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# STRATEGIC MINERALS AND THE U.S. ARCTIC CONTINENTAL SHELF

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ABSTRACT

*The United States may seek to reduce its dependency on China for strategic minerals and rare earth elements by exploiting deposits on its continental shelf in the Arctic region. On December 19, 2023, the United States announced the outer limits of it extended continental shelf. Like other countries, the United States exercises sovereign rights and jurisdiction over the living and non-living resources of the continental shelf, which is comprised of the sea bed and subsoil of the continental margin. The U.S. continental shelf extends beyond 200 nautical miles in seven locations, including the Bering Sea and Arctic Ocean. Although the concept of the continental shelf historically has been associated with offshore oil and natural gas, the area presents opportunities for obtaining strategic hard minerals and rare earth elements required for an array of advanced technologies associated with national security, "green" energy, and information technologies. The United Nations Convention on the Law of the Sea codifies the rules governing coastal State sovereign rights and jurisdiction over such minerals, although the United States is not party to the Convention. The United States suggests that it retains rights in customary international law to exploit the mineral resources of the continental shelf, but U.S. absence from the Convention presents complications. It is uncertain whether the United States is entitled to access the machinery of the Commission on the Limits of the Continental Shelf, a scientific body created by the Convention to make recommendations to States on the extent of their continental shelf claims. At the same time, given that that Convention reflects customary international law, the United States might be obligated to utilize the process set forth the Convention, including submitting its continental shelf data to the Commission on the Limits of the Continental Shelf. As the United States weighs the economic value of strategic minerals against the environmental costs related to exploiting these resources, it also must contend with its status as a non-party to the Convention.*

## INTRODUCTION

In future years, the United States may be able to source strategic minerals and rare earth elements (REE) from its continental shelf. The vast seabed off the coast of Alaska appears to be one of the most promising areas for mineral development. As a coastal state, the United States has claimed exclusive rights over the resources on the seabed extending seaward in some cases hundreds of nautical miles from shore. This continental shelf area is considered a submerged prolongation of the landmass of the coastal state.[1] Coastal state sovereign rights and jurisdiction over the continental shelf is an inherent right and operable as a matter of law without any action required to stake a claim. Coastal states may nominally claim a continental shelf out to a distance of 200 nautical miles (NM) from shore so long as there is not another coastal state right to the area. In some locations coastal state jurisdiction may extend even farther seaward where the seabed comprises a natural extension of the submerged landmass, an area called the "extended" continental shelf (ECS). The entire continental shelf (both within and beyond 200 NM) is determined by the underwater geomorphology or geologic origin of the seabed appertaining to the landmass surrounding the coastal state. While the United States has maintained a claim to a continental shelf since 1945, the complex rules for delineating a continental shelf boundary require the collection of marine scientific and hydrographic data of the seabed.[2] After twenty years of collecting the data for its claim, the United States released coordinates of its ECS in December 2023. Alaska is featured prominently in the U.S. claim, and the seabed around the largest state holds the promise of vast quantities of strategic minerals and REE. These materials are used in semiconductors, "green" energy, and advanced medicine and other technology manufacturing for the commercial and defense sectors. As the United States and its partners and allies pursue a global security strategy grounded in economic and supply chain security informed by the new realities of military and geopolitical risk, the resources of the continental shelf will become increasingly important.

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1. United Nations Convention on the Law of the Sea art. 76(3), Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].

2. Richard Kemeny, *As Countries Battle for Control of North Pole, Science is the Ultimate Winner*, SCIENCE, (June 20, 2019), https://www.science.org/content/article/countries-battle-control-north-pole-science-ultimate-winner [https://perma.cc/PHK6-3HJX].

## I. THE U.S. CLAIM

On December 19, 2023, the United States announced geographic coordinates for its ECS.[3] The area encompasses about one million square kilometers, an expanse about twice the size of California.[4] The U.S. continental shelf is spread across seven seabed regions: two areas in the Gulf of Mexico, the Atlantic coast, the Pacific coast, the Mariana Islands, the Bering Sea, and the Arctic Ocean.[5] Over half of the area of the U.S. continental shelf is off the coast of Alaska.[6] The largest area claimed lies north of Prudhoe Bay, covering the Chukchi Sea and the Canada Basin.[7] This area is regarded as an "extension of [the] country's land territory under the sea,"[8] and it has strategic consequences for American economic prosperity and national security.

More than twenty years ago, the first cruise to support the mapping of the U.S. claim began to systematically collect hydrographic data along the Chukchi Sea and Northwind Ridge.[9] The scientific team embarked in the U.S. Coast Guard icebreaker *Healy*, which is an ice-hardened vessel.[10] The ship is equipped with hull-mounted, multi-beam sonar capable of capturing detailed bathymetry (seafloor depth) to create an accurate picture of the seabed topography.[11]

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3. Office of the Spokesperson, *Announcement of U.S. Extended Continental Shelf Outer Limits,* (Dec. 19, 2023), https://www.state.gov/announcement-of-u-s-extended-continental-shelf-outer-limits/ [https://perma.cc/E9M7-26XA].

4. *Id.*; Danielle Bochove, *US Claims Huge Chunk of Seabed Amid Strategic Push for Resources*, BLOOMBERG (Dec. 22, 2023), https://www.bloomberg.com/news/articles/2023-12-22/us-claims-huge-chunk-of-seabed-amid-strategic-push-for-resources [https://perma.cc/MMN9-C76S]; *White House Adds Nearly 400,000 Square Miles to U.S. Continental Shelf*, MARITIME EXECUTIVE (Dec. 25, 2023), https://maritime-executive.com/article/white-house-adds-nearly-400-000-square-miles-to-u-s-continental-shelf [https://perma.cc/3NN7-N386].

5. Office of the Spokesperson, *supra* note 3.

6. Bochove, *supra* note 4.

7. *Id.*

8. Office of the Spokesperson, *supra* note 3.

9. *Id.*; Larry Mayer, *Mapping the Arctic: Exploring the Unknown Ocean*, NOAA OCEAN EXPLORER, (Sep. 1-10, 2003), https://oceanexplorer.noaa.gov/explorations/03arctic/welcome.html [https://perma.cc/76GW-AAMV].

10. Mayer, *supra* note 9.

11. *Id.*; Martin Jakobsson et al., *The International Bathymetric Chart of the Arctic Ocean Version 4.0*, SCI. DATA July 2020, at 1, 4; *How Multibeam Sonar Works, Bermuda 2009*, NOAA OCEAN EXPLORER, https://oceanexplorer.noaa.gov/explorations/09bermuda/background/multibeam/multibeam.html (last visited Apr. 15, 2024) [https://perma.cc/A98D-XLZF].

The American marine scientific research and hydrographic survey coincides with similar efforts by other states, although the United States is playing catch-up.[12] Russia, for example, asserted resource jurisdiction over much of the seabed of the Arctic Ocean beginning in 2001 and has slowly refined its claim based on new hydrographic data.[13] Moscow's effort paid off in 2023, when the Commission on the Limits of the Continental Shelf (CLCS) validated Russia's claim over 1.7 million square kilometers of the Arctic seabed.[14] The CLCS is an international scientific body established by United Nations Convention on the Law of the Sea (UNCLOS) to review state claims and provide recommendations to the claimant state based on the morphology of the seabed and to ensure adherence to the rules set forth in the treaty.[15] In contrast to the legal certainty obtained by Russia and other states using the process of the CLCS, the U.S. effort is based on customary international law and grounded its historic claim to the resources. The other Arctic coastal states, Denmark (Greenland), Norway, and Canada, all have submitted at least a partial claim to the CLCS.[16] Norway submitted its claim in 2006 and was the first country to receive recommendations in 2009, which extended its continental shelf by 235,000 square kilometers.[17] In 2013, Canada submitted an Arctic continental shelf claim of about 1.2 million square kilometers, followed by an 895,000 square kilometer claim by Denmark via Greenland in

12. Alistair MacDonald & Edward Welsch, *Next Frontier: Mining the Ocean Floor*, WALL ST. J. (June 4, 2012), https://www.wsj.com/articles/SB10001424052702303395-60457743466006578438 8 [https://perma.cc/8L5L-7Y38].

13. Comm'n on the Limits of the Cont'l Shelf (CLCS), *Submissions to the Commission: Submission by the Russian Federation,* U.N. OCEANS & L. OF THE SEA https://www.un.org/depts/los/clcs_new/submissions_files/submission_rus.htm [https://perma.cc/5V6N-CD9H] (Nov. 4, 2024); Comm'n on the Limits of the Cont'l Shelf, Statement by the Chairman of the Commission on the Limits of the Continental Shelf on the Progress of Work in the Commission, ¶¶ 7-16, U.N. Doc. CLCS/32 (Apr. 12, 2002).

