



WHITE PAPER: SEDIMENT PLACEMENT REGULATIONS OF U.S. COASTAL STATES AND TERRITORIES TOWARDS REGIONAL SEDIMENT MANAGEMENT IMPLEMENTATION

American Shore and Beach Preservation Association &
Coastal States Organization

The project was conducted as an activity of the USACE Institute for Water Resources (IWR), and co-led by ASBPA and CSO. The views, opinions, and/or findings contained in this report are those of the authors and should not be construed as an official Department of the Army position, policy, or decision unless so designated by other official documentation. The work was performed under Contract No. W912HQ-16-D-0003, Delivery Order No. W912HQ18F0159.

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

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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 the existence of coastal communities and the homes and livelihoods of 100 million Americans. 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, and enhance the resilience of coastal communities and economies in the face of these dual threats.

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 non-federal project managers that 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 has not aimed to identify and manage finite sediment resources over long time periods and on a regional scale.

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 2021). 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 Environmental Protection Agency (EPA) work with state, territory, and local officials, communities, dredging contractors, coastal property owners, academia, stakeholder groups, and non-profit 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 understanding 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 reuse of sediment from existing and new dredging projects as part of comprehensive RSM strategies (Taylor Engineering 2020). However, a range of both systematic and logistical 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 that were 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
- Limited geotechnical data on navigation channel sediments leading to uncertainty about sediment suitability for reuse; and
- Technical, engineering, and logistical challenges getting sediment from dredging sites to placement sites cost effectively.

The American Shore & Beach Preservation Association (ASBPA) and Coastal States Organization (CSO) have partnered with the USACE Institute for Water Resources to support state and federal RSM priorities by developing a comparative analysis of federal and state/territory BUDM policies and regulations. This project aims to share best practices nationally from effective sediment placement project review standards and policies.

Project Structure

Through desktop research and consultation with coastal states/territories and federal agency partners, ASBPA and CSO aim to develop a national comparative policy analysis of:

1. State/territory-level policies incentivizing BUDM,
2. Quantitative and qualitative standards applied to shoreline placement projects in the permit review process,
3. Policy and process barriers to achieving BUDM priorities, and
4. Success stories in overcoming those barriers.

This project consists of four primary components:

1. Regional workshops with state, federal, and local coastal officials, as well as industry, academic, and NGO stakeholders, to understand RSM & BUDM implementation challenges and share success stories.
2. A comparative policy analysis of coastal state, territory, and federal regulations on sediment movement and placement for use at workshops, including a profile summarizing each coastal state and territory sediment placement regulations and policy, and focused discussion questions on regulatory implementation and the scientific basis underlying policy priorities that will be addressed in the workshop.
3. Success stories highlighting states' most effective regulations and practices furthering RSM and BUDM. The focus will be overcoming policy and regulatory hurdles in order to improve the systems approach to cooperative federal/state sediment management.
4. A final report on effective uses of sediment regulations to implement beneficial use of dredged material, synthesizing White Paper findings with lessons learned from workshop participants. The report will be tailored to an audience of coastal managers, stakeholders and policy makers.

White Paper Structure

This White Paper presents the findings of the policy analysis discussed in item #2 above. The intent of this document is to provide a concise overview of the ASBPA and CSO consultation with regulators and practitioners in six coastal regions. A more detailed final report will follow including findings from regional workshops, best practices for RSM implementation, and success stories. The final report is aimed to be completed in the second half of 2022.

The introduction summarizes the goals and primary outputs of the project and provides background on the RSM principles examined in this work. The Methods section explains the data gathering approach informing the findings presented here. The Results and Discussion section presents regional analyses of regulatory requirements and policy approaches to promoting BUDM, followed by a summary of the policy barriers and practical challenges facing states and territories which seek to implement BUDM requirements or incentives. These barriers, as well as lessons learned from the structure of state regulatory programs, will drive final recommendations. After laying out the primary research questions driving the ongoing workshop series, the white paper presents two appendices. The first provides citations to relevant policies and practices in each state regarding preference for BUDM, preference for natural solutions for erosion control, and restrictions on impacts to sediment supply, erosion, or hydrodynamics. The second summarizes endangered species & critical habitat protection requirements.

Project Partners

ASBPA

Founded in 1926, ASBPA promotes the integration of science, policies and actions that maintain, protect and enhance the coasts of America. As America's only association focused on the science and policies of coastal management, ASBPA works with representatives both to offer background on coastal issues and interests and to connect reporters and editors with appropriate coastal contacts for use in coverage on the economic and environmental value of America's shorelines to the nation.

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 non-profit 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 to, among other purposes, 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.

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 can necessitate the movement or removal of sediment in particular areas (e.g. dredging navigation channels or construction zones). However, this disrupts natural sediment transport and land rebuilding processes that happen in dynamic coastal zones. To mitigate negative impacts, sediment must be kept in the system and used to nourish eroding or subsided land.

RSM combines an understanding of sediment dynamics, anthropogenic influences on natural processes, and stakeholder needs in coastal management. A systematic inventory of regional sediment processes informs a management plan that encourages natural transport processes and identifies sediment deposits that could provide sediment resources to eroding areas (Dalyander et al. 2021).

The watershed-scale of RSM means that a variety of sediment sources must be considered, including offshore borrow areas, upland sand mines, dredging of navigation channels and nearshore shoals. RSM strategies vary based on the unique dynamics of each region: 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).

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. Many states and federal agencies prioritized implementation of RSM principles, including BUDM, but challenges remain. This white paper focuses on the experience of states in implementing these priorities through regulations, policies, guidance, and incentive programs.

Methods

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. These profiles were used as the foundation for conversations with relevant program staff in each state.

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 to 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 six regional workshops have been held with state and federal coastal officials and local stakeholders to share, promote, and identify RSM & BUDM implementation challenges and success stories (Table 1).

TABLE 1. TENTATIVE WORKSHOP SCHEDULE AND LOCATIONS

Region	Date	Format
Southeast/Caribbean	November 15, 2021	Virtual - Complete
New England	January 19, 2022	Virtual - Complete
Great Lakes	March 3, 2022	Virtual
Gulf	April 25, 2022	In-person at GOMCON (planned)
Mid-Atlantic	May 2022	In-person (planned)
Pacific Islands	July 2022	Virtual (planned)
West Coast	September 13, 2022	In-person at ASBPA Conference (planned)

Results & Discussion

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

Specific quantitative or qualitative standards applicable to shoreline placement projects are identified for each state. The intent of these regulations is to preserve the physical characteristics of the natural beach system by making the sediment source as practically similar as possible to the native sediment in composition (carbonate vs quartz), grain size distribution, and color (Hannides et al. 2019). These sediment properties determine beach shape and habitat suitability (Dean 2002). The general term for sediment that meets the state's physical sediment 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.

Similarly, specific quantitative or qualitative standards applicable to wetland restoration projects that accept dredged sediment are identified for each state and are particularly important to estuarine systems. These regulations regard sediment quality based on physical characteristics and habitat suitability (Dean 2002) to ensure that the source of sediment is physically and chemically appropriate for use. Fine-grained sediment has a greater potential to retain contaminants than sand and therefore testing the sediment quality is important. Testing requirements typically reflect industrial pollutants known to occur in the region they cover.

Regional Trends *in the Southeast*

For the purposes of this project, the Southeast includes Florida, Georgia, South Carolina, North Carolina, Puerto Rico, and the U.S. Virgin Islands.

Permitting and Policies

Southeast states require permits for dredging and coastal placement (Table 8). Certifications for water quality and public land rights are typically administered by different programs or departments and attached to these state permits.

Most of the BUDM in the southeast is conducted by the USACE. USACE Districts have a navigation mission to maintain federal channels. Dredged material from these channels provides the majority of beneficially used sediment. Although southeast states have general permit options, projects that qualify for general permits typically do not reuse dredged material beneficially.

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

All of the states in the southeast have policies to encourage or require BUDM (

TABLE 9). 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. The state of 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, the territory's beaches were eroded by Hurricane Maria in 2017 and have not recovered (Barreto-Orta et al. 2019; Mendez-Tejeda et al. 2020). Few sediment inventory studies, 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

Each Southeast state manages the quality of sediment placed on beaches through regulations that specify limits on certain physical sediment properties. Each state has regulations to ensure that the placed beach sediment is not too fine grained relative to the natural or native beach grain size (Table 10). Regulations in SC 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 Florida and North Carolina, beneficially placed dredged sediment is allowed to contain fine-grained sediment (finer than sand) that is up to 10% greater than the amount present in native beach sand; whereas, beach nourishment projects are limited to 5% greater than the amount present in native sand.

The rationale for the 5% difference is relative to the intent of the sediment placement. The intent of beach nourishment is generally for coastal storm damage reduction. Projects are designed with a significant volume of advance fill so that placed sand will stay on the beach for many years (i.e., the renourishment interval) (Willson et al. 2017). Due to this longevity, beach nourishment projects are held to more rigorous grain size requirements to ensure compatibility and avoid habitat impacts. On the other hand, the intent of BUDM placement is not generally for multi-year protection but rather to make an injection of dredged sediment into the littoral system that disperses relatively quickly. Therefore, grain size requirements are less strict.

The USACE SAND study recommended that states utilize and expand regulatory flexibility to increase utilization of additional sediment types (Taylor Engineering 2020). For instance, Florida is considering modifying streamlined permitting procedures for projects that propose to utilize inland sediment sources. Sediment from larger, established mines is considered to be a product with a specific, consistent grain size distribution.

North Carolina, Georgia, and Florida also specify a maximum allowable percentage of granular sediment (larger grain size or coarser than sand) at 5%. North Carolina and Georgia limit carbonate calcium concentration to 15% greater than native, and Georgia specifies a specific color for placed sand due to potential impacts on sea turtle nesting with darker or lighter sand. Incubation temperatures of the sediment, which are affected by sediment color, determine the gender of hatchlings.

Water quality is another factor that can be influenced by dredging and placement of dredged sediment. Fine-grained particles are suspended during the dredging process and water quality may be significantly, albeit temporarily, affected. According to some studies, 75% of fines cannot be accounted for after deposition on the shore (Maglio et al. 2015; Ousley and Coor, 2015). North Carolina, South Carolina, and Georgia issue state water quality certifications along with permits for the dredging and placement of sediment. 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 to 1000 m. This was a science-based rule change that utilized past turbidity monitoring data from many projects to lessen restrictions for sediment placement projects.

