively develop flexible BUDM policies and programs that identify cost-saving opportunities, funding sources, and partners.
- Project development and review: Implement effective and efficient project development and review procedures through collaborative consultations and improved technical guidance.

Federal-level recommendations propose key actions and priorities that federal partners can pursue to strengthen BUDM policies around the nation as follows.

- Policy and regulatory: Support the USACE goal of increased BUDM, including through developing implementation guidance and procedures to better assess economic and environmental benefits and improve stakeholder engagement.
- Interagency collaboration: Sustain and increase interagency collaboration to streamline permitting, manage environmental trade-offs, and renew a national commitment to sediment management.
- Funding: Increase opportunities to fund BUDM projects through collaborative valuation and policy determinations and expanded funding mechanisms.
- Project development and review: Collaboratively develop and implement 5-Year Regional Dredged Material Management Plans (RDMMP), increase staff capacity, and explore BUDM opportunities under existing authorities.

Research investment is needed to develop cost-effective, accurate, and efficient methods to determine sediment suitability, and to improve the understanding of changes in physical sediment characteristics during the dredging process to inform a regulatory shift toward science-based requirements.

Introduction

U.S. coastlines face a dual crisis – a) a shortage of sediment from the development and hardening of shorelines, estuaries, and riverbanks; and b) coastlines, estuaries, and other coastal habitats experiencing severe erosion and inundation, driven by climate-change impacts including sea level rise, Great Lakes lake-level change, and intense hurricanes and coastal storms. These systemic problems, centuries in the making, threaten coastal communities and the homes and livelihoods of 120 million Americans (NOAA 2013). Addressing and abating the causes of these challenges is critical to the future of the coastlines. Regional coordination of sediment management will be vital for coastal managers to maintain coastlines, adapt to changing shorelines, deliver ecosystem services, and enhance the resilience of coastal communities and economies in the face of these threats.

Despite the strategic importance of sand, its extraction, sourcing, use, and management remain largely ungoverned in many regions of the U.S. and the world, leading to numerous environmental and social consequences that have been largely overlooked (UNEP 2022). U.S. coastal resilience projects that involve sediment placement to reduce vulnerability have generally been carried out on a project-by-project basis, either by nonfederal project managers who are focused on a singular community or by federal agencies that operate under a specific congressional authorization. Regulatory permitting is also specific to the individual project design, generally evaluating only the sediment resources required for one event. This standard operating procedure does not identify or manage finite sediment resources over long time periods or on regional scales.

Regional Sediment Management (RSM) uses science, engineering, and planning to keep sediment within the watershed, estuaries, and coastal system while creating economic efficiencies in dredging and coastline management projects (USACE RSM 2022). Through RSM, federal agencies including the U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), U.S. Fish and Wildlife Service (USFWS), and U.S. Environmental Protection Agency (EPA) work with state, territory, and local officials, communities, dredging contractors, coastal property owners, academia, stakeholder groups, and nonprofit partners to understand and manage U.S. coastlines regionally and holistically.

Based on the principle of treating sediment as a valuable resource, RSM uses techniques including sediment modeling, regional planning, and beneficial use of dredged material (BUDM) to understand the regional sediment transport dynamics. It works at the scale of natural geographic areas (watersheds, estuaries, littoral systems) to sustain natural processes, preserve shoreline features, and protect coastal communities and ecosystems. Combined with long-term efforts to adapt to climate change and reduce shoreline hardening, RSM provides a framework for communities to develop and implement shoreline management projects while realizing hazard mitigation, ecological, economic, and recreation benefits throughout the watershed and along the coastline.

Many states and territories, as well as USACE and federal agency partners, have prioritized increasing the beneficial use of sediment from existing and new dredging projects as part of comprehensive RSM strategies (Taylor Engineering 2020). However, a range of both systematic and logistic barriers create uncertainty in designing and implementing BUDM projects. Some key barriers include:

- Permitting processes and standards for both dredging projects and shoreline placement projects designed without considering BUDM options, creating misalignment of standards, timing, and requirements
- Uncertainty or inconsistency in the methodologies required for determining the cost effectiveness, performance, and environmental impacts of BUDM projects
- Dredging planning cycles that do not align with placement project design cycles
- Lack of coordination and mutual situational awareness between the agencies that plan and permit dredging and placement projects to identify BUDM opportunities
- Technical, engineering, and logistic challenges getting sediment from dredging sites to placement sites cost-effectively.
- Lack of funding from federal, state, and local sources to cover dredging demand, causing backlogs, or to cover placement and restoration needs, especially at the local level to meet federal cost share requirements

Purpose and Report Preview

United States Army Corps of Engineers (USACE) initiated an assessment of relevant federal, state, and territorial policies and regulations related to Regional Sediment Management (RSM) and Beneficial Use of Dredged Material (BUDM). The focus of this report is to (1) enhance USACE understanding of state and territorial sediment management policies from the state and territorial perspective, and (2) elevate best practices for advancing RSM and BUDM. The USACE Institute for Water Resources (IWR) provided funding to the American Shore and Beach Preservation Association (ASBPA) and Coastal States Organization (CSO) as part of the National Shoreline Management Study. ASBPA and CSO formed a research team; consulted with federal and state partners, regulators, project managers; conducted regional workshops; and developed a comparative analysis of state and territorial RSM and BUDM policies, including case studies that highlight successful approaches and state- and federal-level recommendations. The report represents the perspectives of the state and territorial entities that contributed to the workshops, analysis, and reporting. The perspectives presented may not be congruent with current USACE guidance, policies, and procedures. However, these perspectives will help USACE identify opportunities to improve communication and coordination with state and territorial partners to advance RSM and BUDM under existing law.

The report provides a comparative analysis of federal and state/territory BUDM policies and regulations. Regional summaries highlight state policies and regulations, such as general permitting systems, policies requiring or encouraging BUDM, use of natural solutions for erosion control, and preservation of littoral dynamics. Summaries detail regulations specific to physical sediment characteristics for each coastal state.

The report also discusses the following policy and regulatory barriers to the success of both individual projects and statewide policies: matching supply to demand; interagency collaboration; funding; research; project development and review; and construction, operations, and monitoring. The barriers stem from physical/logistic causes as well as policy/structural challenges. The report includes case studies of state or regional efforts to overcome these challenges, as well as suggested approaches, best management practices, and needed improvements. **Case studies** are denoted in bold underlined text when referenced throughout the report and provided in Appendix A.

Finally, state- and federal-level recommendations are offered in the following categories: Policy and Regulatory, Interagency Collaboration, Funding, and Project Development and Review. Broad research recommendations toward improved RSM are also provided. Additional appendices provide state profiles and other relevant statutes, regulations, and policies.

Project Structure

Through desktop research and consultation with coastal states/territories and federal agency partners, ASBPA and CSO developed a national comparative policy analysis of the following:

1. State/territory-level policies related to how sediment placement is regulated and whether/how BUDM is encouraged
2. Quantitative and qualitative standards applied to shoreline placement projects in the permit review process
3. Policy and process barriers to achieving BUDM priorities
4. Success stories in overcoming those barriers



This project consisted of the following four primary components:

1. Regional workshops with state, federal, and local coastal officials, as well as industry and nongovernmental organization (NGO) stakeholders, were co-hosted to understand RSM and BUDM implementation challenges and share success stories
2. A comparative policy analysis of coastal state, territory, and federal regulations on sediment movement and placement, was presented in white paper format, for use at workshops, and included profiles summarizing each coastal state and territory sediment placement regulations and policy.
3. Case studies highlight states' most effective regulations and practices furthering RSM and BUDM, focusing on overcoming policy and regulatory hurdles to improve the systems approach to cooperative federal/state sediment management.
4. This final report is on effective uses of sediment regulations to implement BUDM, synthesizing white paper findings with lessons learned from workshop participants. The report has been tailored to an audience of coastal managers, stakeholders, and policy makers.

Project Partners

ASBPA

Founded in 1926, ASBPA promotes the integration of science, policies and actions that maintain, protect and enhance the coasts of America. ASBPA is dedicated to preserving, protecting and enhancing our coasts by merging science and public policy. We advocate for healthy, sustainable and resilient coastal systems to sustain four inter-connected core values provided by shores and beaches: community protection, a strong economy, ecologic health and recreation. ASBPA members include U.S. coastal communities.



CSO

CSO helps coastal states and territories maintain their leadership role in the development and implementation of national coastal and ocean policy and serves as an important professional network for coastal managers. CSO members (the state and territory coastal management programs) coordinate with coastal communities, state agencies, federal government, tribal governments, industry, and nonprofit organizations for the effective management, protection, beneficial use, and development of the coastal zone through the federal-state partnership established under the Coastal Zone Management Act

USACE-IWR

IWR strives to improve the performance of the USACE Civil Works program through analysis of emerging water resources trends and issues; development, distribution, and training in the use of state-of-the-art methods and models in the areas of planning, operations, and civil engineering; and national data management of results-oriented program and project information across Civil Works business lines.



RSM Background

RSM integrates watershed and shoreline management by using a systems approach to sediment management, among other purposes, to minimize erosion and maximize shoreline accretion through efficient use of sediment in a coastal region. RSM is an important element in a comprehensive coastal resilience strategy because adaptation and restoration of coastal systems require sediment management (Rosati et. al 2001).

The underlying premise of RSM is that sediment (gravel, sand, and mud) is a valuable resource that needs to be maintained within a watershed and coastal system. Commerce and development require the movement or removal of sediment in particular areas, such as for dredging navigation

channels or construction zones. As the building block of coastal land, sediment must be kept in the system and used to nourish eroding land, mimicking the natural rebuilding process that happens in dynamic coastal zones.

RSM is informed by an understanding of sediment dynamics, anthropogenic influences on natural processes, and stakeholder needs in coastal management. A systematic inventory of the sediment processes in a region informs a management plan that encourages natural transport processes and can identify sediment deposits that might be used to provide sediment resources to eroding areas (Dalyander et al. 2021).

The watershed management scale of RSM means that a variety of sediment sources must be considered, including offshore borrow areas, upland sand mines, as well as navigation channels and nearshore shoals. Additionally, some sections of the U.S. coastline have a net deficit in the regional sediment budget (e.g., Louisiana’s barrier coastline) while other areas have limited sediment remaining for needed beach nourishment projects (e.g., southeast Florida). Both require supplementation with out-of-system sediment resources to offset losses. These resources must be considered as a component of the overall RSM strategy (Dalyander et al. 2021).

In this report, the general term “shoreline placement projects” includes projects that use any type of sediment source, including those that beneficially use dredged sediment as well as those that source sediment from elsewhere (e.g., offshore or upland). The type of shorelines that are restored in these projects are typically beaches or wetlands, and relevant project purposes include beach nourishment, shoreline stabilization, wetland habitat restoration or creation, and/or island creation. Sediment placement may be regulated differently by states for beach or wetland projects, and whether the sediment is intentionally sourced from a dredging project (BUDM) or not.

BUDM is a tool in the RSM toolkit, using sediment dredged primarily for navigation or construction in a way that benefits the environment, protects, or enhances the coastline, and/or provides other societal benefits. Florida and California began placing sand on eroding beaches as beneficial use from inlet maintenance dredging projects as early as the 1940s, but traditional beach nourishment practices did not begin until the early 1970s (Elko et al. 2021; Coor and Ousley 2019). Today, some states and communities regularly implement BUDM for such needs as regular inlet maintenance and mitigating downdrift beach erosion.

Stakeholder interest in wetland restoration projects is growing along with rates of wetland land loss (Elko et al. 2022b; Ramseur 2020). This coastal enhancement strategy often involves the intentional placement of dredged sediment on a marsh or other wetland to increase its elevation while maintaining hydrology necessary for the restoration of native wetland vegetation. The term “thin layer placement” (TLP) is becoming widely used to describe these projects; however, the thickness of the layer of sediment may vary significantly from project to project. Thus, the term “wetland restoration” is used in this report unless TLP is specifically included in the name of a project.

Methods

Engagement of state and federal policy makers, regulators, and project managers was a high priority during this project. The following methods highlight that objective.

Desktop Review of Policies and Regulations

An initial desktop review was conducted of the policies, relevant authorities, and regulations on sediment placement across each of the 35 coastal states and territories using publicly available documentation. This information was compiled into a standardized spreadsheet to categorize policies and regulations into common themes or focus areas. Whenever possible, quantitative or qualitative standards for sediment use or placement were identified. During interviews, discussed below, these profiles provided the foundation for conversations with relevant program staff in each jurisdiction.

Interviews

Relevant administrative leads and program staff in each coastal state and territory were interviewed to (1) clarify information gathered during the desktop review, and (2) fill remaining information gaps. Interviews and personal correspondences were conducted between September and November 2021. Interviews were also used to identify challenges and opportunities for prioritizing, permitting, and executing RSM and/or BUDM projects.

Regional Workshops

Starting in November 2021, a series of seven regional workshops were held with state and federal coastal officials and local stakeholders to share, promote, and identify RSM and BUDM implementation challenges and success stories (Table 1). Because of the COVID-19 pandemic, early workshops were held virtually. These engagements harnessed the talents and energies of many experts and stakeholders (Figure 1).

Table 1. Workshop schedule and locations.

Region	Date	Format
Southeast/Caribbean	November 2021	Virtual
New England	January 19, 2022	Virtual
Great Lakes	February 23, 2022	Virtual
Gulf	April 25, 2022	In-person; Gulf of Mexico Conference (GoMCon) Baton Rouge, LA
Mid-Atlantic	June 13, 2022	In-person; Monmouth University, Long Branch, NJ
Pacific Islands	August 9, 2022	Virtual
West Coast	September 13, 2022	In-person; ASBPA Conference, Long Beach, CA

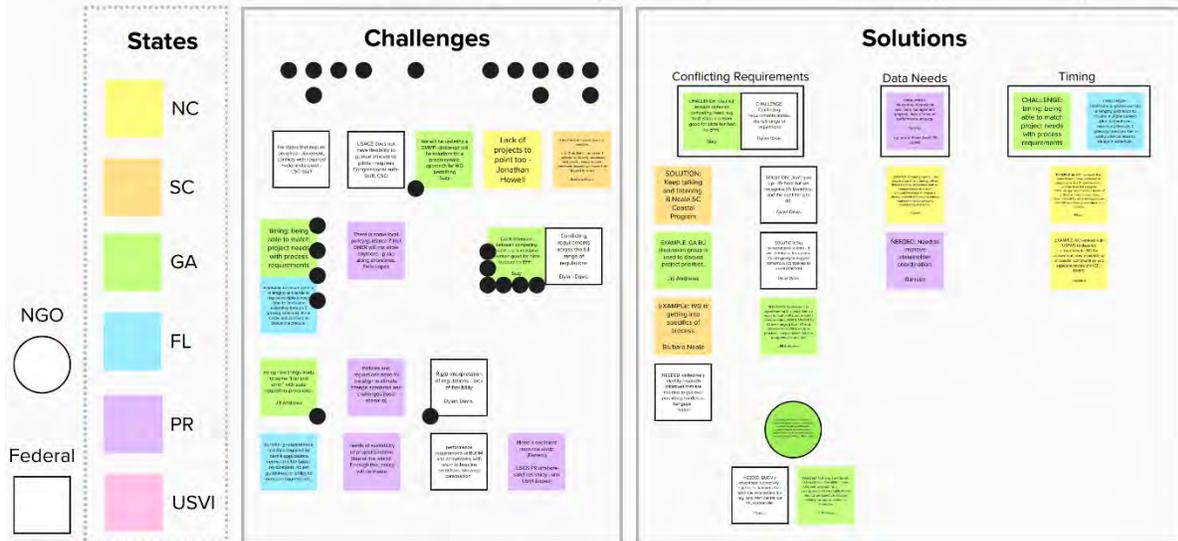


Figure 1. Photos of various workshop engagements including in-person and virtual workshops and information gathering sheets.

Based on concepts introduced by ASBPA and CSO through both regional white papers and introductory presentations, which were informed by the prior input, participants refined the challenges and proposed solutions to improve BUDM implementation. Outcomes from the workshops directly informed the content of this final report. In total, the workshops included nearly 250 participants, 28 presentations, and 25 breakout sessions.

Findings

National trends

The concept of RSM in USACE originated with the intent to change the USACE focus of managing sediments on a project scale, to managing sediments within the region that encompasses local projects. This approach improves the use of sediments (i.e., coordinate dredging activities to retain sediments in the littoral system), reduces costs, increases benefits across multiple projects, and improves relationships and collaboration. RSM seeks to support sustainable solutions to improve the management of sediments across navigation, flood risk management, and ecosystem restoration projects. Since the 67th Coastal Engineering Research Board meeting held in 1998, themed “Regional Sediment Management,” the concept of RSM has expanded beyond a coastal focus to incorporating riverine and reservoir systems, including BUDM for environmental enhancement, and providing more sustainable and resilient approaches. Today, RSM embodies a systems approach using best management practices for more efficient and effective use of sediments in coastal, estuarine, and inland environments.

Coastal stakeholders have expressed a strong desire to collaborate with federal agencies and devote additional resources to coordinate short- and long-term sediment management. Sediment placement regulations, and related state and federal policies, are frequently cited as a significant limitation to implementing RSM.

Other regulatory challenges are also cited. For example, some state acts require an additional review to the federal National Environmental Policy Act (NEPA) process, commonly referred to as “mini-NEPAs” (e.g., the California Environmental Quality Act [CEQA]). This represents another layer of review and documentation to ensure state environmental requirements are met. Additionally, the New Jersey Department of Transportation (the entity responsible for operations and maintenance of 200 nautical miles of shallow-draft navigation channels) has described a regulatory challenge as it relates to the state’s Dredged Material Management Strategy as follows:

“Since the late 1970s, increasing environmental regulation of dredging and dredged material management has created a system that is often at odds with transportation agencies and the dredging industry. Both the marine transportation industry and the environmental agencies both look at sediment as a problem, rather than a resource. This has led to a negative regulatory approach that places large burdens on the industry through reduced permitted work windows and limited management options, even for clean sediment, resulting in both increased costs and deferred maintenance. In some parts of coastal NJ, dredging has not been possible for decades due to a combination of inadequate funding and lack of affordable dredged material management options” (Douglas et al. 2022).

Nationally, confined disposal areas for the placement of dredged sediment have been finite and dwindling for years (Bailey et al. 2009). For example, 13 out of 36 operational reaches within the Savannah District’s portion of the Atlantic Intracoastal Waterway (AIWW) lack sufficient 20-year disposal area capacity (USACE 2015).

Finite sediment resources and increasing demand for beach nourishment are another challenge that will necessitate increased implementation of RSM principles and BUDM in the future (Elko et al. 2021; Taylor Engineering 2020). The Sand Availability and Needs Determination (SAND) study (Taylor Engineering 2020) quantified sand needs and available sand resources for all current beach nourishment projects, both federal and nonfederal, in the USACE South Atlantic Division (SAD) for the next 50 years.

Regionally, a total of 1.3 billion cubic yards (yd³) of sand are needed to support 50-year sand needs. Economically viable long-term sources are limited with sand shortages documented in every state in SAD and in Puerto Rico. By increasing our understanding of sediment compatibility requirements, the volume potential of sediment for shoreline restoration and protection projects can be expanded, thereby increasing BUDM and the lifespan of limited sediment resources.

Congress has recognized sediment management challenges. For example, Section 1122 of the Water Resources Development Act of 2016 requires USACE to establish a pilot program to carry out 10 projects for BUDM. USACE solicited proposals through a Federal Register Notice on February 9, 2018. Puerto Rico and 29 states submitted 95 proposals. On October 10, 2018, the Assistant Secretary of the Army for Civil Works (ASA[CW]) signed the programmatic Environmental Assessment and finding of no significant impact (FONSI) describing the selection process and recommending 10 projects for the pilot program (USACE 2018).

USACE has recently set a goal to increase BUDM to 70% by 2030 (Coleman 2022). Currently, 30% to 40% of all dredged sediment from federal navigation channels is used beneficially for such purposes as nourishing beaches and enhancing wetland habitats (Elko et al. 2022a). However, institutional, financial, technical and other barriers often hamper appropriate sediment management planning. The next section details a more complete discussion of BUDM challenges.

With only three exceptions (Alaska, USVI, and CNMI), all U.S. states and territories have adopted policies to encourage, or even require, that dredged sediments are used in a beneficial manner (Figure 2). This study has broadly classified the state and territory policies as follows. Note that Guam and American Samoa are not shown on the map, but have policies that encourage BUDM.

For each jurisdiction, state/territory policies are identified under three categories:

1. Policies encouraging or requiring the beneficial use of dredged sediment.
2. Policies encouraging or requiring the use of natural or nature-based solutions (NBS), as defined by the state, to include dunes, wetlands, or other designs enhancing or integrating into the coastal ecosystem, versus hard structures for erosion control and shoreline stabilization projects.
3. Policies implementing RSM principles by encouraging or requiring that projects avoid impacts to sediment supply, erosion, or hydrodynamics.

Each policy is coded as “Required” or “Encouraged” based on how it is implemented. For instance, a BUDM policy is coded as “Required” if any dredging project subject to that policy will be required by the jurisdiction to beneficially use the dredged sediment unless a specific exemption threshold or condition is met. A BUDM policy that requires BUDM according to the above standard, but only for a subset of

dredging projects occurring within the jurisdiction (e.g., requiring BUDM for sediment from a particular water body), are marked with “(subset).” A BUDM policy is coded as “Encouraged” if it provides incentives, requires consideration of BUDM options, provides information or support for BUDM projects, etc. Permit regulations that set a preference hierarchy but do not set requirements for choosing one over another are coded as “Encouraged,” unless typical and consistent agency practice is to use that hierarchy as authority to require the preferred option. The same “Required” and “Encouraged” coding is also applied to NBS and hydrodynamics policies. Local policies are not assessed.

In Figure 2, each jurisdiction is classified as “Required,” “Required (subset),” “Encouraged,” or “None” according to its most restrictive policy. For jurisdictions where there currently is no policy or guidance taking a position on the issue, the jurisdiction is coded as “None.”

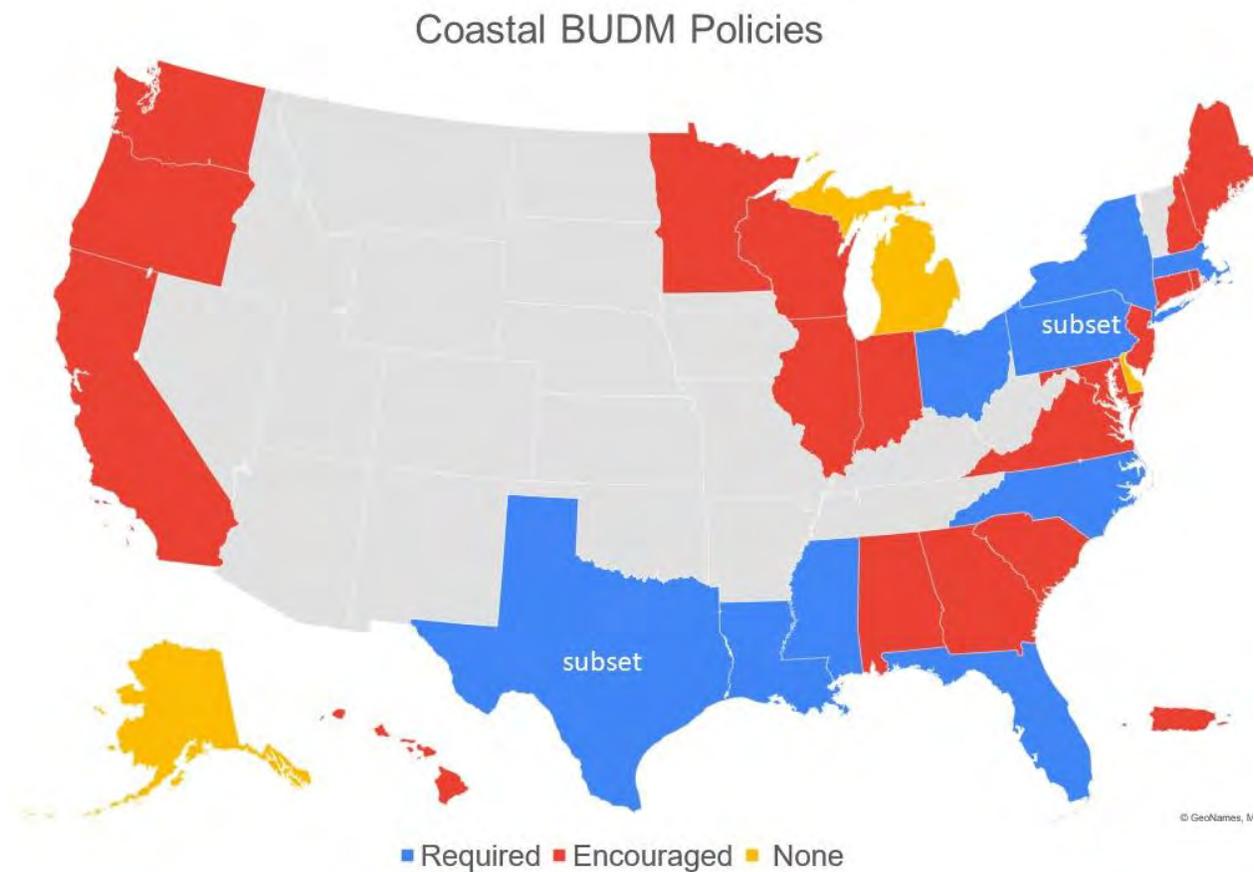


Figure 2. Map of U.S. states and Puerto Rico summarizing beneficial use of dredged material policies as broadly characterized in this study (see text for definitions of Required, Required (subset), Encouraged, and None). See text for policy descriptions of other jurisdictions and Appendices.

Sediment Suitability Regulations

A cost-effective, accurate, nationally applicable, and efficient method to determine suitability does not exist. Basic data on physical characteristics of the sediments to be dredged, such as grain size and levels of contamination, can provide an initial screen of possible beneficial use options. Concern over potential contaminants is common at dredging projects near industrial areas such as the Midwest and Northeast. However, much dredged sediment in the Southeast, and in portions of the Gulf and southern California, has comparatively less history of heavy industry, and less fine-grained sediment. This may help to explain why the use of dredged sediment in these areas has been underway for decades (Ramseur 2020).

In beach systems, the intent of sediment-focused regulations is to preserve the physical characteristics, and thus the environmental function, of the natural system by making the sediment source as practically similar as possible to the native sediment in composition, grain size distribution, and color (Hannides et al. 2019). The general term for sediment that meets physical requirements is “beach-quality sand.” Beach-quality sand is considered compatible with the sediment on the natural or native beach, but the specific characteristics vary by state. There are many reasons to preserve the physical characteristics of the natural beach during restoration projects including the resulting beach geomorphology (e.g., beach slope), habitat and ecosystem suitability (e.g., turtle nesting), and human and ecosystem health concerns (e.g., contaminants).

Water quality can be influenced by dredging and placement of dredged sediment through increased turbidity or release of contaminants. Fine-grained particles are suspended during the dredging process and water quality may be significantly, albeit temporarily, affected through increased turbidity. Chemical testing requirements typically reflect industrial pollutants known to occur in the region they cover; however, fine-grained sediments have a greater potential to retain contaminants than sand. If pollutants are a potential concern, affordable grain size testing is often used to prescreen dredge sites for the probability of the presence of contaminants (e.g., more fines implies a higher potential for contaminants).

As such, all U.S. states regulate sediment suitability based on physical characteristics for general shoreline placement projects (e.g., the percent of fine-grained sediment [“fines”]). Several U.S. territories (Guam, American Samoa, and USVI) lack sediment suitability policies. Specific quantitative or qualitative sediment standards applicable to shoreline (beach and wetland; open ocean and estuarine

coasts) placement projects have been summarized for each state (Figure 3). The following text box defines each category of sediment suitability regulation.

Coastal Sediment Suitability Regulations Categories

Quantitative — Regulations require that placed sediment must be within a measurable tolerance limit from characteristics of the native sediment at the project site. Often, contaminant testing is waived for sandy sediments. For example, sediment shall not contain greater than 10% fines than native.

Qualitative — Regulations require that placed sediment must be similar to, or compatible with, the native sediment at the project site. No measurable tolerances are defined.

Case-by-case — Either no reference is made to physical sediment characteristics or the state/territory determines sediment suitability on a case-by-case basis.

Some jurisdictions have specific quantitative regulations in place to control the percent of fine versus coarse sediment used for shoreline stabilization. For instance, in Florida dredged sediment is allowed 10% fines or less for beneficial use/placement on the beach (Appendix B; Appendix D). Practitioners refer to this as a “90:10 rule.” Jurisdictions with similar rules are labeled on Figure 3. A few states’ regulations differentiate between beach nourishment and BUDM projects. For example, Florida only allows 5% fines for beach nourishment projects (a 95:5 rule). When a state has different tolerances for beach nourishment and BUDM, the more lenient BUDM tolerance is labeled. Additionally, some states use physical sediment characteristics to determine whether testing for contaminants will be required. For example, Minnesota exempts small (<3,000 yd³) dredging projects with ≥ 93% sand from solid waste permitting (Appendix B; Appendix D). Those tolerances are labeled with an asterisk (Figure 3).

Several states, such as California, do not set qualitative standards through regulation, and instead consider the sediment suitability of BUDM projects on a case-by-case basis. However, updated sediment testing guidelines for BUDM were released when new information on chemical concentrations and sediment toxicity conditions in San Francisco Bay became available (SFB-RWQCB, 1992; 2000).

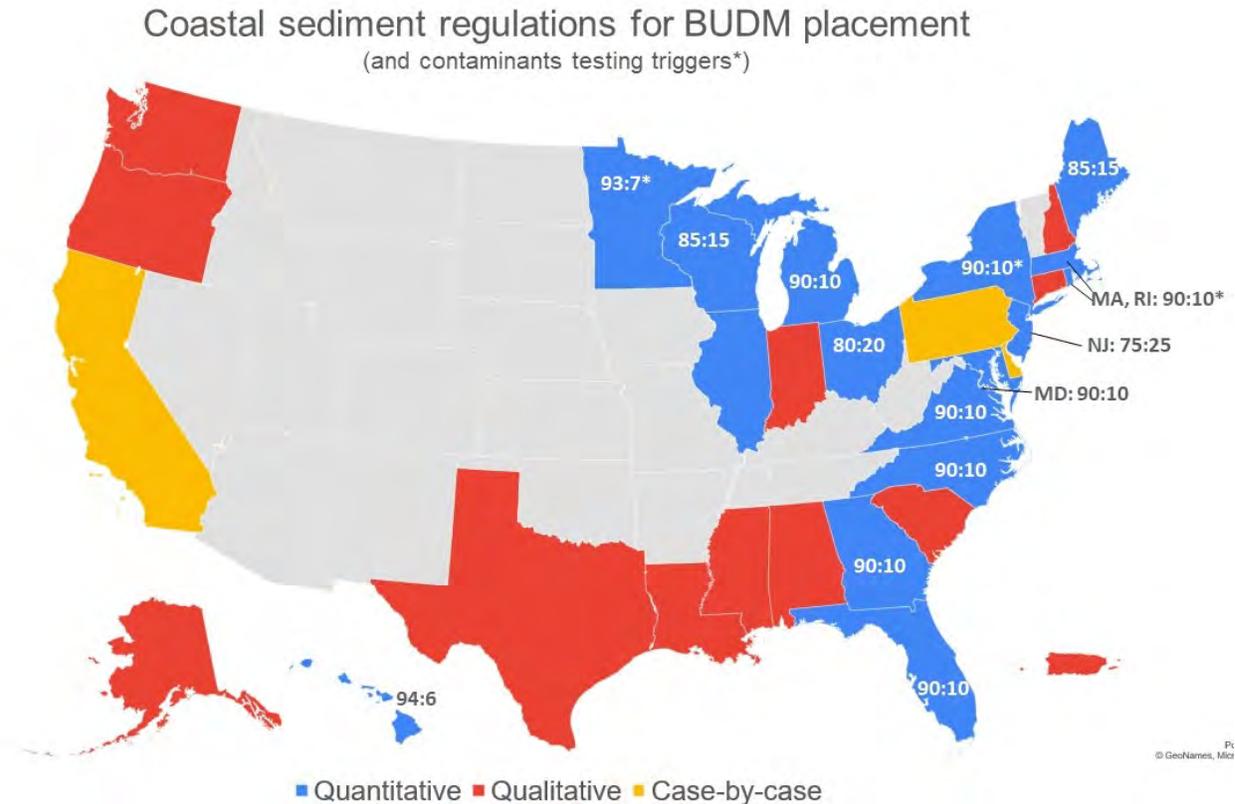


Figure 3. Map of U.S. states and Puerto Rico summarizing regulations governing the physical quality of sediment required for coastal placement, including tolerances for the ratio of sand to fine-grained sediment and triggers* above which contaminant testing is required. See text for details.

Regional Trends

This section provides an overview of controlling policies and regulations in each of the six regions addressed in this research: Southeast, Mid-Atlantic, New England, Gulf of Mexico, Great Lakes, and West Coast and Pacific. For each coastal state and territory in these regions, the general structure of its permitting system is characterized (i.e., what permits will be required for a shoreline placement project using dredged sediment?). Pertinent policies requiring or encouraging use of BUDM, use of natural solutions for erosion control, and preservation of littoral / sediment dynamics are highlighted. An overview of qualitative and quantitative physical sediment standards is also provided. Appendices summarize the coastal state and territories’ sediment placement regulations, policies, and permit requirements.

Regional Trends in the Southeast

For purposes of this report, the Southeast includes North Carolina, South Carolina, Georgia, Florida, Puerto Rico, and USVI.

Permitting and Policies

Southeast state coastal programs require permits for dredging and coastal placement (Appendix B). Certifications for water quality and public land rights are typically administered by different programs or departments and are attached to these state permits.

USACE conducts most of the BUDM in the Southeast. The USACE Districts have the navigation mission to maintain federal channels. Dredged sediment from these channels provides most of the sediment that is used beneficially. Although Southeast states have general permit options, projects that qualify for general permits typically are not using dredged sediment beneficially.

Southeast states offer joint permits with USACE to streamline the permitting process for nonfederal applicants. Because the majority of BUDM implementation occurs with federal projects, the joint permit process does not typically play a role.

All the states in the southeast have policies to encourage or require BUDM (Figure 2). They also all encourage natural solutions for erosion control. North Carolina, Georgia, and Florida encourage or require the avoidance of impacts to sediment supply, erosion rates, and/or inlet or nearshore hydrodynamics (Appendix C). Florida requires this through **Section 161.143 (5) Florida Statutes (F.S.)**, which states:

The department shall update and maintain an annual report on its website concerning the extent to which each inlet project has succeeded in balancing the sediment budget of the inlet and adjacent beaches and in mitigating the inlet's erosive effects on adjacent beaches. The report must estimate the quantity of sediment bypassed, transferred, or otherwise placed on adjacent eroding beaches, or in such beaches' nearshore area, for the purpose of offsetting the erosive effects of inlets on the beaches of this state.

By mandating an annual inlet report, the state legislature has created awareness and highlighted the need for sediment and inlet management to local communities.

Puerto Rico has not historically practiced or considered beach nourishment or BUDM; however, in 2017, Hurricane Maria eroded many of the territory's beaches which have not recovered (Barreto-Orta et al. 2019). Cumulative damages from subsequent recent storms (e.g., Fiona 2022) have exacerbated the erosion problem (Barreto-Orta, 2022). Few regulations or policies exist, but efforts are underway to develop project guidelines. Puerto Rico is relying heavily on Florida's experience and regulations to protect sea turtles.

Physical Sediment Characteristics

All Southeast states have regulations or policies to ensure that placed beach sediment is not too fine-grained relative to the natural or native beach grain size (Figure 3). Regulations in South Carolina are

qualitative (e.g., sediment must be similar to existing beach); whereas, regulations in North Carolina, Georgia, and Florida are quantitative.

Both Florida and North Carolina allow for more leniency for the beneficial placement of dredged sediment than for traditional beach nourishment projects. In both states, beneficially placed dredged sediment may contain fine-grained sediment (finer than sand) that is up to 10% greater than the amount present in native beach sand. Beach nourishment projects, however, are limited to 5% greater than the amount present in native sand. Florida is also considering modifying streamlined permitting procedures for projects that propose to use inland sand sources. Sediment from larger, established mines is considered to be a product with a specific, consistent grain size distribution.



North Carolina, Georgia, and Florida specify a maximum allowable percentage of gravel (>4.75 millimeters [mm], <76mm) at 5%. North Carolina regulates large sediment (<2x native of sediment >1" in and shell [>3 inch]) and Florida (0x native of any sediment >3/4 inch). North Carolina and Georgia limit carbonate calcium concentration to 15% greater than native, and Georgia specifies a specific color for placed sand because of potential impacts on sea turtle nesting with darker or lighter sand. Incubation temperatures of the sand, which are affected by sand color, determine the gender of hatchlings.

North Carolina, South Carolina, and Georgia issue state water-quality certifications along with permits for the dredging and placement of sediment (Appendix B). Florida requires a specific mixing zone around the project, outside of which water quality cannot be degraded. Florida recently modified the size of the allowable mixing zone from 150 meters (m) to 1,000 m. This was a science-based rule change that used past turbidity monitoring data from many projects to lessen restrictions for sand placement projects.

Regional Trends in the Mid-Atlantic

For the purposes of this report, the Mid-Atlantic includes Virginia, Maryland, Delaware, New Jersey, New York, and Pennsylvania. New York and Pennsylvania are also included in the section on the Great Lakes region.

Permitting and Policies

Mid-Atlantic states require permits for coastal sediment placement. Often one of several wetland or water permits may be required depending on the location of the project, the project's design and purpose (e.g., beach nourishment versus wetland restoration), and the resources impacted (Appendix B). For example, New York has separate permits for tidal and freshwater wetlands.

Projects generally require water quality certifications that are reviewed and issued separately from the underlying state wetland permit. In some cases, a separate state lands authorization is issued, although not requiring a separate application (Pennsylvania, New York, Delaware); in other cases, no separate land authorization is required (New Jersey, Maryland, Virginia).

Both the USACE and individual states administer dredging programs in the Mid-Atlantic. Although USACE is responsible for federal channels and state dredging programs for state channels, in practice these programs recognize the necessity of coordinating on planning and operations. Several states in the Mid-Atlantic have worked closely with their USACE districts on RSM programs, including historic and ongoing BUDM projects.

USACE projects do not obtain state permits but are subject to water quality certification and federal consistency review requirements. Nonfederal projects require both state and federal permits. Mid-Atlantic states have joint permitting processes in place with USACE.

Most Mid-Atlantic states have policies in place to encourage BUDM, and these states have worked extensively through their permitting, transportation planning, and wetland restoration programs to expand BUDM practices in the region (Figure 1). For instance, Maryland has developed the “Beneficial Use: Identifying Locations for Dredge” tool, a geographic information system (GIS) data set hosted on the Maryland Coastal Atlas that maps dredging projects, potential restoration projects, distance buffers, and other helpful information to identify BUDM opportunities (MDNR 2022). Virginia has instituted a fast-track joint permitting program for dredging and dredge sediment disposal in state wetland areas and state-owned tidal lands for habitat creation, development of living shoreline features, or enhancement of coastal resilience. New York requires applicants to consider beneficial use first for dredge management, uses federal consistency to ensure that suitable or compatible dredged sediment is kept within the same littoral system from which it was removed, and provides guidance for in-water and riparian dredged sediment placement. Delaware does not have standing policies addressing BUDM, and reports that work is under way on the development of a comprehensive dredging policy framework, which will include setting BUDM as a priority.

Maryland, New Jersey, and Virginia have policies requiring the use of natural solutions for some or all erosion control projects (Appendix C). Delaware and New York have policies encouraging natural solutions for erosion control.

Physical Sediment Characteristics

Several Mid-Atlantic states set quantitative standards for grain size relative to the natural beach or wetland placement area’s grain size (Figure 3). New Jersey requires that beach nourishment sediment be comprised of at least 75% sand larger than 0.0625 mm that is compatible with the receiving beach. Maryland requires that beach nourishment sediment contain no more than 10% silts and clays unless measures are taken to control sediment movement. Virginia requires engineering information on the placement site to determine the acceptable grain size range. Under its fast-track program, sediment with a minimum median grain size of around 0.25 mm, with no more than 20% passing through a #100

sieve (0.149 mm) and no more than 10% passing through a #200 sieve (0.074 mm), has been deemed appropriate for beneficial use.

New York requires that sediment placed within regulated natural protective feature areas must be “clean sand, or gravel of an equivalent or slightly larger grain size.” Delaware and Pennsylvania do not have standards applying specifically to shoreline placement project grain size, but instead rely on the water quality certification process to identify and mitigate impacts from fines.

Each state also requires testing for contaminants in source sediments. New York and New Jersey have incentive provisions for waiver of testing requirements for sufficiently coarse-grained sediment (New York: >90% sand or gravel, New Jersey: >90% grain size >0.0625 mm). Maryland requires that beach-placed sediment be free of organics.

Regional Trends in New England

For purposes of this report, New England includes Maine, New Hampshire, Massachusetts, Rhode Island, and Connecticut.

Permitting and Policies

New England state coastal programs require permits for dredging and coastal placement (Appendix B). Certifications for water quality and public land rights are sometimes administered by different programs or departments and are attached to these state permits.

Massachusetts has an initiative to provide municipalities with comprehensive dredging permits particularly on Cape Cod. This allows a municipality to obtain a single permit covering all municipal channels, thereby streamlining the renewal process, and allowing for flexibility as to the location of the sand placement within the town.

Except for the Barnstable County Dredging Project in Massachusetts, USACE conducts much of the dredging in general and most of the BUDM in New England. The USACE Districts have the navigation mission to maintain federal channels. Dredged material from these channels provides most of the sediment that is used beneficially. A significant amount of the finer grained dredged material in New England is not considered suitable for use because of contaminant and grain size concerns. All New England states use the USACE New England District programmatic permit.

All the states in New England have policies to encourage or require BUDM (Figure 2). For example, Maine has recently created an exemption to encourage BUDM. When clean sand dredged from an inlet is to be placed in the nearshore or on a beach within one mile, the state will waive contaminant testing. New Hampshire overhauled regulations in 2019 to further encourage coastal resilience activities and BUDM. New Hampshire Enforceable Policy #14 encourages BUDM. MA regulations do not require the issuance of a 401 Water Quality Certification (WQC) for beach placement if a local order of conditions is obtained from the conservation commission. This provides an incentive for the beneficial use of compatible dredge sediment. A WQC is required for the dredging. Most New England states encourage

or require the avoidance of impacts to sediment supply, erosion rates, and/or inlet or nearshore hydrodynamics (Appendix C).

Physical Sediment Characteristics

All New England states have regulations to ensure that the placed beach sediment is similar and not too fine grained relative to the natural or native beach grain size (Figure 3). Regulations in New Hampshire and Connecticut are qualitative (e.g., sediment must be similar to existing beach); whereas, regulations in Maine, Massachusetts, and Rhode Island are quantitative. To encourage beneficial use, both Maine and Massachusetts allow for more leniency for the beneficial placement of dredged sediment than for traditional beach nourishment projects. For example, beneficially placed dredged sediment is allowed to contain fine-grained sediment (finer than sand) that is up to 15% greater than the amount present in native beach sand. Beach nourishment projects may be limited to 10% greater than the amount present in native sand.

Granular sediment (larger grain size or coarser than sand) restrictions are not as common in New England state regulations as in the Southeast U.S. Contaminant testing is more prevalent. In recognition that finer grained sediments typically carry contaminants, Rhode Island waives testing for sandy sediments. Most New England states require the color of sand to be similar to the existing beach despite the lack of sea turtle nesting (incubation temperatures of the sand, which are affected by sand color, determine the gender of hatchlings).

All New England states issue state water quality certifications along with permits for the dredging and placement of sediment (Appendix B).

Regional Trends in the Gulf of Mexico

For the purposes of this report, the Gulf of Mexico region includes Florida, Alabama, Mississippi, Louisiana, and Texas. Florida is also included in the section on the Southeast/Caribbean region.

Permitting and Policies

Gulf of Mexico states require a variety of state authorizations for dredging and sediment placement projects (Appendix B). Alabama has integrated wetland, water quality and coastal impact permitting under a single departmental approval, while Louisiana also operates a unified permit (the Coastal Use Permit) which can be administered at the state level or local level with state oversight, depending on the scale, purpose, and impact of the project. Florida has unified environmental approvals under a joint permit with USACE. Mississippi may require a wetland permit and a water quality permit, depending on project location and impacts. Texas unifies state requirements under its Surface Land Lease and Coastal Zone Management Consistency Certification process, but placement projects may also require local permits administering statewide beach and dune protection programs.

Each Gulf of Mexico state also requires separate approval for placement on state-owned submerged lands, typically administered by a separate agency from relevant environmental permits. In Louisiana,

the class of authorization depends on whether fill will be placed on formerly dry, eroded land versus open water.

USACE Districts, including Galveston, New Orleans, Mobile, and Jacksonville, conduct most of the dredging in the Gulf of Mexico. In Florida, significant maintenance dredging is also completed by regional inlet districts. With the USACE dredging more than 100 million yd³ of sediment annually from federal navigation channels throughout the Gulf states, this dredged sediment is frequently considered for beneficial use in conservation and restoration planning processes. It was estimated that roughly 30% of all sediment dredged from federal channels in the Gulf was used beneficially (Parson and Swafford, 2012). Recently, USACE and the Gulf states have been overcoming many challenges and capitalizing on BUDM opportunities (e.g., McQueen et al. 2020).



All the states in the Gulf of Mexico region have policies to either encourage or require BUDM (Figure 2). States also encourage keeping dredged sediments within the natural system or using it to support habitat creation and restoration goals (Appendix C). Some states have created interagency BUDM programs to coordinate with federal, state, and local officials to permit and manage marsh, wetland, and habitat restoration sites where dredged sediment can be placed. For example, in Mississippi the Coastal Wetlands Protection Act, amended in 2010, requires all permitted dredging activities greater than 2,500 yd³ to participate in the state's BUDM program if the sediment is suitable and sites are available. Florida implements strong controls requiring dredged sand to be placed on nearby eroding beaches. Each Gulf of Mexico state also implements policies encouraging the use of nature-based solutions for erosion control, and the states require placement projects to avoid or minimize impacts to the hydrodynamic system.

A collaborative partnership has been instituted through the Gulf of Mexico Alliance (GOMA) among all five Gulf of Mexico states to support the ecological and economic health of the Gulf of Mexico. GOMA has developed a Gulf Regional Sediment Management Master Plan (GRSMMP) to outline the sediment management goals and strategies highlighting the need for a comprehensive understanding of regional sediment systems and processes. The intent of the plan was to establish guidelines using the understanding of sediment dynamics (inputs, outputs, movement) to manage sediment resources toward accomplishing environmental restoration and habitat creation while enhancing the abilities of the GRSMMP users to make informed, cooperative management decisions.

Physical Sediment Characteristics

Across the Gulf of Mexico, sandy sediments are most abundant off the Florida shore and decrease in abundance moving west where fine-grained, fluvial sediments from the Mississippi River and other

rivers dominate the sediment profile (Williams et al. 2012). Sand bodies vary greatly in grain size, color, and composition and are often overlain with finer-grained muddy sediment throughout the Gulf of Mexico inner shelf (Davis 2017). This is particularly true off the coast of Texas, where muddy sediment is dominant or about equal to fine-grained sand in surface sediments. A study by Maglio et al. (2019) on the Florida and Texas coasts suggests that significant fine-grained material is lost during the dredging process, while color and compaction remain similar to pre-dredge conditions. This is of particular interest since quality, fine-grained sand supplies are limited across the Gulf of Mexico.

In evaluating beach fill projects, Texas, Alabama, and Florida require the use of beach-quality sand, meaning using similar grain size and mineralogy as would be found in natural beach environments (Figure 3). Florida also requires at least 90% of beach-placed sediment be sand retained by a #200 sieve.

Gulf of Mexico states have policies to avoid or minimize the impacts associated with BUDM projects across the region (Appendix C). Mississippi Code Title 49, Chapter 27 states: “Surface alterations which have high adverse impacts on natural functions shall not occur, to the maximum extent practicable, on barrier islands and beaches, isolated natural ridges or levees, or in wildlife and aquatic species breeding or spawning areas, or in important migratory routes.” Similar qualitative policies have been set in other Gulf of Mexico states. For example, Texas Administrative Code 501.3 mentions “*to avoid adverse effects to the greatest extent possible...and adverse effects that cannot be avoided must then be minimized to the greatest extent practicable.*”

Gulf of Mexico states use environmental permit review and WQC to manage water quality impacts from placement projects, requiring best practices to test for toxics, minimize turbidity, and avoid or minimize habitat impacts on a case-by-case basis.

Regional Trends in the Great Lakes

For the purposes of this report, the Great Lakes region includes Minnesota, Wisconsin, Illinois, Indiana, Michigan, Ohio, Pennsylvania, and New York. New York and Pennsylvania are also included in the section on the Mid-Atlantic region.

Permitting and Policies

Great Lakes states require shore structure and/or waterway obstruction permits for coastal placement of dredged sediment, as well as wetlands permits in some cases depending on the placement site (Appendix B).

Several Great Lakes states have separate bottomlands leasing / licensing authorizations (Wisconsin, Michigan, Ohio, Pennsylvania, New York); others incorporate that authorization into existing permit processes. For instance, projects that involve construction of structures or placement of fills in Michigan’s Great Lakes waters require a permit from the Department of Environment, Great Lakes, and Energy (EGLE). Certain structures or fills of a certain size on state-owned Great Lakes bottomlands also require a separate lease or conveyance to occupy the bottomlands. EGLE administers the application processes for both the permit and the bottomland lease or conveyance, as applicable.

Projects generally require WQCs that a separate agency reviews. For instance, the Ohio Department of Natural Resources issues its shore structure permit, but the Ohio Environmental Protection Agency issues its WQC. In Michigan, where a project requires a permit from the USACE and the EGLE, the EGLE permit incorporates the 401 WQC and Coastal Zone Management Act (CZMA) certification.

USACE projects do not obtain state permits but are subject to WQC and federal consistency review requirements. Nonfederal projects require both state and federal permits. Michigan has assumed administration of the USACE Clean Water Act 404 program for its inland waterways; however, USACE still reviews 404 applications for projects in/on the Great Lakes and other Rivers and Harbors Act Section 10 waters. Several USACE regional general permits are available for small projects, generally in limited areas.

Both the USACE and individual states administer dredging programs in the Great Lakes. Although USACE is responsible for federal channels and state dredging programs for state channels, in practice these programs recognize the necessity of coordinating on planning and operations. Great Lakes states and USACE Districts participate on the **Great Lakes Dredging Team (GLDT)** (Appendix A) to coordinate and exchange information on dredging and dredged material management. The GLDT has supported dialog on BUDM, including information sharing in support of WRDA 2016 Section 1122 BUDM pilot projects.

BUDM is of increased interest to Great Lakes states, especially as rapid lake level changes in the past decade have greatly exacerbated erosion rates and demand for sediment in some areas. Most Great Lakes states do not have policies in place requiring BUDM, but several encourage its use (Wisconsin, Illinois, Indiana, Ohio, Pennsylvania, and New York) (Figure 2). Illinois, for instance, does not systematically incentivize dredging projects to use BUDM techniques, but the state coastal program has founded the Illinois Shoreline Management Working Group to coordinate regionally across local and federal partners to address sediment deficits and pilot management strategies. Through that effort and a pilot project as part of WRDA 2016 Section 1122, the state is assessing needs for new BUDM policies. New York requires applicants to consider beneficial use first for dredged material management, uses federal consistency to ensure that suitable or compatible dredged sediment is kept within the same littoral system from which it was removed, and provides guidance for in-water and riparian dredged sediment placement. Pennsylvania does not have a general requirement for BUDM, but has worked with Ohio and USACE to establish downdrift placement requirements for Conneaut Harbor, near the Pennsylvania-Ohio boundary.

Notably, Ohio has established BUDM as a priority component of its Lake Erie water-quality and shoreline-management strategies in recent years. In 2015, the state instituted a statutory requirement effective starting in 2020 for all Lake Erie dredged sediment excavated or dredged from a federal navigation channel during harbor or navigation maintenance activities to be placed into confined disposal facilities or beneficially used through upland projects or aquatic habitat restoration projects, beach nourishment, or littoral drift placements, compliant with the terms of the state's solid waste regulations and WQC. Additionally, under the new Harbor Sediment Authorization rules, the state may identify certain appropriately-managed upland dewatered dredge sediment sources as exempt from solid waste and hazardous waste requirements, to be treated as any other soil or earthen material.