14. Comm'n on the Limits of the Cont'l Shelf, Progress of Work in the Commission on the Limits of the Continental Shelf, ¶¶ 11–15, U.N. Doc. CLCS/57/2 (Apr. 3, 2023); *UN CLCS Approves Russia's Arctic Seabed Submission*, THE ARCTIC (Feb. 20, 2023), https://arctic.ru/geographics/20230220/1015466.html [https://perma.cc/5ALK-P5DH].

15. UNCLOS, *supra* note 1, at Annex II.

16. *Commission on the Limits of the Continental Shelf*, DIVISION FOR OCEAN AFFAIRS AND THE LAW OF THE SEA, https://www.un.org/depts/los/clcs_new/clcs_home.htm (last visited Apr. 15, 2024) [https://perma.cc/7LGU-D5N9].

17. Comm'n on the Limits of the Cont'l Shelf, Statement by the Chairman of the Commission on the Limits of the Continental Shelf on the Progress of Work in the Commission, ¶¶ 10–11, U.N. Doc. CLCS/54, (Apr. 27, 2007).

2014.[18] The fact that the United States has lagged behind other nations is ironic, because the United States made the earliest explicit claim to the continental shelf.

## II. HISTORY OF THE U.S. CONTINENTAL SHELF

From the beginning of its history, the United States was ambivalent about offshore maritime claims, preferring instead a liberal order of the oceans that preserved freedom of the seas for ships of all nations. Distinguished American historian Samuel Flagg Bemis referred to the doctrine of freedom of the seas as the "ancient birthright" of the American Republic.[19] By the late nineteenth century, however, the United States became more concerned about the conservation of offshore resources. In the Bering Sea Fur Seal Arbitration of 1890, American officials sought to exclude Canadian pelagic, or high seas, sealing in international waters off the Aleutian Islands.[20] Canadian sealers were taking fur seals as they swam some sixty miles offshore of the Pribilof Island group of the Aleutians.[21] The seal rookery was on U.S. territory, so Canadian fishers took them on the high seas;[22] but hunting seals at sea is inefficient and wasteful. Every skin sold on the market by pelagic sealers represented the destruction of six to eight seals, threatening the viability of the herd.[23] The U.S. Revenue Cutting Service, the precursor to the Coast Guard, captured three of these ships for illegally taking Alaskan seals and threatening the population of the species.[24] The issue was submitted to arbitration, and Canada prevailed over the U.S. in its attempt to regulate high seas sealing.[25] After losing the

18. U.N. Convention on the Law of the Sea, Receipt of the Partial Submission Made by Canada to the Comm'n on the Limits of the Cont'l Shelf, U.N. Doc. CLCS.84.2019.LOS (May 23, 2019); U.N. Convention on the Law of the Sea, Receipt of the Submission Made by the Kingdom of Den. to the Comm'n on the Limits of the Cont'l Shelf, U.N. Doc. CLCS.68.2013.LOS (Dec. 6, 2013); *see* THE ARCTIC INSTITUTE, CONTINENTAL SHELF CLAIMS IN THE ARCTIC (2017).

19. SAMUEL FLAGG BEMIS, A DIPLOMATIC HISTORY OF THE UNITED STATES 875 (4th ed. 1955); WALTER LAFEBER, THE AMERICAN AGE: UNITED STATES FOREIGN POLICY AT HOME AND ABROAD 1750 TO THE PRESENT 277–79, 285, 297, 303 (2d ed. 1994).

20. THE BERING SEA FUR SEAL ARBITRATION, *reprinted in* FREEMAN SNOW, CASES AND OPINIONS ON INTERNATIONAL LAW WITH NOTES AND A SYLLABUS 521 et. seq. (1893); John Basset Moore, 1 HISTORY AND DIGEST OF THE INTERNATIONAL ARBITRATIONS TO WHICH THE UNITED STATES HAS BEEN A PARTY 934, 935 (1898).

21. SNOW, *supra* note 20 at 521.

22. *Id.*

23. D.O. Mills, *Our Fur-Seal Fisheries*, 151 THE N. AM. REV. 300, 303 (1890).

24. SNOW, *supra* note 20.

25. *Id.*

arbitration, the United States went on to negotiate an international agreement to protect Bering Sea fur seals.[26]

At the turn of the century, the United States further extended U.S. jurisdiction over living and non-living resources beyond the territorial sea.[27] At the turn of the twentieth century, the first offshore oil wells were drilled off the coast of California using an extensive network of wooden trestles attached to the land. Then, in the late 1930s, free-standing platforms were built in the Gulf of Mexico.[28] In a quest to secure oil supplies during World War II, Secretary of the Interior Harold Ickes advanced a proposal to claim the mineral resources of the continental shelf.[29] This effort occurred mainly during the Roosevelt administration but culminated in the Truman Proclamation on the continental shelf in 1945.[30] The press release accompanying the Truman Proclamation stated that the U.S. claim covered "submerged land which is contiguous to the continent" constituting the continental shelf.[31]

### *A. Truman Proclamation*

The Truman Proclamation envisioned a limited set of claims over the resources on the seabed and subsoil in the extension of the land mass of the United States into the ocean. Within this area, the U.S. administration regarded "the natural resources of the subsoil and seabed of the continental shelf beneath the high seas but contiguous to the coasts of the United States [as] subject to its jurisdiction and control."[32] The Secretary of the Interior

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26. U.S. DEP'T OF STATE, TREATIES AND OTHER INTERNATIONAL AGREEMENTS OF THE UNITED STATES OF AMERICA (1974).

27. *See* ANN L. HOLLICK, U.S. FOREIGN POLICY AND THE LAW OF THE SEA 20 (1981); *see also* Harry N. Scheiber, *Japan, The North Atlantic Triangle, and the Pacific Fisheries: A Perspective on the Origins of Modern Ocean Law, 1930-1953*, 6 SAN DIEGO INT'L L.J. 27, 38–45 (2004).

28. *The History of Offshore Oil and Gas in the United States (Long Version)* 1-5 (Nat'l Comm'n on the BP Deepwater Horizon Oil Spill and Offshore Drilling, Working Paper No. 22, 2010); JOSEPH A. PRATT ET AL., OFFSHORE PIONEERS: BROWN & ROOT AND THE HISTORY OF OFFSHORE OIL AND GAS 1–7 (1997).

29. HOLLICK, *supra* note 27 at 103-04.

30. *See* Letter from the Secretary of the Interior (Ickes) to the Secretary of State (May 23, 1944), *in* DEP'T OF STATE, FOREIGN RELATIONS OF THE UNITED STATES: DIPLOMATIC PAPERS, 1945, GENERAL: POLITICAL AND ECONOMIC MATTERS VOL. II; Edwin Borchard, *Resources of the Continental Shelf*, 40 AM. J. INT'L L. 53, 53 (1946).

31. Proclamation No. 2667, Policy of the United States with Respect to the Natural Resources of the Subsoil and Sea Bed of the Continental Shelf, 10 Fed. Reg. 12303 (Sept. 28, 1945).

32. HOLLICK, *supra* note 27 at 103-04.

manages the area for administrative purposes. The concept of the continental shelf claim gained rapid acceptance in customary international law. The first oil well beyond the sight of land was drilled in the Gulf of Mexico in 1938.[33] By 1950, Professor Lauterpacht observed, "Seldom has an apparent major change in international law been accomplished by peaceful means more rapidly and amidst more general acquiescence and approval than in the case of the claims to submarine areas—the sea bed and its subsoil—adjacent to the coast of littoral states."[34]

The Outer Continental Shelf Lands Act of 1953 codified the Truman Proclamation and affirmed that the submerged lands lying seaward of the three-mile territorial sea "appertain to the United States and are subject to its jurisdiction and control."[35] The statute describes the continental shelf as subject to U.S. "jurisdiction, control, and power of disposition."[36] The Senate Committee on Interior and Insular Affairs reflected the broad understanding that the continental shelf is "the extension of the land mass of the continents out under the waters of the ocean to the point where the continental slope leading to the ocean bottom begins. This point is generally regarded as a depth of approximately 100 fathoms, or 600 feet, more or less."[37]

### *B. Continental Shelf Convention*

The extent of the continental shelf set forth in the 1958 Continental Shelf Convention mirrored the U.S. measurement of the 200-meter isobath, or 600 feet in depth.[38] The treaty added the nuance that the coastal state could extend its continental shelf beyond that limit "where the depth of the superjacent waters admits of the exploitation of the natural

33. PRATT ET AL., *supra* note 28 at 6–7.

34. Hersch Lauterpacht, *Sovereignty over Submarine Areas*, 27 BRIT. Y.B. INT'L L. 376, 376 (1950).

35. Outer Continental Shelf Lands Act 1953, Pub. L. No. 212 § 2(a), 83d Cong. 67 Stat.

36. *Id.* at § 3.

