

Protection of Undersea Telecommunication Cables: Issues for Congress

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Commercial undersea telecommunication cables carry about 99% of transoceanic digital communications (e.g., voice, data, internet), including financial transactions. Individual private companies and consortia of companies own and operate a network of more than 500 commercial undersea cables that form the backbone of the global internet. Many of these commercial undersea telecommunication cables land in the United States and its territories, supporting communications for consumers, businesses, and the government, including military, diplomatic, and national security agencies. Recent attacks on undersea infrastructure, including the Nord Stream pipelines, has heightened concerns for cables, and spurred calls for increased protection of undersea telecommunication cables and the global cable network.

Intentional and Unintentional Damage to Undersea Cables. Recent intentional and unintentional acts and natural events have damaged undersea telecommunication cables, and disrupted communications. In April 2022, vandals damaged several cable landing sites in France, cutting multiple cables, disrupting and degrading services in several parts of France. French telecom industry representatives described the attacks as “coordinated” and “unprecedented” in scale. In October 2022, another intentional cable cut in France affected communications across Europe and globally. Unintentional acts have also damaged cables and disrupted communications. In October 2022, a cable serving the Shetland Islands was damaged by a fishing vessel, disrupting communications on the islands. In January 2022, an underwater volcano erupted in Tonga severing an undersea cable, affecting communications and internet services on the main island for several weeks, and on the outer islands for 18 months. In June 2023, an undersea cable serving the North Slope of Alaska was severed by naturally shifting ice, affecting internet and cell service for residents in this Arctic area. These events have heightened awareness of the importance of cables, their vulnerabilities, and protection needs.

Telecommunication Cable Protection in the United States. The U.S. government has taken some action to protect subsea cables, adopting penalties for those causing cable damage; restricting vessels from anchoring close to an undersea cable in designated anchoring areas; and creating a Cable Security Fleet to assist with repairs and protect U.S. national security. Yet, vulnerabilities remain. In 2021, the Federal Communications Commission (FCC), citing a lack of visibility into the operational status of undersea cables, created a cable outage reporting system to inform and aid government-wide response. Several public-private working groups studied undersea cable vulnerabilities and provided recommendations for protecting cables from physical damage. The Communications Security, Reliability, and Interoperability Council (CSRIC), a federal advisory committee to the FCC, and a public-private expert team organized under the Analytic Exchange Program (AEP), a program coordinated by the Department of Homeland Security (DHS), on behalf of the Office of the Director of National Intelligence (ODNI), identified challenges to protecting cables from physical damage. Some challenges include that cables are privately owned and cross multiple jurisdictions; the federal review and permitting process for marine infrastructure may not always consider cable protection; and the United States lacks both a robust protection strategy and federal agency leading on cable protection (e.g., endorsing industry standards, disseminating best practices, promoting protection policies). The CSRIC recommended the FCC serve as the lead agency, although other agency structures are possible. The AEP Team also noted gaps in leadership for reporting and investigating unusual activity, and facilitating cable issue resolution. They recommended public-private cooperation to identify and mitigate risks and develop contingency plans.

Issues for Congress. The U.S. government has adopted some protection policies for undersea cables, but has not adopted a strategy or formal framework for protecting cables landing in the United States. Instead, it relies primarily on private sector owners to protect their undersea telecommunication cables from physical damage. Given the recent attacks on undersea cables and damage from natural events that disrupted and degraded communications, Congress may consider policies to strengthen protection of commercial undersea cables landing in the United States (e.g., cables within U.S. waters and with landing stations in the United States). Such policies could fortify the U.S. telecommunications network, protect U.S.-landing cables from damage, and try to ensure continuity of communications in the United States.

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Introduction

Commercial undersea telecommunication cables carry about 99% of transoceanic digital communications, including international voice, data, and internet communications, and financial transactions. Individual private companies and consortia of companies own and operate a network of over 500 commercial undersea telecommunication cables that form the backbone of the global internet. Many of these cables land in the United States and its territories, providing telecommunication and internet services for consumers, businesses, and government agencies, including military, national security, and diplomatic agencies.

Damage to undersea cables can disrupt and degrade communications. TeleGeography, a U.S.-based telecommunication market research firm that tracks and maps undersea cables, estimates there are globally, on average, 100 cable breaks a year.¹ The majority of incidents (about 75%) are caused by human activities, mainly fishing and anchoring. About 14% of cable breaks are caused by natural events (e.g., earthquakes), and 6% by equipment failure. Of the remaining incidents of damage, some are intentional. TeleGeography notes that intentional damage to cables is rare, but says the actual number of incidents is unknown.

Recent attacks on undersea infrastructure, including the Nord Stream pipelines in the Baltic Sea and several undersea telecommunication cables in Europe, have heightened awareness of the importance of undersea infrastructure, and spurred calls for increased protection of undersea cables. In June 2022, the European Parliament published a report outlining efforts by several European Union (EU) countries to bolster cable protection, and called for increased awareness of cable importance and information sharing, and an update of the EU marine strategy to protect cables and strengthen network resiliency.² In June 2023, the North Atlantic Treaty Organization (NATO) agreed to create the Maritime Centre for the Security of Critical Undersea Infrastructure to, among other things, share best practices for cable protection, and facilitate information sharing among NATO nations.³ Congress may consider similar policies to strengthen protection of undersea cables landing in the United States, fortify the U.S. telecommunication network, and support continuity of communications, to safeguard the U.S. economy and national security.

This report focuses on policies to protect cables landing in the United States and cables within U.S. waters from physical damage. It provides background on cable technologies, intentional and unintentional damage to cables, and challenges and recommendations of public-private working groups for protecting undersea telecommunication cables from damage. Next, it discusses U.S. government actions to protect subsea cables, and policy options for Congress should it consider greater protection of cables. This report does not discuss protection of cables in international waters—an issue that has been the subject of ongoing legal debate.⁴ In addition, this report does not address all types of threats, such as cyberattacks on cable management systems and tapping of cables for the purpose of espionage. While these threats exist, they present unique risks to cables which extend beyond the scope of this report.

¹ Alan Mauldin, “Cable Breakage: When and How Cables Go Down,” *TeleGeography*, May 3, 2017, <https://blog.telegeography.com/what-happens-when-submarine-cables-break>.

² Christian Bueger, Tobias Liebetrau, and Jonas Franken, *Security Threat to Undersea Communications Cables and Infrastructure—Consequences for the EU* (hereinafter referred to as the 2022 Report to the European Parliament) June 2022, European Parliament, [https://www.europarl.europa.eu/thinktank/en/document/EXPO_IDA\(2022\)702557](https://www.europarl.europa.eu/thinktank/en/document/EXPO_IDA(2022)702557).

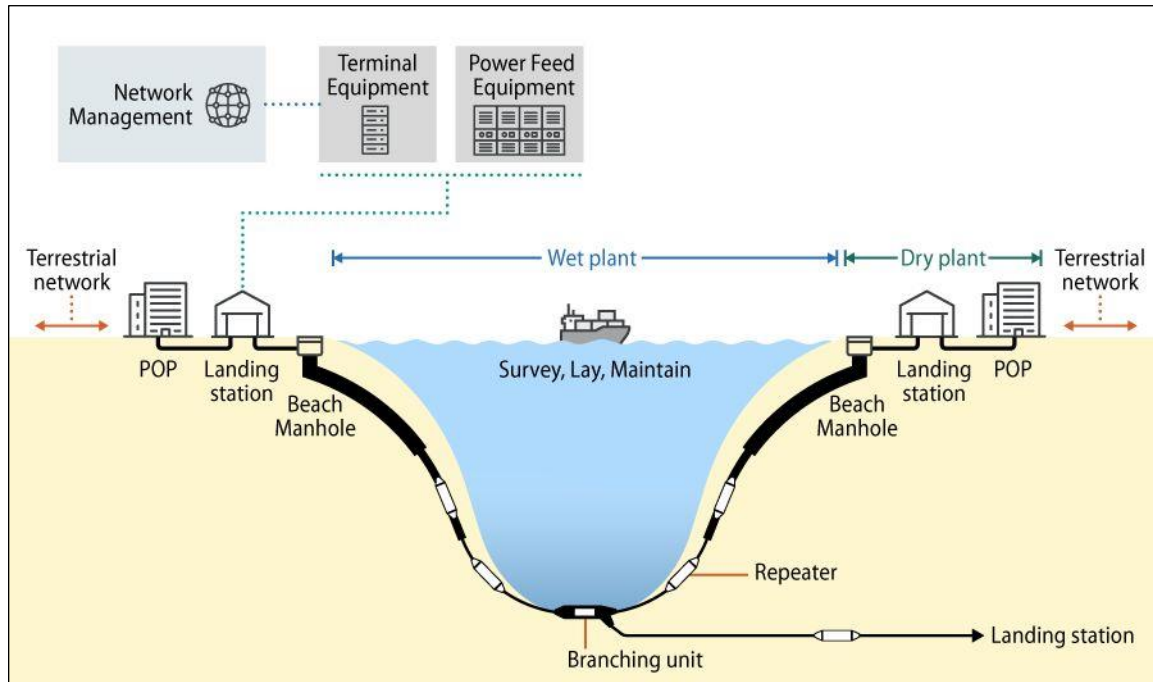
³ North Atlantic Treaty Organization (NATO) Press Conference, June 16, 2023, transcript available at https://www.nato.int/cps/en/natohq/opinions_215694.htm?selectedLocale=en.

⁴ James Kraska, “The Law of Maritime Neutrality and Submarine Cables,” *Journal of International Law* (blog), July 29, 2020, <https://www.ejiltalk.org/the-law-of-maritime-neutrality-and-submarine-cables/>.

Undersea Cable Technologies and Global Network

A complete undersea telecommunication cable system includes fiber-optic cable encased in layers of material (e.g., plastic, steel, aluminum) for protection from water damage and for insulation.⁵ As shown in **Figure 1**, the cable is laid on the ocean floor and connects two or more onshore cable landing stations. The cable landing station typically contains transmission, reception, power, and network management equipment.⁶

Figure 1. Undersea Telecommunication Cable System



Source: CRS.

Note: Graphic shows an undersea telecommunication cable system running from beach manhole to beach manhole; and fiber-optic lines from the cable landing station to a point-of-presence or POP (e.g., data center) that connects via fiber-optic lines to inland terrestrial networks. POP = point-of-presence.

Cable damage can occur intentionally or unintentionally in the water or at cable landing stations. In 2017, the Analytic Exchange Program (AEP), a public-private working group of cable and national security experts, sponsored by U.S. Department of Homeland Security (DHS) on behalf of the Office of the Director of National Intelligence (ODNI), issued a report, *Threats to Undersea Cable Communications* (hereinafter called the 2017 AEP Cable Threats Report).⁷ According to the AEP Team, cables close to shore are typically buried, “offering a layer of protection” from damage, and cables that lay directly on the seabed are somewhat protected,

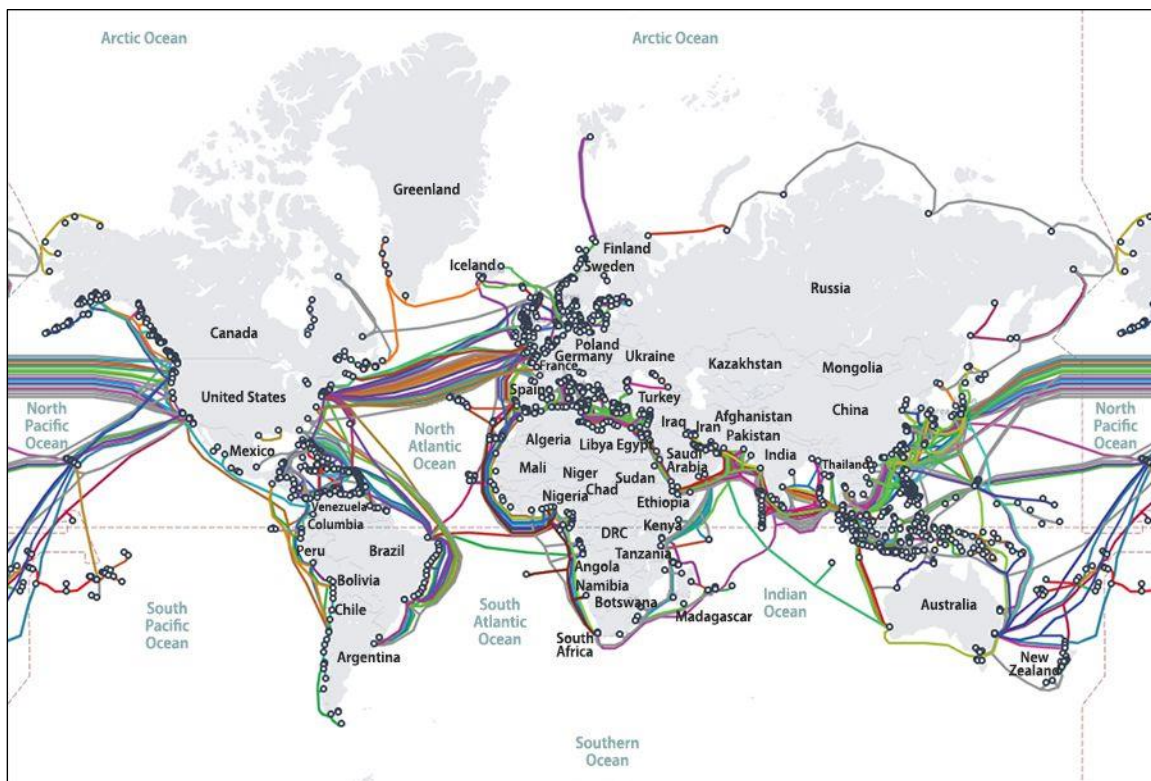
⁵ For more information on the technology, see CRS Report R47237, *Undersea Telecommunication Cables: Technology Overview and Issues for Congress*, by Jill C. Gallagher.

⁶ Dan Swinhoe, “What Is a Submarine Cable? Subsea Fiber Explained,” *DCD*, August 26, 2021, <https://www.datacenterdynamics.com/en/analysis/what-is-a-submarine-cable-subsea-fiber-explained/>.

⁷ Public-Private Analytic Exchange Program (AEP), *Threats to Undersea Cable Communications*, September 28, 2017, p. 6 (hereinafter 2017 AEP Cable Threats Report), <https://www.hsdl.org/?abstract&did=870379>. (AEP facilitates collaborative partnerships between members of the intelligence community and private sector industry experts.)

because of their deep sea location and because their exact location is not publicly disclosed.⁸ The AEP Team found there were limited reports of *undersea* attacks on cables, but cable landing stations, which are more vulnerable, have been actively targeted.⁹ TeleGeography estimates that there are 552 planned and active commercial undersea telecommunication cable systems globally (domestic and international),¹⁰ connecting every continent except Antarctica.¹¹ **Figure 2** shows the global distribution of cables as of May 2023.

Figure 2. Commercial Undersea Telecommunication Cables



Source: TeleGeography, *Submarine Cable Map*, May 16, 2023, <https://www.submarinecablemap.com>.

Notes: Cable colors are for visual clarity of the figure and do not have another significance. Cable landing stations are shown as circles. The map includes commercial undersea cables. It does not include all government-owned cables (e.g., military cables).

Cables can interconnect with each other and with terrestrial networks, forming the backbone of the global internet. This interconnection provides owners with alternate paths to reroute traffic if a

⁸ 2017 AEP Cable Threats Report, pp. 19-20.

⁹ 2017 AEP Cable Threats Report, p. 6.

¹⁰ TeleGeography, "Submarine Cable Frequently Asked Questions," <https://www2.telegeography.com/submarine-cable-faqs-frequently-asked-questions>. Domestic undersea telecommunication cables lay point to point within a country. They can improve connectivity between regions within a country, provide connectivity to the global internet, and connect the mainland to nearby islands; some domestic cables cross into international waters when connecting two domestic points. International undersea telecommunication cables connect two or more countries and enable connection between the countries and sometimes with other countries along the route.

¹¹ International Trade Administration, "Chile Telecommunications Subsea Fiber-Optic Cables," *Market Intelligence*, September 20, 2022, <https://www.trade.gov/market-intelligence/chile-telecommunications-subsea-fiber-optic-cables>. (A cable to Antarctica is planned for 2023.)

cable is damaged. It also means that damage to a cable in one location could affect service to other cables serving other locations.