Great Lakes states generally have policies encouraging the use of natural and nature-based solutions for shoreline erosion control or else offer case-by-case technical assistance, but have not incorporated natural solution requirements into their permitting systems (Appendix C). For instance, Michigan’s EGLE cofounded the Michigan Natural Shoreline Partnership, a public-private partnership to promote nature-based solutions, providing training to contractors and education to landowners. Great Lakes states generally use the review process to require that permit applicants address the impacts of project design on hydrodynamics and littoral drift.

Physical Sediment Characteristics

Some Great Lakes states have enacted quantitative standards for grain size applying to beach nourishment projects (Figure 3). Michigan requires at least 90% of beach-placed sediment be sand retained by a #200 sieve. Ohio requires sediment be at least 80% sand for beach placement, or 60% sand for placement in the littoral drift. Wisconsin requires that the average silt content of shore-placed sediment not exceed the average silt content at the site by >15%, although in practice sediment typically will need to be well below that threshold to meet water quality standards. Minnesota, Illinois, Indiana, Pennsylvania, and New York do not set quantitative grain size standards. For instance, New York requires that sediment placed within regulated natural protective feature areas must be “clean sand, or gravel of an equivalent or slightly larger grain size.”

Sediment standards in Great Lakes jurisdictions generally focus on contaminant testing. Wisconsin, Illinois, Michigan, Pennsylvania, and New York have established testing requirements specifically addressing dredged sediments. Other states rely on the WQC process to measure and address project design impacts on water quality.

Regional Trends in the West Coast and Pacific

For the purposes of this report, the West Coast and Pacific Island jurisdictions include Alaska, American Samoa, California, Guam, Hawaii, CNMI, Oregon, and Washington.

Permitting and Policies

California, Oregon, and Washington each have coastal development permits for projects, including fill placement, within the coastal zone; each has a system for local implementation of these permit requirements with state agency oversight (Appendix B). In Oregon, coastal permit standards are set through Statewide Planning Goals and locally adopted estuary management plans. Hawaii has a coastal development permit applicable specifically to beach placement. American Samoa, Guam, and CNMI implement land use permits applicable to fill placement.

California, Hawaii, Oregon, and Washington each have separate state land leasing or authorization requirements for projects seaward of certain jurisdictional boundaries. American Samoa, Guam, and CNMI do not have similar public lands requirements. Projects generally require WQCs that are reviewed by a separate agency.

The Washington Dredged Material Management Program, which controls access to open-water dumping sites in the Puget Sound, Strait of Juan de Fuca, and Pacific coastal embayments, encourages beneficial use on a case-by-case basis. California also encourages BUDM through the requirements of its coastal use permit and dredge material management project reviews (Figure 2).

American Samoa, Guam, and Hawaii encourage BUDM on a case-by-case basis through their coastal development permitting programs. Oregon does not have a statewide policy requiring BUDM, but authorizes it as a beneficial use through its solid-waste regulations. CNMI does not have a jurisdiction-wide policy to favor BUDM.

Hawaii and Oregon each limit erosion control to nonstructural methods within a subset of their jurisdiction; Hawaii bans hard infrastructure on beaches, while Oregon limits approval of hardened structures to a subset of parcels already developed before 1977. On the open coast, the California Coastal Commission generally restricts the approval of hardened structures, though allows them in certain situations (e.g., where necessary to protect coastal-dependent structures). California and Washington require permit applicants to demonstrate that non-structural methods are infeasible before approving a structural approach. In addition, California policy for the open coast requires that such structural methods minimize and mitigate for impacts to shoreline sand supply. The Pacific Island territories encourage nonstructural methods through permit reviews. Each West Coast and Pacific Island jurisdiction requires permit applicants to demonstrate that hydrodynamics impacts have been avoided or mitigated.



USACE projects do not obtain state permits but are subject to water quality certification and federal consistency review requirements. Nonfederal projects require both state and federal permits. Several USACE regional general permits are available for small projects, generally in limited areas. Some California municipalities have regional general permits for opportunistic beneficial use of sediment but are typically only valid for five years. Opportunistic sources include flood channel and basin clearing and upland construction.

Both USACE and individual states administer dredging programs on the West Coast and Hawaii; USACE is responsible for most or all dredging activity in the Pacific Island territories. States and USACE Districts have prioritized coordination on planning and operations. Several within-state and interstate partnerships exist to bring together federal and state permitting agencies to coordinate on RSM, including the San Francisco Bay Dredged Material Management Office, Southern California Dredged Material Management Team, California Coastal Sediment Management Workgroup, Lower Columbia Solutions Group, and Washington Dredged Material Management Program.

Physical Sediment Characteristics

West Coast beaches vary in size and geologic composition from southern California to western Washington and the far reaches of coastal Alaska. The widest beaches in California are often the result of historical harbor dredging and beach nourishment projects, or sand retention structures (e.g., groins, jetties). Additionally, rivers sustain sediment budgets of littoral cells along the coast, particularly in northern California and the Pacific Northwest. Broad beaches and beach nourishment opportunities are not as common in the Pacific Northwest because of the high-energy wave climate and limited availability of sediment. Because of the steep slope of the continental shelf along the West coast, offshore sand borrow areas are not nearly as prevalent as in the Gulf and East coasts. Groups of islands with diverse geological origin, age, and wave conditions, which play a dominant role in the condition and supply of local sediment across the region, characterize the Pacific Island coastal zones. Pacific Island beaches occur more naturally and local wave-induced shoreward sediment transport leads to more consistent sediment recovery, compared to the West Coast of the U.S.

West Coast and Pacific Island jurisdictions generally have not set numeric criteria for sediment characteristics (Figure 3) — except for Hawaii, which has set standards for compatible beach sediments (permitting source material with mean grain size within 20% or 1.5 times the native sediment, setting maximum fines concentrations). West Coast states provide guidance for using sediment at least as coarse as placement site materials. The California Coastal Sediment Management Workgroup has developed the Sand Compatibility and Opportunistic Use Program (SCOUP), which provides guidance for local communities to develop Opportunistic Nourishment Programs, setting thresholds to assess sediment sources for use with higher percent fines (e.g., up to 45% fines and within 10% of the placement site’s native sand grain size envelope); generally, California regulatory agencies only allow sediment with up to 20-25% fines to be placed on the dry beach and sediment with a higher percentage of fines (up to 45%) must be placed in the surf zone or nearshore.

West Coast and Pacific Island jurisdictions rely on sediment testing under water quality standards to determine toxics and turbidity impacts. For instance, Washington has state sediment quality standards for both fresh and marine waters that must be considered when assessing sediments for beneficial use alternatives. No jurisdictions provide exemptions to testing requirements based on sediment characteristics, although the California SCOUP provides guidelines for doing so. Through the Dredged Material Management Office in the San Francisco Bay Area and the Southern California Dredged Material Management Team, federal and state agencies jointly use a weight-of-evidence approach to make placement suitability determinations.

These jurisdictions also provide strong species and habitat protections through water quality, wetland, and habitat protections (Appendix C). Hawaii implements zone-based avoidance requirements to protect corals. Pacific territories generally rely on federal permitting requirements. California, Oregon, and Washington each issue species closure windows for in-water and shoreline work annually through their fish and wildlife agencies. The California grunion, which spawns on beaches from March through August, is a significant resource considered when permitting beach nourishment projects.

Policy and Regulatory Barriers, Success Stories, and Needs

Nationally, states that seek to incentivize BUDM report a range of policy and regulatory barriers to the success of both individual projects and statewide policies. These barriers can stem from physical/logistical causes as well as policy/structural challenges. A summary of key barriers and policy issues follows. Where applicable, case studies of state or regional efforts to overcome these challenges are referenced. Each section concludes with examples of projects that have addressed the challenge, as well as a discussion of suggested approaches, best management practices, and needed improvements.

Matching Supply to Demand

The core task of RSM for beneficial use is to match suitable sediment sources, in the form of dredging projects, with suitable placement sites, in the form of beach nourishment or habitat restoration projects. This presents a fundamental logistical challenge — matching dredge projects with placement projects — which underlies the full range of associated policy and structural challenges regarding how these alignment opportunities are planned and implemented. This section discusses the logistical challenge, while subsequent sections further assess policy and structural problems.

In practice, for a dredging project and a placement project to constitute a good BUDM opportunity, several practical factors must align: sediment suitability, proximity, and timing.

Sediment Suitability

To meet performance requirements, placement projects must source sediment with physical characteristics that fall within the project's engineering criteria. For instance, beach nourishment projects need sand with an appropriate grain size to structurally support the desired beach and dune profile, fines and contaminants below levels that would have adverse impacts on water quality and habitat, and color and composition matching the existing sediment. Marsh elevation projects need sediment with appropriate grain size for construction equipment and the structural integrity of the new platform, and composition must be suitable for the target habitat.



For BUDM to be opportune, a dredging project must be available from within the same watershed/littoral system to produce sediment that meets the needs of a particular placement project. This practical need can be further complicated by institutional barriers. For instance, planning or monitoring programs may not be in place to identify suitable dredge sources (see subsection *Sediment Resources Inventories*, under the Research section below), or sediment that is suitable for one project (e.g., fine-grain sediment suitable for marsh restoration) may not be approvable under a

permitting system designed with other placement needs in mind (e.g., grain size thresholds set for beach nourishment) (see subsection *Design Guidance for Wetland Restoration*, under the Research section below).

Proximity

One of the most significant cost factors in a beneficial use project is fuel consumption by the vessels used to pump sand from the borrow area to the beach. Thus, the farther a borrow area is located from a candidate placement site, the higher the project cost (Elko et al. 2020). The type of equipment required for a particular project's design can further complicate the transportation process (e.g., proximal hydraulic pumping compared to the double handling of sediment necessary with mechanical barge transport), increasing project costs.

In practice, proximity is often the controlling factor in a BUDM project's cost relative to a non-BUDM disposal alternative. Dredge projects supplying sediment from within the watershed/littoral system, which would contribute toward rebalancing the natural sediment budget and restoring degraded natural beach contours or habitats within that system, can be simply too costly to connect with otherwise suitable placement sites if those placement sites are too far from the dredging site.

Institutional barriers can complicate this practical need as well. Dredged sediment was previously treated as waste rather than a valuable resource. This dated perspective still underlies many agency missions and legal authorities, and budgeting practices which inadequately account for cost-savings that might outweigh BUDM alternative costs, as discussed in forthcoming sections.

Timing

Several independent timelines must align for a placement project to be ready to receive sediment from a dredge project at the time the sediment is produced, including planning, funding, and permitting. Each, once secured, requires work to be completed within a finite window as determined by the approving agency's authorities, funding requirements, and/or seasonal or in-water work-closure windows. Aligning these separate windows is harder for project proponents because of long, unpredictable review processes and barriers to interagency coordination (see subsection *Venues for Coordination* below).

Approved projects are sometimes left with narrow timing constraints that leave little leeway for construction delays or adaptive management. Delays can increase project costs or hinder political or public support.

Successes, Solutions and Needed Improvements

Multiple states have used policy tools (regulation, planning funding, guidance, stakeholder engagement) to incentivize BUDM within their jurisdictions. For instance, several states have implemented BUDM requirements through their permitting regulations applicable to some or all dredging projects:

- Louisiana uses statewide planning, placement project funding, and requirements applying to dredging projects to maximize the beneficial use of Mississippi River sediment to combat extensive coastal wetland loss driven by erosion, sea level rise, and subsidence.
- Ohio prohibits open-water disposal of dredged sediment in Lake Erie, and requires dredged sediment to be disposed of via BUDM, upland innovative use, or in a confined disposal facility (CDF).
- North Carolina’s dredge and fill law requires all dredged sediment to be kept in the littoral system.
- Texas requires dredging project proponents to weigh the transport and volume cost of a BUDM placement against the environmental, recreational, hazard mitigation, and economic benefits of the placement project and the quality of the sediment.

Restrictive policies can be controversial, make design difficult, and lead to conflicts between federal government and the states with these requirements on federally compliant placement sites.

Virginia does not require BUDM as a condition to permit dredging activities, but offers a “fast-track” permitting program for eligible BUDM projects.

Other states have also developed tools and partnerships to build a pipeline connecting dredging activity to placement opportunities. For instance, Ohio’s prohibition on open-water dredge disposal creates higher demand for placement opportunities; the state uses the **Sandusky Bay Initiative** (Appendix A) to connect projects with appropriate placement sites and funding opportunities. Maryland has successfully implemented a multidecadal partnership, in collaboration with agencies and community stakeholders, to direct two decades of clean navigation channel sediment to rebuild **Poplar Island** (Appendix A), a heavily-eroded Chesapeake Bay island.

The USACE Natural Infrastructure Opportunities Tool focuses on matching natural infrastructure projects with beneficial use opportunities (USACE 2022b). The portal brings together environmental, geomorphic, and sediment datasets from multiple sources, as well as upcoming USACE projects, and an interface for users to add their resource needs and resource availability. The goal is to assist with natural infrastructure connections and inspire innovative opportunities during the project planning stage.

Interagency Collaboration and Permitting

Planning, funding, and permitting for both dredging and placement projects are multi-year processes, often completed by separate agencies under separate and not necessarily aligned authorities.

USACE navigation improvement projects that involve new work (e.g., harbor deepening), require separate congressional authorization and appropriation for both the feasibility study phase and implementation, a process that can take years. Consequently, these projects often represent once-in-a-decade opportunities to use BUDM to meet sediment needs within the watershed. USACE’s national assessment of navigation needs and the advocacy of state and local nonfederal partners drive project planning and decision-making. USACE Operations and Maintenance (O&M) dredging projects involve ongoing maintenance of these navigation projects after initial construction. O&M projects are intended

to be completed on a regular basis to maintain sufficient channel depths to meet national navigation needs against continual channel infill resulting from updrift watershed runoff and erosion patterns. USACE Headquarters, which prioritizes federal navigation channels across the nation constrained by annual budget levels, takes the lead on planning and decision-making.

Planning and funding for placement projects vary across a broad range of project types and sponsors. Some coastal communities implement established coastal maintenance activities that seek to obtain sediment on a regular basis, driven by state-supported planning or funding programs in some cases. Much beach maintenance activity takes the form of post-storm beach recovery efforts that require access to sediment within months. Wetland restoration projects may be individual efforts (often pursued opportunistically in response to funding availability) or part of a larger regional beach/wetland restoration program developed and implemented over many years by diverse local, state, federal, private, and nonprofit partners.

Historically, separate entities have planned, funded, and implemented these activities as separate efforts. Impacts from navigation projects to downdrift coastal systems were not a consideration until recently. Some adjacent projects (i.e., locally managed eroding beach downdrift of a federally maintained channel) struggle with coordination of dredging and placement today. RSM seeks to align these efforts through watershed/littoral system scale planning and coordination. RSM faces institutional barriers stemming from the separate authorities and structures of dredging and placement decision-making processes.

Leadership and Staff Capacity

Viable project alignment opportunities exist between many dredging and placement needs, but decision-making agencies must be able to identify and pursue BUDM opportunities. Personnel in relevant decision-making agencies must be aware of these opportunities, and have expertise and confidence in RSM principles. Staff across a range of technical capacities, including coastal engineering, environmental assessment, planning, and budgeting are needed to assess potential BUDM opportunities in a critical and timely manner to start viable projects. This requires training and professional development. As staff turns over, new staff must be brought up to speed, imposing a time and training cost to maintain continuity of institutional knowledge.

Multiple agencies described the pressures of staff capacity and the challenges facing staff who must “wear many hats,” of which promoting BUDM opportunities is only one. Some agencies reported a need for more coastal engineers who can effectively assess project proposals and provide technical assistance to local communities. Program size has a significant impact on this barrier. State agencies in larger states and large municipalities have greater staff capacity to pursue project opportunities than smaller states, territories, and local communities.



Multiple states and USACE have identified increasing BUDM as a policy priority. This type of top-down policy setting requires consistency in implementation across all regions.

Because of the multi-year nature of individual BUDM projects, the success of both individual BUDM projects and broader RSM policies is often dependent on the ongoing leadership of individual champions within multiple agencies and institutions that can consistently promote such opportunities both with external partners and within internal decision-making processes. This reliance on the expertise and motivation of key individuals makes BUDM and RSM policies vulnerable to changes in leadership and staff turnover.

Venues for Coordination

Agencies leading and reviewing dredging and placement projects need adequate coordination mechanisms to align separate planning, funding, and permitting processes, as well as adequate authority and staff capacity to maintain participation. This includes both ongoing programmatic venues for project identification and planning, such as statewide planning processes and regional sediment working groups, as well as project-level coordination mechanisms such as joint review processes.

Ongoing programmatic coordination is important for several reasons, including identification of dredging/placement alignment opportunities, sharing data and priorities, mutual understanding of policy needs and capacities, and long-term regional planning and implementation. Sustained effort must be invested in building partnerships between relevant agencies and stakeholders. Challenges facing programmatic coordination mechanisms include the number of staff and organizations involved, staff turnover, and mission alignment. One or more agencies are needed to take the lead in coordinating meetings, which requires funding and additional staff time that may or may not fit under the agency’s primary mission. Limited funding is available for such collaboration processes, and funding through annual grant programs is too unpredictable and applications are too burdensome to rely on such funding to support staff capacity and multi-year efforts.

Participating agencies and stakeholders need staff capacity to regularly participate, while meetings and engagement opportunities need to be sufficiently regular and productive to justify staff time. As participating staff turn over, new participants must be properly trained. Participants must dedicate effort to learning the authorities and capacities of partner programs. Staff from relevant agencies often have limited awareness of the obligations and limitations of other agencies involved in the process.

Right-sizing the programmatic engagement is itself a challenge. A broad range of institutions must be involved to adequately coordinate important planning, funding, and permitting decisions. If not enough relevant agencies and stakeholders participate, the programmatic engagement process will not be able to effectively influence regional decision making. However, the more organizations are involved, the more effort must be dedicated to finding alignment and common needs across diverse missions, authorities, and capacities (finding the niche), and the more difficult group logistics become.

In addition to programmatic coordination, adequate project-level mechanisms are needed for coordination across agencies with roles in the design, development, funding, and review of individual projects. This category includes partnered project efforts (e.g., co-funded and co-managed projects) as well as joint permit review processes. Challenges facing coordinated project development and review processes include all of those discussed above affecting ongoing planning processes. Additionally, barriers confronting project-level coordination include rapid and overlapping timelines for project development and implementation, funding applications, and permit review.

Project Identification and Long-Term Planning

A multi-agency process is necessary to maintain situational awareness of the watershed/littoral system's dredging, beach maintenance, and ecosystem restoration/enhancement needs to identify and connect BUDM opportunities. This includes both a tracking process — mapping platforms, project and placement site inventories, site suitability tools, and cost estimates — as well as sustainable venues to communicate these needs in a timely fashion aligned with each participant's respective decision making and budgeting process. Dredging, beach management, and habitat officials need training on the planning tools available from their peers in other sectors. Planning tools require time and investment to maintain in the long term.

Respondents highlighted the level of detailed information needed for timely planning as a barrier for project identification efforts. In particular, cost estimates necessary for budgetary decision-making and information about potential environmental impacts are difficult to develop at early project development stages, but are necessary for effective regional planning and for ensuring appropriate staff. More resources are needed to develop this information cost-effectively, and participating agencies face constraints in finding flexibility to make decisions based on limited information, including through phased project development where appropriate.

Other challenges facing long term RSM planning include identifying and developing relationships with littoral landowners (federal and state lands, local communities, land trusts and NGOs, private landowners), selecting locations to minimize private property acquisition.

Place, Culture, Justice, and Equity

Local decision-makers working in under-resourced jurisdictions face barriers in getting federal support down to local levels. Some of their biggest challenges include providing cost-shared funds for large projects, incorporating cultural heritage needs into prescriptive project templates, and working with governmental entities and contractors who may have a limited knowledge of sense of place and culture — especially in island communities, where shoreline resources are deeply intertwined with cultural resources. These challenges, along with long funding timelines, funding application review processes that do not always include local reviewers, and reactive (as opposed to proactive) permit processes, tend to delay or harm sediment management projects.

Successes, Solutions and Needed Improvements

Long-term RSM planning requires agencies with separate missions to find common priorities. Agencies participating in the planning process must make an investment of effort and political capital to elevate RSM and BUDM as a priority alongside and in support of separate mandates (e.g., commercial navigation, minimizing water quality impacts, maximizing wetland restoration). As one respondent said: *“Everyone is in agreement that we want to look at beneficial use, but state and federal agencies need to move past doing just pilots and incorporate BUDM into programmatic practice.”*

Effective collaborations enable state and federal partner agencies to overcome policy obstacles that would be difficult, if not impossible, to address individually. For instance, the North Carolina Division of Coastal Management convened three federal and four state regulatory agencies, along with expert support from USACE and NOAA, to address and overcome conflicting resource protection standards for wetland restoration BUDM projects, resulting in the **North Carolina Thin Layer Project Guidance** (Appendix A). Effective collaborations respond rapidly and effectively to emerging opportunities. For instance, the WRDA 2016 Sec. 1122 BUDM pilot program strongly favored project opportunities that were “shovel ready” (able to quickly assemble financial and real estate commitments and obtain necessary authorizations). In South Carolina, the **Crab Bank Restoration Project** (Appendix A) capitalized on nine years of coordination across federal, state, and local stakeholders to implement a project that restored a popular and severely deteriorated site, diverted valuable navigation dredging sediment from an ocean disposal site, and became one of the first of the Sec. 1122 projects to be constructed.

Regional dredge teams in the Great Lakes and New England regions convening multiple states, USACE, and other key federal partners have provided an effective venue to reach consensus on shared needs, track and identify BUDM opportunities, implement projects, and support research and pilot projects to fill data and knowledge gaps (**Great Lakes Dredging Team** [Appendix A]). These successes are paralleled by in-state and cross-state coordination venues like the New York/New Jersey Regional Dredging Team, San Francisco Bay Long Term Management Strategy and Dredged Material Management Office (DMMO), and Mississippi’s Beneficial Use Group.

The Maryland Dredged Material Management Program has successfully implemented a two-decade partnership to provide a steady supply of sediment from maintenance dredging in the state’s primary federal navigation channel to **Poplar Island** (Appendix A), a long-term island (re-)creation project. As the

Poplar Island project concludes, the underlying partnership has built the trust, reliability, and momentum to keep the sediment pipeline flowing, moving on to the next project at Mid-Bay Islands.

Through Interviews and workshops, participants in these dredge teams identified the following characteristics and approaches that help these teams achieve success:

- Build on shared goals and values.
- Set expectations in advance about team goals and participants' authorities and limitations to anticipate and overcome barriers.
- Demonstrate the value of participating so staff can justify the time investment.
- Use the regional group to speak with a unified voice — provide consistent and reliable information to local communities and stakeholders to build trust.
- Prioritize identifying placement opportunities that accommodate multiple or ongoing placements (e.g., single sites with long-term sediment needs or watershed-wide restoration programs).
- Track upcoming and ongoing projects — meet regularly to discuss what is coming down the pipeline.
- Use pilots or research projects to explore alternative approaches where there is an impasse between participating agencies on regulatory or policy interpretations.
- Focus on the future of the coastal system — involve hydrologists, climate modelers, and geomorphologists.
- Use meetings of the group to circulate new research and information.
- Stay open-minded and keep the conversation going to overcome delays and setbacks.

Effective collaborations should reach across multiple areas of responsibility and expertise, convening those who produce the sediment (USACE, port authorities, state departments of transportation), receive the sediment (reserves, natural resource departments, environmental organizations), review projects (coastal and water permittees), as well as local communities and stakeholders (See *Callout Box: Bringing Everyone to the Table*). For example, the **Interstate Island** (Appendix A) BUDM project successfully navigated the planning and permitting processes of two states (Minnesota and Wisconsin) in part through the organizing capacity and project management expertise brought to the table by the Minnesota Land Trust.

Some of the most significant successes highlighted in interviews and workshops came through persistent interagency collaborations convened with the express goal of finding creative, novel opportunities to combine resources, capacities, and funding. For instance, the **Case Study: Seven Mile Island Innovation Lab** brings together both district-level and national USACE personnel, state regulators, environmental nonprofits, and university researchers to fund and pilot experimental designs prioritized by a stakeholder workshop through a “living lab for mud” model. This model has helped numerous habitat projects to move forward rapidly in the first 3.5 years of the partnership.

Planning and tracking tools are important to support sustained and efficient collaboration. For instance, EPA Region 5 developed the Dredged Materials Management Tool to characterize and quantify environmental and social benefits of BUDM projects in the Great Lakes (EPA 2022). Maryland provides

the Beneficial Use: Identifying Locations for Dredge tool, a GIS dataset hosted on the Maryland Coastal Atlas that maps dredging projects, potential restoration projects, distance buffers, and other helpful information to identify BUDM opportunities.

In coming years, USACE Regional Dredged Material Management Plans (RDMMP) will provide another important tool for tracking and prioritizing BUDM opportunities. Mandated in WRDA 2020 Section 125(c), RDMMPs are five-year plans that districts will update annually and will include estimated dredging quantities for each federal navigation project that is expected to be dredged in the ensuing five-year period, an assessment of the dredging needs for the construction or O&M of water resources development projects within the district over five years, and an evaluation of alternatives for dredged sediment placement including BUDM, open-water placement, and placement in CDFs. The alternatives inventory will be provided as a spreadsheet including key site and funding parameters. The plans identify the Federal Standard for existing navigation projects. RDMMPs supplement, and do not replace, the 20-year Dredged Material Management Plans (DMMPs) already developed for individual USACE navigation projects. A key component of WRDA 2020 Section 125 is the requirement for annual stakeholder engagement. If stakeholder engagement identifies a BUDM alternative that costs the same or less than the Federal Standard and retains capacity or has greater benefit, the BUDM alternative can become the Federal Standard via the Beneficial Use Decision Document Integration process (USACE 2022a). At the time of publication, USACE districts are in the early phases of developing RDMMPs.

States and federal partners have implemented a range of best practices to improve interagency coordination on individual project review, including pre-application meetings, single-application joint permit review processes, use of general permits, and use of programmatic analyses applicable to multiple projects/permits (e.g., programmatic environmental impact statements and programmatic biological opinions). States and federal agencies can simplify the review process by providing clear guidance materials and ensuring that publicly available planning tools provide data and outputs in a form applicable to meeting permit requirements.

Most states coordinate internally to develop input from multiple agencies under a single permit authorization (e.g., consulting with the state endangered and threatened species program as part of the wetlands impact permit). Further, many states coordinate with state and federal partners to provide a single point of contact for project applicants (e.g., the Texas General Land Office, Permit Service Center; Michigan Department of EGLE, Water Resources Division). States that have united wetland and water quality management, coastal planning, and sediment management under the same department have benefitted from greater efficiencies planning and reviewing projects. For instance, the Mississippi Department of Marine Resources Office of Coastal Resources Management administers the state's wetlands permit program, BUDM program, and coastal management program. CZMA federal consistency review and Clean Water Act (CWA) WQC also provide helpful platforms for coordination and alignment between federal and state reviews.

Bringing everyone to the table

Interagency collaboration and stakeholder engagement are critical to effective BUDM implementation and require ongoing, transparent, and constructive coordination between both decision makers and stakeholders.

Federal

- USACE
 - Navigation
 - Environmental
 - Flood Risk Management
 - Emergency Management
 - Regulatory
 - Regional Centers of Expertise
 - Institute for Water Resources
 - Engineer Research and Development Center
- EPA
- NOAA National Marine Fisheries Service (NMFS)
- U.S. Fish and Wildlife Service (USFWS)
 - Ecological Services
 - Coastal Program
 - National Wildlife Refuge System
- U.S. Navy
- Bureau of Ocean Energy Management (BOEM)
- U.S. Department of Transportation (USDOT)
- U.S. Geological Survey (USGS)

State

- Regulatory permitting agencies
- State submerged lands authorization agencies
- Agencies managing solid waste
- Natural resource agencies
- Transportation/highway/navigation departments
- Port authorities
- Public lands/parks departments
- Coastal management program (federal consistency)
- Water quality program (CWA 401 WQC)
- Endangered species program
- Historical preservation program
- National Estuarine Research Reserves
- National Estuary Programs

Local

- Local governments (counties, municipalities)
- Homeowners' associations
- Littoral landowners
- Community champions

Non-Government

- Industry: Dredging, consultants, marinas
- NGOs funding/implementing habitat projects
- Land trusts and other conservation groups
- Tribal nations
- Academia, extension programs (e.g., Sea Grant)

Early consultation and flexibility are key to overcoming barriers. For example, the **Piscataqua River Turning Basin Project** (Appendix A) on the Maine/New Hampshire border began dredging in late 2021, generating a once-in-a-decade volume of sand suitable for beach nourishment. USACE New England District was proactive during the planning phase to connect with the states to identify BUDM opportunities; however, despite interest from both states, local concerns about contaminant levels prevented placement on nearby eroding beaches. Fortunately, Massachusetts was able to coordinate with the District and the towns of Newbury and Salisbury to line up permits and funding in time to implement a nearshore placement project to nourish eroding beaches in both towns. By working regionally and collaboratively, a cross-state solution was found for a significant part of valuable sediment generated by the project.

Funding

Costs to USACE, federal partners, states, and local nonfederal sponsors were some of the most common and outcome-determinative barriers identified by interview and workshop participants.

Nonfederal Cost Share and Local Budgetary Processes

State and local governments operate under tight budgets. Limited funding is available to fund new projects and project designers operate under narrow cost constraints. Some states provide grant support for shoreline management projects and planning or administer dredging programs within their state; some placement projects are eligible for funding under certain federal restoration and hazard mitigation programs. Placement projects are also funded through local taxes, bonds, and usage fees. Each funding source imposes its own eligibility and management requirements that can create challenges for project implementation. Further, funding must be obtained and expended within a time window dictated by the source, which may not align well with permit windows and project capacity/availability.

For local governments looking to serve as nonfederal sponsors for USACE navigation projects, compliance with USACE's bonding and real estate requirements can be difficult and may require multiple rounds of approval through elected boards or public process.

Coming up with the nonfederal cost share was the most frequent barrier highlighted for local sponsors. New USACE navigation projects, including deepening or widening of an existing federal navigation channel, as well as other water resource projects and planning and restoration activities under the Continuing Authorities Program (CAP) require a nonfederal sponsor to agree to cover part of the project expense. The cost share split varies depending on the authority for the project. Often match funds cannot be secured.

Federal Standard

Under USACE regulations for dredging project design, the District must designate one sediment disposal alternative, or a combination of alternatives, that represents the least costly alternative consistent with sound engineering practices and meeting the environmental standards established by the CWA 404(b)(1) evaluation process or ocean dumping criteria. 33 CFR § 335.7. USACE will use the Federal

Standard disposal alternative unless a nonfederal sponsor requests a preferred disposal alternative and agrees to cover the cost difference between that and the Federal Standard alternative (the delta cost). If a BUDM alternative is not the Federal Standard for a dredging project, USACE can use a beneficial placement site, but the delta costs must either be paid entirely by the nonfederal sponsor, or cost-shared under existing authorizations. Under the 204(d) CAP, USACE has the option to share the delta cost for a limited number of BUDM projects annually. The Federal Standard is intended to promote cost efficiency, sound engineering, and environmental compliance to protect the taxpayer.

Three key barriers associated with implementation of the Federal Standard include valuation practices that do not account for the value of dredged sediment or cost savings to non-navigation projects, inconsistent practices across divisions and districts, and conflict with state requirements applying to USACE activities.

USACE Engineering Regulation 1105-2-100 (the Planning Guidance Notebook) requires comprehensive cost and benefit calculations when establishing the Federal Standard. However, the deciding principle implemented by the Federal Standard is to establish as the base plan the least costly option that meets minimum requirements, and to treat other alternatives as separable, incremental costs. Where a BUDM option is not the lowest-cost option, it must instead be considered for incremental cost share under separate authorities (e.g., CAP Section 204[d], Section 207).

In past projects, USACE has not consistently considered the full range of comprehensive costs and benefits for dredge disposal options when identifying the Federal Standard option. For example, past projects have not addressed potential cross business-line cost savings possibilities, such as using dredged sediment to support placement projects under the Aquatic Ecosystem Restoration or Flood Risk Management lines. Federal Standard calculations also have not accounted for cost savings to USACE's ongoing maintenance obligations available for maintaining natural or nature-based systems that reduce shoaling and help provide safe navigation. Consequently, dredging costs have historically been assessed in isolation rather than looking at programmatic cost savings opportunities. This trend is in part structural, because it complies with the regulatory language and long-standing interpretation of the Federal Standard policy, and in part attributable to an institutional culture that has traditionally regarded sediment as a waste to be disposed of in the least expensive safe manner, but which today is evolving.

Therefore, BUDM alternatives have systematically been less likely to be designated as the Federal Standard for navigation projects because the per-yard cost for placement is often higher than that for nearby open-water disposal or CDF alternatives. Because financial resources from nonfederal sponsors are tightly limited, BUDM projects which are not designated as the Federal Standard are often not financially feasible.

Application of the Federal Standard is not consistent across Districts. Project management and accounting standards are set at the Headquarters level, but national methodological guidance is broad and provides considerable room for differences in interpretation. In practice, some districts comply with national requirements by taking a proactive and holistic approach to managing sediment resources

within their area of responsibility, while others take a narrower project-by-project approach in meeting Federal Standard requirements.

Implementation of Federal Standard regulations for environmental compliance was a frequently cited barrier to effective coordination by states. The CWA and CZMA set out requirements for federal compliance with state environmental and coastal management standards. USACE uses engineering best practices and federal (USACE and EPA) technical guidance to determine that the disposal alternative designated as the Federal Standard meets federal environmental standards. In some cases where state standards (e.g., sediment testing requirements, water quality best practices, or limits on open-water disposal) are different from federal standards, the disposal alternative designated as the Federal Standard has been inconsistent with state standards. In these cases, Federal Standard regulations require states to provide funding for the cost of compliance. This has resulted in conflict between states and USACE over CWA and CZMA compliance, and in some cases, dredging has been deferred, impacting local, state, and federal economies/budgets and at times leading to litigation.

Institutional Barriers

The USACE water resource funding process is complicated. Projects require separate congressional authorization and appropriation for the feasibility study and construction phases, which can take decades. Annual budgets for maintenance dredging under the navigation O&M business line are historically oversubscribed. Planning and restoration activities under the CAP do not require separate authorization, but their annual budgets are also oversubscribed and only a limited number of projects are implemented each year. These institutional limitations are the root of several barriers to RSM that districts and their partners in state agencies have long contended with, including disincentives to coordinating across business lines, difficulty funding innovative pilot projects, and low prioritization for monitoring.

USACE business lines are planned and budgeted separately. Project and non-project work must fall under and comply with the accounting standards of one business line. Consequently, USACE business lines have not been incentivized to achieve cost savings across navigation, flood and coastal storm damage reduction, environmental restoration, or recreation lines by combining projects through BUDM. Sharing costs across multiple projects or Districts (e.g., splitting mobilization costs) is logistically complicated.



USACE does not often have flexibility under existing authorities and annual budgeting to pursue innovative pilots, which must receive the same separate congressional authorization and appropriation as major projects. The Section 1122 program under WRDA 2016 (as amended under WRDA 2018 and 2020), for instance, constituted a major leap forward in support for innovative

projects by authorizing 35 new pilots, but appropriations have lagged.

USACE projects are generally funded in phases that include planning; engineering and design (PED); construction; O&M; and monitoring. Monitoring is not included in construction costs and is typically not a high budgetary priority. This makes it harder for Districts and nonfederal sponsors to integrate valuable data collection efforts into project designs that could be used for adaptive design practices and improving the state of knowledge of BUDM best practices.

Successes, Solutions and Needed Improvements

USACE, state partners, and local nonfederal partners have achieved numerous successes in balancing, timing, and combining multiple funding sources to achieve shared BUDM priorities. The neighborhood-drive **Kahuna Bay Beach Nourishment Project** (Appendix A) seeks to leverage a combination of a user-funded bond levied via a new overlay district and Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities hazard mitigation grant funding, but still faces challenges. Through its **Enforceable Sediment Policies** (Appendix A), Florida provides additional credit in state restoration funding scores for projects which use BUDM at protected inlets. Through the **Sandusky Bay Initiative** (Appendix A), Ohio has leveraged multiple state, regional, and federal funding sources to implement a pipeline from dredging projects to a menu of wetland habitat creation, in-water shoal and island wetland wave attenuation, living shorelines, dike repair, and stream connection restoration projects.

The Section 1122 program under WRDA 2016 (as amended under WRDA 2020) will provide a great deal of experience for districts and divisions that have not previously had the opportunity to leverage USACE funds for BUDM, such as the **Crab Bank Restoration** (Appendix A), to find efficiencies and future opportunities. Project proponents are collaborating with a broad range of partners who can fill key capacity gaps and leverage alternative funding streams, such as Sea Grant, National Estuarine Research Reserves, National Estuary Programs, and the National Fish and Wildlife Federation.

Although historic implementation of the Federal Standard has been cited as a significant barrier to BUDM, there have been recent developments that provide opportunities for greater flexibility and more comprehensive accounting of the costs and benefits of BUDM alternatives. Sec. 125(a) of WRDA 2020 establishes a national policy to maximize the beneficial use of sediment obtained from USACE projects. Sec. 125(a)(2)(B) requires districts to calculate the economic and environmental benefits of BUDM when calculating the Federal Standard. Additionally, Sec. 125(a)(2)(C) authorizes USACE to use construction or O&M funds toward the federal cost share of the incremental cost for Section 204(d) BUDM projects, and Sec. 125(c) authorizes RDMMPs, discussed in the Interagency Collaboration and Permitting section.

USACE has prioritized moving toward more comprehensive accounting for benefits, costs, and cost savings in water resource project planning and operations. The recent ASA(CW) policy directive on comprehensive documentation of benefits in decision documents (James 2021), as well as the upcoming rulemaking to implement the Principles, Requirements and Guidelines (PR&G) for water resource projects (CEQ 2013), represent opportunities to integrate comprehensive cost-benefit analysis and improved stakeholder engagement into USACE planning and operational practices.

If Districts are provided the guidance and incentive to incorporate the full cost savings opportunities of BUDM alternatives into Federal Standard calculations, BUDM approaches will more often come out as the least-cost alternative. For instance, the DMMP for the Calumet Harbor and River/Chicago Area Waterway System Dredged Material Disposal Facility opted to compare the cost of beneficially reusing clean harbor-dredged sediment to expand a CDF against the cost of open-water disposal plus sourcing upland sediment to expand the CDF (USACE 2020a). This approach made more financial sense for Chicago District because it already needed to expand the CDF. Although the gross cost of dewatering and placing the dredge sediment exceeded that of open-water disposal, its use avoided uncertainty around higher-cost upland sediment sources. Had the District not accounted for these avoided costs, the BUDM alternative likely would not have been the least-cost alternative; instead, the District can mitigate future costs to the navigation line and use its clean sediment as a valuable resource.

Research

Research is needed to address many of the challenges that have been discussed here, particularly those related to limited sediment resources, highlighted in the *National trends* section. In some locations, sediment budgets within littoral cells are not well defined or are outdated. Many beach nourishment projects for example, focus on finding sand, filling the template, and renourishing without much attention to monitoring the fate of eroded sediment. Many research and monitoring studies about placement impacts on existing ecosystems (vegetation reestablishment, invertebrate communities) exist. Results from projects or pilots are often informative but not always directly transferable to different ecosystems and geomorphic settings.

Demonstrating Need

Practitioners lack funding, access, and documentation of data to demonstrate restoration needs. For example, a prioritization of coastal areas for restoration should consider the risk of inundation, erosion, and infiltration from sea level rise, lake level change, and other climate change impacts. Quantification of the economic value of healthy coastal ecosystems (dunes, wetlands, etc.) is also needed for hazard mitigation, recreation, sustenance of fisheries and other economic sectors. Existing benefit-cost analyses tend to focus only on damage reduction in dollars when determining the benefit of a proposed project, not on diverse co-benefits that may be difficult to account for in a traditional economic framework.

Design Guidance for Wetland Restoration

Research is needed to determine appropriate sediment thickness and physical sediment characteristics for marsh and wetland restoration (*Sediment Suitability* subsection in Matching Supply to Demand).

Sediment Resources Inventories

Stakeholders expressed interest in more detailed inventories and mapping tools to identify sediment resources in nearshore (state) and offshore (federal) waters, as well as in previously used disposal areas. Details could include the physical sediment characteristics of these resources including suitability

analyses or “prescreen.” If the characteristics of sediment resources were better known, areas in need of sediment could be matched to the available sediment resources. This would aid in the planning and coordination process for BUDM and traditional beach nourishment projects.

Additionally, more detailed and vetted inventories would help preserve sand resources for future use in shoreline stabilization projects. For example, as wind energy development continues offshore, nationally vetted inventories can help agencies determine appropriate transmission corridors that do not cross scarce sediment resources. This has not been done proactively in the Gulf. As a result, pipelines and transmission lines conflict with sand resources.

Sediment Dynamics

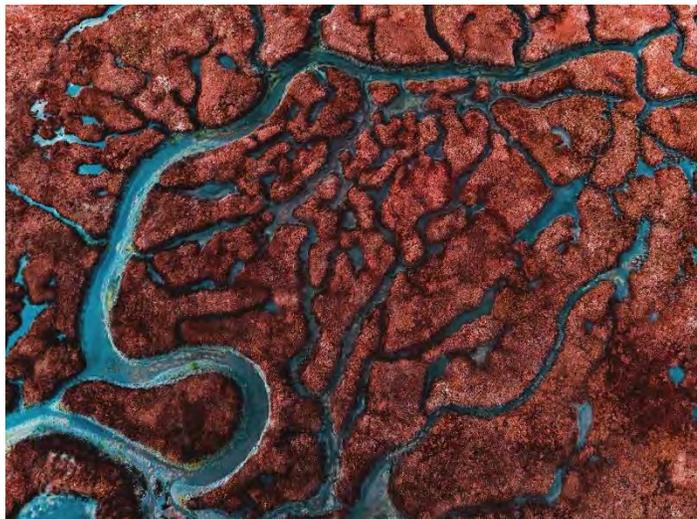
A better understanding of and accounting for sediment transport throughout the coastal system will become increasingly important over the next several decades. If priority and some resources were dedicated to this need, sediment budgets could be completed with minimal data collection in many locations through the compilation and analysis of existing physical sediment processes data. Significant investment in large-scale, long-term field studies, as well as laboratory studies, would certainly help to address this challenge, adding needed data to quantify and understand longshore sediment transport and offshore sediment losses.

Environmental Impacts

A comprehensive annotated bibliography of benthic infaunal research studies organized by region, as they relate to dredge and fill activities is needed. This will help standardize regional design and performance standards for project review (Rosov et al. 2016).

Sediment Suitability Regulations

Challenges in determining suitability requirements for the placement of dredged sediment was a major motivation for this work. A cost-effective, accurate, and efficient method to determine suitability does not exist. During the workshops, it was stated: *“In the absence of additional scientific research, [compatibility analysis] will remain a qualitative process of reviewing quantitative data.”* Quantitative sediment data can be obtained from site plans, boring logs, grain size and color analysis, and sediment sieve data analysis. The latter provides grain-size distribution, gradation curves, and frequency distribution curves. These data are obtained from the dredging location (channel or borrow area) as well as the beach. As detailed in the National trends section,



physical parameters are used to determine sediment suitability relative to compatibility, water quality, and contaminants.

While the composition of sediment is altered during the dredging and placement process, typically reducing the percentage of fine-grained sediment, there is not an accepted methodology to predict these changes (Maglio et al. 2020). Stakeholders in all regions highlighted the need for “fate of fines” research. Regulators have traditionally applied the conservative assumption of 0% fine-sediment loss during the dredging and placement process. However, according to some studies, a 50% to 75% loss in fines occurs during the hydraulic dredging process (i.e., from the in-situ sources to the post-construction fill) (Maglio et al. 2015; Ousley and Coor 2015; Coor and Ousley 2019). Several fate-of-fines studies have been conducted (e.g., Warrick 2012) but additional research is needed to better understand, predict, and share information about this change in fines due to dredging and placement. This can lead to more informed sediment regulations that encourage BUDM.

Due to the cost and time needed to collect and analyze sediment data, generalizations have helped expedite the planning process for maintenance dredging projects. State and federal project planners and regulators commonly adopt general rules of thumb for the physical grain size parameters on either side of a boundary in frequently dredged channels. Seaward of this boundary, sediment is considered suitable for shoreline placement projects. Inland of the boundary, sediment is generally disposed offshore or in a confined disposal area. The boundaries were based on sediment data from a certain time period in the past (e.g., initial project authorization of new work [i.e., virgin] sediments) that may or may not have had the same physical conditions, regulations, or state-of-the-art of science as today. A challenge arises when dredged sediment (e.g., from the reach just inland of the arbitrary boundary) is not tested and is disposed offshore or in a confined upland disposal area. It is unknown whether sediment from this reach may have potential for BUDM opportunities if it were tested. As knowledge of the fate of fines during the dredging process and the temporal evolution of contaminants improves, these assumptions must be revisited for optimal sediment management. The USACE South Atlantic Coastal Study SAND study recommends that states “*use and expand regulatory flexibility to increase utilization of additional sediment types*” (Taylor Engineering 2020).

Successes, Solutions and Needed Improvements

There are many examples of projects that have addressed research needs. USACE recently completed a more than \$20 million feasibility study looking at Coastal Storm Risk Management mitigation and ecosystem restoration measures along the coast of TX (USACE 2021). The Texas General Land Office (GLO) is working on its second update to the Texas Coastal Resiliency Master Plan (TCRMP 2019). The GLO is performing a multi-million-dollar sand transport modeling project to enhance coastal zone management through improved knowledge of nearshore coastal processes (Maglio et al. 2020).

The GLO has partnered with the U.S. Bureau of Ocean and Energy Management (BOEM) to perform one-mile-grid geophysical surveys across the offshore state and adjacent portions of federal waters. This is an ongoing multi-year and several million-dollar investment to broadly inventory available offshore resources (Maglio et al. 2020). On a national scale, BOEM provides the Marine Mineral Information

Service, a comprehensive online tool that consolidates information about national offshore sediment resources (BOEM 2022).

The USACE SAD requires at least 1.3 billion yd³ of sand to support the 50-year sand needs; however, economically viable long-term sources are limited with sand shortages documented in every state in SAD and in Puerto Rico (Taylor Engineering 2020). Many states also maintain their own sediment databases (e.g., the Regional Offshore Sand Source Inventory [FDEP 2022]), but additional geotechnical data, increased spatial coverage, and more recent information is needed.

Numerous studies have proven that the quantification of changes in the percentage of fines content from the dredged site or borrow area to the placement area is possible. The results of these studies need to be implemented into practice in the form of more flexible physical sediment requirements for BUDM projects.

Project Development and Review

The demand for BUDM projects is increasing; however, many state regulatory agencies do not have protocols to permit them. In many cases, the projects may conflict with existing state policies, regulations, and laws. Environmental review requirements designed to avoid or minimize habitat degradation can create challenges for placement project designs, especially wetland habitat creation or island building, that may involve habitat type changes (e.g., open water or submerged aquatic vegetation to tidal marsh or high marsh). Many of the early dredge and fill laws enacted by states were necessary and effective in minimizing the filling of wetlands, for example, for development. Today, these laws can be a deterrent to wetland restoration projects.

Setting Standards

BUDM projects should include clearly defined goals, objectives, performance measures, and success criteria. What are the pre-construction habitat conditions, and how will the project be monitored to determine post-intervention habitat conditions? Establishing criteria through RSM, on a watershed or sediment system scale and across multiple projects, can allow BUDM projects to use dredged sediment opportunistically as it becomes available, meeting agreed-upon criteria, rather than being treated as a convenient option for sediment disposal. However, regulators should ensure close coordination with sediment producers to ensure that these standards are flexible as dredging projects are developed. This will help balance the planning and regulatory requirements with the need to be adaptable based on available sediment volume and project timing.

Integration into the Littoral System

Engineers need to design projects that work with natural hydrodynamics and sediment transport pathways to distribute dredged sediment, allowing nature to assist in sediment dispersal. Innovative placement strategies for wetland restoration are needed. This may involve stepping back to avoid over-engineering when the natural transport patterns are adequate or even superior to controlled outflow. A better understanding of nearshore berm dynamics will also assist with this challenge in open-coast systems.

Contaminant Testing

As mentioned in the National trends section, fine-grained sediments have a greater potential to retain contaminants than sand; therefore, sediment testing is sometimes required if pollutants are a potential concern. Testing requirements typically reflect industrial pollutants known to occur in the region they cover. State requirements intend to limit the placement of contaminated dredged sediment for shoreline projects.

Multiple states reported that they need better information about contaminant testing and thresholds to effectively manage sediment systems in their jurisdictions. Federal guidance on sediment testing for contaminants is outdated (e.g., EPA 2015) and state issued waivers to state regulations for sediment testing are common. They are often based on data from previous tests and/or historic uses. The rationale is that contaminants attach to fine grained sediments so if few fines exist, contaminant levels will be low to nonexistent. Some states base testing requirements on grain size of the sediment to be dredged. For example, in Minnesota, sediment that is greater than or equal to 93% sand is exempt from contaminant testing (Stollenwerk et al. 2014). In New Jersey, contaminant testing is required for beach nourishment sediment less than 90% sand (grain size >0.0625 mm) or if other background information indicates the material may be contaminated. Contaminant testing for sand placement is waived if 90% of the source sand has grain size > 0.0625 mm. N.J.A.C. 7:7 Appendix G, § III-C. In North Carolina, if a navigation project tests “clean” then the state generally does not require additional testing for future maintenance dredging events.

Aligning Authorities and Dealing with Trade-offs

Depending on the jurisdiction, several different federal and state agencies must review the impacts of a BUDM proposal according to separate standards and procedures set in authorizing statutes designed to protect different resources. For instance, on the federal level, USACE implements protections for water quality and navigation under the CWA and Rivers and Harbors Act of 1899, while NOAA Fisheries implements protections for fisheries and critical habitat under the Endangered Species Act, Marine Mammal Protection Act, and others. In some cases, similar divisions of responsibility exist across state agencies. Reviewing agencies have varying flexibility on the permitting conditions they can apply controlling how projects assess, mitigate, and monitor impacts to protected resources.

These alignment needs have created barriers to BUDM projects even where staff subject matter experts within the permitting agencies recognize the effectiveness of the proposal. Respondents particularly highlighted this barrier in the case of allowing or mitigating temporary impacts and in the case of placement project designs, especially wetland habitat creation or island building, that may involve habitat type changes (e.g., open water or submerged aquatic vegetation to tidal marsh or high marsh). For instance, bird island creation is beneficial for threatened and endangered bird species, but it can have negative impacts on essential fish habitat.

Another example is the expectation or regulation that the primary purpose of a BUDM wetlands project is the restoration of impaired wetlands with measurable benefits expected from the addition of

sediment (Appendix A, **NC Thin Layer Project Guidance**). The projects are often required to be not simply for opportunistic disposal or the convenient disposal of dredged sediment; rather, the projects must be thoughtfully designed with the use of dredged sediment as a key component to success. This requirement can be challenging when trying to maximize BUDM opportunities.

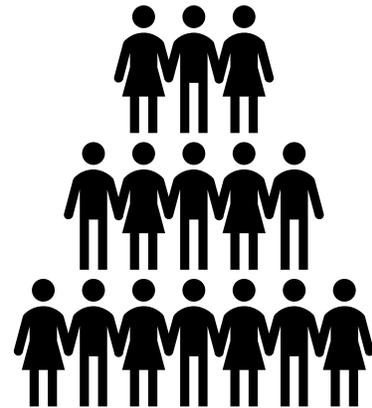
Stakeholders indicated difficulty working within existing statutory requirements (which agencies cannot change), regulatory requirements (which can be slow, expensive, or politically challenging for agencies to change), and guidance to approve projects. This is especially the case where applicable rules were not originally drafted with BUDM in mind, such as dredging rules that treat dredged sediment as waste to be safely contained, beneficial use rules that set statewide standards appropriate for beach nourishment but do not allow fine-sediment placement for wetland restoration, or shoreline erosion control rules designed for hardened structures rather than nature-based solutions. This lack of flexibility can be a challenge during project development, and can hamper agencies' ability to review field modifications, which are common during BUDM projects.