37. Letter From the Acting Assistant Secretary of State for Congressional Relations (Kirlin) to the Director of the Bureau of the Budget (Hughes) (November 28, 1955), *in* FOREIGN RELATIONS OF THE UNITED STATES, 1955–1957, UNITED NATIONS AND GENERAL INTERNATIONAL MATTERS (Lisle A. Rose & John P. Glennon eds., vol. XI 1988); Office of the Geographer, United States Department of State, Sovereignty of the Sea, Geographic Bulletin No. 3 pp. 7–8 (April 1965); Office of the Geographer, United States Department of State, Sovereignty of the Sea, Geographic Bulletin No. 3, pp. 8 – 9 (Rev. October 1969).

38. Convention on the Continental Shelf art. 1., Apr. 29, 1958, 15 U.S.T. 471, T.I.A.S. No. 5578, 499 U.N.T.S. 311; Commentary to the Articles Concerning The Law of the Sea, Rep. of the Yearbook of the International Law Commission, 295-97 (1956).

resources" of the seabed.[39] This formula was immediately problematic, however, because advancements in undersea technology would continually enable exploitation of resources at distances farther from shore. This "exploitability criterion" meant that there might be no end to the depth at which coastal states could exploit the resources of the seabed. If coastal states began to encroach on the resources of the deep seabed, which are all hard mineral resources rather than oil and gas, they would shrink or eliminate the area reserved in Part XI of UNCLOS for the common heritage of all mankind.[40] The limit of coastal state jurisdiction at the 200-meter isobath depth evolved to become a metric of distance of 200 NM. There is uncertainty as to how "meters" changed to "(nautical) miles," (NM) and it may be apocryphal, but a popular theory is that the "m" was misinterpreted. The change either conveniently coincided with, or bolstered, the effort by Chile, Ecuador, and Peru to claim a 200-mile territorial sea and later was associated with the creation of the 200-mile exclusive economic zone (EEZ).[41] It was foreseeable that little or no seabed resources would remain for the benefit of land-locked states or less-developed states that lacked the technology to exploit the deep seabed.[42] Uncomfortable with this prospect, developing states in the 1969 U.N. General Assembly proposed and pushed through to adoption a resolution that called on member states to convene a general conference on the law of the sea to "arrive at a clear, precise and internationally accepted definition of the area of the deep sea-bed and ocean floor which lies beyond the limits of national jurisdiction . . . ."[43]

Just like the 1958 Convention on the Territorial Sea and the Contiguous Zone, which affirmed coastal state sovereignty over a territorial sea but then bypassed the breadth or outer limit of the zone (was it three, six, or twelve NM?), the 1958 Continental Shelf Convention was silent on the maximum extent of the continental shelf.[44] Similarly, the 1969 North Sea Continental Shelf case held that the 1958 Continental Shelf Convention reflected customary international law in its description of the continental shelf as a "natural prolongation" of the state's "land territory"

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39. Lauterpacht *supra* note 34 at 431.

40. Commentary to the Articles Concerning the Law of the Sea, Rep. of the Yearbook of the International Law Commission, 296 (1956).

41. Arthur Dean, *Freedom of the Sea*, 37 FOREIGN AFF., 83, 87 (Oct. 1958).

42. U.N. GAOR, 22nd Sess., 1st committee, 1515th mtg at 62-4, U.N. Doc. A/6696/A/C.1/952 (Nov. 01, 1967).

43. G.A. Res. 2574 (XXIV), at 10 (Dec. 15, 1969); G.A. Res. 2750 (XXV), at 26-27 (Dec. 17, 1970).

44. *See* Convention on the Territorial Sea and the Contiguous Zone, Apr. 29, 1958, 15 U.S.T. 1606, 516 U.N.T.S. 205.

beneath the sea, but it did not address the issue of how far seaward it might extend.[45] The case also ruled that the continental shelf existed "*ipso facto* and *ab initio*" by virtue of coastal state sovereignty.[46] That is, the continental shelf is an inherent part of the coastal state. The United States reaffirmed its understanding of the continental shelf as *ipso facto* and *ab initio* part of the coastal state in 1983.[47]

The coastal states with the largest natural prolongation of the continental margin had an incentive to maximize the extent of the shelf using a geomorphological criterion rather than a simple distance formula of 200 NM.[48] These "broad [continental] margin" states included Argentina, Australia, Brazil, Canada, Iceland, India, Ireland, Madagascar, New Zealand, Norway, Sri Lanka, the United Kingdom, and Venezuela.[49] The group sought to obtain recognition of the broadest possible continental shelf as an extension of the continental margin under the water.[50] As late as 1970, President Nixon had advocated for the 200-meter isobath as the outer limit of the continental shelf,[51] but his idea did not gain traction inside the United States or abroad.[52]

As negotiations for UNCLOS got underway, in 1973, the developing states, represented by the Group of 77, did not have a uniform view on the maximum extent of the continental shelf.[53] By the end of the Fourth Session in 1976, however, states had negotiated the parameters of the outer limit of the extended continental shelf that included both the 200-NM distance formula, as well as the unlimited geomorphological formula advocated by the "broad margineers."[54] The Revised Single Negotiating

45. North Sea Continental Shelf (F.R.G. v. Den.; F.R.G. v. Neth.), Judgement, 1969 I.C.J 3, ¶ 19 (Feb. 20).

46. *Id.*

47. Third United Nations Conference on the Law of the Sea, *Official Records*, U.N. Doc. A/CONF.62/WS/37 (Vol. 17) (Dec. 10, 1982).

48. 2 CTR FOR OCEANS L. & POL'Y, UNITED NATIONS CONVENTION ON THE LAW OF THE SEA 1982 A COMMENTARY 842 (Myron H. Nordquist, et al. eds., 1993).

49. *Id.* at n.2.

50. Alan Beesley, *The Negotiating Strategy of UNCLOS III: Developing and Developed Countries as Partners–A Pattern for Future Multilateral International Conferences?*, 46 L. & CONTEMP. PROBS., 182, 189 (1983).

51. President Richard M. Nixon, Statement About United States Oceans Policy (May 23, 1970); U.S. Dep't. of State, CA-3320, Law of the Sea and Seabed Matters (1970); Victor Cohn, *Nixon Urges World Treaty for Sharing Seabed Riches*, WASH. POST, May 24, 1970, at A1; Richard D. Lyons, *Nixon Proposes a Treaty to Exploit Ocean Floor's Resources for All*, N.Y. TIMES, May 24, 1970, at 28.

52. *Man's Ocean Heritage*, N.Y. TIMES, May 27, 1970, at 46.

53. Beesley, *supra* note 50 at 187.

54. CTR FOR OCEANS L. & POL'Y, *supra* note 48, at 932, 1018.

Text, which formed the basis for the final convention, asserted that coastal states have "sovereign rights over the mineral resources of the continental shelf for a distance of 200 nautical miles," and "beyond 200 nautical miles to the outer edge of the continental margin."[55]

## III. UNITED NATIONS CONVENTION ON THE LAW OF THE SEA

Although the United States accepts the methods in UNCLOS Part VI for delineation of the continental shelf, it has not accepted the International Seabed Authority set forth in UNCLOS Part XI that serves as the gatekeeper for mineral development of the international seabed area.

### *A. Part XI: International Seabed Area*

During the negotiations from 1973 to 1982, the United States raised numerous objections over the provisions on deep seabed mining beyond the continental shelf in areas beyond national jurisdiction (the deep seabed).[56] The United States proposed that the International Seabed Authority should be a licensing authority, with only states and individuals enjoying the right to conduct mining.[57] The United States was concerned that the eight problems in Part XI on deep seabed mining would impede U.S. access to minerals from the ocean.[58] As the treaty negotiations were coming to a close, it became apparent that U.S. objections to the seabed mining provisions were not going to change the text of the new treaty. In anticipation that the United States would not sign the agreement, it

55. *Id.*; Third United Nations Conference on the Law of the Sea, *Official Records*, U.N. Doc. A/CONF.62/WP.8/Rev.1/Part II (Vol. 5) (Dec. 10, 1982).

56. Third United Nations Conference on the Law of the Sea, *Officials Records*, U.N. Doc. A/CONF.62/SR.157 (Vol. 16) (Dec. 10, 1982).

57. Press Release, Dep't of State, the Law of the Sea: A Test of International Cooperation (Apr. 8, 1976) (on file with author).