The United States has high network redundancy. The number of licensed undersea telecommunications cable landing stations rose from 52 in 2004, to 74 in 2019, to 85 in operation or planning to enter service as of May 2023.¹² The AEP Team asserts that in the United States, owners have access to a relatively large number of cables, providing opportunities to reroute traffic to alternate paths in case of cable damage. They also note that there is a concentration of cable landing sites in a few physical locations, creating the potential for a single attack or natural event (e.g., hurricane) to affect multiple cables at once, which could cause long-term communication disruptions for many.¹³

Ownership

Commercial undersea cables can be owned by a single company or a consortium of companies. Cable owners include telecommunication providers, undersea cable companies, content providers (e.g., Facebook), and cloud computing service providers (e.g., Google, Microsoft, Amazon). Owners are investing in new undersea telecommunication cables to: increase capacity to meet an expected increase in demand for mobile data, internet services, and cloud services; expand coverage to serve new regions and customers; and, generate new revenue. Thus, this critical communications infrastructure on which consumers, businesses, and governments rely for everyday connection and communication is owned and expanded primarily by private sector companies.¹⁴ Private sector owners have an economic interest in protecting cables from damage, mainly to preserve their customer base—whose payments for cable use are the primary source of their revenue.

Cross-Jurisdictional Nature of Cables¹⁵

International commercial undersea cables cross international boundaries and land in two or more sovereign states. Domestic cables connect to jurisdictions within the same country, sometimes crossing international waters to connect domestic landing sites. Most cables cross multiple jurisdictions (e.g., international, national, state, local).

The geographic extent of U.S. jurisdiction over international undersea telecommunications cables is generally based on international agreements. These include, but are not limited to, the 1884 International Convention for the Protection of Submarine Telegraph Cables and the United Nations Convention on the Law of the Sea (UNCLOS).¹⁶ UNCLOS establishes national

¹² DHS Protective Security Division, *Characteristics and Common Vulnerabilities Infrastructure Category: Cable Landing Stations*, January 15, 2004, <https://info.publicintelligence.net/DHS-UCL-CV.pdf>; Submarine Cable Networks, “Cable Landing Stations in North America,” accessed July 20, 2022, <https://www.submarinenetworks.com/stations/north-america>; FCC, “Submarine Cable Landing Licenses,” accessed May 17, 2023, <https://www.fcc.gov/research-reports/guides/submarine-cable-landing-licenses>.

¹³ 2017 AEP Cable Threats Report, p. 8.

¹⁴ Some governments have invested in cables. For example, Tonga-Fiji Submarine Cable System is owned and operated by TCL, which developed and manages the cable with financing support from the Asian Development Bank and World Bank. TCL is a public enterprise 80% owned by the government. In China, three state-owned companies in China—China Mobile, China Telecom, and China Unicom—invested in undersea cables. In the United States, the U.S. Navy owns over 40,000 nautical miles of various subsea cables.

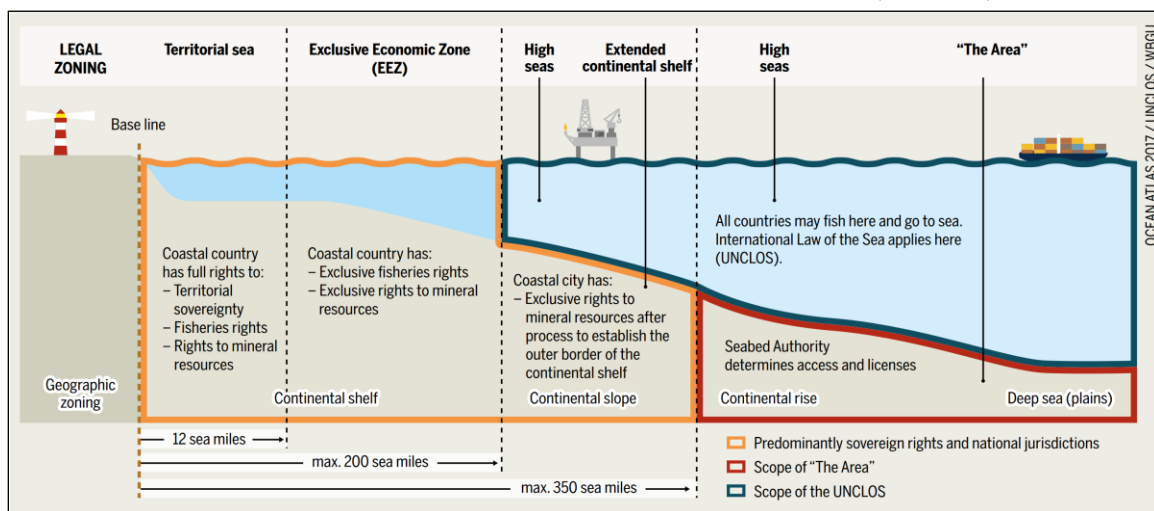
¹⁵ This discussion of UNCLOS and maritime zones was written by Jill Gallagher, Analyst in Telecommunications Policy, and Caitlin Keating-Bitonti, Analyst in Natural Resources Policy.

¹⁶ Convention for the Protection of Submarine Cables, March 14, 1884, 24 Stat. 989, U.S. Congress, Senate, *Treaties*, (continued...)

boundaries for party nations that extend up to 12 nautical miles from the baseline of the coast of the nation, and include the “exclusive economic zone” or EEZ, which extends up to 200 nautical miles from the baseline.¹⁷ While the United States has not ratified UNCLOS, it has generally abided by its terms, as dictated by Presidential Proclamation 5030.¹⁸ **Figure 3** depicts UNCLOS maritime zones and coastal nation rights. UNCLOS grants all nations the freedom to lay and operate undersea cables beneath the “high seas” and on the continental shelf, within a coastal nation’s EEZ, subject to a coastal nation’s rights “to take reasonable measures for the exploration of the continental shelf, the exploitation of its natural resources and the prevention, reduction and control of pollution from pipelines.”¹⁹ Thus, commercial undersea telecommunications cable segments crossing into U.S. territorial waters and landing in the United States, its territories and possessions are subject to oversight and regulation by the U.S. government.

Figure 3. Maritime Zones

Based on the United Nations Convention on the Law of the Sea (UNCLOS)



Source: Ulrich Bähr, *Ocean Atlas: Facts and Figures on the Threats to Our Marine Ecosystems*, Heinrich Böll Foundation Schleswig-Holstein, 1st Edition, May 2017, p. 32, https://www.boell.de/sites/default/files/web_170607_ocean_atlas_vektor_us_v102.pdf.

Notes: UNCLOS Part VII, Article 86, related to the “high seas,” applies to “all parts of the sea that are not included in the exclusive economic zone, in the territorial sea or in the internal waters of a [nation], or in the archipelagic waters of an archipelagic [nation].” In UNCLOS Part XI, Article 133, “the Area” is at or beneath the seabed extending beyond the continental slope.

Commercial undersea telecommunication cables often cross into state and local jurisdictions as well. In accordance with the federal Submerged Lands Act of 1953 (SLA),²⁰ coastal states are generally entitled to an area extending three geographical miles from their officially recognized

Conventions, International Acts, Protocols and Agreements, 61st Cong., 2nd sess., S.Doc. 61-357 (Washington: GPO, 1910), p. 1949; see also United Nations Convention on the Law of the Sea (UNCLOS), December 10, 1982, 1833 U.N.T.S. 397. To date, the United States has not ratified and become party to the convention, but the United States recognizes UNCLOS as part of international customary law.

¹⁷ According to UNCLOS, “the normal baseline for measuring the breadth of the territorial sea is the low-water line along the coast as marked on large-scale charts officially recognized by the coastal State.” UNCLOS, Articles 3, 5, and 57.

¹⁹ UNCLOS, Article 79.

²⁰ 43 U.S.C. §1301 et seq.

coast (or baseline).²¹ In order to accommodate the claims of certain states, the SLA provides for an extended boundary in the Gulf of Mexico if a state can show such a boundary was provided for by the state's "constitution or laws prior to or at the time such State became a member of the Union, or if it has been heretofore approved by Congress."²²

Within their offshore boundaries, coastal states have "(1) title to and ownership of the lands beneath navigable waters within the boundaries of the respective states, and (2) the right and power to manage, administer, lease, develop and use the said lands and natural resources."²³ Thus, with cables, there are often multiple and overlapping jurisdictions. The discussion of U.S. authorities to protect cables in international waters has been the subject of legal debate.²⁴ This report does not focus on U.S. authorities to protect cables in international waters. It focuses on cables landing in the United States, where U.S. local, state, and federal governments have authority to implement protection policies.

Threats to Undersea Telecommunication Cables

Damage to cables may be caused by intentional acts (e.g., cutting of cables) and unintentional damage (e.g., fishing, anchoring, or natural disasters), discussed in more detail below.

Intentional Damage

Intentional acts of damage to cables occur, but are rare, according to TeleGeography. While some intentional incidents (e.g., cutting of cables, vandalism) are publicly reported, the actual number of incidents globally or in the United States is unknown.²⁵

Intentional damage to undersea telecommunication cable systems may include physical damage to cables, such as cutting cables at sea or on land, or attacking cable landing stations. In 2022, two separate attacks on undersea telecommunication cables in France consisted of individuals cutting cables after breaking into cement casings at several cable landing sites; these attacks were described as "coordinated" and "unprecedented" in scale by telecommunication industry representatives.²⁶ The cable cuts disrupted communications in several parts of France, and slowed traffic globally.

In the 2017 AEP Cable Threats Report, the AEP Team notes that there have been limited reports of *underwater* attacks on cables because they are difficult to access on the sea floor.²⁷ Instead, "landing stations are the most accessible and impact-rich targets as they are concentrated in a

²¹ 43 U.S.C. §1301(b). A geographical or nautical mile is equal to 6,080.20 feet, as opposed to a statute mile, which is equal to 5,280 feet.

²² 43 U.S.C. §§1301(b), 1312. After enactment of the SLA, the Supreme Court held that the Gulf coast boundaries of Florida and Texas extend to three marine leagues, or nine nautical miles; other Gulf coast states were unsuccessful in extending their boundaries (U.S. v. Louisiana, 363 U.S. 1, 66 (1960); U.S. v. Florida, 363 U.S. 121, 129 (1960)).

²³ 43 U.S.C. §1311.

²⁴ Garrett Hinck, "Cutting the Cord: The Legal Regime Protecting Undersea Cables," *LawFare*, November 21, 2017, <https://www.lawfareblog.com/cutting-cord-legal-regime-protecting-undersea-cables>.

²⁵ In 2021, the FCC required cable owners to report certain outage information, which they assert will provide more data on cable outages. FCC, "Improving Outage Reporting for Submarine Cables and Enhanced Submarine Cable Outage Data," 85 *Federal Register* 15733-15741, March 19, 2021.

²⁶ Thomas Brent, "Mass Attack on Internet Cables in France 'Almost Professional,'" *The Connexion*, April 28, 2022, <https://www.connexionfrance.com/article/French-news/Mass-attack-on-internet-cables-in-France-almost-professional>.

²⁷ 2017 AEP Cable Threats Report, p. 6.

handful of coastal locations.”²⁸ Intentional damage to terrestrial portions of heavily used undersea telecommunication networks is therefore an area of potentially greater risk. For example, in November 2022, a dual cut to the terrestrial portion of the South East Asia–Middle East–Western Europe 5 cable in Egypt disrupted internet services in multiple countries.²⁹ Companies that track network traffic reported traffic dropping in countries in East Africa, the Middle East, and South Asia,³⁰ and regional impacts to cloud service companies, including Google, Amazon, and Microsoft Cloud.³¹

Risks to subsea cables also may be greater if foreign nations are involved. In 2018, the *Associated Press* cited a Russian publication stating that Russia has the capability to cut cables, connect to top-secret cables, and jam underwater sensors that detect intrusions.³² This capability raised concerns among some Members of Congress,³³ a British parliamentarian,³⁴ and NATO officials.³⁵ The sabotage of the Nord Stream natural gas pipelines in the Baltic Sea in September 2022 has also heightened concerns about the vulnerability of undersea infrastructure, including telecommunication cables.³⁶ In the wake of this attack, the United Kingdom Ministry of Defence is increasing protection of undersea pipelines and telecommunication cables, and conducting a threat assessment of cables landing in Ireland—a major hub for cables connecting the United States, United Kingdom, and Western Europe.³⁷

Bad actors may also leverage information technologies to harm undersea telecommunication cable operations. Improvements to cable systems, including software to monitor cable network integrity and traffic, may help cable companies detect bad actors. According to a report from one policy think tank, “More companies are using remote management systems for submarine cable networks—tools to remotely monitor and control cable systems over the Internet—which are cost-compelling because they virtualize and possibly automate the monitoring of cable

²⁸ Ibid, pp. 19-20.

²⁹ Pakistan Telecommunication Authority (@PTAofficialpk), “Dual cut in the terrestrial segment of SEAMEWE-5,” November 29, 2022, <https://www.kentik.com/blog/outage-in-egypt-impacted-aws-gcp-and-azure-interregional-connectivity/>; see also Simon Sharwood, “Submarine Cable Damage Brings Internet Pain to Asia, Africa,” *The Register*, November 30, 2022, https://www.theregister.com/2022/11/30/seamewe5_cut_outage_apac_africa/.

³⁰ Sebastian Moss, “AAE-1 Cable Cut Cause Widespread Outages in Europe, East Africa, Middle East, and South Asia,” *DCD*, June 8, 2022, <https://www.datacenterdynamics.com/en/news/aae-1-cable-cut-causes-widespread-outages-in-europe-east-africa-middle-east-and-south-asia/>.

³¹ Doug Madory, “Outage in Egypt Impacted AWS, GCP, and Azure Interregional Connectivity,” *Kentik* (blog) June 14, 2022, <https://www.kentik.com/blog/outage-in-egypt-impacted-aws-gcp-and-azure-interregional-connectivity/>. (Reporting packet loss and increased latency for Google, and increased latency for AWS and Microsoft Azure.)

³² Deb Reichmann, “Could Enemies Target Undersea Cables That Link the World?” *AP News*, March 30, 2018, <https://apnews.com/article/moscow-north-america-ap-top-news-politics-russia-c2e7621bda224e2db2f8c654c9203a09>.

³³ U.S. Congress, House Committee on Armed Services, Subcommittee on Intelligence and Emerging Threats and Capabilities meeting jointly with House Committee on Oversight and Reform, Subcommittee on National Security, *Securing the Nation’s Internet Architecture*, 116th Cong., 1st sess., September 10, 2019, H.A.S.C. No. 116-43.

³⁴ Rishi Sunak, MP, *Undersea Cables: Indispensable, Insecure*, Policy Exchange, 2017, pp. 28-33, <https://policyexchange.org.uk/wp-content/uploads/2017/11/Undersea-Cables.pdf>.

³⁵ Speech by NATO Secretary General Jens Stoltenberg at the 66th Annual Session of the NATO Parliamentary Assembly, November 23, 2020, https://www.nato.int/cps/en/natohq/opinions_179665.htm.

³⁶ Christopher Woody, “Suspected Nord Stream Sabotage Shows ‘Vulnerability’ of Everything We Build on the Seabed, Top British Admiral Says,” *Insider*, September 30, 2022, <https://www.businessinsider.nl/suspected-nord-stream-sabotage-shows-vulnerability-of-everything-we-build-on-the-seabed-top-british-admiral-says/>.

³⁷ John Mooney, “Defence Forces Assess Risk to Subsea Cables amid Fears of Russian Attack,” *The Times*, October 16, 2022, <https://www.thetimes.co.uk/article/defence-forces-assess-risk-to-subsea-cables-amid-fears-of-russian-attack-cjld8bf3b>.

functionality.”³⁸ However, they may also create new risks and opportunities for cyberattack. While threats from cyberattacks and acts of espionage (e.g., tapping of cables) exist, they differ from physical attacks on cables. In most cases, these attacks seek to access the data the cable is carrying, and may not cause physical damage to the cable. As such, these threats, which pose unique challenges, extend beyond the scope of this report.

Unintentional Damage

Unintentional damage to undersea telecommunications cables can be caused by human activities such as anchoring (most commonly related to shipping) and commercial fishing; natural hazards such as submarine landslides, volcanos, earthquakes, tsunamis, and strong waves and currents; and animal threats (e.g., sharks or barracuda that may bite cables), although rare. As stated earlier, TeleGeography estimates there are, on average, 100 cable breaks a year globally.³⁹ The majority of incidents (about 75%) are caused by human activities, mainly fishing, anchoring, and other activities. About 14% of cable breaks are caused by natural hazards (e.g., earthquakes), and 6% by equipment failure.

