

Maria Cantwell
S.L.C.

AMENDMENT NO. _____ Calendar No. _____

Purpose: In the nature of a substitute.

IN THE SENATE OF THE UNITED STATES—116th Cong., 1st Sess.

S. 529

To establish a national program to identify and reduce losses from landslide hazards, to establish a national 3D Elevation Program, and for other purposes.

Referred to the Committee on _____ and ordered to be printed

Ordered to lie on the table and to be printed

AMENDMENT IN THE NATURE OF A SUBSTITUTE intended to be proposed by Ms. CANTWELL

Viz:

1 Strike all after the enacting clause and insert the following:
2

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “National Landslide
5 Preparedness Act”.

6 **SEC. 2. DEFINITIONS.**

7 In this Act:

8 (1) 3D.—The term “3D” means 3-dimensional.

9 (2) 3D ELEVATION DATA.—

10 (A) IN GENERAL.—The term “3D elevation data” means 3D, high-resolution data
11

1 obtained using LiDAR, IfSAR, or other meth-
2 ods over the United States (including terri-
3 tories).

4 (B) INCLUSIONS.—The term “3D elevation
5 data” includes terrestrial and bathymetric ele-
6 vation data.

7 (3) 3D ELEVATION PROGRAM.—The term “3D
8 Elevation Program” means the 3D Elevation Pro-
9 gram established under section 5(a).

10 (4) IfSAR.—The term “IfSAR” means
11 interferometric synthetic aperture radar.

12 (5) INDIAN TRIBE.—The term “Indian tribe”
13 has the meaning given the term in section 4 of the
14 Indian Self-Determination and Education Assistance
15 Act (25 U.S.C. 5304).

16 (6) LAHAR.—The term “lahar” means a large
17 debris flow of mostly volcanic material that is—

18 (A) often fast-moving; and

19 (B) a hazard in watersheds downstream of
20 volcanic peaks.

21 (7) LiDAR.—The term “LiDAR” means light
22 detection and ranging.

23 (8) SECRETARY.—The term “Secretary” means
24 the Secretary of the Interior, acting through the Di-
25 rector of the United States Geological Survey.

1 (9) STATE.—The term “State” means—

2 (A) a State; and

3 (B) the District of Columbia.

4 (10) STATE OFFICE.—The term “State office”
5 means any unit of State government that handles
6 the identification, mapping, assessment, and re-
7 search of landslide hazards or responding to land-
8 slide events, including—

9 (A) a State geological survey office;

10 (B) a State department of emergency re-
11 sponse; and

12 (C) a State department of transportation.

13 (11) TERRITORY.—The term “territory”
14 means—

15 (A) the Commonwealth of Puerto Rico;

16 (B) Guam;

17 (C) American Samoa;

18 (D) the Commonwealth of the Northern
19 Mariana Islands;

20 (E) the Federated States of Micronesia;

21 (F) the Republic of the Marshall Islands;

22 (G) the Republic of Palau; and

23 (H) the United States Virgin Islands.

1 **SEC. 3. NATIONAL LANDSLIDE HAZARDS REDUCTION PRO-**
2 **GRAM.**

3 (a) **ESTABLISHMENT.**—The Secretary shall establish
4 a program, to be known as the “National Landslide Haz-
5 ards Reduction Program” (referred to in this section as
6 the “program”)—

7 (1) to identify and understand landslide haz-
8 ards and risks;

9 (2) to reduce losses from landslides;

10 (3) to protect communities at risk of landslide
11 hazards; and

12 (4) to help improve communication and emer-
13 gency preparedness, including by coordinating with
14 communities and entities responsible for infrastruc-
15 ture that are at risk of landslide hazards.

16 (b) **DESCRIPTION OF PROGRAM.**—

17 (1) **PROGRAM ACTIVITIES.**—The Secretary, in
18 coordination with the Interagency Coordinating
19 Committee on Landslide Hazards established by
20 subsection (c)(1) (referred to in this section as the
21 “Committee”) and in coordination with existing ac-
22 tivities of the United States Geological Survey and
23 other Federal agencies, shall—

24 (A) identify, map, assess, and research
25 landslide hazards;

26 (B) respond to landslide events; and

1 (C) in coordination with State offices,
2 units of local government, territories, and In-
3 dian tribes—

4 (i) establish working groups with
5 State offices, units of local government,
6 territories, and Indian tribes to identify re-
7 gional and local priorities for researching,
8 identifying, mapping, and assessing land-
9 slide hazards; and

10 (ii) develop and implement landslide
11 hazard guidelines for—

12 (I) geologists;

13 (II) geological and geotechnical
14 engineers;

15 (III) emergency management
16 personnel; and

17 (IV) land use and other decision-
18 makers.