58. These issues were: decision-making, review conference, access system, technology transfer, production limitations and policies, the Enterprise, national liberation movements and "Grandfather rights." Third United Nations Conference on the Law of the Sea, *Official Records*, U.N. Doc. A/CONF.62/SR.164 (Vol. 16) (Dec. 10, 1982); *see also* Third United Nations Conference on the Law of the Sea*, supra* note 55, ¶ 18 ("the United States delegation had submitted to a specially convened informal meeting of the First Committee on 10 March a document (WG.21/Informal Paper 18) generally referred to as "the Green Book"); *see also* 6 CTR FOR OCEANS L. & POL'Y, UNITED NATIONS CONVENTION ON THE LAW OF THE SEA 1982 A COMMENTARY (Myron H. Nordquist, et al. eds., 2002).

prepared to advance plans for seabed mining unilaterally and with other developed states that shared the same concerns.[59]

> Mining of nodules on the seabed promises to be a significant future supply source for two of the minerals for which our current dependence is a cause of concern—cobalt and manganese—and could also provide alternative long-term supplies of nickel and copper. The Department of State supported the Deep Seabed Hard Minerals Resources Act to provide a legal regime for U.S. mining of the deep sea as an interim measure until a broadly accepted Law of the Sea Treaty enters into force. In the treaty negotiations a central goal of the United States has been the achievement of assured non-discriminatory access to seabed minerals under reasonable terms and conditions. The United States made considerable progress toward that goal at the last negotiating session, but further talks will be necessary to enhance the automaticity of access to seabed minerals within the Law of the Sea regime.[60]

George H. Aldrich, Acting Special Representative of the President for the Law of the Sea Conference, stated in 1981 that U.S. access to strategic minerals had "become hostage" to the U.N. Conference on the Law of the Sea.[61] Aldrich suggested seabed miners require exclusive access to develop a mining site, and such legal certainty can be obtained only through an international agreement.[62]

The American concerns on Part XI were not addressed in the final text. After UNCLOS was adopted in 1982, the Reagan administration announced the United States would not sign the treaty "because several major problems in the Convention's deep seabed mining provisions are contrary to the interests and principles of industrialized nations and would not help attain the aspirations of developing countries."[63] Other developed

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59. 1 U.S. GOV'T PRINTING OFF., Public Papers of the Presidents of the United States 92 (1983); 2 U.S. GOV'T PRINTING OFF., Public Papers of the Presidents of the United States 982 (1983).

60. *National Materials and Minerals Policy, Research and Development Act of 1980: Hearing on H.R. 2743 Before the Subcommittee on Science, Technology, and Spaced of the Senate Committee on Commerce, Science, and Transportation*, 96th Cong. 23 (1981) (statement of Michael Calingaert, Deputy Assistant Sec'y for Econ. and Bus. Aff.).

61. 81 DEP'T OF STATE BULL. 56 (1981).

62. *Id.* at 57.

63. Presidential Statement on United States Oceans Policy, 1 Pub. Papers 378-79 (March 10, 1983).

states also declined to sign UNCLOS for these same reasons.[64] These holdouts were able to obtain significant amendments to the deep seabed mining provisions, which were negotiated between 1992 and 1994.[65] Until the Implementation Agreement was adopted in 1994, Iceland had been the only developed state to have ratified the Convention.[66] Once the Implementation Agreement was adopted in 1994, UNCLOS quickly entered into force as developed states joined the treaty. President Bill Clinton signed the Implementation Agreement for the United States on July 29, 1994, and submitted it to the Senate for its advice and consent on October 7, 1994.[67] UNCLOS entered into force on November 16, 1994.[68] The United States is not party to the Convention and continues to rely on customary international law (as well as the imprecise 1958 Convention) as the legal source for its continental shelf.

### *B. Part VI: Continental Shelf*

For the most part the continental shelf is coterminous with the EEZ to the outer limits of the 200-mile zone, but it may extend even farther seaward in areas where there is a "natural prolongation" of the "continental margin."[69] The ECS is the area of continental shelf beyond the EEZ. The legal character of the continental shelf beneath the EEZ and beyond the EEZ are the same.[70] The final provisions on the ECS were clarified in Part VI of UNCLOS, which was adopted by the Conference in 1982. First, the distance formula states:

> 1. The continental shelf of a coastal State comprises the seabed and subsoil of the submarine areas that extend beyond its territorial sea throughout the natural prolongation of its land territory to the outer edge of the continental margin, or to a distance of 200 nautical miles from the baselines from which the

64. Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea of 10 December 1982, *opened for signature* July 28, 1994, 1836 U.N.T.S. 3 (entered into force Nov. 16, 1994).

65. *Id*.

66. *Id*. (indicating that the United Kingdom joined in 1997, France in 1996, Japan in 1996 and Germany in 1994).

67. *See* S. EXEC. REP. NO. 108-10 (2004).

68. UNCLOS, *supra* note 63.

69. *Dispute Concerning Delimitation of the Maritime Boundary Between Bangladesh and Myanmar in the Bay of Bengal, Judgment*, ¶¶ 434, 435, 437 (ITLOS Mar. 14, 2012) (noting these two terms are synonymous).

70. Barbados v. Trinidad and Tobago, 28 RIAA, 147, 208–09, ¶ 213 (Apr. 11, 2006).

> breadth of the territorial sea is measured where the outer edge of the continental margin does not extend up to that distance.[71]

This definition means that coastal states may utilize either the geomorphological test to claim the entire extent of the natural prolongation of the continental margin, regardless of how far it extends into the ocean, or instead adopt the 200-NM distance formula. The geomorphological test includes not only the continental shelf, but the slope and rise as well:

> 3. The continental margin comprises the submerged prolongation of the land mass of the coastal State, and consists of the seabed and subsoil of the shelf, the slope and the rise. It does not include the deep ocean floor with its oceanic ridges or the subsoil thereof.[72]

Coastal states may choose between these two formulae to obtain the broadest continental shelf they are entitled to, switching back and forth between the two measurements along the same coastline.[73] States electing to claim a continental shelf beyond 200 NM must apply one of the two limitation formulas so that their claims do not "exceed 350 nautical miles from the baselines," or "100 nautical miles from the 2,500 metre isobath," whichever is farther.[74] The limitation formulas ensure that even if there is a natural prolongation of the continental shelf extending hundreds of NM beyond the EEZ, there are discrete constraints to prevent encroachment on the international seabed area.

In 2012, the International Court of Justice recognized Article 76 as reflective of customary international law.[75] Most states are party to UNCLOS and are bound *inter se* by treaty law to the rules governing coastal state claims over the ECS. The United States, however, is not party to UNCLOS but regards the rules concerning continental shelf as reflective of customary international law and binding on all states. Furthermore, even coastal states that are party to UNCLOS cannot assert rights to their ECS as a matter of treaty law against a non-party state, and therefore must also resort to customary international law to ensure recognition of their claims by non-parties.

Although the United States is not party to UNCLOS, it continues the 1983 policy of recognizing the terms of the treaty (except for seabed

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71. UNCLOS, *supra* note 1, art. 76(1).

72. *Id.* art. 76(3).

73. *Id*. art. 76(4).

74. *Id*. art. 76(5).

75. Territorial and Maritime Dispute (Nicar. v. Colom.), Judgement, 2012 ICJ Rep. 624, 666, ¶ 118. (Nov. 19).

mining) as reflective of customary international law. This means the United States used the complex rules in Article 76 of the treaty to delineate its continental shelf, spending some twenty years to map the geophysical and geological characteristics of the seabed and the subsoil of the continental margin. The collection of supporting geomorphological data to delineate a continental shelf beyond 200 miles was conducted by the ECS Task Force, an interagency body of the US government that was chaired by Evan Bloom in the U.S. the Department of State.[76] The U.S. Geological Survey has the responsibility to collect, process, and interpret seismic and geologic data, working in conjunction with the National Oceanic and Atmospheric Administration over the past twenty years.[77] The Joint Chiefs of Staff, the U.S. Navy, the U.S. Coast Guard, the Department of Energy, the National Science Foundation, the Environmental Protection Agency, the Minerals Management Service, and the Arctic Research Commission also participated in the program.[78]

The U.S. claim is bounded by negotiated border agreements with neighboring states.[79] The United States has already established continental shelf boundaries with Cuba,[80] Mexico,[81] and Russia.[82] These negotiated maritime boundaries also apply to the U.S. ECS. The U.S. continental

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76. *See* U.S. Dep't. of State, *Evan Bloom*, https://2017-2021.state.gov/people/evan-bloom/ (last visited Apr. 15, 2024) [https://perma.cc/V2HL-4JVG]; U.S. Dep't of State, Office of the Spokesperson, *Announcement of U.S. Extended Continental Shelf Outer Limits: Media Note* (Dec. 19, 2023) https://www.state.gov/announcement-of-u-s-extended-continental-shelf-outer-limits/ [https://perma.cc/6AK5-HFVZ] [hereinafter U.S. Dep't of State (2023)].

