

118TH CONGRESS
2D SESSION

S. 5629

To support marine carbon dioxide removal activities, and for other purposes.

IN THE SENATE OF THE UNITED STATES

DECEMBER 19 (legislative day, DECEMBER 16), 2024

Mr. SCHATZ introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To support marine carbon dioxide removal activities, and
for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

4 (a) SHORT TITLE.—This Act may be cited as the
5 “Removing and Sequestering Carbon Unleashed in the
6 Environment and Oceans Act” or the “ReSCUE Oceans
7 Act”.

8 (b) TABLE OF CONTENTS.—The table of contents for
9 this Act is as follows:

- Sec. 1. Short title; table of contents.
- Sec. 2. Definitions.
- Sec. 3. Purposes.
- Sec. 4. Rule of construction.

Sec. 5. Research security.

TITLE I—MATTERS RELATING TO THE NATIONAL OCEANIC AND
ATMOSPHERIC ADMINISTRATION

Sec. 101. Establishment of program for advancing marine carbon dioxide removal.

Sec. 102. Monitoring of marine carbon dioxide removal.

Sec. 103. Research areas for marine carbon dioxide removal.

Sec. 104. Interagency working group for marine carbon dioxide removal.

Sec. 105. Biennial report on marine carbon dioxide removal.

Sec. 106. Authorization of appropriations.

TITLE II—MATTERS RELATING TO THE NATIONAL SCIENCE
FOUNDATION

Sec. 201. Researching marine carbon dioxide removal.

TITLE III—MATTERS RELATING TO THE NATIONAL
AERONAUTICS AND SPACE ADMINISTRATION

Sec. 301. Measuring marine carbon dioxide removal from space.

Sec. 302. Authorization of appropriations.

TITLE IV—MATTERS RELATING TO THE NATIONAL INSTITUTE
OF STANDARDS AND TECHNOLOGY

Sec. 401. Validating marine carbon dioxide removal.

Sec. 402. Authorization of appropriations.

1 SEC. 2. DEFINITIONS.

2 In this Act:

3 (1) CARBON REMOVAL CREDIT.—The term
4 “carbon removal credit” means 1 metric tonne of
5 carbon dioxide or equivalent (tCO₂e) that—

6 (A) is removed through marine carbon di-
7 oxide removal and durably stored;

8 (B) is unique, registered, and validated;
9 and

10 (C) may be traded on a voluntary carbon
11 market and retired after purchase.

12 (2) COASTAL WATERS.—The term “coastal
13 waters” has the meaning given that term in section

1 304 of the Coastal Zone Management Act of 1972
2 (16 U.S.C. 1453).

3 (3) CONTIGUOUS ZONE.—The term “contiguous
4 zone” has the meaning given that term in section
5 502 of the Federal Water Pollution Control Act (33
6 U.S.C. 1362).

7 (4) EXCLUSIVE ECONOMIC ZONE.—The term
8 “exclusive economic zone” has the meaning given
9 that term in section 3532 of the Maritime Security
10 and Fisheries Enforcement Act (16 U.S.C. 8001).

11 (5) INDIAN.—The term “Indian” has the mean-
12 ing given that term in section 6151 of the Elemen-
13 tary and Secondary Education Act of 1965 (20
14 U.S.C. 7491).

15 (6) INDIAN TRIBAL GOVERNMENT.—The term
16 “Indian tribal government” means the recognized
17 governing body of any Indian or Alaska Native tribe,
18 band, nation, pueblo, village, community, component
19 band, or component reservation, individually identi-
20 fied (including parenthetically) in the list published
21 most recently as of the date of the enactment of this
22 Act pursuant to section 104 of the Federally Recog-
23 nized Indian Tribe List Act of 1994 (25 U.S.C.
24 5131).

1 (7) INTERAGENCY WORKING GROUP.—The term
2 “interagency working group” means the interagency
3 working group established under section 104.

4 (8) INTERNAL WATERS.—The term “internal
5 waters” means the waters shoreward of the baseline
6 of the territorial seas, which is normally the mean
7 low water line along the coast of the United States.

8 (9) MARINE CARBON DIOXIDE REMOVAL.—The
9 term “marine carbon dioxide removal” means an in-
10 tentional intervention in the marine environment
11 that results in the net removal of carbon dioxide
12 from the atmosphere as measured on a life-cycle
13 basis, taking into account all greenhouse gasses
14 measured in carbon dioxide equivalents.

15 (10) NATIONAL SEA GRANT COLLEGE PRO-
16 GRAM.—The term “national sea grant college pro-
17 gram” means the program maintained under section
18 204(a) of the National Sea Grant College Program
19 Act (33 U.S.C. 1123(a)).

20 (11) NATIVE AMERICAN INDIVIDUAL OR ENTI-
21 TY.—The term “Native American individual or enti-
22 ty” means—

- 23 (A) an Indian;
- 24 (B) a Native Hawaiian;
- 25 (C) a Tribal organization;

1 (D) the Office of Hawaiian Affairs; or

2 (E) a Native Hawaiian organization.

3 (12) NATIVE HAWAIIAN.—The term “Native
4 Hawaiian” has the meaning given that term in sec-
5 tion 6207 of the Elementary and Secondary Edu-
6 cation Act of 1965 (20 U.S.C. 7517).

7 (13) NATIVE HAWAIIAN ORGANIZATION.—The
8 term “Native Hawaiian organization” means a pri-
9 vate nonprofit organization that—

10 (A) serves and represents the interests of
11 Native Hawaiians;

12 (B) has as its primary and stated purpose
13 the provision of services to Native Hawaiians;

14 (C) has Native Hawaiians serving in sub-
15 stantive policymaking positions; and

16 (D) is recognized for having expertise in
17 Native Hawaiian affairs.

18 (14) OFFICE OF HAWAIIAN AFFAIRS.—The
19 term “Office of Hawaiian Affairs” has the meaning
20 given that term in section 6207 of the Elementary
21 and Secondary Education Act of 1965 (20 U.S.C.
22 7517).

23 (15) PROGRAM.—The term “Program” means
24 the program established and maintained under sec-
25 tion 101.