Examples of Unintentional Damage from Human Activities

On October 14, 2022, Faroese Telecom officials reported a cable fault (i.e., failure) on its cable connecting the Shetland and Faroe islands, two archipelagoes that sit between Scotland, Iceland, and Norway.⁴⁰ On October 20, 2022, Faroese Telecom reported a second break in a cable connecting Shetland and mainland Scotland, which disrupted mobile phone and internet services to residents and businesses.⁴¹ According to a Scottish government official, Scotland’s Maritime Coastguard Agency confirmed that a UK-registered fishing vessel damaged the cable, affecting communications on Shetland.⁴²

Fishing vessels are also suspected in the damage to another cable, in Norway, supporting the Svalbard satellite ground station (known as SvalSat). SvalSat downloads data from satellites in polar orbit, and transmits the data via undersea cable to a variety of customers, including the National Aeronautics and Space Administration (NASA) and National Oceanic and Atmospheric Administration (NOAA).⁴³ The cables, owned by Space Norway, contain sensors which, among other things, “measure environmental conditions and fish migration, recording images and sound, and sending the information back to shore.”⁴⁴ In January 2022, one of two Svalbard cables lost signal due a break in the undersea power supply. In January 2023, the Norwegian Institute of International Affairs stated that while there was speculation of sabotage by Russia, “human sabotage has not been proven,” nor has any connection between the attacks on the Nord Stream

³⁸ Ibid.

³⁹ Alan Mauldin, “Cable Breakage: When and How Cables Go Down,” *TeleGeography*, May 3, 2017, <https://blog.telegeography.com/what-happens-when-submarine-cables-break>.

⁴⁰ Chris Cope, “Cable Fault the Third Reported in Waters Around Shetland Since Mid-September,” *Shetland News*, October 21, 2022, <https://www.shetnews.co.uk/2022/10/21/cable-fault-the-third-reported-in-waters-around-shetland-since-mid-september/>.

⁴¹ “Damaged Cable Leaves Shetland Cut off from Mainland,” *BBC News*, October 20, 2022, <https://www.bbc.com/news/uk-scotland-north-east-orkney-shetland-63326102>.

⁴² “UK-Registered Fishing Vessel Damaged Shetland Subsea Cable,” *The Fishing Daily*, December 8, 2022, <https://thefishingdaily.com/latest-news/uk-registered-fishing-vessels-damaged-shetland-subsea-cable>.

⁴³ Space Norway, “The Svalbard Fibre Optic Cable Connection,” June 15, 2022, <https://spacenorway.no/en/what-we-do/operational-infrastructure/the-svalbard-fibre-optic-cable-connection/>.

⁴⁴ Lisbeth Kirk, “Mysterious Atlantic Cable Cuts Linked to Russian Fishing Vessels,” *euobserver*, October 26, 2022, <https://euobserver.com/nordics/156342>.

pipelines and this cable.⁴⁵ The institute called for increased redundancies and protection of communication networks to provide for continued communications if damage occurs. According to some reports, the severed Svalbard cable “is to cost €5.6 million (about \$6 million USD) to repair and be fully operational in 2024, amounting to years of lost scientific data.”⁴⁶

Examples of Damage from Natural Events

A January 15, 2022, underwater volcanic eruption in Tonga (which caused tsunami waves and a volcanic ash cloud)⁴⁷ severed an undersea telecommunication cable, the country’s primary connection to the internet. The cable is owned and operated by the state-owned Tonga Cable Limited (TCL), and connects Tonga to Fiji, where it connects to other international networks.⁴⁸ Five weeks after the disaster, the cable to Fiji was repaired and service restored. Tongan officials announced in March 2022 that repairs to its domestic cable, connecting the main island to its outer islands, could take a year. In April 2023, the Emergency Telecommunications Cluster, a telecommunications response team under the United Nations World Food Programme, reported the timeline for repair had been extended to July 2023 by TCL.⁴⁹ In mid-July 2023, TCL announced the domestic cable to the outer islands was repaired. The repair effort lasted 18 months; it required a survey of the ocean floor, and it took time to obtain the amount and type of cable needed, which ultimately had to be manufactured and shipped to the islands.⁵⁰

In mid-June 2023, an undersea cable serving Alaska’s North Slope was severed, likely by naturally shifting ice, initially leaving residents in this Arctic region without internet or cell phone service. The cable company reported that “a full restoration of service by repair ships could take up to two months.”⁵¹ Telecommunication providers that rely on the cable reportedly transferred some service to satellite communications and terrestrial fiber and microwave networks to provide some connection for customers, but expected service to be slower than usual.⁵²

Because undersea cables can be damaged, most commercial undersea telecommunication cable owners incorporate redundant features into their cable systems. They use alternative routes to redirect traffic to another undersea cable, a terrestrial line, or over satellite networks to provide some service until repairs are complete. In some cases, cable damage can be so severe, as in Tonga, that it can cause widespread and long-term service disruptions (i.e., no service),

⁴⁵ Niels Nagelhus Schia, Lars Gjesvik, and Ida Rødningen, *The Subsea Cable Cut at Svalbard January 2022: What Happened*, Norwegian Institute of International Affairs, Policy Brief, January 2023, p. 2, <https://www.nupi.no/en/publications/cristin-pub/the-subsea-cable-cut-at-svalbard-january-2022-what-happened-what-were-the-consequences-and-how-were-they-managed>.

⁴⁶ Lisbeth Kirk, “Mysterious Atlantic Cable Cuts Linked to Russian Fishing Vessels,” *euobserver*, October 26, 2022, <https://euobserver.com/nordics/156342>.

⁴⁷ NASA, *Tonga Volcanic Eruption and Tsunami 2022*, Disasters, February 17, 2022, <https://appliedsciences.nasa.gov/what-we-do/disasters/disasters-activations/tonga-volcanic-eruption-tsunami-2022>.

⁴⁸ Kingdom of Tonga, “Tonga Cable Limited,” accessed January 25, 2023, <http://www.pacificsoe.org/tonga/state-owned-enterprises/tonga-cable-limited/>.

⁴⁹ Emergency Telecommunications Cluster, *Tonga: Hunga Tonga–Hunga Ha ‘apai Volcano [FINAL]*, April 2023, <https://www.etcluster.org/document/final-etc-tonga-final-situation-report-18-04-april-2023>.

⁵⁰ Paul Lipscombe, “Tonga’s Domestic Submarine Cable Fixed 18 Months After Volcanic Eruption,” *DCD*, July 14, 2023, <https://www.datacenterdynamics.com/en/news/tongas-domestic-submarine-cable-fixed-18-months-on-from-volcanic-eruption/>.

⁵¹ Greg Knight, KNOM-Nome and Chris Klint, Alaska Pubic Media, Anchorage, “Cut Cable Causes Internet and Cellphone Outages in Arctic Alaska,” *Alaska Public Media*, June 12, 2023, <https://alaskapublic.org/2023/06/12/cut-cable-causes-weeks-long-north-slope-northwest-alaska-internet-and-cellphone-outages/>.

⁵² Alena Naiden, “Internet and Cell Outages in Northwest Alaska, North Slope Caused by Offshore Fiber Optic Cut,” *Anchorage Daily News*, June 12, 2023 (updated June 14, 2023).

particularly where there are no redundant cables or other means to reroute traffic. In other cases, damage to a cable can be repaired quickly, resulting in a short period of service disruption or degradation. Thus, redundancies play a critical role in service restoration.

Challenges in Protecting Cables

Several public-private working groups of telecommunication experts, organized under U.S. agencies, have studied subsea cables and cable vulnerabilities, and identified challenges to protecting cables.

CSRIC Working Groups. Several working groups of the Communications Security, Reliability, and Interoperability Council (CSRIC), a federal advisory body to the Federal Communications Commission (FCC) examined cable vulnerabilities and offered recommendations for protecting cables from physical damage. In 2014, the CSRIC formed Working Group 8 to study commercial undersea cables, in response to spatial conflicts between installed and planned undersea cables, and between cables and other marine activities (e.g., beach replenishment, offshore wind farms). The working group's focus was on developing policies and standards to protect cables from physical damage, to strengthen the resilience of the U.S. undersea cable network, and to ensure continuity of communications.⁵³ In 2016, the CSRIC expanded its study of cables, creating another working group (Working Group 4A) to examine how proximity to other marine activities, governmental permitting processes, and clustering of cable routes and landings can increase the risk of cable damage and threaten the resiliency of the U.S. undersea cable network.⁵⁴ The working group focused on governmental coordination and coordination problems in offshore permitting that could exacerbate risks to undersea cables. A second report by Working Group 4A focused on physical risks related to clustering of cable routes and cable landing stations.⁵⁵

AEP Team. The AEP Team, in the 2017 AEP Cable Threats Report, focused on vulnerabilities, national security risks (e.g., insider threat, terrorist attack), and disruption indicators for the submarine cable network and supporting infrastructure. The intent was to identify vulnerabilities and risks associated with undersea cables, and to inform companies reliant on cable communications and law enforcement agencies of risks and mitigation strategies to ensure continuity of communications. Like the CSRIC working groups, the experts on the AEP Team identified challenges to protecting commercial undersea cables landing in the United States, and made recommendations for hardening cable infrastructure—enhancing protection of cable systems to strengthen the resiliency of U.S. telecommunications networks and ensure continuity of communications in the United States.

While the emphasis of these studies differed, both groups identified similar challenges to protecting commercial undersea cables from damage, discussed below.

⁵³ CSRIC IV, Working Group 8, Submarine Cable Routing and Landing, *Final Report—Protection of Submarine Cables through Spatial Separation* (hereinafter referred to as CSRIC IV WG8 Spatial Separation Report), December 2014, p. 1, https://transition.fcc.gov/pshs/advisory/csric4/CSRIC_IV_WG8_Report1_3Dec2014.pdf.

⁵⁴ CSRIC V, Working Group 4A, Submarine Cable Resiliency, *Final Report—Interagency and Interjurisdictional Coordination* (hereinafter referred to as CSRIC V WG4A Interagency Report), June 2016, Executive Summary, https://transition.fcc.gov/bureaus/pshs/advisory/csric5/WG4A_Report-Intergovernmental-Interjurisdictional-Coordination_June2016.pdf.

⁵⁵ CSRIC V, Working Group 4A, Submarine Cable Resiliency, *Final Report—Clustering of Cables and Cable Landings* (hereinafter referred to as CSRIC V WG4A Cable Clustering Report), August 2016, pp. 2, 31-32, https://transition.fcc.gov/bureaus/pshs/advisory/csric5/WG4A_Final_091416.pdf.

Private Sector and Multinational Ownership

As noted earlier, undersea telecommunication cables are primarily privately owned—either by a single owner or a consortium of cable owners. Private owners design and operate cables with protection in mind (e.g., burying cables, fortifying landing stations). They are often able to reroute traffic to alternative paths in the event of a cable failure and report they have experienced few extended communication outages from cable damage. However, given the heavy U.S. reliance on undersea telecommunication cables, and recent damage to cables (e.g., multiple cable cuts, catastrophic damage from natural events) that disrupted communications for many international users over a wide area, the U.S. government may seek to support additional private sector efforts to protect cables.

The 2017 AEP Cable Threats Report found that one of the current models of ownership, wherein a consortium of companies, often from different countries, purchases, operates, and maintains a cable may “present vulnerabilities, which could be exploited and affect the United States.”⁵⁶ Foreign service providers may be involved in decisions concerning the placement of cables in the United States; employees from foreign companies may have access to a cable, cable network, and landing stations; and, where cables connect to a foreign nation, attacks on international cables could affect U.S. communications.⁵⁷ The AEP Team noted that cable ownership can also affect maintenance, responsiveness to repairs, development, and operational transparency. Also, security standards may vary across companies and countries, and a lack of awareness of the various owners and varying policies could create vulnerabilities for cable owners and for cables serving the United States.⁵⁸

The CSRIC working groups stated that the complexity of multinational ownership may present risks to cables. The working groups discussed FCC processes for protecting cables from foreign threats, reviewing cable applications that propose to connect the United States to a foreign nation and those having a 10% foreign ownership interest. The process involves FCC consultation with U.S. national security agencies to review the cable application for national security concerns, and development of national security agreements imposing conditions on owners to protect cables (e.g., restricting access to cable landing stations and network operation centers, imposing physical protections on cables, and cybersecurity requirements). The conditions are meant to safeguard U.S. national security, but are not applied to all cables landing in the United States. The CSRIC working groups noted the lack of generally accepted cable protection standards across companies and nations, and encouraged U.S. government adoption and dissemination of industry-based protection policies, standards, and best practices to U.S. permitting agencies and cable owners to protect cables serving the United States.⁵⁹

⁵⁶ 2017 AEP Cable Threats Report, p. 27.

⁵⁷ Zscaler, “European Cable Cut May Impact Transoceanic Routes,” October 19, 2022, <https://trust.zscaler.com/zscloud.net/posts/12256>. Zscaler noted that the cable cut in France impacted major cables with connectivity to Asia, Europe, and the U.S., and may have resulted in disruption or degradation of service for consumers.

⁵⁸ 2017 AEP Cable Threats Report, p. 17.

⁵⁹ CSRIC IV WG8 Spatial Separation Report, p. 13. The CSRIC Working Group 8 cites a need for governments to endorse, adopt, or encourage use of industry standards and best practices regarding submarine cable protection, development of new standards, and public dissemination of standards.

Cross-Jurisdictional and Cross-Cutting Nature of Cables

A challenge in protecting undersea cables is that cables span many miles and cross multiple jurisdictions, including local, state, federal, and international areas. Each jurisdiction may have different laws, policies, and review processes for undersea telecommunication cables.

The CSRIC Working Group 4A studied jurisdictional challenges. The working group concluded that, while the federal government “retains the power to regulate commerce, navigation, power generation, national defense, and international affairs throughout state waters,” U.S. states and territories retain authority within their territorial seas to manage, develop, and lease resources,” including subsea leases for undersea cables.⁶⁰ The working group found that the “array of federal and state regulations and tribal requirements can create a complex set of processes and requirements for pursuing or tracking a project proposal.”⁶¹ Further, each jurisdiction may impose varying requirements that could strengthen or weaken protection of cables from damage.

As an example, the working group stated that Florida prohibits the landing of cables in the Keys, which could lead to the routing and clustering of cables along certain routes, away from such protected areas.⁶² California and Oregon have, as a condition of their subsea lease, policies in place to re-inspect cables to ensure they have stayed buried, to protect cables from physical damage.⁶³ Thus, policies vary by jurisdiction, and could lead to varying levels of protection for undersea cables landing in the United States.

For U.S. landing sites where there is overlapping jurisdiction, the AEP Team asserts there can be “heavy reliance on the private sector” to ensure security of cables since jurisdictions “may be under the erroneous assumption that other agencies are engaging with the private sector around security concerns.”⁶⁴

An oversight challenge in cable protection policies arising from their cross-cutting nature is the interest and engagement of potentially multiple agencies and congressional committees. Cables relate to environmental, foreign affairs, homeland security, commerce, military, and other issues, and may fall within the responsibilities and interests of multiple federal agencies, which are authorized, appropriated, and overseen by various congressional committees.⁶⁵ The cross-cutting interest in cables may complicate development of comprehensive federal protection proposals. For example, cable spatial separation policies (e.g., requiring separation distances between cables and other marine infrastructure) could potentially affect placement of other marine infrastructure, such as offshore wind farms which is a priority in the Biden Administration. A further complication in achieving a comprehensive approach may be the differing approaches, interests, and concerns of state and local governments hosting cable landing sites. For example, federal policies to protect cable landing sites (e.g., welding manhole covers) could be prohibited or different than policies adopted by state and local governments.

⁶⁰ CSRIC V WG4A Interagency Report, p. 5.

⁶¹ CSRIC V WG4A Interagency Report, pp. 5-6.

⁶² CSRIC V WG4A Cable Clustering Report, p. 6.

⁶³ CSRIC V WG 4A Interagency Report, p. 33.

⁶⁴ 2017 AEP Cable Threats Report, p. 15.

⁶⁵ For example, in a Senate report accompanying the National Defense Authorization Act, for Fiscal Year 2024 (S.Rept. 118-58), the Committee recognized that military installations rely on critical infrastructure (e.g., power, water, telecommunications) not controlled by Department of Defense (DOD). The Committee wrote that it appreciated the DOD’s establishment of a Critical Infrastructure Dense Analysis Center (CIDAC) during fiscal year 2023, which is to engage in information sharing about threats and vulnerabilities with private critical infrastructure owners

Emerging Risks from Other Offshore Activities

The CSRIC Working Group 8 recognized that there are competing demands for U.S. waters that may present challenges to protecting cables from physical damage. The increased use of U.S. coastal and marine areas for resource and infrastructure development activities, such as deployment of offshore wind facilities, deep-sea mining, and oil and gas exploration, creates risks for existing undersea telecommunication cables in terms of installation, operations, and access.⁶⁶

The 2016 report by CSRIC Working Group 4A emphasized the same point, noting a lack of awareness of existing cables and cable protection needs among project planners and permitting agencies. The working group noted that “there is a lack of awareness and/or focus on foreclosure of particular submarine cable routes and landings, and on reductions in geographic diversity of cables through authorization of other marine activities.”⁶⁷ If decisions are made which limit or foreclose certain cable routes or landing sites, and cause cable owners to cluster cables along existing routes and at the same cable landing sites, any damage to those routes or landing sites could have widespread impacts to the U.S. telecommunications.

