

**Calendar No. 631**

116TH CONGRESS }  
2d Session }

SENATE

{ REPORT  
{ 116-327

LIVING SHORELINES ACT OF 2020

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R E P O R T

OF THE

COMMITTEE ON COMMERCE, SCIENCE, AND  
TRANSPORTATION

ON

S. 1730



DECEMBER 15, 2020.—Ordered to be printed

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SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED SIXTEENTH CONGRESS

SECOND SESSION

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### LIVING SHORELINES ACT OF 2020

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Mr. WICKER, from the Committee on Commerce, Science, and  
Transportation, submitted the following

### R E P O R T

[To accompany S. 1730]

[Including cost estimate of the Congressional Budget Office]

The Committee on Commerce, Science, and Transportation, to which was referred the bill (S. 1730) to direct the Administrator of the National Oceanic and Atmospheric Administration to make grants to State and local governments and nongovernmental organizations for purposes of carrying out climate-resilient living shoreline projects that protect coastal communities by supporting ecosystem functions and habitats with the use of natural materials and systems, and for other purposes, having considered the same, reports favorably thereon with an amendment (in the nature of a substitute) and recommends that the bill (as amended) do pass.

#### PURPOSE OF THE BILL

This bill would direct the Administrator of the National Oceanic and Atmospheric Administration (NOAA) to make grants available to State and local governments and nongovernmental organizations for the purposes of carrying out living shoreline projects that protect coastal communities by supporting ecosystem functions and habitats with the use of natural materials and systems, and for other purposes.

#### BACKGROUND AND NEEDS

##### IMPACTS OF COASTAL EROSION

While coastal regions make up less than 4 percent of Earth's land area, approximately one-third of the human population lives within 60 miles of the coast, and these regions contain some of the

most valuable natural resources globally.<sup>1</sup> As coastlines continue to experience population growth and urban development, they have become increasingly vulnerable to natural hazards, coastal erosion, and sea level rise.<sup>2</sup> In the United States, over 350,000 structures are located within 500 feet of the coastline.<sup>3</sup> Average coastal erosion rates vary across the country, with States along the Pacific rocky coastline experiencing the slowest rate of erosion and States along the Gulf and Atlantic coastlines experiencing higher rates of erosion.<sup>4</sup> These average rates can vary significantly from year to year, with some coastlines eroding by more than 100 feet following a major storm. Based on average coastal erosion rates, it is estimated that without beach nourishment or structural protection, thousands of structures, including homes, will be lost to erosion each year in the United States.<sup>5</sup>

In 2000, it was determined that U.S. coastal erosion was responsible for approximately \$500 million in property damage (land and structural) per year.<sup>6</sup> As coastal populations have increased by over 12.5 million people from 2000 to 2017,<sup>7</sup> it is likely that the annual costs associated with coastal erosion have also increased. Previous work has shown a clear economic incentive for investing in resilience measures, with every \$1 spent on pre-event mitigation measures saving up to \$4 in post-event damages.<sup>8</sup> For example, the Multihazard Mitigation Council estimated that mitigation grant programs employed by the Federal Emergency Management Agency yielded an \$11.5 billion return on hazard mitigation investments. Economic benefits alone show a clear motivation for the implementation and improvement of coastal erosion mitigation measures.

#### SHORELINE HARDENING AND LIVING SHORELINES

The Federal Government spends approximately \$150 million every year on beach nourishment and other shoreline erosion control measures to mitigate the impacts of coastal erosion.<sup>9</sup> Traditionally, shoreline stabilization projects have consisted of shoreline hardening, which is defined as an engineered shoreline structure that prevents erosion and/or provides flood protection, such as seawalls, groins, jetties, and breakwaters. As of 2015, shoreline hardening accounted for approximately 14,193 miles, or 14 percent of

<sup>1</sup> Millennium Ecosystem Assessment, *Ecosystems and Human Well-Being*, Washington, DC: Island Press, 2005.