19 (2) NATIONAL STRATEGY.—Not later than 1
20 year after the date of enactment of this Act, and
21 every 5 years thereafter, the Secretary, in coordina-
22 tion with the Committee, shall develop and publish
23 a national strategy for landslide hazards, risk reduc-
24 tion, and response in the United States (including
25 territories), which shall include—

1 (A) goals and priorities for the program;

2 (B) priorities for data acquisition, re-
3 search, communications, and risk management
4 on landslides and landslide hazards across rel-
5 evant Federal agencies; and

6 (C) a detailed interagency plan, which shall
7 take into consideration national disaster pre-
8 paredness, response, and recovery frameworks,
9 to carry out the national strategy, including de-
10 tails about the programs, projects, and budgets
11 that will be used to implement the national
12 strategy.

13 (3) NATIONAL LANDSLIDE HAZARDS DATA-
14 BASE.—In carrying out the program, the Secretary,
15 in coordination with State offices, units of local gov-
16 ernment, territories, and Indian tribes, shall develop
17 and maintain a publicly accessible national landslide
18 hazard and risk inventory database to compile,
19 maintain, standardize, and evaluate data regard-
20 ing—

21 (A) landslide hazards and risks;

22 (B) the impact of landslides on—

23 (i) health and safety;

24 (ii) the economy and infrastructure;

25 and

- 1 (iii) the environment;
2 (C) landslide hazard stabilization; and
3 (D) reduction of losses from landslides.

4 (4) LANDSLIDE HAZARD AND RISK PREPARED-
5 NESS FOR COMMUNITIES.—In carrying out the pro-
6 gram, the Secretary, in coordination with the Sec-
7 retary of the Army, the Secretary of Commerce, the
8 Secretary of Homeland Security, the Secretary of
9 Transportation, and the heads of other relevant Fed-
10 eral agencies, and in consultation with State offices,
11 units of local government, territories, and Indian
12 tribes, shall develop and disseminate—

13 (A) landslide planning and risk reduction
14 guidance, guidelines, maps, tools, and training
15 materials to help inform State, territorial, local,
16 and Tribal governments and decisionmakers
17 with respect to—

- 18 (i) the use and implementation of
19 landslide hazard assessments;
20 (ii) the applied use of the database
21 developed under paragraph (3);
22 (iii) reducing losses from landslides;
23 and

1 (iv) resources available for commu-
2 nities working to improve landslide hazard
3 preparedness; and

4 (B) landslide preparedness curricula and
5 training modules for—

6 (i) State, territorial, local, and Tribal
7 officials;

8 (ii) Federal, State, territorial, local,
9 and Tribal emergency managers; and

10 (iii) the National Guard.

11 (5) DEBRIS FLOW EARLY WARNING SYSTEM.—

12 In carrying out the program, the Secretary, in co-
13 ordination with the Secretary of Commerce and the
14 Secretary of Homeland Security, shall expand the
15 early warning system for debris flow by—

16 (A) expanding the early warning system
17 for post-wildfire debris flow to include recently
18 burned areas across the western United States;

19 (B) developing procedures with State, ter-
20 ritorial, local, and Tribal governments to mon-
21 itor stormwater drainage in areas with high de-
22bris flow risk; and

23 (C) identifying high-risk debris flow areas,
24 such as recently burned land and potential
25 lahar hazard areas.

1 (6) EMERGENCY RESPONSE ACTIVITIES.—In
2 carrying out the program, the Secretary, in coordi-
3 nation with the Secretary of Commerce, the Sec-
4 retary of Homeland Security, the heads of other rel-
5 evant Federal agencies, States offices, units of local
6 government, territories, and Indian tribes, shall es-
7 tablish and support emergency response procedures
8 for the rapid deployment of Federal scientists,
9 equipment, and services to areas impacted by a sig-
10 nificant landslide event—

11 (A) to support emergency response efforts
12 and improve the safety of emergency respond-
13 ers;

14 (B) to improve data collection; and

15 (C) to conduct research to advance the un-
16 derstanding of the causes, impacts, and reduc-
17 tion of landslide hazards and risks.