(16) PROTOCOL.—The term “protocol” means a systematic approach for generating a carbon removal credit that follows a transparent and thorough science-based methodology—

(A) for the development of projects to remove greenhouse gas emissions or sequester carbon; and

(B) for demonstrating how to measure, monitor, report, and verify the removal of greenhouse gas emissions or carbon sequestration by projects described in subparagraph (A).

(17) RELEVANT CONGRESSIONAL COMMITTEES.—The term “relevant congressional committees” means—

(A) the Committee on Commerce, Science, and Transportation of the Senate;

(B) the Committee on Natural Resources of the House of Representatives; and

(C) the Committee on Science, Space, and Technology of the House of Representatives.

(18) SECRETARY.—The term “Secretary” means the Secretary of Commerce.

(19) STANDARD.—The term “standard” means a broad principle or set of criteria established to ensure the credibility and integrity of a carbon removal

1 credit or marine carbon dioxide removal by providing
 2 guidance on measurement, monitoring, reporting,
 3 and verification of greenhouse gas removals.

4 (20) STATE.—The term “State” means any of
 5 the several States of the United States, the District
 6 of Columbia, the Commonwealth of Puerto Rico, the
 7 United States Virgin Islands, American Samoa,
 8 Guam, and the Commonwealth of the Northern Mar-
 9 iana Islands.

10 (21) TERRITORIAL SEAS.—The term “terri-
 11 torial seas” has the meaning given that term in sec-
 12 tion 502 of the Federal Water Pollution Control Act
 13 (33 U.S.C. 1362).

14 (22) TRIBAL ORGANIZATION.—The term “Trib-
 15 al organization” has the meaning given that term in
 16 section 4 of the Indian Self-Determination and Edu-
 17 cation Assistance Act (25 U.S.C. 5304).

18 (23) VOLUNTARY CARBON MARKET .—The term
 19 “voluntary carbon market” means a voluntary mar-
 20 ket through which carbon removal credits may be
 21 bought or sold.

22 **SEC. 3. PURPOSES.**

23 The purposes of this Act are—

1 (1) to support research, development, and field
2 trials of safe and responsible marine carbon dioxide
3 removal;

4 (2) to ensure robust monitoring and protection
5 of coastal and marine ecosystems; and

6 (3) to coordinate Federal actions on marine
7 carbon dioxide removal.

8 **SEC. 4. RULE OF CONSTRUCTION.**

9 Nothing in this Act shall be construed in derogation
10 of applicable law regulating or restricting the use of the
11 contiguous zone, the territorial seas, the exclusive eco-
12 nomic zone of the United States, or coastal waters other
13 than internal waters.

14 **SEC. 5. RESEARCH SECURITY.**

15 The activities authorized under this Act shall be car-
16 ried out in a manner consistent with subtitle D of title
17 VI of the Research and Development, Competition, and
18 Innovation Act (42 U.S.C. 19231 et seq.).

1 **TITLE I—MATTERS RELATING**
2 **TO THE NATIONAL OCEANIC**
3 **AND ATMOSPHERIC ADMINIS-**
4 **TRATION**

5 **SEC. 101. ESTABLISHMENT OF PROGRAM FOR ADVANCING**
6 **MARINE CARBON DIOXIDE REMOVAL.**

7 (a) IN GENERAL.—The Secretary, through the Na-
8 tional Oceanic and Atmospheric Administration and in
9 consultation with the interagency working group, shall es-
10 tablish, not later than 90 days after the date of the enact-
11 ment of this Act, and maintain a program to support and
12 conduct activities to advance the science and under-
13 standing of marine carbon dioxide removal consistent with
14 the objectives and focal areas described in subsection (b).

15 (b) OBJECTIVES AND FOCAL AREAS.—

16 (1) OBJECTIVES.—In carrying out the Pro-
17 gram, the Secretary shall seek to—

18 (A) generate, through research, develop-
19 ment, and field trials, the necessary knowledge,
20 theoretical basis, and empirical evidence to
21 evaluate—

22 (i) the efficacy of marine carbon diox-
23 ide removal, including measurability, dura-
24 bility, magnitude, and additionality;

(ii) environmental and ecosystem responses to marine carbon dioxide removal; and

(iii) the social and economic impacts, including on public health and safety, of marine carbon dioxide removal to adjacent and associated coastal communities; and

(B) apply the knowledge described in subparagraph (A) to—

(i) develop best practices for how marine carbon dioxide removal efficacy is measured, monitored, reported, and verified;

(ii) establish a methodology for defining actionable thresholds of environmental and ecosystem impacts for the deployment of marine carbon dioxide removal;

(iii) evaluate and recommend marine carbon dioxide removal approaches that could be safe and effective for larger-scale deployment for climate mitigation, considering potential positive and negative climate, environmental, and social outcomes;

(iv) evaluate the sustainability of marine carbon dioxide removal approaches, in-

cluding resource requirements, life-cycle efficiency of net carbon removal on a carbon dioxide equivalent basis, scalability, and potential for cost reductions;

(v) analyze viable commercialization pathways and requisite enabling conditions for safe and effective marine carbon dioxide removal; and

(vi) as necessary or appropriate, support the implementation of this Act.

(2) FOCAL AREAS.—In carrying out the Program, the Secretary shall support and conduct activities to advance the science and understanding of—

(A) ocean alkalinity enhancement;

(B) electrochemical engineering approaches;

(C) macroalgae cultivation;

(D) nutrient fertilization;

(E) artificial upwelling and downwelling;

(F) coastal marine ecosystems as a natural climate solution; and

(G) other marine carbon dioxide removal approaches as the Secretary considers appropriate.

1 (c) GRANTS.—

2 (1) IN GENERAL.—In carrying out the Pro-
3 gram, the Secretary shall award grants, on a com-
4 petitive basis, to fund research in accordance with
5 the objectives described in subsection (b)(1) and the
6 Federal research plan described in section 104.

7 (2) CODE OF CONDUCT.—The Secretary shall
8 require grantees under this subsection conducting
9 activities in the field to abide by the code of conduct
10 established under section 104.

11 (3) FUNDING FOR ENGAGEMENT AND CON-
12 SULTATION.—

13 (A) IN GENERAL.—Except as provided in
14 subparagraph (B), not more than 15 percent of
15 the value of any grant awarded under this sub-
16 section may be expended in support of engage-
17 ment and consultation activities.