<sup>2</sup> Wolfgang Kron, "Coasts: The High-Risk Areas of the World," *Journal of Natural Hazards*, vol. 66 (2012), pp. 1363–1382 (<https://doi.org/10.1007/s11069-012-0215-4>) (accessed Oct. 19, 2020).

<sup>3</sup> National Oceanic and Atmospheric Administration, "What Is Shoreline Armoring?" (<https://oceanservice.noaa.gov/facts/shoreline-armoring.html>) (accessed Oct. 29, 2020).

<sup>4</sup> U.S. Climate Resilience Toolkit, "Coastal Erosion" (<https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion>) (accessed Oct. 29, 2020).

<sup>5</sup> Darryl Cohen, "About 60.2M Live in Areas Most Vulnerable to Hurricanes," U.S. Census Bureau, Jul. 15, 2019 (<https://www.census.gov/library/stories/2019/07/millions-of-americans-live-coastline-regions.html>) (accessed Oct. 19, 2020).

<sup>6</sup> The Heinz Center, *Evaluation of Erosion Hazards*, Apr. 2000 (<https://www.fema.gov/pdf/library/erosion.pdf>) (accessed Oct. 19, 2020).

<sup>7</sup> Darryl Cohen, "About 60.2M Live in Areas Most Vulnerable to Hurricanes," U.S. Census Bureau, Jul. 15, 2019 (<https://www.census.gov/library/stories/2019/07/millions-of-americans-live-coastline-regions.html>) (accessed Oct. 19, 2020).

<sup>8</sup> Multihazard Mitigation Council, *Natural Hazard Mitigation Saves: An Independent Study to Assess the Future Savings from Mitigation Activities, Vol. 1, Findings, Conclusions, and Recommendations*, 2005 ([www.nibs.org/MMC/MitigationSavingsReport/Part1\\_final.pdf](http://www.nibs.org/MMC/MitigationSavingsReport/Part1_final.pdf)) (accessed Oct. 19, 2020).

<sup>9</sup> U.S. Climate Resilience Toolkit, "Coastal Erosion," Sep. 13, 2019 (<https://toolkit.climate.gov/topics/coastal-flood-risk/coastal-erosion>) (accessed Oct. 19, 2020).

the continental U.S. coastline.<sup>10</sup> Although shoreline hardening methods have been used for centuries, the effects of shoreline hardening on coastal ecosystem functions and services have only recently begun to be evaluated.<sup>11</sup> Hardened shorelines have been shown to result in habitat loss, habitat connectivity loss, reduction in biodiversity, and increased seaward erosion and erosion of non-hardened adjacent properties.<sup>12</sup> Because of these impacts, emerging nature-based stabilization techniques, such as living shorelines, are gaining attention as an alternative coastal stabilization measure, with the potential to maintain or improve ecosystem services, while simultaneously reducing coastal erosion and damages from storms.<sup>13</sup>

According to NOAA, “living shoreline” is a broad term encompassing a range of shoreline stabilization techniques that use plants or other natural elements in combination with hard infrastructure along tributaries, estuaries, coasts, and bays.<sup>14</sup> These techniques have been shown to offer numerous technical, ecological, economic, and aesthetic benefits as compared to hardened shoreline installations.<sup>15</sup> Living shorelines have been shown to better stabilize shorelines and exhibit less erosion than hardened shorelines.<sup>16</sup> They have been shown to support and increase fish and wildlife populations, while improving water quality through natural filtration.<sup>17</sup>

Additionally, they can be more cost-effective than hardening techniques, minimizing maintenance requirements, increasing property value, and, in some cases, reducing impacts from severe storms.<sup>18</sup> Despite these benefits, there are some challenges to constructing living shorelines. As an emerging field, there is still a lack of experience in using these methods, which results in some

<sup>10</sup> Roberta Kwok, “Rise of ‘Shoreline Hardening’ Threatens Coastal Ecosystems,” *Conservation*, Aug. 6, 2015 (<https://www.conservationmagazine.org/2015/08/rise-of-shoreline-hardening-threatens-coastal-ecosystems/>) (accessed Oct. 29, 2020).