TABLE 2. PERMITS REQUIRED FOR BUDM PROJECTS – SOUTHEAST AND CARIBBEAN JURISDICTIONS

State/ Territory	<i>Dredging & Coastal Placement</i>	<i>State Water Quality</i>	<i>Public Land Rights</i>	<i>Other State</i>	<i>Federal General Permit?</i>
NC	CAMA/NC DEQ general/minor/major permit N.C.G.S. 113A-118 15A NCAC 07J .0201	NC Division of Water Resources, Water Quality Certification N.C.G.S. 143-215	NC State Property Office, Right of Entry letter N.C.G.S. 146-6; 146-12		State Programmatic General Permit, PGP 291 Regional General Permit 48
SC	SC Department of Health and Environmental Control (DHEC) Office of Ocean and Coastal Resource Management (OCRM) Critical Area Permit & Coastal Zone Consistency Certification S.C. Code Reg. (R) §30-1 et. seq.	SC DHEC Water Quality Certification S.C. Code Reg. (R) §61-68 et. seq.	Affidavit of Ownership or Control		Emergency Beach Nourishment (includes sand bags, scraping and minor renourishment Minor Discharge & Excavation 2014-00299 and R.30- 15.H(4) and (5) 2017-00765/S.C Dept of Natural Resources General Permit
GA	GA DNR Coastal Resources Division (CRD) permit required for non-federal projects; USACE exempt GA Shore Protection Act O.C.G.A. § 12-5-230	GA Water Quality Control Act OCGA 12-5-20	GA Revocable License Authority O.C.G.A. § 50- 16-61	GA Coastal Marshlands Protection Act O.C.G.A § 12-5-280 <i>et seq.</i>	Placement at offshore and inshore artificial reefs, respectively Programmatic General Permits 36 & 37
FL	Joint Coastal Permit (JCP) 62B-49, 62B-41, Florida Administrative Code (F.A.C.), Chapters 161 and 373 Florida Statutes (F.S.)	Variance to Mixing Zones, Surface Waters 62-4.244(5), F.A.C., Chapter 403 F.S.	Authorization to use sovereign submerged lands; 18-21, F.A.C. Chapters 253 and 161 (Section .141) F.S.		State assumes federal permitting duties (Joint Permit)
PR	Dept. of Natural Resources (DNR) Joint Application PR CZM Certification				General Permit SAJ-81
USVI	Joint application				Territory assumes federal permitting duties (Joint Permit)

TABLE 3. SUMMARY OF BUDM RELATED POLICIES – SOUTHEAST AND CARIBBEAN JURISDICTIONS

State/ Territory	<i>Beneficially Reuse Dredged Material</i>	<i>Preference for Natural Solutions for Erosion Control</i>	<i>Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics</i>
NC	Required	Hard Structures Prohibited (with exceptions)	Required
SC	Encouraged	Natural Solutions Encouraged	No Statewide Policy
GA	Required	Natural Solutions Encouraged	Required
FL	Required	Natural Solutions Encouraged	Required
PR	No Statewide Policy	Natural Solutions Encouraged	Encouraged
USVI	No Statewide Policy	No Statewide Policy	No Statewide Policy

TABLE 4. PHYSICAL SEDIMENT STANDARDS FOR PLACEMENT – SOUTHEAST AND CARIBBEAN JURISDICTIONS

State/ Territory	<i>Fines*</i>	<i>Gravel (> 4.75 mm)</i>	<i>Mean Grain Size (mm)</i>	<i>Other (Calcium Carbonate/Organics)</i>	<i>Color</i>	<i>Rules/Regulations</i>
NC	BUDM: 10% Beach Nour: 5%	5%	similar to native	CaCO ₂ , 15%	--	15A NCAC 07H.0312 "Technical Standards for Beach Fill Projects" (NCDEQ 2019)
SC	similar to native	--	--	--	--	SC DHEC OCRM Code 30-13.N.(2)(a) (SC DHEC 2020c)
GA	10%	5%		CaCO ₂ , 15% No debris, rocks, foreigners	10yr6.5/1 to 10yr7.0/1	GA DNR Requirements for Beach Nourishment Projects (GA DNR 2020)
FL	BUDM: 10% Beach Nour: 5%	5%		No debris, toxins, foreigners, and shall not cause cementation	Similar to native	Rule 62B-49.005 FAC: Sand Rule
PR	--					Determined case-by-case
USVI	--					Determined case-by-case

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 vs wetland restoration or enhancement), and the resources impacted (Table 5). 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 (PA, NY, DE); in other cases, no separate land authorization is required (NJ, MD, VA).

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 regional sediment management 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. Non-USACE 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 the beneficial reuse of dredged materials, and have worked extensively through their permitting, transportation planning, and wetland restoration programs to expand BUDM practices in the region (Table 6). For instance, Maryland has developed the Beneficial Use: Identifying Locations for Dredge" (BUILD) tool, a GIS dataset hosted on the MD Coastal Atlas that maps dredging projects, potential restoration projects, distance buffers, and other helpful information to identify BUDM opportunities. Virginia 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, 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 material is kept within the same littoral system from which it was removed, and provides guidance for in-water and riparian dredged material placement.

Delaware does not have standing policies addressing BUDM, and reports that work is underway 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. 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 (Table 7). 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 (0.149mm) and no more than 10% passing through a #200 sieve (0.074mm), has been deemed appropriate for BU.

New York requires that material 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, generally through the water quality certification process. New York and New Jersey have incentive provisions for waiver of testing requirements for sufficiently coarse-grained sediment (NY: >90% sand or gravel, NJ: >90% grain size > 0.0625 mm). Maryland requires that beach-placed sediment be free of organics.

TABLE 5. PERMITS REQUIRED FOR BUDM PROJECTS – MID-ATLANTIC JURISDICTIONS

State/ Territory	Dredging & Coastal Placement	State Water Quality	Public Land Rights	Other State	Is Federal General Permit an option?
PA	Water Obstruction and Encroachment Permit, 25 PA Code § 105.11(a); DEP Waiver 16 (Restoration Projects, 25 PA Code § 105.12(a)(16)).	PA 401 Water Quality Certification	Submerged Lands License Agreement, 25 PA Code § 105.31.	n/a	n/a
NY	Protection of Waters Permit, 6 CRR-NY 608, 621; Tidal Wetlands Permit, 6 CRR-NY 661; Freshwater Wetlands Permit, 6 CRR-NY 663.	DEC Water Quality Certification, 6 CRR-NY 608.9.	ONR Temporary Revocable Permit, 6 CRR-NY 190, 196; OGS easement/license/permit, NY Public Lands Law § 75.*	Coastal Erosion Management Permit (within Coastal Erosion Hazard Areas), 6 CRR-NY 505.	n/a
NJ	Waterfront Development Individual Permit, N.J.S.A. 12:5-1 <i>et seq.</i> ; Coastal Area Facility Review Act, N.J.S.A. 13:19-1 <i>et seq.</i>	Water Quality Certificate issued with Waterfront Development Permit. N.J.A.C. 7:9B.	(incorporated into Waterfront Development Permit)	General Permit 24 (GP 24) authorizes habitat creation, restoration, enhancement, and living shoreline activities, including placement of fill. N.J.A.C. 7:7	n/a
DE	DNREC Wetlands and Subaqueous Lands Permit. Del. Code Ann. tit. 7, §§ 6805, 6604.	DNREC Water Quality Certification. Del. Code Ann. tit. 7, ch. 60.	Subaqueous Lands Lease incorporated into Wetlands and Subaqueous Lands Permit. Del. Code Ann. tit. 7, §7205; 7 Del. Admin. C. § 7504-2.4.	Living Shoreline Stabilization Statewide Activity Approval (general permit). Del. Code Ann. tit. 7, §7203.	n/a
MD	Tidal Wetlands License (state-owned wetlands) and Permit (private wetlands), COMAR 26.24.	MDE Water Quality Certification, COMAR 26.08	(incorporated into tidal permit)	n/a	Maryland State Programmatic General Permit 6
VA	Virginia Water Protection Permit, Va Code § 62.1-44.15(5).	(incorporated into Water Protection Permit)	(incorporated into Water Protection Permit)	n/a	NAO 18-RP-02 - Dredging for navigation projects NAO 18-RGP-19 - Shoreline Work

*Some Long Island jurisdictions may require an easement/license from the local government.

TABLE 6. SUMMARY OF BUDM-RELATED POLICIES – MID-ATLANTIC JURISDICTIONS

State/ Territory	<i>Beneficially Reuse Dredged Material</i>	<i>Preference for Natural Solutions for Erosion Control</i>	<i>Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics</i>
PA	Required (subset)	No Statewide Policy	Required
NY	Encouraged	Encouraged	Required
NJ	Encouraged	Required	Required
DE	No Statewide Policy*	Encouraged	Required
MD	Encouraged	Required	Required
VA	Encouraged	Required	No Statewide Policy

*New policies under development

TABLE 7. PHYSICAL SEDIMENT STANDARDS FOR PLACEMENT – MID-ATLANTIC JURISDICTIONS

State/ Territory	<i>Fines</i>	<i>Gravel (> 4.75 mm)</i>	<i>Mean Grain Size (mm)</i>	<i>Other (Contaminants)</i>	<i>Color</i>	<i>Rules/Regulations</i>
PA	case-by-case	--	--	contaminant testing	--	CRMP Policy 2.1
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
NJ	similar to existing Beach Nour: 10%	--	Beach Nour: min 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
DE	case-by-case	--	--	water quality certification	--	7 Del. Admin. C. § 7401.4.1, 4.2
MD	10%	--	Beach nour: equal or greater; Marsh: designed to stay on site	free of organics; water quality impacts	--	COMAR 26.24.03.05; COMAR 26.24.03.06
VA	Fast-track: <20% #100 sieve, <10% #200 sieve; Other: compatible	--	Fast-track minimum median: .25mm	water quality certification	--	4 VAC 20-400-50(C); 4 VAC 20-1340-20,30(D)(1)

Regional Trends *in New England*

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

Permitting and Policies

New England states require permits for dredging and coastal placement (Table 8). Certifications for water quality and public land rights are sometimes administered by different programs or departments and attached to these state permits.