18 (B) EXCEPTION.—The limitation described
19 in subparagraph (A) shall not apply to any
20 grant awarded for a proposal the primary focus
21 of which is the study of outreach, engagement,
22 or social science.

23 (d) ADDITIONAL AUTHORITY.—The Secretary may
24 enter into contracts, public-private partnerships, coopera-

1 tive agreements, or other financial agreements in further-
2 ance of this Act.

3 (e) DATA MANAGEMENT.—

4 (1) STRATEGIES.—The Secretary, in coopera-
5 tion with such partners as the Secretary considers
6 relevant, shall develop and implement data manage-
7 ment strategies to ensure all non-proprietary data
8 collected pursuant to this Act are—

9 (A) properly stewarded for the long-term;

10 and

11 (B) findable, accessible, interoperable, and
12 reusable.

13 (2) IMPLEMENTATION; PRESERVATION AND
14 CURATION.—The Secretary shall—

15 (A) ensure management of data collected
16 under this Act is implemented in accordance
17 with—

18 (i) chapter 35 of title 44, United
19 States Code; and

20 (ii) the Foundations for Evidence-
21 Based Policymaking Act of 2018 (Public
22 Law 115–435; 132 Stat. 5529) and the
23 amendments made by that Act; and

24 (B) preserve and curate such data in ac-
25 cordance with chapter 31 of title 44, United

1 States Code (commonly known as the “Federal
 2 Records Act of 1950”), in order to maximize
 3 use of such data.

4 (f) INTERNATIONAL COORDINATION.—In carrying
 5 out this section, the Secretary shall coordinate with the
 6 Secretary of State and appropriate international entities.

7 **SEC. 102. MONITORING OF MARINE CARBON DIOXIDE RE-**
 8 **MOVAL.**

9 (a) IN GENERAL.—For field activities conducted as
 10 part of the Program, the Secretary shall, as practicable,
 11 provide or otherwise develop the instrumentation, infra-
 12 structure, and personnel for efficient and rigorous moni-
 13 toring to—

14 (1) understand and minimize negative eco-
 15 system, community, and economic impacts related to
 16 marine carbon dioxide removal; and

17 (2) maximize co-benefits of marine carbon diox-
 18 ide removal for communities and ecosystems.

19 (b) MONITORING GOALS.—In carrying out subsection
 20 (a), the Secretary shall—

21 (1) use monitoring assets to achieve the objec-
 22 tives described in section 101(b)(1);

23 (2) support compliance with applicable environ-
 24 mental law;

1 (3) support rigorous, science-based approaches
2 for the research, development, and trialing of tech-
3 nologies for marine carbon dioxide removal;

4 (4) develop and improve technologies for moni-
5 toring, modeling, analyzing, remediating, or miti-
6 gating impacts from marine carbon dioxide removal;

7 (5) study ecosystem responses to marine carbon
8 dioxide removal technology; and

9 (6) collect data to inform the development of
10 uniform standards and protocols for marine carbon
11 dioxide removal, including—

12 (A) the amount of carbon dioxide removed
13 from the ocean and the atmosphere attributable
14 to marine carbon dioxide removal;

15 (B) the duration of carbon sequestration
16 and risk of reversal of sequestration, as applica-
17 ble;

18 (C) for marine carbon dioxide removal
19 technologies that rely on an energy source, the
20 amount of energy consumed by the technology;
21 and

22 (D) other metrics the Secretary considers
23 necessary or advisable.

24 (c) TECHNICAL ASSISTANCE.—To support the devel-
25 opment of reliable, fair, and efficient voluntary carbon

1 markets and best practices, the Secretary, in consultation
 2 with the Secretary of the Treasury and the Secretary of
 3 Energy, may provide technical assistance to promote con-
 4 sistency, reliability, effectiveness, efficiency, and trans-
 5 parency, including through protocol documents and details
 6 relating to—

- 7 (1) calculations;
- 8 (2) sampling methodologies;
- 9 (3) accounting principles;
- 10 (4) systems for measurement, monitoring, re-
 11 porting, and verification; and
- 12 (5) methods to account for additionality, dura-
 13 bility and duration of carbon storage, leakage, and,
 14 as appropriate, avoidance of double counting.

15 (d) PUBLIC-PRIVATE-ACADEMIC PARTNERSHIPS.—

16 The Secretary may examine and develop models for public-
 17 private-academic partnerships to efficiently monitor ma-
 18 rine carbon dioxide removal, including with respect to—

- 19 (1) data sharing and standardization;
- 20 (2) cost sharing;
- 21 (3) in-kind contributions; and
- 22 (4) contracts and grants for third-party moni-
 23 toring activities.

1 (e) CONTRACTS.—In carrying out this section, the
 2 Secretary may enter into contracts the Secretary considers
 3 necessary or advisable.

4 (f) UNLIMITED RIGHT DATA.—

5 (1) IN GENERAL.—Subject to contracts pro-
 6 tecting confidential proprietary data, the Secretary
 7 shall make monitoring data collected, and protocols
 8 created, under this section available to the public at
 9 no cost and with no restrictions on copying, pub-
 10 lishing, distributing, citing, adapting, or otherwise
 11 using such data or protocols.

12 (2) LIMITATION.—The Secretary may enter
 13 into cooperative research and development agree-
 14 ments that restrict data sharing and ensure protec-
 15 tion of intellectual property for such users of re-
 16 search areas designated or established under section
 17 103 as the Secretary considers appropriate.

18 **SEC. 103. RESEARCH AREAS FOR MARINE CARBON DIOXIDE**

19 **REMOVAL.**

20 (a) IN GENERAL.—In carrying out the Program, the
 21 Secretary may—

22 (1) designate federally administered oceanic,
 23 coastal, estuarine, riverine, or terrestrial areas for
 24 research related to one or more marine carbon diox-
 25 ide removal approaches; or

1 (2) award grants to eligible entities to establish
2 such areas for such research.