Innovative Designs

Stakeholders highlighted the challenge of implementing BUDM projects using innovative placement techniques or project designs, especially in jurisdictions where BUDM has not been commonly used. One workshop participant described the experience of proposing new or innovative approaches as requiring a “trial and error” approach to federal and state regulatory requirements. Especially in cases where agency reviewers do not have experience with particular project designs, it can be difficult to scope and communicate about impact analysis requirements.

Public Perception and Stakeholder Engagement

BUDM projects, at times, have faced skepticism or opposition from local communities, especially in areas where BUDM has not been historically practiced. Concerns about historical contamination of harbor sediments or impacts of fines on beaches have impacted coordination on placement opportunities, the permit review process for individual projects, as well as the development of regulatory standards. For instance, several Great Lakes states indicated challenges developing community support for increasing BUDM from industrial rivers. New England District, Maine, and New Hampshire faced local opposition to placing clean sediment from the **Piscataqua River Turning Basin** (Appendix A).



Successes, Solutions and Needed Improvements

Reviewing agencies nationwide are increasingly prioritizing BUDM opportunities within their jurisdictions and partnering with resource management agencies, academia, and industry to find scientifically and legally sound solutions to permitting barriers. Interagency collaboration is the first

step. Respondents highlighted efficiency gains from coordinating best-practices such as monthly meetings across agency staff to identify new projects; discuss potential barriers; and prioritize data needs, technical assistance, and community engagement to overcome those barriers.

For example, representatives from the San Francisco Bay Conservation & Development Commission, San Francisco Regional Water Quality Control Board, USACE San Francisco District and EPA coordinate through a virtual, joint dredged material management office to implement the Long-Term Management Strategy for the Placement of Dredged Material, which provides standards and goals including a goal to maximize the use of dredged sediment as a resource.

Interview and workshop participants emphasized that top-down policy priorities, such as increasing the proportion of dredged sediment that is beneficially used, are successful when leadership not only gives staff-level offices a clear goal and directive, but also the flexibility and authority to accomplish it. Staff need the flexibility to undertake new activities within existing authorities and procedures, and approve new techniques with appropriate oversight and monitoring. Staff also need the autonomy to go to new partners (e.g., other agencies, coastal communities) to offer meaningful new ideas with the trust that they have their organization's backing and authority to follow through.

Many states have found innovative and flexible ways to review and authorize appropriate BUDM projects and navigate statutory responsibilities and limitations. For instance, the new **NC Thin Layer Project Guidance** (Appendix A) provides a set of installation standards and monitoring requirements sufficient to meet permitting standards for three federal and four state permitting agencies. Development and commitment to the guidance required flexibility from each participating agency to work within their statutory and regulatory mandate to find a workable solution that will allow effective projects to move forward and maintain protections for coastal resources.

Restoration of the severely eroded **Babes Beach, Galveston, TX** (Appendix A) project was thought to be financially unviable. The Galveston Park Board and USACE Engineering Research and Development Center (ERDC) and the Galveston District partnered on the development of a sand management plan for Galveston Island. The final report completed in early 2015, entitled, "Galveston Island, TX, Sand Management Strategies," provided a road map for science-based public policy decision-making and used RSM practices. The report concluded that BUDM needed to be an integral part of the local management plan for Galveston's beaches, especially when considering the frequency of dredging and the lack of otherwise available sediment.

In Mississippi, dredging projects above a 25,000 yd³ threshold must participate in a statewide BUDM placement-matching program. The program, partnering with USACE Mobile District, the Port of Pascagoula, and the National Fish and Wildlife Federation, was able to take advantage of existing permits and authorizations to divert 3.3 million yd³ of fresh-cut dredged sediment for wetland and island creation at **Round Island** (Appendix A).

By mandating individual inlet management plans as well as a statewide annual inlet report, Florida highlighted the importance and created an increased awareness of RSM to local communities and federal agencies. Florida strongly incentivized BUDM at inlets to evaluation criteria used for state

funding determinations. BUDM projects receive additional credit in scoring (Appendix A, **Florida's Enforceable Sediment Policies**).

Reviewers of successful BUDM projects emphasize that applicants should prepare detailed permit applications to provide agency staff the information they need to meet regulatory requirements. Pre-application meetings are critical opportunities for applicants to clearly articulate what the project will accomplish and how it will get there. Agency staff can use this meeting to identify impacts and inform applicants of the data needed to characterize them. As BUDM projects become more common, reviewers are also requesting more training and information on successful BUDM designs used in similar environments elsewhere in the nation.

Construction, Operations, and Monitoring

Equipment

Stakeholders highlighted a number of practical constraints that have created a backlog of dredging projects, oversubscribed beach nourishment and habitat restoration programs, and made it more challenging to undertake innovative project designs or pilots. Some states report limited capacity of government-owned dredge equipment, both in availability and in performance capabilities (e.g., lacking pump-out capability). In addition, the private dredging fleet will need to improve BUDM placement techniques through new or adaptive types of equipment. Thus far, industry has responded to placement requirements in plans and specifications for BUDM projects. Contractors must continue to develop capacity and equipment for BUDM purposes, and the government must create contracts that allow for adaptation and risk sharing to control costs. Partnering will allow government and industry to collectively meet the demand for new projects.

Monitoring

Participants across the dredging, placement, and permitting sectors frequently highlighted inadequate monitoring as an important barrier. Individual project monitoring is necessary to assess design success and environmental impacts. Comprehensive regional monitoring programs are necessary to inform RSM planning and develop design criteria for permitting standards. As discussed above, monitoring is a funding and research barrier; it is also an operational barrier, requiring common protocol, site access, and staff capacity. Monitoring protocols should be incorporated into project design during the planning process to provide important design/performance data for future projects. More funding and staff capacity is needed to carry out monitoring efforts.

Monitoring information needs to be effectively disseminated to be used to inform planning, permitting, and future project design. Performance documentation, impacts data, and lessons learned from innovative project designs (e.g., TLP methods) is needed.

Successes, Solutions and Needed Improvements

Research on advancing the construction and operations of dredging and placement techniques has explored elevation enhancement, elevated nesting habitat, sediment enrichment, marsh edge protection and enhanced intertidal shallows at the **Seven Mile Island Innovation Lab (SMIL)** (Appendix A). SMIL also adaptively manages its experimental projects using monitoring data. Many collaborative research projects are underway, led by USACE researchers and university partners.

USACE Headquarters is using the **RSM BU Navigation Sediment Placement Database** (Appendix A) to monitor and track progress towards its goal to increase BUDM to 70% by 2030.

A collaborative group of regulatory agencies developed **NC Thin Layer Project Guidance** (Appendix A), which recommends monitoring associated with TLP projects align with *a priori* specified objectives (e.g., restoration versus enhancement). It recommended that the monitoring plan be designed to (1) determine whether the TLP project goals and objectives are met, (2) evaluate whether the project was built as designed (as-built survey), and (3) evaluate the effects of the project on populations of interest (e.g., *Spartina* spp., bird nesting). Monitoring should be conducted at least once before sediment addition and once yearly for a minimum of 5 to 7 years. It also recommends initial sediment elevations be measured immediately following sediment addition, again between 3 and 6 months later to assess sediment compaction, and after hurricanes or other large-scale events as needed.

Similarly, the **Poplar Island, MD** (Appendix A) highlights how monitoring project proposals are reviewed by committees of federal and state natural resource management agencies, local governments, regulatory and transportation agencies, conservation organizations such as the Chesapeake Bay Foundation, and citizens. Participating agencies and organizations, each with its own responsibility, used the Poplar Island project to achieve mutually beneficial goals.

The **Seal Beach National Wildlife Refuge** (Appendix A) developed a regional sea level rise and climate change adaptation strategy that can be used at regular intervals to ensure the long-term sustainability of Pacific Coast marshes. It is a shining example of using best available science and pre- and post-construction monitoring in BUDM projects.

Recommendations

Three sets of recommendations are provided. State and federal recommendations are classified as policy and regulatory, interagency collaborations, funding, and project development and review. research recommendations are also included.

State

The following recommendations address the categories of BUDM barriers and opportunities discussed in this report, providing an overview of successful approaches taken across the nation. The most appropriate tools for a jurisdiction will depend on the state's statutory authorities, capacities, priorities and needs on the ground, and not all solutions will work in all jurisdictions. To help explore options, states are highlighted to provide successful examples of different ways to implement recommended policy tools.

Policy and Regulatory

Incentivize BUDM through funding, regulatory, and planning requirements, testing waivers, streamlined permitting, and clear technical guidance.

- 1) Incentivize dredging projects to beneficially use sediment through permit requirements or priorities.
 - a) Require suitable dredged sediment to be beneficially used (e.g., Florida, Louisiana, Massachusetts, Mississippi, Washington)
 - b) Require a cost/benefit analysis of beneficial use (e.g., Texas)
 - c) Require dredged sediment to be retained in the littoral system (e.g., New York, North Carolina)
 - d) Prohibit open water placement, except when the open water placement is considered BUDM (e.g., Ohio)
 - e) Set limits on in-water placement (e.g., California)
 - f) Apply BUDM requirements to long-term projects/plans (e.g., Pennsylvania)
 - g) Establish a hierarchy of preferred disposal techniques (e.g., Maryland, Minnesota, New Hampshire, Rhode Island)
 - h) Require proposals to consider/assess BUDM options (e.g., Delaware, New York, Virginia)
- 2) Develop multi-year general permits (or partner with USACE to implement programmatic general permits) for BUDM projects (e.g., Michigan, Louisiana).
- 3) Require dredging projects receiving state funding to beneficially use sediment (e.g., Florida, Massachusetts, Texas).
- 4) Ensure that beach nourishment, habitat creation/restoration, and other relevant BUDM designs can be authorized in certain protected areas.
- 5) Establish a hierarchy of preferred sediment sources for placement projects (e.g., Maine).

- 6) Waive testing requirements for sediment above a suitable grain size (e.g., New Jersey, Rhode Island).
- 7) Exclude or exempt dredged materials from solid waste regulations or provide waivers for sediment of suitable characteristics or provide waivers for sediment suitable for limited uses such as cap or fill material (e.g., Minnesota, New York).
- 8) Waive Public Trust land lease fees or other expenses for BUDM projects (e.g., Indiana, Mississippi).
- 9) Incentivize nonstructural solutions for erosion control (e.g., Maryland).
- 10) Use planning authorities to identify sand sources and placement opportunities (e.g., Connecticut, Mississippi).
- 11) Encourage BUDM through policies, technical guidance, reviewer feedback, and public engagement (e.g., Minnesota, New Hampshire, New Jersey, New York, South Carolina, North Carolina, Wisconsin).
- 12) Apply the findings of ongoing fate of fines research, as well as outcomes from the Research recommendations below, to refine borrow area grain size limits and manage limited sediment resources most effectively.

Interagency Collaborations

Proactively and frequently host participatory planning and implementation discussions amongst BUDM champions at a regional scale to discuss pilot projects and permitting efficiency and develop collaborative guidance and plans.

- 13) Meet regularly across relevant sediment producers and users to identify on an ongoing basis dredging needs (sediment supply) and placement opportunities (sediment demand) on the watershed/littoral system scale, working toward a sustainable pipeline connecting supply to demand.
- 14) Invest in standing coordination groups (e.g., regional dredge teams, in-state collaborations).
- 15) Leverage federal partners' in-kind support to convene and support meeting coordination (e.g., USACE, EPA, NOAA).
- 16) Co-develop projects that meet multiple partners' needs to fill knowledge gaps and build trust and experience.

- 17) Provide guidance that covers each relevant reviewing agency’s process, standards, and requirements, including sediment assessment, site assessment, construction, maintenance, and monitoring.
- 18) Participate in the development of the new RDMMPs mandated in WRDA 2020 to prioritize an inventory of BUDM opportunities connected with USACE navigation projects.
- 19) Develop science-based sediment management plans and guidance to allow for flexibility within statutory obligations to manage natural resource impact trade-offs.
- 20) Implement permit efficiency best-practices such as pre-application meetings, single-application joint permit review processes, general permits, and programmatic analyses (e.g., programmatic environmental impact statements and programmatic biological opinions).
- 21) Use interagency partnerships to “speak with one voice” to coastal communities and stakeholders, providing clarity and predictability.

Funding

Collaboratively develop flexible BUDM policies and programs that identify cost saving opportunities, funding sources, and partners.

- 22) Leverage and combine funding sources and restoration authorities to create dredge-to-placement pipelines.
- 23) Develop inventories of dredging needs and placement opportunities and maintain coordination between relevant partners to respond rapidly to funding opportunities.
- 24) Prioritize state support to beach nourishment or wetland creation/restoration projects that benefit under-resourced communities with limited ability to apply for funds.
- 25) Coordinate with USACE districts when identifying and quantifying costs and benefits for Federal Standard calculations to assess cost-savings options for BUDM placement opportunities.
- 26) For one-time or repeated BUDM placement opportunities that may provide a cost savings for a USACE navigation project, work with districts to implement the placement.
- 27) Take advantage of historic federal investments in nature-based solutions, hazard mitigation, and climate adaptation through national grant programs (e.g., NFWF National Coastal Resilience Fund, FEMA Hazard Mitigation Assistance).
- 28) Incorporate monitoring protocols in base placement project designs.
- 29) Collaborate with partners who can fill key capacity gaps and leverage alternative funding streams, such as Sea Grant, National Estuarine Research Reserves, National Estuary Programs, and the National Fish and Wildlife Federation.

Project Development and Review

Implement effective and efficient project development and review procedures through collaborative consultations and improved technical guidance.

- 30) Understand approaches implemented in other coastal states, territories, and regions and how they may translate to or inform best management practices.
- 31) Provide clear technical guidance on permitting requirements, BUDM techniques (e.g., Georgia, Maryland, Michigan, Minnesota, New Jersey, New York, North Carolina, Ohio, Oregon).
- 32) Establish standing meetings across agency staff to identify new projects, discuss potential barriers, and prioritize data needs, technical assistance, and community engagement to overcome those barriers.
- 33) Invest in place-based, culturally sensitive approaches to developing BUDM projects and RSM programs that benefit lower resourced jurisdictions.
- 34) Provide a “one-stop shop” single point of contact for project applicants.
- 35) Use site-suitability modeling and programmatic reviews (e.g., programmatic environmental impact statements and programmatic biological opinions) to “do the work ahead.” Develop information needed for future permit reviews (e.g., California’s “Cutting Green Tape” initiative).
- 36) Pursue BUDM opportunities such as WRDA 2016 Section 1122 projects.

Federal

The following recommendations address the categories of BUDM barriers and opportunities discussed in this report and propose key actions and priorities that federal partners can pursue to strengthen BUDM policies around the nation. Recommendations are focused on USACE, but support and engagement from other federal agencies is critical to accomplishing shared goals.

Policy and Regulatory

Support the USACE goal of increased BUDM, including through developing implementation guidance and procedures to better assess economic and environmental benefits and improve stakeholder engagement.

- 1) Support programs, collaborations, and projects that will help USACE meet its goal of 70% BUDM by 2030 through non-traditional approaches.
- 2) Develop implementation guidance for Sec. 125(a)(2)(B) of WRDA 2020 to provide clear standards for the integration of comprehensive economic and environmental benefits, efficiencies, and impacts of using the dredged sediment for beneficial uses into the determination of the Federal Standard, including, in the case of beneficial use activities that involve more than one water resources development project, the benefits, efficiencies, and impacts that result from the combined activities.
- 3) Provide clear guidance and outreach material to help states, communities, and stakeholders understand the process and submission requirements to submit “requests from a nonfederal interest to consider specific beneficial placement opportunities” under WRDA 2020 Sec. 125(a) and its implementation guidance (Nov. 7, 2022).
- 4) Develop Agency Specific Procedures for the PR&G, as required by WRDA 2020 Section 110, which:
 - a) Prioritize state and local collaboration to develop a robust locally-preferred water resource project alternatives meeting PR&G requirements.
 - b) Ensure collaboration with nonfederal partners when determining best available science and the appropriate level of detail to apply to alternatives analysis.
 - c) Provide for full accounting of all economic, social, and ecological costs and benefits.
 - d) Provide flexibility to maximize benefits across business lines.
 - e) Integrate diversity, equity, inclusion and justice into decision making.
 - f) Expand the use of nature-based solutions.
 - g) Apply the PR&G federal objective of maximizing sustainable economic development, avoiding and minimizing use and impacts to flood-prone areas, and protecting and

restoring the functions of natural systems to all USACE water resource projects, including dredging and placement projects and the calculation of the Federal Standard.

Interagency Collaboration

Sustain and increase interagency collaboration to streamline permitting, manage environmental trade-offs, and renew a national commitment to sediment management.

- 5) Sustain participation in and support of successful interagency groups.
- 6) Partner with state agencies to implement pre-application meetings, single-application joint permit review processes, general permits, and programmatic analyses (e.g., programmatic environmental impact statements and programmatic biological opinions).
- 7) Form a national interagency working group to understand and manage trade-offs between statutory natural resource protection obligations for effective projects that create temporary or permanent impacts (e.g., habitat conversion).
- 8) Implement the sediment resources recommendations of the National Shoreline Management Study toward a renewed national commitment to sediment management:
 - a) Promote early coordination with federal, Tribal Nation, state, and local agencies on dredge and placement activities to ensure all environmental compliance requirements are met and avoid loss of critically important natural and historic resources.
 - b) Manage projects that generate or need sediment on a regional basis to use limited sediment resources more efficiently, by coordinating across federal, Tribal Nation, state, and local agencies and providing incentives for nonfederal and local sponsors to work collaboratively.
 - c) Develop and adopt a systems approach to advanced planning of dredging and beneficial use activities that considers a wider array of factors in decisions on how and where to place dredged sediments, including the consideration of natural and nature-based features.

Funding

Increase opportunities to fund BUDM projects through collaborative valuation and policy determinations and expanded funding mechanisms.

- 9) Develop implementation guidance for WRDA 2020 Section 125(a)(2)(B) that provides improved valuation practices for determining the Federal Standard dredge disposal alternative.
 - a) Ensure that cost savings provided by BUDM alternatives are reflected in the cost used to compare alternatives. Cost savings should not be included as only qualitative factors.

- b) Provide a clear national cost-accounting methodology that comprehensively accounts for cross business-line cost savings, life-cycle cost savings of capacity gained by the placement alternative, and navigation cost savings for maintaining natural or nature-based systems that reduce shoaling and help provide safe navigation.
 - c) Provide guidance and best practices for demonstrating the value of pilot projects that test experimental designs and meet regional information needs.
- 10) Ensure that dredge disposal alternatives identified as the Federal Standard are consistent with state policies and standards applicable to USACE activities under the CWA and CZMA.
 - 11) Make more federal-state pass-through funding sources (e.g., for coastal resilience, habitat restoration, and economic development) eligible for use as nonfederal match, following the model of the Community Development Block Grant program.
 - 12) Explore opportunities to emulate the Global Match program under Section 404 of the Stafford Act for FEMA Hazard Mitigation Assistance, by allowing districts or divisions to spread overmatch across projects within the area of responsibility to help smaller and under-resourced communities to participate on projects requiring nonfederal cost share.
 - 13) Maximize flexibility for underserved communities to meet cost-share obligations by providing guidance and training on match eligibility (in-kind, etc.), promoting programs with favorable rates for Tribes or underserved communities, and providing maximum flexibility in allowing other sources of funding to serve as match.

Project Development and Review

Collaboratively develop and implement Five-Year RDMMPs, increase staff capacity, and explore BUDM opportunities under existing authorities.

- 14) Collaborate with states to develop and implement Five-Year RDMMPs by adding regional placement sites to existing plans, consider environmental and nature-based opportunities for the future, use existing tools and programs (USACE ERDC RSM, EWN, etc.).
- 15) Expand federal agency staff capacity to better manage permit review needs and continue active participation in interagency collaborations.
- 16) Investigate new opportunities to develop pilot projects under existing authorities.

Research

Invest in research to develop cost-effective, accurate, and efficient methods to determine sediment needs, suitability, and to improve our understanding of changes in physical sediment characteristics during the dredging process to inform a regulatory shift toward science-based requirements.

- 1) Quantify sediment needs for national coastal resilience over the next several decades. The analysis should include volumes of sediment needed for not only beaches, but also marshes, estuarine shorelines, and other non-beach coastal habitats.
- 2) Develop more efficient and cost-effective screening for sediment suitability determinations This would improve accessibility to testing for resource-limited dredging projects.
- 3) Develop quantitative tools to estimate placed sediment characteristics based on in-situ samples. Continue work on methods and techniques to estimate these changes (Berkowitz et. al 2019; Coor et. al 2019; Maglio et. al 2019; Smith et. al 2019).
- 4) Develop protocols for data collection, collect additional datasets, and revisit archived sediment samples from dredging projects with a variety of physical and chemical sediment characteristics (e.g., higher fines content) and using different dredging equipment, operations, and placement areas.
- 5) Evaluate the use of predictive models to estimate changes in physical sediment characteristics based on the dredging equipment and operating parameters. Develop general guidelines for these practices (e.g., expected change in sorting, grain size, percentage of fines content, etc.).
- 6) Develop guidelines for detecting sediments that produce mud aggregates.
- 7) Sustain investment in national tools and geodatabases to assist in BUDM project planning in collaboration with states and other federal agencies. **RSM BU Navigation Sediment Placement Database** (Appendix A); USACE EWN Natural Infrastructure Opportunities Tool (USACE 2022b)
- 8) Expand the spatial coverage and add sediment suitability details to sediment resources inventories like the SACCS SAND Database (Taylor Engineering 2020) and BOEM’s Marine Mineral Information Service (BOEM 2022),

Acronyms and Abbreviations

ASA(CW)	Assistant Secretary of the Army for Civil Works
ASBPA	American Shore & and Beach Preservation Association
BOEM	U.S. Bureau of Ocean and Energy Management
BUDM	beneficial use of dredged material
CAP	Continuing Authorities Program
CDF	confined disposal facility
CEQA	California Environmental Quality Act
CNMI	Commonwealth of the Northern Mariana Islands
CSO	Coastal States Organization
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
EGLE	Department of Environment, Great Lakes, and Energy
EPA	U.S. Environmental Protection Agency
GIS	geographic information system
GLDT	Great Lakes Dredging Team
GLO	General Land Office
GOMA	Gulf of Mexico Alliance
GRSMMP	Gulf Regional Sediment Management Master Plan
IWR	Institute for Water Resources
NBS	nature-based solutions
NEPA	National Environmental Policy Act
NOAA	National Oceanic and Atmospheric Administration
O&M	operations and maintenance
PR&G	Principles, Requirements and Guidelines
RDMMP	Regional Dredged Material Management Plans
RSM	Regional Sediment Management
SAD	South Atlantic Division
SAND	Sand Availability and Needs Determination
SCOUP	Sand Compatibility and Opportunistic Use Program
SMIIL	Seven Mile Island Innovation Lab
TLP	thin layer placement
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USVI	U.S. Virgin Islands
WQC	Water Quality Certification

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Federal

- Bureau of Ocean Energy Management
- Environmental Protection Agency
- National Oceanic and Atmospheric Association
- National Park Service
- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- U.S. Geological Survey

Local/State/Regional:

- Alabama Department of Conservation and Natural Resources; Alabama Department of Environmental Management, Coastal Section
- American Samoa Department of Commerce, Coastal Management Program; Department of Port Administration
- California Coastal Commission; California State Coastal Conservancy; San Francisco Bay Conservation and Development Commission
- Connecticut Department of Energy and Environmental Protection, Land and Water Resources Division
- Delaware Department of Natural Resources and Environmental Control, Division of Climate, Coastal and Energy
- Florida Department of Environmental Protection, Coastal Engineering & Geology, and Beaches Inlets and Ports Programs
- Georgia Department of Natural Resources
- Guam Bureau of Statistics and Plans, Coastal Management Program; Guam Environmental Protection Agency
- Hawaii Office of Planning and Sustainable Development, Coastal Zone Management Program; Hawaii Sea Grant; Maui County, Hawaii, Department of Planning
- Illinois Department of Natural Resources, Coastal Management Program Office
- Indiana Department of Environmental Management, Lake Michigan Coastal Program
- Louisiana Coastal Protection and Restoration Authority; Louisiana Department of Natural Resources, Office of Coastal Management
- Maine Department of Marine Resources, Coastal Program; Maine Department of Environmental Protection; Maine Geological Service; City of Portland, Maine

- Maryland Department of the Environment; Maryland Department of Natural Resources, Chesapeake and Coastal Service; Critical Area Commission; Maryland Department of Transportation, Maryland Port Administration
- Massachusetts Executive Office of Energy and Environmental Affairs, Office of Coastal Zone Management
- Michigan Department of Environment, Great Lakes, and Energy, Water Resources Division
- Minnesota Department of Natural Resources, Lake Superior Coastal Program; Minnesota Pollution Control Agency; Duluth Seaway Port Authority
- Mississippi Department of Marine Resources, Office of Coastal Resources Management; Mississippi Department of Environmental Quality
- New Hampshire Department of Environmental Services, Coastal Program
- New Jersey Department of Environmental Protection, Bureau of Climate Resilience Planning, Office of Coastal Engineering, Office of Dredging and Sediment Technology; New Jersey Department of Transportation
- New York State Department of State, Office of Planning, Development & Community Infrastructure; New York State Department of Environmental Conservation
- North Carolina Department of Environmental Quality, Division of Coastal Management; Division of Water Resources
- Commonwealth of the Northern Mariana Islands Bureau of Environmental and Coastal Quality, Division of Coastal Resources Management; Department of Public Lands
- Ohio Department of Natural Resources, Office of Coastal Management; Ohio Environmental Protection Agency, Division of Surface Water
- Oregon Department of Land Conservation and Development, Coastal Management Program
- Pennsylvania Department of Environmental Protection, Compacts and Commissions Office
- Rhode Island Coastal Resources Management Council
- South Carolina Department of Health and Environmental Control, Office of Ocean & Coastal Resource Management
- Texas General Land Office, Coastal Resources Division
- Virginia Department of Environmental Quality, Office of Environmental Impact Review; Virginia Marine Resources Commission
- Washington Department of Ecology, Shorelands & Environmental Assistance Program
- Wisconsin Department of Administration, Coastal Management Program; Wisconsin Department of Natural Resources, Public Trust Waters and Zoning Section; Wisconsin Department of Transportation; Brown County, Wisconsin, Port and Resource Recovery Department; Port of Milwaukee
- Great Lakes Commission
- Mid-Atlantic Regional Council on the Ocean
- Northeast Regional Ocean Council

Nonprofit Organizations

- Alliance for the Great Lakes
- Comer Family Foundation
- Hawaii Shore and Beach Preservation Association
- Manomet

- The Nature Conservancy
- The Water Institute
- The Wetlands Institute

Academia

- California State University
- Georgia Southern University
- Harte Research Institute
- Monmouth University
- Rutgers University
- Stevens Institute of Technology
- Stockton University
- Stony Brook University
- Texas A&M University
- University of Connecticut
- University of Georgia
- University of Hawaii
- University of Las Palmas de Gran Canaria
- University of New Hampshire
- University of New Orleans
- University of Puerto Rico Rio Piedras
- University of Southern Florida
- Virginia Institute of Marine Science

Industry

- ACT Engineers
- Anchor QEA
- APTIM
- BayLand Consultants & Designers Inc.
- CDM Smith
- Coastal Frontiers Corporation
- CVB PW Engineering
- GBA Inc.
- GHD Inc.
- Geosyntec Consultants
- HDR Inc.
- Micronesian Environmental Services
- Moffat & Nichol
- Sea Engineering Inc.
- SBRF, Inc.
- Stantec
- Taylor Engineering

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The regulations summarized in this report, which focuses on federal and state law and does not address Tribal Nation and local laws, are only a start towards understanding the full picture of the context-specific, place-based policy guiding sediment management. An essential element of regional sediment management policy and project planning is to honor Tribal Nations' lived experience, stories, indigenous knowledge, wisdom and intergenerational knowledge of sediment, sand, and coastal processes.

We hope that readers of this report will actively seek out and honor Tribal Nations' perspectives on sediment use and coastal land stewardship in their projects. The Institute for Tribal Environmental Professionals at Northern Arizona University, Native Land Digital a Canadian nonprofit organization, and Climate Science Alliance and the Southwest Climate Adaptation Science Center (SWCASC) Southwest Adaptation Forum (SWAF) provide resources.

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Appendix A

Case Studies

Denoted in the report as bold underline text.

- **California:** Seal Beach National Wildlife Refuge
- **Florida:** Enforceable Sediment Policies
- **Hawaii:** Kahana Bay Proposed Beach Nourishment
- **Maryland:** Poplar Island
- **Massachusetts/New Hampshire:** Piscataqua River Turning Basin
- **Minnesota/Wisconsin:** Interstate Island
- **Mississippi:** Round Island
- **New Jersey:** Seven Mile Island Innovation Lab
- **North Carolina:** Thin Layer Project Guidance
- **Ohio:** Sandusky Bay Initiative
- **South Carolina:** Crab Bank Restoration Sec. 1122 Project
- **Texas:** Babes Beach, Galveston, Texas
- **Great Lakes:** Great Lakes Dredging Team
- **National:** USACE RSM BU Navigation Sediment Placement Database

Seal Beach National Wildlife Refuge:

Permitting a Novel Adaptation Strategy in a Southern California Salt Marsh

The California State Coastal Conservancy, US Fish and Wildlife Service (USFWS), California Department of Fish and Wildlife, and other partners worked on a very successful pilot BUDM project. A layer (8-10 inches) of clean dredged sediments was added to 8 acres of a low elevation salt marsh within the Seal Beach National Wildlife Refuge in Orange County, CA. A rainbow sprayer and end-of-pipe baffle impingement placed approximately 22,000 CY of clean dredged material from the Main Channel West of Sunset/Huntington Harbour. This was one of the first known thin layer placement projects in the US west coast.

The goal of the pilot was to implement and evaluate the success of thin layer placement as a regional sea level rise and climate change adaptation strategy that can be used at regular intervals to ensure the long-term sustainability of Pacific coast marshes. Pre- and post-construction monitoring evaluated both the ecological response and the overall effectiveness of the project. Post-construction monitoring started immediately following dredged material placement and continued for 5 years.

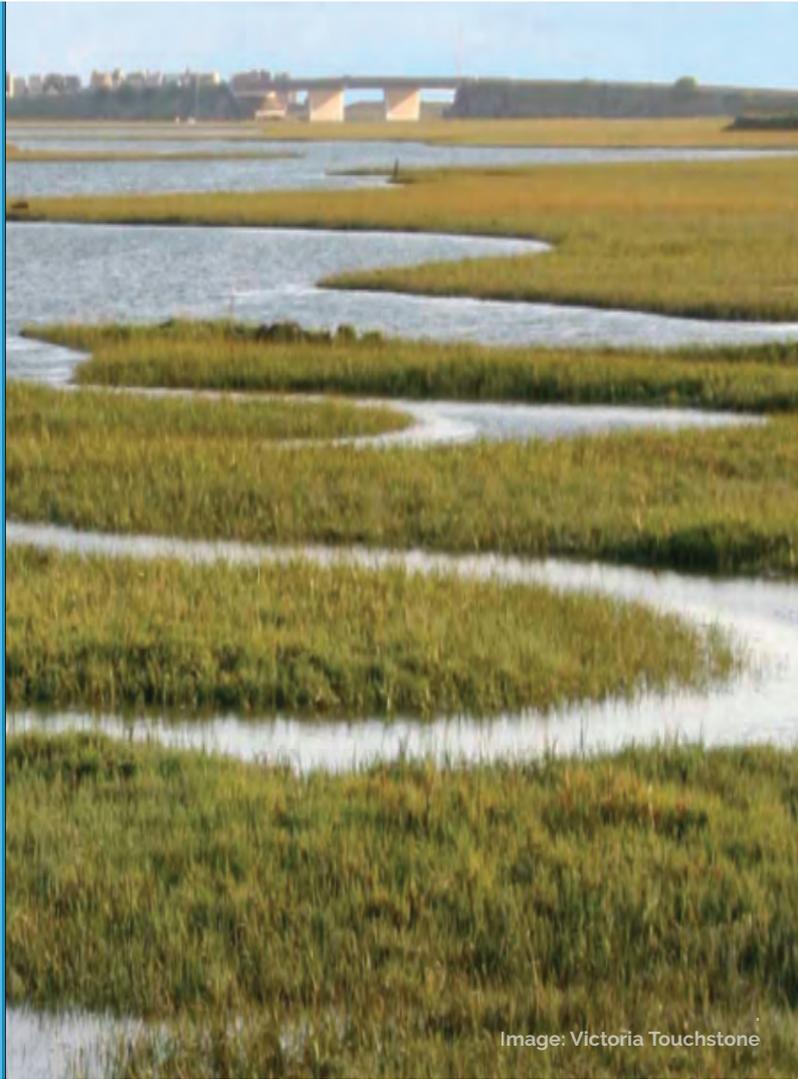


Image: Victoria Touchstone

Partners

USFWS, Orange County Parks, CA Dept. of Fish and Wildlife, California Coastal Conservancy, USACE, Naval Weapons Station Seal Beach, CA State Lands Commission, Southwest Wetlands Interpretive Association, University of California Los Angeles, USGS, California State University Long Beach, Chapman University

Key Information

- **Project type:** Habitat construction/restoration
- **Keywords:** Monitoring; thin-layer placement innovation; research
- **Location:** Seal Beach National Wildlife Refuge
- **Jurisdictions:** CA
- **Funding Source:** CA Dept. of Fish & Wildlife, CA Coastal Conservancy, USFWS, Orange County Parks, and USACE-ERDC.



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring (Pre and post augmentation)

Lessons Learned Callout

Science was used to inform management planning. This included an experimental design with a robust monitoring program and a robust source sediment analysis that informed the project outcomes. Open communication with partners & permitting agencies. The success of the project was based on finding an advocate, obtaining seed funding, and securing major grant funding.

Monitoring included several criteria such as adjacent habitat & protected species monitoring, suspended sediment concentration, elevation, sediment accretion, plant recruitment, carbon sequestration, and others monitoring to paint a full picture of whether the project met its goals or not.

It took time to work through the many methods of determining elevation changes , amount of materials to build sediment barriers, effect of barriers on tidal creek formation & tidal flushing.

The compaction of sediment, grain size, & loss of initial elevation due in part to subsidence was another challenge that needed to be addressed.

Project Overview

Tidal salt marshes dominate this 965-acre refuge called the Seal Beach National Wildlife Refuge (Refuge). The federally endangered light-footed Ridgway's rail also calls this Refuge home. Located within the boundaries of the Naval Weapons Station, the Refuge is administered by the US Fish and Wildlife Service as part of the National Wildlife Refuge System.

In 2007, partners came together to develop the USFWS Comprehensive Conservation Plan. This plan identified novel approaches to protect its endangered species such as BUDM. This was a comprehensive effort that required a review of all of the data, issues, and several meetings with all of the Refuge stakeholders.

Once Refuge stakeholders helped select the strategy, sediment source, and thickness, and a conceptual design was put in place, it was time to bring in partners. Word was spread at meetings and conferences. They found an advocate staff from a funding agency, California State Coastal Conservancy (SCC). SCC provided seed funding for construction & monitoring of the project (\$600,000). The total cost of project construction and long term biological and physical monitoring was \$3,305,554. The project team submitted grants, met with regulators, developed permit applications, and identified the correct scientists to address all monitoring requirements before the project was finalized.

Timeline:

2012 - Comprehensive Conservation Plan completed with multiple resource agency involvement

2013 - Sea-level rise studies continue

2014 - Refuge & Orange County agree on sediment source

2014 - Coordination with permitting agencies

2015 - Grant funding (CDFW, CSCC, FWS); pre-augmentation monitoring of physical and biological conditions

2016 - Project construction

2016 - 2021 Post augmentation monitoring of physical and biological conditions

2021 - Final monitoring reports, lessons learned



A thin layer (8-10 inches) of clean dredged sediments was added to 8 acres of a low elevation salt marsh within the Seal Beach National Wildlife Refuge in Orange County, CA.

Image Credit: Evyan Borgnis Sloane, Victoria Touchstone

Funding Source

The cost of project construction and long term biological and physical monitoring is \$3,305,554, which was obtained from the following agencies: Orange County Parks, CA Dept. of Fish & Wildlife, CA Coastal Conservancy, USFWS, Orange County Parks, and USACE-ERDC.

Additional Links

Seal Beach National Wildlife Refuge, Thin Layer Placement Project Sheet:

https://tlp.el.erdc.dren.mil/wp-content/uploads/2020/09/Project-Sheet_Seal-Beach-NWR_final.pdf

Seal Beach National Wildlife Refuge, Thin Layer Saltmarsh Sediment Augmentation Project:

https://dornsife.usc.edu/assets/sites/291/docs/CoSMoS/Seal_Beach_NWR_Salt_Marsh_Sediment_Augmentation_Project.pdf

Enhancing marsh elevation using sediment augmentation: A case study from southern California, USA (2021, Shore & Beach, 89(4), 21-32.):

<https://asbpa.org/publications/shore-and-beach/shore-beach-in-2021-vol-89/enhancing-marsh-elevation-using-sediment-augmentation-a-case-study-from-southern-california-usa/>

Sediment Placement Regulations of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

State of Florida's enforceable sediment policies: Sand Rule and Inlet Management Plans

The state of Florida has adopted enforceable sediment management policies to require RSM and BUDM. Fla. Stat. 161.142(5) requires that beach quality sand from federal navigation projects be placed on or nearby adjacent eroding beaches. State-mandated Inlet Management Plans provide sediment budgets, maintenance dredging schedules, and sediment bypass volumes for all of Florida's inlets. The "Sand Rule" was the first in the nation to specify the criteria for sand placed on the state's beaches for the protection of the environmental functions of Florida's beaches. Very similar versions of this rule have been adopted by other states and federal agencies. These plans and rules highlight Florida's legislative and policy commitment to RSM and BUDM.



St. Marys River Entrance being dredged by a Manson hopper dredge to bypass material south to Fernandina Beach.

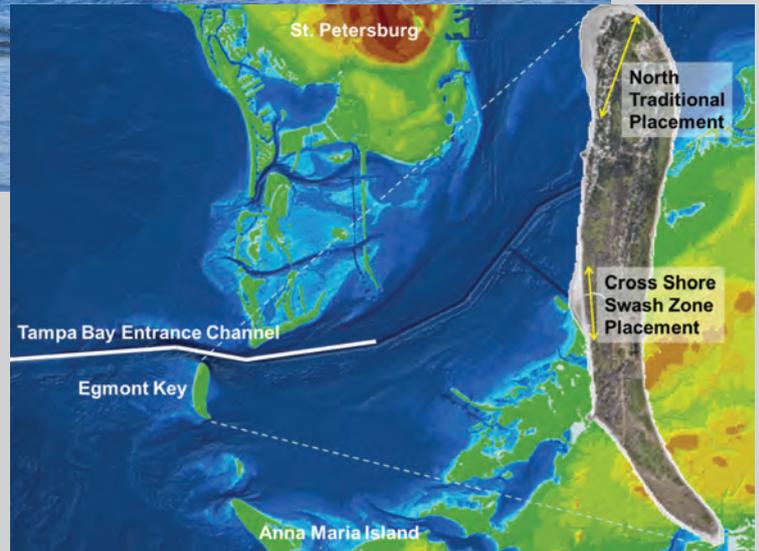


Photo by Lindsay Brantley (DEP), March 2022

Partners

Department of Environmental Protection, Division of Water Resource Management, local governments, state agencies, federal government and the private sector

Key Information

- **Project type:** Regulatory planning and design guidelines with enforceable policies
- **Keywords:** shoreline protection; beach nourishment; sand; fines; maintenance dredging; regulation/guidance
- **Location:** Coastal FL
- **Jurisdictions:** FL
- **Funding Source:** N/A



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring

Project Overview

In addition to the individual inlet management plans, Section 161.143 (5) Florida Statutes (F.S.), also requires that FDEP update and maintain an annual inlet report on its website concerning the extent to which each inlet project has succeeded in balancing the sediment budget of the inlet and adjacent beaches and in mitigating the inlet's erosive effects on adjacent beaches. The report must estimate the quantity of sediment bypassed, transferred, or otherwise placed on adjacent eroding beaches, or in such beaches' nearshore area, for the purpose of offsetting the erosive effects of inlets on the beaches of this state.

This state Annual Inlet Report includes the individual inlet management plan's (IMP) adoption year, IMP updated year, annual bypass numbers by year, bypass objective, annualized volume, cumulative volume, cumulative objective, surplus/deficit volume and the percentage of the bypass objective met. The Annual Inlet Report highlights the surplus and/or deficit of material that is being bypassed on an annual basis to each side of an inlet that is actively managed. The report includes a bar graph for each inlet that has bypass numbers to be shown.

The FDEP created the Sand Rule, Florida Administrative Code 62B-41.007(2)(j) and (k), in 1992 and amended the Rule in 2001, which specifies the criteria for sand placed on the state's beaches. The Sand Rule requires that material used for beach nourishment be similar in grain size distribution to the native or existing beach; additionally, fine sediment, defined by the percentage of material passing the #230 U.S. Standard Sieve (silt and clay sized particles), must comprise 5% or less of beach nourishment material. Material obtained from maintenance of navigation channels allows 10% fines or less for beneficial use/placement on the beach and 20% fines or less for beneficial use/placement in the nearshore. To address the research gap on sediment characteristic changes during the dredging and placement process, FDEP has made exceptions to the Sand Rule in special circumstances with severe erosion and low potential for negative resource impacts (e.g. Maglio et al. 2020).

Additional Links

- FDEP Strategic Planning and Coordination Website:
<https://floridadep.gov/rcp/beaches-inlets-ports/content/strategic-planning-and-coordination>

Lessons Learned Callout

By mandating individual inlet management plans, as well as a statewide annual inlet report, the state legislature highlighted the importance and created an increased awareness of inlet management to local communities and federal agencies.

Florida strongly incentivized BUDM at inlets by linking to evaluation criteria used for state funding determinations. BUDM projects receive additional credit in scoring.

Sediment Placement Regulations of U.S. Coastal States and Territories

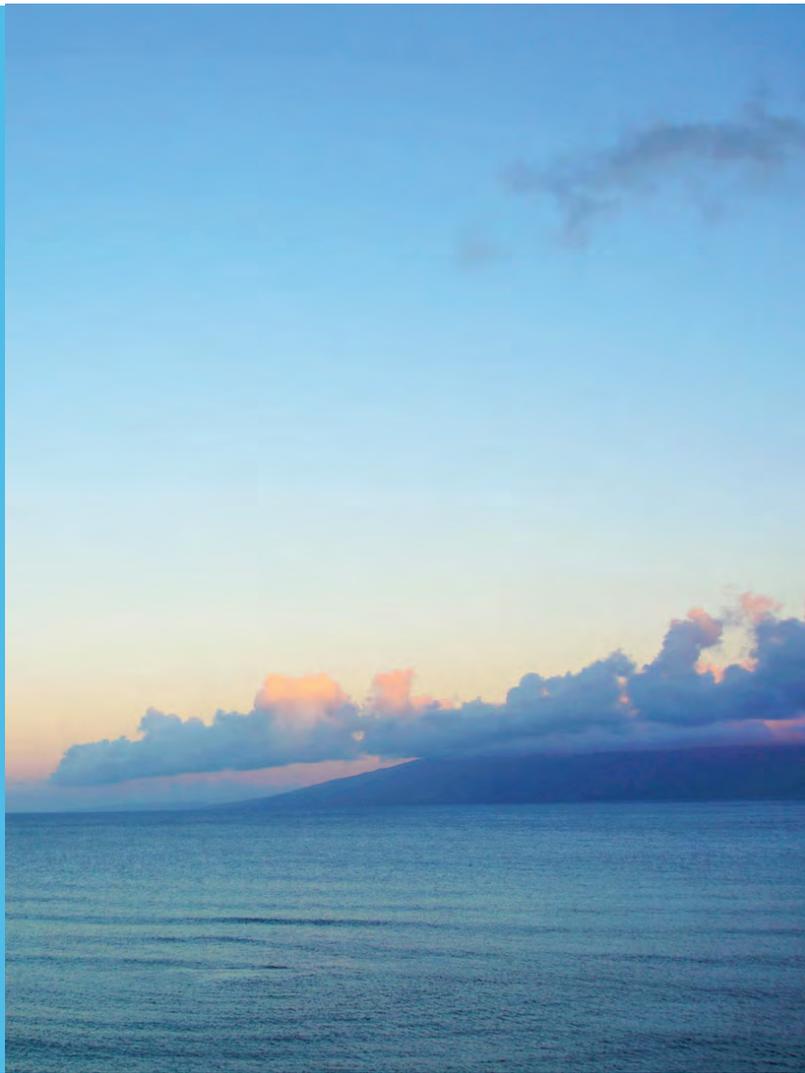


ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

Kahana Bay Proposed Beach Nourishment

Project, Maui, Hawaii

In Kahana Maui, Hawai'i, ten condominium shoreline parcels, comprising nearly 1,000 units along a 3700-foot-long stretch of eroded shoreline, have partnered to lead a 40 million dollar project to protect structures and infrastructure from beach erosion as well as to enhance the degraded shoreline ecosystem. While this project is still in the planning/proposal stage, it is worth highlighting because of parcel to parcel coordination in the conception of a multi-pronged sediment management solution. The project also proposes to utilize private funding, with possible Community Facilities District (CFD) financing, an innovative combination of public and private funds. Sand will be dredged from near-shore areas to replicate the 1975 Kahana Bay shoreline. Shoreline access will be provided as well as community benefits.



Partners

Kahana Bay Steering Committee (KBSC) represents nine condominiums and one kuleana parcel; Oceanit; Hawai'i Sea Grant; Maui County. Department of Planning, District (CFD) financing

Key Information

- **Project type:** Beach nourishment
- **Keywords:** shoreline protection; beach nourishment; sand; public perception; partnership/landowner collective; community financing; private financing.
- **Location:** Kahana Bay, Maui, Hawai'i
- **Jurisdictions:** Kahana Bay Steering Committee (KBSC), Maui County, Hawai'i
- **Funding Source:** Private funding, with possible Community Facilities District (CFD) financing



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring

Lessons Learned

This project unraveled opportunities in utilizing offshore sand to develop a regional scale project that explores public/private financing options to protect 8-to12.

As with regional projects, a lot of thought and intention goes into informing and coordinating 9 condo properties with nearly 1,000 individual owners. Financing a project with so many units at stake can become politicized.

Environmental Impact Statement (EIS) can delay project implementation.



Hawai'i local decision makers are expressing interest in shifting from Hawaii's reactive shoreline permit process to a more proactive permitting process to overcome multiple levels of barriers within funding and permitting mechanisms.

Image Credit: James Buika

Project Overview

Nine condominiums and a kuleana parcel have been experiencing intensifying threats to sea level rise and coastal erosion. This site is within the Maui County Flood Zone, but the properties were built prior to the enactment of setback regulations and the Federal coastal zone management act. Out of concern for the future of these large condominium structures, a group of property owners came together to form the Kahana Bay Steering Committee to explore beach restoration options that span multiple parcels as opposed to an individualized approach to shoreline protection. The project objectives also include enhancement of the ecosystem and improved shoreline access for the community.

Kahana Bay Steering Committee, represents the nine condominiums and one kuleana parcel along the coastline between Kahana Stream and Pohaku Park (0.7 miles). Oceanit, University of Hawai'i Sea Grant College Program and the Maui County Department of Planning provided technical and design assistance and coordination support.

A three-pronged strategy that presents a sustainable and resilient solution to mitigate regional shoreline erosion using sand transported from offshore for beach nourishment and berm enhancement was proposed.

Beach nourishment: Dredging, transporting, and placing between 50,000 and 100,000 cubic yards (cy) of sand from three identified offshore borrow areas to restore the beach to a 1975 target beach width;

Berm enhancement: Using dredged sand and planted with native coastal flora along the backshore of the beach profile will help provide wave run-up protection and serve as a sand reservoir for the beach system; and

To keep the restored sand in place, seven 215-ft rock T-groins, each with approximately 200 ft-wide breakwater sections. In addition, the headland at the north end of the project area will be reinforced with imported boulder stones.

Other benefits include six coves created in the nearshore area, addition of hard substrate that will serve as niche space for marine species, and preserving long-term water quality.

There are two possibilities for public funding of the project, including Maui County Community Facilities District (CFD) and Federal Emergency Management Agency (FEMA) Building Resilient Infrastructure and Communities (BRIC). These two options are currently being pursued.

Kahana: Community Facilities District w/ bond. A hypothetical calculation for an anticipated cost = \$40,000,000 would be as follows:

- 961 owners = \$42,000/unit
- 30 year bond life @5% = \$2,700/year
- Average of \$225/month/owner for 30 years

If funded, the dredging and placement of sand and rock groins will be completed by a private contractor for the Kahana Bay Steering Committee (KBSC) complying with all Federal, State, and county permit conditions to preserve and protect marine resources.

Sediment Placement Regulations of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

Long Term Island Creation at Poplar Island

The Department of Transportation (MDOT) Maryland Port Administration and USACE have implemented a long-term partnership, in collaboration with agencies and community stakeholders, to direct two decades of clean navigation channel sediment to rebuild a heavily-eroded Chesapeake Bay island.



Containment cells at Poplar Island, 2021
Image Credit: Maryland Department of Transportation

Partners

Maryland Department of Transportation – Maryland Port Administration; Maryland Environmental Services; USACE NAB; USFWS; USGS; EPA.

Key Information

- **Project type:** Habitat construction/restoration
- **Keywords:** island creation; wetland creation/restoration; fines; maintenance dredging; partnership
- **Location:** Chesapeake Bay; Talbot County, Maryland
- **Jurisdictions:** MD



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring

Project Overview

A consortium of the MDOT Maryland Port Administration (MPA), USACE, and USFWS, coordinated through the MPA Dredged Material Management Program (DMMP), have collaborated over two decades on a long-term program to transport clean dredged material from the Port of Baltimore and certain reaches of the Baltimore/Chesapeake Bay Navigation Channels 25 miles to rebuild the heavily-eroded Poplar Island.

Poplar Island's extent was surveyed in 1847 to exceed 1,100 acres, and it supported a thriving local community through to the 1920's, when accelerating erosion drove residents off. By 1995, approximately 4 acres of land remained above water. The 2001 Maryland Dredged Material Management Act (DMMA) forbids open-water disposal and establishes a hierarchy for dredged material disposal sites that prefers beneficial use and innovative reuse. Rebuilding Poplar Island to approximately its 1847 size provided a DMMA-compliant island restoration opportunity for the supply of sediment available from the Port of Baltimore.

The program began with the signing of a Chesapeake Bay Ecosystem Management agreement committing to the beneficial use of dredged material to restore island habitat in 1994. Island rebuilding has taken place in multiple phases, starting with construction of >35,000 feet of containment dikes using sand, rock, and stone and placement of ~1,140 acres of fill in 1998-2005, with about half developed as wetlands and half developed as uplands habitat. An expansion was approved in 2007 and construction began in 2016 on a 575 acre expansion and elevation of existing upland dikes, carried out by USACE contractors Great Lakes Dredging Company, H&L Contracting, LLC, and McLean Contracting Company. Funding has come from multiple sources. The final project will consist of approximately 776 acres of tidal wetlands, including low marsh and high marsh habitat, bird nesting islands, and open water ponds, and an upland portion of approximately 829 acres, as well as a 110-acre open water embayment of depth up to 12ft.

The DMMP prioritizes conservation and restoration projects using economic and environmental decision matrices implemented through three Executive, Management, and Citizens committees.

The final expansion of the island was completed in 2022 – the site will receive dredged material until 2032. MDOT MPA and USACE have signed the Design Agreement for the next remote offshore island habitat project at Mid-Bay Islands, authorized in 2014. Mid-Bay will provide 90-95 million cubic yards of dredged material placement capacity, restore priority habitat, and enhance shoreline protection and resiliency for Dorchester County.

Lessons Learned

Multi-Year Planning: The MDOT Maryland Port Administration and USACE Baltimore District have built a long-term partnership to reuse clean navigation sediment for habitat restoration and creation. The enduring working relationship has enabled the partners to agree on a new site further South down the Bay after Poplar Island caps out.

Partner Collaboration: Restoration and monitoring project proposals are reviewed by committees of federal and state natural resource management agencies, local governments, regulatory and transportation agencies, conservation organizations such as the Chesapeake Bay Foundation, and citizens. Participating agencies and organizations, each with its own responsibility, used the Poplar Island project as a way to achieve mutually beneficial goals.