With the exception of the Barnstable County Dredging Project in Massachusetts, most of the dredging and BUDM in New England is conducted by the USACE. USACE Districts have a navigation mission to maintain federal channels. Dredged material from these channels provides the majority of beneficially reused sediment. A significant amount of finer grained dredged material in New England is not considered suitable for reuse due to contaminants and other concerns. All states utilize the USACE New England District programmatic permit.

All of the states in New England have policies to encourage or require BUDM (Table 9). 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 has 16 enforceable Coastal Program policies, many of which encourage BUDM. N Hampshire also overhauled regulations in 2019 to further encourage coastal resilience activities and BUDM.

All states also encourage or require natural solutions for erosion control. Most New England states encourage or require the avoidance of impacts to sediment supply, erosion rates, and/or inlet or nearshore hydrodynamics.

Physical Sediment Characteristics

Each New England state manages the quality of sediment placed on beaches through regulations that specify limits on certain physical sediment properties. Each state has regulations to ensure that the placed beach sediment is similar and not too fine-grained relative to the natural or native beach grain size (Table 10). 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. 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 sediment; whereas beach nourishment projects may be limited to 10% greater than the amount present in native sediment.

Granular sediment (larger grain size or coarser than sand) restrictions are not as common in New England state regulations. However, contaminant testing is more prevalent. In recognition that finer-grained sediments typically carry contaminants, Rhode Island waives testing for sandy sediments. Most of 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).

Water quality is another factor that can be influenced by dredging and placement of dredged sediment. Fine-grained particles are suspended during the dredging process and water quality may be significantly, albeit temporarily, affected. According to some studies, 75% of fines cannot be accounted for after deposition on the shore (Maglio et al. 2015; Ousley and Coor, 2015). All of New England states issue state water quality certifications along with permits for the dredging and placement of sediment.

TABLE 8. PERMITS REQUIRED FOR BUDM PROJECTS – NEW ENGLAND JURISDICTIONS

State/ Territory	Dredging & Coastal Placement	State Water Quality	Public Land Rights	Other State	Is Federal General Permit an option?
ME	Maine Department of Environmental Protection (DEP) Natural Resources Protection Act (NRPA) Permit, a one-time use authorization. A renewal is the "permit by rule" or "PBR" Me. Rev. Stat. (MRS) Tit. 38, §480 PL 1987, c. 809, §2	Combined with NRPA process PL 1987, c. 809, §2	A dredging lease for projects located on submerged land (below the elevation of low tide) may be required from the Department of Conservation, Bureau of Public Lands (BPL).	NRPA regulates wetland impacts, but Maine communities can regulate wetlands under the Municipal Shoreland Zoning statute, MRS Tit 38, §435 "Maine Solid Waste Management Rules Chapter 418 REDUCED PROCEDURE APPLICATION FOR BENEFICIAL USE OF DREDGE MATERIAL AS BEACH NOURISHMENT FILL"	Yes, New England District USACE
NH	State wetlands bureau permit required for dredging and filling and for modifying sand dunes N.H. Rev. Stat. Ann. (RSA) §482-A. I. Fill and Dredge in Wetlands Act	Certification, Water Pollution and Disposal RSA 485-A	Grant of Right required, RSA 482-A:22	Shoreland Water Quality Protection Act RSA 483-B	Yes, NH Programmatic General Permit
MA	Massachusetts Department of Environmental Protection (MassDEP) Waterways Permit Chapter 91, The Massachusetts Public Waterfront Act	State Water Quality Certification 314 CMR 9.03(1) through (8) and 314 CMR 9.04(1) through (13)	Public Trust Statute Chapter 91 310 CMR 9.00	Massachusetts Environmental Policy Act (MEPA) review for certain projects, Mass. Gen. Laws ch. 30 §§ 61-62I 301 CMR 11.00	Yes, Massachusetts General Permit for minor activities in the State of Massachusetts
RI	Dredging permit from the Coastal Resources Management Council (CMRC) and Department of Environmental Management (DEM) Rhode Island "Red Book" 650-RICR-20-00-1	Certification included with DEM permit, Water Quality Regulations (250-RICR-150-05-1)	--	--	Yes, New England District programmatic permit

TABLE 9. SUMMARY OF BUDM RELATED POLICIES – NEW ENGLAND JURISDICTIONS

State/Territory	<i>Beneficially Reuse Dredged Material</i>	<i>Preference for Natural Solutions over Hard Structures for Erosion Control</i>	<i>Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics</i>
ME	Encouraged	Encouraged	Required
NH	Encouraged	Required/ Encouraged	Required
MA	Required	Encouraged	Required
RI	Encouraged	Encouraged	Required
CT	Encouraged	Required/ Encouraged	Required

TABLE 10. PHYSICAL SEDIMENT STANDARDS FOR PLACEMENT – NEW ENGLAND JURISDICTIONS

State/ Territory	<i>Fines</i>	<i>Gravel (> 4.75 mm)</i>	<i>Mean Grain Size (mm)</i>	<i>Other (Contaminants)</i>	<i>Color</i>	<i>Rules/Regulations</i>
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
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)
MA	Beach Nour: 10% BUDM more lenient	similar to existing	similar to existing	--	--	MassDEP's Guide to BMPs for Projects in MA DEP WQ Regs
RI	10%	--	similar to existing	metals and contaminants testing required*	--	Red Book, 1.3.1, (I) 5. g. 1 250-RICR-150-05-2.7 C. 1.
CT	--	--	similar to existing	--	similar to existing	Permit conditions

* Contaminant testing waived if 90% sand with a grain size > 0.0625 mm

Regional Trends *in the Gulf of Mexico*

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

Permitting and Policies

Gulf of Mexico states require permits for dredging and coastal placement (Table 11). Project proponents must also consider regulatory clearances through the National Environmental Policy Act, Clean Water Act Section 404/401, Endangered Species Act, etc., as well as potential real estate and rights-of-way issues that have to be resolved before the planned placement of dredged material at any site.

Most of the BUDM in the Gulf of Mexico is conducted by the USACE. USACE Districts in the Gulf of Mexico, including the Galveston, New Orleans, Mobile, and Jacksonville Districts, strive to maintain federal navigation channels, inlets, and harbors. With the USACE dredging over 100 million cubic yards of sediment annually from federal navigation channels throughout the Gulf states, this dredged material is a potential source of sediment that should be considered for beneficial use in conservation and restoration planning processes. It is estimated that roughly 30% of all material dredged from federal channels in the Gulf is used beneficially and there are many issues that need to be overcome to maximize BU opportunities (Parson & Swafford, 2012). Gulf of Mexico states also offer joint permits with USACE to streamline the permitting process for non-federal applicants. Because the majority of BUDM implementation occurs with federal projects, the joint permit process does not typically play a role.

All of the states in the Gulf of Mexico have policies to either encourage or require beneficial use of dredged material. States also encourage keeping dredged sediments within the natural system or using it to support habitat creation and restoration goals. In partnership with USACE, states set actions and strategies for the management of dredged material over a minimum period of 20 years in a dredged material management plan (DMMP) as identified by Engineering Regulation 1105-2-100 (USACE, 2000). In the Gulf of Mexico, most large-scale navigation channel projects have an existing feasibility study and projects have been authorized by Congress, but new efforts to deepen or widen channels require new studies and Congressional authorizations.

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. Additionally, the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE) funded sand studies in several Gulf of Mexico states to support sand leasing programs and assess the potential environmental effects of dredging (Morton et al., 1995).

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). Additionally, many sand shoals and sandy seafloor areas are subject to multiple uses as they are considered important benthic habitat for a variety of marine life and are unavailable for use (Williams et al., 2012).

Not all states have regulations in place to control the percent fine versus coarse material used for BU projects (Table 13). Gulf of Mexico states often face sediment budget constraints due to limited supplies and additional regulations on the condition and quality of sediment would further limit opportunities for BU project implementation and ecosystem restoration. However, limitations on the dredging of sand throughout the Gulf of Mexico are imposed by two factors: (1) the inshore depth of closure, which is related to the cross-shore sediment transport exchange between the beach and shelf (at approximately 5–10 m water depths, depending on location); and (2) the offshore depth limits, which is determined by the conventional U.S. dredging standard of 27–33 m (Williams et al., 2012). These limitations can restrict potential sand recovery by conventional dredging to a relatively narrow area of the inner shelf. Further, dredging in shallow waters is likely to disrupt littoral processes and may increase shore erosion.

Gulf of Mexico states have policies to avoid or minimize the impacts associated with BU dredge and fill projects across the region. Mississippi Code Title 49, Ch 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 policies have been set in other Gulf 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.” In Louisiana, CZM regulations further state that “destruction or adverse alternations must be avoided in natural biological valuable areas or those that include protective coastal features.”

Water quality can also be influenced by dredging and placement of dredge sediment and is of particular concern in wetland or habitat restoration projects. All Gulf of Mexico states function under Section 401 of the CWA (33 U.S.C. 1251) to mitigate municipal or industrial discharges to coastal waters.