<sup>11</sup> National Research Council, *Mitigating Shore Erosion Along Sheltered Coasts*, 2007, Washington, DC: National Academies Press.

<sup>12</sup> Rachel Gittman et al., “Ecological Consequences of Shoreline Hardening: A Meta-Analysis,” *Journal of BioScience*, vol. 66, no. 9 (Sep. 1, 2016), pp. 763–773 (<https://academic.oup.com/bioscience/article/66/9/763/1753956>) (accessed Oct. 19, 2020); Gary Griggs, “The Impacts of Coastal Armoring,” *Journal of Shore and Beach*, vol. 73, no. 1 (Jan. 2005), pp. 13–22.

<sup>13</sup> National Oceanic and Atmospheric Administration (NOAA), *Guidance for Considering the Use of Living Shorelines*, 2015, pp. 4–9 ([https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines\\_2015.pdf](https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf)) (accessed Oct. 19, 2020).

<sup>14</sup> National Oceanic and Atmospheric Administration (NOAA), *Guidance for Considering the Use of Living Shorelines*, 2015, pp. 4–9 ([https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines\\_2015.pdf](https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf)) (accessed Oct. 19, 2020).

<sup>15</sup> Federal Emergency Management Agency, *Bioengineering Shoreline Stabilization*, Jul. 2018 (<https://www.fema.gov/media-library-data/1532021309766-274c41b3c5ed9c1e6e2150b16166e2c0/BioengineeredShorelineStabilizationJobAid.pdf>) (accessed Oct. 19, 2020).

<sup>16</sup> *Ibid.*

<sup>17</sup> *Ibid.*; M.S. Peterson et al., “Habitat Use by Early Life-History Stages of Fishes and Crustaceans Along a Changing Estuarine Landscape: Differences Between Natural and Altered Shoreline Sites,” *Journal of Wetlands Ecology and Management*, vol. 8, no. 2–3 (2000), pp. 209–219; Steven Scyphers et al., “Oyster Reefs as Natural Breakwaters Mitigate Shoreline Loss and Facilitate Fisheries,” *Journal of PLoS ONE*, vol. 6, no. 8 (Aug. 5, 2011) (<https://doi.org/10.1371/journal.pone.0022396>) (accessed Oct. 19, 2020).

<sup>18</sup> Katie Arkema et al., “Coastal Habitats Shield People and Property From Sea-Level Rise and Storms,” *Journal of Nature Climate Change*, vol. 3 (2013), pp. 913–918 (<https://www.nature.com/articles/nclimate1944>) (accessed Oct. 19, 2020); Rachel Gittman et al., “Marshes With and Without Sill Protect Estuarine Shorelines From Erosion Better Than Bulkheads During a Category 1 Hurricane,” *Journal of Ocean and Coastal Management*, vol. 102 (Dec. 2014), pp. 94–102 (<https://doi.org/10.1016/j.ocecoaman.2014.09.016>) (accessed Oct. 19, 2020).

residual risk.<sup>19</sup> The current permitting process is geared towards hardening techniques, which makes permitting lengthier and more challenging for nature-based techniques.<sup>20</sup> In some areas, these techniques may also not be suitable, such as in urban environments where there is not enough natural land to construct a living shoreline.<sup>21</sup> Additionally, there is a lack of public awareness of the added benefits and performance of living shorelines compared to traditional stabilization techniques.<sup>22</sup>