3 (b) PURPOSE.—The purpose of the research areas
4 designated or established under this section shall be to en-
5 able—

6 (1) the basic and applied science needed to
7 achieve the objectives described in section 101(b)(1),
8 including through—

9 (A) bench-scale, mesocosm, and wet lab ex-
10 periments; and

11 (B) field trials, other field research, and
12 demonstration projects;

13 (2) coordinated permitting and compliance with
14 applicable environmental law, engagement and con-
15 sultation with relevant stakeholders, and risk mitiga-
16 tion;

17 (3) sensing networks that can reliably return
18 accurate observations across a wide field of variables
19 in support of the monitoring goals set forth in sec-
20 tion 102(b);

21 (4) a community of practice among Federal and
22 non-Federal researchers, entrepreneurs, and other
23 stakeholders;

24 (5) the incubation or acceleration of businesses
25 that can safely deploy—

1 (A) marine carbon dioxide removal; or

2 (B) technologies to measure, monitor, re-
3 port, or verify approaches; and

4 (6) long-term community engagement and par-
5 ticipation in marine carbon dioxide removal activi-
6 ties.

7 (c) INVENTORY.—Not later than 180 days after the
8 date of the enactment of this Act, the Secretary shall—

9 (1) conduct an inventory of existing Federal fa-
10 cilities and oceanic, coastal, estuarine, riverine, or
11 terrestrial areas that may be suitable for designation
12 as federally administered research areas under this
13 section;

14 (2) submit the inventory to the interagency
15 working group for review;

16 (3) following submittal of the inventory under
17 paragraph (2), publish the inventory to the Federal
18 Register for public comment; and

19 (4) use such public comments to inform the se-
20 lection of research areas.

21 (d) GRANTS.—

22 (1) ELIGIBLE ENTITIES.—For purposes of
23 grants under this section, an eligible entity is any of
24 the following:

1 (A) A National Laboratory (as defined in
2 section 2 of the Energy Policy Act of 2005 (42
3 U.S.C. 15801)).

4 (B) An institution of higher education (as
5 defined in section 101 of the Higher Education
6 Act of 1965 (20 U.S.C. 1001)).

7 (C) A State, local, or Indian tribal govern-
8 ment.

9 (D) Any other private or public entity.

10 (E) A consortium of entities described in
11 any of subparagraphs (A) through (D).

12 (2) APPLICATIONS.—An eligible entity seeking
13 a grant under this section shall submit to the Sec-
14 retary an application at such time, in such manner,
15 and containing such information as the Secretary
16 may require.

17 (3) PRIVATE SECTOR INVESTMENT.—In award-
18 ing grants under this section, the Secretary shall
19 seek to leverage private sector investment, to the ex-
20 tent possible.

21 (e) SUITABILITY ASSESSMENT.—

22 (1) IN GENERAL.—The Secretary shall assess
23 the suitability of each research area under consider-
24 ation for designation or establishment under this
25 section.

1 (2) DATA; TOOLS; CONSIDERATIONS.—In car-
2 rying out paragraph (1), the Secretary—

3 (A) shall use relevant scientific, social, and
4 economic data, including baseline environmental
5 data and any assessments of baseline environ-
6 mental data; and

7 (B) may—

8 (i) develop and employ marine spatial
9 planning tools; and

10 (ii) consider non-contiguous areas that
11 are proximate to one another and con-
12 nected by ecological or oceanographic fac-
13 tors.

14 (3) FACTORS.—In carrying out paragraph (1),
15 the Secretary may assess the following:

16 (A) Matters relating to oceanographic and
17 ecological characteristics, including—

18 (i) proximity and access to geologic
19 storage formations;

20 (ii) impacts to coastal and marine eco-
21 systems, biodiversity, protected species,
22 and the habitat of such species;

23 (iii) proximity and impacts to existing
24 protected areas, such as marine monu-
25 ments and sanctuaries; and

1 (iv) bathymetry, ocean circulation,
2 and carbon chemistry baselines.

3 (B) Matters relating to human uses and
4 communities, including—

5 (i) current and possible future human
6 uses of the research area and the areas in
7 reasonable proximity to the research area;

8 (ii) availability of existing sensor net-
9 works, technology, infrastructure, and
10 land-based facilities;

11 (iii) where appropriate, potential co-
12 location with existing infrastructure such
13 as desalination plants, ships, moorings,
14 and renewable energy; and

15 (iv) potential socioeconomic or
16 sociocultural impacts on adjacent coastal
17 communities, including Native American
18 individuals or entities.

19 (C) Potential downstream impacts beyond
20 the research area.

21 (D) Such other factors as the Secretary
22 considers appropriate, in consultation with—

23 (i) States or Indian tribal govern-
24 ments that are in reasonable proximity to
25 the research area; or

1 (ii) the interagency working group.

2 (f) TERMS AND CONDITIONS.—

3 (1) IN GENERAL.—For each research area des-
4 ignated or established under this section, and sub-
5 ject to subsection (i), the Secretary shall develop
6 terms and conditions by which all users of the re-
7 search area shall abide.

8 (2) ELEMENTS.—At a minimum, the terms and
9 conditions developed under this subsection shall in-
10 clude—

11 (A) a requirement for any user of the re-
12 search area to abide by the code of conduct es-
13 tablished under section 104;

14 (B) stewardship, management, and con-
15 servation measures that incorporate local and
16 traditional knowledge, to the greatest extent
17 practicable;

18 (C) a requirement for the user to develop
19 and follow a plan to—

20 (i) mitigate risks and conflicts regard-
21 ing local ecological conditions, biological
22 sensitivities, protected resources, and com-
23 mercial and human uses;

1 (ii) monitor ecosystem responses with-
2 in, and in reasonable proximity to, the re-
3 search area;

4 (iii) address potential environmental
5 degradation resulting from activities at the
6 research area; and

7 (iv) following the expiration of a re-
8 search area, remove—

9 (I) the user's fixtures, fur-
10 nishings, equipment; and

11 (II) any improvements made to
12 the research area;

13 (D) clear, objective thresholds of environ-
14 mental harm that require the immediate ces-
15 sation of a user's activities at the research area;

16 (E) the user's consent for—

17 (i) remote monitoring of the user's ac-
18 tivities and the impacts of those activities
19 on the environment; and

20 (ii) regular and unannounced inspec-
21 tions of the user's activities by the advisory
22 board for the research area appointed
23 under subsection (j);

24 (F) a requirement that the user will com-
25 ply with all applicable law and policies; and

1 (G) additional terms and conditions as the
2 Secretary considers necessary or appropriate in
3 furtherance of this Act.