TABLE 11. PERMITS REQUIRED FOR BUDM PROJECTS – GULF OF MEXICO JURISDICTIONS

State/Territory	Dredging & Coastal Placement	State Water Quality	Public Land Rights	Other State	Is Federal General Permit an option?
TX	Texas Nat'l Res. Code, Ch. 33, 51; Title 31, TX Admin Code, Ch. 15; General Permits required for maintenance dredging, channel dredging, oyster reefs, living shorelines, and armoring systems (bulkheads)		Tex. Nat. Res. Code Ann. §61.011 <i>et seq</i>	GLO surface lease for placement TAC Title 31 Chapter 15 – Beach/Dune Rules – Beachfront Construction Certificate and Dune Protection Permit Texas Historical Commission	Yes, PGP with USACE Galveston District
LA	La. Admin. Code tit. 43, §723 A (2)(i). Coastal Management Regulations. A permit is required for shoreline modification projects.			La. Admin. Code tit. 43, §723 A (2)(n). Coastal Management Regulations. A permit is required for activities which impact barrier islands and beaches.	PGP for Coastal Zone Activities
MS	Miss Code Ann. Miss Code Ann; § 53-7-69	DEQ issue through 401, and land and water resources	§ 39 - 7 - 3; publicly owned lands (39 - historic sites)		Yes, USACE Mobile District
AL	ADEM Admin. Code r. 335-8-2-.02,.08; General Permits; ADCNR-SLD may require a separate permit and fee for removal of dredged material from State water bottoms	ADEM Admin. Code ch. 335-8-2, 335-6-10.		Projects which include potential impacts to water bottoms or the dredging and/or filling of wetlands will require permits and/or certifications from ADEM, the U.S. Army Corps of Engineers (USACE), and, in some instances, the State Oil and Gas Board, and/or the ALDCNR-State Lands Division	Yes, USACE Mobile District

TABLE 12. SUMMARY OF BUDM RELATED POLICIES - GULF OF MEXICO JURISDICTIONS

State/Territory	Beneficially Reuse Dredged Material	Preference for Natural Solutions over Hard Structures for Erosion Control	Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
TX	Encouraged	Natural Solutions Encouraged	Required
LA	Required	Natural Solutions Encouraged	Required
MS	Required	Natural Solutions Encouraged	Required
AL	Encouraged	Natural Solutions Encouraged	Encouraged

TABLE 13. PHYSICAL SEDIMENT STANDARDS FOR PLACEMENT – GULF OF MEXICO JURISDICTIONS

State/Territory	<i>Fines*</i>	<i>Gravel (> 4.75 mm)</i>	<i>Mean Grain Size (mm)</i>	<i>Other (Contaminants)</i>	<i>Color</i>	<i>Rules/Regulations</i>
TX	similar to existing	--	similar to existing	free of contaminants; water quality impacts	--	Determined case-by-case
LA	similar to existing	--	similar to existing	free of organics; water quality impacts	--	Determined case-by-case
MS	similar to existing	--	similar to existing	free of organics; water quality impacts	--	Determined case-by-case
AL	similar to existing	--	similar to existing	material must be free of toxic pollutants in toxic amounts and devoid of sludge or solid waste; adverse impacts to the coastal resources have been reduced to the greatest extent practicable	--	ADEM Admin. Code div. 335-8.

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 material, as well as wetlands permits in some cases depending on the placement site (Table 14).

Several states have separate bottomlands leasing / licensing authorizations (WI, MI, OH, PA, NY); others incorporate that authorization into existing permit processes. For instance, in the limited subset of Michigan dredge/fill projects in Great Lakes waters that require Great Lakes bottomlands leasing/conveyances, the Department of Environment, Great Lakes, and Energy (EGLE), the primary permitting agency, coordinates with the Department of Natural Resources, the agency generally responsible for managing state-owned lands.

Projects generally require water quality certifications that are reviewed by a separate agency. For instance, the Ohio Department of Natural Resources issues its shore structure permit, but the Ohio Environmental Protection Agency issues its water quality certification. In Michigan, where a project requires a permit from the USACE and the Department of Environment, Great Lakes, and Energy (EGLE), the EGLE permit incorporates the 401 WQC and CZMA certification.

USACE projects do not obtain state permits, but are subject to water quality certification and federal consistency review requirements. Non-USACE projects require both state and federal permits. Michigan has assumed administration of the USACE Clean Water Act 404 program for its inland waterways; however, the USACE still reviews 404 applications for projects in/on the Great Lakes. 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) to coordinate and exchange information dredging and dredge 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 (WI, IL, IN, OH, PA, NY) (Table 15). 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 dredge management, uses federal consistency to ensure that suitable or compatible dredged material is kept within the same littoral system from which it was removed, and provides guidance for in-water and riparian dredged material 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 line.

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 material to be beneficially reused through upland or littoral placements or industrial applications, compliant with the terms of the state's solid waste regulations. Additionally, under the new Harbor Sediment Authorization rules, the state may identify certain appropriately-managed dredge sediment sources as exempt from solid waste and hazardous waste requirements – as in, to be treated as any other soil.

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. For instance, Michigan EGLE co-founded 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 (Table 16). 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 greater than 15 percentage points, 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 material 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 materials. Other states rely on the water quality certification process to measure and address project design impacts on water quality.

TABLE 14. PERMITS REQUIRED FOR BUDM PROJECTS – GREAT LAKES JURISDICTIONS

State/ Territory	Dredging & Coastal Placement	State Water Quality	Public Land Rights	Other State	Is Federal General Permit an option?
MN	DNR Public Waters Work Permit, Minn. Stat. § 103G.245	MPCA Water Quality Certification, Minn. R. 7001.1400 <i>et seq.</i>	(incorporated into Public Waters Work Permit)	n/a	Beach Creation and Nourishment RGP; Shoreline RGP
WI	DNR Waterways Individual Permit, Wis. Stat. Ann. § 30.12; Wetland Individual Permit, Wis. Stat. Ann. § 281.36; WI Dredging Authority, Wis. Stats. 30.20.	DNR Water Quality Certification, Wis. Admin. Code NR §§ 299, 102, 103	DNR Bulkhead Line, Wis. Stat. Ann. § 30.11; PLB Lakebed Lease, Wis. Stat. Ann. § 24.39	Maintenance dredging GP, Wis. Admin. Code NR § 310.09-12	n/a
IL	IDNR Regular Permit, 615 ILCS 5.	IL EPA Water Quality Certification	(incorporated into IDNR authorization)	n/a	Lake Michigan Regional General Permit
IN	IDNR Navigable Waterways Fill Permit, IC 14-29-1-8; Sand and Gravel Permit, IC 14-29-1-3.	IDEM Water Quality Certification	(incorporated into Fill Permit)	n/a	Programmatic General Permit for Minor Activities
MI	EGLE Part 325 permit, MCL 324.32501 <i>et seq.</i> (Great Lakes); EGLE Part 301 Inland lakes & Streams permit, MCL 324.30101 <i>et seq.</i> (connecting channels).	EGLE Water Quality Certification, MCL 324.3101 <i>et seq.</i>	DNR bottomland conveyance (subset of Part 325 projects)	EGLE Part 303 Wetlands Protection auth., MCL 324.30301 <i>et seq.</i> (wetlands restoration)	RGP 1990-2000050-S16 (includes USACE maintenance dredging and placement in approved beach nourishment sites)
OH	ODNR Shore Structure Permit, O.R.C. § 1521.22.	Ohio EPA Water Quality Certification, O.R.C. § 6111.03(O,P).	ODNR Submerged Lands Lease, O.R.C. § 1506.11.	Harbor Sediment Authorization, O.A.C. 3745-599-400; Coastal Erosion Area Permit; General BU Permit, O.A.C. 3745-599-200; Indiv. BU Permit O.A.C. 3745-599-310	n/a
PA	Water Obstruction and Encroachment Permit, 25 PA Code § 105.11(a); DEP Waiver 16 (Restoration Projects, 25 PA Code § 105.12(a)(16).	DEP Water Quality Certification	Submerged Lands License Agreement, 25 PA Code § 105.31.	n/a	n/a
NY	Protection of Waters Permit, 6 CRR-NY 608, 621; Wetlands Permit, 6 CRR-NY 661 (tidal), 663 (fresh).	DEC Water Quality Certification, 6 CRR-NY 608.9.	ONR Permit, 6 CRR-NY 190, 196; OGS permit, NY Pub Lands Law § 75.	Coastal Erosion Management Permit (within Coastal Erosion Hazard Areas), 6 CRR-NY 505.	n/a

TABLE 15. SUMMARY OF BUDM RELATED POLICIES - GREAT LAKES JURISDICTIONS

State/ Territory	<i>Beneficially Reuse Dredged Material</i>	<i>Preference for Natural Solutions for Erosion Control</i>	<i>Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics</i>
MN	No Statewide Policy	Encouraged	Required
WI	Encouraged	Encouraged	Encouraged
IL	Encouraged	No Statewide Policy	Required
IN	Encouraged	No Statewide Policy	Encouraged
MI	No Statewide Policy	No Statewide Policy	Required
OH	Required	Encouraged	Encouraged
PA	Required (subset)	No Statewide Policy	Required
NY	Encouraged	Encouraged	Required

TABLE 16. PHYSICAL SEDIMENT STANDARDS FOR PLACEMENT – GREAT LAKES JURISDICTIONS

State/	<i>Fines</i>	<i>Gravel</i>	<i>Mean Grain Size (mm)</i>	<i>Other (Contaminants)</i>	<i>Color</i>	<i>Rules/Regulations</i>
MN	case-by-case	--	--	clean, inorganic, free of pollutants	--	Minn. R. 6115.0190(5)(B).
WI	% fines < % placement fines +15		fines: #200 sieve	80 mg/L TSS; appropriate control measures; contaminant testing	similar to existing	Wis. Admin. Code NR §§ 345.02; 347.06; 347.08
IL	similar to existing	--	equal or larger	water quality certification; contaminant testing if >20% silt	--	35 Ill. Admin. Code §§ 302.515, 395.205(a)(1), 395.401(b)
IN	"suitable"	--	--	water quality certification	--	§ 312 IAC 6-5-8
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)
OH	Beach nour: 20%; Littoral drift: 40%	--	--	water quality certification	--	O.R.C. § 6111.33; O.A.C. § 3745-32-05
PA	case-by-case	--	--	testing re Great Lakes Dredged Material Testing and Evaluation Manual.	--	CRMP Policy 2.1
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

Regional Trends *in the West Coast & Pacific*

For the purposes of this report, includes California, Oregon, Washington, Alaska, American Samoa, Commonwealth of the Mariana Islands, Hawaii, and Guam.

Permitting and Policies

Pacific state coastal programs require permits for dredging and coastal placement (Table 17). Certifications for water quality and public land rights are administered by different resource agencies and attached to these state permits. UASCE Nationwide Permits are not available in California, where the California Coastal Commission (CCC) and San Francisco Bay Conservation and Development Commission (BCDC) denied federal consistency concurrence.

Pacific coast and island jurisdictions all have policies to encourage or require BUDM. California, Oregon, and Washington have implemented requirements with specific language about the use and placement of sediment for BU projects. For instance, in California, the CA Coastal Act stipulates the use and intent of borrowed sediment for BUDM projects across the outer California coast. For example, CA Coastal Act Chapter 3, Section 30233(b) states: “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 longshore current systems.”