18 (c) INTERAGENCY COORDINATING COMMITTEE ON
19 LANDSLIDE HAZARDS.—

20 (1) IN GENERAL.—There is established a com-
21 mittee, to be known as the “Interagency Coordi-
22 nating Committee on Landslide Hazards”.

23 (2) MEMBERSHIP.—The Committee shall be
24 composed of the following members (or their des-
25 ignees):

1 (A) The Secretary, who shall serve as
2 Chairperson of the Committee.

3 (B) The Secretary of Agriculture.

4 (C) The Secretary of the Army.

5 (D) The Secretary of Commerce.

6 (E) The Secretary of Homeland Security.

7 (F) The Secretary of Transportation.

8 (G) The Director of the National Science
9 Foundation.

10 (H) The Director of the Office of Science
11 and Technology Policy.

12 (I) The Director of the Office of Manage-
13 ment and Budget.

14 (3) MEETINGS.—The Committee shall meet at
15 the call of the Chairperson.

16 (4) PURPOSE AND DUTIES.—The Committee
17 shall—

18 (A) advise and oversee the program;

19 (B) facilitate communication and coordina-
20 tion across Federal agencies in the planning,
21 management, budgeting, and execution of land-
22 slide activities; and

23 (C) support the development and execution
24 of the national strategy under subsection (b)(2),
25 including by—

1 (i) supporting the development of na-
2 tional goals and priorities for the national
3 strategy;

4 (ii) articulating Federal agency roles,
5 responsibilities, and resources for carrying
6 out the national strategy; and

7 (iii) overseeing the implementation of
8 the national strategy.

9 (d) ADVISORY COMMITTEE.—

10 (1) IN GENERAL.—The Secretary shall establish
11 an advisory committee, to be known as the “Advi-
12 sory Committee on Landslides” (referred to in this
13 subsection as the “Advisory Committee”).

14 (2) MEMBERSHIP.—The Advisory Committee
15 shall be composed of not fewer than 11 members—

16 (A) of whom none may be an individual de-
17 scribed in any of subparagraphs (A) through
18 (F) of section 7342(a)(1) of title 5, United
19 States Code; and

20 (B) who shall be representatives of—

21 (i) States, including State geological
22 organizations;

23 (ii) territories, including territorial ge-
24 ological organizations;

1 (iii) Indian tribes, including Tribal ge-
2 ological organizations;

3 (iv) research institutions and institu-
4 tions of higher education that are quali-
5 fied—

6 (I) to provide advice regarding
7 landslide hazard and risk reduction;
8 and

9 (II) to represent related sci-
10 entific, architectural, engineering, and
11 planning disciplines;

12 (v) industry standards development
13 organizations; and

14 (vi) State, territorial, local, and Tribal
15 emergency management agencies.

16 (3) RECOMMENDATIONS.—

17 (A) IN GENERAL.—The Advisory Com-
18 mittee shall submit to the Committee rec-
19 ommendations for the implementation of the
20 program, including recommendations regard-
21 ing—

22 (i) landslide hazard and risk reduction
23 and planning;

24 (ii) tools for communities;

25 (iii) research; and

1 (iv) such other topics as the Advisory
2 Committee determines appropriate.

3 (B) CONSIDERATION.—The Secretary and
4 the agency heads described in subparagraphs
5 (B) through (I) of subsection (e)(2) shall take
6 into consideration any recommendation of the
7 Advisory Committee submitted under subpara-
8 graph (A).

9 (e) GRANT PROGRAMS.—

10 (1) COOPERATIVE LANDSLIDE HAZARD MAP-
11 PING AND ASSESSMENT PROGRAM.—

12 (A) IN GENERAL.—Subject to appropria-
13 tions, the Secretary may—

14 (i) provide grants, on a competitive
15 basis, to State, territorial, local, and Tribal
16 governments to research, map, assess, and
17 collect data on landslide hazards within the
18 jurisdictions of those governments; and

19 (ii) accept and use funds received
20 from other Federal and non-Federal part-
21 ners to advance the purposes of the pro-
22 gram.