4 (g) DURATION.—

5 (1) IN GENERAL.—The duration of research
6 areas designated or established under this section
7 shall be determined as provided in this subsection.

8 (2) RESEARCH AREAS ADMINISTERED BY A
9 FEDERAL AGENCY.—

10 (A) REASSESSMENT.—Not less frequently
11 than once every 5 years, the Secretary shall re-
12 assess each research area administered by a
13 Federal agency to ensure that the research area
14 advances the purpose set forth in subsection
15 (b), the research area is suitable under sub-
16 section (e), and users of the research area are
17 in compliance with applicable terms and condi-
18 tions developed under subsection (f).

19 (B) TERMINATION OF ACTIVITIES.—If,
20 pursuant to a reassessment carried out with re-
21 spect to a research area under subparagraph
22 (A), the Secretary finds that the research area
23 does not advance the purpose set forth in sub-
24 section (b), the research area is not suitable
25 under subsection (e), or users of the research

1 area are noncompliant with applicable terms
 2 and conditions developed under subsection (f),
 3 the Federal agency administering the research
 4 area shall—

5 (i) terminate activities at the research
 6 area; and

7 (ii)(I) close down operations at the re-
 8 search area pursuant to applicable terms
 9 and conditions; or

10 (II) remediate the research area to
 11 comport with subsections (b), (e), and (f).

12 (3) RESEARCH AREAS ADMINISTERED BY AN
 13 ELIGIBLE ENTITY.—

14 (A) INITIAL PERIOD.—An eligible entity
 15 administering a research area under this Act
 16 may carry out activities at the research area for
 17 an initial period of 5 years.

18 (B) REASSESSMENT.—Before the conclu-
 19 sion of an initial period for a research area de-
 20 scribed in subparagraph (A), the Secretary shall
 21 reassess the research area to ensure that the re-
 22 search area advances the purpose set forth in
 23 subsection (b), the research area is suitable
 24 under subsection (e), and users of the research

1 are in compliance with applicable terms and
2 conditions developed under subsection (f).

3 (C) ADDITIONAL PERIOD.—If, pursuant to
4 a reassessment carried out with respect to a re-
5 search area under subparagraph (B), the Sec-
6 retary finds that the research area advances the
7 purpose set forth in subsection (b), the research
8 area is suitable under subsection (e), and users
9 of the research area are in compliance with ap-
10 plicable terms and conditions developed under
11 subsection (f), the Secretary may authorize the
12 eligible entity administering the research area
13 to carry out activities at the research area for
14 a single, additional period of 5 years.

15 (D) TERMINATION OF ACTIVITIES.—If,
16 pursuant to a reassessment carried out with re-
17 spect to a research area under subparagraph
18 (B), the Secretary finds that the research area
19 does not advance the purpose set forth in sub-
20 section (b), the research area is not suitable
21 under subsection (e), or users of the research
22 area are noncompliant with applicable terms
23 and conditions developed under subsection (f),
24 the eligible entity administering the research
25 area shall—

1 (i) terminate activities at the research
2 area; and

3 (ii)(I) close down operations at the re-
4 search area pursuant to applicable terms
5 and conditions; or

6 (II) remediate the research area to
7 comport with subsections (b), (e), and (f).

8 (E) REESTABLISHMENT.—In order to
9 allow for continuity of operations, not later
10 than 1 year prior to the conclusion of an addi-
11 tional 5-year period for a research area author-
12 ized under subparagraph (C), the eligible entity
13 administering the research area may reapply for
14 the establishment of the research area under
15 this section.

16 (h) COMMUNITY BENEFITS.—For each research area
17 designated or established under this section, and subject
18 to subsection (i), the Secretary shall develop, to the extent
19 possible, opportunities to deliver benefits to communities
20 with interest in the research area, such as—

- 21 (1) community benefit agreements;
- 22 (2) workforce development opportunities;
- 23 (3) mitigation measures;
- 24 (4) public education efforts; and

1 (5) other socioeconomic or educational benefit
2 schemes.

3 (i) ENGAGEMENT OR CONSULTATION; PARTNER-
4 SHIPS.—In carrying out subsections (f) and (h), the Sec-
5 retary—

6 (1) shall engage or consult, as appropriate, re-
7 garding the terms and conditions and community
8 benefits described in such subsections with—

9 (A) State, local, and Indian tribal govern-
10 ments with jurisdiction over any part of the re-
11 search area;

12 (B) members of communities proximate to
13 the research area, including relevant rec-
14 reational and commercial users, academic insti-
15 tutions, Native American individuals or entities,
16 and nongovernmental organizations; and

17 (C) other stakeholders as the Secretary
18 considers necessary to ensure full and fair en-
19 gagement with potentially impacted community
20 members; and

21 (2) may leverage existing partnerships and as-
22 sets to support meaningful public participation, in-
23 cluding—

24 (A) the national sea grant college program;

25 (B) Regional Ocean Partnerships; and

1 (C) the Regional Collaboration Network.

2 (j) ADVISORY BOARDS.—

3 (1) IN GENERAL.—Except as provided in para-
4 graph (3), the Secretary shall appoint an advisory
5 board to support oversight of each research area
6 designated or established under this section, con-
7 sisting of—

8 (A) one or more representatives of each
9 Federal agency participating in activities at the
10 research area;

11 (B) one or more representatives of each
12 State, county, or Indian tribal government adja-
13 cent to the research area;

14 (C) one or more members from each com-
15 munity adjacent to the research area;

16 (D) one or more representatives of the
17 users of the research area; and

18 (E) additional members as the Secretary
19 considers appropriate.

20 (2) DUTIES.—

21 (A) IN GENERAL.—A board appointed
22 under this subsection shall—

23 (i) monitor the delivery of community
24 benefits, compliance with the applicable
25 terms and conditions, and, as necessary or

advisable, inspections of activities at the research area;

(ii) meet regularly with the Secretary to provide advice and guidance for the management, conservation, and stewardship of the research area;

(iii) provide advice and recommendations to the Secretary on whether a proposed use or user of the research area should be allowed; and

(iv) take other actions to support the safe, effective, orderly, and lawful operation of the research area at the discretion of the Secretary.