The states partner with USACE to implement RSM, including promotion of BUDM. For instance, California jointly adopted with USACE and the EPA the Long Term Management Strategy for the Placement of Dredged Material in the San Francisco Bay Region, which includes programmatic goals to maximize beneficial reuse of dredged sediment in the Bay Area.

Additionally, Pacific states and island jurisdictions encourage coordination with the appropriate state and federal agencies to conduct studies that assess environmental impacts on species protected under the Endangered Species Act (16 U.S.C. 1531).

Physical Sediment Characteristics

The U.S. Pacific Coast beaches vary in size and geologic composition from southern California to western Washington state and the far reaches of coastal Alaska. The widest beaches in California are often the result of historical harbor dredging and periodic beach nourishment projects. Additionally, rivers sustain sediment budgets of littoral cells along the coast, particularly in northern California and the Pacific Northwest. Pacific Island coastal zones are characterized by groups of islands with a diversity of geological origin, age, and wave conditions that play a dominant role in the condition and supply of local sediment across the region. 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.

Pacific Coast states have regulations that stipulate few quantifiable but many qualitative metrics for determining sediment condition and compatibility. California does not set quantified limits on percentage of fines or coarse material, but typically will require contaminant testing for sediment containing many fines. Guidance calls for no more than 10% coarse-grained (> 4.75mm) sediment for BU projects. Oregon, Washington, and Alaska allow for more leniency

for sediment compatibility. Similarly, Pacific Island jurisdictions do not have specific requirements for the percentage of fine versus coarse grained sediments for use in BU projects. However, in Hawaii, regarding the compaction of sediment, new fill shall be compacted to 90% of maximum density as determined by the ASTM soil compaction test D1557, except for slopes.

The Pacific Island jurisdictions have primarily qualitative metrics for determining sediment condition and compatibility for BUDM. Specifically, no requirements for percent fine versus coarse sediment exists. However, sources of sediment for BU projects are recommended to be similar to the native sediment in composition, grain-size, or color.

Given the wealth of ecological resources surrounding Hawaii and the Pacific Islands, there are several recommended measures to avoid or minimize project impacts to threatened and endangered animals - including birds, turtles, and invertebrates. For habitat restoration projects, it is often required to Incorporate applicable BMPs regarding Work in Aquatic Environments to minimize the degradation of water quality and impacts to fish and wildlife resources.

Pacific states and island jurisdictions typically require some form of water quality certification through a Federal NPDES permit is required for projects with municipal or industrial discharges to coastal waters identified under Section 401 CWA (33 U.S.C. 1251). Pacific Coast states may also require WQ certification through the respective local resource agencies.

TABLE 17. PERMITS REQUIRED FOR BUDM PROJECTS – WEST COAST & PACIFIC JURISDICTIONS

State/Territory	<i>Dredging & Coastal Placement</i>	<i>State Water Quality</i>	<i>Public Land Rights</i>	<i>Other State</i>	<i>Is Federal General Permit an option?</i>
CA	CWRCB permit, Cal. Code Regs. tit. 14, §13000-14000	Via Regional Water Quality Control Boards	Cal. Code Regs. tit. 14, §13000-14000	--	yes
OR	DSL Removal-Fill Permit (R/F); §196.800-196.990; OPRD Ocean shore alteration permit, ORS 390 and OAR 736-020	Water quality certification	Oregon Statewide Planning Goals and Guidelines. Goal 17: Coastal Shorelands. Or. Admin. R. 660-15	--	yes
WA	DWF Hydraulics Code permit (RCW 77.55.100 — 360); WDOE Shoreline Management Act permit (RCW 90.58)	discharge permits under the State Water Pollution Control Act (Chapter 90.48)	Wash. Admin. Code §173-16-040(3)(b)	DFW Hydraulics Code (RCW 77.55.100 — 360); Shoreline Management Act permit (RCW 90.58) (local, DOE review)	no
AK	Alaska Department of Environmental Conservation Construction General Permit (2021 CGP, AKR100000)		Alaska Admin. Code tit. 6, §80.060(b)	--	yes
AS	--	--	--	--	yes
CNMI	§65-30; DCRM Regulations 15-10 and additional requirements for other agencies in One-Start Process.	§65-30 Water Quality Standards; CNMI Water Quality Certifications. Public Law 3-47 and DCRM Regulations 15-10.	Public Law 3-47 (21)(22); § 15-10-335 (b)(5); CNMI Constitution Article XII; US Public Law 94-241 "Covenant to Establish CNMI in Political Union with USA", 48 USC §1801; Lease Agreement; 902 Consultations; Public Law 15-2; Public Law 15-21	Submerged Lands Act 43 U.S.C. §§ 1301 <i>et seq.</i> ; Public Law 113-34 Amendment to Territorial SLA; Public Law 93-435 Territorial Submerged Lands Act; Proclamation 9077 Submerged Lands CNMI MTNM	yes
GU	--	--	--	--	yes
HI	Major or minor permit; Chapter 205A, HRS.		Haw. Rev. Stat. §205A-26(3)(C).		yes

TABLE 18. SUMMARY OF BUDM RELATED POLICIES - WEST COAST & PACIFIC JURISDICTIONS

State/Territory	<i>Beneficially Reuse Dredged Material</i>	<i>Preference for Natural Solutions over Hard Structures for Erosion Control</i>	<i>Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics</i>
CA	Required	Required/ Encouraged	Required
OR	Encouraged	Encouraged	Required
WA	Encouraged	Encouraged	Required
AK	Encouraged	Encouraged	No Statewide Policy
AS	Encouraged	Encouraged	Required
CNMI	Encouraged	Encouraged	Required
GU	Encouraged	Encouraged	Required
HI	Encouraged	Encouraged	Required

TABLE 19. PHYSICAL SEDIMENT STANDARDS FOR PLACEMENT – WEST COAST & PACIFIC JURISDICTIONS

State/Territory	Fines*	Gravel (> 4.75 mm)	Mean Grain Size (mm)	Other (Contaminants)	Color	Rules/Regulations
CA	case-by-case	case-by-case; ±10% nat. beach	similar to existing	Water quality certification and micro toxicity evaluation	--	Cal. Pub. Res. Code § 30233 (a), (b).
OR	case-by-case; <5%	--	--	contaminant testing	--	OR DEQ Chapter 340; Div 41; 340-041-0001
WA	case-by-case	--	--	contaminant testing	--	WA Chapter 173-204 WAC
AK	similar to existing	--	--	contaminant testing	--	AK Water Quality Standards; 18 AAC 70
AS	similar to existing	similar to existing	--	free of organics; water quality impacts	--	Determined case-by-case
CNMI	similar to existing	similar to existing	--	free of organics; water quality impacts	--	Determined case-by-case
GU	similar to existing	similar to existing	--	free of organics; water quality impacts	--	Determined case-by-case
HI	similar to existing	similar to existing	Compacted to 90% of max. density	free of organics; water quality impacts	--	1983 CC c 10, Article 3, Section 10-21; 1983 CC c 10, Article 3, Section 10-19, Ord 01-108, sec 1

Challenges and Barriers to BUDM Implementation

Nationally, states that seek to incentivize BUDM report a range of barriers to the success of individual projects and statewide policies, including both physical/logistical as well as policy/structural challenges. A brief summary of key barriers and policy issues follows.

Matching Supply to Demand

- **Timing:** Planning, permitting, and funding for both dredging projects and placement projects take a multiyear process. It is sometimes difficult to align the dredging window with approved and funded placement projects, which typically require lengthy permitting and coordination time periods.
- **Distance vs. Cost:** One of the most significant cost factors in a dredging/beach nourishment project is fuel consumption by the vessels used to pump sand from the borrow area to the beach (e.g. USACE 2019a; 2019b). Thus, the farther a borrow area is located from the beach placement site, the higher the project cost (Elko et al. 2000).
- **Material Suitability:** Many dredging projects generate suitable sediment with resource value, but the highest placement need isn't always within range of suitable dredged sediment sources. Likewise, many placement projects cannot use sediment from nearby dredging sources because the sediment does not meet physical or water quality standards.
 - In some cases, material that may be suitable for a nearby placement project (e.g. high fine grain content for marsh accretion), does not meet physical requirements designed with other project types in mind (e.g. beach nourishment).

Interagency Collaboration and Permitting

- **Venues for Coordination:** Greater coordination is needed through standing working groups, joint project review processes, and other venues between relevant agencies including USACE navigation, environment, flood risk management, recreation, and regulatory business lines; state navigation, wetlands, natural resources, coastal management, and water quality programs; ports and marinas; and local communities.
 - Agencies need staff capacity to participate in regular meetings.
 - Meetings must be productive to be worth participants' time.
- **Project Identification:** Relevant agencies need awareness of the jurisdiction's dredging, beach maintenance, and ecosystem restoration/enhancement needs early enough in the planning process to align dredging and placement projects.
 - Dredging, beach management, and habitat officials need training on the tools available from their peers in the other sectors to identify BUDM opportunities, site suitability, etc.
- **Long Term Planning:** Regional studies and BUDM strategies are needed both to identify potential dredge/placement alignments and build and sustain working relationships between agencies.
 - USACE must coordinate with coastal states, communities, and stakeholders early and throughout the planning and design process to ensure that research products meet local and regional needs.

- **Habitat Conversion:** 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 SAV to tidal marsh or high marsh).
- **Navigating Permits for Innovative Designs:** Trying new or innovative approaches can lead to “trial and error” with federal and state regulatory requirements. Flexibility is needed for reviewers and project proponents to identify project goals/outcomes.