Maximizing coastal erosion reduction will not come from any one stabilization technique, but most likely a diverse portfolio of stabilization techniques.<sup>24</sup> As outlined by NOAA and the U.S. Army Corps of Engineers (USACE), stabilization measures used will depend on geophysical parameters, such as wave energy, overall objectives, cost reliability, and numerous other factors.<sup>25</sup> To promote an integrated approach, NOAA and USACE have developed a forum to engage partners and stakeholders in a Systems Approach to Geomorphic Engineering (SAGE). SAGE promotes a hybrid engineering approach, using both living and hardening shoreline stabilization techniques, to develop tailored solutions to coastal communities. For example, in areas with low to moderate wave energy the two agencies recommend vegetation with minimal hard infrastructure to minimize habitat impact and cost of installation while still preventing coastal erosion. Alternatively, in areas highly vulnerable to storm surge and wave forces, hardened structures, such as seawalls, might be necessary to prevent storm surge flooding and landward coastal erosion.<sup>26</sup>

#### LIVING SHORELINES WORK

Federal agencies, including NOAA, the Environmental Protection Agency, and USACE, have provided funding and design assistance for living shoreline installations. In addition, several States have enacted regulations to encourage installation of living shorelines over hardened shoreline structures.<sup>27</sup> NOAA is considered one of the leading agencies in living shorelines work, providing technical assistance, funding for pilot projects to develop shoreline stabilization techniques, and conducting biological research to evaluate the effectiveness of various living shoreline projects. For example, the NOAA Restoration Center has worked with partners on over 100

<sup>19</sup> Systems Approach to Geomorphic Engineering (SAGE), "Natural and Structural Measures for Shoreline Stabilization," Feb. 2015 (<https://coast.noaa.gov/data/digitalcoast/pdf/living-shoreline.pdf>) (accessed Oct. 19, 2020).

<sup>20</sup> National Wildlife Foundation, *Softening Our Shorelines: Policy and Practice for Living Shorelines Along the Gulf and Atlantic Coasts*, Washington, DC: Island Press, 2020 (<https://www.nwf.org/-/media/Documents/PDFs/NWF-Reports/2020/Softening-Our-Shorelines.ashx>) (accessed Oct. 19, 2020).

<sup>21</sup> Systems Approach to Geomorphic Engineering (SAGE), "Natural and Structural Measures for Shoreline Stabilization," Feb. 2015 (<https://coast.noaa.gov/data/digitalcoast/pdf/living-shoreline.pdf>) (accessed Oct. 19, 2020).

<sup>22</sup> National Wildlife Foundation, *Softening Our Shorelines: Policy and Practice for Living Shorelines Along the Gulf and Atlantic Coasts*, Washington, DC: Island Press, 2020 (<https://www.nwf.org/-/media/Documents/PDFs/NWF-Reports/2020/Softening-Our-Shorelines.ashx>) (accessed Oct. 19, 2020).

<sup>24</sup> U.S. Army Corps of Engineers, *Coastal Risk Reduction and Resilience: Using the Full Array of Measures*, Sep. 2013.

<sup>25</sup> Systems Approach to Geomorphic Engineering (SAGE), "Natural and Structural Measures for Shoreline Stabilization," Feb. 2015 (<https://coast.noaa.gov/data/digitalcoast/pdf/living-shoreline.pdf>) (accessed Oct. 19, 2020).

<sup>26</sup> *Ibid.*

<sup>27</sup> Donna Marie Bilkovic et al., "The Role of Living Shorelines as Estuarine Habitat Conservation Strategies," *Journal of Coastal Management*, vol. 44, no. 3 (2016), p. 161 (<https://doi.org/10.1080/08920753.2016.1160201>) (accessed Oct. 19, 2020).

living shoreline projects. NOAA has also worked with post-disaster communities in redevelopment planning, highlighting projects that withstood disaster impacts with the hope of incorporating lessons learned in future development. Given NOAA's other resource management responsibilities, the agency incorporates information in living shoreline project design and installation that will protect essential fish habitat and the habitat critical for threatened or endangered species, while protecting coastal communities.<sup>28</sup>

#### SUMMARY OF PROVISIONS

If enacted, S. 1730, the Living Shorelines Act of 2020, would do the following:

- Authorize appropriations of \$25 million for fiscal years 2021 to 2024 for natural and nature-based projects to increase the resilience of shorelines from both the National Sea Grant College Program and the Coastal Zone Management Act of 1972.
- Require the National Sea Grant Advisory Board to advise the Secretary of Commerce on strategies for using the National Sea Grant College Program to address the resilience of ocean, coastal, and Great Lakes resources.
- Provide the Secretary of Commerce the authority to waive coastal state grant-matching requirements based on coastal state justification.
- Require data to be collected and annual reports to be produced on performance of nature-based shoreline project grants by coastal states.
- Direct the Secretary of Commerce to take into account annual report performance measures when making grant eligibility determinations.