Compliance: Maryland's Dredged Material Management Act prioritizes beneficial reuse and prohibits open-water placement. Novel island-creation projects would not comply with the Act, regardless of habitat benefit. Therefore, the Poplar Island project team has focused on using the historical bounds of a heavily-eroded island to scope the restoration site.

Additional Links

Project Homepage

<http://www.poplarislandrestoration.com/>

EPA/USACE Summary

<https://www.epa.gov/sites/default/files/2015-09/documents/beneficial-use-of-dredged-materials-case-study-of-poplar-island-chesapeake-bay.pdf>

Technical Case Study "Poplar Island: Understanding the development of a beneficial use restoration site"

<https://pubs.er.usgs.gov/publication/70230103> (2022)

Sediment Placement Regulations of U.S. Coastal States and Territories



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Piscataqua River Turning Basin Federal Navigation Improvement Project

The federal navigation improvement project provided a wider turning basin to allow for efficient and safe handling of existing and future commerce at the terminals in the upper reach of the Piscataqua River. During the planning process, the USACE New England District approached neighboring states to identify placement area(s) for the beach quality sand dredged from this project. While some of the sand was placed in the nearshore environment adjacent to eroding beaches in Massachusetts, about 80% of the volume of sand was placed at an EPA approved offshore disposal site. This is a once in a decade opportunity that Maine and New Hampshire unfortunately missed due to contaminant concerns.

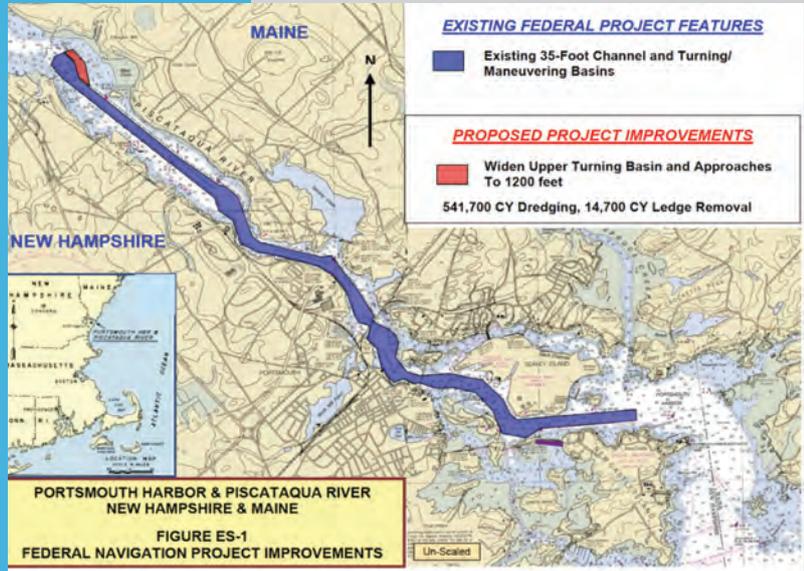


Photo by Bob Boeri, State of MA

Partners

USACE New England District, Massachusetts Office of Coastal Zone Management, New Hampshire Department of Environmental Services

Key Information

- **Project type:** Project Planning
- **Keywords:** shoreline protection; sand; nearshore placement; harbor/channel deepening; public perception
- **Location:** Piscataqua River, NH/ME border; Salisbury and Newbury Beaches, MA
- **Jurisdictions:** MA/NH/ME

Funding Source: Federal O&M Construction Funds

- Matching Supply to Demand
- Interagency Collaboration & Permitting
- Funding
- Research
- Planning, Engineering & Design
- Construction & Operations
- Monitoring

Project Overview

November 26, 2021 - dredging began.

December 8, 2021 - first scows delivered sand to the Newbury nearshore site.

Project completed April 15, 2022.

Placement volumes were as follows:
Isle of Shoals Offshore Disposal Site:
608,885 cubic yards (cy);
Newbury nearshore site: 130,706 cy;
Salisbury nearshore site 12,575 cy;

Eroding beaches in Maine (e.g., Wells Beach) and New Hampshire are not receiving sediment from this project.

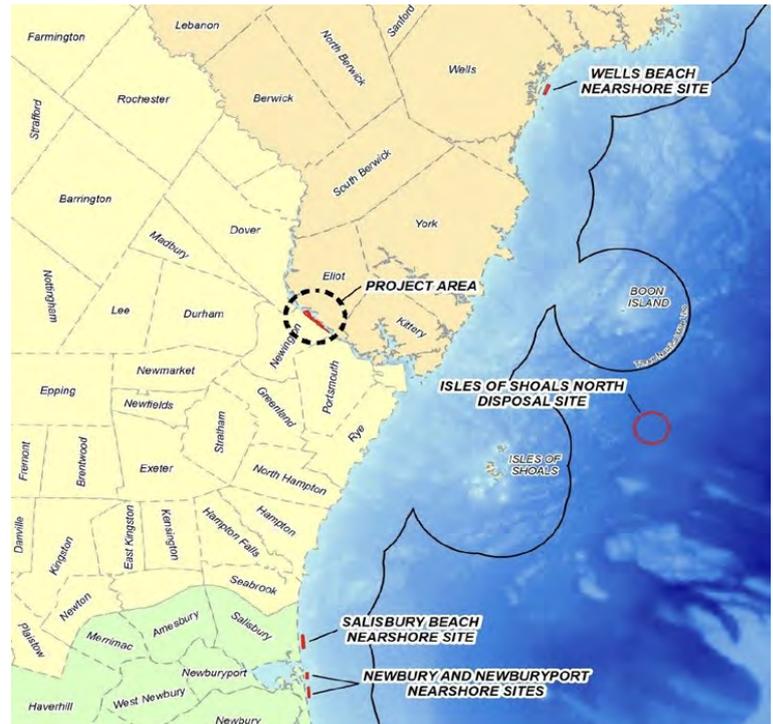


Photo by Bob Boeri, State of MA

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Lessons Learned

Coordination of BUDM projects is challenging. Without proper policies and procedures in place, states that want to accept dredged material sometimes cannot.

Misconception by municipalities and members of the public that because the Piscataqua River is heavily used by commercial vessels and there are several industrial and commercial facilities located along its shores, the material dredged from the river wasn't suitable for beach nourishment.

Sediment Placement Regulations of U.S. Coastal States and Territories



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Interstate Island Avian Habitat Restoration Project

This project straddled two states, and hence had to undergo permitting in two different jurisdictions. The strength of this project is aligning the regulations of two states to get a project implemented within a relatively short term timeframe given the urgent impacts of rising lake levels.



Photo by Carroll Henderson

Partners

The Minnesota Land Trust; Minnesota and Wisconsin Departments of Natural Resources. USEPA; U.S. Fish and Wildlife Services; U.S. Army Corps of Engineers Detroit District

Key Information

- **Project type:** Habitat construction/restoration
- **Keywords:** Wetland creation/restoration; fines; maintenance dredging; nesting grounds
- **Location:** Interstate Island is a small island in Lake Superior that sits directly on the Minnesota and Wisconsin border, running through the Duluth-Superior harbor
- **Jurisdictions:** MN and WI
- **Funding Source:** Great Lakes Restoration Initiative; Great Lakes Fish and Wildlife Restoration Act; Outdoor Heritage Fund, as appropriated by the Minnesota State Legislature and recommended by Lessard Sams Outdoor Heritage Council (LSOHC)



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring

Project Overview

Interstate Island is a Wildlife Management Area in Minnesota and a Wildlife Refuge in Wisconsin. The island straddles the Minnesota and Wisconsin state line between Duluth and Superior near the Blatnik Bridge and is jointly managed by both states.

This restoration project is part of the St. Louis River Area of Concern and was a required action of the Remedial Action Plan. Its completion was necessary for the removal of the Degraded Fish and Wildlife Populations Beneficial Use Impairment (BUI).

This project was unique because it was led by a land trust who provided organizing capacity, had an accelerated timeline of completion, included shorebird centric design elements as well as resilience to rising lake levels, and beneficially used 40,000 cubic yards of sand dredged from the navigation channel by the Army Corps of Engineers.

Permits from multiple different agencies were acquired including the City of Duluth, Minnesota Dept of Natural Resources, Minnesota State Historic Preservation Office, Minnesota Pollution Control Agency, US Army Corps of Engineers, and Wisconsin Department of Natural Resources. A full list of permits can be found here <https://files.dnr.state.mn.us/input/environmentalreview/interstate-island/eaw.pdf> (page 14).

The construction window for this project was tight given that state regulations required avoidance of disturbing nesting habitat starting in late Spring. This conflicted with a cold spring that slowed ice melt, with the Duluth Harbor not opening up until early April. The contractors modeled a nimble, flexible approach and mobilized to complete the construction prior to May 1 which marked the beginning of nesting season.

Lessons Learned

Partnering with a local land trust (Minnesota Land Trust) provided much needed organizing capacity and project management expertise to get multiple agencies on the same page.

Combining the goal of habitat restoration with the delisting of the Area of Concern helped elevate the importance of this initiative. Notably, it was added to the St. Louis River Area of Concern 2019 Remedial Action Plan which brought with it more opportunities to collaborate and align multiple funding sources and initiatives.

Additional Links

<https://www.jfbrennan.com/blog/restoring-habitat-to-save-endangered-species>

<https://www.sehinc.com/portfolio/interstate-island-restoration-and-stabilization>

<https://files.dnr.state.mn.us/input/environmentalreview/interstate-island/rod.pdf>

<https://mnland.org/2022/04/18/interstate-island/>

<https://files.dnr.state.mn.us/input/environmentalreview/interstate-island/eaw.pdf>

<https://www.lccmr.mn.gov/proposals/2019/originals/218-f.pdf>

<https://www.stlouisriver.org/news/slraoc-updates-interstate-island-final-phase-of-restoration>

Sediment Placement Regulations of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

Round Island, Mississippi

Mississippi officials coordinated a multi-agency effort to bolster the uninhabited island of Round Island, Mississippi with recently dredged material. After successful construction of new berms and the addition of 220 acres of island, Round Island grew to be one of Mississippi's largest rookeries and survived Tropical Storm Cindy.



Image Credit: Mississippi Department of Marine Resources

Partners

National Fish and Wildlife Foundation; Mississippi Department of Environmental Quality; Mississippi Department of Marine Resources; United States Army Corps of Engineers; Port of Pascagoula

Key Information

- **Project type:** BUDM via beach nourishment and habitat reconstruction
- **Keywords:** Island creation; wetland creation/restoration
- **Location:** Round Island, Mississippi just outside of Pascagoula, Mississippi
- **Jurisdictions:** MS
- **Funding Source:** National Fish and Wildlife Foundation; CZMA §306; Mississippi Department of Environmental Quality; USACE; Jackson County, Mississippi Port Authority; Gulf Oil Spill Funds



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring

Project Overview

Mississippi officials coordinated a multi-agency effort to bolster the uninhabited island of Round Island, Mississippi with recently dredged material. After successful construction of new berms and the addition of 220 acres of island, Round Island grew to be one of Mississippi's largest rookeries and survived Tropical Storm Cindy.

Coastal erosion, driven by land subsidence and sea level rise, has caused approximately 15,000 acres of land loss on coastal Mississippi over the last 70 years. Round Island, about two miles off Pascagoula, Mississippi, was a relict barrier island along the Mississippi Sound subject to extensive long term erosion, having lost ~96% land area since it was first charted 300 years ago. It was identified in the mid-2000s as a good candidate for BUDM from the nearby Port of Pascagoula, five miles away, as the location represented potential shorebird habitat and extensive 1-3ft shoals remained of the former island's footprint.

An initial project on the site proposed to use dredged sediment from the Port of Pascagoula, but had to be rescoped before dredged material could be delivered. A preliminary sand "training" dike constructed from the shoals remained on site, enclosing the 220-acre design perimeter for the project.

The state revisited the project in 2016 when a new BUDM opportunity arose. Mississippi had in recent years formed the state Beneficial Use Group with the priorities to revitalize beneficial use policies and counteract sediment loss in the coastal zone. The groups work had led to passage of the Coastal Wetlands Protection Act, which established a statewide BUDM placement program and required dredging projects over 2,500cy to participate. When, in 2016, USACE undertook a major navigation project to widen and deepen the Pascagoula Ship Channel from 38ft to 42ft, generating 5 million cy of new cut dredged material, the state BUDM project identified the sediment as suitable for the Round Island project.

Project partners, including the National Fish and Wildlife Foundation, Mississippi Department of Environmental Quality, Mississippi Department of Marine Resources, USACE Mobile District, and the Port of Pascagoula used the existing permits for the 220-acre island restoration project. Work took place in two phases, starting with building up a berm to 12ft elevation adjacent to the existing training dike, followed by pumped distribution of 3.3 million cy of fine silt/clay into the new berm enclosure, with 150 acres placed at elevations mimicking local marsh and a breach left open at the northern end for tidal exchange.

By acting efficiently to use existing authorities and combining funding from multiple sources including Gulf Environmental Benefit Fund funds, project partners were able to revitalize an incomplete restoration project and divert clean, compatible sediment to reclaim eroded land. Bird habitat has taken root on the restored acreage, growing into one of the state's largest with seven shorebird species and more than 3,000 nests, and the project weathered the impacts of Tropical Storm Cindy in 2017. Today, the site contains dredged materials from private, county and federal projects and is still active as a potential BUDM site in the state placement program.

Lessons Learned

Project partners moved nimbly to use existing permits and authorizations to take advantage of a major new deepening project.

In Mississippi, dredging projects over 2,500cy are required to work with the state BU program, administered by the MDMR Office of Coastal Resources Management, to identify BUDM placement sites. The state program facilitates connection with projects that save costs and meet habitat goals.

Additional Links

Information on Mississippi's Beneficial Use Program:

<https://dmr.ms.gov/beneficial-use/>

Article Referencing Round Island:

http://masglp.olemiss.edu/waterlog/pdf/sep20/wl40.3_article2.pdf

NOAA Article about Round Island:

<https://coast.noaa.gov/states/stories/sediment-policies-bring-resilience-and-industry-bonuses.html>

Sediment Placement Regulations of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

Seven Mile Island Innovation Lab (SMIIL)

SMIIL advances our understanding of BUDM techniques through innovative research, collaboration, and practical application. Researchers are using a combination of engineering and natural processes to enhance and protect marshes. SMIIL is the result of a groundbreaking partnership, and a persistent, collaborative approach across USACE & with others that began in the Spring of 2019. SMIIL is based on an international concept pioneered by a Dutch organization that uses a "Living Lab for Mud" to test and demonstrate environmental and societal benefits.

SMIIL goals focus on maintaining safe navigation channels while retaining dredged sediment in the system to benefit natural ecosystems and coastal communities. Research on advancing dredging and placement techniques has explored elevation enhancement, elevated nesting habitat, sediment enrichment, marsh edge protection and enhanced intertidal shallows. SMIIL also adaptively manages their experimental projects using monitoring data. Many collaborative research projects are underway, led by USACE PIs and university partners.

Location and project map of SMIIL highlighted previous and planned sediment placement location sites.



Image Credit: Monica Chasten, USACE NAP

Partners

USACE Philadelphia District (NAP); USACE Engineering Research & Development Center (ERDC) including the Regional Sediment Management and Engineering with Nature Programs; NJ Department of Environmental Protection; The Wetlands Institute; Numerous university researchers

Key Information

- **Project type:** Habitat construction/restoration; partnership
- **Keywords:** island creation; wetland creation restoration; fines; innovation; research; partnership
- **Location:** Seven Mile Island
- **Jurisdictions:** NJ

- Matching Supply to Demand
- Interagency Collaboration & Permitting
- Funding
- Research
- Planning, Engineering & Design
- Construction & Operations
- Monitoring

Project Overview

Seven Mile Island, New Jersey was chosen to host an Innovation Lab due to the presence of existing and historic dredged material placement sites, confined disposal facilities, federal and state channels including the New Jersey Intracoastal Waterway (NJIWW), extensive tidal marshes, a mixture of sandy and muddy sediments, and a rich historic dataset to build upon.

The SMIL encompasses ~24 square miles of tidal marshes, coastal lagoons, tidal channels and bays between the Cape May County mainland and the barrier island communities of Stone Harbor and Avalon, NJ. The NJIWW, a federal channel maintained by the USACE-NAP, bisects the SMIL. The Wetlands Institute sits at the center of the laboratory's significant area of publicly managed lands (Cape May Wetlands Wildlife Management Area) and provides an ideal base of operations. In addition to SMIL's significant ecological value, the location allows collaborators to build upon recent beneficial use placement of NJIWW dredged material and post-construction monitoring efforts, a history of sediment placement and field research, and a well-established field station with over 50 years of relevant research.

For example Gull Island is a test bed for the development of several new dredging and material placement tools that were implemented in fall 2021. The project improved marsh resilience through elevation enhancement, and created marsh edge protection features – an experimental approach to try to intercept breaking waves (predominantly from boat wakes) from damaging the marsh edge. Nearly 65,000 cubic yards of clean dredged sediment enhanced more than 30 acres of marsh, while simultaneously clearing shoaling in the adjacent waterway. The sediment ranged from 40-60% fine-grained material. This project demonstrated that the uncontained distribution of sediment with a large percentage of fines is an effective and cost effective approach to BUDM.

Lessons Learned

SMIL Purpose: Advance and improve dredging and marsh restoration techniques in coastal New Jersey through innovative research, collaboration, knowledge sharing and practical application.

SMIL Goals: Maintaining safe navigation channels while retaining dredged sediment in the system to benefit natural ecosystems and coastal communities

Additional Links

<https://www.nap.usace.army.mil/Missions/Civil-Works/Coastal-Dredging-Beneficial-Use>

<https://wetlandsinstitute.org/smil-2/>

Fact Sheet

<https://wetlandsinstitute.org/wp-content/uploads/2021/08/Seven-Mile-Times-Endless-Summer-2021.pdf>

Sediment Placement Regulations of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

NC Thin Layer Project Guidance

The demand for BUDM projects like TLP is increasing; however, federal and state regulatory agencies do not have clear guidance or protocols for use in permit reviews. Regulators in N.C. are collaboratively and proactively addressing this need by developing permitting guidelines that intended to streamline the process for these new projects, identify suitable sites, and closely monitor project outcomes..

During 2022, guidance for the permitting of “thin layer” placement (TLP) projects on tidal marshes in North Carolina was developed by an interagency working group. The Guidance Document includes a range of site assessment and monitoring protocols that aims to help regulatory agencies and project sponsors determine the suitability of proposed sites, how a project will be monitored, and how impacts and project outcomes will be evaluated. While the guidance has not yet been tested on a proposed project, this proactive example of interagency collaboration is worth monitoring.

Application of dredged material onto degraded salt marsh in Camp Lejeune, North Carolina, as part of 2018-2022 NOAA study.



Photo Credit: NOAA National Centers for Coastal Ocean Science & USFWS

Partners

Partners: NC Division of Coastal Management, U.S. Army Corps of Engineers, National Marine Fisheries Service, U.S. Fish and Wildlife Service, N.C. Division of Marine Fisheries, N.C. Division of Water Resources, N.C. Wildlife Resources Commission, U.S. Army Corps of Engineers Regional Sediment Management Center of Expertise in Jacksonville, FL, and NOAA's National Center for Coastal Ocean Science in Beaufort, NC.

Key Information

- **Project type:** Interagency Collaboration & Permitting
- **Keywords:** wetland creation/restoration; fines; thin-layer placement; regulation/guidance; partnership
- **Location:** Coastal North Carolina
- **Jurisdictions:** NC



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring

Project Overview

Collaborative guidance for project planners was developed in 2022 by agencies that play key roles in permitting coastal projects in North Carolina. Agencies agreed that sediment placement will temporarily impact the existing wetland habitat, and developed criteria to assess and monitor temporary impacts and the long-term condition. The Guidance Document recommends that planners develop quantitative objectives, assess the suitability of the site, and develop a monitoring plan with success criteria before proceeding. The recommended items are important or helpful for project scoping, interagency permitting reviews, and future outcome evaluations.

The guidance recommends that a site assessment be used to determine the extent and likely cause of the degradation of a tidal marsh site of interest, and the likelihood that TLP can produce desired results in terms of the specific restoration goals at the selected site.

Guidance also recommended that monitoring associated with TLP projects align with a priori specified objectives (e.g., restoration vs enhancement). It recommended that the monitoring plan be designed to (1) determine whether the TLP project goals and objectives are met, (2) evaluate whether the project was built as designed (as-built survey), and (3) evaluate the effects of the project on populations of interest (e.g., *Spartina* spp., bird nesting). The guidance recommends that monitoring should be conducted at least once before sediment addition and once yearly for a minimum of five to seven years. It also recommends initial sediment elevations be measured immediately following sediment addition, again between 3-6 months later to assess sediment compaction, and after hurricanes or other large-scale events as needed.

Lessons Learned

Proactively discussing the permitting process for future TLP projects has positioned N.C. to avoid regulatory confusion and delays when the inevitable applications are submitted.

Additional Links

State Website: <https://deq.nc.gov/about/divisions/coastal-management/estuarine-shorelines>

Guidance Document

<https://deq.nc.gov/media/31315/open>

Sediment Placement Regulations of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

Ohio Sandusky Bay Initiative - Cedar Point Causeway Wetland Project

Ohio's Coastal Program has partnered with local, state, and federal partners to implement a coordinated series of wetland restoration and creation projects around Sandusky Bay to achieve ambitious water quality improvement and habitat restoration targets. A pilot project at the Cedar Point Causeway will use dredged material from the Sandusky federal navigation channel to create a new coastal wetland that will provide fish and wildlife habitat and water quality benefits. Participation is incentivized by a new Ohio law that prohibits open water placement of dredged material into the Ohio waters of Lake Erie.

Photo by ODNR Office of Coastal Management



A drone image of the Cedar Point Causeway wetland project in Sandusky Bay looking north toward the Cedar Point Amusement Park in Sandusky, Ohio. The 32 acre nature-based designed retaining structure was constructed during the winter 2021 to 2022 and consists of two cells (north and south) separated by a low-relief center berm.

Partners

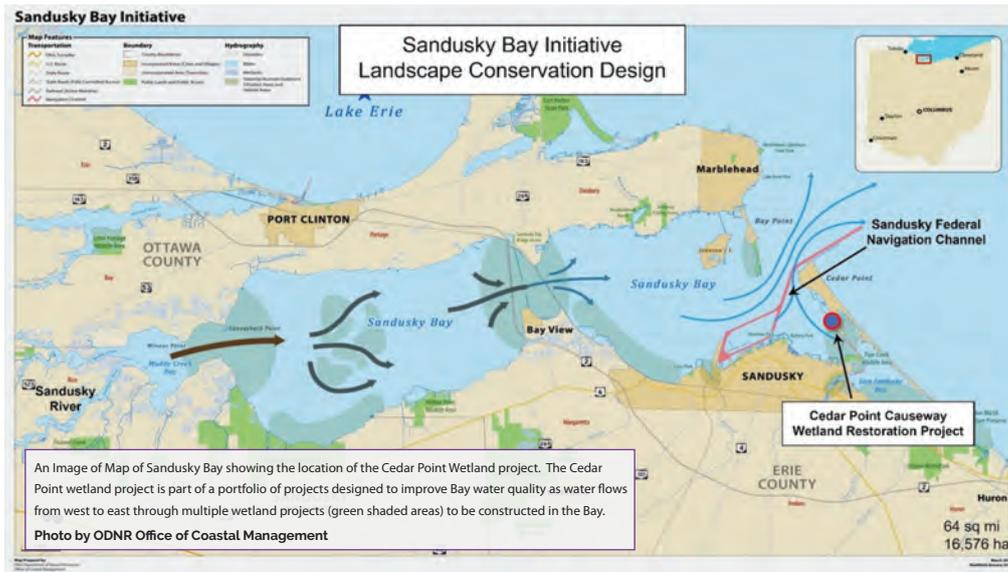
City of Sandusky; Ohio Department of Natural Resources; USACE LRB (Buffalo District); Great Lakes Restoration Initiative

Key Information

- **Project type:** Coastal Wetland Habitat Construction/Restoration
- **Keywords:** Wetland creation; shoreline protection; habitat creation; fines; maintenance dredging; innovation; regulation/guidance; coastal resiliency; partnership
- **Location:** Sandusky, OH
- **Jurisdictions:** OH
- **Funding Source:** (For Cedar Point Causeway Project): Ohio Healthy Lake Erie Fund; Great Lakes Restoration Initiative (For Sandusky Bay Initiative) Ohio's Healthy Lake Erie Fund; H2Ohio Initiative; Great Lakes Restoration Initiative; USACE LRB (Buffalo District)

- Matching Supply to Demand
- Interagency Coordination, Regulatory & Permitting
- Funding
- Research
- Planning, Engineering & Design
- Construction & Operations
- Monitoring

Project Overview



In 2015, Ohio passed new legislation (O.R.C. § 6111.32) prohibiting any open water disposal of dredged material in Lake Erie. Every year, dredging of Ohio's north shore harbors yields nearly 1.5 million tons of sediment which, as of July 2020, must be safely disposed of in a CDF or beneficially reused through upland or littoral placements or industrial applications. This lead-

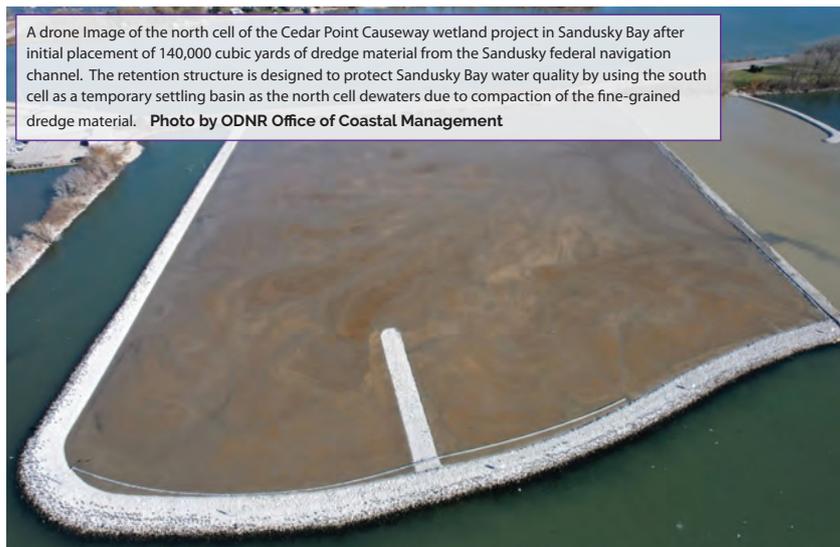
ing-edge policy has catalyzed greater innovation and collaboration across the state to treat dredged material as a valuable resource for the health and economy of coastal Ohio. One example of supply meeting demand comes out of Sandusky Bay.

Through the Sandusky Bay Initiative, the Ohio Coastal Management Program under the Ohio Department of Natural Resources (ODNR) has partnered with the City of Sandusky, Ohio Environmental Protection Agency (Ohio EPA), and United States Army Corps of Engineers (USACE) to create a dredge-to-wetlands program that will protect the shoreline, restore fish and wildlife habitat, attract waterfowl, and improve bay water quality.

Sandusky Bay drains about 1,800 square miles of mostly agricultural land, leading to an accumulation of surplus nutrients like phosphorus in the 64 square mile embayment of Lake Erie. This agricultural runoff as well as urban contaminants has led to an annual cycle of harmful algae blooms, causing impacts to Lake Erie beyond. In order to combat these blooms and improve usability of the Bay, the Sandusky Bay Initiative is coordinating a series of wetland projects across the Bay to create an array of new, shallow wetland buffers with habitat, water quality, and wave attenuation benefits.

The Initiative's first project, a pilot wetlands creation design that is first-of-its-kind in the Great Lakes, has begun work at the Bay's inlet at Cedar Point. The project will receive clean, dewatered dredged material which will be placed in a series of cells sheltered by rock breakwaters and allowed to take shape naturally. The project's 30-acre footprint extends 1,600 feet along the shore and 800 feet into the Bay. Mark Schaffer Excavating and Trucking of Norwalk, Ohio has led construction of the breakwaters and USACE will conduct sediment placement across multiple dredging cycles. Once the cells are filled, the City will grade the projects. Total construction time is expected to take five years, driven by dredging cycles, and the Initiative has plans for 10 years of monitoring.

Planning for the Cedar Point project began in 2017 and construction began in 2022 in time for the year's USACE dredging season. The project is expected to cost \$3.6 million, including \$392,000



A drone image of the north cell of the Cedar Point Causeway wetland project in Sandusky Bay after initial placement of 140,000 cubic yards of dredge material from the Sandusky federal navigation channel. The retention structure is designed to protect Sandusky Bay water quality by using the south cell as a temporary settling basin as the north cell dewateres due to compaction of the fine-grained dredge material. Photo by ODNR Office of Coastal Management

from the Great Lakes Restoration Initiative [to cover USACE placement costs above the federal standard delta costs. State funding for the project was provided by the Ohio's Healthy Lake Erie Fund.

The Cedar Point pilot project is one component of the larger Sandusky Bay Initiative, which will implement a portfolio of wetland restoration and creation projects to improve Sandusky Bay water quality, enhance fish and wildlife habitat, provide recreational opportunities, and enhance coastal resiliency within the Bay. Other projects coordinated through

the Initiative include wetland habitat creation, in-water shoal and barrier island wetland creation restoring wetland connectivity to the Bay and coastal riparian floodplain.

2

<https://lakeerie.ohio.gov/programs-and-projects/dredge-material-program/harbor-2>

3

<https://www.greatlakesnow.org/2019/06/sandusky-bay-initiative-ohio-dnr-plans-massive-multi-project-initiative-to-transform-the-bays-waters/>

4

For more info: <https://coast.noaa.gov/states/stories/sandusky-bay-initiative.html>.

Lessons Learned

In Ohio, the new state law banning open lake placement of dredge sediment has been the catalyst for change within Lake Erie and the surrounding waters. In response to the new legislation, creative solutions designed to and beneficially reuse dredged sediments have been developed and implemented in partnership with federal and state agencies and local communities for this abundance of dredge material have been cultivated through projects benefiting local habitats as well as local cities and towns.

The Ohio Department of Natural Resources (ODNR) is exploring pursuing a strategy to beneficially use dredge material with innovative nature-based design techniques to create and restore lost coastal wetland and fish and wildlife habitat along the Ohio Lake Erie coastline. These projects are the first of their kind in the Great Lakes and will provide valuable "lessons learned" for future restoration efforts in the Great Lakes. The wetland creation and restoration will keep dredge materials from being dumped, provide structural stability to habitats, promote new habitat growth, and clean up water flowing into Lake Erie.

Additional Links

Sandusky Bay Initiative Full Overview:

<https://www.greatlakesnow.org/2019/06/sandusky-bay-initiative-ohio-dnr-plans-massive-multi-project-initiative-to-transform-the-bays-waters/>

NOAA Sandusky Bay Initiative Summary:

<https://coast.noaa.gov/states/stories/sandusky-bay-initiative.html>

Sandusky Bay Initiative Before and After Video:

https://www.youtube.com/watch?v=Sh_Lu-pMvik

Sandusky Harbor Dredge Management

<https://lakeerie.ohio.gov/programs-and-projects/dredge-material-program/harbor-2>

Sandusky Register Article on Cedar Point:

<https://sanduskyregister.com/news/374860/sandusky-begins-work-on-wetlands-project/>

H2Ohio Wetlands Project Overviews:

<https://ohiodnr.gov/discover-and-learn/safety-conservation/about-ODNR/news/H2Ohio-Wetland-Projects-Northwest-Ohio>

Sediment Placement Regulations of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

Crab Bank Restoration, Section 1122 Project, South Carolina

In September 2021, the Crab Bank Seabird Sanctuary in Charleston Harbor was restored with the Army Corps' Charleston District as the lead agency of a collaborative, multi-partner project team. This project highlights one of the successfully constructed projects authorized by Section 1122 of WRDA16. It beneficially placed about 660,000 cy of sediment from the Charleston Harbor Deepening "Post 45" project to restore prime bird nesting habitat.



Before and after aerial photos of Crab Bank during the 2021 restoration project.

Three months elapsed between the photos.



Photo: Norfolk Dredging Company

Partners

- USACE Charleston District,
- SC Coastal Conservation League,
- SC Department of Natural Resources,
- Coastal Expeditions

Key Information

- **Project type:** Interagency Collaboration; Habitat Restoration; Policy Implementation
- **Keywords:**
- **Location:** Charleston Harbor
- **Jurisdictions:** SC
- **Funding Source:** USACE Construction funds for harbor deepening (new work); Foundation raised funding to cover delta cost of construction. The SC Coastal Bird Conservation Program, initially created for the Crab Bank effort, is managed by SCDNR and houses the funding.



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring

Project Overview

Located in the busy Charleston Harbor between the tip of Sullivan's Island and Patriots Point, the restored Crab Bank provides prime nesting habitat above mean high water that benefits a wide variety of nesting and migrating seabird species. Crab Bank was a popular spot for boaters and birds until it began deteriorating over the last decade. Charleston Harbor is almost constantly being dredged but most parts of the harbor do not contain beach compatible sand. The deepening project provided large amounts of sediment to be reused beneficially.

The project was identified as one of the 10 pilot BUDM projects authorized by Section 1122 of WRDA16, and was one of the first of these projects to be constructed.

"Nine years ago, Crab Bank was just a concept, three years ago SCDNR stepped up to make it a reality, and this spring it became vital habitat and nesting grounds for shorebirds. It is rare in an engineer's career to see a project from concept to completion. Seeing this to completion is very rewarding," said Brian Williams, one of the USACE project managers. In November 2021, the project was finished and 32 acres of prime nesting habitat had been created for shorebirds. For the restoration of Crab Bank, Norfolk Dredging used approximately 660,000 cubic yards of compatible material from the Charleston Harbor Deepening "Post 45" project.

Placing the dredged material on Crab Bank was not the least-cost placement method, therefore, a non-federal sponsor was needed to make the concept a reality. The South Carolina Department of Natural Resources (SCDNR) filled that role and shared in the costs of the project. If not for their commitment and partnership, the sandy sediment would have wound up sequestered in the ocean placement site.

• Additional Links

Crab Bank effort, is managed by SCDNR and houses the funding.

<https://www.sccoastalbirds.org/>

Additional Links: SC Coastal Conservation League Crab Bank website:

<https://www.coastalconservation-league.org/projects/crab-bank-restoration/>

Lessons Learned

Partnering with diverse stakeholder groups can help with engagement, expertise, funding, and outreach.

BUDM projects are a way to connect with the local community because dredged sediment disposal is typically not visible to the public (i.e., placed underwater, or in out of the way confined disposal areas). Restoration efforts built with dredged sediment can become a community centerpiece that can be easily highlighted and viewed from afar, in this case, from the Arthur Ravenel Jr. Bridge.

Critical nesting areas are vulnerable to sea level rise, and restoration of this habitat is a desirable outcome of BUDM projects. In this case, beneficially using material from the deepened channel restored 32 acres of prime nesting grounds, giving shorebirds and seabirds much-needed habitat for increasing their populations this spring and those to follow.

Sediment Placement Regulations of U.S. Coastal States and Territories



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Babes Beach Galveston, TX

The Galveston Park Board and the USACE through its Engineer Research and Development Center (ERDC) in Vicksburg, MS., along with the Galveston District partnered on the development of a sand management plan for Galveston Island. The final report completed in early 2015 entitled, "Galveston Island, Texas, Sand Management Strategies" provided a roadmap for science based public policy decision making and utilized Regional Sediment Management (RSM) practices.

The placed sediment was obtained from the periodic maintenance dredging of the Galveston Ship Channel between Bolivar Peninsula and Galveston Island, in the fall of 2015 and winter of 2016. Partners covered the delta cost for beach placement.



Sand dredged from the Houston-Galveston ship channel was used to nourish Babe's Beach in Galveston, TX. Image: USACE SWG

Partners

USACE Galveston District; Galveston Island Park Board of Trustees; City of Galveston Industrial Development Corp.; Texas General Land Office (GLO); Texas Commission on Environmental Quality (RESTORE); Manson Construction.

Key Information

- **Project type:** Habitat restoration
- **Keywords:** Shoreline protection; beach nourishment; sand; maintenance dredging; fines; innovation; partnership; research
- **Location:** Galveston Island
- **Jurisdictions:** TX
- **Funding Source:** TX GLO Coastal Erosion & Planning Response Act (CEPRA); City of Galveston Industrial Development Corporation (IDC) 4B Sales Tax; Texas GLO; Gulf of Mexico Energy Security Act (GOMESA); Resources and Ecosystems Sustainability, Tourist Opportunities, and Revived Economies of the Gulf Coast States Act of 2012 (RESTORE Act)

- Matching Supply to Demand
- Interagency Collaboration & Permitting
- Funding
- Research
- Planning, Engineering & Design
- Construction & Operations
- Monitoring

Project Overview

This portion of coastline was renamed Babe's Beach after former state Senator A.R. "Babe" Schwartz who was an early leader in Texas helping protect the public's right to access the beach, and he was a co-sponsor, advocate, and supporter of the Texas Open Beach Act passed into law in 1959. In 2021, the project restored nearly 10,000 feet to a 300-ft wide berm along the western Galveston seawall using 608,948 cy of beneficially reused sediment from the Houston-Galveston ship channel transported by hopper dredge.

This third cycle of BUDM nourishment was a huge success given that less than 10 years prior, it was believed that restoration of this extremely eroded beach was not financially viable. Previous estimates from various engineering firms and State agencies indicated an approximate cost of \$75 to \$100 million for a 1ft. emergent beach. This information effectively took restoration projects off the table as an option for western seawall beaches. Then in late 2013 that perception started to change. The Galveston Park Board and the USACE through its Engineer Research and Development Center (ERDC) in Vicksburg, MS., along with the Galveston District partnered on the development of a sand management plan for Galveston Island. The final report completed in early 2015 entitled, "Galveston Island, Texas, Sand Management Strategies" provided a roadmap for science based public policy decision making and utilized Regional Sediment Management (RSM) practices.

The report concluded that beneficial use of dredged material (BUDM) needed to be an integral part of the local management plan for Galveston's beaches especially when considering the frequency of dredging and the lack of otherwise available sediment. The report also indicated that sediment volumes necessary to achieve emergent beaches might not be as astronomical as previously thought and included recommendations for the strategic placement of material in locations to take advantage of the existing littoral processes. This led to the first nourishment project in 2015 followed by 2017 and now 2021.

Lessons Learned

The State of Texas does not have quantitative sediment regulations thus allowing for frequent beneficial use projects along the Texas Gulf Coast as local funding allows.

The project is beneficial to all parties involved as placement of material on the beach helps to replenish an extremely limited resource and it increases the life span and capacity of the USACE adjacent dredged material disposal areas. Without beach placement the dredged material would likely be disposed offshore in an area beyond the depth of closure and lost to the littoral system forever.

Collaboratively developed sand management plans can provide a roadmap for science-based public policy decision making and Regional Sediment Management (RSM) practices.

Additional Links

Galveston District Navigation Branch:

<https://www.swg.usace.army.mil/Missions/Navigation>

Link to video time lapse of the project

<https://youtu.be/GZEDkq1Ax68>

Sediment Placement Regulations of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

Great Lakes Dredging Team

The Great Lakes Dredging Team (GLDT) is a partnership of federal and state agencies created to assure that the dredging of U.S. harbors, connecting channels and tributaries is conducted in a timely and cost-effective manner while meeting environmental protection, restoration, and enhancement goals.

The GLDT serves as a forum for both governmental and non-governmental Great Lakes dredging interests to discuss the region's dredging needs. The GLDT meets annually and conducts studies, prepares reports and provides information to its members on dredging and dredging-related activities.



Detroit River Dredging
Taken by Keit Kropf, USACE

Partners

- Great Lakes Commission
- US Army Corps of Engineers Detroit District
- [Click here for full list](#)

Key Information

- **Project type:** Planning/partnership
- **Keywords:** Regulation/guidance; partnership; research
- **Location:** Great Lakes basin
- **Jurisdictions:** All Great Lakes States
- **Funding Source:** US Army Corps of Engineers Detroit District



Matching Supply to Demand



Interagency Collaboration & Permitting



Funding



Research



Planning, Engineering & Design



Construction & Operations



Monitoring

Project Overview

The GLDT is not an advisory body. Its purpose is not to furnish advice to the federal government and the organization does not operate in any official capacity to oversee or direct the federal government. The purpose of the GLDT is to foster an exchange of information among participants regarding various aspects of the dredging process and dredged material management.

Information exchanged via the GLDT assists the U.S Army Corps of Engineers (USACE) in implementing the USACE Environmental Operating Principles, which were developed to ensure USACE missions include integrated sustainable environmental practices.

A highlight of the Great Lakes Dredging Team's efforts is the publication of the Great Lakes Beneficial Use Testing Manual in 2019 and the Environmental Evaluation and Management of Dredged Material for Beneficial Use in 2022.

As an example, in 2021, the Great Lakes Dredging Team hosted the dredging windows symposium in order to better connect best available science with policy. The goal of the symposium was to share methodologies, processes, data sources and criteria used to establish windows in the Lake Michigan basin. This was followed by a discussion among the states, federal agencies and other regional interests involved in windows program policy and implementation to explore the potential for a more coordinated, science-based, collaborative approach to establishing environmental windows. Next steps for this effort include a more formalized report to guide dredging windows policy.

Lessons Learned

Having a large forum with collective institutional knowledge, a long history (since 1994), and active membership from state, federal, local and private entities, has provided a platform for transparent problem solving on technical and policy issues relating to dredging.

By involving state, local, federal, and private entities in the development of reports and technical guidance, the GLDT has been able to develop consensus-based, widely accepted, policy-relevant materials to promote the beneficial use of dredged materials, provided policy guidance on upland testing, dredging windows, and a review of the decision-making process for dredging.

Additional Links

Publications, many of which have informed policy and permitting

<https://www.lre.usace.army.mil/Missions/Great-Lakes-Information/Great-Lakes-Dredging-Team/Publications/>

Beneficial Use Testing Manual for the Great Lakes (widely used by permitting authorities to evaluate compliance under the Clean Water Act 401 water quality certification):

https://www.lre.usace.army.mil/Portals/69/docs/GreatLakesInfo/docs/Great%20Lakes%20Dredging%20Team/Publications/RegionalBeneficialUseManual_Nov2020-draft-final.pdf?ver=5ZrTW3oyUNDHimx-PWwPsg%3d%3d

Sediment Placement Regulations of U.S. Coastal States and Territories

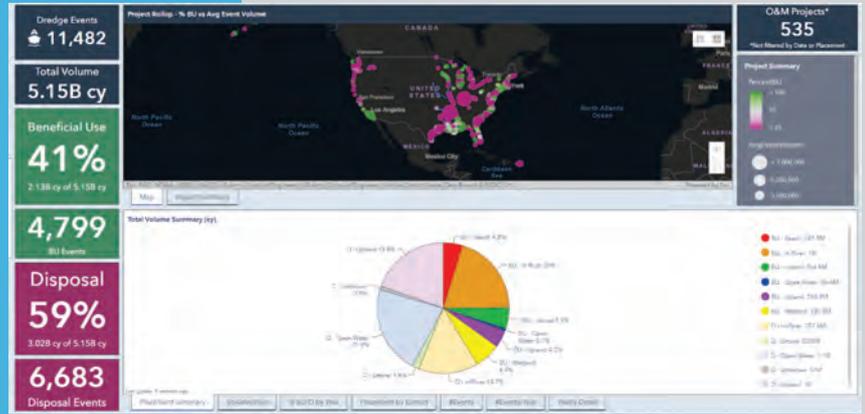


ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

USACE RSM BU Navigation Sediment Placement Database

USACE intends to use [this database](#) to track progress towards its goal to increase BUDM to 70% by 2030. The database is an inventory of Federal navigation projects Nationwide to determine the extent to which RSM goals and BUDM principles have been implemented across USACE Districts at the project and District levels.

Data from the USACE Institute for Water Resources (IWR) Navigation Data Center's Dredging Information System (DIS) were utilized and considerably refined using District managed information and through interviews. There have been nearly 11,500 individual dredging events from 535 navigation projects since 1998. The database describes the type of sediment placement for each, and whether or not it was beneficial. As of 2021, about 40% of the USACE placement has been



USACE RSM Program's Beneficial Use geodatabase illustrating that about 40% of dredged sediment is used beneficially today. Image: USACE RSM Program

Partners

USACE Regional Sediment Management Program; Elko Coastal Consulting, Inc.; APTIM

Key Information

- **Project type:** Mapping for project development and review; monitoring
- **Keywords:** Tool; island creation; wetland creation/restoration; shoreline protection; beach nourishment; harbor/channel deepening; maintenance dredging
- **Location:** National scale
- **Jurisdictions:** All USACE Districts, coastal and inland
- **Funding Source:** USACE Regional Sediment Management Program

- Matching Supply to Demand
- Interagency Collaboration & Permitting
- Funding
- Research
- Planning, Engineering & Design
- Construction & Operations
- Monitoring

Project Overview

This geodatabase of Federal coastal and inland navigation projects was developed to determine the extent to which Regional Sediment Management (RSM) goals have been implemented across the USACE at the project and District levels. The effort quantified 1) the volume of sediment dredged from Federal navigation channels by both contract and USACE-owned dredges, and 2) the placement type and whether sediment was disposed or placed beneficially. The majority of the dredging data were based on the USACE Dredging Information System (DIS) database, but when available, the geodatabase was expanded to include more detailed USACE District-specific data that were not included in the DIS database.

Two datasets were developed in this study: the Nationwide Dataset and the District-Specific and Quality Checked Dataset. The National Dataset is based on statistics extracted from the combined DIS Contract and Government Plant (GP) data. This database is a largely unedited database that combined the two available national datasets. Due to varying degrees of data completeness in these two datasets, this study undertook a data refinement process to improve the information in the National Datasets. This was done through interviews, literature search, and the inclusion of additional District-specific data provided by individual Districts that often represent more detailed information on dredging activities.

The District-specific and Quality Checked database represents a customized, quality-checked database generated by this study. An interactive web-based tool was developed that accesses both datasets and displays them on a national map which can be viewed at the District or Project scale.

Lessons Learned

Systematically inventorying sediment placement types can help track BUDM nationwide.

Additional Links

USACE Navigation Sediment Placement Database:

<https://www.arcgis.com/apps/dashboards/1dg1fcfd05c14569be7d3e67c73e03bc>

USACE RSM Website:

<https://rsm.usace.army.mil/>

USACE IWR Dredging Information System:

<https://ndc.ops.usace.army.mil/dis/>

Sediment Placement Regulations
of U.S. Coastal States and Territories



ASBPA and CSO worked with coastal states, USACE, and key partners on this national-scale comparative policy analysis of BUDM policies and sediment placement regulations. Recommendations and case study highlights were developed through expert interviews and regional practitioner workshops.

Appendix B

State and Territory Profiles

For each jurisdiction, state/territory policies are identified under three categories:

1. Policies encouraging or requiring the beneficial use of dredged sediment;
2. Policies encouraging or requiring the use of natural solutions (as defined by the state, to include dunes, wetlands, or other designs enhancing or integrating into the coastal ecosystem) versus hard structures for erosion control and shoreline stabilization projects; and
3. Policies implementing regional sediment management principles by encouraging or requiring that projects avoid impacts to sediment supply, erosion, or hydrodynamics.

Each policy is coded as “Required” or “Encouraged” based on how it is implemented. For instance, a BUDM policy is coded as “Required” if any dredging project subject to that policy will be required by the state to beneficially use the dredged material unless a specific exemption threshold or condition is met. A BUDM policy which requires BUDM according to the above standard, but only for a subset of dredging projects occurring within the jurisdiction (e.g., requiring BUDM for sediment from a particular waterbody), are marked with “(subset).” A BUDM policy is coded as “Encouraged” if it provides incentives, requires consideration of BUDM options, provides information or support for BUDM projects, etc. Permit regulations which set a preference hierarchy but do not set requirements for choosing one over another are coded as “Encouraged,” unless typical and consistent agency practice is to use that hierarchy as authority to require the preferred option. The same “Required” and “Encouraged” coding is also applied to NBS and hydrodynamics policies.



Alabama

State Profile

Introduction

Dredging and placement projects require environmental permit review by the Department of Environmental Management (ADEM) and authorization to use state-owned submerged lands (referred to as Consent of Use) by the Department of Conservation & Natural Resources State Lands Division (ADCNR-SL) . ADEM has a joint permitting agreement with USACE Mobile District; both agencies concurrently review joint applications for USACE Individual Permits for dredging, beach nourishment, and shoreline stabilization projects. ADEM also coordinates water quality certification and federal consistency review through this permitting process.

Dredged material from the Mobile Harbor federal navigational channel is generally disposed through open water placement or placement in a CDF. Alabama, Mobile District, and federal, academic, and industry partners are working through the Mobile Bay Interagency Working Group (est. 2011) to develop BUDM opportunities, including ongoing planning for the proposed Upper Mobile Bay Beneficial Use Wetland Creation Site.

Permit Table

Permit	Authority	Description
ADEM Permit	ADEM Admin. Code r. 335-8-1-.03.	For fill and placement activities in the coastal zone. Administered by ADEM
Submerged Land Consent of Use	Ala. Admin. Code r. 220-4-.09	For dredging or placement on state-owned submerged lands. Administered by ADCNR-SL.
Water Quality Certification	ADEM Admin. Code ch. 335- 8-2, 335-6-10	Administered by ADEM.
Federal Consistency	ADEM Admin. Code r. 335-8	Administered by ADEM.

Policies

- **BUDM Encouraged:** "To the maximum extent feasible, all beach compatible dredge materials taken from the tidal coastal system shall be placed on beaches or within the nearshore sand system." Ala. Admin. Code r. 220-4-.09(4)(b)(11).
- **BUDM Encouraged:** Approved beach nourishment, shoreline stabilization or marsh creation, restoration or enhancement projects are identified as authorized purposes for dredging and filling activities on State waterbottoms or adjacent wetlands." ADEM Admin. Code r. 335-8-2-.02(1)(a).
- **NBS Required:** "Bulkheads, the placement of rip-rap, and other structural shoreline armament shall not be permitted ... unless it is demonstrated ... that: ... there are no feasible non-structural alternatives available including, but not limited to, preservation and restoration of dunes, beaches, wetlands, submersed grassbeds, and shoreline restoration and nourishment and retreat or abandonment." ADEM Admin. Code r. 335-8-2-.06(1)(d). See also ADEM Admin. Code r. 335-8-2-.06(2), -.08(4)(b).
- **NBS Encouraged:** "To the maximum extent possible, shoreline stabilization should be accomplished by the establishment of appropriate native wetland vegetation. Rip-rap materials, previous interlocking brick systems, filter mats, wave attenuation units and other similar stabilization methods should be utilized in lieu of vertical seawalls wherever feasible." Ala. Admin. Code r. 220-4-.09(4)(b)(6).
- **Hydrodynamics Required:** Applying to structural projects - "Bulkheads, the placement of rip-rap, and other structural shoreline armament shall not be permitted ... unless it is demonstrated ... that: ... the structure will be designed so as to allow the normal hydrologic regime to be maintained in wetland areas." ADEM Admin. Code r. 335-8-2-.06(1)(c).

Physical Sediment Conditions

- **Qualitative:** Placement/fill activities are reviewed for adverse impacts to water quality, habitat resources and public access. ADEM Admin. Code r. 335-8-2-.01. Specific criteria are not provided in regulation for sediment placement projects.

Sand Source

- N/A

Water Quality

Minimize: Material placed on State water bottoms or in wetlands must be free of toxic pollutants in toxic amounts and devoid of sludge or solid waste; reasonable assurance must be provided that applicable water quality standards will be met and adverse impacts to the coastal resources have been reduced to the greatest extent practicable. ADEM Admin. Code div. 335-8-.02(1,5,8).

Endangered Species & Critical Habitat

- **Minimize:** "Activities on state owned submerged lands shall be designed to minimize or eliminate adverse impacts on fish and wildlife habitat. Special attention and consideration shall be given to endangered and threatened species habitat." Ala. Admin. Code r. 220-4-.09(4)(b)(10). See also ADEM Admin. Code r. 335-8-2-.01(2)(b).

Placement Guidelines & Restrictions

- N/A.