Funding

- **Federal Standard:** USACE’s Federal Standard policy requires Districts to identify and prefer the least costly project alternative, so long as it determines the alternative is consistent with sound engineering and environmental requirements. The Federal Standard is intended to promote cost efficiency, sound engineering, and environmental compliance by avoiding costly or impractical options and fostering innovation. The Federal Standard sometimes impedes projects because BUDM is often more expensive than traditional options.
 - Application of the standard is not consistent across Districts. Districts lack a standard calculation methodology to weigh best management practices and least cost measures.
 - Some Districts prioritize costs to the navigation business line when developing dredge project alternatives, placing less importance on cost savings available by connecting dredging projects via BUDM with habitat restoration, flood risk management, or recreation projects.
 - Some state statutes require beneficial placement. This can be a challenge for Districts that are required to utilize the Federal Standard, which in turn limits placement.
 - Districts and states have in the past reached contradictory determinations of whether a lowest cost alternative is consistent with state or federal environmental requirements, creating conflict around project alternative selection (e.g. rejecting alternatives that use BUDM).
- **Non-Federal Match:** Local sponsors may have trouble meeting non-federal match requirements.
 - More federal-state passthrough funding sources (e.g. for coastal resilience, habitat restoration, and economic development) should be made eligible for use as non-federal match, following the model of HUD CDBG funds.
- **Budgetary Disincentives:**
 - USACE business lines are planned and budgeted separately, so, for instance, Navigation personnel are not structurally incentivized to achieve cost savings in flood and coastal storm damage reduction, environment, or recreation lines by combining projects through BUDM.
 - USACE Districts rely on overhead from project funds to maintain office and staffing capacity, and so are disincentivized from redesigning or combining projects to reduce overhead costs.

- **Pilots:** USACE does not have the flexibility under existing authorities and annual budgeting to pursue innovative pilots - instead they require separate Congressional authorization and appropriation (for instance WRDA 2016 § 1122).
- **Limited Resources for Post-Project Monitoring:** USACE projects are generally funded in phases that include Planning, Engineering and Design (PED), Construction, and Operations and Maintenance/Monitoring. Monitoring is not included in construction costs and is typically not a high budgetary priority. This may impede valuable data collection efforts that could be used for adaptive design practices and improving the state of knowledge of BUDM best practices.

Research

- **Sediment Resources Inventory:** At a national scale, BOEM has one of the most comprehensive online tools that consolidates information about sediment resources such as potential offshore borrow areas for beach nourishment. The USACE SAND database begins to tackle this challenge at a regional scale (Taylor Engineering 2020), but additional geotechnical data, increased spatial coverage, and more recent information is needed. Many New England states also have comprehensive sediment inventories.
- **Sediment Dynamics:** In some locations, sediment budgets within littoral cells are not well defined or are outdated.
 - These studies can be completed with minimal data collection in many locations via compilation and analysis of existing physical sediment processes data.
- **Environmental Impacts:** Many research and monitoring studies about impacts on existing ecosystems (vegetation reestablishment, invertebrate communities) exist.
 - Results from projects or pilots are not always transferable to different ecosystems and geomorphic settings even within regions (e.g., reefs, seagrass, marsh systems in the Southeast/Caribbean).
 - 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).
- **Demonstrating Need:** Practitioners need better funding, access, and documentation of data to demonstrate restoration need, both for funding as well as for project review. Information needs include:
 - Prioritization for wetland areas for restoration, risk of inundation, erosion, and infiltration from sea level rise, lake level change, and other climate change impacts, through studies or modeling; and
 - Quantification of the economic value of healthy coastal ecosystems (dunes, wetlands, etc.) for hazard mitigation, recreation, sustenance of fisheries and other economic sectors, etc. Existing benefit/ cost analyses (BCAs) 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 an economic framework.

Science-Based Sediment Regulations: Clarity is needed on how regulators can set scientifically-supported project review standards and design parameters (e.g. grain size, source restrictions).

Project Planning, Engineering, and Design

- **Setting Standards:** 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?
- **Integration into the Littoral System:** Innovative placement strategies are needed to model sediment distribution designs to work with natural dynamics.

Construction and Operations

- **Equipment:** Some states report limited capacity of government-owned dredge equipment, both in availability and in performance capabilities (e.g. lacking pump-out capability).
- **Staff capacity:** Agencies may not have the staff capacity to devote the necessary extra oversight during construction, for example to allow for collaborative decision making for field modifications, which are common during beneficial use projects

Monitoring

- **Integrating Monitoring into Project Planning:** Monitoring protocols should be incorporated into project design to provide important design/performance data for future projects.
- **Capacity:** More funding and staff capacity is needed to carry out monitoring efforts.
- **Documentation and Information Availability:** Practitioners need better access to performance and impact data from innovative project designs (e.g. thin layer placement methods).

Workshop Discussion Questions

Practitioner input will be collected on the following policy questions which may evolve as workshops proceed.

1. **Standardizing consultation** - How should teams collaborate on dredging projects and placement projects in order to design projects, obtain permits, and secure funding within a workable timeframe?
2. **Understanding environmental impacts** - What barriers does your program face working within state and federal water quality, habitat protection, and other environmental standards to approve appropriate BUDM placement projects? And how do you overcome them?
3. **Information sources** – Do sufficient publications or sources exist for your program to effectively manage sediment regionally? If so, what is used to numeric thresholds (grain size, %organics, etc.), water quality protection measures, and placement requirements, either as statewide policy or through case-by-case review?
4. **Managing the Federal Standard** - How do USACE districts, states, and other project partners coordinate to determine and manage the delta-cost for a BUDM project?
5. What key barriers and policy issues are not adequately captured in the above summary?

Final Report

A final report on effective uses of sediment regulations to implement beneficial use of dredged material will synthesize White Paper findings with lessons learned from workshop participants. The report will be tailored to an audience of coastal managers, stakeholders and policy makers. In addition to more detailed overviews of regional trends outside of New England, the final report will review case studies and best practices in sediment management and regulation from the coastal states. Strategies and opportunities to address barriers to BUDM implementation, as well as recommendations, will also be included.

Summary

This white paper presents findings from a comparative analysis of physical, water quality, habitat protection, and other permitting requirements in state and territory regulations applicable to placement projects beneficially reusing dredged materials, as well as the policy approaches taken by coastal states toward managing and, where appropriate, incentivizing beneficial use. Information was gathered through desktop research and a regional workshop, vetted through interviews with state regulators.

A range of systematic, practical, and funding barriers confront states and territories which seek to incentivize greater reuse of dredged sediment and to keep valuable sediment resources in the littoral system through regional sediment management. Challenges include practical issues with matching supply to demand, interagency collaboration and permitting, funding projects, meeting research needs, coordinating on project planning, engineering, and design, and implementing project construction, operations, and monitoring.

References

- Barreto-Orta, M., Méndez-Tejeda, R., Rodríguez, E., Cabrera, N., Díaz, E., and Pérez, K., 2019. State of the Beaches in Puerto Rico after Hurricane Maria, *Shore & Beach*, 87(1), 16-23.
- Dalyander, P.S., Miner, M.D., Khalil, S.M., Lee, D.M., LeBlanc, J.W., Newman, A., Cameron, S.C., and Di Leonardo, D.R., (2021). Barrier Island System Management (BISM): A Holistic System-Approach to Adaptively Manage Louisiana's Barrier Islands and Headlands. The Water Institute of the Gulf. Prepared for and funded by the Coastal Protection and Restoration Authority. Baton Rouge, LA under Task Order 73.
- Dean, R.G., 2002. Beach Nourishment Theory and Practice, Advanced Series on Ocean Engineering – Volume 18, World Scientific Publishing, River Edge, NJ.
- Elko, N., K. Brutsche, Q. Robertson, M. Hartman, and Z. Dong, in press. USACE Navigation Sediment Placement: An RSM Program Database (1998–Present). ERDC/TN RSM-21-XX., Vicksburg, MS: US Army Engineer Research and Development Center.
- Elko, N., McKenna, K., Briggs, T.R., Brown, N., Walther, M., Kana, T., and York, D., 2020. An ASBPA white paper: Coastal inlets best management practices, *Shore & Beach*, 88(3), 75-84. <http://doi.org/10.34237/1008838>.
- Maglio, C.K., J.D. Ousley, and J.L. Coor, 2015. “Sediment engineering thru dredging and with nature (SETDOWN) — Fate of fines in the dredging and placement process.” *Proc. Coastal Sediments 2015*, World Scientific, Singapore.
- Mendez-Tejeda, R., Pérez-Valentín, K.A., and Barreto-Orta, M., 2020. “Impact of Extreme Weather Events on the Beaches of Puerto Rico: The Case of Ocean Park, San Juan.” *American Journal of Marine Science*, vol. 8, no. 1: 1-5. <http://pubs.sciepub.com/marine/8/1/1/index.html>, accessed 11.23.2021.
- Ousley, J.D., and J.L. Coor, 2015. “Fate of fines study— Sediment Loss During the Hydraulic Dredging Process.” *National Conference on Beach Preservation Tech. 2015*, Sand Key, Florida.
- Parson, L.E. and Swafford, R., 2012. Beneficial use of sediments from dredging activities in the Gulf of Mexico. In: Khalil, S.M., Parson, L.E., and Waters, J.P. (eds.), *Technical Framework for the Gulf Regional Sediment Management Master Plan (GRSMMP)*, *Journal of Coastal Research*, Special Issue No. 60, 45–50.
- Rosov, B., Bush, S., Briggs, T. M. R., and Elko, N., 2016. The State of Understanding the Impacts of Beach Nourishment Activities on Infaunal Communities, *Shore & Beach*, 84(3): 51-55.
- Taylor Engineering, 2020. USACE South Atlantic Division Sand Availability and Needs Determination Summary Report, Prepared for USACE, W912BU-15-D-0006, 256p, https://www.sad.usace.army.mil/Portals/60/siteimages/SACS/508%20SAND_FINAL_Report_15Sep_CC.pdf?ver=0m6wxMybXbFmX_UJdid1kg%3D%3D, accessed 11.5.2021.
- USACE, 2000. Planning Guidance Notebook. Engineering Regulation (ER) 1105-2-100. U.S. Army Corps of Engineers, Washington, DC.
- USACE, 2019a. Carolina Beach, NC Beach Renourishment Evaluation Report. Wilmington District USACE, <https://www.saw.usace.army.mil/Missions/Coastal-Storm-Risk-Management/Carolina-Beach/> accessed 2/22/2020.
- USACE, 2019b. Wrightsville Beach, NC Beach Renourishment Validation Study Report. Wilmington District USACE, <https://www.saw.usace.army.mil/Missions/Coastal-Storm-Risk-Management/Wrightsville-Beach/> accessed 2/22/2020.