As investment in diverse marine infrastructure increases,⁶⁸ existing cables may face increased risk of damage from installation of new infrastructure, and new cables may face challenges in achieving route and landing site diversification, which could create a *single point of failure*—a location in the U.S. telecommunication network where infrastructure is concentrated, and where damage at that location could cause the entire system or network to stop working.

Lack of a Robust Strategy to Protect Cables

The CSRIC working groups, and some scholars, have cited efforts by other nations to protect cables and the lack of a robust protection strategy in the United States.⁶⁹

The DHS Cybersecurity and Infrastructure Security Agency (CISA) is the lead U.S. agency for critical infrastructure protection. CISA is responsible for understanding, managing, and reducing the risk to critical infrastructure, including the U.S. communications infrastructure. CISA works with public and private partners to identify risks, defend against threats to U.S. infrastructure, and develop mitigation strategies.⁷⁰ CISA hosts both the Communications Sector Coordinating Council (SCC), a group of telecommunication industry representatives that share information and develop tools, guidelines, and products to address risks, vulnerabilities, and emerging issues to the communications sector, and the Communications Sector Government Coordinating Council

⁶⁶ CSRIC IV WG8 Spatial Separation Report, p. 36.

⁶⁷ CSRIC V WG4A Cable Clustering Report, p. 11.

⁶⁸ The White House, “FACT SHEET: Bidenomics is Boosting Clean Energy Manufacturing for Offshore Wind and Creating Good-Paying American Union Jobs,” press release, July 20, 2023. Noting increasing investment in offshore wind farms.

⁶⁹ CSRIC V WG4A Interagency Report, p. 33. See also, Lane Burdette, “Leveraging Submarine Cables for Political Gain: U.S. Responses to Chinese Strategy,” *Journal of Public and International Affairs*, May 5, 2021, <https://jpia.princeton.edu/news/leveraging-submarine-cables-political-gain-us-responses-chinese-strategy>. Discusses Chinese strategic plan for cables, and lack of U.S. strategy; see also Colin Wall and Pierre Morcos, “Invisible and Vital: Undersea Cables and Transatlantic Security,” *Center for Strategic and International Studies*, June 11, 2021, <https://www.csis.org/analysis/invisible-and-vital-undersea-cables-and-transatlantic-security>. Discusses the lack of action to protect undersea cables, need for national assessments of cable risks, and collective effort among U.S. allies to protect the global network.

⁷⁰ CISA, “Communications Sector,” <https://www.cisa.gov/topics/critical-infrastructure-security-and-resilience/critical-infrastructure-sectors/communications-sector>.

(GCC), a group of agencies with missions related to communications. The GCC and SCC coordinate to develop plans, policies, and activities to protect critical infrastructure.⁷¹

To date, the GCC and SCC have not addressed the protection of commercial undersea telecommunication cables. In 2015, DHS developed a Communications Sector-Specific Plan to identify risks to communication networks and establish goals and guidance for the sector agencies and industries to reduce risks and strengthen security and resiliency of those networks. While the plan mentions undersea telecommunication cables, it does not identify specific risks, policies, or a strategy to mitigate those risks.⁷² Similarly, in the 2022 Communications SCC annual report, there is no mention of commercial undersea cables, or emerging threats to undersea cables.⁷³

Other nations are facing the same challenges. The European Parliament published a report in 2022 discussing challenges with cable protection, highlighting efforts by several EU countries to bolster cable protection, and citing a need for increased awareness of cable importance and information sharing. The authors found that in past marine security strategy documents, cable protection “is only vaguely included in the core strategic interests, and no direct action is devoted to implementation.”⁷⁴ The report recommends an update of the EU marine security strategy to protect cables and strengthen network resiliency.⁷⁵

Lack of a Lead Federal Agency on Cable Protection

The CRSIC Working Group 4A describes an “urgent need” for a single federal point of contact—a lead agency—for undersea telecommunication cables to raise awareness of cables and to promote protection policies.⁷⁶ It urged the designation of a lead agency to provide guidance and best practices to cable owners and agencies making permitting decisions to protect existing and new cable systems, enhance the resiliency of the undersea cable network, and ensure continuity of communications. The working group states the following regarding cable protection, “Without increased awareness of submarine telecommunication cables and improved coordination between agencies, the existing regulatory requirements may not be effective.”⁷⁷ The 2017 AEP Team found “no single or group of federal agencies is dedicated to fielding company questions around vendor, supplier, contractor, and manufacturer resources; investigating flagged issues (e.g., unusual observed maritime activity); and/or facilitating issue resolution.”⁷⁸

Thus, both the CRSIC working groups and the AEP Team identified as a challenge the lack of a single federal agency to serve as a point of contact for cable owners, lead on cable protection policy, coordinate on permitting decisions, report unusual activity, and investigate issues.

Multiple Entities Involved in Review and Permitting

The CRSIC Working Group 4A studied interagency challenges, and found that the permitting and review process is complex and arguably disjointed. The working group and industry stakeholders

⁷¹ CISA, “Government Coordinating Councils,” <https://www.cisa.gov/government-coordinating-councils>.

⁷² DHS, *Communications Sector-Specific Plan: An Annex to the NIPP 2013*, 2015, <https://www.cisa.gov/sites/default/files/publications/nipp-ssp-communications-2015-508.pdf>.

⁷³ DHS, *Communications Sector Coordinating Council 2022*, 2022, http://www.comms-scc.org/wp-content/uploads/2022/05/CSCC20Annual20Report_2022-compressed.pdf.

⁷⁴ 2022 Report to the European Parliament, p. 51.

⁷⁵ Ibid.

⁷⁶ CRSIC V WG4A Interagency Report, Executive Summary.

⁷⁷ CRSIC V WG4A Interagency Report, p. 36.

⁷⁸ 2017 AEP Cable Threats Report, p. 16.

found that there are multiple federal agencies involved in the review and permitting of cable projects, “each with different mandates and responsibilities, and operating under different statutes,” and that the U.S. permitting process may inadequately consider cable protection.⁷⁹

Along with multiple federal entities involved in the review and permitting of cables, state and local agencies are also involved in cable permitting. Decisions from permitting agencies could strengthen protection of cables or exacerbate risks; in some instances permitting agencies may not be aware of or consider threats to cables.

Federal Entities Involved in Cable Review and Permitting

Table 1 provides an overview of selected federal entities that may be engaged in the permitting and review of commercial undersea telecommunication cables, and others that have technical expertise and protection roles.⁸⁰ Depending on the specifics of a cable project and the natural resources affected, multiple federal entities acting under different statutes, regulations, and presidential directives may be involved in the review and approval of a commercial undersea telecommunication cable landing in the United States. Two of the agencies with more prominent roles are the FCC and the U.S. Army Corps of Engineers (USACE).

- The FCC licenses cable landing stations for cables connecting the United States to a foreign nation and domestic cables crossing into international waters. The FCC coordinates with other executive branch agencies on initial review of undersea telecommunication cable landing license applications. The FCC requires license applicants to provide information on entities that will own or control the U.S. cable landing station and entities that own or control a 5% or greater interest in the cable system. Generally, for applications from a foreign citizen or foreign entity, including a foreign government, holding 10% or more direct or indirect interest in the proposed cable, the FCC refers the application for a national security, law enforcement, and foreign policy review by the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector (referred to as “the Committee”). The Committee is a group of executive branch agencies and offices formalized in a 2020 executive order.⁸¹
- USACE has permit and review responsibilities that apply to certain activities in regulated waters, including the installation of undersea cables. Undersea telecommunication cable project developers generally must obtain USACE approval for work related to the portion of a cable in regulated waters. In these instances, USACE is not regulating the cable per se; it is regulating navigation impacts from the mean high water line at the shore out to three nautical miles and the seabed over the outer continental shelf, and dredging and filling impacts of the cable segment out to three nautical miles of the territorial sea.

As part of the federal permitting and review of a cable, federal agencies such as USACE or the cable permit applicant may be required to consult with or obtain a permit or approval from other federal agencies in NOAA, such as the National Ocean Service (NOS) or its National Marine

⁷⁹ CSRIC V WG4A Interagency Report, pp. 6, 36; see also Justin Sherman, “The U.S. Should Get Serious About Submarine Cable Security,” *Council on Foreign Relations* (blog), September 13, 2021, <https://www.cfr.org/blog/us-should-get-serious-about-submarine-cable-security>.

⁸⁰ See the **Appendix** for detailed information on agency roles in federal permitting and review.

⁸¹ Executive Office of the President, “Establishing the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector,” 85 *Federal Register* 19643-19650, April 4, 2020.

Fisheries Service (NMFS), and agencies in the Department of the Interior (DOI), including the National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and Bureau of Ocean Energy Management (BOEM), depending on the specific impacts and location of the cable project. Other agencies, such as the DHS, Department of Transportation (DOT), and the U.S. Coast Guard (USCG) may also support protection of cables.

Table 1. Selected Federal Entities with Roles in Commercial Undersea Telecommunication Cables Landing in the United States

Relevant Agencies and Their Departments	Principal Role Related to Cables	Description
Federal Entities with Permitting and Review Responsibilities That Apply to Commercial Undersea Cables		
Federal Communications Commission (FCC)	Licensing cable landings and operation of commercial telecommunication cables connecting the United States to a foreign nation and domestic cables that cross into international waters	The FCC reviews cable landing license applications to ensure they are in the public interest. Before granting or revoking a license, the FCC must obtain approval from the Secretary of State and from any federal agency or department that the FCC may deem necessary (typically, the U.S. Departments of Commerce and Defense). The FCC also refers certain applications with 10% or more foreign direct or indirect interest in the cable for review to the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector (see next entry).
Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector (Committee)	Reviewing certain FCC applications related to cables for national security, law enforcement, and foreign policy concerns	The Committee assists the FCC in identifying and mitigating risks to U.S. national security. It reviews cable license applications with 10% or greater direct or indirect foreign interest. Committee members include the Attorney General, Secretaries of Defense and Homeland Security, other executive branch departments or agencies, or assistant to the President as determined by the President. Advisors include the Secretaries of State, the Treasury, and Commerce; Director of the Office of Management and Budget; U.S. Trade Representative; Director of National Intelligence; Administrator of the General Services Administration; Director of the Office of Science and Technology Policy, and certain Assistants to the President.
Department of the Army, U.S. Army Corps of Engineers (USACE)	Permitting activities that may obstruct navigation and certain activities subject to the Clean Water Act	Undersea cable owners must obtain USACE approval (e.g., permits) related to cable projects' impacts on navigation and impacts of dredge and fill material before laying cables in regulated waters. USACE also conducts environmental reviews required under the National Environmental Policy Act (NEPA) that inform its permitting decisions.
Other Agencies That May Be Engaged in Permitting and Review Depending on Specific Impacts or Locations of Cable Project		
Department of Commerce, National Oceanic and Atmospheric Administration (NOAA)	Consulting with regulatory agency (e.g., USACE) or applicant on actions that may have an adverse impact on marine wildlife and ecosystems, and in some cases, issuing permits or approvals related to these protected coastal and marine resources	NOAA is responsible for conserving and managing certain coastal and marine ecosystems and resources, including areas of the ocean and specific species that may be affected by undersea cable projects. Federal agencies and cable applicants may be required to consult or obtain a permit from NOAA's National Ocean Service or its National Marine Fisheries Service.

Relevant Agencies and Their Departments	Principal Role Related to Cables	Description
Department of the Interior, National Park Service (NPS), U.S. Fish and Wildlife Service (FWS), and Bureau of Ocean Energy Management (BOEM)	Approving right-of-ways, and actions related to certain protected species and related to protecting undersea power cables	If an undersea telecommunication cable project requires a right-of-way to use land in a national park or marine refuge, the NPS or FWS may potentially become involved. FWS may also have a role in implementing the Endangered Species Act. DOI's BOEM may coordinate with other agencies to ensure that undersea power transmission cables authorized by BOEM do not affect telecommunication cables.
Other Technical Expertise and Protection Roles Related to Commercial Undersea Cables		
Department of the Navy, Naval Seafloor Cable Protection Office (NSCPO)	Participating in discussions of commercial undersea cables based on its technical expertise	The NSCPO represents the interest of the Navy and Navy cable owners in policy discussions with U.S. agencies, presenting a coordinated response on cable protection and policy issues.
Department of Transportation (DOT), Maritime Administration	Administering the Cable Security Fleet program, in coordination with Department of Defense	The program enables the U.S. government to contract to maintain a fleet of active, commercially viable, privately owned United States-flag cable vessels to meet national security requirements (including for the laying, maintenance, and repair of submarine cables), provide the U.S. government access to participating vessels in times of national emergency, and maintain a U.S. presence in the international submarine cable service market.
Department of Homeland Security (DHS), U.S. Coast Guard (USCG)	Enforcing all applicable federal laws on, under, and over the high seas and U.S territorial waters	DHS leads critical infrastructure protection, including for the communications sector. By law, the DHS Secretary is required to take cables into account when setting ship anchorage areas. USCG can set temporary protection zones in and around harbors that can preclude or protect cable laying, and enable cable maintenance and repair. USCG licenses and certifies U.S.-flag cable laying vessels and crews.

Source: CRS.

Notes: Details on agency roles, including authorizing statutes, permitting, licensing, and environmental review processes are included in the **Appendix**. One agency's responsibilities may require or necessitate that it consult with another agency.

Each entity engaged in permitting or review is limited to the jurisdictional scope of its authorities and the specific statutes it is responsible for implementing. An agency's review may focus on certain segments of commercial undersea telecommunication cables (e.g., segments transecting a national park) or certain aspects of a cable project (e.g., foreign ownership). Given the differing locations of commercial undersea telecommunication cables and owners and operators involved, the agencies and entities that may need to review a cable project will also vary.

Review by the entities shown in **Table 1** may lead to specific requirements or modifications to cable projects for cable landing sites or for physical protection of cable landing stations, national security or natural resources (i.e., construction disturbance limitations or requirements on a right-of-way through a federally protect marine area). In some cases, the review process may prevent projects from moving forward unless certain concerns or potential impacts are addressed.⁸² These requirements can sometimes affect the cable's operation, vulnerabilities, and economic viability.

⁸² In 2000, the Southern Cross Cable Network was rerouted from a proposed landing site in Monterey Bay, CA, to (continued...)

State and Local Government Involvement in Cable Review and Permitting

Along with federal permitting and review process, commercial undersea telecommunication cables may also be subject to oversight and regulation by state and local governments. Each state government has a different permitting process for cables that often includes an environmental review of the project associated with the grant of a seabed lease, which owners need to lay cables in state-controlled waters. Local permitting processes may involve acquisition of easements, access to locally-owned beaches, land, and roads, and compliance with requirements related to abatement of noise, water, and air pollution.⁸³

Ease of permitting in certain areas can attract cable landings, increase the number of cables available in an area, and strengthen redundancies. It could also lead to clustering of cable landing stations in a few locations, reducing geographic diversity, and creating single points of failure for the U.S. cable network. In the United States, the CSRIC working groups note that cable landing sites are concentrated in a few areas:

On the U.S. East Coast, existing landing sites are clustered in the Northeast including Massachusetts, Rhode Island, New York, New Jersey, and in the Southeast along the Florida coast in three primary locations. On the U.S. West Coast, existing landing sites are located in Northwest in Washington and Oregon and in the Southwest in Northern, Central, and Southern California. Landing sites connect Alaska and Hawaii to the U.S. mainland.⁸⁴

The working group encouraged coordination among federal, state, local agencies and industry to promote geographic diversity in cable routes and landing sites and promote cable and network resiliency.

Lack of Coordination During Review and Permitting

The CSRIC working groups found that while many agencies are involved in review and permitting of cables and undersea infrastructure, there is generally, a lack of coordination between agencies and a lack of awareness of cable protection needs.

The working groups cited lack of coordination as a challenge during permitting of undersea cables and during permitting of other marine infrastructure (e.g., wind farms). The lack of coordination could, according to the working groups, exacerbate risk to cables and the cable network serving the United States.

The first study of the CSRIC in 2014 originated out of concerns related to spatial conflicts between installed and planned undersea cables and other marine activities (e.g., offshore dredging, beach replenishment, and offshore wind farms). The FCC tasked the CSRIC with examining risks to submarine cables and the submarine cable infrastructure, and “how proximity to other marine activities, governmental permitting processes, and clustering of cable routes and landing can increase the risk of cable damage and harm U.S. network resilience.”⁸⁵

Nedonna Beach, OR, after experiencing delays in securing permission to land at the California site given the proposed California marine route would have passed through a marine protected area (Nicole Starosielski, *The Undersea Network* (Duke University Press, 2015), p. 147). See also DOJ, “Team Telecom Recommends FCC Grant Google and Meta Licenses for Undersea Cable,” press release, December 17, 2021. Discussing security requirements on Google and Meta related to the Pacific Light Cable and recommendations to reroute the cable away from Hong Kong.