23 (B) PRIORITY.—

24 (i) IN GENERAL.—The Secretary shall
25 consult annually with the Committee,

1 States, units of local government, terri-
2 tories, and Indian tribes to establish prior-
3 ities for the grant program under this
4 paragraph.

5 (ii) FUNDING PRIORITIZATION.—In
6 providing grants under this paragraph, the
7 Secretary shall give priority to projects—

8 (I) that will achieve the greatest
9 landslide hazard and risk reduction;

10 (II) that reflect the goals and
11 priorities of the national strategy es-
12 tablished under subsection (b)(2)(A);

13 (III) not less than 50 percent of
14 the total cost of which is matched by
15 non-Federal sources; and

16 (IV) that include acquisition of
17 enhanced elevation data consistent
18 with the 3D Elevation Program.

19 (C) REQUIREMENT.—If the Secretary
20 elects to provide grants under subparagraph
21 (A)(i), the Secretary shall publish on a publicly
22 available website a description of—

23 (i) the grants; and

24 (ii) the findings made from those
25 grants.

1 (2) NATIONAL LANDSLIDE RESEARCH
2 GRANTS.—

3 (A) IN GENERAL.—To advance the goals
4 and priorities of the national strategy estab-
5 lished under subsection (b)(2)(A), subject to ap-
6 propriations, the Director of the National
7 Science Foundation (referred to in this para-
8 graph as the “Director”) may provide grants to
9 eligible entities for landslide research, including
10 research on—

11 (i) the causes, mechanisms, triggers,
12 hydrology, and geology of landslides;

13 (ii) ways to reduce landslide hazards
14 and risks to minimize loss of life and prop-
15 erty, including landslide hazard and risk
16 communication, perception, decision-
17 making, tools, and technologies; and

18 (iii) other goals and priorities of the
19 national strategy established under sub-
20 section (b)(2)(A).

21 (B) ELIGIBLE ENTITIES.—The Director
22 shall determine whether an entity is eligible to
23 receive a grant under this paragraph.

24 (C) REQUIREMENTS.—In providing grants
25 under this paragraph, the Director shall—

1 (i) ensure that the grants are pro-
2 vided on a competitive basis;

3 (ii) consider grant applications sub-
4 mitted by eligible entities that have devel-
5 oped the application in partnership with 1
6 or more State geological surveys; and

7 (iii) publish on a publicly available
8 website a description of—

9 (I) the grants; and

10 (II) the findings made from those
11 grants.

12 (f) BIENNIAL REPORT.—Through calendar year
13 2030, the Secretary shall submit to Congress a biennial
14 report, including a description of, with respect to the 2-
15 calendar-year period preceding the date of the report—

16 (1) the goals and accomplishments of the Com-
17 mittee in carrying out the national strategy devel-
18 oped under subsection (b)(2);

19 (2) the results of the activities of the Com-
20 mittee under this section; and

21 (3) the extent to which any recommendations of
22 the Advisory Committee under subsection (d)(3)(A)
23 have been implemented.

24 (g) SIGNIFICANT EVENTS.—Not later than 1 year
25 after a significant landslide event in the United States (in-

1 cluding territories) occurs, the Secretary shall publish on
2 a publicly available website—

3 (1) a description of the landslide event and the
4 implications of the event on communities, including
5 life and property;

6 (2) recommendations on how the identification
7 of the landslide risk could have been improved prior
8 to the event;

9 (3) a description of the effectiveness of any
10 warning and risk communication, including the dis-
11 semination of warnings by State, territorial, local,
12 and Tribal partners in the affected area;

13 (4) recommendations to improve risk identifica-
14 tion, reduction, and communication to landowners
15 and units of local government;

16 (5) recommendations to improve landslide haz-
17 ard preparedness and emergency response activities
18 under this section; and

19 (6) such other findings as the Secretary deter-
20 mines appropriate.

21 (h) FUNDING.—There is authorized to be appro-
22 priated to carry out this section \$37,000,000 for each of
23 fiscal years 2020 through 2023, of which—

24 (1) \$25,000,000 each fiscal year shall be made
25 available to the United States Geological Survey;

1 (2) \$11,000,000 each fiscal year shall be made
2 available to the National Science Foundation; and

3 (3) \$1,000,000 each fiscal year shall be made
4 available to the National Oceanic and Atmospheric
5 Administration.