- USACE RSM, 2019a. National Regional Sediment Management Program, <https://rsm.usace.army.mil/> accessed 11/5/2021.
- Welch, M., Mogren, E. T., & Beeney, L. (2016). A literature review of the beneficial use of dredged material and sediment management plans and strategies.
- Williams, S. J., Flocks, J., Jenkins, C., Khalil, S., & Moya, J. (2012). Offshore sediment character and sand resource assessment of the northern Gulf of Mexico, Florida to Texas. *Journal of Coastal Research*, (60 (10060)), 30-44.
- Willson, K., Thomson, G., Briggs, T.M.R., Elko, N., and Miller, J., 2017. Beach Nourishment Profile Equilibration: What to expect after sand is placed on a beach, *Shore & Beach*, 85(2): 49-51.

Appendix A: Key State Policies

This section summarizes statewide policies identified for four categories:

1. Policies encouraging or requiring the beneficial reuse of sediment obtained through dredging projects;
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) vs hard structures for erosion control projects;
3. Policies implementing regional sediment management principles by encouraging or requiring that projects avoid impacts to sediment supply, erosion, or hydrodynamics; and
4. Policies setting required or encouraged limits on sand sources for shoreline placement projects.

In each section, the policies of the state as a whole are classified as “required,” “required for a subset of projects,” “encouraged,” or “no statewide policy” according to the most restrictive policy.

Alabama

Beneficially Reuse Dredged Material

Encouraged

ADEM Rules and Regulations - Division 8 Coastal Area Management Program.

ADEM Admin. Code r. 335-8-2-.02,.08

Ala. Admin. Code r. 335-8-2-.02

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

ADEM Rules and Regulations - Division 8 Coastal Area Management Program. Ala.

Admin. Code r. 335-8-2-.08

Ala. Admin. Code r. 335-8-2-.02

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

Alaska

Beneficially Reuse Dredged Material

Encouraged

Alaska Admin. Code tit. 6, §80.040(2); 6 Alaska Admin. Code § 80.050

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

No Statewide Policy

American Samoa

Beneficially Reuse Dredged Material

Encouraged

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

California

Beneficially Reuse Dredged Material

Required/Encouraged

Cal. Pub. Res. Code § 30233(b). California Coastal Act

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

CA Coastal Act, Chapter 3, Section 30235

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

Connecticut

Beneficially Reuse Dredged Material

Encouraged

State is required to 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)

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

State 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.

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.

CCMA, CGS Section 22a-92(b)(2)(D) and (E);CGS 22a-92(c)(2)(e)

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
Required/Encouraged

Degrading natural erosion patterns through the significant alteration of littoral transport of sediments in terms of deposition or source reduction must be minimized.

Uses that substantially accelerate erosion or lead to significant despoliation of tidal flats are disallowed.

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)(C); -92(b)(2)(C); -93(15)(B)

Delaware

Beneficially Reuse Dredged Material
No Statewide 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.

Preference for Natural Solutions over Hard Structures for Erosion Control
Natural Solutions Encouraged

Nonstructural erosion control measures are preferred for shoreline stabilization work in appropriate environments. 7 Del. Admin. C. § 7504-4.10.1.3.

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.

Avoid Impacts on Sediment Supply, Erosion, 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.

Florida

Beneficially Reuse Dredged Material

Required (subset)

Beach quality sand from federal navigation dredging projects must be placed on, or in the nearshore area of nearby adjacent eroding beaches. Fla. Stat. ch. 161.142(5).

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

"Beach restoration and nourishment projects are in the public interest." Fla. Stat. ch. 161.088.

Erosion control projects must be designed to minimize potential adverse impacts to the beach and dune system. Fla. Admin Code r. 62B-33.0051.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

Inlet relocation, opening or maintenance must not alter hydrodynamics or long-term sand management, and will be designed to balance the sediment budget of the inlet and adjacent beaches. Fla. Admin Code r. 62B-41.005 (11-12).

Georgia

Beneficially Reuse Dredged Material

Required

"[S]and shall be used to replenish the adjacent coastal beaches, if feasible..." O.C.G.A. 52-9-2(a)(1).

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

The Department encourages applicants to use living shorelines, Engineering with Nature techniques, low impact development, etc. through the public interest balancing test. O.C.G.A. 12-5-286(g)(1).

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

"[I]t is the policy of this state that there shall be no net loss of sand from the state's coastal barrier beaches resulting from dredging activities" O.C.G.A. 52-9-1.

It is state policy to allow "only activities and alterations of the sand dunes an which do not substantially impair the values and functions of the sand-sharing system..." O.C.G.A. 12-5-231

The Department conducts a public interest test evaluating in part "[w]hether or not unreasonably harmful obstruction to or alteration of the natural flow of navigational water within the affected area will arise [or] unreasonably harmful or increased erosion, shoaling of channels, or stagnant areas of water will be created...." O.C.G.A. 12-5-286(g)(1,2).

Guam

Beneficially Reuse Dredged Material

Encouraged

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

Hawaii

Beneficially Reuse Dredged Material

Encouraged

Haw. Rev. Stat. §205A-26(3)(A); Haw. Rev. Stat. §205A. Hawaii Coastal Zone Management Act.

HRS Chapter 205A; HI Rev Stat 180C-2

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

Illinois

Beneficially Reuse Dredged Material

Encouraged

Statewide Permit No. 11 identifies beach nourishment and bank stabilization as an authorized use for minor dredging material disposal. Ill. Admin. Code tit. 17, § 3704.110.

Preference for Natural Solutions over Hard Structures for Erosion Control

No Statewide Policy

Avoid Impacts on Sediment Supply, Erosion, 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.

Placement projects must not cause bank or shoreline instability on other properties. Ill. Admin. Code tit. 17, § 3704.90(b).

Indiana

Beneficially Reuse Dredged Material
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.

Preference for Natural Solutions over Hard Structures for Erosion Control
No Statewide Policy

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
Encouraged

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

Beneficially Reuse Dredged Material
Encouraged

La. Admin. Code tit. 43, §707 B. Coastal Management Regulations

Preference for Natural Solutions over Hard Structures for Erosion Control
Natural Solutions Encouraged

CWPPRA (Coastal Wetlands Planning, Protection and Restoration Act)

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
No Statewide Policy

Massachusetts

Beneficially Reuse Dredged Material

Required

If a dredging project is publicly funded, any clean compatible dredge material must be placed on the closest public beach. Ensure that dredging and disposal of dredged material minimize adverse effects on water quality, physical processes, marine productivity, and public health and take full advantage of opportunities for beneficial re-use. Mass CSZ Policy Guide: Ports and Harbors Policy #1

Dredged material shall not be disposed if a feasible alternative exists that involves the reuse, recycling, or contaminant destruction and/or detoxification. 314 CMR 9.07 (e)

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions 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. Mass CZM Policy Guide: Coastal Hazards Policy #1

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

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

Beneficially Reuse Dredged Material

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. Environment Article, § 5-1101(a) (3).

Preference for Natural Solutions over Hard Structures for Erosion Control

Hard Structures Prohibited (with exceptions)

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.

Avoid Impacts on Sediment Supply, Erosion, 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).

Maine

Beneficially Reuse Dredged Material
Encouraged (subset)

“Beach nourishment sediment may be obtained from, but is not limited to, the following sources in order of preference: (1) Beneficial reuse of material dredged from Maine's federal channels and harbors by the United States Army Corps of Engineers (ACOE)...” Sand Dune Rule.

Preference for Natural Solutions over Hard Structures for Erosion Control
Natural Solutions Encouraged

Coastal sand dunes systems are resources of state significance; “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”

This 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; Sand Dune Rule

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
Required

If the activity is on or adjacent to a sand dune, it will 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, §

Michigan

Beneficially Reuse Dredged Material
No Statewide Policy

Dredging regulations and general permits allow, but do not encourage, certain beneficial uses for beach nourishment.

Preference for Natural Solutions over Hard Structures for Erosion Control
No Statewide Policy

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 wetland restoration projects.

Avoid Impacts on Sediment Supply, Erosion, 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).

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

Beneficially Reuse Dredged Material

No Statewide Policy

Beach amendment / nourishment is identified as a potential use for suitable dredged material, but is not encouraged or required. Permit requirements establish a hierarchical preference for dredge disposal options which does not include beneficial use. MPCA Dredged Material Management Manual at 27; 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).

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

The DNR recommends a natural approach to shoreline stabilization through the establishment and maintenance of natural vegetation.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

Placed dredge material may not result in sedimentation or obstruction of navigation. Minn. R. 6115.0200(5)(B)(2)(d).

Mississippi

Beneficially Reuse Dredged Material

Encouraged

Beneficial Use Law MS § 49-27-61; Chapter VIII, Section 2, Part III

Preference for Natural Solutions over Hard Structures for Erosion Control
Natural Solutions Encouraged

Miss Code Title 49, Ch 27

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
No Statewide Policy

New Hampshire

Beneficially Reuse Dredged Material
Encouraged

"Encourage beach renourishment and wildlife habitat restoration as a means of dredge disposal whenever compatible."

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. Coastal Program Policy #14, Ch. Env-Wt 607.09 (e)

Preference for Natural Solutions over Hard Structures for Erosion Control
Natural Solutions Encouraged

Beach nourishment is preferred BUDM.
Living Shorelines required for tidal shoreline stabilization unless not practicable.
Ch Env-Wt 609.04 (a), 609.07

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
Required

Impacts on fisheries shall be identified including alteration of hydrology or water dynamics. 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 607.05 e and 609.10(b)(5)

New Jersey

Beneficially Reuse Dredged Material
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).

Uncontaminated dredged sediments with 75% sand or greater are generally encouraged for beach nourishment. N.J.A.C. 7:7-12.9(b)(6).

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.

Preference for Natural Solutions over Hard Structures for Erosion Control

Hard Structures Prohibited (with exceptions)

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).

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

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.

Beach nourishment is encouraged provided 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

Beneficially Reuse Dredged Material

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. 6 NYCRR 360.12(c)(1)(iv) and 360.12(e). 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.

“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.

The state has provided grants through the Water Quality Improvement Program (WQIP) and Resiliency and Economic Development Initiative (REDI) and developed public/private partnerships to improve placement for habitat and coastal resiliency benefits.