⁸³ CSRIC V WG4A Interagency Report, p. 33.

⁸⁴ CSRIC V WG4A Cable Clustering Report, p. 6.

⁸⁵ CSRIC IV, Working Group 8, Submarine Cable Routing and Landing, *Final Report—Protection of Submarine Cables through Spatial Separation*, December 2014, pp. 14-15.

The CSRIC working groups found that the installation of a submarine cable system and other marine infrastructure often involves many agencies (e.g., federal, state, local), each with its own mandates, priorities, and permitting processes, “most of which are not coordinated at all with the FCC—or with each other.”⁸⁶ While many agencies may review cable projects, the FCC—the nation’s expert agency in telecommunications—and other U.S. agencies responsible for critical infrastructure security (e.g., DHS) do not have direct input into other agencies’ permitting decisions, including decisions that may affect the placement or protection of cables.⁸⁷ The 2016 report studying interagency coordination states:

This fragmented system of regulation and planning has resulted in a number of particular coordination problems that exacerbate risks to submarine cables, including gaps in actual or perceived legal authorities, gaps in how existing legal authority is exercised, lack of familiarity with submarine cable technologies and installation and repair operations, and lack of clarity in procedures for consultation between relevant agencies when other marine activities are proposed for permitting in proximity to submarine cables.⁸⁸

The working groups found that agencies making decisions about cables or other marine activities may not always be aware of existing cables, cable protection needs, and may not always take cable protection and repair needs into account, which could leave individual cables and the telecommunication cable network vulnerable to damage.⁸⁹ Challenges to coordinating include the increasingly crowded marine environment, competing stakeholder interests, differing agency interests and mandates, and complex jurisdictional authorities. Competing interests may also present some challenges, as some cable stakeholders may assert that permitting decisions and policies may introduce risks to cables,⁹⁰ while some marine and maritime stakeholders assert that installation of cables could adversely affect navigation, maritime, environmental, and fishery interests.⁹¹

Lack of Awareness of Cable Protection Needs

Cable industry stakeholders and experts indicate that agencies involved in the planning and permitting of cables and other undersea infrastructure, such as wind farms, may not always be aware of the existence of undersea cables in the proposed project area, and so may not take existing cables or cable protection needs into account.⁹²

The CSRIC working group found that agencies and companies proposing offshore projects do not always consider the impact a planned project may have on undersea telecommunication cables, that consideration of cables is often not integrated into agency permitting and review processes, and that agencies and offshore project developers are not always aware of best practices for protecting cables.⁹³ The CSRIC working group asserts that marine infrastructure, including

⁸⁶ CSRIC IV WG8 Spatial Separation Report, p. 22.

⁸⁷ CSRIC V WG4A Interagency Report, pp. 33-34.

⁸⁸ CSRIC V WG4A Interagency Report, pp. 33-34.

⁸⁹ CSRIC V WG4A Interagency Report, p. 36.

⁹⁰ CSRIC V WG4A Cable Clustering Report, pp. 5-7.

⁹¹ CSRIC V WG4A Interagency Report, p. 30; see also Coffen-Smout, Scott & Herbert, Glen J., 2000. “Submarine Cables: A Challenge for Ocean Management,” *Marine Policy*, Elsevier, vol. 24(6), pages 441-448, November. While cable and environmental interests may conflict, a full discussion of U.S. stakeholder environmental and natural resource protection concerns is beyond the scope of this report.

⁹² CSRIC V WG4A Interagency Report, p. 35.

⁹³ CSRIC V WG4A Interagency Report, pp. 36-37; see also CSRIC IV WG8 Spatial Separation Report, pp. 56-57.

undersea cables, needs protections and procedures similar to “call before you dig” initiatives established to prevent damage to pipelines and electrical lines.⁹⁴

In addition to recommending that the FCC serve as the point of contact for cables, the working group also recommended that FCC create a clearinghouse of information on cables, including the identification of existing and planned cables, spatial requirements for installation, repair, and protection of cables, activities that can damage cables, and penalties for damaging cables.⁹⁵ This approach is similar to that used in Australia, where the communications regulatory agency serves as a clearinghouse and point of contact on cable issues for cable companies and other marine activities (e.g., fishing, offshore development companies).⁹⁶

U.S. Government Actions to Protect Cables

The U.S. government has taken various actions to protect cables landing in the United States from physical damage, as discussed below.

Cable Protection Consideration in Establishing Anchorages

On December 23, 2022, Congress enacted the Don Young Coast Guard Authorization Act of 2022 (Division K of P.L. 117-263).⁹⁷ It requires the Secretary of the department in which the USCG is operating⁹⁸ to define and establish anchorage grounds in the navigable waters of the United States, and to take into account protection of the marine environment, proximity to undersea cables, and the safe and efficient use of the marine transportation system, and national security. The act also would prohibit vessels from anchoring in “near proximity” to an undersea pipeline or cable, unless authorized by the Captain of the Port (who is a USCG officer). It also would require the Secretary responsible for the USCG to review and identify anchorage regulations that may need modification, “in the interest of marine safety, security, and environmental concerns, taking into account undersea pipelines, cables, or other infrastructure.”⁹⁹ In targeting anchoring, Congress addressed a significant threat to cables. Industry reports indicate that anchoring accounts for about 25% of cable damage incidents.¹⁰⁰

⁹⁴ CSRIC V WG4A Interagency Report, p. 37.

⁹⁵ CSRIC V WG4A Interagency Report, p. 44.

⁹⁶ Australian Communications and Media Authority (ACMA), “Submarine Cables,” <https://www.acma.gov.au/submarine-cables>.

⁹⁷ The provision amends 46 U.S.C. §70006.

⁹⁸ U.S. law (14 U.S.C. §103) states that the Coast Guard “shall be a service in the Department of Homeland Security, except when operating as a service in the Navy upon the declaration of war if Congress so directs in the declaration or when the President directs.” For more information, see CRS In Focus IF10484, *Defense Primer: Department of the Navy*, by Ronald O'Rourke.

⁹⁹ The act reflects concerns the House Transportation and Infrastructure Committee raised in a report (H.Rept. 117-282) concerning the San Pedro Bay Pipeline oil spill on the coastline near Long Beach, CA, in the fall of 2021. The committee wrote, “Although still under investigation, the crack is believed to have been caused by a vessel anchor strike during a heavy weather event...” In its report, the Committee reiterated its interest in safeguarding shorelines from oil spills, and hence, amended anchoring laws to prohibit anchoring within certain distances of undersea pipelines or cables unless permitted by the Captain of the Port.

¹⁰⁰ Alan Mauldin, “Cable Breakage: When and How Cables Go Down,” *TeleGeography BLOG*, May 3, 2017, <https://blog.telegeography.com/what-happens-when-submarine-cables-break>.

Enhanced Access to Repair Vessels

In the National Defense and Authorization Act (NDAA) for Fiscal Year 2020 (P.L. 116-92), Congress authorized funding for a Cable Security Program for two privately-owned U.S.-flagged ships,¹⁰¹ each subsidized at \$5 million per year, to meet national security requirements related to undersea cables.¹⁰² The program's authorization allows for maintaining a fleet of active, commercially viable, privately owned United States-flag cable vessels to meet national security requirements and to maintain a U.S. presence in the international submarine cable services market. Program participants enter into operating agreements with DOT's Maritime Administration that require the vessel to continuously and actively operate in the commercial submarine cable services market (including the laying, maintenance, and repair of submarine cables), provide the U.S. government access to participating vessels in times of national emergency, and maintain a U.S. presence in the international submarine cable service market.¹⁰³ The U.S. government also has a ship—the U.S. Navy's USNS *Zeus*—capable of laying and repairing cable.

Penalties for Damages

Pursuant to the 1884 Convention on the Protection of Submarine Telegraph Cables, the U.S. government adopted laws making damage to cables a punishable offense.¹⁰⁴ For willful injury to cables, the offense is a misdemeanor. Offenders may be subject to imprisonment for up to two years, or to a fine not to exceed \$5,000, or both (47 U.S.C. Chapter 2, §21). For negligent injury to a cable, the offense is also a misdemeanor. Offenders may be subject to imprisonment for three months or to a fine not to exceed \$500 or both (47 U.S.C. Chapter 2, §22). U.S. laws on penalties for cable damage were adopted in 1888. Many groups, including the International Cable Protection Committee (ICPC), the CSRIC, the AEP Team, and the European Parliament have recommended countries review penalties to ensure that the penalties are substantial enough to deter damage.

Cable Outage Reporting System

The U.S. government has taken some action to identify outages in cables. Starting on October 28, 2021, the FCC requires undersea telecommunication cable owners to report to the FCC specified unplanned service outages.¹⁰⁵ The FCC uses this outage reporting system for other telecommunication networks (e.g., wireline, wireless), and has extended it to undersea cables to better track and understand cable outages, to assist cable owners and customers, and to inform national response efforts.

¹⁰¹ U.S.-flagged vessel means any vessel documented (registered) under the laws of the United States (26 U.S.C. §1355).

¹⁰² For more information, see CRS Report R46654, *U.S. Maritime Administration (MARAD) Shipping and Shipbuilding Support Programs*, by Ben Goldman. See also "C.S. *Decisive* Reflagged for U.S. Cable Security Fleet," *American Maritime Officer*, vol. 52, no. 2, February 2022. Noting that SubCom's cable ship, C.S. *Dependable*, was reflagged into U.S. registry in December 2021 and SubCom's cable ship, C.S. *Decisive*, was reflagged into U.S. registry in January 2022 for service in the two-ship U.S. Cable Security Fleet.

¹⁰³ Maritime Administration, DOT, "Request for Applications To Be Considered for Enrollment in the Cable Security Fleet," 86 *Federal Register* 355, January 5, 2021.

¹⁰⁴ 47 U.S.C. Chapter 2, §§21-25.

¹⁰⁵ FCC, "Improving Outage Reporting for Submarine Cables and Enhanced Submarine Cable Outage Data," 86 *Federal Register* 22360, April 28, 2021, <https://www.federalregister.gov/documents/2021/04/28/2021-08651/improving-outage-reporting-for-submarine-cables-and-enhanced-submarine-cable-outage-data>.

Congressional Hearings and Legislative Activity

Congress has discussed cable protection issues in hearings, but has not adopted a comprehensive protection framework. Such a framework could potentially include, for example, designating an agency to lead subsea cable protection efforts, developing a cable protection strategy, adopting protection policies, or mandating coordination in permitting processes to protect commercial undersea telecommunication cables landing in the United States. Congress has supported proposals to fund undersea cables, to limit the use of untrusted equipment (i.e., equipment identified by the U.S. government as posing a national security risk) in undersea cables, and to restrict the sale of U.S.-made cable equipment to foreign adversaries.

Congressional Hearings

Congressional hearings illustrate sustained congressional interest in the reliability and protection of commercial undersea telecommunication cables. From January 3, 2019 (116th Congress) through August 8, 2023 (118th Congress), 11 congressional committees held at least 26 hearings that referenced undersea telecommunication cables.¹⁰⁶ Hearings covered a range of topics including funding for undersea telecommunication cables to expand internet access in the United States;¹⁰⁷ protection of cables landing in the United States and its territories to increase their resiliency and redundancy of the U.S. and global network, and to avoid service disruptions;¹⁰⁸ military use of commercial undersea cables and security concerns;¹⁰⁹ security of cables, including physical security, cybersecurity, and security of data transmitted via cable;¹¹⁰ and foreign investment in the global undersea telecommunication cable networks.¹¹¹ Members questioned federal agencies on their role in assuring the security of undersea telecommunication cables,¹¹² recognizing the challenges given the number of departments and agencies involved, their overlapping jurisdictions, and individual mandates.¹¹³

¹⁰⁶ Based on a search in ProQuest Congressional by CRS research librarians, conducted on August 8, 2023. Committees that held hearings referencing undersea cables included House and Senate Appropriations, House and Senate Armed Services, House Foreign Affairs and Senate Foreign Relations, Senate Commerce, Science, and Transportation, Senate Finance, House Natural Resources, House Transportation and Infrastructure, and House Agriculture.

¹⁰⁷ For example, see U.S. Congress, Senate Committee on Indian Affairs, *Setting New Foundations: Implementing the Infrastructure Investment and Jobs Act for Native Communities*, 117th Cong., 2nd sess., May 4, 2022, S. Hrg. 117-505.

¹⁰⁸ For example, see U.S. Congress, House Agriculture Committee, *Rural Broadband: Examining Internet Connectivity Needs and Opportunities in Rural America*, 117th Cong., 1st sess., April 20, 2021, H. Hrg. 117-4.

¹⁰⁹ For example, see U.S. Congress, House Committee on Armed Services, Subcommittee on Intelligence and Emerging Threats and Capabilities meeting jointly with House Committee on Oversight and Reform, Subcommittee on National Security, *Securing the Nation's Internet Architecture*, 116th Cong., 1st sess., September 10, 2019, H.A.S.C. No. 116-43.

¹¹⁰ For example, see U.S. Congress, Senate Armed Services, *Posture of the Navy in Review of the Defense Authorization Request for FY2021 and the Future Years Defense Program*, 116th Cong., 2nd sess., March 5, 2020.

¹¹¹ U.S. Congress, House Committee on Foreign Affairs, Subcommittee on Asia, the Pacific, Central Asia and Nonproliferation, *Digital Economic Engagement in the Indo-Pacific*, 117th Cong., 2nd sess., January 19, 2022, p. 45.

¹¹² U.S. Congress, House Committee on Armed Services, Subcommittee on Intelligence and Emerging Threats and Capabilities meeting jointly with House Committee on Oversight and Reform, Subcommittee on National Security, *Securing the Nation's Internet Architecture*, 116th Cong., 1st sess., September 10, 2019, H.A.S.C. No. 116-43.

¹¹³ *Ibid*, p. 2.

Legislative Activity

CRS conducted a search of congress.gov to identify legislative proposals that referenced undersea telecommunication cables.¹¹⁴ In the 118th Congress, CRS identified four bills pertaining to submarine cables. CRS identified legislative proposals that would, if enacted, alter the review of cable applications for law enforcement and national security purposes. CRS identified legislation and legislative proposals that would fund new cable infrastructure in the United States. Funding new cables could increase redundancies and enhance the resiliency of the U.S. telecommunication network. CRS also found legislation that would restrict the availability of U.S. cable equipment to foreign adversaries. This could limit the ability of foreign adversaries to control the global cable network, and the flow of traffic across that network, potentially improving the security of the global cable network and the data it carries.¹¹⁵

- **Codifying the Committee Reviewing Cables for National Security Concerns.** In the 118th Congress, H.R. 4506, TEAM TELECOM Act would establish an interagency national security review process, codifying elements of the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector (Committee). The bill proposes some changes to the process, requiring that the FCC submit applications (including applications pertaining to submarine cable landing licenses and the transfer of control of a submarine cable landing license) to the Under Secretary of Commerce for Communications and Information, National Telecommunications and Information Administration (NTIA) in the Department of Commerce; the current process requires the FCC to refer applications to the Committee, currently chaired by the Attorney General (DOJ). For more information on the Committee, see the **Appendix**. H.R. 4510, the NTIA Reauthorization Act of 2023 incorporates text from H.R. 4506, and through amendments, would terminate the Committee after the NTIA establishes such an interagency review process.
- **New Cable Infrastructure.** Congress has considered legislation to expand cable networks to improve access to broadband services, including undersea cable infrastructure. In the 116th Congress, some Members introduced legislation to incentivize states to build internet exchange centers and cable landing stations to expand access to broadband services, as in S. 1166. In the 117th Congress, the Infrastructure Investment and Jobs Act (P.L. 117-58) includes undersea telecommunications cables and landing stations as an allowable expense under Middle Mile Grant Program funded under the act. In the 118th Congress, a bill introduced in the House in (H.R. 3385) proposes the study of a new transatlantic cable connecting the continental United States, U.S. Virgin Islands, and Africa to expand digital commerce and improve national security.
- **Cable Technologies and Global Network Security.** In the 118th Congress, the House passed legislation (H.R. 1189) on March 27, 2023, related to preventing foreign adversaries from acquiring goods and technologies capable of supporting

¹¹⁴ The search, conducted on August 8, 2023, used terms specific to undersea telecommunications cables. That is, the search identified bills that specifically referenced undersea telecommunications cables, rather than capturing all legislation that would alter how federal agencies review, license, or permit under various statutes.