(B) ADDITIONAL DUTIES.—Upon the request of a board appointed under this subsection, the Secretary may assign additional duties to the board as the Secretary considers appropriate.

(3) SPECIAL RULE FOR REGIONAL OCEAN PARTNERSHIPS.—At the discretion of the Secretary or upon the request of a State, local, or Indian tribal government, the Secretary may request that the Regional Ocean Partnership in which the research area is located carry out the duties described in para-

1 graph (2) instead of appointing a board as provided
2 in paragraph (1).

3 **SEC. 104. INTERAGENCY WORKING GROUP FOR MARINE**
4 **CARBON DIOXIDE REMOVAL.**

5 (a) IN GENERAL.—There is established an inter-
6 agency working group for marine carbon dioxide removal
7 under the Subcommittee on Ocean Science and Tech-
8 nology of the National Science and Technology Council.

9 (b) MEMBERSHIP.—The interagency working group
10 shall be composed of one or more representatives from
11 each of the following:

12 (1) The Army Corps of Engineers.

13 (2) The National Oceanic and Atmospheric Ad-
14 ministration.

15 (3) The National Institute of Standards and
16 Technology.

17 (4) The Department of Energy.

18 (5) The Bureau of Ocean Energy Management.

19 (6) The Bureau of Safety and Environmental
20 Enforcement.

21 (7) The United States Fish and Wildlife Serv-
22 ice.

23 (8) The United States Geological Survey.

24 (9) The Department of State.

25 (10) The Environmental Protection Agency.

1 (11) The National Aeronautics and Space Ad-
2 ministration.

3 (12) The National Science Foundation.

4 (13) The Smithsonian Institution.

5 (14) The Office of Naval Research.

6 (15) The Department of the Navy.

7 (16) The Coast Guard.

8 (17) The Department of Agriculture.

9 (18) The Council on Environmental Quality.

10 (19) The Office of Science and Technology Pol-
11 icy.

12 (c) CO-CHAIRS.—One or more representatives from
13 the National Oceanic and Atmospheric Administration
14 and one or more representatives from the Department of
15 Energy shall serve as co-chairs of the interagency working
16 group.

17 (d) MEETINGS.—The interagency working group
18 shall meet not less frequently than once each year, at the
19 call of the co-chairs.

20 (e) DUTIES.—The interagency working group shall—

21 (1) not later than 90 days after the date of the
22 enactment of this Act, establish a plan to coordinate
23 Federal research on marine carbon dioxide removal
24 in accordance with subsection (f);

1 (2) not later than 1 year after the date of the
2 enactment of this Act—

3 (A) establish a code of conduct in accord-
4 ance with subsection (g); and

5 (B) standardize the implementation of that
6 code of conduct;

7 (3) coordinate efforts among Federal agencies
8 to support compliance with existing law;

9 (4) support research and development of safe
10 and effective marine carbon dioxide removal;

11 (5) coordinate Federal funding opportunities in
12 a manner that avoids duplication of funding and re-
13 search efforts and maximizes funding for marine
14 carbon dioxide removal;

15 (6) as appropriate, provide recommendations
16 to—

17 (A) support the transition from research to
18 operations of safe and effective marine carbon
19 dioxide removal; and

20 (B) integrate marine carbon dioxide re-
21 moval into voluntary carbon markets;

22 (7) publish and submit the biennial report re-
23 quired by section 105;

24 (8) not later than 90 days after the date on
25 which the interagency working group receives the in-

1 inventory submitted under section 103(c), review the
2 inventory and provide recommendations to the Sec-
3 retary for the selection of research areas;

4 (9) ensure the public availability of and public
5 access to the results of marine carbon dioxide re-
6 moval research in accordance with subsection (h);
7 and

8 (10) take other actions, as the interagency
9 working group considers necessary, to coordinate
10 Federal support for safe and effective marine carbon
11 dioxide removal.

12 (f) FEDERAL RESEARCH PLAN.—

13 (1) ADOPTION OF EXISTING PLANS.—In car-
14 rying out subsection (e)(1), the interagency working
15 group may adopt one or more research plans pre-
16 pared by agencies represented on the interagency
17 working group or through other interagency efforts.

18 (2) UPDATES.—Not later than 5 years after the
19 date on which the plan described in subsection (e)(1)
20 is established, and every 5 years thereafter, the
21 interagency working group shall update the plan.

22 (3) REQUIREMENTS.—The plan described in
23 subsection (e)(1) shall—

24 (A) prioritize public engagement and eco-
25 system impacts; and

1 (B) further the objectives and focal areas
2 described in section 101(b).

3 (g) CODE OF CONDUCT.—

4 (1) IN GENERAL.—The interagency working
5 group shall, after publication and an opportunity for
6 public comment in the Federal Register, establish a
7 code of conduct for research relating to marine car-
8 bon dioxide removal (in this subsection referred to
9 as the “code of conduct”).

10 (2) ADOPTION BY AGENCIES.—The agencies
11 represented on the interagency working group shall
12 adopt the code of conduct.

13 (3) APPLICABILITY.—Each grantee under this
14 Act conducting activities in the field and each user
15 of a research area designated or established under
16 section 103 shall abide by the code of conduct.

17 (4) MINIMUM SUBSTANTIVE REQUIREMENTS.—
18 The code of conduct shall, at minimum, require—

19 (A) open access to research data, findings,
20 codes of conduct, mitigation plans, and sci-
21 entific publications arising from the research;

22 (B) that open-water testing is preceded
23 and informed by laboratory, mesocosm, and
24 modeling research;

25 (C) public disclosure of funding sources;

1 (D) educational materials and community
2 learning opportunities to increase awareness
3 and literacy of proposed research activities,
4 findings, risks, uncertainties, potential benefits,
5 and the distribution of anticipated benefits and
6 harms;

7 (E) opportunities for interested stake-
8 holders to provide input on research design;

9 (F) where applicable, solicitation and in-
10 corporation of local and traditional knowledge
11 into research design and decisions;

12 (G) reasonable efforts to deconflict re-
13 search with existing commercial and human
14 uses;

15 (H) for each experiment, a mitigation plan
16 that describes—

17 (i) potential ecosystem responses;

18 (ii) potential social outcomes, includ-
19 ing to health and safety;

20 (iii) any measures taken to minimize
21 harm; and

22 (iv) liability and guidelines for remedi-
23 ation of adverse impacts, including envi-
24 ronmental degradation, resulting from re-
25 search;

1 (I) compliance with all applicable domestic
2 and international laws and policies; and

3 (J) other requirements or best practices, as
4 the interagency working group determines nec-
5 essary, to assess and communicate positive and
6 negative social and environmental impacts and
7 uncertainties.