77. U.S. Dep't of State (2023), *supra* note 76.

78. U.S. Dep't of State, *About the U.S. Extended Continental Shelf Project* https://2017-2021.state.gov/about-the-u-s-extended-continental-shelf-project/ (last visited Apr. 15, 2024) [https://perma.cc/Z4YJ-XNAA] [hereinafter U.S. Dep't of State (2017)].

79. U.S. DEP'T OF STATE, THE OUTER LIMITS OF THE EXTENDED CONTINENTAL SHELF OF THE UNITED STATES OF AMERICA: EXECUTIVE SUMMARY 25, 46 (2023).

80. Media Note, Office of the Spokesperson, U.S. Dep't of State (Jan. 18, 2017); Treaty Between the United States of America and the Republic of Cuba on the Delimitation of the Continental Shelf in the Eastern Gulf of Mexico Beyond 200 Nautical Miles, Jan. 18, 2017 (not in force) (preamble, "Affirming that the provisions of international law pertaining to the seaward extent of the continental shelf are reflected in Article 76 of the 1982 United Nations Convention on the Law of the Sea").

81. Treaty on the Delimitation of the Continental Shelf in the Western Gulf of Mexico Beyond 200 Nautical Miles, U.S.-Mex., June 9, 2000, T.I.A.S. No. 01-117, 2143 U.N.T.S. 417; Media Note, Office of the Spokesperson, U.S. Dep't of State (Jan. 18, 2017); *see also* Sean D. Murphy, *U.S. Mexico Continental Shelf Boundary in Gulf of Mexico*, 95 AM. J. INT'L L. 393, 394 (2001).

82. *Union of Soviet Socialist Republics – United States: Agreement on the Maritime Boundary,* 29 Int'l Legal Materials 941 (Cambridge Univ. Press, 1990).

shelf partially overlaps with the neighboring unresolved claims of Canada, the Bahamas, and Japan.[83] UNCLOS provides a formula in Article 83 for addressing overlapping areas,[84] but resolving these disputes is incumbent on the affected states.

### *C. Annex II: CLCS*

UNCLOS created a scientific body called the Commission on the Limits of the Continental Shelf (CLCS) to review and consider state submissions concerning the limits of the ECS and make "recommendations" to coastal states.[85] The CLCS is composed of twenty-one members who are scientific experts rather than lawyers or diplomats, and they also may work with states on their submissions by providing technical advice.[86]

Coastal states party to UNCLOS that intend to establish a continental shelf beyond 200 NM shall submit scientific data supporting their claim to the CLCS.[87] The CLCS considers the claim and makes recommendations to the coastal state.[88] If the coastal state establishes its ECS based on the recommendations by the CLCS, it shall be "final and binding."[89] The Article does not define what "final and binding" means, but it is generally regarded as being beyond challenge by other states. And yet, the CLCS cannot presuppose to dictate the seabed boundaries of states that may disagree, particularly for non-parties. It is also unclear whether this process reflects a rule that has crystallized into customary law and is therefore applicable to the United States and other non-party states, such as Venezuela and Turkey. As an inherent right of the coastal state, the legality of the ECS is not dependent on the "procedural requirements" of the CLCS.[90]

Becoming a party to UNCLOS would facilitate international recognition and legal certainty regarding the outer limits of the U.S.

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83. U.S. Dep't of State (2017), *supra* note 78.

84. UNCLOS, s*upra* note 1, art. 83.

85. *Id.* at art. 76(8); *Id.* at Annex II, arts. 1, 3(1)(a).

86. *Id.* at Annex II, arts. 2, 3(1)(b).

87. *Id.* at Annex II, art. 4.

88. *Id.* at Annex II, art. 6(3).

89. UNCLOS, *supra* note 1, art. 76(8).

90. *Dispute Concerning Delimitation of the Maritime Boundary Between Bangladesh and Myanmar in the Bay of Bengal*, *supra* note 69, ¶ 408. This view is reflected in UNCLOS, *supra* note 1, art. 77(3), which states that the rights of the coastal state over the continental shelf do not depend on its effective or notional occupation or on any express proclamation.

continental shelf by ensuring access to the CLCS.[91] In the absence of U.S. accession to the treaty, the extent that the United States either shall or may access the machinery of the CLCS is unclear. It is unresolved whether the CLCS would be entitled to consider a submission from a non-party. Article 3 of Annex II on the functions of the CLCS, however, suggests that it was established to consider technical datum submitted by "coastal States" rather than "State parties." This text suggests that non-parties to UNCLOS might utilize the CLCS process to gain greater acceptance for their ECS claims.

On the other hand, if that is the case, the United States would seem to accept obligations to provide a stream of revenue to the International Seabed Authority for minerals exploited beyond 200 nautical miles pursuant to Article 82(1) of UNCLOS. That Article requires "the coastal State [] make payments or contributions . . . in respect of exploitation of the non-living resources of the continental shelf beyond 200 nautical miles from the baselines from which the breadth of the territorial sea is measured."[92]

## IV. U.S. OUTER CONTINENTAL SHELF

The U.S. outer continental shelf (OCS) is defined as:

> (1) all submerged lands lying seaward and outside of the area of lands beneath navigable waters as defined in [the Submerged Lands Act], and of which the subsoil and seabed appertain to the United States and are subject to its jurisdiction and control or within the exclusive economic zone of the United States and adjacent to any territory of the United States; . . . ."[93]

This definition is applicable within the U.S. federal system to separate the continental shelf jurisdiction of the individual states of the union, which generally extends to three geographical miles, from the jurisdiction of the U.S. government, which extends beyond that outer limit.[94] The "outer" in the OCS refers to the shelf beyond three miles, whereas in international law, the continental shelf beyond the EEZ is often referred to as the "extended" continental shelf or ECS.

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91. *Charting the Arctic: Security, Economic, and Resource Opportunities: Joint Hearing Before the Comm. on Foreign Affs., Subcomms. on Eur., Eurasia, and Emerging Threats, and W. Hemisphere*, 114th Cong. (2015) (statement of Admiral Robert J. Papp, Jr.).

92. UNLCOS, *supra* note 1, art. 82(1).

93. Outer Continental Shelf Lands Act, 43 U.S.C. § 1331(a)(1).

94. Submerged Lands Act, 43 U.S.C. § 1301(2).

Within the U.S. federal system, individual states, such as Alaska, may extend their coastal state jurisdiction to three NM, except in some areas of Texas, the Gulf Coast of Florida, and the Commonwealth of Puerto Rico, where jurisdiction extends three NM from shore.[95] In some areas of Texas and Florida, along the Gulf Coast and the Commonwealth of Puerto Rico, jurisdiction extends nine NM from shore. The Alaska continental shelf includes the Beaufort Sea, Chukchi Sea, Bering Sea, Hope Basin and Norton Basin across the Bering Sea from Russia, Cook Inlet, and the Gulf of Alaska. In some cases, the Submerged Lands Act (SLA) coastline is not consistent with the baseline, such as when the U.S. Supreme Court identifies an SLA boundary by judicial decree.[96] Federal jurisdiction extends to the outer edge of the continental margin, or 200 NM from the baseline, whichever is greater.[97] Applying the formula in Article 76 of UNCLOS, the United States has an extensive continental shelf projecting into the Arctic Ocean that lies beyond 200 NM.

### *A. Oil and Gas*

The United States produces more natural gas than any other nation.[98] American reserves of natural gas rank fifth in the world, behind Russia, Iran, Qatar, and Turkmenistan.[99] Some analysts believe the United States has greater oil reserves than Saudi Arabia, although the consensus is that the American oil reserves are dwarfed by not only Saudi Arabia and Venezuela, but also Kuwait, Iran, Iraq, Canada, and Russia.[100] Still, U.S. oil reserves are believed to be larger than some other oil producers, including Kazakhstan, Qatar, Libya, and Nigeria.[101]

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95. *Id.* §§ 1301-15.

96. *Id.*

97. UNCLOS, *supra* note 1, art. 76.

98. BP STATISTICAL REV. OF WORLD ENERGY 28 (69th ed. 2020).

99. Andrew Fawthrop, *Profiling the Top Five Countries with the Biggest Natural Gas Reserves*, NS ENERGY (Mar. 15, 2021), https://www.nsenergybusiness.com/features/biggest-natural-gas-reserves-countries/ [https://perma.cc/67TT-MH23]; *see also Natural Gas by Country 2024*, WORLD POPULATION REV., https://worldpopulationreview.com/country-rankings/natural-gas-by-country (last visited Apr. 17, 2024) [https://perma.cc/KMJ3-A9LE].

100. BP STATISTICAL REV. OF WORLD ENERGY, *supra* note 97 at 14; *see also* Anshool Deshmukh, *Which Countries Have the World's Largest Proven Oil Reserves?*, VISUAL CAPITALIST (June 7, 2021), https://www.visualcapitalist.com/ranking-the-countries-with-the-largest-proven-global-oil-reserves-in-the-world/ [https://perma.cc/Q8MU-L4PP].