¹¹⁵ Dale Aluf, *China's Subsea Cable Power Play in the Middle East and North Africa*, The Atlantic Council, Issue Paper, May 2023, https://www.atlanticcouncil.org/wp-content/uploads/2023/05/ChinasGrowingInfluence_052423-1.pdf.

the construction, maintenance, or operation of undersea cable projects.¹¹⁶ The bill would require the President, acting through the Secretary of State and in consultation with the Secretary of Commerce, to develop a strategy to eliminate the availability of such goods and technologies to foreign adversaries, among other actions.¹¹⁷ The bill would also require congressional committee notification on related actions. The intent, according to one of its sponsors, is “to limit foreign adversaries like China from accessing goods and technologies capable of supporting undersea cables and establishing agreements with allies and partners to do the same.”¹¹⁸

Undersea Cable Protection: Issues for Congress

Undersea cables are vital to the national security and economic interests of the United States. While industry stakeholders state that there have been few reported communication outages from undersea cable damage in the United States, outages have occurred.¹¹⁹ Given recent damage to undersea cables that disrupted and degraded communications, and given continuing concerns for global undersea infrastructure, heightened by the war in Ukraine¹²⁰ and tensions with China,¹²¹ Congress may consider policies to enhance protection of commercial undersea cables landing in the United States from physical damage. While damage to cables outside of the United States can affect communications in the United States, by focusing on protection of undersea cables landing in the United States and encouraging redundancies, some stakeholders assert that Congress could strengthen resiliency of the U.S. telecommunication network, ensure continuity of communications, and safeguard U.S. national and economic security.

As previously discussed, Congress has taken some actions to enhance protection of subsea cables. A policy consideration for Congress is whether those actions are sufficient or whether additional action is needed to protect commercial undersea telecommunication cables. Other policy questions include whether, or how to, address other cable concerns and recommendations identified by

¹¹⁶ The U.S. government has taken similar actions to restrict the availability of certain telecommunication technologies for entities that pose a threat to U.S. national security. This bill would eliminate the availability of those goods and technologies capable of supporting the construction of undersea cables, specifically. For more information on U.S. restrictions on telecommunication technologies, see CRS Report R47012, *U.S. Restrictions on Huawei Technologies: National Security, Foreign Policy, and Economic Interests*, by Jill C. Gallagher.

¹¹⁷ The strategy would include identification of goods and technologies capable of supporting undersea cables; U.S. and multilateral export controls and licensing policies for such goods and technologies; U.S. allies and partners that have a share of the market with respect to such goods and technologies; entities under the control, ownership, or influence of foreign adversaries; efforts to promote U.S. leadership at international standards-setting bodies; and, presence and activities of foreign adversaries at international standards-setting bodies.

¹¹⁸ Representative Brian Mast, “Mast, Kim Introduce Bill to Limit China’s Ability to Develop Critical Undersea Cables,” press release, February 24, 2023, <https://mast.house.gov/press-releases?ID=3A27FEF8-8C2C-465F-A3AC-B349611752D8>. Such legislation could limit expansion of foreign adversary involvement in the global cable network, reducing potential risks (e.g., controlling interconnection points, forming chokepoints, accessing data transmitted on interconnected cables, espionage).

¹¹⁹ 2017 AEP Cable Threats Report, pp. 6, 8, 13. See also FCC, “Improving Outage Reporting for Submarine Cables and Enhanced Submarine Cable Outage Data,” 85 *Federal Register* 15734, March 19, 2021. Statements from the North American Submarine Cable Coalition (NASCA) noting that “the passage of time has shown few reportable outages in general,” asking for the FCC to rescind its new cable outage reporting rules.

¹²⁰ Sabine Siebold, “NATO Says Moscow May Sabotage Undersea Cables as Part of War on Ukraine,” *Reuters*, May 3, 2023, <https://www.reuters.com/world/moscow-may-sabotage-undersea-cables-part-its-war-ukraine-nato-2023-05-03/>.

¹²¹ Paul Lipscombe, “China Flexes Muscles over Internet Subsea Cables Across South China Sea,” DCD, March 15, 2023, <https://www.datacenterdynamics.com/en/news/china-flexes-muscles-over-internet-subsea-cables-across-south-china-sea/>.

cable industry stakeholders and experts. A discussion of policy recommendations from stakeholders and other options for reducing damage to cables is presented below.

Cable Protection Strategy

Congress may consider the development of a cable protection strategy to enhance protection of cables landing in the United States. The strategy may include designation of agencies and agency roles in protection, policies to protect cables, assessment of risks, and public-private coordination on cable protection.¹²²

The European Parliament, in its 2022 report recognizes efforts by individual EU countries to protect cables, but notes a lack of a protection strategy and calls for development of a national strategy and action items to enhance cable protection. Congress could consider directing an existing agency (e.g., FCC, DHS) or a set of agencies (e.g., interagency working group) to develop a comprehensive cable protection strategy for the United States that strengthens the resiliency of the U.S. cable network, could direct a public-private working group to develop a protection strategy for cables and the U.S. cable network, or could continue to rely primarily on private sector owners to secure their cables.

Lead Federal Agency

Congress may consider designating a single agency as the lead agency on cable protection, or giving multiple agencies responsibilities for cable protection. Congress may consider designating such an agency (or agencies) with responsibilities for identifying and adopting policies to protect cables, develop and disseminate policies, standards, and best practices to permitting agencies, and coordinating interagency cable protection efforts. Congress could task an existing agency with cable protection responsibilities or assign these responsibilities to a new agency.

Cable stakeholders have argued that, under such an approach, the lead agency best positioned could be the FCC, in consultation with DHS. The FCC is the lead agency on commercial telecommunications, has engineering staff, and has studied the protection of cables to promote the security, resiliency, and redundancies of commercial undersea telecommunication cables and the U.S. telecommunication network. The FCC is already the lead federal agency for regulating communications in the United States, including by cable, and the agency that grants commercial undersea telecommunication cable landing licenses to private sector applicants. For initial installation of cables, the FCC is responsible for issuing licenses for international and some domestic commercial undersea telecommunication cables,¹²³ consulting national security agencies, and coordinating protections for these cables through national security agreements. However, its current involvement with other agencies (e.g., USACE, natural resource agencies) that may review cable installations or impose requirements on their installation, operations, or repair is limited. Stakeholders have suggested the FCC could work collaboratively with industry to identify or develop standards and policies to protect undersea cables and issue guidance for permitting agencies and others to raise awareness of cable protection needs, offer best practices in

¹²² While the CSRIC Working Group 4A in 2016 stopped short of calling for a national protection strategy, it pressed for a single agency to lead protection of cables, endorsement of industry standards and best practices for cable protection, interagency coordination, and public-private coordination to enhance cable protection. Further, the working group noted that other countries such as Australia and New Zealand have robust governance regimes, and also concluded that the United States lacks a robust submarine cable protection regime that acknowledges the importance of undersea telecommunication cable to U.S. economic and national security interests (CSRIC V WG4A Interagency Report, p. 33).

¹²³ Domestic cables that cross international waters.

cable protection, and identify the FCC as a resource on cable questions.¹²⁴ On the other hand, the FCC is an independent commission, funded from regulatory fee offsetting collections (e.g., licensing fees and fines) and from spectrum auction revenues. To take on additional cable protection responsibilities, the FCC may need authorities and resources from Congress. For more on the current FCC roles, see the **Appendix**.

Congress may also consider DHS Cybersecurity and Infrastructure Security Agency (CISA) as the lead agency. CISA is the lead federal agency for understanding, managing, and reducing the risk to critical infrastructure, including the U.S. communications infrastructure. CISA works with public and private partners to identify risks, defend against threats to U.S. infrastructure, and develop mitigation strategies.¹²⁵ CISA hosts the Communications Sector Coordinating Council (SCC), a group of telecommunication industry representatives that share information and develop tools, guidelines, and products to address risks, vulnerabilities, and emerging issues to the communications sector, and the Communications Sector Government Coordinating Council (GCC), a group of agencies with missions related to communications. The GCC and SCC coordinate to develop plans, policies, and activities to protect critical infrastructure.¹²⁶ Congress could consider designating DHS as the lead agency for undersea telecommunication cable protection through its efforts to protect critical infrastructure. While DHS has these structures (e.g., GCC, SCC) in place, it has not developed a strategy for protecting commercial undersea cables. Congress may consider tasking DHS alone to lead this effort, or mandate DHS work in coordination with others (e.g., FCC, DOJ, ODNI, state and local government representatives, cable owners, and cable organizations) to develop such a strategy.

Potential Lead Agency Responsibilities

If Congress considers designating a single agency to lead cable protection efforts, it may evaluate which agency would be best equipped to lead, activities the agency should perform, whether coordination with other agencies should be required, and resources needed to carry out these new coordination efforts. Congress may consider naming one agency or multiple agencies with protection responsibilities. For example, Congress could consider tasking DHS with updating the CSCC Annual Report to include risks to cables, or directing DHS to develop a protection strategy, or to work with the FCC and USACE to develop an assessment of cable risks and guidance to mitigate risks.

Raising Public Awareness of Cable Protection Needs and Policies

Congress may consider funding new federal programs or websites to raise awareness of cable protection needs. Industry working groups have cited a need for increased awareness of cable importance and use in U.S. telecommunications and financial systems. The CSRIC working recommended that the FCC serve as the point of contact for cables, and that it create a clearinghouse of information on cables and guidance on cable installations, including existing and planned cables, optimal spatial requirements for installation, repair, and protection of cables, activities that can damage cables, and penalties for damaging cables.¹²⁷ Similarly, the AEP Report called for designation of a single agency to field industry questions or regional private-public information sharing groups (including cable owners, repair companies, and federal, state, local

¹²⁴ CSRIC V WG4A Interagency Report, p. 45.

¹²⁵ Cybersecurity and Infrastructure Security Agency (CISA), “Communications Sector,” <https://www.cisa.gov/communications-sector>.

¹²⁶ CISA, “Government Coordinating Councils,” <https://www.cisa.gov/government-coordinating-councils>.

¹²⁷ CSRIC V WG4A Interagency Report, p. 44.

law enforcement) to proactively review risks, coordinate mitigation strategies, and share actionable intelligence.¹²⁸

Resource for Informing Permitting and Review

Congress may assess how cable protection is addressed in federal and state permitting and review of cables and other marine projects, how these activities interact with the marine environment and species, whether there is need for greater information, guidance, and coordination among permitting agencies to protect both cables and natural resources. If Congress were to task a federal agency to lead on cable protection, that agency may become a resource on cable protection considerations for federal and state agencies tasked with permitting and review of cable and other marine projects.

Identifying Cable Protection Policies and Standards

Both CSRIC working groups and AEP report authors have recognized that policies and standards vary across jurisdictions and recommend public-private cooperation to develop and promote adoption of best practices, policies, and standards to protect cables landing in the United States.¹²⁹ Both the CSRIC working groups and AEP report authors noted that there were industry policies and standards to protect cables, and encouraged industry to adopt best practices. The AEP Team stated that service providers and customers should “ensure they conduct due diligence into the various parties involved in the placement, maintenance, and repair of submarine cable as security best practices are not standardized throughout the industry, in the United States or internationally.”¹³⁰ These include ICPC’s 2022 *Government Best Practices for Protecting and Promoting Resilience of Submarine Telecommunications Cables*.¹³¹ It recommends actions governments can take to foster the deployment and protection of undersea telecommunications cables and to maintain continuity of communications in the event of damage. The CSRIC working groups urge the U.S. government to recognize of industry standards and best practices for protecting cables, and to encourage use of these standards and best practices in the United States and globally.

Policies to Protect Cables from Physical Damage

As companies and governments lay more undersea telecommunication cables and develop other marine infrastructure (e.g., pipelines, power cables, offshore wind facilities), Congress may consider policies to protect cables from physical damage. This section discusses select policies and standards identified by the CSRIC working groups, the AEP report authors, and the ICPC that Congress may consider if it addresses the physical vulnerabilities and protection of commercial undersea telecommunication cables.

The CSRIC working groups recommended adoption or promotion of industry standards and best practices for protecting cables from physical damage (e.g., protection of landing sites). The

¹²⁸ AEP Cable Threats Report, p. 9.

¹²⁹ CSRIC IV WG8 Spatial Separation Report, pp. 8-9. See also CSRIC V WG4A, p. 9. Stating “Elsewhere in the world submarine cables and other marine infrastructure coexist quite well in close proximity due to a well-established working relationship between industries, as well as the application of established industry recommendations and guidelines, such as those of the International Cable Protection Committee (ICPC) and the European Subsea Cables Association (formerly Subsea Cables UK).”; and 2017 AEP Cable Threats Report, pp. 17-18.

¹³⁰ 2017 AEP Cable Threats Report, p. 17.

¹³¹ ICPC, “ICPC Best Practices,” (hereinafter referred to as ICPC Best Practices), November 18, 2022, <https://iscpc.org/publications/icpc-best-practices/>.

CSRIC working groups and AEP Team also discussed broader policies for protection, including cable protection zones, minimum separation policies, and policies to ensure route diversification.

Policies to Protect Cable Landing Sites

In its 2016 report *Clustering of Cables and Cable Landings*, the CSRIC working group recommended improving the physical protection of the undersea telecommunication cable system. The group recommended limiting the number of cables per manhole to limit risks due to proximity. It recommended hardening cable landing stations to protect against natural hazards and man-made attacks and increasing surveillance to detect intrusions.¹³² The AEP report recommended protecting manholes (e.g., welding manholes shut), burying cables, and securing all structures housing network cabling.¹³³ The report notes the difficulty in ensuring protection policies in place in areas of overlapping jurisdiction, and recommends federal agency coordination with the private sector in areas of jurisdictional overlap (e.g., landing stations and where cables arrive on land).¹³⁴

In cases where the FCC refers cable applications to the Committee, the Committee may impose requirements to physically protect the cable and cable landing station from attacks or damage, cybersecurity requirements, and reporting requirements. The FCC may reiterate some of those requirements in its licensing agreement (e.g., location of specific infrastructure, system interconnection documentation, access rights, equipment used in the cable system) to reduce the risk of physical damage to cables.¹³⁵ Thus, some cables landing in the United States are scrutinized for physical and other security risks, but not all applications are referred or reviewed in such detail—only those that pose a risk to U.S. national security. Thus, cables landing in the United States may have varying security requirements and levels of protection.

Congress could direct an agency or interagency working group in consultation with industry, to assess risks, develop standards and best practices, and require or encourage private sector owners to adopt certain protection policies.¹³⁶

Cable Protection Zones

In its 2016 report, *Clustering of Cables and Cable Landings*, the CSRIC working group recommended that the FCC encourage development of cable protection zones around existing undersea cables to protect communications infrastructure from other maritime activities.¹³⁷

Australia and New Zealand, for example, use cable protection zones. In Australia, the government designated the Australian Communications and Media Authority (ACMA), its communications regulator, to serve as the single point of contact on cable issues, and authorized it to declare protection zones for cables, and to prohibit or restrict activities within those zones that may

¹³² CSRIC V WG4A Cable Clustering Report, pp. 4-5.

¹³³ 2017 AEP Cable Threats Report, p. 24.

¹³⁴ 2017 AEP Cable Threats Report, pp. 17-18.

¹³⁵ U.S. Department of Justice (DOJ), “National Security Agreement,” December 2021, <https://www.justice.gov/opa/press-release/file/1457286/download>. This is national security agreement between Edge Cable Holdings USA, LLC, Meta Platforms, Inc. (formerly known as Facebook, Inc.), on the one hand, and the DOJ, DHS, and DOD, collectively, on the other.

¹³⁶ As an example, the Transportation Security Administration (TSA), through a public-private collaborative approach, developed guidance for pipeline owners and operators to enhance security of pipelines. See TSA, *Pipeline Security Guidelines*, April 2021, https://www.tsa.gov/sites/default/files/pipeline_security_guidelines.pdf.

¹³⁷ CSRIC V WG4A Cable Clustering Report, p. 12.

damage cables.¹³⁸ The ACMA has declared three protection zones. Protection zones run through state-controlled coastal waters, Australian-controlled territorial waters, and through its EEZ; the protection zones are about two nautical miles wide, and run from the shore to 200 nautical miles out or to the edge of the continental shelf, and are monitored.¹³⁹ Further, certain Australian state and territory laws do not apply in protection zones. Cable operators may deploy in protection zones or in other areas that are not in protection zones.