Resources

- **Regional Sediment Management (RSM) Strategy for Mobile Bay, Alabama**
<https://erdc-library.erdcdren.mil/jspui/bitstream/11681/5009/1/ERDC-CHL-CHETN-XIV-41.pdf>





Alaska

State Profile

Introduction

The AK Department of Environmental Conservation (DEC) Division of Water serves as the initial point of contact for all dredging projects. This state agency ensures the requirements of 18 AAC 60 (Solid Waste Regulations), 18 AAC 70 (Water Quality Standards), and 18 AAC 75 (Oil and Hazardous Substance Regulations) are met.

ADEC issued guidance for the USACE, municipalities, contractors and other stakeholders that may conduct dredging projects in the state is summarized below.

Permit Table

Permit	Authority	Description
ADEC Permit	18 AAC 15	Dredging permit
Certificate of Reasonable Assurance	18 AAC 15 & 70	Require that the conditions in permits ensure compliance with the Alaska Water Quality Standards (WQS).
Letter of Non Objection	18 AAC 60 & 75	Issued by the Solid Waste and Contaminated Sites (CS) programs
Fish Habitat Permits		Issued by the Alaska Department of Fish and Game (ADF&G)
Small Suction Dredge General Permit (AKG375000)	18 AAC 72	Suction dredges with intake diameters <= 6 inches and horsepower <= 18 (fresh water) or 23 (marine water) or highbankers (aka powers sluices) that discharge to waters of the U.S. must obtain a discharge authorization

Policies

- **BUDM Required:** N/A
- **NBS Encouraged:** N/A
- **Hydrodynamics:** N/A

Physical Sediment Conditions

- **Quantitative:** Metals concentrations are compared to natural background levels for BUDM projects.

Sand Source

- N/A

Water Quality

- State regulations grant DEC the authority to authorize a mixing zone in a permit. An authorized mixing zone must ensure that WQS will be met at all points outside of the mixing zone. 18 AAC 70.240.
- Antidegradation: 18 AAC 70.015 to .016.

Endangered Species & Critical Habitat

- **Minimize:** Projects in wetlands must minimize unavoidable impacts and, depending on the site's wetland category, may need to demonstrate social or economic development or public need. Compensatory mitigation may be required.

Placement Guidelines & Restrictions

- N/A

Resources

- **Dredge Material Guidance:** <https://dec.alaska.gov/spar/csp/guidance-forms/>





American Samoa Territory Profile

Intro

The American Samoa Coastal Management Program (ASCMP) issues the Land Use Permit, pursuant to authority granted the Development Planning Office (DPO) under Public Law 21-35, the American Samoa Coastal Management Act (the Act) of 1990, 24.0501 et seq., ASCA. This is a streamlined land use permit system that integrates the permitting requirements of each of the territorial agencies concerned with environmental management.

Permit Table

Permit	Authority	Description
Land Use Permit	The American Samoa Coastal Management Program	A land use permit application is necessary for all physical project work, including, but not limited to, site preparation, filling, grading, dredging, excavation, and erection or siting of structures.
American Samoa Water Quality Standards	AS Water Quality Standards Admin Rule No. 0012019 §24.0202	401 Water Quality Certification

Policies

- **BUDM Encouraged:** The coastal program encourages beneficial reuse when reviewing projects. A.S.A.C. § 26.02
- **NBS Encouraged:** The coastal program encourages natural and hybrid designs when reviewing coastal erosion control projects. A.S.A.C. § 26.02
- **Hydrodynamics Required:**
 - Required to "prevent negative impacts to receiving waters and ground waters as a result of disruption in natural drainage patterns caused by development." A.S.A.C. § 24.0208.
 - The expectation for land use permit applications is that alterations of the natural shoreline, streams, and hillsides are minimized; and adverse effects on habitats, streams, and drainage are minimized. ASCA §§ 24.0501 et. seq
 - Any project proposed for location within a designated Shoreline Management Area and a shoreline area is required to provide evidence that the effects of shoreline development on natural beach processes shall be minimized. ASCA §§ 24.0501 et. seq

Physical Sediment Conditions

- Case by case

Sand Source

- The taking of sand, gravel, or other aggregates and minerals from the beach and near shore areas is not allowed within a designated Special Management Shoreline Area

Water Quality

- Territorial water quality standards shall be the standards of Territory in the coastal zone. Consistent with these standards, degraded water quality shall be restored to acceptable levels and potential threats to water quality shall be prevented from degrading water quality where feasible. Nonpoint source pollution shall be controlled through implementation of best management practices.

Endangered Species & Critical Habitat

- Coral reefs and other submerged lands shall not be dredged, filled, or otherwise altered or channeled unless it can be demonstrated that there is a public need, there are no feasible, environmentally preferable alternatives, and unless measures are taken to minimize adverse impacts. ASCA §§ 24.0501 et. seq

Placement Guidelines & Restrictions

- Regulated activities include altering wetlands by placing fill or dumping, or depositing of any soil, stones, sand, gravel, mud, aggregate of any kind or garbage, either directly or indirectly, on or in any coastal wetlands. Also regulated is the dredging, excavating or removal of soil, mud, sand, gravel, flora, fauna or aggregate of any kind from any coastal wetlands. ASCA §§ 24.0501 et. seq
- A field guide was designed specifically for contractors in American Samoa involved in clearing, grading, stockpiling, and other earth-moving activities at all construction sites
http://www2.epa.as.gov/sites/default/files/documents/surface/esc_fieldguide_complete_small_11044.pdf

Resources

- <https://www.govinfo.gov/content/pkg/CZIC-khz3600-a46-1994/html/CZIC-khz3600-a46-1994.htm>
- <https://www.doc.as.gov/application-center>
- http://www2.epa.as.gov/sites/default/files/documents/surface/esc_fieldguide_complete_small_11044.pdf





California State Profile

Introduction

California coastlines comprise a wide variety of ecosystems and morphologies, providing opportunities for beneficial use for beach nourishment, habitat restoration, and sea level rise adaptation. The widest beaches in California are often the result of historical harbor dredging and periodic beach nourishment projects.

State agencies with permitting and oversight responsibilities include the California Resources Agency, State Lands Commission, Department of Fish & Game, State Water Board through Regional Water Quality Control Boards (RWQCB), and two coastal management programs, the California Coastal Commission (CCC) and San Francisco Bay Conservation and Development Commission (BCDC).

Statewide and regionally, state agencies have coordinated with USACE San Francisco and Los Angeles Districts and EPA on permitting coordination and regional sediment management initiatives, including regional programs and the Coastal Sediment Management Workgroup tasked with developing a coastwide California Coastal Sediment Management Master Plan.

Dredged material management in the San Francisco Bay region is coordinated through the Long Term Management Strategy for the Placement of Dredged Material (2001), which provides standards and goals including a goal to maximize the use of dredged material as a resource. The program coordinates across state and federal agencies through the Dredged Material Management Office (DMMO), an interagency virtual office composed of representatives of BCDC, San Francisco Bay RWQCB, USACE, and USEPA which provides a joint application process and maintains technical guidance resources.

In Southern California, dredged material management is coordinated through the Southern California Dredged Material Management Team (SC-DMMT) which was modeled after the DMMO to increase coordination and permitting efficiencies. The SC-DMMT is organized by the USACE Los Angeles District, attended by representatives of CCC, the jurisdictionally relevant RWQCB, USEPA, USFWS, and the California Department of Fish and Wildlife (CDFW). Monthly SC-DMMT calls take agenda topic requests from current or prospective applicants and primarily involve the review and discussion of Sampling Analysis Plans (SAPs) and Sampling Analysis Plan Results (SAPR) regarding the suitability of sediment for various placement locations and uses.

The Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (LTMS) Management Plan was adopted in 2000 by the USACE, the USEPA, BCDC, and the San Francisco Bay Regional Water Quality Control Board (Water Board). This voluntary program is highly coordinated and includes goals to maximize BUDM in the Bay Area. Since its inception, over 29 million cubic yards of sediment has been beneficially reused from the maintenance and new work dredging projects, including USACE federal navigation channels, ports, and oil terminals primarily in wetland restoration projects, but also a subtidal restoration project, and port construction projects. Because this program spans all dredging projects in San Francisco Bay, it affords programmatic minimization measures that are environmentally protective, and therefore programmatic consultations have occurred with the resource agencies. Permits for the dredging projects are generally consistent across the regulatory agencies and favor beneficial reuse of sediment over aquatic disposal.

Permit Table

Permit	Authority	Description
Coastal Development Permit	Cal. Code Regs Tit. 14, § 13050 <i>et seq.</i>	For placement within the coastal zone.
BCDC Major Permit	Cal. Code Regs Tit. 14, § 10310 <i>et seq.</i>	For placement within San Francisco Bay region. Administered by San Francisco Bay Conservation & Development Commission.
State Lands Commission General Lease or Agreement	Cal. Code Regs Tit. 2, § 2002.	For placement on ungranted tidal and submerged lands.
Streambed Alteration Agreement	Cal. Fish & Game Code § 1602.	For placement in rivers or streams. Administered by Department of Fish & Game
Water Quality Certification	Cal. Code Regs. Tit. 23, § 2926.	Administered by the State Water Board and Regional Water Quality Control Boards. Includes CA Ocean Plan
Federal Consistency	Cal. Code Regs Tit. 14, § 30200 <i>et seq.</i>	Administered by Coastal Commission and San Francisco Bay Conservation & Development Commission.

Policies

- BUDM Encouraged:** "Dredge spoils suitable for beach replenishment should be transported for these purposes to appropriate beaches or into suitable longshore current systems." Cal. Pub. Res. Code § 30233(b) (CA Coastal Act).
- BUDM Encouraged:** The Long Term Management Strategy for the Bay Area sets a goal to limit in-Bay placement to 20% of the total volume of sediment dredged from the Bay and maximize beneficial reuse of dredged sediment.
- BUDM Encouraged:** Water areas may be filled in accordance with a port master plan for the purposes of habitat restoration or creation and improving shoreline appearance or public access. Cal. Pub. Res. Code § 30705(a) (CA Coastal Act).

- **NBS Encouraged:** The CA Coastal Act allows for hard armoring in limited circumstances and requires softer, less environmentally damaging alternatives when feasible:

"Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply.

Existing marine structures causing water stagnation contributing to pollution problems and fishkills should be phased out or upgraded where feasible." Cal. Pub. Res. Code § 30235 (CA Coastal Act).

- **Hydrodynamics Required:** "Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs." Cal. Pub. Res. Code § 30253 (CA Coastal Act)
- **Hydrodynamics Required:** "Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. " Cal. Pub. Res. Code § 30233(b) (CA Coastal Act).
- **Hydrodynamics Required:** "Revetments, ... and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply." Cal. Pub. Res. Code § 30235 (CA Coastal Act).
- **Hydrodynamics Required:** In the context of port master plans, "the nature, location, and extent of any fill, including the disposal of dredge spoils within an area designated for fill, shall minimize harmful effects to ... sand transport systems, and shall minimize reductions of the volume, surface area, or circulation of water." Cal. Pub. Res. Code § 30706 (CA Coastal Act).
Hydrodynamics Encouraged: "Erosion control and flood control facilities constructed on water-courses can impede the movement of sediment and nutrients that would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for these purposes are the method of placement, time of year of placement, and sensitivity of the placement area." Cal. Pub. Res. Code § 30233(d) (CA Coastal Act).

Physical Sediment Conditions

- **Qualitative:** Source material should be similar to placement site material.
- In the Bay Area, DMMO agencies review the sediment characterization and use a weight-of-evidence approach to make placement suitability determinations. Sediment testing protocols follow procedures set forth by USACE and USEPA in the Inland Testing Manual and further refined by Public Notice (PN01-01) for use in San Francisco Bay for in-Bay placement.
- The Coastal Sediment Management Workgroup has developed the Sand Compatibility and Opportunistic Use Program Plan, which provides guidance for local communities to develop Opportunistic Nourishment Programs (specifically for sandy beaches), setting thresholds to assess sediment sources for use with higher percent fines (e.g. up to 45% fines and within 10% of the placement site native sand grain size envelope). However, typically, dry beach placement is not allowed for sediment with more than 20-25% fines.

Sand Source

N/A

Water Quality

- "Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation. Dredge spoils suitable for beach replenishment should be transported for these purposes to appropriate beaches or into suitable long-shore current systems." Cal. Pub. Res. Code § 30233(b) (CA Coastal Act).

Endangered Species & Critical Habitat

- **Avoid:** Environmental work windows for Bay Area projects are provided in the Dredger's Handbook Appx C.
- **Minimize:** The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams." Cal. Pub. Res. Code § 30231 (CA Coastal Act).
- **Minimize:** "Marine resources shall be maintained, enhanced, and, where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes." Cal. Pub. Res. Code § 30230 (CA Coastal Act).
- **Minimize:** In the context of port master plans, "dredging shall be planned, scheduled, and carried out to minimize disruption to fish and bird breeding and migrations, marine habitats, and water circulation...." Cal. Pub. Res. Code § 30705(c) (CA Coastal Act).
- **Minimize:** In the context of port master plans, "the nature, location, and extent of any fill, including the disposal of dredge spoils within an area designated for fill, shall minimize harmful effects to coastal resources, such as water quality, fish or wildlife resources...." Cal. Pub. Res. Code § 30706 (CA Coastal Act).

Placement Guidelines & Restrictions

- Generally, source sand grain size is expected to fall within 10% of the grain size envelope of the placement site native sand.
- Typically, dry beach placement is not allowed for source sediment with more than 20-25% fines; n/a sediment with a higher percentage of fines (up to 45%) must be placed in the surfzone or nearshore.
- Typically, chemical testing is not required for source sediment with less than 10% fines content.

Resources

- **Beach Restoration Regulatory Guide**
<https://dbw.parks.ca.gov/pages/28702/files/Beach%20Restoration%20Regulatory%20Guide%202006.pdf>
- **Sand Compatibility and Opportunistic Use Program Plan** https://dbw.parks.ca.gov/pages/28702/files/Final_SCOUP_Master_Plan.pdf
- **Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region (2001)**
<https://www.spn.usace.army.mil/Portals/68/docs/Dredging/LMTS/entire%20LMTF.pdf>
- **LTMS Dredger's Handbook (2021)**
https://bcdca.gov/LTMS/Long-Term-Management-Strategy_Dredgers-Handbook.pdf
- **State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State**
https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2019/040219_10_procedures_clean_v032219_conformed_final.pdf





Connecticut State Profile

Introduction

The CT Department of Energy and Environmental Protection (DEEP) Bureau of Water Protection and Land use's Land and Water Resources Division (LWRD), regulates a variety of activities in tidal wetlands and in tidal, coastal or navigable waters of the state through two different permit programs: Structures, Dredging and Fill; and Tidal Wetlands.

The Authorizing Statutes include Sections 22a-359 through 22a-363f of the Connecticut General Statutes (CGS) (Structures, Dredging and Fill), CGS Sections 22a-28 through 22a-35 (Tidal Wetlands), and CGS Sections 22a-90 through 22a-112 (Connecticut Coastal Management Act). The U.S. Army Corps of Engineers (USACE) New England District (NAE) conducts most of the dredging activities in the state. Relevant federal agencies are consulted on all coastal permit applications.

Permit Table

Permit	Authority	Description
Dredging & Coastal Placement	CT General Statutes (CGS) Sections 22a-359 through 22a-363f and 22a-28 through 22a-35	CT Dept of Energy and Environmental Protection (DEEP) provides 3 permit options: general, certificate of permission, and individual. Living shorelines are a special case.
State Water Quality Certification	CGS Sections 22a-426	Section 401 State Water Quality Certificate from DEEP
Public Land Rights	Sec. 22a-361 (a) (1)	Requires royalty payment for sediment removed if to be used for non-public, e.g., construction but an exemption for beach nourishment exists. Intent was to prevent mining of sand/gravel.
Other State	CGS Section 22a-209f	DEEP Beneficial Use Determination Authorization ("BUD Authorization"), Solid Waste Program, not under coastal program jurisdiction if upland

Policies

- **BUDM Encouraged:** Develop a long range planning program for the continued maintenance and enhancement of federally maintained navigation facilities to effectively and efficiently plan and provide for environmentally sound dredging and disposal of dredged materials. CGS Sec. 22a-92(c)(1)(C)
- **NBS Encouraged:** Promotes use of non-structural alternatives like living shorelines. The "creation" of wetlands is allowed for the "purpose of shellfish and finfish management, habitat creation and dredge spoil disposal. Restoration and enhancement of degraded intertidal flats is encouraged. CCMA, CGS Section 22a-92(b)(2)(D) and (E)
- **NBS Required:** Dredged material that is clean sand must be offered as beach nourishment but otherwise nourishment sand must be trucked in from upland to avoid fisheries contamination. CGS 22a-92(c)(2)(e)
- **Hydrodynamics Required:** Degrading natural erosion patterns through the significant alteration of littoral transport of sediments in terms of deposition or source reduction must be minimized. CGS section 22a-93(15)(C)
- **Hydrodynamics Required:** Uses that substantially accelerate erosion or lead to significant despoliation of tidal flats are disallowed. CGS Sec. 22a-92(b)(2)(C)
- **Hydrodynamics Required:** Degrading existing circulation patterns of coastal waters through the significant patterns of tidal exchange or flushing rates, freshwater input, or existing basin characteristics and channel contours must be minimized. CGS section 22a-93(15)(B)

Physical Sediment Conditions

- **Qualitative:** Enforced via permit conditions: Imported sand must match the grain size and color of the existing beach sand.

Sand Source

- No statewide policy but BUDM projects typically use sediment from a USACE dredging project or an upland sand source.

Water Quality

- Degradation of water quality must be avoided or minimized. Temporary degradation may be acceptable if BMPs are employed. CGS section 22a-93(15)(A), Sec. 22a-426-8 (a)(1-4)
- Sediments must be screened for contaminants of concern and managed in accordance with Remediation Standard Regulations. Dredged sediment is considered solid waste (contaminated) or clean fill (which can include treated sediment to reduce contamination to an acceptable level) Sec. 22a-426-4 (g) (3), 20 Sec. 22a-426-4 (k), Regs CT State Agencies, Sec. 22a-209-1

Endangered Species & Critical Habitat

- **Minimize:** Degrading or destroying essential wildlife, finfish or shellfish habitat through significant alteration of the composition, migration patterns, distribution, breeding or other population characteristics of the natural species or significant alteration of the natural components of the habitat must be minimized. CGS section 22a-93(15)(G)
- Windows restrict dredging activities to avoid impacts with migrations, winter flounder, shellfish (for example, Oct through Jan or April depending on species); disturbance of piping plover nesting areas during the nesting season (mid-April to mid-August).

Placement Guidelines & Restrictions

- N/A

Resources

- **Overview of the CT Coastal Permit Program:**
<https://portal.ct.gov/DEEP/Coastal-Resources/Coastal-Permitting/Overview-of-the-Connecticut-Coastal-Permit-Program>
- **Comprehensive Materials Management Strategy (CMMS), Public Act 14-94 :**
https://portal.ct.gov/-/media/DEEP/waste_management_and_disposal/Solid_Waste_Management_Plan/CMMSFinalAdoptedComprehensiveMaterialsManagementStrategy.pdf
- **USACE Long Island Sound Dredged Material Management Plan:**
<https://www.nae.usace.army.mil/Missions/Projects-Topics/Long-Island-Sound-DMMP/>





Delaware State Profile

Introduction

Delaware reports that work is underway on the development of a comprehensive dredging policy framework, which will include setting BUDM as a priority, but the state does not currently have standing policies addressing BUDM. The Delaware Coastal Program under the Delaware Department of Natural Resources and Environmental Control (DNREC) has partnered with state agencies on the management framework effort.

Sediment placement projects are reviewed for impacts on beach or wetland habitats according to the characteristics of the placement site. A Subaqueous Lands Lease is required for placement on public tidelands, and is incorporated into an overall Wetlands and Subaqueous Lands Permit.

Permit Table

Permit	Authority	Description
Wetlands and Subaqueous Lands Permit	Del. Code tit. 7, § 6604; 6805	Including New Dredge, Maintenance Dredge, Fill, and/or Vegetative Stabilization appendix as needed.
Water Quality Certification	Del. Code tit. 7, ch. 60.; 7 Del. Admin. C. § 7401.	
Federal Consistency	7 DE Admin. C. § 2201	
Subaqueous Lands Lease	Del. Code tit. 7, §7205; 7 Del. Admin. C. § 7504-2.4.	Incorporated into Wetlands and Subaqueous Lands Permit
Living Shoreline Stabilization Statewide Activity Approval	Del. Code tit. 7, §7203.	General permit available for living shoreline stabilization projects.

Policies

- **No statewide BUDM policy:** Submerged Land regulations require the department to consider the economic and noneconomic benefits of dredge and fill projects. 7 Del. Admin. C. § 7504-4.11.2.2 Department guidance highlights BUDM as an important option.
- **NBS Encouraged:** Structures such as erosion control structures on the beach are prohibited with few exceptions seaward of a coastal setback line by Division of Watershed Stewardship. 7 Del. Admin. C. § 5102-3.1.
- **NBS Encouraged:** Nonstructural erosion control measures are preferred for shoreline stabilization work in appropriate environments. 7 Del. Admin. C. § 7504-4.10.1.3.
- **Hydrodynamics Required:** Structures and construction activities such as erosion control structures on the ocean and Delaware Bay beaches are prohibited with few exceptions seaward of a coastal setback line by Division of Watershed Stewardship through the Regulation Governing Beach Protection and the Use of Beaches. Applications for permits for exceptions require rigorous engineering analysis to show that the structure or activity will not increase vulnerability of an area during coastal storms such as by causing further dune erosion. 7 Del. Admin. C. § 5102-3.1.

Physical Sediment Conditions

- **Qualitative:** case-by-case

Sand Source

- N/A

Water Quality

- Dredging projects, including disposal, must be conducted in a manner the Department determines is consistent with sound conservation and water pollution control practices. 7 Del. Admin. C. § 7504-4.11.3
- Narrative criteria of the state's Surface Water Quality Standards apply to shoreline and in-water placement. 7 Del. Admin. C. § 7401-6. Contaminant evaluations are often required as part of the permit application to identify possible failure of the criteria, and to propose corrective measures to meet the criteria.

Endangered Species & Critical Habitat

- **Minimize:** The Department considers environmental effects of dredged material disposal on the placement site. 7 Del. Admin. C. § 7504-4.7, 4.11.2.2.
- **Minimize:** Discharges to waters of exceptional recreational or ecological significance shall be avoided to the maximum extent practicable. In order to be permitted, a discharge must be the least environmentally damaging practicable alternative. 7 Del. Admin. C. § 7401-5.6.1.3

Placement Guidelines & Restrictions

- Projects in dune areas seaward of the state coastal setback line require engineering analysis to demonstrate erosion impacts or storm vulnerability will not be increased.

Resources

- **Site Evaluation for Living Shoreline Projects in Delaware**
https://static1.squarespace.com/static/59b69f4f2994caee6bf52abe/t/5ea82bf97189b11145040d10/1588079656882/DelawareLivingShorelineSiteEvaluation_v10.pdf
- **Developing Monitoring Plans for Living Shoreline Projects in Delaware:
A Goal-Based Framework**
https://static1.squarespace.com/static/59b69f4f2994caee6bf52abe/t/5c2f944ec2241b6e53673b3a/1546622031144/DELS+Framework+V.2.0._Final.pdf





Florida State Profile

Introduction

The FL Department of Environmental Protection (FDEP) Beaches, Inlets and Ports Program (BIPP) regulates sediment placement in the state. The U.S. Army Corps of Engineers (USACE) Jacksonville District (SAJ) and regional inlet districts conduct most of the dredging activities in the state. USACE SAJ is also home to the South Atlantic Division (SAD) Regional Sediment Management (RSM) Regional Center of Expertise (CX) which assists with research and policies to encourage BUDM. The FL Fish and Wildlife Commission and relevant federal agencies are consulted on all coastal permit applications.

Permit Table

Permit	Authority	Description
Joint Coastal Permit (JCP)	62B-49, 62B-41, Florida Administrative Code (F.A.C.), Chapters 161 and 373 Florida Statutes (F.S.)	Individual permit application for approval from state and SAJ for dredging and coastal sediment placement
Water Quality	62-4.244(5), F.A.C., Chapter 403 F.S.	Variance to Mixing Zones, Surface Waters
Public Land Rights	18-21, F.A.C. Chapters 253 and 161 (Section .141) F.S.	Authorization to use sovereign submerged lands; Explanation of property rights of state and private upland owners in beach restoration project areas
General Permits	n/a	Although options for state and federal general permits exist, BUDM projects do not qualify for general permits.

Policies

- **BUDM Required:** Beach or nearshore sand placement is the least-cost disposal method. Beach quality sand from federal navigation projects must be placed on or nearby adjacent eroding beaches. Fla. Stat. 161.142(5). The department is authorized to enter into agreements with local governments to cost share and coordinate RSM. Fla. Stat. 161.101(7) Establish RSM alternatives for existing beach/inlet projects. Fla. Stat. 161.161(1)(d)
- **NBS Encouraged:** Beach nourishment projects are in the public interest; Hard structures must minimize potential adverse impacts to the beach and dune system Fla. Stat. 161.088, 62B-33.0051, FAC
- **Hydrodynamics Required:** Inlet relocation, opening or maintenance must not alter hydrodynamics or long-term sand management. 62B-41.005 (11) & (12), F.A.C.

Physical Sediment Conditions

- **Quantitative:** Sand Rule: Sediment shall be carbonate, quartz or similar between 0.062mm and 4.76mm. Beach nourishment sand 95:5 rule (5% fines); Navigation dredging (BUDM) 90:10 rule (10% fines limit). BUDM in nearshore, 80:20 rule. Shall not contain > 5% gravel. Shall be similar in color. Rule 62B-41.007, F.A.C
- A sediment Quality Control plan is required. Rule 62B-49.005 FAC

Sand Source

- Guidance provided in Sediment Geotechnical Guidelines:
<https://floridadep.gov/rcp/coastal-engineering-geology/content/coastal-engineering-geology-group-technical-reports#sediments>

Water Quality

Turbidity Control: Mixing zone variance attached to Joint Coastal Permit. 62-4.244(5)(c), F.A.C.

Endangered Species & Critical Habitat

- **Avoid:** Timing and sequence of inlet construction shall protect nesting sea turtles and their hatchlings and habitats. Additional criteria for activities in surface waters. F.S. 373.414(1) and 161-142 (3)
- **Avoid:** Protection of Marine Turtles, provides that FDEP may condition the timing of beach restoration projects and may require the relocation of potentially affected turtle nests to provide protection to nesting sea turtles. F.S. 379-2431 (1)(2), F.S. 161.053

Placement Guidelines & Restrictions

- Dredged sand is required to be placed on adjacent eroding beaches. 161.142(1) FS
- Multi-year maintenance plan must promote inlet sand bypassing. Fla. Stat. 161.091(2)(e)
- Erosional impacts from inlets must be mitigated. Fla. Stat. 161.161(1)(b)

Resources

FL Beaches/Coastal Rules & Statutes:

- <https://floridadep.gov/rcp/beaches/content/beaches-and-coastal-systems-rules-statutes>

Strategic Beach Management Plan; Inlet Management Plans Regional Offshore Sand Source Inventory:

- <http://rossi.urs-tally.com>

• **Environmental Resource Permit Applicant Handbook:**

<https://floridadep.gov/rcp/beaches-inlets-ports/content/tools-applicants>

Sediment Geotechnical Guidelines:

<https://floridadep.gov/rcp/coastal-engineering-geology/content/coastal-engineering-geology-group-technical-reports#sediments>





Georgia State Profile

Introduction

The GA Department of Natural Resources Coastal Resources Division (GADNR-CRD) regulates sediment placement in the jurisdictional marsh and shore areas that impact public trust lands. The U.S. Army Corps of Engineers (USACE) Savannah District (SAS) conducts dredging projects in the state. Relevant federal agencies are consulted on all coastal permit applications.

The GADNR-CRD uses the following mechanisms of authority to allow for activities in the jurisdictional marsh and shore areas and to regulate structures and activities that impact public trust lands which fall under jurisdiction of these regulations. The GA Shore Protection Act (O.C.G.A. § 12-5-230) is the governing legislation that regulates activities and structures in jurisdictional beach and shore areas and the GA Coastal Marshlands Protection Act (O.C.G.A § 12-5-280 et seq.) is the governing legislation that regulates activities and water dependent structures in jurisdictional marshlands.

Permit Table

Permit	Authority	Description
GA DNR Coastal Resources Division (CRD) Permit	GA Shore Protection Act O.C.G.A. § 12-5-230 GA Coastal Marshlands Protection Act O.C.G.A. 12-5-280	GADNR-CRD permit is required for all shoreline engineering activities which include beach and dune renourishment. BUDM projects are done in partnership with USACE. GADNR-CRD permit is required for all activities impacting coastal marshland and estuarine areas, including dredge and placement/fill activities. Activities by USACE to maintain navigation channels and dispose materials are exempt.
Water Quality Certification	OCGA 12-5-20	GA Water Quality Control Act
GA Revocable License (RL) authority	O.C.G.A. § 50-16-61	Allows for structures to occupy public trust lands water bottoms. CRD is delegated authority over tidal water bottoms.

Policies

- **BUDM Encouraged:** Projects for improving navigation channels, Disposal of sand and sediment originating from water navigation related projects. GA River and Harbor Development Act. O.C.G.A. §52-9-1 and -2
- **NBS Encouraged:** Living Shorelines, Engineering with Nature, etc. with no adverse impacts. O.C.G.A. § 12-5-239(i)(1) through (3) 12-5-286(g)(1-3).
- **Hydrodynamics Required:** Public Interest Test Required: activity will not impair the values and functions of the sand-sharing system including the coastal sand dunes, beaches, sandbars, and shoals. O.C.G.A. § 12-5-230

Physical Sediment Conditions

- **Quantitative:** Internal Policy Document: GDNR Requirements for Beach Nourishment Projects
- Shall not exceed 10% fines (~0.075mm), 5% coarse gravel (~4.5mm), 15% shell.
- Color between 0yr6.5/1 and 10yr7.0/1 on the Munsell soil color chart

Sand Source

- Determined case-by-case, rely on BOEM and university sand search studies.

Water Quality

- State issues water quality certification, GA Water Quality Control Act O.C.G.A. § 12-5-20

Endangered Species & Critical Habitat

- **Avoid:** Protection of Endangered Wildlife § 27-3-130
- **Minimize:** The purpose of these guidelines is to minimize the effects of beach nourishment projects on sea turtle reproduction and to ensure nourished beaches are compatible with native beaches. GDNR Requirements for Beach Nourishment Projects
- **Avoid:** Placement windows for nesting and fisheries (sturgeon) season determined in federal consultations. Construction shall be outside the loggerhead turtle nesting and hatching season (May 1-October 31). 2020 South Atlantic Regional Biological Opinion, GDNR Requirements for Beach Nourishment Projects

Placement Guidelines & Restrictions

- Dispersal of sediment in deep channels allowed. Beach-quality dredged sand must be placed on adjacent beaches either on beach or in nearshore. O.C.G.A. 52-9-1 and 2.

Resources

- **GA Marsh and Shore Permits:**
<https://coastalgadnr.org/MarshShore>
- **2020 South Atlantic Regional Biological Opinion:**
<https://www.sas.usace.army.mil/Missions/Civil-Works/SARBO/>





Guam Territory Profile

Introduction

The Guam Department of Public Works, the Department of Land Management, the Guam Environmental Protection Agency and the Bureau of Statistics and Plans provide information in which laws, regulations, permits, clearances are required for a particular project.

The Guam Bureau of Statistics and Plan (BSP) created the Guam Comprehensive Development Plan and coordinates permit reviews through networked agency coordination.

Disclaimer: The information in this table is for development requirements on Guam not necessarily for dredging and disposal permitting, which also needs authorization from USACE. As such the Guam permitting process is through both local government and federal government.

Permit Table

Permit	Authority	Description
Guam Seashore Clearance Permit	GC § 63107	Required if within Guam Seashore Reserve. Administered by Guam Seashore Protection Commission at Guam Department of Land Management
Water Quality Certification	Guam Water Quality Standards 22 GAR GEPA §5103	401 WQC issuance identifies that construction or operation of a proposed project or facility will be conducted in a manner consistent with the Guam Water Quality Standards. Administered by Guam Environmental Protection Agency.
Wetland Permit	Chapters 61 & 62 of the Government Code of Guam and Executive Order No. 91-27.	For development activity in wetlands areas. Administered by the Guam Land Use Commission/ Guam Land Hybrid Commission.
Clearing and Grading Permit	21 GCA CH 61, 21 GCA CH. 66, and 21 GCA CH 67	For clearing or grading. Administered by Guam Department of Public Works.
Land Use Permit		Clearing, Grubbing, Grading and Stockpiling Permit, Soil Importation. Administered by Guam Environmental Protection Agency.
Federal Consistency Determination	15 CFR Part 930 Subpart C	Federal Consistency determination as required under 15 CFR Part 930 Subpart C. Administered by the Bureau of Statistics and Plans.

Policies

- **BUDM Encouraged:** When reviewing projects, permitting agencies highlight BUDM as an important option. 22 GAR § 10105
- **NBS Encouraged:** Agencies encourage the use of natural designs in mandatory Erosion and Sediment Control Plans. 22 GAR § 10105
- **Hydrodynamics Required:**
 - "All earth-moving activities on Guam shall be conducted in such a way as to prevent accelerated erosion and the resulting sedimentation. To accomplish this all persons engaged in earth-moving activities shall design, implement, and maintain erosion and sediment control measures which effectively prevent accelerated erosion and sedimentation." 22 GAR § 10105(a)(1).
 - The potential dangers of flooding landslides, erosion, and siltation must be minimized or eliminated. ("Territorial Seashore Protection Act," Department of Land Management, 1980. Authority: Chapter 63, Title 21, Seashore Act (as amended), Government Code of Guam.)
 - Man-made alteration of sand dunes which would increase potential flood damage is prohibited. (The Government of Guam, Department Of Public Works, under the authority of Subsection (a), Subsection 66116, Article 1, Chapter 66, Building Law, 21)

Physical Sediment Conditions

- N/A

Sand Source

- N/A

Water Quality

- GEPA reviews and certifies (401 WQC) the permit for compliance with all local regulations and policies and in accordance with the Guam Water Quality Standard

Endangered Species & Critical Habitat

- Development in the following types of fragile areas is regulated to protect their unique character: historical and archeological sites, wildlife habitats, pristine marine and terrestrial communities, limestone forests, and mangrove stands and other wetlands. (16 U.S.C. §1456) and the Code of Federal Regulations Title 15 Part 930
- All living resources within the territorial waters of Guam, particularly corals and fish, shall be protected from over harvesting and, in the case of marine mammals, from any taking whatsoever. (16 U.S.C. §1456) and the Code of Federal Regulations Title 15 Part 930

Placement Guidelines & Restrictions

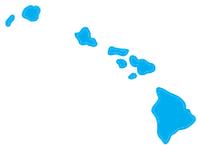
- N/A

Resources

2022 Guidebook to Development Requirements on Guam:

<https://bsp.guam.gov/guam-development-guidebook>





Hawai'i State Profile

Introduction

Agencies involved in regulating sediment management in Hawai'i include the State DLNR OCCL, State Coastal Zone Management Office (CZMO), and the State Department of Health, Clean Water Branch (DOH).

Other federal agencies that provide provide oversight for the Fish and Wildlife Coordination Act and the

Endangered Species Act include the DLNR Division of Aquatic Resources (DAR), U.S. Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration, National Marine Fisheries Service Protected Resources Division.

Generally, an adaptive management approach is encouraged by these agencies to ensure that the nourished beach does not become a source for sedimentation, disrupt natural drainage, or get washed away shortly after placement.

Permit Table

Permit	Authority	Description
Conservation District Use Application (CDUA)	DNR OCCL HAR §13-5-22 <i>et seq.</i> HRS §183C-3	Regulates any beach placement.
Small Scale Beach Nourishment (SSBN) Category I Permits (< 500 yd ³ of sand seaward of the shoreline)	Integrates the below permits into one application managed by the DLNR. HAR §13-5-23	For the placement of up to 500 yd ³ of carbonate sand in the waters and land of the State of Hawaii (within the same littoral cell) and for small scale sand placement retention devices such as geotextile bags.
Small Scale Beach Nourishment (SSBN) Category II Permits (< 10,000 yd ³ of sand seaward of the shoreline)	Integrates the below permits into one application managed by the DLNR. HAR §13-5-23	For the placement of up to 10,000 yd ³ of carbonate sand in the waters and land of the State of Hawaii (within the same littoral cell) and for small scale sand placement retention devices such as geotextile bags.

Permit Table - Continued

Permit	Authority	Description
Right of Entry Permit	County	Required if accessing state land through county lands.
Variances	§205A-46	A variance may be granted if the activity is related to moving of sand from one location seaward of the shoreline to another location seaward of the shoreline; provided it will not adversely affect beach processes. will not diminish the size of a public beach, and will be necessary to stabilize an eroding shoreline
Section 401 WQC	Hawaii Department of Health (DOH), Clean Water Branch (CWB).	Regulates discharge into state waters, including any beach placement below high-tide line
CWA Section 404 permit	U.S. Army Corps of Engineers, Regulatory Branch, Honolulu	for any work, including construction and dredging, in the Nation's navigable waters – administered by the U.S. Army Corps of Engineers, Regulatory Branch, Honolulu[g].
Section 402 NPDES	DOH Clean Water Branch	Regulates any land disturbance greater than 1 acre (including beach placement/stockpiling)
CZM Federal Consistency Review	State Office of Planning, Hawai'i CZM program	Regulates USACE Beach Placement
CZM Special Management Area Review/ Shoreline Setback Variance	State Office of Planning, Hawai'i CZM program	Beach Placement in counties.
Department of the Army (DA) State Programmatic General Permit (Standard)	USACE	C&C beach placement below high-tide line
Stockpiling Permit	Local counties	Stockpiling

Policies

- **BUDM Encouraged:** Sand placement not to exceed 10,000 cubic yards per occasion, with minor sand retention structures, extraction of sand from submerged lands, and transportation or transmission of sand from an offshore extraction site to the replenishment site. HAR §13-5-23 P-16 BEACH RESTORATION (C-1)
- **BUDM Encouraged:** Variance may be granted if sand from one location seaward of the shoreline to another location seaward of the shoreline will not adversely affect beach processes, will not diminish the size of a public beach, and will be necessary to stabilize an eroding shoreline §205A-46
- **NBS Required (subset):** Construction of private shoreline hardening structures, including seawalls and revetments is prohibited at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities.
- **NBS Encouraged:** The construction of public shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities should be minimized. HRS § 205A-2(c)(g)(B,C).
- **NBS Encouraged:** Geotextile bags and other sand retention techniques implemented in conjunction with small scale beach placement are covered by the Small Scale Beach Nourishment Permit. HAR §13-5-23
- **Hydrodynamics Required:** Altering any bay, estuary, salt marsh, river mouth, slough or lagoon should be minimized. HRS § 205A26(3)(A).
- **Hydrodynamics Required:** New structures inland from the shoreline setback should be located to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion. HRS § 205A-2(c)(g)(A).

Physical Sediment Conditions

- **Quantitative:** The proposed fill sand shall not contain more than 6% fines, defined as the #200 sieve (0.074 mm) and more than 10% coarse sediment defined by the #4 sieve (4.76 mm) This may be adjusted by the PTE or the Chairperson based on the analysis of the existing beach sand.
- **Quantitative:** Compatibility of the existing and proposed fill beach sands shall be demonstrated by the grain size distribution of the fill sand and shall fall within 20% of the existing sand, as measured by a percent finer than or percent coarser than value. For example, if the existing sand has a 45% grain size finer than the #100 sieve, the proposed fill sand must contain between 25% and 65% grain size finer than the #100 sieve.
- Alternatively, and for cases where the beach fill grain size distribution curve is uniformly finer than the existing beach, the overall fill ratio of the fill sand to existing sand shall not exceed 1.5. Overfill factor shall be calculated using the USACE method of overfill factor, RA, determined by comparing mean sediment diameter and sorting values of the existing beach and borrow sediments (in ϕ , units). See Coastal Engineering Manual V-4.1.e.3 Sections h and I on sediment suitability and overfill factor.

No more than 50% of the fill sand shall have a grain diameter less than 0.125 mm as measured by #120 Standard Sieve Mesh.

Beach fill shall be dominantly composed of naturally occurring carbonate beach or dune sand.

- Crushed limestone or other man made or non-carbonate sands are not allowable under this permit.

Sand Source

- Beach fill sand should be obtained from an approved source and be reviewed and authorized by the appropriate authority including but not limited to the Historic Preservation Division.

Water Quality

- All placed material shall be free of contaminants of any kind including: excessive silt, sludge, anoxic or decaying organic matter, turbidity, temperature or abnormal water chemistry, clay, dirt, organic material, oil, floating debris, grease or foam or any other pollutant that would produce an undesirable condition to the beach or water quality. Should the DLNR determine the sand quality inferior, the applicant may be asked to provide better quality sand or screen the existing sand for contaminants at their own expense. (SSBN Guide)

Endangered Species & Critical Habitat (SSBN Guide)

- No activities that may disrupt or otherwise adversely affect organisms or habitats in areas of recognized biological importance such as coral reefs, mud flats, vegetated shallows, fish spawning grounds and areas of concentrated shellfish production without the consent of the National Marine Fisheries Service, the Division of Aquatic Resources and the U.S. Fish and Wildlife Service.
- No activity to adversely affect a federally listed threatened or endangered species or a species proposed for such a designation, including the destruction or modification of its designated critical habitat, a recognized sanctuary or refuge.
- No activity that would substantially disrupt the movement of those species of aquatic life indigenous to the area, including those species that normally migrate through the area.
- No activity may occur in known turtle-nesting areas during egg-laying and hatching periods. Placement Guidelines & Restrictions (SSBN Guide)
- Best Management Practices (BMP) and an appropriate monitoring and assessment plan should be developed and implemented.
- Equipment must not be refueled in the shoreline area. The applicant shall ensure construction or other objectionable material is contained and prevented from entering state waters. Heavy equipment shall not be allowed to enter waters except to remove a sand plug from the stream mouth and/or during sand pumping activity while effective silt containment devices are properly deployed/maintained surrounding the equipment and the equipment is properly mounted on a barge or similar vessel.
- If temporarily installed retention structures (including geotextile bags and geotubes) are found to be ineffective or if the structures cause unanticipated impacts to the area, they shall be removed at the applicant's expense, within thirty (30) days upon written notification to the applicant by the DLNR.
- Temporary soil stabilization shall be applied in vulnerable areas that will remain unfinished for more than 30 days.

Resources

- **Hawaii Department of Land and Natural Resources, Office of Conservation and Coastal Lands Administrative Rules**
<https://dlnr.hawaii.gov/occl/rules>





Illinois State Profile

Introduction

Shoreline placement projects in Illinois are permitted through a joint application process coordinated between USACE Chicago District, Department of Natural Resources, and Illinois Environmental Protection Agency. Projects on Lake Michigan waters require land use authorization, which is incorporated into the joint permit.

Illinois does not use the dredge or placement permitting process to establish preference for BUDM techniques. The state coastal program has founded the Illinois Shoreline Management Working Group to coordinate regionally across local and federal partners to address sediment deficits and pilot management strategies. Through that effort and a pilot project as part of WRDA 2016/Section 1122, the state is assessing needs for new BUDM policies.

Permit Table

Permit	Authority	Description
IDNR Regular Permit	Ill. Admin. Code tit. 17, § 3704.90	For Lake Michigan construction below OHWM. Coordinated by Department of Natural Resources.
Water Quality Certification	Ill. Admin. Code tit. 35, § 302	Administered by Illinois Environmental Protection Agency
Federal Consistency	Various; see Illinois Coastal Management Program	Administered by Department of Natural Resources

Policies

- BUDM Encouraged:** The Rivers, Lakes, and Streams Act, the statute authorizing the Lake Michigan permitting process, allows but does not establish a preference for “the placing of unconfined fills or deposits of clear sand, rock or other material approved by the IDNR in or along the shores of Lake Michigan ... for the purpose of replacing or augmenting the natural material in the littoral currents, for creating new beaches or for replenishing existing beaches, for the protection of the shore against erosion...” 615 ILCS 5.

- **BUDM Encouraged:** The Chicago District Lake Michigan RGP authorizes placement of clean dredged material landward of the 18ft depth contour with fewer testing requirements. BUDM Encouraged: Statewide Permit No. 11 for minor dredging identifies beach nourishment and bank stabilization as authorized uses. Ill. Admin. Code tit. 17, § 3704.110.
- **Hydrodynamics Required:** In general, no projects are permitted that are deemed potentially disruptive to the movement of littoral transport along the beaches and nearshore areas. CMP at 52.
- **Hydrodynamics Required:** Placement projects must not cause bank or shoreline instability on other properties. Ill. Admin. Code tit. 17, § 3704.90(b).

Physical Sediment Conditions

- **Qualitative:** Placed sand should be comparable with the natural sand and be of equal or larger grain size. 35 Ill. Admin. Code §§ 302.515, 395.205(a)(1), 395.401(b)
Quantitative: Material greater than 20% silt (No. 230 U.S.) requires resuspension testing. Ill. Admin. Code tit. 35 § 395.205(a)(1).

Sand Source

- N/A

Water Quality

- Dredge placement requires an IEPA determination that the material will not violate IPCB regulations.
- Material greater than 20% silt (No. 230 U.S.) requires resuspension testing. Ill. Admin. Code tit. 35 § 395.205(a)(1).
- Exemptions for water quality testing include if the material is composed predominantly of sand, gravel or other naturally occurring sedimentary material with particle sizes larger than silt. Ill. Admin. Code tit. 35, § 395.204.
- The Lake Michigan RGP General Condition 6 specifies use of the Illinois Urban Manual Practice Standard for Floating Silt Curtain (no. 917).

Endangered Species & Critical Habitat (SSBN Guide)

- **Mitigate:** Restrictions may be imposed pursuant to the Illinois Endangered Species Protection Act. 520 ILCS 10.
- The Department of Natural Resources provides the Ecological Compliance Assessment Tool (EcoCAT) to identify potential impacts to state threatened or endangered species, or habitat. The tool is used in the E&T consultation process. Ill. Admin. Code tit. 17, § 1075.40.

Placement Guidelines & Restrictions

- Nourishment projects incorporating perpendicular structures are required to mitigate sand-trapping impacts on littoral drift, including initial placement of clean, compatible sand in an amount equal to 120% of the structure's potential capacity to retain sand, as well as two years of monitoring and case-by-case mitigation as needed.

Resources

- **Guidelines for the Submittal of Applications for Illinois Department of Natural Resources, Office of Water Resources Permits for Shore Protection Projects in Lake Michigan**
<https://www2.illinois.gov/dnr/WaterResources/Documents/Lake%20Michigan%20Permit%20Guidelines.pdf>





Indiana State Profile

Introduction

Shoreline placement for beach nourishment or wetland restoration/creation in Indiana requires Department of Natural Resources authorization under the Navigable Waterways Fill Permit process, which applies to placement into navigable waterways including Lake Michigan waters and applies a factor test including assessment of significant harm to the environment, as well as a 401 water quality certification. Dredging of sand from the bed of Lake Michigan may instead require a DNR Sand and Gravel Permit, which does not require a separate Navigable Waterways Fill Permit but which applies like requirements. A royalty fee applies to the removal of dredged material from Lake Michigan; however, that fee is waived if suitable sediment is beneficially used for beach nourishment.

Most beach nourishment activity in Indiana to date has consisted of bypass projects around perpendicular shoreline structures. There has been limited opportunity to date for beach or wetland beneficial use projects.

Permit Table

Permit	Authority	Description
Navigable Waterways Fill Permit	IC 14-29-1-8	For placement within navigable waterways. Administered by the Department of Natural Resources.
Sand and Gravel Permit	IC 14-29-1-3	For taking sand, gravel, stone, or other mineral or substance from or under the bed of a navigable waterway. Administered by the Department of Natural Resources.
Water Quality Certification	327 IAC 2	Administered by Department of Environmental Management
Federal Consistency	Various, see Indiana Lake Michigan Coastal Program	Administered by the Department of Natural Resources.

Policies

- **BUDM Encouraged:** Royalty fees applying to the removal of dredged material from Lake Michigan are waived for suitable sediment beneficially used for beach nourishment. IC 14-29-3-2; 312 IAC 6-5-8.
- **NBS Encouraged:** A general authorization is available for beach nourishment within the Indiana Dunes National Seashore, exempting placement from Navigable Waterways Fill Permit requirements. 312 IAC 6-6-1.
- **Hydrodynamics Required:** When issuing a Navigable Waterways Fill Permit, IDNR will consider the impact of the project on accretion and erosion of sand or sediments. 312 IAC 6-1-1(e). Applicants must evaluate the likely impact of the project on coastal dynamics, including shoreline erosion and accretion, sand movement within the lake, and interaction with existing structures. 312 IAC 6-8-2(d).

Physical Sediment Conditions

- **Qualitative:** The dredged material fee waiver (IC 14-29-3-2) is available for "suitable" dredged material.

Sand Source

- N/A

Water Quality

- Placement projects must obtain standard water quality certification.

Endangered Species & Critical Habitat (SSBN Guide)

- **Minimize:** Applicants must demonstrate the project will not cause significant harm to the environment. 312 IAC 6-8-2(b)(2).

Placement Guidelines & Restrictions

- N/A

Resources

- **Beach Nourishment summary page**
<https://www.in.gov/dnr/water/lake-michigan/beach-nourishment>
- **Waterways Permitting Handbook**
<https://www.lrc.usace.army.mil/Portals/36/docs/regulatory/pdf/INWWB.pdf>





Louisiana State Profile

Introduction

Louisiana has integrated policies promoting BUDM into its comprehensive strategic approach to addressing coastal land loss in the face of rapid erosion, inundation, and subsidence along significant stretches of the coastal zone. The state's strategy, coordinated through the Louisiana Coastal Master Plan overseen by the Coastal Protection and Restoration Authority, includes coordination with USACE New Orleans District to increase BUDM for navigation projects, implementing BUDM requirements in coastal permits, and development of pilots and innovative approaches. New Orleans District has prioritized cost effectively increasing its rate of BUDM via the Louisiana Coastal Area Beneficial Use of Dredged Material (LCA BUDMAT) Program.

The Department of Natural Resources (DNR) Office for Coastal Management oversees the state's Coastal Use Permit system, and the Division of Administration Office of State Lands (OSL) oversees state-owned tidal lands. Depending on the location and scope of a dredging or placement project, the Coastal Use Permit review process will be administered either by the DNR or by a local coastal management program with DNR oversight. DNR provides a joint permit application process which facilitates coordinated reviews by USACE and relevant state agencies. Dredging projects greater than 25,000cy requiring a Coastal Use Permit are required to either beneficially use the material or make a voluntary contribution to a Coastal Resources Trust fund which funds wetland restoration efforts statewide.

Permit Table

Permit	Authority	Description
Coastal Use Permit	La. R.S. 49:214.30(A).	For dredging and placement projects. Administered by local coastal programs with DNR oversight.
Coastal Use Permit General Permit 17	La. R.S. 49:214.30(E).	General permit authorizing placement of dredged material in shallow water areas for marsh creation or nourishment. Administered by DNR
State Lands Permit (Class A or E)	La. R.S. 41:1701 <i>et seq.</i>	Authorization to place fill on previously eroded (Class A) or other (Class E) water bottoms. Administered by OSL.
Water Quality Certification	La. R.S. 30:2074(A)(3).	Administered by Department of Environmental Quality
Federal Consistency	La. R.S. 49:214.32.	Administered by DNR.

Policies

- **BUDM Required:** "Spoil shall be used beneficially to the maximum extent practicable to improve productivity or create new habitat, reduce or compensate for environmental damage done by dredging activities, or prevent environmental damage. Otherwise, existing spoil disposal areas or upland disposal shall be used to the maximum extent practicable rather than creating new disposal areas." La. Admin. Code tit. 43, § I-707(B).
- **BUDM Encouraged:** General permits for maintenance dredging (e.g., GP-13 for surface flow channels, GP-15 for commercial navigation) authorize placement for BUDM. For dredging of greater than 25,000cy, a strategic plan for beneficial use is required.
- **NBS Encouraged:** "Nonstructural methods of shoreline protection shall be used to the maximum extent practicable." La. Admin. Code tit. 43, § I-709(A).
- **Hydrodynamics Required:** Projects are required to avoid to the maximum extent practicable significant impacts to littoral and sediment transport processes, sediment supply from freshwater flows, natural coastal features, land loss, or erosion. La. Admin. Code tit. 43, § I-701(G).
- **Hydrodynamics Required:** "Spoil shall be deposited utilizing the best practical techniques to avoid disruption of water movement, flow, circulation, and quality ... [and] downstream land loss and erosion" La. Admin. Code tit. 43, § I-707(A,J).