8 (5) MINIMUM ENGAGEMENT REQUIREMENTS.—

9 In fulfilling the requirements described in paragraph
10 (4), grantees and users described in paragraph (3)
11 shall maximize participation of and consultation
12 with, at minimum—

13 (A) State, local, and Indian tribal govern-
14 ments with jurisdiction over any part of the
15 area in which field research relating to marine
16 carbon dioxide removal is conducted;

17 (B) members of communities proximate to
18 the area, including relevant recreational and
19 commercial users, academic institutions, Native
20 American individuals or entities, and non-
21 governmental organizations; and

22 (C) other stakeholders as the head of the
23 Federal agency providing resources for the
24 grantee or user considers necessary to ensure

1 full and fair engagement with potentially im-
2 pacted community members.

3 (6) UPDATES.—Not less frequently than once
4 each year for the first 5 years following the date of
5 the enactment of this Act, and once every 5 years
6 thereafter, the interagency working group shall re-
7 view, and, as appropriate update, the code of con-
8 duct to ensure that it remains timely and relevant.

9 (h) PUBLIC AVAILABILITY AND ACCESS.—

10 (1) IN GENERAL.—Subject to contracts pro-
11 tecting confidential proprietary data, the interagency
12 working group may make research papers and other
13 results generated under this Act available to the
14 public at no cost and with no restrictions on copy-
15 ing, publishing, distributing, citing, adapting, or oth-
16 erwise using such papers or results.

17 (2) PORTAL.—Not later than 1 year after the
18 date of the enactment of this Act, the interagency
19 working group shall establish a new portal or des-
20 ignate an existing information portal to ensure,
21 while protecting sensitive proprietary information,
22 that data and information on marine carbon dioxide
23 removal generated under this Act, or by other Fed-
24 eral programs and relevant stakeholders, is easily,
25 digitally accessible, including information that would

1 be useful to policymakers, researchers, and other
 2 stakeholders for advancing research or evaluating
 3 the deployment of marine carbon dioxide removal.

4 (i) MEMORANDUM OF AGREEMENT.—Not later than
 5 90 days after the date of the enactment of this Act, the
 6 members of the interagency working group shall enter into
 7 a memorandum of agreement to implement this Act.

8 **SEC. 105. BIENNIAL REPORT ON MARINE CARBON DIOXIDE**
 9 **REMOVAL.**

10 (a) IN GENERAL.—Not later than 2 years after the
 11 date of the enactment of this Act, and not less frequently
 12 than once every 2 years thereafter, the interagency work-
 13 ing group shall—

14 (1) publish a report on marine carbon dioxide
 15 removal carried out pursuant to this Act, in accord-
 16 ance with subsection (c); and

17 (2) submit the report to the relevant congres-
 18 sional committees.

19 (b) ELEMENTS.—Each report required by subsection
 20 (a) shall include, for the period covered by the report, the
 21 following:

22 (1) A description of progress made toward the
 23 objectives described in section 101(b)(1), including—

1 (A) findings generated under subparagraph
2 (A) of such section and the information on
3 which those findings are based; and

4 (B) efforts and outcomes related to sub-
5 paragraph (B) of such section.

6 (2) A summary of the activities conducted at all
7 research areas designated or established under sec-
8 tion 103, including—

9 (A) the number of entities and personnel
10 using each research area for marine carbon di-
11 oxide removal; and

12 (B) the specific marine carbon dioxide re-
13 moval approaches studied or deployed.

14 (3) A summary of key findings from data col-
15 lection and monitoring, including—

16 (A) the amount of carbon dioxide removed
17 from the ocean and the atmosphere, as meas-
18 ured on a life-cycle basis, by each removal tech-
19 nology;

20 (B) whether a particular removal tech-
21 nology results in net removals of greenhouse
22 gasses from the atmosphere over its life cycle,
23 and the duration of sequestration, as applicable;

1 (C) for removal technologies that rely on
 2 an energy source, the amount of energy con-
 3 sumed by the technology; and

4 (D) any other metrics the interagency
 5 working group considers necessary or advisable.

6 (4) A summary of research findings, knowledge
 7 gaps, and future research priorities.

8 (5) An assessment of the permitting regime
 9 regulating marine carbon dioxide removal that in-
 10 cludes recommendations for improved efficiency or
 11 coordination, as applicable.

12 (6) An identification of barriers in resources,
 13 capacity, technology, infrastructure, or expertise to
 14 advancing the science and application of marine car-
 15 bon dioxide removal.

16 (7) Strategic updates to the objectives described
 17 in section 101(b)(1).

18 (8) Any additional matters the interagency
 19 working group considers relevant.

20 (c) PUBLIC AVAILABILITY.—The interagency work-
 21 ing group shall—

22 (1) publish each report required by subsection

23 (a) on a publicly accessible website; and

24 (2) make each such report available to the pub-
 25 lic at no cost and with no restrictions on copying,

1 publishing, distributing, citing, adapting, or other-
 2 wise using the report.

3 **SEC. 106. AUTHORIZATION OF APPROPRIATIONS.**

4 There are authorized to be appropriated to the Under
 5 Secretary of Commerce for Oceans and Atmosphere to
 6 carry out this title—

- 7 (1) \$264,000,000 for fiscal year 2025;
- 8 (2) \$263,200,000 for fiscal year 2026;
- 9 (3) \$256,400,000 for fiscal year 2027;
- 10 (4) \$256,200,000 for fiscal year 2028;
- 11 (5) \$244,400,000 for fiscal year 2029;
- 12 (6) \$149,200,000 for fiscal year 2030;
- 13 (7) \$149,200,000 for fiscal year 2031;
- 14 (8) \$149,200,000 for fiscal year 2032;
- 15 (9) \$149,200,000 for fiscal year 2033; and
- 16 (10) \$149,200,000 for fiscal year 2034.