101. Deshmukh, *supra* note 100.

By 2007, 14% of U.S. natural gas and 27% of its oil production came from the OCS.[102] The undiscovered but economically and feasibly recoverable oil and gas on the U.S. continental shelf is substantial. The U.S. Bureau of Ocean Energy Management (BOEM) estimates that the U.S. continental shelf contains 68.79 billion barrels of oil (Bbo) and 229 trillion cubic feet of natural gas (Tcfg).[103] Alaska accounts for 24.69 Bbo, while the Gulf of Mexico holds 28.59 Bbo, with the remainder divided between the Atlantic Coast (4.31 Bbo) and the Pacific Coast (10.20 Bbo).[104] The Alaskan continental shelf holds more than half of the offshore discoverable natural gas of the United States: 124.03 Tcfg compared to the total of 229.03 Tcfg, with the Gulf of Mexico accounting for 54.84 Tcfg.[105] This compares with Saudi Arabia's oil reserves, which officially are estimated at 260 to 265 Bbo, although actual reserves might be between 70 to 120 Bbo because outside auditors have not been allowed to review the data since 1988.[106]

The U.S. continental shelf may contain vast reserves of oil and gas, further bolstering its position as an energy powerhouse. In the current political climate, however, the fossil fuel reserves are a less compelling reason to focus on the resources of the continental shelf than the prospect of hard mineral development.

### *B. Hard Minerals*

Although the initial concept for extracting non-living resources on the continental shelf focused on oil and natural gas, mineral wealth may prove to be an even greater market. Seabed minerals form within a variety of geologic and oceanographic areas and occur throughout the global seabed. Minerals form on the seabed or subsoil of the ocean as the result of either

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102. *Leasing and Development of Oil and Gas Resources on the Outer Continental Shelf: Hearing Before the Comm. on Natural Resources, Subcomm. on Energy and Mineral Resources*, 111th Cong. (Mar. 17, 2009) (statement of Chris Oynes, Associate Director, Offshore Energy and Min. Mgmt.).

103. 2021 NATIONAL ASSESSMENT OF UNDISCOVERED OIL AND GAS RESOURCES OF THE U.S. OUTER CONTINENTAL SHELF, BUREAU OF OCEAN ENERGY MGMT. 28 (Dec. 2021).

104. *Id.*

105. Submerged Lands Act, 43 U.S.C. § 1301(2).

106. John Kemp, *Saudi Arabia's Oil Reserves: How Big Are They Really?*, REUTERS, (July 10, 2016, 9:31 PM), https://www.reuters.com/article/us-saudi-oil-kemp/saudi-arabias-oil-reserves-how-big-are-they-really-kemp-idUSKCN0ZL1X6/; Robert Rapier, *How Much Oil Does Saudi Arabia Really Have?*, FORBES (Feb. 14, 2019, 08:00 AM), https://www.forbes.com/sites/rrapier/2019/02/14/how-much-oil-does-saudi-arabia-have/?sh=304b8a567b33.

a reworking of terrestrial mineralization or diagenetic,[107] hydrogenetic,[108] and hydrothermal (seabed volcanic) processes in the ocean.[109] As land-based sources of minerals become increasingly difficult to access, states are looking to the seabed to obtain raw materials.[110]

There are three types of seabed minerals:

- Manganese nodules or polymetallic nodules are deposits or accretion of nodules "on or just below the surface of the deep seabed, which contain manganese, nickel, cobalt and copper."[111]
- Ferromanganese crusts or cobalt-rich crusts are hydroxide/oxide deposits formed from "direct precipitation of minerals from seawater onto hard substrates."[112] These crusts contain concentrations of cobalt, titanium, nickel, platinum, molybdenum, tellurium, cerium, and other metallic and rare earth elements.[113]
- Seafloor massive sulfide (SMS) deposits or polymetallic sulfides are "hydrothermally formed deposits of [sulfides] and accompanying mineral resources in the Area which contain

107. The term diagenetic pertains to the physical, chemical, or biological changes in sediments caused by the interaction of the water and rocks, microbes, and pressure and increasing temperature. R. C. SELLEY, ENCYCLOPEDIA OF GEOLOGY 666-668 (2d ed. 2005), ("As sediment is buried more deeply, temperature and pressure increase and, ultimately, diagenesis merges into metamorphism, with shale becoming slate, sandstone becoming quartzite, and limestone becoming marble.").

108. Hydrogenetic minerals precipitate from the sea water column. *See* Dengfeng Li et al., *Critical Metal Enrichment Mechanism of Deep-Sea Hydrogenetic Nodules: Insights from Mineralogy and Element Mobility*, 118 ORE GEOLOGY REVS. 1, 1 (2020) (describing hydrogenetic minerals as those "metals in . . . marine nodules and crusts . . . uptaken from seawater").

109. AMY GARTMAN ET AL., MARINE MINERALS IN ALASKA — A REVIEW OF COASTAL AND DEEP-OCEAN REGIONS 17 (2022).

110. Todd Woody & Evan Harper, *A Gold Rush in the Deep Sea Raises Questions about the Authority Charged with Protecting It*, L.A. TIMES, (Apr. 19, 2022, 4:00 AM), https://www.latimes.com/politics/story/2022-04-19/gold-rush-in-the-deep-sea-raises-questions-about-international-seabed-authority.

111. Int'l Seabed Auth., Dec. of the Council of the International Seabed Authority Relating to Amendments to the Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area and Related Matters, U.N. Doc. ISBA/19/C/17, annex I (July 22, 2013).

112. Int'l Seabed Auth., Dec. of the Assembly of the International Seabed Authority Relating to the Regulations on Prospecting and Exploration for Cobalt-rich Ferromanganese Crusts in the Area, U.N. Doc. ISBA/18/A/11, annex I (Oct. 22, 2012).

113. *Id.*

> concentrations of metals including, inter alia, copper, lead, zinc, gold and silver."[114]

### *C. Mineral Supply Chain Security*

In 1995, the United States was dependent on foreign sources for forty-seven strategic minerals.[115] That year, the United States imported 100% of its supply of eight of these nonfuel materials and more than 50% of its supply of sixteen other nonfuel materials.[116] By 2022, the United States imported 100% of its supply of fifteen nonfuel minerals, including gallium, manganese, and yttrium.[117] China was the principal source for six of these materials (arsenic, gallium, graphite, mica, tantalum, and yttrium) and a secondary source for three more (indium, scandium, and strontium).[118] Seven out of nine of these materials are on the U.S. Critical Minerals List containing fifty materials.[119] Arsenic is used in semiconductors. Gallium is used in integrated circuits and advanced optical devices.[120] Graphite is used in fuel cells, batteries, and lubricants.[121] Tantalum is used in metallurgy and capacitors, and yttrium is required for catalysts, ceramics, lasers, metallurgy, and phosphors.[122] Indium is used in anode coatings for electrochemical processes and chemical catalysts.[123] Ceramics, fuel cells, and metallurgy use scandium.[124]

The United States imports more than 90% of its supply of six more minerals (gemstones, titanium, potash, bismuth, nepheline syenite, and REE, including fourteen metallic chemical lanthanide elements).[125] Titanium, bismuth, and REE are on the Critical Minerals List.[126] China is the top source for two of these, plus rare earth compounds and metals. Bismuth has applications in the medical field, metallurgy, and nuclear research. Titanium is used in metallurgy and pigments.

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114. *Id.*
115. U.S. GEOLOGICAL SURV., U.S. DEPT. OF THE INTERIOR, MINERAL COMMODITY SUMMARIES 1996 4 (1996).
116. *Id.*
117. U.S. GEOLOGICAL SURV., U.S. DEPT. OF THE INTERIOR, MINERAL COMMODITY SUMMARIES 2023 7 (2023) [hereinafter MINERAL COMMODITY SUMMARIES 2023].
118. *Id.*
119. 2022 Final List of Critical Minerals, 87 Fed. Reg. 10381 (Feb. 24, 2022).
120. MINERAL COMMODITY SUMMARIES 2023, *supra* note 117, at 17.
121. *Id.*
122. *Id.*
123. *Id.*
124. *Id.*
125. *Id.* at 7, 17.
126. 2022 Final List of Critical Minerals, *supra* note 119.