6 **SEC. 4. GROUND SUBSIDENCE.**

7 As the Secretary determines to be appropriate and
8 subject to appropriations, the Secretary, through existing
9 programs, shall advance the identification, mapping, re-
10 search, and monitoring of subsidence and groundwater re-
11 source accounting, particularly in areas affected by
12 drought.

13 **SEC. 5. 3D ELEVATION PROGRAM.**

14 (a) ESTABLISHMENT OF 3D ELEVATION PRO-
15 GRAM.—

16 (1) IN GENERAL.—The Secretary shall establish
17 a program, to be known as the “3D Elevation Pro-
18 gram”—

19 (A) to provide 3D elevation data coverage
20 for the United States;

21 (B) to coordinate and facilitate the collec-
22 tion, dissemination, and use of 3D elevation
23 data among Federal departments and agencies
24 and non-Federal entities;

1 (C) to produce standard, publicly acces-
2 sible 3D elevation data products for the United
3 States; and

4 (D) to promote the collection, dissemina-
5 tion, and use of 3D elevation data among Fed-
6 eral, State, local, and Tribal governments, com-
7 munities, institutions of higher education, and
8 the private sector through—

9 (i) cooperative agreements;

10 (ii) the development and maintenance
11 of spatial data infrastructure to provide
12 quality control and deliver to the public 3D
13 elevation data products;

14 (iii) in coordination with the 3D Ele-
15 vation Federal Interagency Coordinating
16 Committee established under subsection
17 (b), States, and industry and standards
18 bodies, the development of standards and
19 guidelines for 3D elevation data acquisition
20 to increase accessibility to 3D elevation
21 data in a standard, easy-to-use format; and

22 (iv) the identification, assessment, and
23 adoption of emerging technologies to im-
24 prove the accuracy and efficiency of the
25 3D Elevation Program.

1 (2) MANAGEMENT.—

2 (A) IN GENERAL.—The Secretary shall
3 manage the 3D Elevation Program—

4 (i) to ensure efficiency with respect to
5 related activities of the Department of the
6 Interior and other participating Federal
7 departments and agencies; and

8 (ii) to meet the needs of Department
9 of the Interior programs, stakeholders, and
10 the public.

11 (B) OTHER FEDERAL DEPARTMENTS AND
12 AGENCIES.—The head of each Federal depart-
13 ment and agency involved in the acquisition,
14 production, distribution, or application of 3D
15 elevation data shall—

16 (i) coordinate with the 3D Elevation
17 Federal Interagency Coordinating Com-
18 mittee established under subsection (b) to
19 acquire additional, enhanced 3D elevation
20 data;

21 (ii) submit to the Secretary a descrip-
22 tion of priority areas of interest for 3D ele-
23 vation data collection for use in providing
24 grants and cooperative agreements under
25 subsection (d);

1 (iii) implement policies and procedures
2 for data acquisition and sharing that are
3 consistent with standards and guidelines
4 developed under the 3D Elevation Pro-
5 gram;

6 (iv) participate in, and share the re-
7 sults and benefits of, the 3D Elevation
8 Program, in accordance with standards
9 and guidelines developed under the 3D
10 Elevation Program; and

11 (v) ensure that any 3D elevation data
12 acquired with Federal grant funding—

13 (I) meets 3D Elevation Program
14 standards; and

15 (II) is included in the national
16 holdings of those data.

17 (b) 3D ELEVATION FEDERAL INTERAGENCY CO-
18 ORDINATING COMMITTEE.—

19 (1) ESTABLISHMENT.—The Secretary, in co-
20 ordination with the Secretary of Commerce and the
21 Secretary of Homeland Security, shall establish an
22 interagency coordinating committee, to be known as
23 the “3D Elevation Federal Interagency Coordinating
24 Committee” (referred to in this subsection as the

1 "Committee"), to better coordinate 3D elevation
2 data management across the Federal Government.

3 (2) MEMBERSHIP.—The Committee shall be
4 composed of the following members (or their des-
5 ignees):

6 (A) The Secretary, who shall serve as
7 Chairperson of the Committee.

8 (B) The Secretary of Agriculture.

9 (C) The Secretary of Commerce.