#### LEGISLATIVE HISTORY

S. 1730 was introduced on June 5, 2019, by Senator Harris (for herself and Senators Murphy, Blumenthal, Menendez, Wyden, Booker, Merkley, and Feinstein) and was referred to the Committee on Commerce, Science, and Transportation of the Senate. Senators Carper, Markey, and Baldwin were later added as cosponsors. On July 22, 2020, the Committee met in open Executive Session and, by voice vote, ordered S. 1730 reported favorably with an amendment (in the nature of a substitute with amendments). This includes a substitute amendment sponsored by Senator Blumenthal and one (modified) first degree amendment sponsored by Senator Rick Scott.

A related bill, H.R. 3115, the Living Shorelines Act of 2019, was introduced on June 5, 2019, by Representative Pallone (for himself and Representatives Coleman, Lowenthal, Bonamici, Cartwright, Wasserman Schultz, Soto, Demings, Khanna, Blunt Rochester, Lee [D-CA-13], and Davis [D-CA-53]) and was referred to the Committee on Natural Resources of the House of Representatives. There are 32 additional cosponsors. On November 26, 2019, the Committee on Natural Resources reported H.R. 3115 favorably

<sup>28</sup> National Oceanic and Atmospheric Administration, *Guidance for Considering the Use of Living Shorelines*, 2015, pp. 13–15 ([https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines\\_2015.pdf](https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf)) (accessed Oct. 19, 2020).

with amendments proposed by Representatives Cunningham and Graves.

#### ESTIMATED COSTS

In accordance with paragraph 11(a) of rule XXVI of the Standing Rules of the Senate and section 403 of the Congressional Budget Act of 1974, the Committee provides the following cost estimate, prepared by the Congressional Budget Office:

<b>At a Glance</b>			
<b>S. 3997, Safeguarding American Innovation Act</b>			
As ordered reported by the Senate Committee on Homeland Security and Governmental Affairs on July 22, 2020			
By Fiscal Year, Millions of Dollars	2021	2021-2025	2021-2030
Direct Spending (Outlays)	*	*	*
Revenues	*	*	*
Increase or Decrease (-) in the Deficit	*	*	*
Spending Subject to Appropriation (Outlays)	9	25	not estimated
Statutory pay-as-you-go procedures apply?	Yes	<b>Mandate Effects</b>	
Increases on-budget deficits in any of the four consecutive 10-year periods beginning in 2031?	No	Contains intergovernmental mandate?	No
		Contains private-sector mandate?	No
* = between -\$500,000 and \$500,000.			

S. 1730 would amend the National Sea Grant College Act and the Coastal Zone Management Act of 1972 to authorize the appropriation of \$50 million annually over the 2021–2024 period for the National Oceanic and Atmospheric Administration to provide grants to states and university partners to research, design, and implement projects that restore or stabilize shorelines using nature-based approaches.

Using historical spending patterns for similar grant programs, CBO estimates that implementing S. 1730 would cost \$174 million over the 2021–2025 period and \$26 million after 2025, assuming appropriation of the authorized amounts.

The costs of the legislation, detailed in Table 1, fall within budget function 300 (natural resources and environment).