Physical Sediment Conditions

- **Qualitative:** Placement projects are reviewed for feasibility and impacts on erosion and sediment transport processes. La. Admin. Code tit. 43, § I-709(A).

Sand Source

- N/A

Water Quality

- Projects are required to avoid to the maximum extent practicable impacts to water quality, including discharges of toxic substances or turbidity resulting from dredging. La. Admin. Code tit. 43, § I-701(G).
- "Spoil disposal areas shall be designed and constructed and maintained using the best practical techniques to retain the spoil at the site, reduce turbidity, and reduce shoreline erosion when appropriate." La. Admin. Code tit. 43, § I-707(F).
- "Shoreline modification structures shall be built using best practical materials and techniques to avoid the introduction of pollutants and toxic substances into coastal waters." La. Admin. Code tit. 43, § I-709(D).

Endangered Species & Critical Habitat (SSBN Guide)

- **Mitigate:** Placement projects are required to avoid or minimize impacts to coastal resource ecological value, or to offset via compensatory mitigation. La. Admin. Code tit. 43, § I-724.

Placement Guidelines & Restrictions

- N/A

Resources

- **Louisiana Coastal Master Plan**

<https://coastal.la.gov/our-plan/2023-coastal-master-plan>

- **BUDMAT Resources**

<https://www.mvn.usace.army.mil/Missions/Environmental/Louisiana-Coastal-Area/Beneficial-Use-of-Dredged-Material>





Maine State Profile

Introduction

The ME Department of Environmental Protection (DEP) and the U.S. Army Corps of Engineers (USACE) New England District (NAE) jointly regulate dredging activities in the state. Permits are required from both of these agencies for any dredging activity. Maine's Natural Resources vProtection Act (NRPA, Me. Rev. Stat. Ann. Tit. 38, §480) and Wetland Protection Rules (Chapter 310) contain specific language that protects the state's marine habitats and fisheries, including requirements for timing the project and notifying local fisheries interests of planned dredging activities. Maine's Coastal Sand Dune Rules (05-096 DEP, Ch 355) apply to activities in a coastal sand dune system and requires an individual permit pursuant to NRPA. Relevant federal agencies are consulted on all coastal permit applications.

Permit Table

Permit	Authority	Description
Department of Environmental Protection (DEP) NRPA Coastal Permit	Me. Rev. Stat. (MRS) Tit. 38, §480 PL 1987, c. 809, §2	Non-USACE dredging and/or filling projects receive a one-time use authorization. An allowance for a one-time renewal is the "permit by rule" or "PBR"
Water Quality Certification	PL 1987, c. 809, §2	Included with coastal permit
Dredging Lease		Issued by Department of Conservation, Bureau of Public Lands (BPL)
Home Rule provisions of Maine Constitution and under Maine's Municipal Shoreland Zoning statute	MRS Tit 38, §435	Local governments have the authority to regulate non-forested wetlands greater than ten acres in size.
BUDM as beach fill	Maine Solid Waste Management Rules Chapter 418	REDUCED PROCEDURE APPLICATION FOR BENEFICIAL USE OF DREDGE MATERIAL AS BEACH NOURISHMENT FILL

Policies

- **BUDM Encouraged:** Sand Dune Rule: material for beach nourishment may be obtained from, but is not limited to, the following sources in order of preference: (1) Beneficial use of material dredged from Maine's federal channels and harbors by the United States Army Corps of Engineers (ACOE); (2) Material excavated from upland sources; and (3) Material dredged from near shore and offshore waters provided that the dredging complies with the standards in Chapter 310, Wetlands and Waterbodies Protection Rules and 38 M.R.S.A. §§ 480-A to 480-Z.
- **NBS Encouraged:** Coastal sand dunes systems are resources of state significance and that "there is a need to facilitate research, develop management programs and establish sound environmental standards that will prevent the degradation of and encourage the enhancement of these resources. Attempts to prevent erosion and flooding through the construction or enlargement of seawalls harm the beach and dune system. 38 M.R.S.A. §480-A
- **NBS Encouraged:** The department encourages landowners to consider removing a seawall or similar structure and covering the area with sand and dune vegetation, or replacing the structure in a more landward position to reduce its influence on the beach and sand dune system. Sand Dune Rule.
- **Hydrodynamics Encouraged:** Do not unreasonably interfere with the natural supply or movement of sand or gravel within or to the sand dune system or unreasonably increase the erosion hazard to the sand dune system. PL 2003, c. 551, §8

Physical Sediment Conditions

- **Qualitative:** Only material that has texture and color characteristics consistent with native, and that has a similar particle size may be used for beach nourishment. Ch 355, Section 8
- **Quantitative: BUDM:** <15% fines and a maximum measurable level of metals and toxins. Maine Solid Waste Management Rules Chapter 418

Sand Source

- **BUDM encouraged:** see BUDM Policies above, Sand Dune Rule.

Water Quality

- The activity will not violate any state water quality law, including those governing the classification of the State's waters. PL 1987, c. 809, §2

Endangered Species & Critical Habitat

- **Minimize:** The department may restrict the time of year during which material for a beach nourishment project may be placed on the beach to minimize impacts on existing wildlife habitat. Sand Dune Rule
- PBR examples, No sand may be moved seaward of the frontal dune between April 1 and September 1, unless written approval from the Department of Inland Fisheries and Wildlife has been obtained. An activity involving dune restoration or dune construction must be performed between March 1 and April 1 or October 1 and November 15.

Placement Guidelines & Restrictions

- The dredging transportation route must minimize adverse impacts on the fishing industry and the disposal site must be geologically suitable. Dredge spoil disposal in a wetland not permitted unless sediments sampled in accordance with approved protocol, transport route is publicly noticed, adjacent municipalities have approved. NPRA

Resources

- ME NRPA:
<https://www.maine.gov/dep/land/nrpa>
- Applications to Dredge or to Dispose of Dredged Material in Coastal Waters:
<https://www.maine.gov/dep/land/nrpa/fsdredg.htm>





Maryland State Profile

Introduction

Beneficial use policy in Maryland is guided by the Dredged Material Management Act, which establishes a hierarchy of preferred dredged material management practices with innovative use and beneficial use at the top. The Act establishes the Maryland Dredged Material Management Program to implement a 20-year capacity and placement plan for Port of Baltimore dredging needs. Through the DMMP, MDOT Maryland Port Administration and USACE have implemented a long-term partnership, in collaboration with agencies and community stakeholders, to direct two decades of clean navigation channel sediment to rebuild Poplar Island, a heavily-eroded Chesapeake Bay island. In partnership with relevant agencies, communities, and industry, the state has also invested in a range of in-water/habitat placement pilot projects and innovative upland use research efforts.

The Maryland Department of the Environment (MDE) administered a joint permit review process with USACE Baltimore District, including a State Programmatic General Permit minor and maintenance dredging which authorizes limited placement for beach nourishment or marsh creation.

Permit Table

Permit	Authority	Description
Tidal Wetlands License	COMAR 26.24	For projects on state-owned wetlands. Administered by the Board of Public Works on recommendation from MDE.
Individual Tidal Wetlands Permit	COMAR 26.17.04	For projects on privately-owned tidal wetlands. Administered by MDE.
Individual Non-Tidal Wetlands/Waterways Permit	COMAR 26.23	For projects on privately-owned nontidal wetlands and waterways of the state. Administered by MDE.
Maryland State Programmatic General Permit 6	33 U.S.C. 1344	For dredging <500cy. Administered by MDE.
Water Quality Certification	COMAR 26.08	Administered by MDE.
Federal Consistency	Various, see coastal program.	Administered by Department of Natural Resources, Chesapeake and Coastal Service.

Policies

- **BUDM Encouraged:** Through statewide dredged material management planning, beneficial use and innovative use are prioritized over other disposal methods. MD. Environment Code § 5-1104.2.
- **BUDM Encouraged:** Maryland works with dredging applicants to match sediment with projects in need of BU material. Authorized beneficial uses of dredged material include: restoration of underwater grasses; restoration of islands; stabilization of eroding shorelines; replenishment of beach areas; creation or restoration of wetlands; and creation, restoration, or enhancement of fish or shellfish habitats. MD. Environment Code, § 5-1101(a)(3).
- **NBS Required:** Erosion control projects must consist of marsh creation or other nonstructural shoreline stabilization measures that preserve the natural environment unless a Waiver is obtained. COMAR 26.24.04.01.
- **Hydrodynamics Required:** Material placement may not cause adverse impacts to existing navigation channels, longshore current patterns, or adjacent properties. COMAR 26.24.03.05(D)(1).

Physical Sediment Conditions

- **Qualitative:** Placed dredged material must be equal to or larger in size than sediments at the placement location, unless measures are taken to control its movement. COMAR 26.24.03.05(C)(1).
- **Qualitative:** For beach nourishment projects, fill material grain size shall be equal to or greater in grain size and character to the existing beach material, or determined otherwise to be compatible with existing site conditions and acceptable to the Department. Silt and clay fills that change the sandy nature of the existing beach materials are not acceptable. COMAR 26.24.03.06(D)(1,3).
- **Quantitative:** Placed material may not contain more than 10 % silts and clays unless measures are taken to control the dredged material's movement. COMAR 26.24.03.05(D)(2).
- For beach nourishment projects, gravel fill may be acceptable if particle sizes are equal to or greater than existing beach materials. COMAR 26.24.03.06(D)(4).
- The Innovative use and Beneficial Use of Dredged Material Guidance Document provides testing standards.

Sand Source

- Testing standards provided in guidance vary for sediments from Baltimore Harbor vs. those from elsewhere in the state; project-specific requirements are determined on a case-by-case basis.

Water Quality

- Maryland may require an application to submit information on "Predicted impacts of the fill on tidal wetlands, water quality, and aquatic habitat, including leaching or dispersion of pollutants," and "Methods to ensure that the fill does not adversely affect water quality during and after construction." COMAR 26.24.03.06(B)(4,9).
- Placed dredged material must be relatively free of organic material. COMAR 26.24.03.05(C)(2).
- Turbidity shall be minimized during the disposal operation. COMAR 26.24.03.05(D)(4).
- The Innovative use and Beneficial Use of Dredged Material Guidance Document provides testing standards and screening criteria.

Endangered Species & Critical Habitat

- **Avoid:** Adverse impacts on fish spawning, nursery, and migration patterns shall be prevented. Adverse impacts on vegetated tidal wetlands, submerged aquatic vegetation, chartered natural oyster bars, and anadromous fish spawning and nursery grounds shall be minimized. COMAR 26.24.03.05(D).

Placement Guidelines & Restrictions

- For beach nourishment projects, fill material must be placed above the mean high water line before final grading to achieve the desired beach profile, unless site conditions prohibit the placement of fill material above the mean high water line and specific measures are designed to prevent material from washing away from the site. COMAR 26.24.03.06(D)(5).
- Dredged material that does not match a marsh placement location grain size may be beneficially used if breakwaters, groins, or other similar structures are installed to control its movement. COMAR 26.24.03.05(C)(1).

Resources

- **Permit Guide 3.18 (tidal wetland licenses):**
<https://mde.maryland.gov/programs/Permits/Documents/2008permitguide/WMA/3.18.pdf>
- **Permit Guide 3.19 (nontidal wetlands):**
<https://mde.maryland.gov/programs/Permits/Documents/2008permitguide/WMA/3.19.pdf>
- **Innovative use and Beneficial Use of Dredged Material Guidance Document:**
https://mde.maryland.gov/programs/Marylander/Documents/Dredging/FINAL_IBR_GUIDANCE_12.05.2019_MDE.pdf
- **Instructions for Short Form:**
https://mde.maryland.gov/programs/Water/WetlandsandWaterways/PermitsandApplications/Pages/tidal_instructions.aspx
- **Shore Erosion Control Guidelines - Marsh Creation:**
<https://mde.maryland.gov/programs/Water/WetlandsandWaterways/PermitsandApplications/Documents/www.mde.state.md.us/assets/document/wetlandswaterways/Shoreerosion.pdf>
- **Shore Erosion Control Guidelines for Waterfront Property Owners:**
<https://mde.maryland.gov/programs/Water/WetlandsandWaterways/PermitsandApplications/Documents/www.mde.state.md.us/assets/document/wetlandswaterways/Shoreerostext.pdf>
- **Shoreline Stabilization Factsheets:**
https://mde.maryland.gov/programs/Water/WetlandsandWaterways/PermitsandApplications/Pages/shore_stabilization.aspx
- **Coastal Wetlands of Maryland:**
<https://mde.maryland.gov/programs/Water/WetlandsandWaterways/PermitsandApplications/Documents/www.mde.state.md.us/assets/document/wetlandswaterways/CoastalWetlands.pdf>
- **Buffer Notification Form and Buffer Management Plans:**
<http://dnr.maryland.gov/criticalarea/Pages/sec.aspx>
- **Living Shoreline Waiver:**
<https://mde.maryland.gov/programs/Water/WetlandsandWaterways/Pages/LivingShorelines.aspx>
- **Structural Shoreline Stabilization Map:**
<https://mde.maryland.gov/programs/water/wetlandsandwaterways/documentsandinformation/pages/wetlandtidalshoremeps.aspx>
- **Residential Dredging Fact Sheet:**
<https://mde.maryland.gov/programs/Marylander/Documents/Residential%20Dredging%20Fact%20Sheet%20Final%20203-25-21.pdf>

Resources - Continued

- **BUILD tool to identify BUDM projects:**

<https://maryland.maps.arcgis.com/apps/MapSeries/index.html?appid=d0c99b4a4b564a6age8d6ff665c7b2d1>

- **Maryland State Programmatic General Permit 6**

<https://www.nab.usace.army.mil/Portals/63/MDSPGP-6%20Permit%20Final%20with%20Appendicies%2020210930.pdf>





Massachusetts State Profile

Introduction

The Massachusetts Department of Environmental Protection (MassDEP) regulates dredging and beneficial placement in the state. Local, state, and federal entities conduct dredging projects in MA. The state is proactive about finding uses for dredged sand and strong proponent of BUDM. A state Environmental Protection Act regulates complex dredging projects and relevant federal agencies are consulted for all coastal projects.

Permit Table

Permit	Authority	Description
Waterways Permit	Chapter 91, The Massachusetts Public Waterfront Act	Required for any activity located in, under, or over flowed tidelands, filled tidelands, such as the beneficial use of dredged sediment as beach fill.
Water Quality Certification	314 CMR 9.03(1) through (8)	401 Water Quality Certification is not required for certain listed activities provided the specified conditions are met (e.g., beach nourishment)
Water Quality Certification	314 CMR 9.04(1) through (13)	401 Water Quality Certification is required and listed activities are subject to the Criteria for Evaluation of Applications for the Discharge of Dredged or Fill Material in 314 CMR 9.06 and/or 9.07 (e.g., dredging in an Outstanding Resource Water per 314 CMR 4.00)
Public Trust Statute	Chapter 91 310 CMR 9.00	
Wetlands Protection Act (WPA)	M.G.L. c. 131, § 40 310 CMR 10.00	Enforced at local level due to home rule, local conservation commissions issue conditions
	Mass. Gen. Laws ch. 30 §§ 61-62I 301 CMR 11.00	If project triggers certain environmental thresholds, must go through a Massachusetts Environmental Policy Act (MEPA) review prior to issuance of state permit and federal consistency review.
MA Endangered Species Act	321 CMR 10.00	Projects must avoid or minimize damage to endangered species or their habitats

Policies

- **BUDM Required:** If a dredging project is publicly funded, it is state policy that any clean compatible dredge material be placed on the closest public beach. Ensure that dredging and disposal of dredged material take full advantage of opportunities for beneficial re-use. Mass CSZ Policy Guide: Ports and Harbors Policy #1
- **BUDM Required:** Dredged material shall not be disposed if a feasible alternative exists that involves the use, recycling, or contaminant destruction and/or detoxification. 314 CMR 9.07 (e)
- **NBS Encouraged:** Non-structural alternatives, such as beach and coastal bank nourishment, dune rebuilding, and stabilization by vegetative plantings, should be favored over structural measures where feasible. Structures are becoming increasingly recognized as expensive short-term solutions, which frequently exacerbate problems elsewhere along the coast and foster a false sense of security. Mass CZM Policy Guide: Coastal Hazards Policy #1
- **Hydrodynamics Required:** Ensure that dredging and disposal of dredged material minimize adverse effects on physical processes. Removal of nearshore material must not lead to increased erosion or other adverse changes to the shoreline. Dredging projects will not cause a significant increase in the volume or velocity of water or a permanent change in circulation patterns. Mass CSZ Policy Guide: Ports and Harbors Policy #1.

Physical Sediment Conditions

- **Qualitative:** Grain size of the source material should be the same size or larger than the native beach sand to minimize erosion. MassDEP's Guide to BMPs for Projects in MA
- **Quantitative:** Sediment must not exceed 10% fine material. MassDEP's Guide to BMPs for Projects in MA

Sand Source

- N/A

Water Quality

- The unconfined ocean disposal of contaminated dredged material is prohibited. Mass CSZ Policy Guide: Ports and Harbors Policy #1
- Turbidity control required during dredging projects. Massachusetts Clean Waters Act, M.G.L. c. 21, §§ 26-53, 314 CMR 3.00, 4.00, 9.00

Endangered Species & Critical Habitat

- **Avoid:** Avoid or minimize damage to endangered species or their habitats. 321 CMR 10.00, MA Endangered Species Act
- Dredging shall not be undertaken during migration, spawning or juvenile development periods of finfish, shellfish, crustaceans or merostomatans in locations where such organisms may be affected, except as specifically approved by the Department. 314 CMR 9.07 (3) (d)

Placement Guidelines & Restrictions

- Sand should be placed downdrift. MassDEP's Guide to BMPs for Projects in MA
- Discharge of dredged sediment may only occur if no alternative exists that would be less harmful. 314 CMR 4.00

Resources

- **Mass CZM Policy Guide:**

<https://www.mass.gov/doc/massachusetts-office-of-coastal-zone-management-policy-guide/download>

- **MassDEP's Guide to BMPs for Projects in MA:**

<https://www.mass.gov/doc/beach-nourishment-massdeps-guide-to-best-management-practices-for-projects-in-ma/download>

- **Applying the Massachusetts Coastal Wetlands Regulations:**

A Practical Manual for Conservation Commissions to Protect the Storm Damage Prevention and Flood Control Functions of Coastal Resource Areas (The Coastal Manual):

<https://www.mass.gov/files/documents/2020/10/14/czm-coastal-manual-2020-update.pdf>





Michigan State Profile

Introduction

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) coordinates with USACE Detroit District on dredged material management and beneficial use opportunities. Permits are required from both of these agencies for any dredging or discharge of fill activity in Great Lakes coastal waters. Where a federal permit is required for a project, the state permit provides the water quality certification and the federal consistency certification. In addition to the use of dredged material for beach nourishment on Great Lakes shorelines, the Corps is increasingly interested in beneficial use disposal options for federal navigation channels in Great Lakes connecting channels, which are three major rivers including the St. Marys River, St. Clair River, and Detroit River.

Dredging, discharge of fill, and other projects in the Great Lakes, Great Lakes connecting channels, and other Rivers and Harbors Act section 10 waters are reviewed through a joint permit application process between Detroit District and EGLE's Water Resources Division. CWA section 404 authorization is provided through the state permit unless a federal permit is required; Michigan has assumed CWA section 404 regulatory responsibility within its boundaries, except for section 10 waters where USACE still administers 404 permitting. For BUDM projects involving beach nourishment or voluntary wetland restoration, EGLE coordinates with the Department of Natural Resources. EGLE provides guidance and support for shoreline management best practices, including as a founding member of the Michigan Natural Shoreline Partnership.

Permit Table

Permit	Authority	Description
Part 325 Great Lakes Submerged Lands permit	MCL 324.32501 <i>et seq.</i>	For dredging and discharge of fill in Great Lakes waters. Administered by the Department of Environment, Great Lakes, and Energy.
Part 301 Inland lakes & Streams permit	MCL 324.30101 <i>et seq.</i>	For dredging and discharge of fill in Great Lakes connecting channels. Administered by the Department of Environment, Great Lakes, and Energy.
Great Lakes bottomlands leasing/conveyance process	MCL 324.32501 <i>et seq.</i>	Required for certain uses of state-owned Great Lakes bottomlands. Administered by the Department of Environment, Great Lakes, and Energy.

Permit Table - Continued

Permit	Authority	Description
Part 303 Wetlands Protection permit	MCL 324.30301 <i>et seq.</i>	For dredging, discharge of fill, and habitat restoration in wetlands. Administered by the Department of Environment, Great Lakes, and Energy.
Part 365 Endangered Species Protection authorization	MCL 324.36501 <i>et seq.</i>	For activities that may impact plants and animals on Michigan's list of threatened and endangered species. Administered by the Department of Natural Resources.
Water Quality Certification	MCL 324.3101 <i>et seq.</i> MAC R 323.1041 <i>et seq.</i> (Part 4 water quality standards)	Administered by the Department of Environment, Great Lakes, and Energy.
Federal Consistency	Various; see coastal program	Administered by the Department of Environment, Great Lakes, and Energy.

Policies

- **No statewide policy for BUDM:** Dredging regulations and general permits allow, but do not establish a preference for, certain beneficial uses for beach nourishment.
- **NBS Encouraged:** Michigan incentivizes the use of natural solutions focused on inland lakes and streams with less dynamic shoreline processes, but does not have preference policies that would come directly into play in a coastal BUDM project. The coastal program has identified promotion of nature-based solutions as a priority and provides cost-share grants to local governments for small coastal restoration projects.
- **Hydrodynamics Required:** Filling, dredging, and placement must cause the least disruption to the littoral drift and longshore processes, or mitigate disruptions. Mich. Admin. Code r. 322.1011(c).
- **Hydrodynamics Required:** Monitoring is required at EGLE's discretion to ensure that injury to the riparian interests of adjacent property owners does not occur, including monitoring the littoral drift in the project areas. Mich. Admin. Code r. 322.1011(d).

Physical Sediment Conditions

- **Quantitative:** Sand for beach nourishment must be retained by Standard Sieve #200. DEQ WRD-045 at 2.
- **Quantitative:** At least 90% of dredged sediment used for beach nourishment must be sand. DEQ WRD-045 at 2.

Sand Source

- N/A

Water Quality

- The activity will not violate any state water quality law, including those governing the classification of the State's waters. PL 1987, c. 809, §2

Endangered Species & Critical Habitat

- **Avoid:** Take of plants and animals on Michigan's list of threatened and endangered species is prohibited unless authorized by the Department of Natural Resources. MCL 324.36505.
- **Mitigate:** Adverse effects to the environment, public trust, and riparian interests must be minimized and mitigated, and there must be no less harmful, feasible, and prudent alternative. Mich. Admin. Code r. 322.1015.
- **Avoid:** Spawning closures on Great Lakes and inland lakes and streams are established periodically via Department of Natural Resources Fisheries Orders.

Placement Guidelines & Restrictions

- Sediment must be placed landward of the 6ft contour (or out to 12ft for previously authorized projects). DEQ WRD-045 at 2.

Resources

- **DEQ WRD-045: Placement of Dredged Material on Great Lakes Bottomlands (guidance)**
https://www.michigan.gov/documents/deq/wrd-policy-045-dredged-material-on-bottomlands_489492_7.pdf
- **DEQ WRD-048 Sediment Testing for Dredging Projects (guidance)**
https://www.michigan.gov/documents/deq/wrd-policy-048-sediment-testing_620980_7.pdf





Minnesota State Profile

Introduction

Dredged material is managed through Minnesota's water quality program, which categorizes sediment into one of three "management levels" based on suitability analysis; approved uses are specified according to management level that is guided by Soil Reference Values for upland placement and Sediment Quality Targets for in-water placement, both established by the Minnesota Pollution Control Agency. Sediment greater than 93% sand is exempt from contaminant testing for upland placement. In-water placement also requires a Public Waters Work Permit by the Department of Natural Resources.

Water regulations allow for beneficial use of dredged material to create or improve habitat areas for fish and wildlife; they also include disfavorable language allowing use for erosion control "when there are no other feasible, practical, and ecologically acceptable means to protect the shoreline" or for wetland mitigation when "there are no other feasible, practical, and ecologically acceptable mitigative measures."

Permit Table

Permit	Authority	Description
State Disposal System individual permit	Minn. R. 7001.3050.	For disposal of dredged material, including use applications, if sourced from designated areas at/near Lake Superior. Administered by the Pollution Control Agency.
Public Waters Work Permit	Minn. R. 6115.0150 <i>et seq.</i>	For placement below Ordinary High Water (OHW) level. Administered by Department of Natural Resources.
Water Quality Certification	Minn. R. 7001.1400 <i>et seq.</i>	Administered by Pollution Control Agency.
Federal Consistency	Various; see coastal program	Administered by Department of Natural Resources.
Beach Creation and Nourishment RGP	CWA 404; RH 10	For small projects (<50ft). Administered by St. Paul District.

Policies

- **BUDM Encouraged:** "Use or use of dredged material, where suitable, is highly recommended as a management option by the MPCA." MPCA Dredged Material Management Manual at 25. Use/use as a beach amendment or in-water disposal to support a legitimate purpose is considered on a case-by-case basis in the context of an individual permit. Deep water disposal is not authorized.
- **BUDM Encouraged:** Dredge projects of less than 3000 cy of sediment that is greater than or equal to 93% sand are exempt from solid waste permitting. MPCA Dredged Material Management Manual at 6.
- **BUDM Encouraged:** Permit requirements establish a hierarchical preference for dredge disposal options. One option (4th on the list) provides that "redeposition of excavated materials, consisting of inorganic materials free from pollutants, into public waters shall only be permitted when it will result in improvement of natural conditions of public waters for the public benefit and will not result in sedimentation, obstruction of navigation, or a loss of fish or wildlife habitat." Minn. R. 6115.0200(5)(B)(2); see also Minn. R. 6115.0216(6).
- **BUDM Encouraged:** A USACE RGP is available for small projects (50ft), and are exempted from Public Waters Work permit requirements. Minn. R. 6115.0190(4)(A).
- **NBS Encouraged:** The DNR recommends a natural approach to shoreline stabilization through the establishment and maintenance of natural vegetation.
- **Hydrodynamics Required:** Placed dredge material may not result in sedimentation or obstruction of navigation. Minn. R. 6115.0200(5)(B)(2)(d).

Physical Sediment Conditions

- **Quantitative:** Dredge projects of less than 3000 cy of sediment that is greater than or equal to 93% sand are exempt from solid waste permitting. MPCA Dredged Material Management Manual at 6.

Sand Source

- N/A

Water Quality

- Dredged materials from navigation sites at/near Lake Superior are classified into one of three management levels according to contamination thresholds. The lowest tier is acceptable for the broadest array of placement sites. MPCA Dredged Material Management Manual at 15.
- Sediment that is greater than or equal to 93% sand are exempt from contaminant testing. MPCA Dredged Material Management Manual at 10.
- Fill must consist of clean inorganic material that is free of pollutants and nutrients. Minn. R. 6115.0190(5)(B).
- Fill placement may require erosion control structures. Minn. R. 6115.0190(5)(D).

Endangered Species & Critical Habitat

- **Avoid:** Placed dredge material may not result in loss of fish or wildlife habitat. Projects must minimize encroachment, change, or damage to the ecology of the waterway. Work in water is restricted from April 1 through June 30 for gamefish spawning/incubation in inland waters. Work in water is restricted from October 1 through May 30 in Lake Superior. Impacts to wetlands must be mitigated through a replacement plan (exempt for certain restoration activities). Minn. R. 6115.0190.0200.

Placement Guidelines & Restrictions

- Placement of fill material in public waters is regulated by the MN DNR according to MN Rules 6115.0190 & 6115.0191. It is the goal of the MN DNR to limit the placement of any fill material into public waters in order to:
 - Minimize encroachment, change, or damage to the environment;
 - Regulate the quantity and quality of fill and the purposes for which filling may be allowed; and
 - Maintain consistency with floodplain, shoreland, and wild and scenic rivers management standards and ordinances.

Resources

- **MPCA Dredged Material Management Manual (2014)**
<https://www.pca.state.mn.us/sites/default/files/wq-gen2-01.pdf>
- **Best Management Practices for the Management of Dredged Material**
<https://www.pca.state.mn.us/business-with-us/dredged-materials-management>





Mississippi State Profile

Introduction

Mississippi guides and incentivizes BUDM through the Beneficial Use Group (BUG), launched in 2008, co-facilitated by the MS Department of Marine Resources (MDMR) and USACE Mobile District, and convening federal, state, and private stakeholders (e.g., local ports). Building on work since 2002 by state partners, the USACE Mobile District through the Gulf Regional Sediment Management Master Plan, and the Gulf of Mexico Alliance Habitat Team, BUG was instrumental in introducing a 2011 amendment to the Coastal Wetlands Protection Act establishing a statewide beneficial use requirement for eligible dredged material. The provision requires dredging projects greater than 2,500cy to work with the state BU program, administered by the MDMR Office of Coastal Resources Management, to identify BUDM placement sites unless the project is conducted by an exempt agency or funded by a grant program or local bond. The BU program permits and manages designated marsh and habitat restoration sites where the dredged sediments can be placed; the state seeks to provide “one-stop permitting” through MDMR for permitting in the coastal area.

Mississippi uses the 2011 Beneficial Use Master Plan (updated from the original released in 2002) to coordinate this process. The 2011 update included a comprehensive sediment budget study for Mississippi barrier islands and the sound (led by the USACE/USGS Mississippi Coastal Improvements Program), an inventory of potential BU sites and designs, and sediment testing protocols based on USACE and EPA guidance using simplified analytical, toxicity, and chemical testing. Using this foundation, BUG initiates permitting actions for BU sites across the coast, taking an active role in developing placement opportunities to match with dredge projects. Through the Mississippi Coastal Program, MDMR has identified enhancing policies and procedures for BUDM, with a focus on sediment suitability assessment, as a strategic priority.

Permit Table

Permit	Authority	Description
Wetlands Permit	MS Code § 49-27-9	For dredging, beach nourishment, and fill placement in coastal wetlands. Administered by Dept of Marine Resources.
DEQ Permit	11 Miss. Admin. Code Pt. 6, Ch. 2.	For discharges into state waters. Administered by Commission on Environmental Quality.
Standard Tidelands	MS Code § 29-1-107;	Administered by Secretary of State.

Permit Table - Continued

Permit	Authority	Description
Water Quality Certification	MS Code § 49-17-28	Administered by Commission on Environmental Quality.
Federal Consistency	MS Code § 57-15-6	Administered by Dept of Marine Resources

Policies

- BUDM Required:** "The department shall require any party permitted to conduct dredging activities of over ... 2,500 cubic yards to participate in the department programs involving beneficial use of dredge materials, provided the material is suitable and a beneficial use site is available." MS Code § 49-27-61.
 - BUDM Required:** "All dredged material will be viewed as a potential reusable resource, and all disposal plans must include provisions for access to such resources. Dredged material suitable for beach replenishment, habitat restoration and enhancement, construction, or other purposes (sanitary landfill, agricultural soil improvement, etc.) must be used immediately for such purposes or stockpiled in designated beneficial use staging areas or other non-wetland areas for later use. All projects involving the removal of over two thousand five hundred (2500) cubic yards of dredged material must evaluate the dredged material in accordance with approved procedures to determine suitability. All dredged material determined to be suitable for beneficial uses must participate in the Department programs involving beneficial use." 22 Miss. Code R. § 23-08-107.
 - BUDM Encouraged:** "If approved ... a party may deposit acceptable dredge materials in a designated location for a fee not to exceed ... 50% of the fair market cost to transport and dispose of the material in an approved upland site. The department shall consider in-kind services for offsetting depositional charges." MS Code § 49-27-61; 22 Miss. Code. R. § 23-06-109.03.
- NBS Required:** Under wetland permit standards applicable to erosion control activities, "nonstructural methods must be used in preference to structural methods. Vegetation as a nonstructural method is preferred to structural methods of sloping (3:1) rip-rap, and rip-rap is preferred to vertical seawalls. Vertical face bulkheads may be used only in low energy areas ..." 22 Miss. Code R. § 23-08-103.
- NBS Encouraged:** Wetland permitting and public trust leasing requirements "favor the preservation of the natural state of the public trust tidelands and their ecosystems..." MS Code § 49-27-9; 22 Miss. Code. R. § 23-06-102 (wetland permitting); 1 Miss. Code R. § 11-2.4 (public lands leasing).
 - NBS Encouraged:** "All public projects of any federal, state or local governmental entity which serve a higher public purpose of promoting the conservation, reclamation, preservation of the tidelands and submerged lands, public use for fishing, recreation or navigation, or the enhancement of public access to such lands shall be exempt from any [public trust tidelands] use or rental fees." MS Code § 29-15-13.
 - Hydrodynamics Required:** Activities in or affecting wetlands are reviewed for impacts to the natural supply of sediment and nutrients to the coastal wetlands, sediment transport processes, water flow, and natural circulation. 22 Miss. Code. R. § 23-08-113.
 - Hydrodynamics Required:** Under wetland permit standards applicable to erosion control activities, "[s]tructural methods may be used only when there is a reasonable probability of controlling erosion at the immediate site, and where the structure will not significantly increase erosion in nearby areas." 22 Miss. Code R. § 23-08-103.
 - Hydrodynamics Encouraged:** Wetland permit application review includes assessment of cumulative impacts and direct and indirect effects on the biological integrity and productivity of coastal wetlands communities and ecosystems. 22 Miss. Code R. § 23-06-103.

Physical Sediment Conditions

- **Qualitative:** All dredging projects above the 2,500 cy threshold are required to "evaluate the dredged material in accordance with approved procedures to determine suitability." 22 Miss. Code R. § 23-08-107

Sand Source

- N/A

Water Quality

- "Fill material must be nontoxic and either stabilized or of sufficient size as to not be displaced during typical storm tides. Beach nourishment does not require stabilization." 22 Miss. Code R. § 23-08-114.04.
- State water quality standards are applied through the wetlands permit and water quality certification process. Conditions or monitoring requirements may be imposed, including "bioassays to determine potential water quality impacts of dredged material in accordance with EPA approved methods and/or the methods set forth in" regulation. 11 Miss. Admin. Code Pt. 6, Ch. 1, Rule 1.3.1 § B(7).

Endangered Species & Critical Habitat

- **Minimize:** DMR conducts consultation with the Mississippi Natural Heritage Program and the U.S. Fish and Wildlife Service concerning wetland permit applications for projects that may affect endangered flora and fauna. 22 Miss. Code R. § 23-06-103.11.05.

Placement Guidelines & Restrictions

- N/A

Resources

- **MDMR BUDM webpage**
<https://dmr.ms.gov/beneficial-use>





New Hampshire State Profile

Introduction

The N.H. Wetlands Bureau regulates dredging and filling and modifying sand dunes. The N.H. Coastal Program is responsible for federal consistency review of these types of projects. Tidal dredging in New Hampshire is facilitated by the Dredge Management Task Force (DMTF). No statute mandates the task force. It consists of representatives from various federal (e.g., U.S. Army Corps of Engineers New England District (NAE), NOAA National Marine Fisheries Service) and state agencies (e.g., Dept of Environmental Services, Fish and Game Department, Port Authority as well as staff of the congressional delegation. The task force facilitates the state and federal permitting processes.

Permit Table

Permit	Authority	Description
N.H. Wetlands Bureau Permit	N.H. Rev. Stat. Ann. (RSA) §482-A. I. Fill and Dredge in Wetlands Act	This permit is required for dredging and filling and for modifying sand dunes.
State Water Quality	Shoreland Water Quality Protection Act (SWQPA) RSA 485-A	Water Pollution and Waste Disposal 401 certification
Grant of Rights	RSA 482-A:22	Required for use of public lands for dredging or filling

Policies

- **BUDM Encouraged:** Encourage beach renourishment and wildlife habitat restoration as a means of dredge disposal whenever compatible. Coastal Program Policy #14
- **BUDM Encouraged:** The primary acceptable means of disposal for uncontaminated sediments shall be for beneficial use, such as beach nourishment, dune restoration, and shoal creation associated with living shorelines. Ch. Env-Wt 607.09 (e)
- **NBS Required:** Living Shorelines required for tidal shoreline stabilization unless not practicable. Ch Env-Wt 609.07

Policies - Continued

- **NBS Required:** New seawalls or riprap is prohibited with some exceptions. Ch Env-Wt 609.07 and .09
- **NBS Encouraged:** Living Shorelines are preferred means of stabilizing tidal shorelines. Ch Env-Wt 609.04 (a).
- **Hydrodynamics Required:** Impacts on fishery habitat shall be identified including alteration of hydrology or water dynamics. Ch 607.05 e. Tidal shoreline stabilization projects must avoid adverse effects on the property or surrounding properties such as increased erosion due to deflection of waves or currents. Ch 609.10(b)(5)

Physical Sediment Conditions

- **Qualitative:** Beach nourishment material shall be compatible with existing for grain size, shape, and color. If not virgin beach nourishment material, must be tested for contaminants. Ch Env-Wt 608.04 (b)(1 & 2). Sediment must be characterized according to grain size. Sediment from proposed dredge site shall be characterized according to history of exposure to contamination sources and benthic analysis. Ch Env-Wt 607.05 (g) (1-3)

Sand Source

- N/A

Water Quality

- Dredging fines shall be avoided to reduce turbidity. All practicable methods for minimizing suspended sediment and turbidity shall be employed, including closed buckets when appropriate. Dispersion modeling is required to avoid impacts from turbidity and contaminants. Ch. Env-Wt 607.07-.09

Endangered Species & Critical Habitat

- **Avoid:** No impacts to protected species or habitat shall be allowed with some exceptions. Ch.Env-Wt 609.10 (b) (2)
- **Avoid:** Dredging can only occur Nov 15 - Mar 15 to avoid impacts to fish and shellfish resources. Ch Env-Wt 307.10(i). Sequential dredging shall be used when practicable to avoid dredging activity during specific time periods in environmentally sensitive areas, to avoid turbidity and sedimentation, bottom disruption, and noise in sensitive areas used by fishery resources during spawning, migration, and egg development. Ch Env-Wt 607.02

Placement Guidelines & Restrictions

- Near-shore disposal of dredged material with the intent of creating a berm to provide a sand source for a nearby sandy beach shall be considered beneficial use. Ch. Env-Wt 607.09(f)

Resources

- **Wetlands and Shoreland Permit Applications: Processing Guide for City and Town Clerks:**
<https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/wetlands-city-town-clerk-guidance.pdf>
- **NH Living Shoreline Site Suitability Assessment:**
<https://www.des.nh.gov/sites/g/files/ehbemt341/files/documents/2020-01/r-wd-19-19.pdf>
- **NH Department of Environmental Services, Coastal Waters:**
<https://www.des.nh.gov/water/coastal-waters>





New Jersey State Profile

Introduction

New Jersey has a longstanding policy to maximize the beneficial use of dredged material, including through shoreline placement projects. The state has set a standard to use at least 75% of sand dredged in the state for beach nourishment, with a target of 90%. The New Jersey Department of Transportation Office of Maritime Resources collaborates with USACE, state agencies, and coastal communities to coordinate its dredging schedule with beach nourishment, habitat restoration and creation, shoreline stabilization, and upland beneficial use opportunities.

Shoreline placement projects require review under the Waterfront Development Law, applying to development on or adjacent to tidal waterways, the Wetlands Act, and Coastal Area Facility Review Act, which regulates installations and shore protection structures within the CAFRA area, covering a major part of the state's ocean coast. New Jersey has also assumed administration of the Clean Water Act 404 permit program. Sediment condition, testing, and best practice requirements for beach nourishment and habitat development projects are set out in Appendix G to the Coastal Zone Management Rules (N.J.A.C. 7:7). Habitat restoration and creation projects are authorized under a general permit (GP24). Beach nourishment projects will typically require an individual permit under the Coastal Area Facility Review Act, although some (e.g., for shorebird habitat restoration) may fall under GP24.

Permit Table

Permit	Authority	Description
Waterfront Development Individual Permit	N.J.S.A. 12:5-1 et seq	For development on or adjacent to tidal waterways. Administered by the Department of Environmental Protection.
Coastal Area Facility Review Act	N.J.S.A. 13:19-1 et seq	Regulates installations and shore protection structures within the CAFRA area. Administered by the Department of Environmental Protection.
NJPDES Discharge to Surface Water permit	N.J.A.C. 7:9B	May be required for dewatering of material not from the same waterbody as the placement site. Administered by the Department of Environmental Protection.
Water Quality Certificate	N.J.A.C. 7:9B	May be required for dewatering of material from the same waterbody as the placement site. Administered by the Department of Environmental Protection.

Permit Table - Continued

Permit	Authority	Description
Federal Consistency Determination	N.J.A.C. 7:7	Administered by the Department of Environmental Protection.
General Permit 24	N.J.A.C. 7:7	Authorizes habitat creation, restoration, enhancement, and living shoreline activities, including placement of fill.

Policies

- **BUDM Encouraged:** The beneficial use of dredged material of appropriate quality and particle size for purposes such as restoring landscape, ... beach protection, creating marshes, ... and making new wildlife habitats is encouraged. N.J.A.C. 7:7-15.12(d).
- **BUDM Encouraged:** Uncontaminated dredged sediments with 75% sand or greater are generally encouraged for beach nourishment. N.J.A.C. 7:7-12.g(b)(6).
- **BUDM Encouraged:** The Department encourages the renourishment of eroding beaches through the placement of clean sand of acceptable grain size composition. N.J.A.C. 7:7 Appendix G.
- **NBS Required:** Non-structural shore protection and/or storm damage reduction measures that allow for the growth of vegetation shall be used unless it is demonstrated that use of non-structural measures is not feasible or practicable. N.J.A.C. 7:7-15.11(b)(1).
- **Hydrodynamics Required (subset):** Applicants to use general permits must indicate through their compliance statement that the proposed project will not impact longshore transport or sediment supply. N.J.A.C. 7:7-23.5.
- **Hydrodynamics Required:** Project proponents must demonstrate that sediment deposition will not cause unacceptable shoaling in downdrift inlets and navigation channels. N.J.A.C. 7:7-15.11(f)(3).

Physical Sediment Conditions

- **Quantitative:** For beach nourishment use, sediment must be 75% or greater sand (grain size larger than 0.0625 mm) with a grain size compatible with that of the receiving beach. Appendix G, § IV-C(3).
- Contaminant testing is required for beach nourishment material less than 90 percent sand (grain size >0.0625 mm) or if other background information indicates the material may be contaminated. The use of dredged material to develop wetlands habitats may require project-specific permits with specific conditions. N.J.A.C. 7:7-12.7(c)(10) (new dredging); N.J.A.C. 7:7-12.6(c)(2) (maintenance dredging).
- Contaminant testing for stand placement is waived if 90% of the source sand has grain size > 0.0625 mm. N.J.A.C. 7:7 Appendix G, § III-C.

Sand Source

- N/A

Water Quality

- Turbidity concentrations and other water quality parameters at, downstream, and upstream of the dredging site shall meet applicable Surface Water Quality Standards at N.J.A.C. 7:9B. Dredging procedures lay out a menu of best practices that may be required, including silt curtains and timing restriction. N.J.A.C. 7:7-12.7(c)(10) (new dredging); N.J.A.C. 7:7-12.6(c)(3) (maintenance dredging).

Endangered Species & Critical Habitat (SSBN Guide)

- **Avoid:** The Department may impose seasonal restrictions for projects within proximity of protected habitat types. N.J.A.C. 7:7-12.7(c)(10) (new dredging); N.J.A.C. 7:7-12.6(c)(7) (maintenance dredging). Dredging procedures lay out a menu of best practices that may be required, including seasonal/migratory restrictions. N.J.A.C. 7:7 Appendix G
- **Avoid:** New dredging should avoid impacting areas of ecological importance. N.J.A.C. 7:7 Appendix G.
- **Avoid/Minimize:** Projects requiring individual permits are subject to endangered & threatened species protections. N.J.A.C. 7:7-9.36; 9.37.

Placement Guidelines & Restrictions

- Filling in natural water areas is discouraged and filling wetlands areas is prohibited. Such activity requires a demonstration that there is no practicable or feasible land alternative. N.J.A.C. 7:7-12.11.
- For wetland habitat creation, in order to prevent the physical dispersal of the placed dredged material, low wave/current energy, shallow water sites should be used for wetland creation projects. N.J.A.C. 7:7 Appendix G.

Resources

- **The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters (Appendix G)**
https://www.nj.gov/dep/rules/rules/njac7_7.pdf
- **Restoration of Sand Dunes Along the Mid-Atlantic Coast (Soil Conservation Service, 1992)**
https://www.nj.gov/dep/landuse/download/cp_036.pdf
- **USACE Engineer Manual EM 1110-2-5026 (30 June 1987), Beneficial Uses of Dredged Material** https://budm.el.erdc.dren.mil/guidance/EM_1110-2-5026.pdf
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New York State Profile

Introduction

New York offers guidance and programmatic support for in-water and riparian BUDM placement, but does not currently have standing regulatory policies addressing shoreline placement BUDM - although incentives are in place through solid waste regulations for the range of upland BUDM uses. The state coordinates with USACE and partners including New Jersey and Connecticut on dredge management in New York Harbor and the Long Island Sound. Through the Lake Ontario Resiliency and Economic Development Initiative (REDI) Regional Dredging Project, the state has also funded backlogged maintenance dredging, dredge material management planning, and placement for BUDM resilience projects in eight Lake Ontario and St. Lawrence River counties.

All BUDM projects, including in-water and shoreline placement, is governed by standards in the DEC Technical & Operational Guidance Series 5.1.9 (TOGS 5.1.9). Suitability for in-water placement is determined by contaminant thresholds.

Permit Table

Permit	Authority	Description
Protection of Waters Permit	6 CRR-NY 608, 621	For activities with impacts on protected waters according to classification. Administered by DEC.
Tidal Wetlands Permit	6 CRR-NY 661	For placement in tidal wetlands. Administered by DEC.
Freshwater Wetlands Permit	6 CRR-NY 663	For placement in tidal wetlands. Administered by DEC.
Water Quality Certification	6 CRR-NY 608.9	Administered by DEC.
Federal Consistency	Various; compiled in NYS Coastal Management Program	Administered by DOS. Including consistency with Local Waterfront Revitalization Programs
Temporary Revocable Permit	6 CRR-NY 190, 196	

Permit Table - Continued

Permit	Authority	Description
Protection of Waters Permit	6 CRR-NY 608, 621	For activities with impacts on protected waters according to classification. Administered by DEC.
Tidal Wetlands Permit	6 CRR-NY 661	For placement in tidal wetlands. Administered by DEC.
OGS easement/license/permit	NY Public Lands Law § 75	Administered by OGS. Some Long Island jurisdictions may require an easement/license from the local government.
Coastal Erosion Management Permit	6 CRR-NY 505	For placement within Coastal Erosion Hazard Areas as determined by the presence of a natural protective feature; administered by DEC.

Policies

- BUDM Required:** Applicants are required to consider beneficial use first for dredge management, and the state provides guidance for in-water and riparian dredged material placement. See DEC Technical & Operational Guidance Series 5.1.9 (TOGS 5.1.9).
- BUDM Encouraged:** "Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land." This policy is implemented in NY to ensure that suitable or compatible dredged material is kept within the same littoral system from which it was removed. NYSCMP Policy 15.
- BUDM Encouraged:** The coastal management program encourages the use of dredged material for various types of habitat restoration throughout many areas designated as significant coastal fish and wildlife habitats. NYSCMP Policy 7.
- BUDM Encouraged:** Policies are in place to exempt dredged materials from solid waste regulations (6 NYCRR Part 360) if used for a suitable upland placement purpose.
- NBS Encouraged:** New York provides guidance and programs to encourage protecting and restoring natural shorelines, and addresses natural solution design alternatives through permit review.
- NBS Encouraged:** "Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible." NYSCMP Policy 17.
- NBS Encouraged:** "Hardening of the shoreline is to be avoided except when alternative means, such as soft engineering alternatives, are not effective. Beach nourishment, revegetation, offshore bar building, or inlet sand bypassing are preferred approaches to control erosion because of fewer environmental impacts than hard structures." Long Island Sound Coastal Management Program (LISCMP) Policy 6.

- **NBS Encouraged:** "Manage navigation infrastructure to limit adverse impacts on coastal processes. Manage navigation channels to limit adverse impacts on coastal processes by designing channel construction and maintenance to protect and enhance natural protective features and prevent destabilization of adjacent areas; and make beneficial use of suitable dredged material. Manage stabilized inlets to limit adverse impacts on coastal processes." LISCMP Policy 4.4.
- **Hydrodynamics Required:** "Mining, excavation or dredging in coastal waters shall not significantly interfere with natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land." NYSCMP Policy 15. This policy is implemented in NY to ensure that suitable or compatible dredged material is kept within the same littoral system.
- **Hydrodynamics Encouraged:** Under coastal erosion hazard area regulations, project proponents must account for the impacts of changed littoral drift on neighboring properties.

Physical Sediment Conditions

- **Quantitative:** Material is > or equal to 90% sand and gravel is exempt from contaminant testing. TOGS 5.1.9.
- Clean sand, or gravel of an equivalent or slightly larger grain size, is the only material which may be deposited within nearshore areas, and must be used for deposition of material on beaches. 6 CRR-NY 505.8(a)(4),(b)(7).
- Sediment meeting Class A standards under TOGS 5.1.9 (de minimis contaminant thresholds) is generally suitable for riparian or in-water placement; Class B material (low contaminant thresholds) may be allowed on a case-by-case basis with adequate management strategies.

Sand Source

- N/A

Water Quality

- Sampling and evaluation procedures for dredged sediment are set in TOGS 5.1.9. See also DEC Cmsn'r Policy #60 (Screening and Assessment of Contaminated Sediment).
- Material is > or equal to 90% sand and gravel is exempt from contaminant testing. TOGS 5.1.9.
- Environmental protection practices such as careful equipment operation, floating booms, silt curtains or screens, as well as equipment-specific BMPS, are mandated as needed under TOGS 5.1.9.

Endangered Species & Critical Habitat

- **Avoid:** Active bird nesting and breeding areas must not be disturbed unless such disturbance is pursuant to a specific wildlife management activity approved in writing by the department. 6 CRR-NY 505.8(b)(10) et seq.
- **Minimize:** The assessment criteria for a Coastal Erosion Management Permit include that the project prevent, if possible, or minimize adverse effects on natural resources, including, but not limited to significant fish and wildlife habitats and shellfish beds. 6 CRR-NY 505.6(c)(3).

Placement Guidelines & Restrictions

- "Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land." NYSCMP Policy 15. This policy is implemented in NY to ensure that suitable or compatible dredged material is kept within the same littoral system from which it was removed.

Resources

- **In-Water and Riparian Management of Sediment and Dredged Material (TOGS 5.1.9)**
https://www.dec.ny.gov/docs/water_pdf/togs519.pdf
- **DEC Cmsn'r Policy #60 (Screening and Assessment of Contaminated Sediment).**
https://www.dec.ny.gov/docs/administration_pdf/cp60.pdf
- **Using Natural Measures to Reduce the Risk of Flooding and Erosion**
https://www.dec.ny.gov/docs/administration_pdf/crranaturalmeasuresgndc.pdf
- **NYSDEC Tidal Wetlands Guidance for Living Shorelines**
https://www.dec.ny.gov/docs/fish_marine_pdf/dmrlivingshoreguide.pdf





North Carolina State Profile

Introduction

The N.C. Department of Environmental Quality (DEQ) Division of Coastal Management (DCM) regulates sediment placement. DCM carries out the state's Coastal Area Management Act (CAMA, N.C.G.S. § 113A-100), the Dredge and Fill Law (N.C.G.S. § 113-229) and the federal Coastal Zone Management Act of 1972 in the 20 coastal counties, using rules and policies of the N.C. Coastal Resources Commission (CRC). The U.S. Army Corps of Engineers (USACE) Wilmington District (SAW), as well as the state and local governments, conduct dredging projects in North Carolina. Relevant federal agencies are consulted on all coastal permit applications.