Minerals are especially important to critical sectors of the U.S. economy, including the defense industrial base. The Department of Defense (DoD) has prioritized four areas of critical vulnerability posed by a potential shortfall in key minerals: (1) kinetic capabilities, including missile systems, hypersonic missiles, and directed energy weapons; (2) energy storage and batteries, high-capacity batteries, and especially lithium batteries; (3) castings and forgings, metals, or composites used in manufacturing tools; and (4) microelectronics.[127] To address the shortfall, the DoD recommended building domestic production capacity.[128] The United States also sought to obtain strategic minerals from partners and allies. In October 2023, China added urgency to these decisions when it placed restrictions on the export of gallium and germanium to the United States, widely seen as retaliation for the U.S. CHIPS Act to protect the American semiconductor industry.[129]

In a post-pandemic political environment, and with competition with China, Russia, and Iran intensifying, the United States is more focused on supply chain security, including raw materials. In 2020, President Trump signed an executive order to focus the U.S. government on supply chain security:

> Our country needs critical minerals to make airplanes, computers, cell phones, electricity generation and transmission systems, and advanced electronics. Though these minerals are indispensable to our country, we presently lack the capacity to produce them in processed form in the quantities we need. American producers depend on foreign countries to supply and process them. For 31 of the 35 critical minerals, the United States imports more than half of its annual consumption. The United States has no domestic production for 14 of the critical minerals and is completely dependent on imports to supply its demand. Whereas the United States recognizes the continued importance of cooperation on supply chain issues with international partners and allies, in many cases, the aggressive economic practices of certain non-market foreign producers of critical minerals have destroyed vital mining and manufacturing jobs in the United States. Our dependence on

127. U.S. DEP'T OF DEF., SECURING DEFENSE-CRITICAL SUPPLY CHAINS: ACTION PLAN DEVELOPED IN RESPONSE TO EXECUTIVE ORDER 14017 2 (2022) [hereinafter SECURING DEFENSE-CRITICAL SUPPLY CHAINS].

128. *Id.*

129. Amy Lv & Dominique Patton, *China Exported No Germanium, Gallium in August After Export Curbs*, REUTERS (Sept. 20, 2023, 6:56 AM), https://www.reuters.com/world/china/china-exported-no-germanium-gallium-aug-due-export-curbs-2023-09-20/#.

> one country, the People's Republic of China (China), for multiple critical minerals is particularly concerning. The United States now imports 80 percent of its rare earth elements directly from China, with portions of the remainder indirectly sourced from China through other countries. . . . I therefore determine that our Nation's undue reliance on critical minerals, in processed or unprocessed form, from foreign adversaries constitutes an unusual and extraordinary threat, which has its source in substantial part outside the United States, to the national security, foreign policy, and economy of the United States. I hereby declare a national emergency to deal with that threat.[130]

China's dominance in strategic minerals took decades to develop and will take time to unwind. In the early 1980s, Canada was the largest supplier of hard minerals to the United States, including gold, nickel, and zinc.[131] Australia and Mexico were also key suppliers.[132] Today, still more than 95% of U.S. REE are obtained abroad.[133] China now stands alongside Canada as a one of the top two major sources of imported mineral commodities.[134] The Secretary of the Interior has identified critical minerals as those essential to the economic prosperity and national security of the United States. Strategic mineral supply chains are especially vulnerable to disruption, which became evident during the COVID pandemic. The Biden administration has continued, and in some ways accelerated, the intention to partially decouple from China. In 2021, Biden issued an executive order to protect America's supply chains.[135] The executive order requires the Secretary of Defense as the National Defense Stockpile Manager to submit a report setting out the risks in the supply chain for critical minerals and other strategic minerals, including REE.[136] The DoD report was released one year later, offering sixty-four recommendations to ensure mineral-supply-chain security.[137] Even as the U.S. works with partner nations to provide strategic minerals, it has

130. Exec. Order No. 13953, 85 Fed. Reg. 62539 (Sep. 30, 2020).

131. *U.S. Strategic Minerals Dependency: Statement Before the Subcomm. on Sci., Tech., and Space of the S. Comm. on Com., Sci., and Transp.*, *supra* note 60.

132. *Id.*

133. *Critical Minerals and Materials Program*, NAT'L ENERGY TECH. LAB'Y, https://netl.doe.gov/resource-sustainability/critical-minerals-and-materials/background#ref12 (last visited Apr. 17, 2024) [https://perma.cc/XM5A-J7V7].

134. MINERAL COMMODITY SUMMARIES 2023, *supra* note 117, at 8.

135. Exec. Order No. 14017, 86 Fed. Reg. 11849 (Feb. 24, 2021).

136. *Id.* at 11850.

137. SECURING DEFENSE-CRITICAL SUPPLY CHAINS, *supra* note 127, at 67.

embarked on a program to "onshore" and "ally-shore" hard minerals.[138] Yet the DoD report makes no mention of the prospect of offshore minerals.[139]

### *D. International Efforts*

With distended supply chains, states are moving quickly to explore the possibility of internalizing mineral resources, and minerals on the continental shelf are likely to be an important source. Other states have leaped ahead of the United States in this area. Namibia has collected diamonds from its seabed for more than sixty years.[140] The Norwegian Parliament voted on January 9, 2024, to authorize prospect mining on parts of its continental shelf between Norway and Greenland.[141] The Cook Islands passed the Seabed Minerals Act in 2019 and published Draft Seabed Minerals Regulations in 2020.[142]

Japan conducted a test excavation of cobalt-rich crust on its seabed in 2020 and expects to begin mining by the late 2020s.[143] In 2018, Japan discovered a treasure trove of strategic minerals on its continental shelf surrounding Minamitorishima, located about 1,150 miles southeast of Tokyo.[144] A 965-square-mile survey of the continental shelf around the

138. *Id.* at 10.

139. *Id.*

140. Alexandra Wexler, *De Beers Harvests Diamonds at the Bottom of the Sea*, WALL ST. J. (Oct. 20, 2016), https://www.wsj.com/articles/de-beers-harvests-diamonds-at-the-bottom-of-the-sea-1476973582; Wendell Roelf, *De Beers' Big Green Machine Sucks up Namibian Diamonds*, REUTERS (June 18, 2014), https://www.reuters.com/article/namibia-diamonds-idUSL6N0OZ1QA20140618/.

141. Eric Lipton, *Norway Moves To Allow Seabed Mining Exploration*, N.Y. TIMES (Jan. 9, 2024), https://www.nytimes.com/2024/01/09/climate/seabed-mining-norway-oceans.html.

142. Seabed Minerals (SBM) Act 2019 and Seabed Minerals (Exploration) Regulations 2020, COOK ISLANDS SEABED MINERAL AUTHORITY, https://www.sbma.gov.ck/laws, (last visited Apr. 17, 2024) [https://perma.cc/36M5-NDAR].

143. *JOGMEC Conducts World's First Successful Excavation of Cobalt-Rich Seabed in the Deep Ocean; Excavation Test Seeks to Identify Best Practices to Access Essential Green Technology Ingredients While Minimizing Environmental Impact*, JOGMEC (Aug. 21, 2020), https://www.jogmec.go.jp/english/news/release/news_01_000033.html [https://perma.cc/K825-UPH9]; *JOGMEC conducts comprehensive evaluation of seafloor hydrothermal deposits development*, JOGMEC (Nov. 14, 2023), https://www.jogmec.go.jp/english/news/release/news_10_00050.html [https://perma.cc/LK36-LA42].

144. Mayumi Negishi, *Japan Hopes Rare-Earth Find Will Give It an Edge Against China*, WALL ST. J. (Apr. 11, 2018), https://www.wsj.com/articles/japan-hopes-rare-earth-find-will-give-it-an-edge-against-china-1523446948.

island revealed that the seabed contains an estimated 16 million tons of rare earth oxides.[145] Core samples suggest the seabed and subsoil contains as much as "780 years' worth of the global supply of yttrium, 620 years' worth of europium, 420 years' worth of terbium and 730 years' worth of dysprosium . . . ," used in nuclear reactors.[146] Terbium is used in advanced medicine.[147] Japan is developing a strategy for ocean development that is expected to provide a way forward for securing resources in its surrounding seabed, with the minerals around Minamitorishima a prominent element.[148] The effort is based on Japan's Fourth Basic Ocean Policy. The Third Plan, released in 2018, was committed to developing methane hydrates, offshore wind, and wave power for energy, and to excavating hard minerals.[149] The hard minerals are found in seafloor polymetallic sulfides, cobalt-rich manganese crusts, polymetallic nodules, and rare earth muds.[150] Japan's 2023 strategy goes further; the new strategy will also include expanded maritime domain awareness using satellites and other means.[151]

### *E. Alaska's Potential Mineral Wealth*

Like other states, the United States should look to offshore sources to see whether it can address some of the demand for strategic minerals, and Alaska could be the key element of such an approach. Legacy legislation and guidelines already exist for obtaining hard minerals located on the continental shelf.[152] Today, Alaska mainly produces gold, lead, sand and gravel (construction), silver, and zinc, but the future could include higher-

145. Yutaro Takaya et al., *The Tremendous Potential of Deep-Sea Mud as a Source of Rare-Earth Elements*, NATURE 1, 1-8 (Apr. 10, 2018).