10 (D) The Secretary of Homeland Security.

11 (E) The Director of the National Science
12 Foundation.

13 (F) The Director of the Office of Science
14 and Technology Policy.

15 (G) The Director of the Office of Manage-
16 ment and Budget.

17 (H) The head of any other Federal depart-
18 ment or agency, at the request of the Secretary.

19 (3) COORDINATION.—The Committee shall co-
20 ordinate, as appropriate, with the existing activities
21 of—

22 (A) the 3D Elevation Program Executive
23 Forum;

24 (B) the Alaska Mapping Executive Com-
25 mittee;

1 (C) the 3D Elevation Working Group;

2 (D) the 3D National Elevation Sub-
3 committee; and

4 (E) State offices.

5 (4) MEETINGS.—The Committee shall meet at
6 the call of the Chairperson.

7 (5) DUTIES.—The Committee shall—

8 (A) oversee the planning, management,
9 and coordination of the 3D Elevation Program;
10 and

11 (B) develop, by not later than 1 year after
12 the date of enactment of this Act, and update
13 periodically thereafter—

14 (i) a strategic plan that establishes
15 goals and priorities for activities carried
16 out under the 3D Elevation Program; and

17 (ii) a detailed management plan to
18 implement the strategic plan.

19 (c) SUBCOMMITTEE OF NATIONAL GEOSPATIAL AD-
20 VISORY COMMITTEE.—

21 (1) ESTABLISHMENT.—

22 (A) IN GENERAL.—The Secretary shall es-
23 tablish, within the National Geospatial Advisory
24 Committee, a subcommittee (referred to in this
25 subsection as the “Subcommittee”).

1 (B) MEMBERSHIP.—The Subcommittee
2 shall—

3 (i) consist of not fewer than 11 mem-
4 bers, of whom none may be a Federal offi-
5 cer or employee; and

6 (ii) include representatives of—

7 (I) research and academic insti-
8 tutions;

9 (II) industry standards develop-
10 ment organizations;

11 (III) units of State and local gov-
12 ernment; and

13 (IV) the private sector.

14 (2) DUTIES.—

15 (A) ASSESSMENT.—The Subcommittee
16 shall conduct an assessment of—

17 (i) trends and developments in—

18 (I) the collection, dissemination,
19 and use of 3D elevation data; and

20 (II) science and technology relat-
21 ing to 3D elevation data;

22 (ii) the effectiveness of the 3D Ele-
23 vation Program in carrying out the activi-
24 ties described in subsection (a)(1);

1 (iii) the need to revise or reorganize
2 the 3D Elevation Program; and

3 (iv) the management, coordination,
4 implementation, and activities of the 3D
5 Elevation Program.

6 (B) REPORT.—Not later than 1 year after
7 the date of enactment of this Act, and every 2
8 years thereafter, the Subcommittee shall submit
9 to the Secretary and the 3D Elevation Federal
10 Interagency Coordinating Committee estab-
11 lished under subsection (b) a report that in-
12 cludes—

13 (i) the findings of the assessment
14 under subparagraph (A); and

15 (ii) recommendations of the Sub-
16 committee based on those findings, if any.

17 (d) GRANTS AND COOPERATIVE AGREEMENTS.—

18 (1) IN GENERAL.—The Secretary may make
19 grants and enter into cooperative agreements with
20 other Federal departments and agencies, units of
21 State, local, or Tribal government, institutions of
22 higher education, nonprofit research institutions, or
23 other organizations to facilitate the improvement of
24 nationwide coverage of 3D elevation data.

1 (2) APPLICATIONS.—To be eligible to receive a
2 grant or enter into a cooperative agreement under
3 this subsection, an entity described in paragraph (1)
4 shall submit to the Secretary an application at such
5 time, in such manner, and containing such informa-
6 tion as the Secretary may require.

7 (3) TERMS AND CONDITIONS.—A grant or coop-
8 erative agreement under this subsection shall be sub-
9 ject to such terms and conditions as the Secretary
10 determines to be appropriate, including making data
11 publically available and interoperable with other
12 Federal datasets.

13 (e) AUTHORIZATION OF APPROPRIATIONS.—There is
14 authorized to be appropriated to carry out this section
15 \$20,000,000 for each of fiscal years 2020 through 2023.