Permit Table

Permit	Authority	Description
Joint Coastal Management Permit	N.C.G.S. 113A-118 15A NCAC 07J .0201	NC DEQ CAMA permit is required for dredging or nourishment. General permits for less than 1,000 cy. Major permits serve as an "umbrella" application and review process for several state agencies, and often for the Corps of Engineers.
Water Quality Certification	N.C.G.S. 143-215	Issued by NC Division of Water Resources, incorporated into CAMA permit.
Right of Entry Letter	N.C.G.S. 146-6; 146-12	NC State Property Office, issues Right of Entry letters for state land covered in water

Policies

- **BUDM Required:** Clean, beach quality material dredged from navigational channels within the active nearshore, beach or inlet shoal systems shall not be removed permanently from the active nearshore, beach or inlet shoal system. This dredged material shall be disposed of on the ocean beach or shallow active nearshore area where it is environmentally acceptable and compatible with other uses of the beach. NC Dredge and Fill Law, § 113-229 h(2), 15A NCAC 07M SECTION .1100
- **NBS Encouraged:** It is the policy of the State of North Carolina that material resulting from the excavation or maintenance of navigation channels be used in a beneficial way wherever practicable. 15A NCAC 07M SECTION .1100. Beach nourishment, land use planning, relocation, and vegetation management suggested for erosion mitigation. 15A NCAC 07M SECTION .0200, 15A NCAC 07M .0202.
- **NBS Encouraged:** Bulkheads, jetties, groins, breakwaters prohibited, with the exception of up to 6 terminal groins § 113A-115.1. 15A NCAC 07H .0308.
- **Hydrodynamics Required:** Projects which would directly or indirectly block or impair existing navigation channels, increase shoreline erosion, deposit spoils below normal high water, cause adverse water circulation patterns, violate water quality standards, or cause degradation of shellfish waters are considered incompatible with the management policies of public trust areas. 15A NCAC 07H .0207 (d)

Physical Sediment Conditions

- **Quantitative:**
 - BUDM: Sediment completely confined to the permitted dredge depth of a maintained navigation channel or associated sediment deposition basins within the active nearshore, beach or inlet shoal system shall be considered compatible if the average percentage by weight of fine-grained (less than 0.0625 millimeters) sediment is <10%;
 - Other Borrow Areas: fines cannot exceed native + 5%. Granular sediment (≥ 2 mm and < 4.76 mm) must not be $>10\%$. Gravel (≥ 4.76 mm and < 76 mm) must not be $>5\%$. No more than 2x native of sediment >1 in and shells >3 in. Calcium carbonate must not be $>15\%$. 15A NCAC 07H .0312.

Sand Source

- Sediment in public disposal sites shall be available for any BU project. Sediment testing only needs to occur 2x in maintenance channels with one dredging event in between. 15A NCAC 07M SECTION .1100

Water Quality

- Water quality may not be degraded in "Outstanding Resource Waters" (ORW) 15A NCAC 07H .0208 (a) (5)

Endangered Species & Critical Habitat

- **Minimize:** Projects will be permitted to protect threatened and endangered species, and to minimize impacts to fish, shellfish and wildlife resources; 15A NCAC 07H .0312 (4)
- **Avoid:** Project timing designated by state agency in consultation with state/fed agencies during permitting process (see Statewide Programmatic Biological Opinion) for Sea Turtle nesting, Migratory birds, and Essential fish habitat/spawning closure. 15A NCAC 07H .0312 (4)

Placement Guidelines & Restrictions

- Maintenance sediment dredged from inlets must be placed on the beach or in the nearshore. Restoration of estuarine waters is strongly encouraged. NC Dredge and Fill Law, § 113-229 h(2), 15A NCAC 07M SECTION .1100.
- Dredged sediment may not be placed on wetlands. 15A NCAC 07H .0208(b)(1)(C)

Resources

- **NC DEQ:**
<https://deq.nc.gov/about/divisions/division-coastal-management>
- **NC Beach and Inlet Management Plan:**
<https://deq.nc.gov/about/divisions/coastal-management/coastal-management-oceanfront-shorelines/beach-inlet-management-plan>
- **Statewide Programmatic Biological Opinion:**
<https://www.boem.gov/sites/default/files/non-energy-minerals/NC-BogueB-anks-FWSSPBO.pdf>
- **Thin Layer Project Guidance:**
<https://deq.nc.gov/about/divisions/coastal-management/estuarine-shorelines>
- **Shallow Draft Navigation Channel Dredging and Aquatic Weed Fund, N.C.G.S. § 143-215.73F,**
Special revenue fund for State's cost share for dredging to keep shallow draft navigation channels navigable and safe.



Northern Mariana Islands Territory Profile

Introduction

Under Commonwealth of the Northern Mariana Islands (CNMI) Public Law 11-62 “Beach Preservation Act of 1998”, the removal of sand from beaches in the Commonwealth, and for other purposes is regulated. Under CNMI law (under PL3-47), activities in Areas of Particular Concern (APCs) which include shorelines and high hazard flood zones require a coastal permit. Large scale activities or “Major Sitings” may require a permit regardless of where they are located as the entire land mass of the CNMI is considered within the coastal zone.

Areas of Particular Concern (APC) relevant to dredging and regional sediment management activities include the following:

- Shoreline APC – The area between the water line and 150 feet inland.
- Lagoon and Reef APC – The area extending seaward from the water line to the outer slope of the reef.
- Wetlands and Mangrove APC – Those areas which are permanently or periodically covered with water and within which can be found species of wetland or mangrove vegetation.
- Port and Industrial APC – Those land and water areas surrounding the commercial port of Saipan, Tinian and Rota.
- Coastal High Hazard Flood Zone APC- Those areas identified as a coastal flood hazard zone (V & VE) in the Federal Emergency Management Agency (FEMA). (NMIAC § 15-10-345)

Permit Table

Permit	Authority	Description
Division of Environmental Quality (DEQ) Earthmoving and Erosion Control Permit	NMIAC §65-30	Used for dredging and coastal placement. Additional requirements for other agencies in One Start Process, which include the Historic Preservation Office, the Division of Fish and Wildlife, and the Division of Coastal Resources Management.

Permit Table

Permit	Authority	Description
Division of Coastal Resources Management (DCRM) Permit	NMIAC §15-10	Governs development proposed in APCs and other major siting activities. Also includes building redevelopment and stormwater incentives and requires incorporation of the CNMI Mitigation Hierarchy in project development.
DEQ Water Quality Permit	NMIAC §65-130-530	CNMI Water Quality Certifications.

Policies

- No statewide BUDM policy
- **NBS Encouraged**
 - "...[W]herever possible, soft stabilization using re-vegetation measures, green infrastructure, and other 'living shoreline' alternatives should be implemented instead of hard stabilization and shoreline armoring;" § 15-10-335(d)(2)
 - In the event that hard stabilization is proposed, the applicant must explain what "soft measures" were considered and why they were determined to be inappropriate. § 15-10, Part 200 (Building Redevelopment and Stormwater Incentives). NMIAC § 15-10-101(c)(2).
- **Hydrodynamics Required:** To the extent practical, the development of identified hazardous lands including floodplains, erosion-prone areas is not permitted. Public Law 3-47 (7)
- **Hydrodynamics Encouraged:** "It is the coastal resources management policy of the Commonwealth of the Northern Mariana Islands to ... not permit to the extent practicable, development of identified hazardous lands including floodplains, erosion-prone areas... [and] protect all coastal resources, particularly sand, corals and fish from taking beyond sustainable levels..." CNMI Public Law 3-47(7,17).
- **Hydrodynamics Encouraged:** Public Law 11-62 "Beach Preservation Act of 1998": To regulate the removal of sand from beaches in the Commonwealth

Physical Sediment Conditions

- **Qualitative:** Similar to existing sediment.

Sand Source

- Free of organics; water quality impacts

Water Quality

- DEQ Water Quality Permit. NMIAC §65-130-530

Endangered Species & Critical Habitat

- **Minimize:** Impacts to Areas of Particular Concern (APC)

Placement Guidelines & Restrictions

- Submerged Lands Act 43 U.S.C. §§ 1301 et seq.; Public Law 113-34 Amendment to Territorial SLA; Public Law 93-435 Territorial Submerged Lands Act; Proclamation 9077 Submerged Lands CNMI MTNM. This authority falls under the jurisdiction of the Department of Lands and Natural Resources (DLNR):

§ 145-60-530 Dredging

- 15-10-610(d) require that CRM permit is valid only if the permitted project is otherwise lawful and in compliance with other necessary governmental permits.
- CNMI Mitigation Hierarchy:
<https://dcrm.gov.mp/wp-content/uploads/crm/Mitigation-Hierarchy-Rule-2018.pdf>
- Smart, Safe Growth Guidance:
<https://opd.gov.mp/assets/cnmi-ssg-guidance-manual-final-2018-11-14.pdf>
- Living Shorelines and Nature-Based Solutions Guidebook:
<https://dcrm.gov.mp/living-shorelines-and-nature-based-solutions-guidebook-accessible-may2022/>

Resources

- **DCRM Permitting Guidelines**
<https://dcrm.gov.mp/our-programs/permitting/the-permitting-process>





Ohio State Profile

Introduction

Ohio has prioritized increasing the beneficial reuse of dredged material, including through a 2020 statutory prohibition on open-Lake disposal. The Department of Natural Resources (ODNR) issues coastal permits and submerged land leases for shoreline placement projects, and the Ohio Environmental Protection Agency (Ohio EPA) reviews water quality certifications and regulates innovative upland placement.

OEPA maintains a harbor sediment authorization for Lake Erie dredge identifying sediment that does not require Ohio EPA solid waste permitting. In the shoreline stabilization context, dredge material may be incorporated into nature-based solutions.

ODNR's Office of Coastal Management funds and coordinates multiple BUDM incentive programs, such as the Sandusky Bay Initiative. The Lake Erie Shore Erosion Management Plan (LESEMP) maps erosion rates and causes along the Ohio shoreline and provides site suitability analysis for erosion control methods, including sediment placement.

Permit Table

Permit	Authority	Description
ODNR Shore Structure Permit	O.R.C. § 1506.40	Applying to coastal construction and erosion control
ODNR Submerged Lands Lease	O.R.C. § 1506.11	Required for placement projects partially on state lands
Harbor Sediment Authorization	O.A.C. 3745-599-400 O.A.C. 3745-599-410	Lake Erie harbor dredged material covered by and managed in accordance with a harbor sediment authorization is neither a solid waste or other waste,
Coastal Erosion Area Permit	O.R.C. § 1506.07	Required for coastal construction in within Coastal Erosion Areas
General BU Permit	O.A.C. 3745-599-200	Authorizes upland placement
Indiv. BU Permit	O.A.C. 3745-599-310	Authorizes upland placements
Ohio EPA Water Quality Certification	O.R.C. § 6111.03(O,P)	

Policies

- **BUDM Required:** Open water disposal of dredged material is prohibited. Dredge must be disposed of in a CDF or beneficially used. O.R.C. § 6111.32.
- **BUDM Encouraged:** ODNR requires (encourages USACE) dredged sand/gravel to be returned to shallow nearshore waters or beach-placed downdrift of the point of dredging. OCMP Policy 22
- **BUDM Encouraged:** Ohio may issue or renew a harbor sediment authorization for Lake Erie dredge that is not a hazardous waste and that is unlikely to create a nuisance or adversely affect public health, safety, or the environment. Lake Erie dredge that is covered by and managed in accordance with an effective harbor sediment authorization is neither a solid waste nor another waste for the purposes of its solid and hazardous waste regulations. O.A.C. 3745-599-400.
- **BUDM Encouraged:** The Lake Erie Shore Erosion Management Plan (LESEMP) maps erosion rates and causes along the Ohio shoreline and provides site suitability analysis for erosion control methods, including sediment placement.
- **BUDM Encouraged:** Sand- and gravel-sized sediments should be returned to the littoral system downdrift of the point of dredging. OCMP Policy 17.
- **NBS Encouraged:** The OCMP as developed a Nature-Based Shoreline Certification training program.
- **Hydrodynamics Required:** ODNR considers impacts on the littoral zone, including sand transport, in issuing the Submerged Land Lease. O.A.C. § 1501-6-03(D)(2)(f).

Physical Sediment Conditions

- **Quantitative:**
 - Dredged sediment that is at least 80% sand is eligible for beach nourishment.
 - Dredged sediment that is at least 60% sand is eligible to be placed in the littoral drift
 - O.R.C. § 6111.33; O.A.C. § 3745-32-05

Sand Source

- N/A

Water Quality

- Discharge of dredged material must not interfere with attainment/maintenance of water quality standards. O.A.C. § 3745-32-05.

Endangered Species & Critical Habitat

- **Minimize:** Projects in wetlands must minimize unavoidable impacts and, depending on the site's wetland category, may need to demonstrate social or economic development or public need. Compensatory mitigation may be required. OCMP Policy 12 & O.A.C. 3745-1-54

Placement Guidelines & Restrictions

- Sand- and gravel-sized sediments should be returned to the littoral system downdrift of the point of dredging. OCMP Policy 17.

Resources

- **Coastal Permits and Lease Applications Booklet**

<https://ohiodnr.gov/static/documents/coastal/permits-leases/booklet-CoastalPermitsLease.pdf>

- **Ohio Coastal Design Manual**

<https://ohiodnr.gov/business-and-industry/best-management-practices/coastal-erosion-and-shoreline-protection>

- **Lake Erie Shore Erosion Management Plan**

<https://ohiodnr.gov/discover-and-learn/safety-conservation/about-ODNR/coastal-management/coastalpropertyowners/LESEMP-documents>

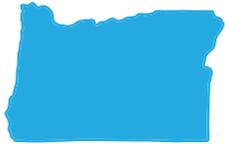
- **USACE "Dredging - What You Should Know" fact sheet**

<https://www.lrb.usace.army.mil/Portals/45/docs/regulatory/DistrictInfo/FactSheets/OhioDredgingFactSheet10May2013.pdf>

- **Ohio Lake Erie Commission Website**

<https://lakeerie.ohio.gov/home>





Oregon State Profile

Intro

Beach nourishment is not common in Oregon because of the high-energy wave climate and limited availability of sediment, typically from distant estuarine sources. Beneficial use beach nourishment projects have been pursued from dredging near the Columbia River where Oregon participates on the Lower Columbia Solutions Group with Washington and federal partners to manage dredged material in that shared waterway. Opportunities also exist for beneficial use for tidal wetland restoration.

Oregon sets out land management standards through a series of Statewide Planning Goals. These goals are then implemented through local comprehensive land use plans and implementing ordinances. State statutes and administrative rules must also be consistent with the Statewide Planning Goals. There are four coastal goals: Goal 16 (Estuaries), Goal 17 (Coastal Shorelands), Goal 18 (Beaches and Dunes) and Goal 19 (Ocean Resources).

Oregon's ocean coastline seaward of a statutory vegetation line is managed by the Oregon Parks and Recreation Department. Tidal estuaries are regulated through locally-adopted estuary management plans under standards set in Goal 16 (Estuarine Resources).

Permit Table

Permit	Authority	Description
Ocean Shore Alteration Permit	OAR 736-020	For activities in the Ocean Shore State Recreation Area (extreme low tide to the further inland of the statutory or actual vegetation line). Administered by Oregon Parks and Recreation Department.
Land Use Compatibility Statement	OAR 340-018	For state and federal permitted activities in areas covered by local comp plans and land use codes. Administered locally.
Removal-Fill Permit	OAR 196-800	For placement seaward of the highest measured tide line. Administered by Department of State Lands (Joint app with USACE)

Permit Table - Continued

Permit	Authority	Description
State Land Easement	OAR 141-082	For permanent structure and uses on state-owned land. Administered by Department of State Lands.
Water Quality Certification	OAR 340-041	Administered by Department of Environmental Quality
Federal Consistency	Various, compiled via mapping tool	Administered by Department of Land Conservation and Development

Policies

- **BUDM Encouraged:** Dredged material is approved for use for habitat improvement, beach nourishment or other similar uses under a standing solid waste beneficial use determination. OAR 340-093-0270 (5)(c).
- **NBS Required (subset):** Local governments and permitting agencies have in some cases set requirements for alternatives analyses ensuring that structural erosion control is only used if necessary for the success of the project.
- **NBS Required (subset):** Hardened erosion control structures are limited to a subset of beachfront lots developed before 1977. Guidance suggests that sand nourishment is exempted from the prohibition, but may still be subject to permitting. Guidebook on Erosion Control Practices at 17.
- **NBS Encouraged:** "Land-use management practices and non-structural solutions to problems of erosion and flooding shall be preferred to structural solutions." Statewide Planning Goal 17 Implementation Requirement 5.
- **Hydrodynamics Encouraged:** Application for the OPRD Ocean Shore Alteration Permit for projects greater than 50 ft requires a geologic report documenting impacts on sand source, supply, and movement on the affected beach as well as within the same littoral cell.
- **Hydrodynamics Encouraged:** In developing structures that might excessively reduce the sand supply or interrupt the longshore transport or littoral drift, the developer should investigate, and where possible, provide methods of sand by-pass. OAR 660-015-0010(3).

Physical Sediment Conditions

- **Qualitative:** Guidance provides that sand should be the same size or coarser than the local sediment. Guidebook on Erosion Control Practices at 44.

Sand Source

- N/A

Water Quality

- Testing requirements and protective measures may be imposed to meet water quality standards for toxics (OAR 340-041-0033), turbidity (OAR 340-041-0036), etc.

Endangered Species & Critical Habitat

- **Minimize:** State and federal agencies shall carry out actions that are reasonably likely to affect ocean resources and uses of the Oregon territorial sea in such a manner as to ... protect ... important marine habitat, including estuarine habitat, which are areas and associated biologic communities that are ... needed to assure the survival of threatened or endangered species. Statewide Planning Goal 19.
- **Minimize:** The Department of Fish and Wildlife provides regularly updated guidance on in-water work windows. <https://www.dfw.state.or.us/lands/inwater/Oregon%20In-water%20Work%20Guidelines%20January%202022.pdf>

Placement Guidelines & Restrictions

- N/A

Resources

- **Guidebook on Erosion Control Practices of the Oregon Coast**
https://www.oregon.gov/lcd/Publications/guidebook_erosion_control_practices.pdf
- **Removal-Fill Guide**
https://www.oregon.gov/dsl/WW/Documents/Removal_Fill_Guide.pdf
- **An Introduction to Water-Related Permits and Reviews Issued by Oregon State Agencies**
https://www.oregon.gov/dsl/WW/Documents/water_related_permits_user_guide_2012.pdf



Pennsylvania State Profile

Introduction

There are two pathways for BUDM placement projects in Pennsylvania: the O&E Permit or Waiver 16 for restoration projects. 25 PA Code § 105.12(a)(16). The Department of Environmental Protection will determine during pre-application consultation which pathway is suitable for the project. DEP waste management will review the sediment analysis plan; the clean water program will review the sampling plan for compliance with 401; and the coastal management program will review for compliance with waterway policies.

A robust pipeline exists for dredged sediment from PA waters of the Delaware Estuary (SE) to be beneficially used as landfill cap soil. In this region, however, federal projects typically come in under the NWP, which already has PA CZ and 401 approval, which means they come in without state review. That is not the case in Erie (NW).

Permit Table

Permit	Authority	Description
Water Obstruction and Encroachment Permit	25 PA Code § 105.11(a).	For placement in navigable waters. Administered by the Department of Environmental Protection.
DEP Waiver 16	25 PA Code § 105.12(a)(16).	General permit for habitat restoration projects. Administered by the Department of Environmental Protection.
Water Quality Certification	25 Pa. Code § 93.6 <i>et seq.</i>	Administered by the Department of Environmental Protection.
Federal Consistency	Various, see program.	Administered by the Department of Environmental Protection.
Submerged Lands License Agreement	25 PA Code § 105.31.	For placement in navigable waters. Administered by the Department of Environmental Protection.

Policies

- **BUDM Required (subset):** Under the state's coastal management enforceable policies and Geographic Location Description, the state requires that suitable sediment dredged from Conneaut Harbor, OH, be placed downdrift of the Harbor's federal breakwater to return it to the littoral system. CRMP Policies 1.2, 2.1.
- **NBS Encouraged:** The state encourages use of natural solutions on a case-by-case basis through permit pre-application review and federal consistency review.
- **Hydrodynamics Required:** Discharges of dredged or fill material shall be properly maintained to prevent erosion and other types of pollution. 25 Pa. Code § 105.421.
- **Hydrodynamics Required:** Discharges of dredged or fill material may not restrict or impede the passage of normal or expected high flows or cause the relocation of the waters. 25 Pa. Code § 105.411(2).
- **Hydrodynamics Required:** Dredging and spoil disposal and related activities ... will be regulated to protect against ... reductions in flood flow capacity. CRMP Policy 2.1.

Physical Sediment Conditions

- **Qualitative:** Determinations are made on a case-by-case basis, following the Great Lakes Dredged Material Testing and Evaluation Manual. CRMP Policy 2.1.
Material from Conneaut Harbor must contain >60% coarse sand for return for downdrift placement. CRMP Policy 2.1.

Sand Source

- N/A

Water Quality

- State water quality standards are applied through the waterway permit and water quality certification process.

Endangered Species & Critical Habitat

- **Minimize:** Discharge dredged or fill material into a spawning area during spawning season, or into migratory water bird breeding, feeding, or nesting areas requires a determination that the project's public benefit which outweighs the damage to the public natural resources. 25 Pa. Code § 105.411(1,3).

Placement Guidelines & Restrictions

- N/A

Resources

- N/A





Puerto Rico Territory Profile

Introduction

The PR Department of Natural Resources (DNR) Coastal Management Program regulates sediment placement in the jurisdictional marsh and shore areas that impact public trust lands. In Puerto Rico, a Coastal Zone Management Consistency Concurrence is required from the Puerto Rico Planning Board. The U.S. Army Corps of Engineers (USACE) Jacksonville District (SAJ) conducts dredging projects in the territory. Relevant federal agencies are consulted on all coastal permit applications.

Historically, sand mining from beaches for industrial purposes, such as construction projects, has been a major coastal management challenge in PR. Despite regulatory efforts over the last several decades (e.g., Sand and Stone Law, Law No. 132 of 1968, Prohibits extraction of sand from dune areas), it remains a challenge today.

Permit Table

Permit	Authority	Description
PR DNR Permit	PR Coastal Management Program Document, Chapter 3	Permit for dredging or extraction of sand, from dunes or any other source, on public or private property.
Water Quality Certification	Section 404(b)(1) of the Clean Water Act (CWA) of 1972	Handled at federal level (e.g., See Resources and Guidance)

Policies

BUDM Encouraged: Coordinated with USACE SAJ. San Juan Dredged Material Management Plan

NBS Encouraged: A PR Expert Advisory Committee on climate change (CEACC) developed 103 recommendations to face climate change impacts on the coast that include the use of natural solutions as a preference over hard structures. Law No. 33 2019. Puerto Rico Climate change, mitigation, adaptation, and resilience Law.

Policies

- **Hydrodynamics Encouraged:** Avoid all activities which could cause a deterioration or destruction of natural systems which are critical to the preservation of the environment, such as coral reef, sand dunes, mangroves, sea grass beds. Objectives and Public Policies of the PR Land Use Plan (OPP-PRLUP) Policy section 30.03

Physical Sediment Conditions

- N/A

Sand Source

- **Establish public policy regarding the conservation of sand resources in Puerto Rico:** This mechanism was created as an attempt to promote balance between supply and demand of this resource from the construction industry as well as its conservation. The Order prohibits all extraction from beaches and the mouths of rivers, specifically in Puerto Rico's maritime zone. This order was issued after it was recognized that extraction of sand from the beaches and coastal dunes can cause substantial changes to the terrain "Special Flood Hazard Areas Regulation," and Administrative Order No. 2-93 (AO-2-93), issued by the DNER Secretary in 1993

Water Quality

- Federal certification, no state authority/program

Endangered Species & Critical Habitat

- No state authority/program
- **See Conditions:** 2018 San Juan Harbor Biological Opinion

Placement Guidelines & Restrictions

- Dredged sediments which comply with criteria established by the EPA for fresh water, estuaries or the sea, can be deposited in designated areas to minimize potential adverse results for marine organisms or to fill areas authorized by the DNER.
- Dredged material cannot be transported from coastal waters to mangroves, estuarine areas or fresh water for its disposal.
- Dredged material that will violate Section 404 must be placed upland or in an EPA approved ODMDS. There are five ocean disposal sites designated to receive dredged material from harbors in Puerto Rico. PRCZMP criteria

Resources

- **San Juan Harbor, PR, Navigation Improvements Study and EA:**
<https://www.saj.usace.army.mil/Missions/Civil-Works/Navigation/Navigation-Projects/San-Juan-Harbor/>
- **PR Coastal Management Program Document:**
<https://www.drna.pr.gov/wp-content/uploads/2021/08/PMZCPR-ingles-2009-final.pdf>





Rhode Island State Profile

Introduction

The R.I. Coastal Resources Management Council (CMRC) and Department of Environmental Management (DEM) regulate dredging activities in the state. The state's Coastal Resources Management Program's guidance document is known as the "Red Book."

Permit Table

Permit	Authority	Description
State dredging permit	Red Book 650-RICR-20-00-1	Dredging permits from the CMRC and DEM required sediment must be classified.
State Water Quality Certification	250-RICR-150-05-1	Included in DEM permit

Policies

- BUDM Encouraged:** Beach nourishment and habitat restoration and creation, in the coastal zone, are first priority placement for dredged material. R.I. Gen. Laws § 46-6.1-3
- NBS Encouraged:** Coastal Council prefers nonstructural shoreline protection methods over all other shoreline protection methods for controlling erosion such as stabilization with vegetation and beach nourishment due to their effectiveness in preserving beaches, natural shoreline habitats and sediment dynamics. Hybrid shoreline protection methods are preferred over structural shoreline protection methods due to their effectiveness in preserving beaches, natural shoreline habitats and sediment dynamics as compared to structural shoreline protection. Where structural shoreline protection may be authorized riprap revetments are preferred to vertical steel, timber, or concrete seawalls and bulkheads. Red Book, 1.2.2. D. 1., G.1.a.&d.
- Hydrodynamics Encouraged:** Bottoms of dredged areas shall slope downward into the waterway so as to maximize tidal flushing. Red Book, 1.3.1, (I) 5. b. i.

Physical Sediment Conditions

- **Quantitative:** Grain size and metals/contaminants analysis required, contaminant testing may be waived if sediment is 90% sand with a grain size > 0.0625 mm. 250-RICR-150-05-2.7 C. 1. Sediment is predominantly clean sands possessing grain size and such other characteristics to make them compatible with the naturally occurring beach material. Red Book, 1.3.1, (l) 5. g. 1

Sand Source

- N/A

Water Quality

- When fine-grained sediments are to be removed, the applicant shall employ proper turbidity controls as necessary to control the transport of materials placed in suspension by dredging. Red Book, 1.3.1, (l) 4. c.

Endangered Species & Critical Habitat

- **Minimize:** Avoid and minimize impacts to SAV habitat. Red Book 1.2.2. R.1.b.
- **Minimize:** Limit dredging and disposal to specific times of the year in order to minimize odors and/or impacts on fish and shellfish. Red Book 1.2.2. l. 4.d.

Placement Guidelines & Restrictions

- Dredged sediments which comply with criteria established by the EPA for fresh water, estuaries or the sea, can be deposited in designated areas to minimize potential adverse results for marine organisms or to fill areas authorized by the DNER.
- Dredged material cannot be transported from coastal waters to mangroves, estuarine areas or fresh water for its disposal.
- Dredged material that will violate Section 404 must be placed upland or in an EPA approved ODMDS. There are five ocean disposal sites designated to receive dredged material from harbors in Puerto Rico. PRCZMP criteria

Resources

- **RI Coastal Resources Management Council:**
<http://www.crmc.ri.gov/regulations.html>





South Carolina State Profile

Introduction

The S.C. Department of Health and Environmental Control (DHEC) Office of Ocean and Coastal Resource Management (OCRM) regulates sediment placement. The S.C. Beachfront Management Act (Coastal Tidelands and Wetlands Act, as amended, §48-39-250 et seq.) is the governing legislation for all beachfront activities, and has been revised and amended since 1988. The U.S. Army Corps of Engineers Charleston District (SAC) conducts most of the dredging activities in the state. The S.C. Department of Natural Resources (SC DNR) and relevant federal agencies are consulted on all coastal permit applications.

Permit Table

Permit	Authority	Description
Joint Permit Application DHEC OCRM Critical Area Permit	S.C. Code Reg. (R) §30-1 et. seq.	Individual permit application for approval from state and SAC for dredging and coastal sediment placement
Coastal Zone Consistency Certification		General review required for all major coastal projects
SC DHEC Water Quality Certification	S.C. Code Reg. (R) §61-68 et. seq.	When required, issued by the SC DHEC Bureau of Water
Affidavit of Ownership or Control		Public land rights affidavit, attached to the Critical Area Permit
SC DNR General Permit for Emergency Beach Nourishment	2014-00299; R.30-15.H(4) and (5) 2017-00765	Sand bags, scraping and minor renourishment

Policies

- **BUDM Encouraged:** Where possible, artificial beach nourishment shall be performed in concert with inlet stabilization or navigation projects. S.C. Code Regs. 30-13(N)(2)(b).
- **NBS Encouraged:** Living Shorelines encouraged as an alternative to traditional hardened erosion control structures in estuarine environments. S.C. Code Regs. 30-12(Q).
- **NBS Encouraged:** It is policy of the state to "severely restrict the use of hard erosion control devices to armor the beach/dune system and to encourage the replacement of hard erosion control devices with soft technologies as approved by the department which will provide for the protection of the shoreline without long-term adverse effects, encourage the use of erosion-inhibiting techniques which do not adversely impact the long-term well-being of the beach/dune system, [and] promote carefully planned nourishment as a means of beach preservation and restoration where economically feasible." S.C. Code § 48-39-260(3-5).
- **Hydrodynamics:** No statewide policy

Physical Sediment Conditions

- **Qualitative:** Careful study shall be given to the type (grain size and quality) of material most suitable for nourishment of a particular beach area. R30-13 N. 2) (a)
- USFWS Biological Opinion typically requires a 10% fines limit as well as other compatibility specifications.

Sand Source

- Borrow areas and sand for artificial nourishment shall be carefully selected to minimize adverse effects. R30-13 L(2)(b).

Water Quality

- Protective measures such as silt curtains and weirs should be included. R30-12 G(1).

Endangered Species & Critical Habitat

- **Avoid:**Dredging in borrow areas shall not be in conflict with spawning seasons or migratory movements of significant estuarine or marine species. Nourishment of beach areas shall be scheduled to interfere with nesting and brood-rearing activities of sea birds, sea turtles, or other wildlife species; R30-13 L.(2)(c).
- **Avoid:** Maintenance dredging should be timed to minimize interference with/impacts to aquatic life

Placement Guidelines & Restrictions

- Filling or excavation of vegetated tidelands for the construction of a living shoreline is prohibited. No creation of upland allowed. R30-12.Q.
- Placement of dredged materials into confined disposal sites is required. R30-12 G(1).
- Dredging and filling in wetlands is discouraged; it can always be expected to have adverse environmental consequences. R30-12 G(1).

Resources

- **SC DHEC OCRM:**
<https://scdhec.gov/environment/your-water-coast/ocean-coastal-resource-management-ocrm>
- **Blue Ribbon Committee on Shoreline Management**
<https://scdhec.gov/sites/default/files/Library/CR-010631.pdf>





Texas State Profile

Introduction

The Texas General Land Office (GLO), as the lead state agency responsible for the Texas Coastal Management Program, beach and dune protection program, and state coastal erosion program, coordinates statewide shoreline management strategy through the Texas Coastal Resiliency Master Plan. Through the Plan, the state has identified a shortage of beach-suitable sand as a primary need for coastal resilience, and has prioritized expanding BUDM in the state to meet the need.

GLO coordinates Texas coastal authorization and USACE CWA permitting through the "Permit Service Center." The review process will require a coastal boundary survey to determine the boundary between private upland and state-owned submerged lands. Review standards for dredge projects require a cost-benefit analysis of the cost of beneficially reusing the dredged material over non-beneficial disposal, compared against the environmental, recreational, protective, erosion-preventative, and economic benefits, proximity, and scale of the beneficial alternative. Projects where the delta costs are "reasonably proportionate" are required to beneficially use the material.

Permit Table

Permit	Authority	Description
Coastal Zone Management Consistency Certification	31 Tex. Admin. Code § 505.30.	Applying to dredging and placement activities. Together with the Surface Lease Agreement, pulls together relevant state standards and authorizations. Administered by GLO.
Surface Lease Agreement	31 Tex. Admin. Code § 155.3.	Applying to dredging or placement on state-owned submerged lands. Administered by GLO and School Land Board.
Dune Protection Permit	31 Tex. Admin. Code § 15.4.	Applying to projects seaward of the dune protection line. Administered locally with GLO oversight.
Beachfront Construction Certificate	31 Tex. Admin. Code § 15.5.	Applying to projects adjacent to public beaches. Administered locally with GLO oversight.

Permit Table - Continued

Permit	Authority	Description
Aquatic Introduction Permit	31 Tex. Admin. Code § 57.252.	For wetlands projects involving planting aquatic plants in state waters. Administered by Parks & Wildlife Department.
Water quality certification	31 Tex. Admin. Code § 501.21 et seq.	Administered by the Texas Commission on Environmental Quality.

Policies

- **BUDM Required:** If the costs of the beneficial use of dredged material from dredging projects in commercially navigable waterways are reasonably comparable to the costs of disposal in a non-beneficial manner, or if the increased costs are reasonably proportionate to the benefits of BU, the material shall be used beneficially. 31 Tex. Admin. Code § 501.25(d).
- **BUDM Required (subset):** Projects constructing and maintaining navigation inlets and channels using funding from the Coastal Erosion Response Account are required to use dredged material to benefit, eroding beach areas or to restore or create wetlands to mitigate erosion. 31 Tex. Admin. Code § 15.44.
- **NBS Encouraged:** "Non-structural erosion response methods such as beach nourishment, sediment bypassing, nearshore sediment berms, and planting of vegetation shall be preferred instead of structural erosion response methods." 31 Tex. Admin. Code § 501.26(a)(5).
- **NBS Encouraged:** "Living Shorelines and vegetative cover are the preferred method of shoreline stabilization and shall be used where practical." 31 Tex. Admin. Code § 155.3(f)(8)(a).
- **Hydrodynamics Required:** Dredge material disposal projects are required to minimize impacts on coastal resources through best practices identified on a case-by-case basis, including design elements "to avoid adverse disruption of water inundation patterns, water circulation, erosion and accretion processes, and other hydrodynamic processes." 31 Tex. Admin. Code § 501.25(b)(1)(B).

Physical Sediment Conditions

- **Qualitative:** Dredge material disposal projects are required to minimize impacts on coastal resources through best practices identified on a case-by-case basis. 31 Tex. Admin. Code § 501.25(b).
- **Qualitative:** Beach nourishment standards for the BUDM requirement applying to projects funded through the Coastal Erosion Response Account include qualitative requirements for grain size, mineralogy, and quality. 31 Tex. Admin. Code § 15.44(d).
- **Qualitative:** Placement of dredged material with harmful concentrations of hazardous substances or unacceptable mineralogy or grain size is prohibited within critical dune areas or seaward of the dune protection line. 31 Tex. Admin. Code § 15.4(c).

Sand Source

- N/A

Water Quality

- State water quality standards (31 Tex. Admin. Code § 501.21 et seq.) and standards for sediment toxicity are applied through coastal consistency and water quality certification process (31 Tex. Admin. Code § 501.25(a)(1)). Best practices may be required on a case by case basis to control impacts. 31 Tex. Admin. Code § 501.25(b).

Endangered Species & Critical Habitat

- **Minimize:** "Dredging and the disposal and placement of dredged material shall avoid and otherwise minimize adverse effects to coastal waters, submerged lands, critical areas, coastal shore areas, and Gulf beaches to the greatest extent practicable," including best practices to minimize habitat impacts. 31 Tex. Admin. Code § 501.25(a),(b)(6).

Placement Guidelines & Restrictions

- N/A

Resources

- **Texas Coastal Resiliency Master Plan**
<https://coastalstudy.texas.gov/resources/files/2019-coastal-master-plan.pdf>
- **Beach Nourishment Resiliency Design Guide**
https://www.glo.texas.gov/coast/coastal-management/coastal-resiliency/resources/final_beach-dune_designguide.pdf
- **Dune Protection and Improvement Manual for the Texas Gulf Coast**
<https://www.glo.texas.gov/coast/coastal-management/forms/files/dune-protection-manual-gpb.pdf>
- **Guide to Living Shorelines in Texas**
<https://cleancoast.texas.gov/documents/guide-to-living-shorelines-texas.pdf>





U.S. Virgin Islands Territory Profile

Introduction

The USVI Coastal Zone Management Commission regulates activities in the coastal zone. V.I. Code tit. 12, § 906 (8) assures that dredging or filling of submerged lands is clearly in the public interest. In the Virgin Islands, the Department of Planning and Natural Resources permit constitutes compliance with the Coastal Zone Management Plan. The U.S. Army Corps of Engineers (USACE) Jacksonville District (SAJ) conducts dredging and coastal improvement projects in the territory with the U.S. Virgin Islands Department of Public Works as the local sponsor. Relevant federal agencies are consulted on all coastal permit applications.

Permit Table

Permit	Authority	Description
Joint Coastal Permit	V.I. Code tit. 12, § 906	A joint application is submitted to the VI Coastal Zone Management Commission and the U.S. Army Corps of Engineers
Water Quality Certification	CVIR 12-007-000, Subchapter 186	Certificate issued by the U.S. Virgin Islands Department of Planning and Environmental Resources, Division of Environmental Protection (DPNR-DEP)

Policies

- **BUDM:** No territory policy.
- **NBS:** No territory policy.
- **Hydrodynamics:** No territory policy.

Physical Sediment Conditions

- N/A

Sand Source

- N/A

Water Quality

- Water Quality Management Program, Water Quality Standards, CVIR 12-007-000, Subchapter 186
- **Class A Waters:** Maximum nephelometric turbidity unit (NTU) reading of 3 is permitted, unless coral reefs are present, then NTU=1.

Endangered Species & Critical Habitat

- **No territory program:** Conditions depend on requirements from federal consultations.

Placement Guidelines & Restrictions

- N/A

Resources

- **Savan Gut Phase II, example of USACE SAJ administered coastal improvement project:**
<https://www.saj.usace.army.mil/About/Congressional-Fact-Sheets-2022/Savan-Gut-Phase-II-VI-I>





Virginia State Profile

Introduction

Virginia has established a policy that quality dredged material is a valuable State resource and may be used for beach replenishment, as well as to encourage the beneficial use of dredged material for creating living shoreline features, creating wetlands, or developing oyster reef habitat.

Virginia and USACE Norfolk District use a single Joint Permit Application to process permits under the authorities of USACE, the Virginia Marine Resources Commission, the Virginia Department of Environmental Quality, and/or Local Wetlands Boards. The state has instituted a fast-track joint permitting program for local governments for dredging and disposal of dredge material in state wetland areas and state-owned tidal lands for habitat creation or development of living shoreline features or to enhance coastal resilience.

Permit Table

Permit	Authority	Description
Virginia Water Protection Permit	Va Code § 62.1-44.15(5).	Applies to filling, excavation, or alteration of wetlands; administered by DEQ.
Submerged Lands Act	Va. Code § 28.2-1200.	Applies to placement on public tidal lands; administered by the Marine Resources Commission
Wetlands Act	Va. Code § 28.2-1300	Applies to modifications of wetlands; administered by local wetlands boards and the Marine Resources Commission
Water Quality Certification	9 VAC 25-260	Administered by DEQ
Federal Consistency	Federal Consistency Manual	Administered by DEQ
Regional Permit 19 (18-RP-19)	CWA 404	USACE regional general permit for living shorelines as well as riprap, bulkheads, and other hardened shore stabilization.

Policies

- **BUDM Encouraged:** "The beaches of the Commonwealth shall be given priority consideration as sites for the disposal of that portion of dredged material determined to be suitable for beach nourishment." Va Code § 10.1-704.
- **BUDM Encouraged:** Virginia "will strive to achieve maximum beneficial uses of suitable dredged material for those projects which qualify under criteria established here while protecting the interests of the Commonwealth in the land and the resources lying channelward of the mean low water shoreline..." 4 VAC 20-400-30.
- **BUDM Encouraged:** A fast-track joint permitting program is available to local governments for dredging and disposal of dredge material in state wetland areas and state-owned tidal lands for habitat creation or development of living shoreline features or to enhance coastal resilience. 4 VAC 20-1340-10 et seq.
- **NBS Required (subset):** Shore hardening structures are not permitted on barrier islands. 4 VAC 20-440-10(C)(5).
- **NBS Encouraged:** The BUDM fast-track program incentivized local governments to use habitat restoration and living shoreline features for coastal resilience. 4 VAC 20-1340-10 et seq.
Hydrodynamics: n/a

Physical Sediment Conditions

- **Quantitative:** Under the fast-track permit regulations, applicants must submit a geotechnical analysis of the material unless it is SM (silty sands), SP (poorly graded sand), or SW (well graded sand), using the Unified Soil Classification System, with a minimum median grain size of around 0.25 mm with no more than 20% passing through a #100 sieve (0.149mm) and no more than 10% passing through a #200 sieve (0.074mm). 4 VAC 20-1340-20.30(D)(1).
- Engineering information must be analyzed to determine acceptable grain size range of fill material, design berm height, width and length, probable fate of the material, expected loss rates and the resulting maintenance requirements. 4 VAC 20-400-50(C).

Sand Source

- N/A

Water Quality

- State water quality standards are applied through the Water Protection Permit and water quality certification process.
- As of April 2021, Virginia has announced an Intended Regulatory Action to develop turbidity criteria for the state water quality standards.

Endangered Species & Critical Habitat

- **Minimize:** [Placement] project[s] should be engineered in a manner which results in the least environmental impact while providing an efficient and cost effective construction plan. Consideration will be given, but not limited to, the project's potential impacts on existing natural resources and habitats. These include, inter alia, existing finfish, shellfish, turtle and avian species and their critical time periods for spawning, nesting and nursery functions in areas of submerged aquatic vegetation, wetlands and submerged or intertidal and beach habitat. 4 VAC 20-400-50(E).
- **Minimize:** Applications for the fast-track permit must submit information on "Current recreational and commercial fishing activity in the proposed dredge and placement areas" as well as "anticipated environmental impact of the dredge material proposed for placement on (i) wetlands, dunes or beaches, submerged lands, and (ii) nearby benthic, marine, and fishery resources, including an assessment of any coastal resilience or beneficial ecological services provided by such placement. 4 VAC 20-1340-30(D).
- **Avoid:** "In order to lessen the possibility of dredging having adverse effects on commercially or recreationally important fisheries, certain seasonal dredging limitations may be imposed on a site specific basis depending on sediment type, proximity to shellfish areas or spawning grounds, dredging method, the project's size, location and measures taken to reduce turbidity." Subaqueous Guidelines II(D).

Placement Guidelines & Restrictions

- N/A

Resources

- **Subaqueous Guidelines (2005)**
https://www.mrc.virginia.gov/regulations/subaqueous_guidelines.shtm
- **Coastal Primary Sand Dunes Beaches Guidelines (1993)**
https://www.mrc.virginia.gov/regulations/dune_guidelines.pdf
- **Tidal Wetlands Guidelines (2021)**
https://mrc.virginia.gov/Notices/2021/Final-Draft-Wetlands-Guidelines-Update_05-19-2021.pdf





Washington State Profile

Introduction

Dredging projects are coordinated in Washington in partnership between the Department of Natural Resources, Department of Ecology, USACE Seattle District, and US EPA.

Regional dredged material management programs operate in two main regions: the Puget Sound, Strait of Juan de Fuca, and Pacific coastal embayments are managed through the state Dredged Material Management Program (DMMP), and the non-Port project area on the WA side of the lower Columbia River is managed through the Columbia River Disposal Program in coordination with Oregon counterparts. Programs in both regions have prioritized increasing the share of dredged material beneficially used; in practice, BUDM is encouraged on a case-by-case basis. Dredged sediment from the inland Snake River is also used beneficially. Beach nourishment in Washington includes both traditional sand placement projects as well as placement of pebble/cobble beaches.

Shoreline sediment placement projects require state water placement, water quality, and aquatic land permits. Local communities are also required to establish Shoreline Master Programs under the Shoreline Management Act, including provisions for protection of dunes, beaches, and wetlands and standards for dredge material disposal to avoid and minimize significant ecological impacts. Shoreline placement projects must comply with these plans, which emphasize regional sediment management and protection of natural sediment processes. Streamlined permitting procedures are available for certain projects implementing state and local habitat restoration and flood control plans.

Permit Table

Permit	Authority	Description
Hydraulic Project Approval	WAC Ch. 220-660	For construction or work that will use, divert, obstruct, or change the natural flow or bed of any of the salt or fresh waters of the state. Administered by Dept. of Fish and Wildlife
Aquatic Land Use Authorization	WAC 332-30-122	For placement on state-owned aquatic lands. Administered by Dept. of Natural Resources. (Joint app with USACE)
Substantial Development Permit	WAC Ch. 173-26	For dredging, filling, and construction in a shoreline area valued above ~\$7,000. Administered by local jurisdictions with Dept. of Ecology oversight.

Permit Table - Continued

Permit	Authority	Description
Shoreline Conditional Use Permit	WAC Ch. 173-26	For uses subject to special conditions in the local shoreline master program or not listed. Administered by local jurisdictions and reviewed by Dept. of Ecology.
401 Water Quality Certification	WAC Ch. 173-201A; Ch. 173-204.	Administered by Dept. of Ecology.
Federal Consistency	Various; compiled in Washington Coastal Zone Management Program Enforceable Policies	Administered by Dept. of Ecology.

Policies

- **BUDM Encouraged:** Disposal in an established open water site must be for dredged material that meets the approval of federal and state agencies and for which there is no practical alternative upland disposal site or beneficial use such as beach enhancement. WAC 332-30-166(3).
- **BUDM Encouraged:** Under Hydraulic Code Rules, "The department may allow dredged material placement for beneficial uses such as beach nourishment or capping of contaminated sediments." WAC 220-660-410(4)(d).
- **BUDM Encouraged:** "[Local shoreline] master programs should include provisions for uses of suitable dredged material that benefit shoreline resources." WAC 173-26-231(3)(f).
- **NBS Required:** A person must use the least impacting technically feasible bank protection alternative. A person should propose a hard armor technique only after considering site characteristics such as the threat to major improvements, wave energy, and other factors in an alternatives analysis. WAC 220-660-370(3)(b).
- **NBS Required:** Where erosion has been demonstrated to threaten a primary structure, the guidelines for local shoreline master programs require that softer methods of stabilization be employed unless demonstrated to be infeasible. WAC 173-26-231(3)(a).
- **NBS Required (subset):** Rulemaking is underway to implement new statutory requirements for residential property owners applying for a Hydraulic Project Approval (HPA) to replace a marine shoreline stabilization or armor structure using the least impacting, technically feasible bank protection alternative. RCW 77.55.231.
- **NBS Encouraged:** Under guidelines for local shoreline master programs, structural and hybrid approaches are acceptable for ecosystem restoration projects where non-structural methods are not feasible or not sufficient and there is no net loss of shoreline ecological functions. WAC 173-26-231(3)(a)(iii)(IV).

- **NBS Encouraged:** Small beach nourishment and bioengineered erosion control (i.e. living shoreline) projects for single-family residences are exempt from Shoreline Management Act permit requirements under an exemption designed for bulkheads. WAC 173-27-040(2)(c).
- **Hydrodynamics Required:** Guidelines for local shoreline master programs must implement standards for structural shoreline stabilization measures "to avoid and, if that is not possible, to minimize adverse impacts to sediment conveyance systems." WAC 173-26-231(3)(a)(iii)(E).

Physical Sediment Conditions

- **Qualitative:** Sediment selected for beach nourishment is recommended to be at least as texturally coarse as the original beach material. Marine Shoreline Design Guidelines at 7.1-19.
- General ranges of appropriate gravel sizes for Puget Sound beach nourishment is provided by Marine Shoreline Design Guidelines at 7.1-21.

Sand Source

- N/A

Water Quality

- Testing requirements and thresholds are set on a case-by-case basis, and typically will be at least as stringent as those for open-water disposal. Dredged Material Evaluation and Disposal Procedures User Manual at 2-16; 14-142. See WAC 173-204-410(7).
- To minimize turbidity, hopper dredges, scows and barges used to transport dredged materials to the disposal or transfer sites must completely contain the dredged material. WAC 220-660-410(4)(e).

Endangered Species & Critical Habitat

- **Avoid:** In-water work is not allowed during designated windows. WAC 220-660-330.
- **Mitigate:** Local shoreline master plans for jurisdictions with new or maintenance dredge projects are required to set standards for dredge material disposal to avoid or minimize significant ecological impacts and, for impacts which cannot be avoided, to mitigate impacts in a manner that assures no net loss of shoreline ecological functions. WAC 173-26-231(3)(f).

Placement Guidelines & Restrictions

- Soft shoreline methods that allow beach processes and habitat to remain intact may extend waterward of the OHWL. Tighter restrictions apply to hard structures. WAC 220-660-370(4)(a).

Resources

- **Dredged Material Evaluation and Disposal Procedures User Manual (2021)**
<https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll11/id/5397>
- **Shoreline Permitting Manual**
<https://apps.ecology.wa.gov/publications/documents/1706029.pdf>
- **Marine Shoreline Design Guidelines**
<https://wdfw.wa.gov/sites/default/files/publications/01583/wdfw01583.pdf>





Wisconsin State Profile

Introduction

Dredging and placement operations in Wisconsin are coordinated between the Wisconsin Department of Natural Resources and USACE St. Paul, Detroit, and Chicago districts. Projects to place sediment on Great Lakes shorelines will generally need waterways and wetland authorizations and a bulkhead line determination coordinated by the Department of Natural Resources. The Department provides standards for beach nourishment and shoreline placements, and encourages BUDM.

Permit Table

Permit	Authority	Description
Waterways Individual Permit	Wis. Stat. § 30.12	For placement in navigable waters. Administered by Department of Natural Resources.
Wetland Individual Permit	Wis. Stat. § 281.36	For placement in wetlands. Administered by Department of Natural Resources.
WI Dredging Authority	Wis. Stat. § 30.20.	For removal of material from under navigable waters. Administered by Department of Natural Resources.
DNR Bulkhead Line	Wis. Stat. § 30.11	Establishing jurisdictional requirements for placement. Administered by Department of Natural Resources.
PLB Lakebed Lease	Wis. Stat. § 24.39.	For certain placements in Lake Michigan or Superior. Coordinated by the Department of Natural Resources.
Water Quality Certification	Wis. Admin. Code NR §§ 299, 103	Administered by Department of Natural Resources.
Federal Consistency	Various; see coastal program.	Administered by the Department of Administration.

Permit Table - Continued

Permit	Authority	Description
Maintenance Dredging General Permit	Wis. Admin. Code NR § 310.09-12	For municipal projects <50 kcy or other projects <3 kcy. Administered by Department of Natural Resources.
City of Superior SAMP RGPs	CWA 401; RH 10.	A set of USACE RGPs are available for limited fill projects (~15 ac) in the area managed by the City of Superior Special Area Management Plan. Administered by St. Paul District.

Policies

- **BUDM Encouraged:** It is department policy to encourage use of dredged material. Wis. Admin. Code NR § 347.01.
- **NBS Encouraged:** DNR encourages soft and hybrid armoring solutions and considers the impacts of hardened solutions on the public trust through its permit evaluation process. Wis. Stat. Ann. § 30.12.
- **Hydrodynamics Encouraged:** DNR considers project impacts on hydrodynamics through the public trust balancing test in its permit evaluation process. Wis. Stat. Ann. § 30.12.

Physical Sediment Conditions

- **Quantitative:** #200 sieve or less than .074 mm dia. Wis. Admin. Code NR § 347.07(4)(a)(1).
- Average of silt and clay in dredged material must not exceed the average percentage of silt plus clay in the existing beach by more than 15%. Wis. Admin. Code NR § 347.07(4)(a)(1).
- The color of the dredged material may not differ significantly from the color of the beach material. Wis. Admin. Code NR § 347.07(4)(a)(1).

Sand Source

- N/A

Water Quality

- Monitoring must be in place for water quality indicators, including TSS and DO. Wis. Admin. Code NR § 347.08(2).
- Proponents are required to conduct contaminant testing if available information is either insufficient to determine the possibility for sediment contamination, or shows a possibility for sediment contamination. Wis. Admin. Code NR § 347.06(3)(b).
- Testing (case-by-case) is required for projects greater than 50 cubic yards or where there are known contaminants. Wis. Admin. Code NR § 347.06.
- Wastewater criteria for a WI PDES general permit may not be exceeded. Wis. Admin. Code NR § 347.07(4)(a)(2).
- The maintenance dredging general permit sets a TSS limit at 40 mg/L for trout streams and 80 mg/L otherwise, and requires appropriate control measures such as silt curtains. Wis. Admin. Code NR §§ 345.02(c)(5-8).