17 **TITLE II—MATTERS RELATING**
 18 **TO THE NATIONAL SCIENCE**
 19 **FOUNDATION**

20 **SEC. 201. RESEARCHING MARINE CARBON DIOXIDE RE-**
 21 **MOVAL.**

22 (a) RESEARCH.—The Director of the National
 23 Science Foundation shall award grants to support the
 24 Federal research plan described in section 104, including
 25 research related to—

1 (1) the efficacy of marine carbon dioxide re-
2 moval, including measurability, magnitude of green-
3 house gas removal, durability, and additionality;

4 (2) ecosystem responses to and social dimen-
5 sions of marine carbon dioxide removal;

6 (3) tools and technologies to support under-
7 standing and measurement of the efficacy and envi-
8 ronmental impacts of marine carbon dioxide re-
9 moval; and

10 (4) other relevant research areas, as determined
11 by the Director of the National Science Foundation.

12 (b) COORDINATION.—In carrying out subsection (a),
13 the Director of the National Science Foundation shall co-
14 ordinate with the heads of appropriate Federal agencies,
15 including the Secretary.

16 (c) SCIENCE WORKFORCE DEVELOPMENT.—The Di-
17 rector of the National Science Foundation shall leverage,
18 as appropriate, the existing scientific training, workforce
19 development programs, and networks of the National
20 Science Foundation to build and expand scientific capacity
21 and expertise related to marine carbon dioxide removal.

1 **TITLE III—MATTERS RELATING**
 2 **TO THE NATIONAL AERO-**
 3 **NAUTICS AND SPACE ADMIN-**
 4 **ISTRATION**

5 **SEC. 301. MEASURING MARINE CARBON DIOXIDE REMOVAL**
 6 **FROM SPACE.**

7 (a) MARINE CARBON DIOXIDE REMOVAL ACTIVI-
 8 TIES.—To the extent practicable, the Administrator of the
 9 National Aeronautics and Space Administration (referred
 10 to in this title as the “Administrator”) shall ensure that
 11 the capabilities and assets of the National Aeronautics and
 12 Space Administration are used to advance understanding
 13 of the efficacy and impacts of marine carbon dioxide re-
 14 moval and to support the Federal research plan described
 15 in section 104, including by—

16 (1) leveraging the research portfolio of the Na-
 17 tional Aeronautics and Space Administration;

18 (2) enhancing the monitoring and modeling pro-
 19 grams of the National Aeronautics and Space Ad-
 20 ministration to incorporate relevant data for marine
 21 carbon dioxide removal;

22 (3) leveraging and aligning the Mission Direc-
 23 torates of the National Aeronautics and Space Ad-
 24 ministration; and

1 (4) carrying out any other relevant activity, as
2 determined by the Administrator.

3 (b) COORDINATION AND PROGRAM CONSISTENCY.—

4 In carrying out the activities described in subsection (a),
5 the Administrator shall coordinate with the head of any
6 appropriate Federal agency, including the Under Sec-
7 retary of Commerce for Oceans and Atmosphere, to ensure
8 that the research activities of the National Aeronautics
9 and Space Administration are carried out in cooperation
10 with the efforts of such agency.

11 **SEC. 302. AUTHORIZATION OF APPROPRIATIONS.**

12 There are authorized to be appropriated to Adminis-
13 trator to carry out this title—

- 14 (1) \$4,900,000 for fiscal year 2025;
- 15 (2) \$4,900,000 for fiscal year 2026;
- 16 (3) \$4,800,000 for fiscal year 2027;
- 17 (4) \$4,800,000 for fiscal year 2028;
- 18 (5) \$4,600,000 for fiscal year 2029;
- 19 (6) \$2,800,000 for fiscal year 2030;
- 20 (7) \$2,800,000 for fiscal year 2031;
- 21 (8) \$2,800,000 for fiscal year 2032;
- 22 (9) \$2,800,000 for fiscal year 2033; and
- 23 (10) \$2,800,000 for fiscal year 2034.

1 **TITLE IV—MATTERS RELATING**
2 **TO THE NATIONAL INSTITUTE**
3 **OF STANDARDS AND TECH-**
4 **NOLOGY**

5 **SEC. 401. VALIDATING MARINE CARBON DIOXIDE RE-**
6 **MOVAL.**

7 (a) MARINE CARBON DIOXIDE REMOVAL INITIA-
8 TIVE.—The Under Secretary of Commerce for Standards
9 and Technology shall carry out an initiative to develop and
10 standardize benchmark materials, measurements, data,
11 and models to accelerate innovation in and validate per-
12 formance of materials and technologies for marine carbon
13 dioxide removal.

14 (b) COORDINATION.—In carrying out the activities
15 described in subsection (a), the Under Secretary of Com-
16 merce for Standards and Technology shall coordinate with
17 the heads of such Federal agencies as the Under Secretary
18 considers appropriate, including the Under Secretary of
19 Commerce for Oceans and Atmosphere.

20 (c) INTERNATIONAL ENGAGEMENT.—The Under
21 Secretary of Commerce for Standards and Technology, in
22 coordination with the Secretary of State, shall engage
23 international bodies to promote global adoption of the
24 standards referred to in subsection (a).

1 **SEC. 402. AUTHORIZATION OF APPROPRIATIONS.**

2 There are authorized to be appropriated to the Under
3 Secretary of Commerce for Standards and Technology to
4 carry out this title—

- 5 (1) \$11,500,000 for fiscal year 2025;
6 (2) \$11,500,000 for fiscal year 2026;
7 (3) \$11,200,000 for fiscal year 2027;
8 (4) \$11,200,000 for fiscal year 2028;
9 (5) \$10,700,000 for fiscal year 2029;
10 (6) \$6,500,000 for fiscal year 2030;
11 (7) \$6,500,000 for fiscal year 2031;
12 (8) \$6,500,000 for fiscal year 2032;
13 (9) \$6,500,000 for fiscal year 2033; and
14 (10) \$6,500,000 for fiscal year 2034.

○