In New Zealand, the Ministry of Transport is the administering agency for its Submarine Cables and Pipelines Protection Act 1996.¹⁴⁰ The act and pursuant regulations establish a framework for cable protection and delineate agency roles in setting protection areas, patrolling protected areas, investigating offenses, and prosecuting offenders.¹⁴¹ The protection zones can include an area in the internal waters, territorial sea, or EEZ of New Zealand (with additional approvals from the Ministry of Foreign Trade).¹⁴² Protection zones can be declared by the Governor-General, by Order in Council,¹⁴³ at the recommendation of the Transport Minister, who must consult with persons or entities which the Minister considers would be affected by the order (no agencies are named specifically). New Zealand has declared 10 protection zones. All anchoring and fishing are banned in those areas.¹⁴⁴ Commercial fishing and anchoring in a protected area are subject to a fine of up to \$100,000 (NZD) or about \$60,000 (USD); non-commercial operators fishing or anchoring in a protected area may be subject to a fine up to \$20,000 (NZD) or about \$12,000 (USD).¹⁴⁵ Any person who damages a submarine cable or pipeline, “whether willfully or negligently,” can be fined up to \$250,000 (NZD) or about \$150,000 (USD). Protection is the responsibility of cable owners, but is also supported by government-designated protection officers and maritime police.¹⁴⁶ Thus, the New Zealand government creates protection areas, assists private cable owners and operators by monitoring and appointing people (protection officers) to monitor the security and enforcing protection laws, and imposes fines and penalties on offenders. New Zealand also engages in education, integrating its information on cable protection zones into

¹³⁸ Commonwealth Consolidated Acts (Australia), Telecommunications Act of 1997—Schedule 3A, http://classic.austlii.edu.au/au/legis/cth/consol_act/ta1997214/sch3a.html; Parliament of Australia, “Telecommunications and Other Legislation Amendment (Protection of Submarine Cables and Other Measures) Bill 2005,” August 23, 2005 (last recorded update), https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bId=r2323.

¹³⁹ Motion by Mr. Entsch, Parliamentary Secretary to the Minister for Industry, Tourism, and Resources, “Telecommunications and Other Legislation Amendment (Protection of Submarine Cables and Other Measures) Bill 2005,” Second Reading, June 23, 2005, https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bId=r2323.

¹⁴⁰ New Zealand Legislation, “Submarine Cables and Pipelines Protection Act 1996,” <https://www.legislation.govt.nz/act/public/1996/0022/latest/DLM375803.html#DLM375855>.

¹⁴¹ Ibid. See also, Ministry of Economic Development, “The Framework for Submarine Cable Protection in New Zealand,” presentation to the Asia-Pacific Economic Cooperation, Workshop and Information Sharing on Submarine Cable Protection, Singapore, April 13, 2009, Agenda Item: 1, slides 5-7, http://mddb.apec.org/documents/2009/TEL/TEL39-SPSG-WKSP/09_tel39_spsg_wksp_007rev3.pdf.

¹⁴² New Zealand Legislation, “Submarine Cables and Pipelines Protection Act 1996,” Section 12, <https://www.legislation.govt.nz/act/public/1996/0022/latest/DLM375803.html#DLM375855>.

¹⁴³ New Zealand Parliamentary Counsel Office, “New Zealand Legislation: Glossary,” <https://www.legislation.govt.nz/glossary.aspx>.

¹⁴⁴ New Zealand Legislation, “Submarine Cables and Pipelines Protection Order 2009,” <https://www.legislation.govt.nz/regulation/public/2009/0041/latest/DLM1847701.html>.

¹⁴⁵ For more information on U.S. penalties, see “Penalties” section below.

¹⁴⁶ New Zealand Ministry of Transport, “Protecting New Zealand’s Undersea Cables,” <https://www.transport.govt.nz/about-us/what-we-do/queries/protecting-new-zealands-undersea-cables/>.

maritime guidance, educational materials, and government websites—providing information on protected areas, prohibited activities, and penalties.¹⁴⁷

While protections limit activities that could damage cables, they may also limit other productive activities in coastal waters and create added government responsibilities and costs.¹⁴⁸ They may also lead to clustering of cables, which could create security risks.¹⁴⁹ Their implementation may be challenging in some geographies where there is extensive maritime traffic, existing infrastructure (e.g., power cables, wind farms), and other activities (e.g., fishing).¹⁵⁰

Spatial Separation

With increased competition for ocean space, undersea telecommunication cable owners, as well as other maritime industry actors, are interested in policies that protect their activities and infrastructure and increased coordination between industries, agencies, and stakeholder groups.¹⁵¹ In its guidance *Government Best Practices for Protecting and Promoting Resilience of Submarine Telecommunications Cables*, the ICPC writes,

Spatial separation of submarine cables from other marine activities is one of the effective means of cable protection. It minimizes the risk of damage from other marine activities and ensures that submarine cable operators have ready and unfettered access to their cables for installation and maintenance needs and to minimize outage time in connection with a repair. The oceans, however, are increasingly crowded spaces where ideal spatial separation might not be possible, and where marine industries make compromises regarding proximity while seeking to reduce risk through closer coordination and communication.¹⁵²

In its report *Protection of Submarine Cables through Spatial Separation*, a CSRIC working group recommended the FCC endorse ICPC recommendations on spatial separation distances, share spatial separation recommendations with other agencies, and urge agencies to adopt spatial separation distances.¹⁵³ The working group encouraged the FCC and cable owners to engage with permitting agencies early in the cable planning process to increase awareness among all agencies involved, and to discuss spatial distance requirements.

¹⁴⁷ Stuart Kaye, “The Protection of Platforms, Pipelines and Submarine Cables Under Australian and New Zealand Law,” in *Maritime Security*, 1st ed. (Routledge, 2009), p. 201. See also Maritime New Zealand, “Submarine Power and Phone Cables—Boat Safety in NZ—Maritime New Zealand,” March 27, 2011, https://www.youtube.com/watch?v=_6d-gdXnP-M. Example of information distributed by the government (Maritime New Zealand) and redistributed through industry groups (Safer Boating NZ).

¹⁴⁸ Commonwealth Consolidated Acts (Australia), Telecommunications Act of 1997—Schedule 3A, http://classic.austlii.edu.au/au/legis/cth/consol_act/ta1997214/sch3a.html; Parliament of Australia, “Telecommunications and Other Legislation Amendment (Protection of Submarine Cables and Other Measures) Bill 2005,” August 23, 2005 (last recorded update), https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/bd/bd1314a/14bd046.

¹⁴⁸ ACMA, “Submarine Cables,” <https://www.acma.gov.au/submarine-cables>.

¹⁴⁹ ICPC Best Practices, p. 1.

¹⁵⁰ Christian Bueger and Tobias Liebetrau, “Beyond Triple Invisibility: Do Submarine Data Cables Require Better Security?” *IPI Global Observatory* (blog), September 15, 2021.

¹⁵¹ Letter from Merrick J. Burden, Executive Director, Pacific Fishery Management Council, to Bureau of Ocean Energy Management, January 7, 2022, <https://www.pcouncil.org/documents/2022/01/january-2022-letter-to-boem-on-offshore-wind-fisheries-mitigation-guidance.pdf/>. The Pacific Fishery Management Council recommended collaboration (or required coordination) between marine industries, agencies, and stakeholder groups to assess and avoid any adverse impacts from energy projects on marine activities and habitats.

¹⁵² ICPC Best Practices, p. 3.

¹⁵³ CSRIC IV WG8 Spatial Separation Report, pp. 8-9.

Norwegian-based risk assessment and analytics firm DNV forecasts that there will be a nine-fold increase in global demand for ocean space by the middle of the century, with offshore wind installations expected to account for 82% of demand.¹⁵⁴ DNV asserts that shallow, near-shore waters will generally face more demand, and space requirements will need to be carefully managed to allow for new uses (e.g., offshore energy, food production), while also protecting existing infrastructure, industries, and marine ecosystems.¹⁵⁵ DNV's Director of Energy Transition Outlook has asserted there is a role for government in marine spatial planning; the firm argues that through "careful regulation" and "collaboration between agencies, industries, and countries," existing uses and habitats can be protected, while new uses, and potentially shared uses, can emerge.¹⁵⁶

While the ICPC identifies separation policies as an effective means to protect cables, other cable stakeholders support industries are forging their own protection agreements which could be more stringent than ICPC recommendations. A CSRIC working group, in its report on spatial separation, urged the FCC and industry to promote the development and implementation of new and innovative protection measures for undersea telecommunication cables, stating, "cable protection is a complex undertaking that requires more than just a default separation distance from other marine activities."¹⁵⁷ The report maintained that coordination and collaboration between agencies and industries are essential to protecting cables at installation and after.

Route Redundancy and Diversification

Cable concentration may lead to "choke points" and increase the risk that a single attack, accident, or natural hazard could affect multiple telecommunication providers simultaneously, potentially disrupting or degrading communications for many users, including government users, increasing national security risks.¹⁵⁸ In its 2016, *Final Report—Clustering of Cables and Cable Landings*, the CSRIC working group recommended interagency and inter-jurisdictional cooperation to promote the diversification of undersea telecommunication cable routes, increase redundancy, and avoid landing cables in only a few areas of the United States.

In a 2004 report, DHS found that the U.S. undersea telecommunication cable network had diversification of routes and operators had built redundancies into their networks.¹⁵⁹ In the United States, where there are many cables and extended terrestrial networks, cable owners have many choices of alternative or backup systems if their primary cables sustain damage, allowing for traffic to be rerouted. Cable companies may design their cable systems to ensure that each node on the network (i.e., each connection point) connects to at least two other nodes on the network, offering opportunities to reroute traffic when necessary, and implement agreements with other cable owners to transfer traffic between networks during outages.

This approach is said to have enhanced global resilience of the commercial undersea telecommunication network, even though vulnerabilities persist. For example, service disruption

¹⁵⁴ DNV, *Ocean's Future to 2050*, December 16, 2021, Foreword, <https://www.dnv.com/oceansfuture/>.

¹⁵⁵ Ibid, p. 6.

¹⁵⁶ Sverre Alvik, "Offshore Wind Will Define the Race for Ocean Space," *Forbes*, June 7, 2022, <https://www.forbes.com/sites/sverrealvik/2022/06/07/offshore-wind-will-define-the-race-for-ocean-space/?sh=3e36b4e57481>. Sverre Alvik is DNV's Director of Energy Transition Outlook.

¹⁵⁷ CSRIC IV WG8 Spatial Separation Report, p. 57.

¹⁵⁸ CSRIC V WG4A Cable Clustering Report, p. 11.

¹⁵⁹ DHS Protective Security Division, *Characteristics and Common Vulnerabilities Infrastructure Category: Cable Landing Stations*, January 15, 2004, p. 2, <https://info.publicintelligence.net/DHS-UCL-CV.pdf>.

due to the cable outage in Svalbard was avoided due to traffic being rerouted to a parallel cable,¹⁶⁰ while the Tonga cable outage disrupted service for five weeks due to a lack of network redundancy. There may be local vulnerabilities due to geographic clustering even where there is network redundancy—the deliberate attack off the southern coast of France affected three undersea cables systems and disrupted and degraded service for several hours.¹⁶¹

The ICPC says that operators design routes with redundancies in mind, but also notes that operators design routes to follow the shortest viable route between landing points exhibiting the lowest cost and risk to the cable, adjusting for technical, economic, and regulatory factors, as they find necessary.¹⁶² It recommends that governments adopt and implement regulatory frameworks to optimize routes and landings, and ensure routes and landings are geographically diverse.

The Maritime Awareness Project identifies challenges in routing that may affect geographic diversity. They assert that the “lack of diversity is dictated by a variety of limitations, including the cost and ease of permitting requirements, the topographic makeup of the seabed, the cost and ease of laying cables, and protections for marine environments.”¹⁶³ Others note that diversification of routes and wide geographic distribution of cables may make monitoring and repair difficult.¹⁶⁴

If Congress is interested in increasing the geographic diversity of commercial undersea telecommunication landing sites in the United States to improve network resilience and redundancy it may consider assigning a federal agency the responsibility of conducting a risk assessment to identify the most vulnerable areas or most vulnerable undersea telecommunication cables. It may also consider whether an agency or agencies should support the development of undersea telecommunication cable resiliency plans to ensure continuity of communications.

Anchoring and Fishing

Reportedly, the most frequent cause of cable damage is fishing and anchoring activities.¹⁶⁵ While fishing activities are associated with a higher incidence of cable damage, individual fishing incidents often affect only a single cable, while less-frequent anchor damage due to dragging may impact multiple cables and affect multiple telecommunication providers.¹⁶⁶

Coordination between undersea telecommunication cable owners and the commercial fishing industry does sometimes occur formally, and sometimes on an informal and ad hoc basis.¹⁶⁷ Some entities, such as the New England Fishery Management Council, have developed submarine cable policies—best practices for protecting marine habitats, species, and fisheries from impacts of

¹⁶⁰ Jason Rainbow, “Space Norway Plots Recovery Mission for Failed Subsea Cable,” *Space News*, January 13, 2022, <https://spacenews.com/space-norway-plots-recovery-mission-for-failed-subsea-cable/>.

¹⁶¹ Zscaler, “European Cable Cut May Impact Transoceanic Routes,” posted October 19, 2022, <https://trust.zscaler.com/zsccloud.net/posts/12256>.

¹⁶² ICPC Best Practices, p. 7.

¹⁶³ National Bureau of Asian Research, Maritime Awareness Project, “Submarine Cables: Background,” <https://www.nbr.org/publication/submarine-cables/>.

¹⁶⁴ Lieutenant Commander Peter Barker, “Undersea Cables and the Challenges of Protecting Seabed Lines of Communication,” Center for International Maritime Security (blog), March 15, 2018, <https://cimsec.org/undersea-cables-challenges-protecting-seabed-lines-communication/>

¹⁶⁵ ICPC Best Practices, p. 1.

¹⁶⁶ Mick Green et al., “Submarine Cable Network Security,” Presentation at Submarine Cable Protection Information Sharing Workshop, Singapore, April 13, 2009, <https://www.iscpc.org/documents/?id=138>.

¹⁶⁷ CSRIC V WG4A Interagency Report, p. 31. Discussing Fisherman/Cable Coordination Committees and Agreements.

cable installations.¹⁶⁸ Others, such as the Oregon Fishermen's Cable Committee developed an agreement between Oregon commercial fishermen and fiber optic cable companies whereby the fishermen agree to report any snags or damage to cables to the cable owner; in turn, cable owners agree to release them from potential civil liability for any damage to cables for ordinary negligence and compensate them for any gear lost in the process.¹⁶⁹

Congress has taken action to protect cables from damage from anchors. In P.L. 117-263, Division K, Congress authorized the Secretary of the federal agency in which the Coast Guard is operating to create anchorage areas and required the protection of undersea cables be taken into account when doing so. It prohibited vessels from anchoring in "near proximity" to an undersea pipeline or cable, unless authorized by the Captain of the Port (a USCG officer).

Penalties

The authority and amount of current U.S. penalties for damaging an undersea telecommunication cable were established in 1888.¹⁷⁰ The law states that any person who "willfully and wrongfully" breaks or injures a cable, or attempts to break a cable shall be guilty of a misdemeanor and subject to imprisonment for up to two years or a fine not to exceed \$5,000, or both (47 U.S.C. §21). Those who, by "culpable negligence" break or damage an undersea telecommunication cable in such a manner as to interrupt communications shall be liable to imprisonment for a term not to exceed three months, or a fine not to exceed \$500, or both (47 U.S.C. §22).¹⁷¹ There are other rules and penalties adopted in 47 U.S.C. Chapter 2, pertaining to undersea cables, including laws stipulating that these penalties shall not bar a suit for damages for breaking or injuring a cable (47 U.S.C. §28), and that the master of an offending vessel is also liable to punishment (47 U.S.C. §29).¹⁷²

Other countries have similar penalties in place as the 1884 convention encourages countries to adopt in law penalties for damaging cables; some countries have further developed their penalties for damaging cables and related enforcement. In Australia, damage to cables (willful or in negligent conduct) is a criminal offense subject to a 10-year prison term and a fine.¹⁷³ In 2021, the Australian Federal Police charged the master of a container ship with dragging its cable and damaging the Australia Singapore Cable, causing over \$1 million (USD) in damages. In what is reported to be the first prosecution of this offense, the captain was arrested and faced up to three

¹⁶⁸ New England Fishery Management Council, *Submarine Cables Policy*, December 1, 2020, https://d23h0vhsm26o6d.cloudfront.net/NEFMC-Submarine-Cables-Policy-1-Dec-2020_201221_095243.pdf.

¹⁶⁹ Oregon Fishermen's Cable Committee, "About OFCC," http://www.ofcc.com/about_ofcc.htm.

¹⁷⁰ 47 U.S.C. Chapter 2.

¹⁷¹ In 47 U.S.C. §23, there is an exception, in that the penalties at 47 U.S.C. §21 and 47 U.S.C. §22 do not apply to a person who breaks or injures a cable "in an effort to save the life or limb of himself or of any other person, or to save his own or any other vessel" if reasonable precautions to avoid such cable breaking or injury.

¹⁷² 47 U.S.C. §24 states that the master of any vessel laying cables and the master of any vessel interacting with a cable-laying ship must adhere to certain requirements, including communication and distance requirements to avoid collisions and disruption of cable-laying activities, and requirements to avoid buoys marking undersea cables; 47 U.S.C. §25 requires the master of any fishing vessel to keep implements and nets a certain distance from a vessel engaged in laying or repairing a cable, and from buoys marking undersea cables; 47 U.S.C. §26 states that commanders of warships may require exhibition of documents evidencing the nationality of offending vessels and make reports of infractions imposed by the International Convention for the Protection of Submarine Cables, and 47 U.S.C. §27 imposes penalties on any person who has custody of such documents and refuses to exhibit them to an officer or a vessel of war or other commissioned vessel.