Endangered Species & Critical Habitat

- **Avoid:** A dredging project must either avoid impacts on endangered species or obtain an ITA. Wis. Admin. Code NR § 345.04(3)(a)(2).

Placement Guidelines & Restrictions

- N/A

Resources

Guidance for Applying the Sediment Sampling and Analysis Requirements of Chapter NR 347, Wisconsin Administrative Code

- <https://dnr.wi.gov/files/pdf/pubs/WT/WT0778.pdf>



Appendix C

Key State Policies

This section summarizes statewide policies identified for three categories:

- Policies encouraging or requiring the beneficial use of sediment obtained through dredging projects (e.g., Figure 2);
- Policies encouraging or requiring the use of natural or nature-based solutions (as defined by the state to include dunes, wetlands, or other designs enhancing or integrating into the coastal ecosystem) vs hard structures for erosion control projects;
- Policies implementing regional sediment management principles by encouraging or requiring that projects avoid impacts to sediment supply, erosion, or hydrodynamics; and

In each section, the policies of the state are classified as “required,” “required for a subset of projects,” encouraged, or “no statewide policy” according to the most restrictive policy.

Beneficial Use of Dredged Material

Required

Florida: Beach or nearshore sand placement is the least-cost disposal method. Beach-quality sand from federal navigation projects must be placed on or nearby adjacent eroding beaches; Florida Statutes 161.142(5). The department is authorized to enter into agreements with local governments to cost share and coordinate RSM; Florida Statutes 161.101(7). Establish RSM alternatives for existing beach/inlet projects; Florida Statutes 161.161(1)(d).

Louisiana: “Spoil shall be used beneficially to the maximum extent practicable to improve productivity or create new habitat, reduce or compensate for environmental damage done by dredging activities, or prevent environmental damage. Otherwise, existing spoil disposal areas or upland disposal shall be used to the maximum extent practicable rather than creating new disposal areas”; La. Admin. Code tit. 43, § 1-707(B).

Massachusetts: Dredged material shall not be disposed if a feasible alternative exists that involves the use, recycling, or contaminant destruction and/or detoxification; 314 CMR 9.07 (e).

Mississippi: “The department shall require any party permitted to conduct dredging activities of over ... 2,500 cubic yards to participate in the department programs involving beneficial use of dredge materials, provided the material is suitable and a beneficial use site is available”; MS Code § 49-27-61. “All dredged material will be viewed as a potential reusable resource, and all disposal plans must include provisions for access to such resources. Dredged material suitable for beach replenishment, habitat restoration and enhancement, construction, or other purposes (sanitary landfill, agricultural soil improvement, etc.) must be used immediately for such purposes or stockpiled in designated beneficial use staging areas or other non-wetland areas for later use. All projects involving the removal of over two

thousand five hundred (2500) cubic yards of dredged material must evaluate the dredged material in accordance with approved procedures to determine suitability. All dredged material determined to be suitable for beneficial uses must participate in the Department programs involving beneficial use"; 22 MS Code R. § 23-08-107.

New York: Applicants are required to consider beneficial use first for dredge management, and the state provides guidance for in-water and riparian dredged material placement. See DEC Technical & Operational Guidance Series 5.1.9 (TOGS 5.1.9).

North Carolina: Clean, beach quality material dredged from navigational channels within the active nearshore, beach or inlet shoal systems shall not be removed permanently from the active nearshore, beach or inlet shoal system. This dredged material shall be disposed of on the ocean beach or shallow active nearshore area where it is environmentally acceptable and compatible with other uses of the beach; NC Dredge and Fill Law, § 113-229 h(2), 15A NCAC 07M Section 1100.

Ohio: Open water disposal of dredged material is prohibited. Dredge must be disposed of in a CDF or beneficially used; O.R.C. § 6111.32.

Texas: If the costs of the beneficial use of dredged material from dredging projects in commercially navigable waterways are reasonably comparable to the costs of disposal in a non-beneficial manner, or if the increased costs are reasonably proportionate to the benefits of BU, the material shall be used beneficially; 31 Tex. Admin. Code § 501.25(d).

Required (subset)

Massachusetts: If a dredging project is publicly funded, it is state policy that any clean compatible dredge material be placed on the closest public beach. Ensure that dredging and disposal of dredged material take full advantage of opportunities for beneficial re-use; Mass CSZ Policy Guide: Ports and Harbors Policy #1.

Pennsylvania: Under the state's coastal management enforceable policies and Geographic Location Description, the state requires that suitable sediment dredged from Conneaut Harbor, OH, be placed downdrift of the Harbor's federal breakwater to return it to the littoral system; CRMP Policies 1.2, 2.1.

Texas: Projects constructing and maintaining navigation inlets and channels using funding from the Coastal Erosion Response Account are required to used dredged material to benefit, eroding beach areas or to restore or create wetlands to mitigate erosion; 31 Tex. Admin. Code § 15.44.

Encouraged

Alabama: "To the maximum extent feasible, all beach compatible dredge materials taken from the tidal coastal system shall be placed on beaches or within the nearshore sand system." Ala. Admin. Code r. 220-4-.09(4)(b)(11). BUDM Encouraged: Approved beach nourishment, shoreline stabilization or marsh

creation, restoration or enhancement projects are identified as authorized purposes for dredging and filling activities on State waterbottoms or adjacent wetlands”; ADEM Admin. Code r. 335-8-2-.02(1)(a).

American Samoa: The coastal program encourages beneficial use when reviewing projects. A.S.A.C. § 26.02.

California: “Dredge spoils suitable for beach replenishment should be transported for these purposes to appropriate beaches or into suitable longshore current systems”; Cal. Pub. Res. Code § 30233(b) (CA Coastal Act). The Long Term Management Strategy for the Bay Area sets a goal to limit in-Bay placement to 20% of the total volume of sediment dredged from the Bay and maximize beneficial use of dredged sediment. Water areas may be filled in accordance with a port master plan for the purposes of habitat restoration or creation and improving shoreline appearance or public access; Cal. Pub. Res. Code § 30705(a) (CA Coastal Act).

Connecticut: Develop a long-range planning program for the continued maintenance and enhancement of federally maintained navigation facilities to effectively and efficiently plan and provide for environmentally sound dredging and disposal of dredged materials; CGS Sec. 22a-92(c)(1)(C).

Georgia: Projects for improving navigation channels, Disposal of sand and sediment originating from water navigation related projects. GA River and Harbor Development Act. O.C.G.A. §52-9-1 and -2.

Guam: When reviewing projects, permitting agencies highlight BUDM as an important option; 22 GAR § 10105.

Hawaii: Sand placement not to exceed 10,000 cubic yards per occasion, with minor sand retention structures, extraction of sand from submerged lands, and transportation or transmission of sand from an offshore extraction site to the replenishment site; HAR §13-5-23 P-16 BEACH RESTORATION (C-1). Variance may be granted if sand from one location seaward of the shoreline to another location seaward of the shoreline will not adversely affect beach processes, will not diminish the size of a public beach, and will be necessary to stabilize an eroding shoreline; §205A-46.

Illinois: The Rivers, Lakes, and Streams Act, the statute authorizing the Lake Michigan permitting process, allows but does not establish a preference for “the placing of unconfined fills or deposits of clear sand, rock or other material approved by the IDNR in or along the shores of Lake Michigan ... for the purpose of replacing or augmenting the natural material in the littoral currents, for creating new beaches or for replenishing existing beaches, for the protection of the shore against erosion...”; 615 ILCS 5. The Chicago District Lake Michigan RGP authorizes placement of clean dredged material landward of the 18ft depth contour with fewer testing requirements. Statewide Permit No. 11 for minor dredging identifies beach nourishment and bank stabilization as authorized uses; Ill. Admin. Code tit. 17, § 3704.110.

Indiana: Royalty fees applying to the removal of dredged material from Lake Michigan are waived for suitable sediment beneficially used for beach nourishment; IC 14-29-3-2; 312 IAC 6-5-8.

Louisiana: General permits for maintenance dredging (e.g., GP-13 for surface flow channels, GP-15 for commercial navigation) authorize placement for BUDM. For dredging of greater than 25,000cy, a strategic plan for beneficial use is required.

Maryland: Through statewide dredged material management planning, beneficial use and innovative use are prioritized over other disposal methods; MD. Environment Code § 5-1104.2. Maryland works with dredging applicants to match sediment with projects in need of BU material. Authorized beneficial uses of dredged material include: restoration of underwater grasses; restoration of islands; stabilization of eroding shorelines; replenishment of beach areas; creation or restoration of wetlands; and creation, restoration, or enhancement of fish or shellfish habitats; MD. Environment Code, § 5-1101(a)(3).

Maine: Sand Dune Rule: material for beach nourishment may be obtained from, but is not limited to, the following sources in order of preference: (1) Beneficial use of material dredged from Maine's federal channels and harbors by the United States Army Corps of Engineers (ACOE); (2) Material excavated from upland sources; and (3) Material dredged from near shore and offshore waters provided that the dredging complies with the standards in Chapter 310, Wetlands and Waterbodies Protection Rules and 38 M.R.S.A. §§ 480-A to 480-Z.

Minnesota: “Use or use of dredged material, where suitable, is highly recommended as a management option by the MPCA”; MPCA Dredged Material Management Manual at 25. Use/use as a beach amendment or in-water disposal to support a legitimate purpose is considered on a case-by-case basis in the context of an individual permit. Deep water disposal is not authorized. Dredge projects of less than 3000 yd³ of sediment that is greater than or equal to 93% sand are exempt from solid waste permitting; MPCA Dredged Material Management Manual at 6. Permit requirements establish a hierarchical preference for dredge disposal options. One option (4th on the list) provides that “redeposition of excavated materials, consisting of inorganic materials free from pollutants, into public waters shall only be permitted when it will result in improvement of natural conditions of public waters for the public benefit and will not result in sedimentation, obstruction of navigation, or a loss of fish or wildlife habitat”; Minn. R. 6115.0200(5)(B)(2); see also Minn. R. 6115.0216(6). A USACE RGP is available for small projects (50ft), and are exempted from Public Waters Work permit requirements; Minn. R. 6115.0190(4)(A).

Mississippi: “If approved ... a party may deposit acceptable dredge materials in a designated location for a fee not to exceed ... 50% of the fair market cost to transport and dispose of the material in an approved upland site. The department shall consider in-kind services for offsetting depositional charges”; MS Code § 49-27-61; 22 Miss. Code. R. § 23-06-109.03.

New Hampshire: Encourage beach renourishment and wildlife habitat restoration as a means of dredge disposal whenever compatible; Coastal Program Policy #14. The primary acceptable means of disposal for uncontaminated sediments shall be for beneficial use, such as beach nourishment, dune restoration, and shoal creation associated with living shorelines; Ch. Env-Wt 607.09 (e).

New Jersey: The beneficial use of dredged material of appropriate quality and particle size for purposes such as restoring landscape, ... beach protection, creating marshes, ... and making new wildlife habitats

is encouraged; N.J.A.C. 7:7-15.12(d). Uncontaminated dredged sediments with 75% sand or greater are generally encouraged for beach nourishment provided the particle size is compatible with that of the receiving beach; N.J.A.C. 7:7-12.9(b)(6). (Typically, material that is greater than 90% sand is utilized for beach nourishment.) The Department encourages the renourishment of eroding beaches through the placement of clean sand of acceptable grain size composition (similar to the grain size of the existing beach); N.J.A.C. 7:7 Appendix G.

New York: “Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land.” This policy is implemented in NY to ensure that suitable or compatible dredged material is kept within the same littoral system from which it was removed; NYSCMP Policy 15. The coastal management program encourages the use of dredged material for various types of habitat restoration throughout many areas designated as significant coastal fish and wildlife habitats; NYSCMP Policy 7. Policies are in place to exempt dredged materials from solid waste regulations (6 NYCRR Part 360) if used for a suitable upland placement purpose.

Ohio: ODNR requires (encourages USACE) dredged sand/gravel to be returned to shallow nearshore waters or beach-placed downdrift of the point of dredging; OCMP Policy 22. Ohio may issue or renew a harbor sediment authorization for Lake Erie dredge that is not a hazardous waste and that is unlikely to create a nuisance or adversely affect public health, safety, or the environment. Lake Erie dredge that is covered by and managed in accordance with an effective harbor sediment authorization is neither a solid waste nor another waste for the purposes of its solid and hazardous waste regulations; O.A.C. 3745-599-400. The Lake Erie Shore Erosion Management Plan (LESEMP) maps erosion rates and causes along the Ohio shoreline and provides site suitability analysis for erosion control methods, including sediment placement. Sand- and gravel-sized sediments should be returned to the littoral system downdrift of the point of dredging; OCMP Policy 17.

Oregon: Dredged material is approved for use for habitat improvement, beach nourishment or other similar uses under a standing solid waste beneficial use determination; OAR 340-093-0270 (5)(c).

Puerto Rico: Coordinated with USACE SAJ. San Juan Dredged Material Management Plan.

Rhode Island: Beach nourishment and habitat restoration and creation, in the coastal zone, are first priority placement for dredged material; R.I. Gen. Laws § 46-6.1-3.

South Carolina: Where possible, artificial beach nourishment shall be performed in concert with inlet stabilization or navigation projects; S.C. Code Regs. 30-13(N)(2)(b).

Virginia: “The beaches of the Commonwealth shall be given priority consideration as sites for the disposal of that portion of dredged material determined to be suitable for beach nourishment”; Va Code § 10.1-704. Virginia "will strive to achieve maximum beneficial uses of suitable dredged material for those projects which qualify under criteria established here while protecting the interests of the Commonwealth in the land and the resources lying channelward of the mean low water shoreline..."; 4

VAC 20-400-30. A fast-track joint permitting program is available to local governments for dredging and disposal of dredge material in state wetland areas and state-owned tidal lands for habitat creation or development of living shoreline features or to enhance coastal resilience; 4 VAC 20-1340-10 *et seq.*

Washington: Application for use of an established site must be for dredged material that meets the approval of federal and state agencies and for which there is no practical alternative upland disposal site or beneficial use such as beach enhancement; WAC 332-30-166(3). Under Hydraulic Code Rules, “The department may allow dredged material placement for beneficial uses such as beach nourishment or capping of contaminated sediments”; WAC 220-660-410(4)(d). “[Local shoreline] master programs should include provisions for uses of suitable dredge material that benefit shoreline resources”; WAC 173-26-231(3)(f).

Wisconsin: It is department policy to encourage use of dredged material; Wis. Admin. Code NR § 347.01.

Nature-Based Solutions

Required

Alabama: “Bulkheads, the placement of rip-rap, and other structural shoreline armament shall not be permitted ... unless it is demonstrated ... that: ... there are no feasible non-structural alternatives available including, but not limited to, preservation and restoration of dunes, beaches, wetlands, submersed grassbeds, and shoreline restoration and nourishment and retreat or abandonment”; ADEM Admin. Code r. 335-8-2-.06(1)(d). See also ADEM Admin. Code r. 335-8-2-.06(2), -.08(4)(b).

Connecticut: Dredged material that is clean sand must be offered as beach nourishment but otherwise nourishment sand must be trucked in from upland to avoid fisheries contamination; CGS 22a-92(c)(2)(e).

Maryland: Erosion control projects must consist of marsh creation or other nonstructural shoreline stabilization measures that preserve the natural environment unless a Waiver is obtained; COMAR 26.24.04.01.

Mississippi: Under wetland permit standards applicable to erosion control activities, “nonstructural methods must be used in preference to structural methods. Vegetation as a nonstructural method is preferred to structural methods of sloping (3:1) rip-rap, and rip-rap is preferred to vertical seawalls. Vertical face bulkheads may be used only in low energy areas ...”; 22 Miss. Code R. § 23-08-103.

New Hampshire: Living Shorelines required for tidal shoreline stabilization unless not practicable; Ch Env-Wt 609.07. New seawalls or riprap is prohibited with some exceptions; Ch Env-Wt 609.07 and .09.

New Jersey: Non-structural shore protection and/or storm damage reduction measures that allow for the growth of vegetation shall be used unless it is demonstrated that use of non-structural measures is not feasible or practicable; N.J.A.C. 7:7-15.11(b)(1).

Washington: A person must use the least impacting technically feasible bank protection alternative. A person should propose a hard armor technique only after considering site characteristics such as the threat to major improvements, wave energy, and other factors in an alternatives analysis; WAC 220-660-370(3)(b). Where erosion has been demonstrated to threaten a primary structure, the guidelines for local shoreline master programs require that softer methods of stabilization be employed unless demonstrated to be infeasible; WAC 173-26-231(3)(a).

Required (subset)

Hawaii: Construction of private shoreline hardening structures, including seawalls and revetments is prohibited at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities.

Oregon: Local governments and permitting agencies have in some cases set requirements for alternatives analyses ensuring that structural erosion control is only used if necessary for the success of the project. Hardened erosion control structures are limited to a subset of beachfront lots developed before 1977. Guidance suggests that sand nourishment is exempted from the prohibition, but may still be subject to permitting; Guidebook on Erosion Control Practices at 17.

Virginia: Shore hardening structures are not permitted on barrier islands; 4 VAC 20-440-10(C)(5).

Washington: Rule-making is under way to implement new statutory requirements for residential property owners applying for a Hydraulic Project Approval (HPA) to replace a marine shoreline stabilization or armor structure using the least impacting, technically feasible bank protection alternative; RCW 77.55.231.

Encouraged

Alabama: “To the maximum extent possible, shoreline stabilization should be accomplished by the establishment of appropriate native wetland vegetation. Rip-rap materials, pervious interlocking brick systems, filter mats, wave attenuation units and other similar stabilization methods should be used in lieu of vertical seawalls wherever feasible”; Ala. Admin. Code r. 220-4-.09(4)(b)(6).

American Samoa: The coastal program encourages natural and hybrid designs when reviewing coastal erosion control projects; A.S.A.C. § 26.02.

California: The CA Coastal Act allows for hard armoring in limited circumstances and requires softer, less environmentally damaging alternatives when feasible: “Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply. Existing marine structures causing water stagnation contributing to pollution problems and fishkills should be phased out or upgraded where feasible”; Cal. Pub. Res. Code § 30235 (CA Coastal Act).

Connecticut: Promotes use of non-structural alternatives like living shorelines. The “creation” of wetlands is allowed for the “purpose of shellfish and finfish management, habitat creation and dredge spoil disposal. Restoration and enhancement of degraded intertidal flats is encouraged; CCMA, CGS Section 22a-92(b)(2)(D) and (E).

Delaware: Structures such as erosion control structures on the beach are prohibited with few exceptions seaward of a coastal setback line by Division of Watershed Stewardship; 7 Del. Admin. C. § 5102-3.1. Nonstructural erosion control measures are preferred for shoreline stabilization work in appropriate environments; 7 Del. Admin. C. § 7504-4.10.1.3.

Florida: Beach nourishment projects are in the public interest; Hard structures must minimize potential adverse impacts to the beach and dune system; Fla. Stat. 161.088, 62B-33.0051, FAC.

Georgia: Living Shorelines, Engineering with Nature, etc. with no adverse impacts; O.C.G.A. § 12-5-239(i)(1) through (3) 12-5-286(g)(1-3).

Guam: Agencies encourage the use of natural designs in mandatory Erosion and Sediment Control Plans; 22 GAR § 10105.

Hawaii: The construction of public shoreline hardening structures, including seawalls and revetments, at sites having sand beaches and at sites where shoreline hardening structures interfere with existing recreational and waterline activities should be minimized; HRS § 205A-2(c)(9)(B,C). Geotextile bags and other sand retention techniques implemented in conjunction with small scale beach placement are covered by the Small Scale Beach Nourishment Permit; HAR §13-5-23.

Indiana: A general authorization is available for beach nourishment within the Indiana Dunes National Seashore, exempting placement from Navigable Waterways Fill Permit requirements; 312 IAC 6-6-1.

Louisiana: “Nonstructural methods of shoreline protection shall be used to the maximum extent practicable”; La. Admin. Code tit. 43, § I-709(A).

Massachusetts: Non-structural alternatives, such as beach and coastal bank nourishment, dune rebuilding, and stabilization by vegetative plantings, should be favored over structural measures where feasible. Structures are becoming increasingly recognized as expensive short-term solutions, which frequently exacerbate problems elsewhere along the coast and foster a false sense of security; Mass CZM Policy Guide: Coastal Hazards Policy #1.

Maine: Coastal sand dunes systems are resources of state significance and that “there is a need to facilitate research, develop management programs and establish sound environmental standards that will prevent the degradation of and encourage the enhancement of these resources. Attempts to prevent erosion and flooding through the construction or enlargement of seawalls harm the beach and dune system; 38 M.R.S.A. §480-A. The department encourages landowners to consider removing a seawall or similar structure and covering the area with sand and dune vegetation, or replacing the

structure in a more landward position to reduce its influence on the beach and sand dune system; Sand Dune Rule.

Michigan: Michigan incentivizes the use of natural solutions focused on inland lakes and streams with less dynamic shoreline processes, but does not have preference policies that would come directly into play in a coastal BUDM project. The coastal program has identified promotion of nature-based solutions as a priority and provides cost-share grants to local governments for small coastal restoration projects.

Minnesota: The DNR recommends a natural approach to shoreline stabilization through the establishment and maintenance of natural vegetation.

Mississippi: Wetland permitting and public trust leasing requirements “favor the preservation of the natural state of the public trust tidelands and their ecosystems...”; MS Code § 49-27-9; 22 Miss. Code. R. § 23-06-102 (wetland permitting); 1 Miss. Code R. § 11-2.4 (public lands leasing). “All public projects of any federal, state or local governmental entity which serve a higher public purpose of promoting the conservation, reclamation, preservation of the tidelands and submerged lands, public use for fishing, recreation or navigation, or the enhancement of public access to such lands shall be exempt from any [public trust tidelands] use or rental fees”; MS Code § 29-15-13.

New Hampshire: Living Shorelines are preferred means of stabilizing tidal shorelines; Ch Env-Wt 609.04 (a).

New York: New York provides guidance and programs to encourage protecting and restoring natural shorelines, and addresses natural solution design alternatives through permit review. “Non-structural measures to minimize damage to natural resources and property from flooding and erosion shall be used whenever possible”; NYSCMP Policy 17. “Hardening of the shoreline is to be avoided except when alternative means, such as soft engineering alternatives, are not effective. Beach nourishment, revegetation, offshore bar building, or inlet sand bypassing are preferred approaches to control erosion because of fewer environmental impacts than hard structures”; Long Island Sound Coastal Management Program (LISCMP) Policy 6. “Manage navigation infrastructure to limit adverse impacts on coastal processes. Manage navigation channels to limit adverse impacts on coastal processes by designing channel construction and maintenance to protect and enhance natural protective features and prevent destabilization of adjacent areas; and make beneficial use of suitable dredged material. Manage stabilized inlets to limit adverse impacts on coastal processes”; LISCMP Policy 4.4.

North Carolina: It is the policy of the State of North Carolina that material resulting from the excavation or maintenance of navigation channels be used in a beneficial way wherever practicable. 15A NCAC 07M SECTION .1100. Beach nourishment, land use planning, relocation, and vegetation management suggested for erosion mitigation; 15A NCAC 07M SECTION .0200, 15A NCAC 07M .0202. Bulkheads, jetties, groins, breakwaters prohibited, with the exception of up to 6 terminal groins; § 113A-115.1. 15A NCAC 07H .0308.

CNMI: “...[W]herever possible, soft stabilization using re-vegetation measures, green infrastructure, and other ‘living shoreline’ alternatives should be implemented instead of hard stabilization and shoreline

armorings”; § 15-10-335(d)(2). In the event that hard stabilization is proposed, the applicant must explain what “soft measures” were considered and why they were determined to be inappropriate. § 15-10, Part 200 (Building Redevelopment and Stormwater Incentives); NMIAC § 15-10-101(c)(2).

Oregon: “Land-use management practices and non-structural solutions to problems of erosion and flooding shall be preferred to structural solutions”; Statewide Planning Goal 17 Implementation Requirement 5.

Pennsylvania: The state encourages use of natural solutions on a case-by-case basis through permit pre-application review and federal consistency review.

Puerto Rico: A PR Expert Advisory Committee on climate change (CEACC) developed 103 recommendations to face climate change impacts on the coast that include the use of natural solutions as a preference over hard structures; Law No. 33 2019. Puerto Rico Climate change, mitigation, adaptation, and resilience Law.

Rhode Island: Coastal Council prefers nonstructural shoreline protection methods over all other shoreline protection methods for controlling erosion such as stabilization with vegetation and beach nourishment due to their effectiveness in preserving beaches, natural shoreline habitats and sediment dynamics. Hybrid shoreline protection methods are preferred over structural shoreline protection methods due to their effectiveness in preserving beaches, natural shoreline habitats and sediment dynamics as compared to structural shoreline protection. Where structural shoreline protection may be authorized riprap revetments are preferred to vertical steel, timber, or concrete seawalls and bulkheads; Red Book, 1.2.2. D. 1., G.1.a.&d.

South Carolina: Living Shorelines encouraged as an alternative to traditional hardened erosion control structures in estuarine environments; S.C. Code Regs. 30-12(Q). It is policy of the state to "severely restrict the use of hard erosion control devices to armor the beach/dune system and to encourage the replacement of hard erosion control devices with soft technologies as approved by the department which will provide for the protection of the shoreline without long-term adverse effects, encourage the use of erosion-inhibiting techniques which do not adversely impact the long-term well-being of the beach/dune system, [and] promote carefully planned nourishment as a means of beach preservation and restoration where economically feasible"; S.C. Code § 48-39-260(3-5).

Texas: “Non-structural erosion response methods such as beach nourishment, sediment bypassing, nearshore sediment berms, and planting of vegetation shall be preferred instead of structural erosion response methods”; 31 Tex. Admin. Code § 501.26(a)(5). “Living Shorelines and vegetative cover are the preferred method of shoreline stabilization and shall be used where practical”; 31 Tex. Admin. Code § 155.3(f)(8)(a).

Virginia: The BUDM fast-track program incentivized local governments to use habitat restoration and living shoreline features for coastal resilience; 4 VAC 20-1340-10 *et seq.*

Washington: Under guidelines for local shoreline master programs, structural and hybrid approaches are acceptable for ecosystem restoration projects where non-structural methods are not feasible or not sufficient and there is no net loss of shoreline ecological functions; WAC 173-26-231(3)(a)(iii)(IV). Small beach nourishment and bioengineered erosion control (i.e. living shoreline) projects for single-family residences are exempt from Shoreline Management Act permit requirements under an exemption designed for bulkheads; WAC 173-27-040(2)(c).

Wisconsin: DNR encourages soft and hybrid armoring solutions and considers the impacts of hardened solutions on the public trust through its permit evaluation process; Wis. Stat. Ann. § 30.12.

Hydrodynamics

Required

Alabama: Applying to structural projects - “Bulkheads, the placement of rip-rap, and other structural shoreline armament shall not be permitted ... unless it is demonstrated ... that: ... the structure will be designed so as to allow the normal hydrologic regime to be maintained in wetland areas”; ADEM Admin. Code r. 335-8-2-.06(1)(c).

American Samoa: Required to “prevent negative impacts to receiving waters and ground waters as a result of disruption in natural drainage patterns caused by development”; A.S.A.C. § 24.0208. The expectation for land use permit applications is that alterations of the natural shoreline, streams, and hillsides are minimized; and adverse effects on habitats, streams, and drainage are minimized; A.S.A.C. §§ 24.0501 et. Seq. Any project proposed for location within a designated Shoreline Management Area and a shoreline area is required to provide evidence that the effects of shoreline development on natural beach processes shall be minimized; A.S.A.C. §§ 24.0501 et. seq.

California: “Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs”; Cal. Pub. Res. Code § 30253 (CA Coastal Act). “Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation”; Cal. Pub. Res. Code § 30233(b) (CA Coastal Act). “Revetments, ... and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when designed to eliminate or mitigate adverse impacts on local shoreline sand supply”; Cal. Pub. Res. Code § 30235 (CA Coastal Act). In the context of port master plans, “the nature, location, and extent of any fill, including the disposal of dredge spoils within an area designated for fill, shall minimize harmful effects to ... sand transport systems, and shall minimize reductions of the volume, surface area, or circulation of water”; Cal. Pub. Res. Code § 30706 (CA Coastal Act).

Connecticut: Degrading natural erosion patterns through the significant alteration of littoral transport of sediments in terms of deposition or source reduction must be minimized; CGS section 22a-93(15)(C). Uses that substantially accelerate erosion or lead to significant despoliation of tidal flats are disallowed;

CGS Sec. 22a-92(b)(2)(C). Degrading existing circulation patterns of coastal waters through the significant patterns of tidal exchange or flushing rates, freshwater input, or existing basin characteristics and channel contours must be minimized; CGS section 22a-93(15)(B).

Florida: Inlet relocation, opening or maintenance must not alter hydrodynamics or long-term sand management. 62B-41.005 (11) & (12), F.A.C.

Guam: “All earth-moving activities on Guam shall be conducted in such a way as to prevent accelerated erosion and the resulting sedimentation. To accomplish this all persons engaged in earth-moving activities shall design, implement, and maintain erosion and sediment control measures which effectively prevent accelerated erosion and sedimentation”; 22 GAR § 10105(a)(1). The potential dangers of flooding landslides, erosion, and siltation must be minimized or eliminated; Territorial Seashore Protection Act,” Department of Land Management, 1980. Authority: Chapter 63, Title 21, Seashore Act (as amended), Government Code of Guam. Man-made alteration of sand dunes which would increase potential flood damage is prohibited; The Government of Guam, Department Of Public Works, under the authority of Subsection (a), Subsection 66116, Article 1, Chapter 66, Building Law, 21.

Hawaii: Altering any bay, estuary, salt marsh, river mouth, slough or lagoon should be minimized; HRS § 205A26(3)(A). New structures inland from the shoreline setback should be located to conserve open space, minimize interference with natural shoreline processes, and minimize loss of improvements due to erosion; HRS § 205A-2(c)(9)(A).

Illinois: In general, no projects are permitted that are deemed potentially disruptive to the movement of littoral transport along the beaches and nearshore areas; CMP at 52. Placement projects must not cause bank or shoreline instability on other properties; Ill. Admin. Code tit. 17, § 3704.90(b).

Indiana: When issuing a Navigable Waterways Fill Permit, IDNR will consider the impact of the project on accretion and erosion of sand or sediments; 312 IAC 6-1-1(e). Applicants must evaluate the likely impact of the project on coastal dynamics, including shoreline erosion and accretion, sand movement within the lake, and interaction with existing structures; 312 IAC 6-8-2(d).

Louisiana: Projects are required to avoid to the maximum extent practicable significant impacts to littoral and sediment transport processes, sediment supply from freshwater flows, natural coastal features, land loss, or erosion; La. Admin. Code tit. 43, § I-701(G). “Spoil shall be deposited utilizing the best practical techniques to avoid disruption of water movement, flow, circulation, and quality ... [and] downstream land loss and erosion”; La. Admin. Code tit. 43, § I-707(A, J).

Massachusetts: Ensure that dredging and disposal of dredged material minimize adverse effects on physical processes. Removal of nearshore material must not lead to increased erosion or other adverse changes to the shoreline. Dredging projects will not cause a significant increase in the volume or velocity of water or a permanent change in circulation patterns; Mass CSZ Policy Guide: Ports and Harbors Policy #1.

Maryland: Material placement may not cause adverse impacts to existing navigation channels, longshore current patterns, or adjacent properties; COMAR 26.24.03.05(D)(1).

Michigan: Filling, dredging, and placement must cause the least disruption to the littoral drift and longshore processes, or mitigate disruptions; Mich. Admin. Code r. 322.1011(c). Monitoring is required at EGLE's discretion to ensure that injury to the riparian interests of adjacent property owners does not occur, including monitoring the littoral drift in the project areas; Mich. Admin. Code r. 322.1011(d).

Minnesota: Placed dredge material may not result in sedimentation or obstruction of navigation; Minn. R. 6115.0200(5)(B)(2)(d).

Mississippi: Activities in or affecting wetlands are reviewed for impacts to the natural supply of sediment and nutrients to the coastal wetlands, sediment transport processes, water flow, and natural circulation; 22 Miss. Code. R. § 23-08-113. Under wetland permit standards applicable to erosion control activities, “[s]tructural methods may be used only when there is a reasonable probability of controlling erosion at the immediate site, and where the structure will not significantly increase erosion in nearby areas”; 22 Miss. Code R. § 23-08-103.

New Hampshire: Impacts on fishery habitat shall be identified including alteration of hydrology or water dynamics. Ch 607.05 e. Tidal shoreline stabilization projects must avoid adverse effects on the property or surrounding properties such as increased erosion due to deflection of waves or currents; Ch 609.10(b)(5).

New Jersey: Project proponents may be required based on the type and scope of the project to demonstrate that sediment deposition will not cause unacceptable shoaling in downdrift inlets and navigation channels; N.J.A.C. 7:7-15.11(f)(3).

New York: “Mining, excavation or dredging in coastal waters shall not significantly interfere with the natural coastal processes which supply beach materials to land adjacent to such waters and shall be undertaken in a manner which will not cause an increase in erosion of such land”; NYSCMP Policy 15. This policy is implemented in NY to ensure that suitable or compatible dredged material is kept within the same littoral system from which it was removed.

North Carolina: Projects which would directly or indirectly block or impair existing navigation channels, increase shoreline erosion, deposit spoils below normal high water, cause adverse water circulation patterns, violate water quality standards, or cause degradation of shellfish waters are considered incompatible with the management policies of public trust areas; 15A NCAC 07H .0207 (d).

Ohio: ODNR considers impacts on the littoral zone, including sand transport, in issuing the Submerged Land Lease; O.A.C. § 1501-6-03(D)(2)(f).

Pennsylvania: Discharges of dredged or fill material shall be properly maintained to prevent erosion and other types of pollution; 25 Pa. Code § 105.421. Discharges of dredged or fill material may not restrict or impede the passage of normal or expected high flows or cause the relocation of the waters; 25 Pa. Code

§ 105.411(2). Dredging and spoil disposal and related activities ... will be regulated to protect against ... reductions in flood flow capacity; CRMP Policy 2.1.

Texas: Dredge material disposal projects are required to minimize impacts on coastal resources through best practices identified on a case-by-case basis, including design elements “to avoid adverse disruption of water inundation patterns, water circulation, erosion and accretion processes, and other hydrodynamic processes”; 31 Tex. Admin. Code § 501.25(b)(1)(B).

Washington: Guidelines for local shoreline master programs must implement standards for structural shoreline stabilization measures “to avoid and, if that is not possible, to minimize adverse impacts to sediment conveyance systems”; WAC 173-26-231(3)(a)(iii)(E).

Required (subset)

New Jersey: Applicants to use general permits and/or individual permits for nature based solutions projects may be required through hydrodynamic studies to demonstrate that the project will not impact longshore transport or sediment supply; N.J.A.C. 7:7-23.5.

Encouraged

California: “Erosion control and flood control facilities constructed on watercourses can impede the movement of sediment and nutrients that would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for these purposes are the method of placement, time of year of placement, and sensitivity of the placement area”; Cal. Pub. Res. Code § 30233(d) (CA Coastal Act).

Delaware: Structures and construction activities such as erosion control structures on the ocean and Delaware Bay beaches are prohibited with few exceptions seaward of a coastal setback line by Division of Watershed Stewardship through the Regulation Governing Beach Protection and the Use of Beaches. Applications for permits for exceptions require rigorous engineering analysis to show that the structure or activity will not increase vulnerability of an area during coastal storms such as by causing further dune erosion; 7 Del. Admin. C. § 5102-3.1.

Georgia: Public Interest Test Required: activity will not impair the values and functions of the sand-sharing system including the coastal sand dunes, beaches, sandbars, and shoals; O.C.G.A. § 12-5-230.

Maine: Do not unreasonably interfere with the natural supply or movement of sand or gravel within or to the sand dune system or unreasonably increase the erosion hazard to the sand dune system; PL 2003, c. 551, §8.

Mississippi: Wetland permit application review includes assessment of cumulative impacts and direct and indirect effects on the biological integrity and productivity of coastal wetlands communities and ecosystems; 22 Miss. Code R. § 23-06-103.

New York: Under coastal erosion hazard area regulations, project proponents must account for the impacts of changed littoral drift on neighboring properties.

CNMI: “It is the coastal resources management policy of the Commonwealth of the Northern Mariana Islands to ... not permit to the extent practicable, development of identified hazardous lands including floodplains, erosion-prone areas... [and] protect all coastal resources, particularly sand, corals and fish from taking beyond sustainable levels...”; CNMI Public Law 3-47(7,17). Public Law 11-62 “Beach Preservation Act of 1998”: To regulate the removal of sand from beaches in the Commonwealth.

Oregon: Application for the OPRD Ocean Shore Alteration Permit for projects greater than 50 ft requires a geologic report documenting impacts on sand source, supply, and movement on the affected beach as well as within the same littoral cell. In developing structures that might excessively reduce the sand supply or interrupt the longshore transport or littoral drift, the developer should investigate, and where possible, provide methods of sand by-pass; OAR 660-015-0010(3).

Puerto Rico: Avoid all activities which could cause a deterioration or destruction of natural systems which are critical to the preservation of the environment, such as coral reef, sand dunes, mangroves, sea grass beds; Objectives and Public Policies of the PR Land Use Plan (OPP-PRLUP) Policy section 30.03.

Rhode Island: Bottoms of dredged areas shall slope downward into the waterway so as to maximize tidal flushing; Red Book, 1.3.1, (I) 5. b. i.

Wisconsin: DNR considers project impacts on sediment systems and hydrodynamics through the public trust balancing test in its permit evaluation process; Wis. Stat. Ann. § 30.12.

Appendix D

Other Relevant Statutes, Regulations and Policies

Like Appendix C, this section is organized by topic rather than by state. It includes detailed overviews of physical sediment placement regulations and of endangered species and critical habitat rules.

Physical sediment placement regulations

Table 2. Physical sediment placement regulations. Note a “Shorthand Rule” is listed for states with measurable quantitative regulations for BUDM or beach nourishment placement, or contaminant testing limits*, as described in the text (Figure 3).

Physical sediment rules		Fines	Gravel (> 4.75 mm)	Mean Grain Size (mm)	Other: Calcium Carbonate/Organic	Color	Rules/Regulations	Shorthand Rule
Qualitative	AK	Similar to existing	--	--	Contaminant testing	--	AK Water Quality Standards; 18 AAC 70	
Qualitative	AL	Similar to existing	--	Similar to existing	Free of toxins	--	ADEM Admin. Code div. 335-8.	
Case-by-case	AS	--	--	--	Contaminant testing	--	AS Water Quality Standards Admin Rule No. 001-2019 §24.0202	
Case-by-case	CA	Similar to existing	--	Opportune Guidance: 10%	Contaminant testing	--	Cal. Code Regs. Tit. 23, § 2926.	
Qualitative	CN MI	case-by-case	--	--	Contaminant testing	--	NMIAC §65-130	
Qualitative	CT	--	--	Similar to existing	--	Similar to existing	Permit conditions	
Case-by-case	DE	case-by-case	--	--	Water quality certification	--	7 Del. Admin. C. § 7401.4.1, 4.2	

Quantitative	FL	BUDM: 10% Beach Nour: 5%	5%		No debris, toxins, foreigns, and shall not cause cementation	Similar to existing	Rule 62B-49.005 FAC: Sand Rule	90:10
Quantitative	GA	10%	5%		CaCO ₂ , 15% No debris, rocks, foreigns	10yr6.5/ 1 to 10yr7.0/ 1	GA DNR Requirements for Beach Nourishment Projects (GA DNR 2020)	90:10
Case-by-case	GU	case-by-case	--	--	Contaminant testing	--	Guam Water Quality Standards 22 GAR GEPA §5103	
Quantitative	HI	<6% #200; <10% #4	--	Within 20% or 1.5x	Contaminant testing	--	1983 CC c 10, Article 3, Sec 10- 21; 1983 CC c 10, Article 3, Sec 10-19, Ord 01-108, Sec 1	94:6
Quantitative	IL	Similar to existing	--	= or >	Contaminant testing if >20% silt	--	35 Ill. Admin. Code §§ 302.515, 395.205(a)(1), 395.401(b)	
Qualitative	IN	"suitable"	--	--	Water quality certification	--	§ 312 IAC 6-5-8	
Qualitative	LA	Similar to existing	--	Similar to existing	Free of organics; water quality impacts	--	LA Admin. Code Title 33, Part IX, Chapter 11. Surface Water Quality Standards	
Quantitative	MA	Beach Nour: 10%; BUDM more lenient	Similar	Similar to existing	--	--	MassDEP's Guide to BMPs for Projects in MA DEP WQ Regs	90:10
Quantitative	MD	10%	--	Beach nour: = or >; Marsh: designed to stay on site	Free of organics; water quality impacts	--	COMAR 26.24.03.05; COMAR 26.24.03.06	90:10

Quantitative	ME	Similar to existing BUDM: 15%	--	Similar to existing	BUDM: <maximum measurable levels of metals and toxins	Similar to existing	Ch 355, Section 8 Maine Solid Waste Management Rules Chapter 418	85:15
Quantitative	MI	Beach nour: 10%; Else: similar to existing	--	Beach nour: #200 sieve	Water quality certification; contaminant testing, based on site history	--	DEQ WRD-045 (guidance) DEQ WRD-048 (guidance)	90:10
Quantitative	MN	case-by-case	--	--	Clean, inorganic, free of pollutants; projects <3,000 yd ³ exempt from solid waste testing if at least 93% sand	--	Minn. R. 6115.0190(5)(B).	93:7*
Qualitative	MS	Similar to existing	--	Similar to existing	Free of organics; water quality impacts	--	Determined case-by-case	
Quantitative	NC	BUDM: 10% Beach Nour: 5%	5%	Similar to existing	CaCO ₂ , 15%	--	15A NCAC 07H.0312 "Technical Standards for Beach Fill Projects" (NCDEQ 2019)	90:10
Qualitative	NH	Similar to existing	--	Similar to existing	--	Similar to existing	Ch. Env-Wt 607.05 (g) (1 & 3) Ch Env-Wt 608.04 (b)(1)	
Quantitative	NJ	Beach Nour: 25%	--	Similar to existing (>0.0625 mm)	Contaminant testing; waived if 90% grain size >0.0625 mm	--	N.J.A.C. 7:7 Appendix G; N.J.A.C. 7:7-12.6(c)(3); N.J.A.C. 7:7-12.7(c)(10)(iii); N.J.A.C. 7:9B	75:25

Quantitative	NY	Similar to existing	--	--	Contaminant testing; waived if 90% sand/gravel	--	6 CRR-NY 505.8(a)(4),(b)(7) TOGS 5.1.9; DEC Cmsn'r Policy #60	90:10*
Quantitative	OH	Beach nour: 20%; Littoral drift: 40%	--	--	Water quality certification	--	O.R.C. § 6111.33; O.A.C. § 3745-32-05	80:20
Qualitative	OR	As coarse as existing	--	--	Contaminant testing	--	Guidebook on Erosion Control Practices	
Case-by-case	PA	case-by-case	--	--	Testing re Great Lakes Dredged Material Testing Evaluation Manual	--	CRMP Policy 2.1	
Qualitative	PR	--					Determined case-by-case	
Quantitative	RI	--	--	Similar to existing	Contaminant testing; waived if 90% sand >0.0625 mm	--	Red Book, 1.3.1, (I) 5. g. 1 250-RICR-150-05-2.7 C. 1.	90:10*
Qualitative	SC	Similar to existing	--	--	--	--	SC DHEC OCRM Code 30-13.N.(2)(a) (SC DHEC 2020c)	
Qualitative	TX	Similar to existing	--	Similar to existing	Free of contaminants and WQ impacts after dilution/dispersion	--	TX Admin. Code Title 31, Part 16, Rule §501.25	
Case-by-case	US VI	--					Determined case-by-case	
Quantitative	VA	<20% #100 sieve and <10% #200 sieve	--	Minimum median: .25mm	Water quality certification	--	4 VAC 20-400-50(C); 4 VAC 20-1340-20,30(D)(1)	



Qualitative	WA	compatible	--	--	Contaminant testing	--	Marine Shoreline Design Guidelines	
Quantitative	WI	<15% fines		fines: #200 sieve	80 mg/L TSS; contaminant testing	Similar to existing	Wis. Admin. Code NR §§ 345.02; 347.06; 347.08	85:15

Endangered Species & Critical Habitat

Table 3. Endangered Species & Critical Habitat Protection Requirements

	Protect, Minimize, Avoid, None	Timing windows?	Authority
AL	Minimize: In order to lessen the possibility of dredging having adverse effects on commercially or recreationally important fisheries, certain seasonal dredging limitations may be imposed on a site-specific basis depending on sediment type, proximity to shellfish areas or spawning grounds, dredging method, the project's size, location and measures taken to reduce turbidity.	Case-by-case	ADEM Administrative Code R.335-8; Subaqueous Guidelines II(D)
AK	Protect: protection of endangered species, critical habitat, and historic properties, and implementation of control measures described in the SWPPP in the areas under their control.	Migratory bird nesting: May 1-Jul 15 Salmon: No dredging within 1 nm of an anadromous stream or river: Jun 1-Jul 15	50 CFR §226.202
AS	--	--	--
CA	Protect: Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas	Case-by-case	CCA, Section 30240
CNMI	--	--	--
CT	Minimize: Degrading or destroying essential wildlife, finfish or shellfish habitat through significant alteration of the composition, migration patterns, distribution, breeding or other population characteristics of the natural species or significant alteration of the natural components of the habitat must be minimized.	Restrict dredging activities to avoid impacts with migrations, winter flounder, shellfish (e.g., Oct.-Jan. or April) Piping plover: Mid-April to mid-Aug	CGS section 22a-93(15)(G)
DE	Minimize: The Department considers environmental effects of dredged material disposal on the placement site.	Case-by-case	7 Del. Admin. C. § 7504-4.11.2.2
FL	Protect: Timing/sequence of projects shall provide protection to species and habitats	Timing/sequence of projects shall provide protection to species and habitats	F.S. 373.414(1) and 161-142 (3)

			F.S. 379-2431 (1)(2) F.S. 161.053
GA	Avoid & Minimize: Avoid turtles, minimize the effects of beach nourishment projects on sea turtle reproduction	Placement windows for nesting and fisheries (sturgeon) season determined in federal consultations Loggerhead turtle: May 1-Oct 31	2020 South Atlantic Regional Biological Opinion; GDNR Req for Beach Nour Projects
GU	--	--	--
HI	Avoid, Minimize, and Protect: recommended measures to avoid or minimize project impacts to threatened or endangered animals, including birds, turtles, and invertebrates	Case-by-case	Title 12. Conservation and resources, Chapter 195D
IL	Mitigate: Restrictions may be imposed pursuant to the Illinois Endangered Species Protection Act.	Case-by-case	520 ILCS 10
IN	Minimize: Applicants must demonstrate the project will not cause significant harm to the environment.	Case-by-case	§ 312 IAC 6-8-2(b)(2).
LA	Avoid: Proposed conservation measures include environmental protection measures and best management practices (BMPs) that would be implemented during the construction of the project to avoid or minimize potential environmental effects.	Windows determined in federal consultations and construction shall be outside the turtle and shorebird nesting and hatching seasons	50 CFR§402
MA	Avoid & Minimize damage to endangered species or their habitats	No dredging during migration, spawning or juvenile development periods of finfish, shellfish, crustaceans or merostomatans, except as approved	321 CMR 10.00, MA Endangered Species Act; 314 CMR 9.07 (3) (d)
MD	Avoid: Adverse impacts on fish spawning, nursery, and migration patterns shall be prevented	Case-by-case	COMAR 26.24.03.05(D)
ME	Minimize: The department may restrict the time of year during which material for a beach nourishment project may be placed on the beach to minimize impacts on existing wildlife habitat.	No sand may be moved seaward of the frontal dune: Apr 1-Sep 1, except as approved Dune restoration/construction only: Mar 1-Apr 1 or Oct 1-Nov 15.	PBR; Sand Rule
MI	Mitigate: Adverse effects to the environment, public trust, and riparian interests must be minimized and mitigated, and there must be no less harmful, feasible, and prudent alternative	Annual operating windows are set by EGLE	Mich. Admin. Code r. 322.1015

MN	Avoid: Placed dredge material may not result in loss of fish or wildlife habitat. Projects must minimize encroachment, change, or damage to the ecology of the waterway. Impacts to wetlands must be mitigated through a replacement plan (exempt for certain restoration activities).	Dredging restricted: Apr 1-Jun 30 for gamefish spawning/incubation in inland waters. Dredging restricted in Lake Superior: Oct 1- May 30.	Minn. R. 6115.0190, 0191, 0200
MS	Avoid: Surface alterations with high adverse impacts on natural functions shall not occur, to the maximum extent practicable, on barrier islands and beaches, isolated cheniers, isolated natural ridges or levees, or in wildlife and aquatic species breeding or spawning areas, or in important migratory routes	Case-by-case	Miss Code Title 49, Ch 27
NC	Protect & Minimize: Projects shall protect threatened/endangered species and minimize impacts to fish, shellfish and wildlife.	Timing designed by state/fed agencies during permitting process	15A NCAC 07H .0312 (4)
NH	Avoid & Minimize: No impacts to protected species or habitat shall be allowed with some exceptions	Dredging allowed: Nov 15 - Mar 15 (fish and shellfish). Sequential dredging shall be used when practicable.	Ch.609.10 (b) (2); Env-Wt 607.02
NJ	Avoid: New dredging should avoid impacting areas of ecological importance.	Dredging best practices may be required, including seasonal/migratory restrictions.	N.J.A.C. 7:7-9.36, 9.37; Appx. G
NY	Avoid: Active bird nesting and breeding areas must not be disturbed unless such disturbance is pursuant to a specific wildlife management activity approved in writing by the department.	case-by-case	6 CRR-NY 505.8(b)(10) et seq.
OH	Minimize: Projects in wetlands must minimize unavoidable impacts and, depending on the site's wetland category, may need to demonstrate social or economic development or public need. Compensatory mitigation may be required.	Case-by-case	O.A.C. § 3745-1-54
OR	Protect: No Action Alternative: No change to abundance, distribution or habitat conditions supporting terrestrial or aquatic ESA-listed species in the vicinity of the NHNS Site	Dredging in the Columbia River allowed: Nov.-Feb. (salmonids)	(40 C.F.R. § 1508.7

PA	Minimize: Discharge dredged/fill material into a spawning area during spawning season, or into migratory water bird breeding, feeding, or nesting areas requires a public benefit determination	Case-by-case	25 Pa. Code § 105.411(1,3)
PR	--	--	--
RI	Avoid & Minimize impacts to SAV habitat	Limit dredging/disposal to specific times of the year to minimize odors and/or impacts on fish and shellfish	Red Book 1.2.2. R.1.b.; Red Book 1.2.2. I. 4.d.
SC	Protect & Minimize: Dredging in the borrow areas shall not be in conflict with spawning seasons or migratory movements of significant estuarine or marine species.	Beach nourishment shall not interfere with nesting and brood-rearing activities of sea birds, sea turtles, or other wildlife species	R30-13 L. 2) (c); Beach Management Act, Section 4 (3)
TX	Avoid & Minimize: avoid destruction or adverse modification of designated critical habitat	No marsh construction: March 1-Sept. 30 (eastern black rail); Avoid construction: Nov. 1-April 30 (whooping crane).	TX Parks and Wildlife Code, Title 5, Chapter 68; Rule No. R161-17.12 , 6-13-2017.
USVI	--	--	--
VA	Minimize: Least environmental impact	Case-by-case	4 VAC 20-400-50(E); 4 VAC 20-1340-30(D); Subaqueous Guidelines II(D)
WA	Avoid & Minimize: The location of an authorized sediment impact zone shall avoid whenever possible and minimize adverse impacts to areas of special importance	Case-by-case	Chapter 70.105D RCW. 13-06-014 (Order 08-07), § 173-204-564
WI	Avoid: A dredging project must either avoid impacts on endangered species or obtain an ITA.	Set through public trust balancing test.	Wis. Admin. Code NR § 345.04(3)(a)(2)