TABLE 1.—ESTIMATED INCREASES IN SPENDING SUBJECT TO APPROPRIATION UNDER S. 1730

	By fiscal year, millions of dollars—					
	2021	2022	2023	2024	2025	2021–2025
Authorization .....	50	50	50	50	0	200
Estimated Outlays .....	10	33	43	48	40	174

On October 7, 2019, CBO transmitted a cost estimate for H.R. 3115, the Living Shorelines Act of 2019, as ordered reported by the House Committee on Natural Resources September 25, 2019. Portions of the two bills are similar and CBO's estimates of their budg-



etary effects differ because the two bills would authorize appropriations totaling different amounts over different time periods.

The CBO staff contact for this estimate is Robert Reese. The estimate was reviewed by H. Samuel Papenfuss, Deputy Director of Budget Analysis.

#### REGULATORY IMPACT STATEMENT

Because S. 1730 does not create any new programs, the legislation will have no additional regulatory impact, and will result in no additional reporting requirements. The legislation will have no further effect on the number or types of individuals and businesses regulated, the economic impact of such regulation, the personal privacy of affected individuals, or the paperwork required from such individuals and businesses.

#### CONGRESSIONALLY DIRECTED SPENDING

In compliance with paragraph 4(b) of rule XLIV of the Standing Rules of the Senate, the Committee provides that no provisions contained in the bill, as reported, meet the definition of congressionally directed spending items under the rule.

#### SECTION-BY-SECTION ANALYSIS

##### *Section. 1. Short title.*

This section would provide that the bill may be cited as the “Living Shorelines Act of 2020”.

##### *Section. 2. Modifications to National Sea Grant College Program.*

This section would amend the National Sea Grant College Program Act, to include the need to increase our understanding of the resilience of our Nation’s ocean, coastal and Great Lakes resources. This section would require the National Sea Grant Advisory Board to advise the Secretary of Commerce on strategies for using the National Sea Grant College Program to address the resilience of ocean, coastal, and Great Lakes resources. This section would add resilience to the list of qualifications for voting members of the Advisory Board. Additionally, this section would authorize additional appropriations of \$25 million for fiscal years 2021 to 2024 for competitive grants for cooperative research, implementation, and extension regarding natural, nature-based, and restoration approaches to increasing the resilience of shorelines. The Committee believes that using existing, successful programs, such as the National Sea Grant College Program, to promote living shorelines will lead to the most effective outcome.

##### *Section 3. Modifications to resource management improvement grants to coastal states.*

This section would amend the Coastal Zone Management Act of 1972, expanding projects eligible for State resource management improvement grants, to include the design and implementation of climate-resilient living shoreline projects and materials, and systems that protect coastal communities, habitats, and natural system functions. This section would also allow the Secretary of Commerce to reduce or waive the State grant-matching requirement if

the eligible coastal state makes a justification for why it cannot meet the matching requirement. This section would require each eligible coastal state (or representative of the State) receiving a grant to monitor and collect data on the benefits of the project to the coastal community and the performance of the project in providing those benefits. NOAA would make this data available on a publicly accessible website. Within 1 year of receiving the grant, and annually thereafter until completion of the project, the State would be required to submit a report to the Secretary with the data collected and an assessment of the ultimate effectiveness of the project in increasing coastal protection in the coastal community. The Secretary would be directed to take into account the successes or failures of each grantee based on these data and reports in making eligibility determinations for grants under this section. Additionally, this section would authorize appropriations of \$25 million for fiscal years 2021 to 2024 to be used toward living shoreline projects grants authorized in this section.

#### CHANGES IN EXISTING LAW

In compliance with paragraph 12 of rule XXVI of the Standing Rules of the Senate, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new material is printed in italic, existing law in which no change is proposed is shown in roman):

## NATIONAL SEA GRANT COLLEGE PROGRAM ACT

\* \* \* \* \*

[33 U.S.C. 1121 et seq.]