A goal of the New York State Resiliency and Economic Development Initiative Regional Dredging Project was to facilitate strategic thinking regarding BUDM for a comprehensive sediment management program supporting natural protective features. Numerous dredging projects included reuse in the form of littoral drift/beach nourishment.

Preference for Natural Solutions over Hard Structures for Erosion Control
Natural Solutions Encouraged

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.

“Consider sea level rise when siting and designing projects involving substantial public expenditures.” LISCMP Policy 4.6.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
Required

“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.

Under coastal erosion hazard area regulations, project proponents must account for the impacts of changed littoral drift on neighboring properties.

North Carolina

Beneficially Reuse Dredged Material

Required

Beach quality sand from navigation dredging projects must be kept in the littoral system. 15A NCAC 7M .1100.

Preference for Natural Solutions over Hard Structures for Erosion Control

Hard Structures Prohibited (with exceptions)

Bulkheads, seawalls, revetments, jetties, groins and breakwaters are prohibited on ocean shorelines for erosion control with some exceptions. 15A NCAC 07H .0308.

Preferred response measures for shoreline erosion include nonstructural and vegetation-based solutions. 15A NCAC 07M .0202.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

"Projects which would directly or indirectly block or impair existing navigation channels, increase shoreline erosion, deposit spoils below normal high water, [or] cause adverse water circulation patterns, ... are considered incompatible with the management policies of public trust areas...." 15A NCAC 07H .0207(d).

Northern Mariana Islands

Beneficially Reuse Dredged Material

No statewide policy

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions 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)

"Soft measures" such as living shorelines, planting native beach vegetation, maintaining or establishing vegetative buffers, or building green swales for water collection and the like must be considered as alternatives to hard structures, such as sea walls, to limit coastal erosion. If "hard structures" are proposed, application must explain what "soft measures" were considered and why they were determined to be inappropriate. § 15-10-101(c)(2)

2022 DCRM Regulation Updates pending adoption will include further incentives for natural solutions.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
Required

DCRM Regulations §§ 15-10-315, 330, 335

§65-130-530, Water Quality Certification

“Not permit to the extent practicable, development of identified hazardous lands including floodplains, erosion-prone areas...” Public Law 3-47 (7)

2022 DCRM Regulation Updates pending adoptions will include further incentives for Stormwater Management

Public Law 11-62 “Beach Preservation Act of 1998”

DCRM Regulations § 15-10: Including § 15-10-315, § 15-10-335

Public Law 3-47 (17): “Protect all coastal resources, particularly sand...”

Public Law 11-62 “Beach Preservation Act of 1998”: To regulate the removal of sand from beaches in the Commonwealth, and for other purposes

Ohio

Beneficially Reuse Dredged Material
Required

ODNR strongly urges the COE and requires other public and private entities to provide littoral/beach nourishment by returning dredged material composed primarily of sands or gravels derived from Lake Erie beach or nearshore zones to the shallow (less than 10 feet deep) nearshore waters or on the beach downdrift of the worksite. OCMP Policy 22.

Open water disposal of dredged material is prohibited. Dredge must be disposed of in a CDF or beneficially reused. O.R.C. § 6111.32.

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 any other 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.

Ohio has implemented for the upland beneficial use of Lake Erie dredge through a general BU permit (OAC 3745-599-200) or individual BU permit (OAC 3745-599-310).

Ohio EPA has issued individual BU permits for specific dredge material beneficial use projects. No general beneficial use permits have been issued to date for Lake Erie dredge. A harbor sediment authorization for Lake Erie dredge from Conneaut Harbor was issued by the Director of Ohio EPA on September 24, 2021.

Preference for Natural Solutions over Hard Structures for Erosion Control

No Statewide Policy

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Encouraged

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

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).

Oregon

Beneficially Reuse Dredged Material

Encouraged

Oregon Statewide Planning Goals and Guidelines. Goal 18: Beaches and Dunes; Or. Admin. R. 660-15.

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

Oregon Statewide Planning Goals and Guidelines. Goal 18: Beaches and Dunes; Or. Admin. R. 660-15.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

No Statewide Policy

Pennsylvania

Beneficially Reuse Dredged Material

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.

Preference for Natural Solutions over Hard Structures for Erosion Control
No Statewide Policy

The state encourages use of natural solutions on a case-by-case basis through permit pre-application review and federal consistency review.

Avoid Impacts on Sediment Supply, Erosion, 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.

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.

Puerto Rico

Beneficially Reuse Dredged Material
No Statewide Policy

Preference for Natural Solutions over Hard Structures for Erosion Control
Encouraged

The Puerto Rico Climate Change Council, working under the authority of Law 33 2019 developed 103 recommendations to face coastal erosion that include the use of natural solutions as a preference over hard structures.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics
Encouraged

Department policy is to "avoid all activities which could cause a deterioration or destruction of natural systems which are critical to the preservation of the environment, such ... sand dunes."

Rhode Island

Beneficially Reuse Dredged Material
Required

Establishes beach nourishment and habitat restoration and creation, in the coastal zone as a first priority placement for dredged material. R.I. Gen. Laws § 46-6.1-3

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

Nonstructural shoreline protection methods preferred over all other 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. Red Book 1.2.2. D. 1., G.1.a.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

No statewide policy

South Carolina

Beneficially Reuse Dredged Material

Required (subset)

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).

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions 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).

Living Shorelines are encouraged as an alternative to traditional hardened erosion control structures in estuarine environments. S.C. Code Regs. 30-12(Q).

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

No Statewide Policy

Texas

Beneficially Reuse Dredged Material

Encouraged

Tex. Admin. Code. Tit. 31, §501.25.

Tex. Nat. Res. Code Ann. §61.011 *et seq.* Texas Open Beaches Act.; Texas Coastwide Erosion Response Plan

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

Tex. Nat. Res. Code Ann. §61.011 *et seq.* Texas Open Beaches Act.; Texas Coastwide Erosion Response Plan

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Required

Tex. Admin. Code. Tit. 31, §501.25.

U.S. Virgin Islands

Beneficially Reuse Dredged Material

No Statewide Policy

Preference for Natural Solutions over Hard Structures for Erosion Control

No Statewide Policy

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

No Statewide Policy

Virginia

Beneficially Reuse Dredged Material

Encouraged

VA "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 channel ward 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.

Preference for Natural Solutions over Hard Structures for Erosion Control

Hard Structures Prohibited (with exceptions)

"The Commission shall permit only living shoreline approaches to shoreline management unless the best available science shows that such approaches are not suitable. If the best available science shows that a living shoreline approach is not suitable, the Commission shall require the applicant to incorporate, to the maximum extent possible, elements of living shoreline approaches into permitted projects." Va. Code § 28.2-104.1(D).

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.

Shore hardening structures are not permitted on barrier islands. 4 VAC 20-440-10(C)(5).

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

No Statewide Policy

Washington

Beneficially Reuse Dredged Material

Encouraged

Wash. Admin. Code §173-16-060(16). Washington Shoreline Management Act Guidelines

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions Encouraged

Wash. Admin. Code §173-16-060(16). Washington Shoreline Management Act Guidelines

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

No Statewide Policy

Wisconsin

Beneficially Reuse Dredged Material

Encouraged

It is department policy to encourage reuse of dredged material. Wis. Admin. Code NR § 347.01.

Preference for Natural Solutions over Hard Structures for Erosion Control

Natural Solutions 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.

Avoid Impacts on Sediment Supply, Erosion, Hydrodynamics

Encouraged

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 B: Other Relevant Statutes, Regulations and Policies

Table A-1. Endangered Species & Critical Habitat Protection Requirements

<i>State/Territory</i>	<i>Protect, Minimize, Avoid, None</i>	<i>Timing windows?</i>	<i>Authority</i>
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 window of 1 May to 15 July Salmon - No dredging shall be conducted within 1 nautical mile of an anadromous stream or river between June 1st and July 15th.	50 CFR §226.202
AS	Protect: Protect all coastal resources, particularly sand, corals and fish from taking beyond sustainable levels and in the case of marine mammals and any species on the Commonwealth and Federal Endangered Species List, from any taking whatsoever	--	Public Law 3-47 (17) Public Law 2-51 §85-30 DLNR Fish and Wildlife Regs DCRM Regulations 15-10
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.	{EXAMPLE: disturbance of piping plover nesting areas during the nesting season (mid-April to mid-August.)} Windows: restrict dredging activities to avoid impacts with migrations, winter flounder, shellfish for example, Oct through Jan or April	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 Construction shall be outside the loggerhead turtle nesting and hatching season (May 1-October 31).	2020 South Atlantic Regional Biological Opinion GDNR Req for Beach Nour Proj
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: Remay 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.	Placement windows for nesting season 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.	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.	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. Adverse impacts on vegetated tidal wetlands, submerged aquatic vegetation, chartered natural oyster bars, and anadromous fish spawning and nursery grounds shall be minimized.	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 between April 1 and September 1, unless written approval from the Department of Inland Fisheries and Wildlife has been obtained.	PBR; Sand Rule

		An activity involving dune restoration or dune construction must be performed between March 1 and April 1 or October 1 and November 15.	
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).	case-by-case	Minn. R. 6115.0190,0200
MS	Avoid: Surface alterations which have 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 can only occur Nov 15 - Mar 15 to avoid impacts to fish and shellfish resources. 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.609.10 (b) (2); Env-Wt 607.02
NJ	Avoid: New dredging should avoid impacting areas of ecological importance.	Dredging procedures lay out a menu of best practices that 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) <i>et seq.</i>

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: Under the No Action Alternative, there would be no change to abundance, distribution or habitat conditions supporting terrestrial or aquatic ESA-listed species.	The recommended in-water work window for the Columbia River is November through February (salmonids)	(40 C.F.R. § 1508.7
PA	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.	case-by-case	25 Pa. Code § 105.411(1,3)
PR	--	--	--
RI	Avoid & Minimize impacts to SAV habitat	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. 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.	Nourishment of beach areas shall be scheduled so as not to 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 activities will occur from March 1st through September 30 for eastern black rail (BLRA) season; Avoid construction activities during whooping crane wintering season November 1 through April 30.	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)