146. Negishi, *supra* note 144.

147. Takaya et al., *supra* note 145 at 1–2; Negishi, *supra* note 144.

148. *Japan's Ocean Development Strategy to Be Strengthened with Eye on China*, JAPAN NEWS (Aug. 28, 2023), https://japannews.yomiuri.co.jp/politics/politics-government/20230828-132737/ [https://perma.cc/J7EC-FPTV].

149. THE THIRD BASIC PLAN ON OCEAN POLICY, 55-61 (2018), https://www8.cao.go.jp/ocean/english/plan/pdf/plan03_e.pdf.

150. *Id.*

151. *Japan's Ocean Development Strategy to Be Strengthened with Eye on China*, *supra* note 148.

152. U.S. Dep't Interior, Minerals Mgmt. Serv. (MMS) Guidelines for Obtaining Minerals other than Oil, Gas and Sulphur on the Outer Continental Shelf (Pub. L. No. 103-426, enacted Oct. 31, 1994; 108 Stat. 4371).

value offshore hard minerals.[153] The nonfuel mineral economy of Alaska is ranked sixth in the United States.[154]

Alaska's offshore seabed contains areas that are conducive to mineral formation. Melting ice cover makes potential mineral extraction more feasible.[155] Alaska's continental shelf has extensional basins formed by an active subduction zone that may contain seafloor massive sulfide deposits, deep abyssal plains that could contain seabed nodules, and seamounts that may contain ferromanganese crusts.[156] The Alaskan ECS has the potential for seabed minerals throughout the Canada Basin and on the seafloor along the arc of the Aleutian Islands, although data are limited and no areas beyond the EEZ have been identified containing undersea minerals.[157] Ferromanganese crusts are present along seamounts in the Gulf of Alaska and the Chukchi Borderland due north of Alaska in the Arctic Ocean.[158]

Alaska could become a reservoir of the critical minerals needed for U.S. economic and national security. The Energy Act of 2020 defines "critical minerals" as those designated by the Secretary of the Interior that are:

> minerals, elements, substances, and materials . . . that . . . (i) are essential to the economic or national security of the United States; (ii) the supply chain of which is vulnerable to disruption . . . ; and (iii) serve an essential function in the manufacturing of a product, . . . the absence of which would have significant consequences for our economy or our national security.[159]

## CONCLUSION

As the largest part of the U.S. continental shelf, Alaska's offshore area, which has many favorable geomorphological characteristics, may one day be an important and secure source of strategic minerals. Other nations have already embarked on prospecting for hard minerals on their continental shelf, while the International Seabed Authority has awarded fifteen exploratory permits to some twenty-two contractors.[160]

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153. MINERAL COMMODITY SUMMARIES 2023, *supra* note 115 at 10–12.
154. *Id*.
155. *See* GARTMAN ET AL., *supra* note 109 at 1.
156. *Id.*
157. *Id.*
158. *Id.*
159. 30 U.S.C. § 1606(c)(4)(A).
160. *Exploration Contracts*, INTERNATIONAL SEABED AUTHORITY, https://www.isa.org.jm/exploration-contracts/ (last visited Apr. 17, 2024) [https://perma.cc/Y7BF-UMFV].

The legal wrinkle for the United States is that it is not party to UNCLOS. The inherent nature of the continental shelf means that the United States is not in jeopardy of losing sovereign rights and jurisdiction; however, the CLCS mechanism for ensuring international acceptance may not be available to non-parties to the Convention. While the United States can act unilaterally to develop its continental shelf, it does so under the theory of customary international law rather than rights affirmatively codified in UNCLOS.

There are three precedents in international law in which the United States advanced unilateral claims based on customary international law, and the international community respected them. First, the Truman Proclamation asserted a right to offshore resources. Other states quickly accepted the claim. The U.S. claim was regarded as a refinement of existing customary international law and numerous states similarly situated moved to establish their own claims. The theoretical underpinning of the continental shelf as a prolongation of the continental margin had widespread appeal.

Second, the United States unilaterally adopted a 200-mile fisheries zone in 1976, and other nations withdrew their fishing vessels beyond the outer limit and respected the U.S. claim.[161] Numerous coastal states already were asserting offshore jurisdiction over fisheries, many out to the 200-mile limit. Although the international law governing the content of coastal state fisheries jurisdiction was uncertain, it was apparent that some type of coastal state fishing zone was going to be part of the package deal of UNCLOS.

Third, the United States unilaterally established a 200-mile EEZ, which was a creation of UNCLOS. Still, the U.S. EEZ was rapidly accepted by other states even while the Reagan administration declined the opportunity to sign UNCLOS.[162] While it is unclear whether the EEZ had crystallized into customary international law when Reagan asserted the U.S. claim in 1983, the International Court of Justice held in 2012 that it had entered into customary international law.[163] These examples suggest that the United States may develop mineral resources on its ECS based purely on customary law and regardless of whether it is party to UNCLOS,

161. Magnuson-Stevens Fishery Conservation and Management Act, Pub. L. 94-265 (1976); Mead Treadwell, *Arctic Horizons: A Primer and Critical Questions on Extending US Territory in the Arctic Ocean*, THE WILSON CENTER (Dec. 19, 2023), https://www.wilsoncenter.org/article/arctic-horizons-primer-and-critical-questions-extending-us-territory-arctic-ocean [https://perma.cc/7R7E-47FY].

162. Presidential Statement on United States Oceans Policy, *supra* note 63.

163. Territorial and Maritime Dispute (Nicar. v. Colom.), 2012 I.C.J. 624, ¶ 118 (Nov. 19).

and other states will respect it. Recently, however, the Russian Federation has challenged the right of the United States to delineate an ECS. Speaking through its representative at the International Seabed Authority on March 18, 2024, Russia declared it does not recognize the U.S. unilateral claim.[164] Specifically, Russia asserted that the U.S. ECS claim encroaches on the International Seabed Area set aside for mineral development for the common heritage of mankind. The Russia position is likely to attract support from other UNCLOS states party.

Whether the United States joins UNCLOS, the strategic aspects of mineral supply chain security will persist, and a decision will have to be made whether to consider offshore sources. The United States is in a position of economic and military vulnerability due to its reliance on China and other unfriendly sources of strategic minerals and REE. As global politics and economics unfold in tandem and the United States competes with China, Russia, and Iran throughout the world, the attraction for internal lines of supply is nowhere more compelling than in hard minerals. Consequently, the United States may look to offshore Alaska to fill this need. This conclusion calls for three caveats.

First, while the United States has negotiated boundaries with Russia and Canada, there are a handful of relatively small, disputed areas of the continental shelf between the United States and Canada that are unresolved. One of these disputes is in the Gulf of Maine, and the other is in the Beaufort Sea. Off the coast of Alaska, the United States recognizes the equidistance formula and Canada observes the 141st Meridian to the North Pole.[165] This dispute will have to be resolved through bilateral negotiations but does not affect the vast majority of ECS entitlement. Until there is a negotiated solution that provides clarity, the United States should avoid developing that portion of its ECS.

Second, it is uncertain what types of minerals are available off the coast of Alaska, and in what quantity and purity. Although the geomorphology is promising, more work will have to be done to determine exactly what lies at the bottom of the sea in the Arctic Ocean.

Third, although the need for seabed strategic minerals is urgent and compelling, there are undetermined environmental costs of exploiting

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164. Sergey Petrovich, Permanent Representative of the Russian Fed'n to the Int'l Seabed Auth., Remarks During the 29th Session of the ISA Council (Mar. 18, 2024).

165. II CUMULATIVE DIGEST OF UNITED STATES PRACTICE IN INTERNATIONAL LAW 1981–1988, at 1888–92 (Marian Nash (Leich), ed. July 1994); 2004 DIGEST OF UNITED STATES PRACTICE IN INTERNATIONAL LAW 734–735 (Sally J. Cummins, ed. 2006); 2005 DIGEST OF UNITED STATES PRACTICE IN INTERNATIONAL LAW 705–706 (Sally J. Cummins, ed. 2007); 2008 DIGEST OF UNITED STATES PRACTICE IN INTERNATIONAL LAW at 640–42 (Elizabeth R. Wilcox, ed. 2010).

them. With the potential harm to the environment looming in the background, environmental opposition to offshore development can be strong and unpredictable.[166] The United States may decide that the risk of environmental damage from exploiting minerals on the seabed outweighs the value of exploiting them.

166. Timothy Puko & Andrew Duehren, *Politics: GOP Ferver Ebbs for Offshore Drilling - Shift in Sentiment Waylays Trump Administration Push for Oil Drilling off Southeast Coast*, WALL ST. J. (Nov. 30, 2019), https://www.wsj.com/articles/republican-fervor-ebbs-for-offshore-oil-drilling-11575040183.