#### SEC. 202. CONGRESSIONAL DECLARATION OF POLICY.

(a) FINDINGS.—The Congress finds and declares the following:

(1) \* \* \*

(2) \* \* \*

(3) \* \* \*

(4) The vitality of the Nation and the quality of life of its citizens depend increasingly on the understanding, assessment, development, management, utilization, *resilience*, and conservation of ocean, coastal, and Great Lakes resources. These resources supply food, energy, and minerals and contribute to human health, the quality of the environment, national security, and the enhancement of commerce.

(5) The understanding, assessment, development, management, utilization, *resilience*, and conservation of such resources require a broad commitment and an intense involvement on the part of the Federal Government in continuing partnership with State and local governments, private industry, universities, organizations, and individuals concerned with or affected by ocean, coastal, and Great Lakes resources.

(6) The National Oceanic and Atmospheric Administration, through the national sea grant college program, offers the most suitable locus and means for such commitment and engagement through the promotion of activities that will result in

greater such understanding, assessment, development, management, utilization, *resilience*, and conservation of ocean, coastal, and Great Lakes resources. The most cost-effective way to promote such activities is through continued and increased Federal support of the establishment, development, management, and operation of programs and projects by sea grant colleges, sea grant institutes, and other institutions, including strong collaborations between Administration scientists and research and outreach personnel at academic institutions.

(b) OBJECTIVE.—The objective of this title is to increase the understanding, assessment, development, management, utilization, *resilience*, and conservation of the Nation’s ocean, coastal, and Great Lakes resources by providing assistance to promote a strong educational base, responsive research and training activities, broad and prompt dissemination of knowledge and techniques, and multidisciplinary approaches to environmental problems.

(c) \* \* \*

**SEC. 203. DEFINITIONS.**

As used in this subchapter—

(1) \* \* \*

(2) \* \* \*

(3) \* \* \*

(4) The term “field related to ocean, coastal, and Great Lakes resources” means any discipline or field, including marine affairs, resource management, technology, education, or science, which is concerned with or likely to improve the understanding, assessment, development, management, utilization, *resilience*, or conservation of ocean, coastal, or Great Lakes resources.

(5) \* \* \*

\* \* \* \* \*

(16) \* \* \*

**SEC. 204. NATIONAL SEA GRANT COLLEGE PROGRAM.**

\* \* \* \* \*

**SEC. 209. NATIONAL SEA GRANT ADVISORY BOARD.**

(a) \* \* \*

(b) DUTIES.

(1) IN GENERAL.—The Board shall advise the Secretary and the Director concerning—

(A) strategies for utilizing the sea grant college program to address the Nation’s highest priorities regarding the understanding, assessment, development, management, utilization, *resilience*, and conservation of ocean, coastal, and Great Lakes resources;

(B) \* \* \*

(C) \* \* \*

(c) MEMBERSHIP, TERMS, AND POWERS.—(1) The Board shall consist of 15 voting members who shall be appointed by the Secretary. The Director and a director of a sea grant program who is elected by the various directors of sea grant programs shall serve as nonvoting members of the Board. Not less than 8 of the voting members of the Board shall be individuals who, by reason of knowledge, experience, or training, are especially qualified in one or more

of the disciplines and fields included in marine science. The other voting members shall be individuals who, by reason of knowledge, experience, or training, are especially qualified in, or representative of, education, marine affairs and resource management, coastal management, extension services, State government, industry, economics, planning, or any other activity which is appropriate to, and important for, any effort to enhance the understanding, assessment, development, management, utilization, *resilience*, or conservation of ocean, coastal, and Great Lakes resources. No individual is eligible to be a voting member of the Board if the individual is (A) the director of a sea grant college or sea grant institute; (B) an applicant for, or beneficiary (as determined by the Secretary) of, any grant or contract under section 205; or (C) a full-time officer or employee of the United States.

(2) \* \* \*

\* \* \* \* \*

(8) \* \* \*

\* \* \* \* \*

**SEC. 212. AUTHORIZATION OF APPROPRIATIONS.**

(a) AUTHORIZATION.—

(1) \* \* \*

(2) \* \* \*

(3) *COASTAL HAZARD REDUCTION ACTIVITIES FOR FISCAL YEARS 2021 THROUGH 2024.—In addition to other amounts authorized to be appropriated to carry out this title, there are authorized to be appropriated \$25,000,000 for each of fiscal years 2021 through 2024 for competitive grants for cooperative research, implementation, and extension regarding natural, nature-based, and restoration approaches to increasing the resilience of shorelines.*

(b) \* \* \*

\* \* \* \* \*

**COASTAL ZONE MANAGEMENT ACT OF 1972**

\* \* \* \* \*

[16 U.S.C. 1455a]

\* \* \* \* \*

**SEC. 306A. COASTAL RESOURCE IMPROVEMENT PROGRAM.**

(a) \* \* \*

(b) The Secretary may make grants to any eligible coastal state to assist that state in meeting one or more of the following objectives:

(1) \* \* \*

\* \* \* \* \*

(4) \* \* \*

(5) *The design and implementation of climate-resilient living shoreline projects and the application of innovative uses of*

*natural materials and systems to protect coastal communities, habitats, and natural system functions.*

(c)(1) \* \* \*

(d)(1) \* \* \*

(2) \* \* \*

(3) \* \* \*

(4) *The Secretary may reduce or waive the matching requirement under paragraph (1) for an eligible coastal state if—*

(A) *the eligible coastal state submits to the Secretary in writing—*

(i) *a request for such a reduction or waiver and, in the case of a request for a reduction, the amount of the reduction; and*

(ii) *a justification for why the state cannot meet the matching requirement; and*

(B) *the Secretary agrees with the justification.*

(e) \* \* \*

(f) \* \* \*

(g) *The Secretary shall require each eligible coastal state (or a representative of the state) receiving a grant under subsection (b)(5) to carry out a living shoreline project—*

(1) *to monitor and collect data on—*

(A) *the benefits of the project to the coastal community in which the project is carried out, including—*

(i) *mitigating the effects of erosion;*

(ii) *attenuating the impact of coastal storms and storm surge;*

(iii) *mitigating shoreline flooding;*

(iv) *mitigating the effects of sea level rise and extreme tides;*

(v) *sustaining, protecting, or restoring the functions and habitats of coastal ecosystems; or*

(vi) *such other forms of coastal protection as the Secretary considers appropriate; and*

(B) *the performance of the project in providing such benefits;*

(2) *to make data collected under the project available on a publicly accessible internet website of the National Oceanic and Atmospheric Administration; and*

(3) *not later than one year after the eligible coastal state receives the grant, and annually thereafter until completion of the project, to submit to the Secretary a report including—*

(A) *the data described in paragraph (1);*

(B) *an assessment of the ultimate effectiveness of the project in increasing coastal protection in the coastal community in which the project is carried out, including a description of—*

(i) *the project;*

(ii) *the activities carried out under the project; and*

(iii) *the techniques and materials used in carrying out the project; and*

(C) *a detailed description of any deficiencies or failures of the project to perform as originally intended.*

(h) *In making eligibility determinations for grants under subsection (b)(5), the Secretary shall take into account the successes or*

*failures of each grantee demonstrated by the compliance of the grantee with the requirements under subsection (g).*

\* \* \* \* \*

[16 U.S.C. 1464(a)]

**SEC. 318. AUTHORIZATION OF APPROPRIATIONS.**

(a) There are authorized to be appropriated to the Secretary, to remain available until expended—

(1) for grants under sections 306, 306A, and 309—

(A) \$47,600,000 for fiscal year 1997;

(B) \$49,000,000 for fiscal year 1998; and

(C) \$50,500,000 for fiscal year 1999; **[and]**

(2) for grants under section 315—

(A) \$4,400,000 for fiscal year 1997;

(B) \$4,500,000 for fiscal year 1998; and

(C) \$4,600,000 for fiscal year 1999**[.]**; and

(3) for grants under section 306A(b)(5), \$25,000,000 for each of fiscal years 2021 through 2024.

(b) \* \* \*

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