¹⁷³ ACMA, "Zone to Protect Perth Submarine Cables," <https://www.acma.gov.au/zone-protect-perth-submarine-cables>.

years in prison and a \$40,000 (AU) or roughly a \$29,000 (USD) fine.¹⁷⁴ According to media reports, prosecutors discontinued the case; the cable owner is pursuing recovery of costs due to the damage.¹⁷⁵ Some countries, including Sweden, require that if the owner of an undersea cable or pipeline causes damage to another undersea cable or pipeline, the owner shall pay the cost of repairing the damage.¹⁷⁶

CSRIC asserts that the 135-year-old penalties for damaging undersea telecommunication cables should be updated.¹⁷⁷ The working group recommend steeper penalties to increase awareness and attention to cables, deter damage, and support cooperative agreements with the fishing industry for reporting, addressing damage, and compensating ship owners for any losses (e.g., cutting away trawl gear to prevent further damage to cables).¹⁷⁸

If Congress considers increasing penalties, it could weigh the benefit of increased fines as a potential deterrent, and the impact of such penalties on the maritime and fishing industries, which account for nearly 75% of the incidents of damage to cables. Further, it may consider whether to distinguish intentional attacks on cables, like the incidents in France or potential cyberattacks, from other incidents (e.g., fishing, anchoring) and how such offenses might be identified and penalties enforced.

Conclusion

Commercial undersea cables are vital to U.S. communications (e.g., voice, data, internet), and financial transactions. Increased data use by consumers, businesses, and government agencies, has increased everyday reliance on undersea cables. Damage to cables could disrupt or degrade communications, and threaten U.S. national security and economic interests. Recent incidents have heightened awareness of cable importance and spurred calls for their increased protection. Congress may seek to examine U.S. cable outages, and consider whether additional protection is needed from the U.S. government, private sector owners, or through public-private coordination.

¹⁷⁴ Australian Federal Police, “Ship Captain Charged Over Underwater Cable Damage off Perth,” press release, August 21, 2021, <https://www.afp.gov.au/news-media/media-releases/ship-captain-charged-over-underwater-cable-damage-perth>.

¹⁷⁵ Ry Crozier, “Ship Captain’s Case over Vocus Subsea Cable Cut ‘Discontinued,’” *iTnews*, May 17, 2023, <https://www.itnews.com.au/news/ship-captains-case-over-vocus-subsea-cable-cut-discontinued-595914>.

¹⁷⁶ ICPC Best Practices, p. 5.

¹⁷⁷ CSRIC IV WG8 Spatial Separation Report, pp. 45, 53.

¹⁷⁸ CSRIC IV WG8 Spatial Separation Report, pp. 8, 54. (The report cited the Oregon Fisherman’s Cable Committee Agreement among potential models for cable protection.)

Appendix. Federal Entities' Roles in Permitting and Review of Commercial Undersea Cables

This appendix discusses federal entities that are or may be involved in the permitting and review of undersea telecommunication cable projects. It focuses on current federal entities' roles and U.S. laws and regulations pertaining to the installation of international commercial undersea telecommunication cables landing in the United States (i.e., on U.S. land and within U.S. territorial waters).

Depending on the specifics of the cable project and natural resources affected, multiple federal agencies, acting under different statutes, and an executive branch committee may be involved in the review and approval of an international commercial undersea cable landing in the United States. There are the entities with permitting and review responsibilities that apply to undersea telecommunication cable projects, which are the FCC and USACE; and those entities that may be engaged in permitting and review depending on the specific impacts or location of the cable project, which include NOAA and the Department of the Interior.

- **Federal Entities with Permitting and Review Responsibilities that Apply to Commercial Undersea Cables.** Two agencies with relevant regulatory authority are the FCC and USACE. Pursuant to a 2020 executive order, the FCC refers certain FCC applications (e.g., FCC cable landing license applications) involving foreign investment to the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector (referred to hereinafter as “the Committee”). The Committee reviews undersea cable landing license application for national security, law enforcement, and foreign policy concerns.
- **Other Agencies That May Be Engaged Depending on Specific Impacts or Location of the Cable Project.** Other federal agencies may also be responsible for implementing statutes addressing the impacts of activities, including undersea telecommunication cables construction and operation, on sensitive environmental areas. For example, NOAA may review the effects of proposed cables on marine ecosystems and species in federally protected coastal areas. Other agencies may be responsible for permitting projects on federal land. For example, the National Park Service reviews projects, including undersea cable projects, seeking a right-of-way to use land in a national park.

This appendix provides a brief introduction to the cross-cutting environmental documentation required for federal agency actions pursuant to the National Environmental Policy Act (NEPA, 42 U.S.C. §§4321-4335) before discussing the cable-relevant roles and authorities of the FCC, the role of and the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector in review of certain FCC applications and second, the regulatory role of USACE for activities relevant to undersea cables. The third and fourth sections discuss the roles of NOAA and Department of the Interior, respectively, as they may relate to certain undersea cable activities are discussed. While a detailed discussion of state and local laws and regulations that may relate to undersea cables is beyond the scope of this report and appendix, the box titled “State and Local Regulation of Undersea Cables” provides an introduction to the topic.

National Environmental Policy Act

Under the National Environmental Policy Act, which was enacted in 1970 (P.L. 91-190), federal agencies may be required to conduct an environmental review for actions they authorize. NEPA requires agencies to consider the significant environmental consequences of their proposed actions and inform the public about their decision-making. Under NEPA and its implementing regulations, federal agencies must perform an environmental review for each proposed “major federal action” over which a federal agency has some control or responsibility, such as when issuing a license, permit, or other regulatory authorization, or providing funding. For more on NEPA, see the box “Environmental Review Requirements and Agency Permitting.” This appendix is focused primarily on the roles of the various federal entities, and does not provide detailed descriptions of how the agencies comply with crosscutting federal requirements like NEPA.¹⁷⁹

Environmental Review Requirements and Agency Permitting

NEPA requires federal agencies to identify and consider the potential impacts of their proposed actions before making a final decision about whether to proceed with the action or an alternative to it. During this identification and consideration process, the agency is to consult with and obtain comment from other federal agencies that have jurisdiction by law or special expertise with respect to the involved environmental impacts. Examples of laws that may require consultation with other agencies or entities include the Endangered Species Act and the Magnuson-Stevens Fishery Conservation and Management Act, among others.

Federal agencies are required to develop procedures for their environmental review. In their NEPA regulations, agencies may classify for the agency’s purpose certain types of projects as categorically excluded from requiring either an environmental assessment or an environmental impact statement. To make this classification, the agency must determine that the activities associated with those types of projects are expected generally to have minimal or no impact on the environment. Each federal agency is to integrate its procedures implementing NEPA into the agency’s broader decision-making procedures. For more on how an agency may consult with other federal agencies, see description of U.S. Army Corps of Engineers in Appendix.”

Federal Communications Commission¹⁸⁰

Prior to 1954, entities interested in landing or operating an undersea cable in the United States had to first obtain a license from the President of the United States. The Cable Landing License Act of 1921 stipulated that “[no] person shall land or operate in the United States any submarine cable directly or indirectly connecting the United States with any foreign country, or connecting one portion of the United States with any other portion thereof, unless a written license to land or operate such cable has been issued by the President of the United States.”¹⁸¹

¹⁷⁹ This appendix also does not delve into the permitting and review effort for certain large, complex infrastructure projects under Division D, Title XLI of P.L. 114-94, Fixing America’s Surface Transportation Act, which is referred to as FAST-41. While certain broadband projects are eligible for participation in FAST-41, no “Offshore Broadband Infrastructure” projects are listed among the FAST-41 covered projects (see Permitting Dashboard, FAST-41 Covered Projects, at <https://www.permits.performance.gov/projects/fast-41-covered>). Participation in the FAST-41 program is voluntary. FAST-41 does not alter any applicable statutory or regulatory requirement, environmental law, regulation, or review process, or public involvement procedure. For more on implementation of FAST-41 and the associated Federal Permitting Improvement Steering Council, see Permitting Dashboard, The Federal Permitting Improvement Steering Council at <https://www.permits.performance.gov/tools/federal-environmental-review-and-authorization-inventory>.

¹⁸⁰ This section was written by Patricia Moloney Figliola, Specialist in Internet and Telecommunications Policy, and Jill Gallagher, Analyst in Telecommunications Policy.

¹⁸¹ 47 U.S.C. §34.

In 1954, President Dwight D. Eisenhower issued Executive Order (E.O.) 10530,¹⁸² which delegated this authority to the FCC, among other things. Under E.O. 10530, the FCC has authority to issue, withhold, or revoke licenses to land or operate commercial undersea telecommunication cables in the United States, provided no such license shall be granted or revoked by the FCC until obtaining approval of the Secretary of State and such advice from any executive department the FCC deems necessary.¹⁸³

Commercial undersea telecommunication cable owners may also need to obtain authority to provide international telecommunication services, as required under Section 214 of the Communications Act of 1934, as amended (“Communications Act”).¹⁸⁴ Further, cable owners may need to report foreign ownership interests in undersea cables, as required under Section 310(b) of the act.¹⁸⁵ Other FCC rules include notification and approval requirements for licensees that are, or propose to become, affiliated with a foreign carrier.¹⁸⁶ These requirements are discussed in more detail below.

Cable Landing License Requirement

To land or operate a commercial undersea telecommunication cable in the United States, cable owners must apply for and obtain an FCC cable landing license. The FCC adopted rules and regulations related to the review of applications for cable landing licenses in 2001.¹⁸⁷ The rules specify—

- the information required to be in an application for a new license or the transfer or assignment of an existing license;
- the entities that must be part of an application for a cable landing license;
- the procedures for processing applications, including eligibility for “streamlined” processing;
- conditions imposed on each cable landing license; and
- reporting requirements that generally apply to licensees affiliated with a carrier with market power in a country at the foreign end of the cable.

The Telecommunications and Analysis Division (TAD) of the FCC’s International Bureau issues licenses to own and operate undersea telecommunication cables and landing stations in the United States.¹⁸⁸ The TAD also authorizes the modification or transfer of existing cable landing licenses. Before granting an application, the FCC coordinates with the Department of State (DOS) and other agencies, as needed.¹⁸⁹ A license is required for an undersea telecommunication cable to connect—

- the continental United States with any foreign country;

¹⁸² Executive Order 10530, “Providing for the Performance of Certain Functions Vested in or Subject to the Approval of the President,” May 10, 1954, <https://www.archives.gov/federal-register/codification/executive-order/10530.html>.

¹⁸³ *Ibid.*

¹⁸⁴ 47 U.S.C. §214.

¹⁸⁵ 47 U.S.C. §310(b).

¹⁸⁶ 47 C.F.R. §1.768.

¹⁸⁷ 47 C.F.R. §1.767.

¹⁸⁸ FCC, “Submarine Cable Applications,” <https://www.fcc.gov/submarine-cable-applications>.

¹⁸⁹ For an example of an FCC approval, see FCC, Public Notice (Report No. SCL-00266), March 27, 2020, https://licensing.fcc.gov/ibfsweb/ib.page.FetchPN?report_key=2247086.

- Alaska, Hawaii, or the U.S. territories or possessions with a foreign country, the continental United States, or with each other; and
- points within the continental United States, Alaska, Hawaii, or a territory or possession in which the cable is laid within international waters.¹⁹⁰

The requirements of the Cable Landing License Act of 1921 do not apply to cables (including their terminals) lying wholly within the continental United States.¹⁹¹

Applicants must follow FCC requirements. Any entity that owns or controls a U.S. cable landing station and all other entities owning or controlling a 5% or greater interest in the cable system and using U.S. points of the cable system must be listed as applicants. Applicants must state whether they plan to operate on a common carrier basis (e.g., carriers that provide public services or services to all) or non-common carrier basis (e.g., carriers that provide private services to businesses or government),¹⁹² which determines how the FCC regulates services and transfer of licenses. Many commercial undersea telecommunication cable systems in the United States operate on a non-common carrier basis, which allows them to sell capacity to private entities as needed, and at varying prices.¹⁹³ As of September 2021, there were 81 FCC-licensed undersea cable systems.¹⁹⁴

Section 214 Authorization to Provide International Service

If a licensee operates an undersea telecommunication cable system on a common carrier basis, it must also obtain authority to provide international telecommunication services as required under Section 214 of the Communications Act.¹⁹⁵ To obtain this approval, the licensee must file an *International Section 214 Application* with the FCC, as specified in the FCC's rules.¹⁹⁶ Further, the licensee must obtain prior approval from the FCC before it can transfer control of or assign its international Section 214 authorization or other regulated assets (such as customer accounts) to another entity, including another authorized U.S.-international carrier.¹⁹⁷

Applicants must include information demonstrating how the approval of the application would serve the public interest, convenience, and necessity. They must also disclose ownership details, including proposed changes in ownership and percentage of ownership, and affiliations with foreign carriers, entities, or countries.¹⁹⁸

¹⁹⁰ 47 U.S.C. §34.

¹⁹¹ *Ibid.*

¹⁹² Common carrier licensees provide public services, such as telephone services that connect with other telephone networks; the Communications Act of 1934, as amended, requires, among other things, that telephone companies as "common carriers" make their services available to the public at affordable rates. Non-common carrier services include private services, or those intended for specific customers, such as businesses or police dispatch systems.

¹⁹³ Andrew D. Lipman and Nguyen T. Vu, "Building a Submarine Cable: Navigating the Regulatory Waters of Licensing and Permitting," *Submarine Telecoms Forum*, March 2011.

¹⁹⁴ FCC, "Submarine Cable Landing Licenses Granted," <https://www.fcc.gov/submarine-cable-landing-licenses-granted>.

¹⁹⁵ 47 U.S.C. §214.

¹⁹⁶ 47 C.F.R. §63.18.

¹⁹⁷ 47 C.F.R. §63.24.

¹⁹⁸ 47 C.F.R. §63.18.

Section 310(b) Foreign Ownership Reporting

Section 310(b) of the Communications Act requires the FCC to review foreign investment in broadcast, common carrier, and aeronautical radio licensees.¹⁹⁹ Section 310(b)(4) establishes a 25% benchmark for investment by foreign individuals, governments, and corporations in the controlling U.S. parent of these licensees; Section 310(b)(3) limits foreign investment in the licensee itself to 20%. Undersea cable licensees operating on a common carrier basis may file a petition, pursuant to Section 310(b), requesting approval for increased indirect foreign ownership of its licenses, which the FCC may grant, if it is in the public interest.

FCC Review Process

The FCC's review and approval of cable landing license applications are shaped in part by a 1974 FCC determination. In 1974, the FCC determined that its action related to review and approval of new undersea cable systems are categorically excluded from NEPA requirements to produce an environmental assessment or an environmental impact statement.²⁰⁰ For more on NEPA, see the text box in this report titled "Environmental Review Requirements and Agency Permitting."

FCC does review license applications consistent with its statutes, and regulations adopted after a public notice and comment period. The FCC's rules for cable landing licenses provide for "streamlined" processing for some applications; the rules require FCC action on an application to be taken within 45 days of release of the public notice when the applicant can demonstrate eligibility for streamlined processing.²⁰¹ To qualify for the streamlined process, the applicant must send copies of the application to the DOS,²⁰² Department of Defense, and the Department of Commerce (DOC). The FCC generally acts on applications ineligible for streamlining within 90 days of issuance of a public notice, granting approval, denial, or referral to executive agencies for review.

The FCC consults with DOS as required for cable landing licenses, and with other relevant executive branch agencies as necessary, to obtain their expertise in identifying and evaluating issues of concern in landing station applications; Section 214 authorizations; and Section 310(d) foreign ownership reporting documents.

Generally, when an applicant has a direct or indirect foreign investor with 10% or greater ownership the FCC refers the applicant to the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector, previously referred to as Team Telecom. For more about the Committee and its review, see the next section.

¹⁹⁹ 47 U.S.C. §310(b). Aeronautical Fixed Service is a radiocommunication service that enables communications and transmittal of data between specified fixed points provided primarily for the safety of air navigation and for the regular, efficient and economical operation of air transport. See 47 C.F.R. §2.1(c).

²⁰⁰ See 47 C.F.R. §§1.1301 et seq. The FCC's NEPA regulations address "Actions which are categorically excluded from environmental processing" (47 C.F.R. §1.1306) and "Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared" (47 C.F.R. §1.1307). In a note at 47 C.F.R. §1.1306, the FCC states that "[t]he provisions of §1.1307(a) and (b) of this part do not encompass the construction of new submarine cable systems."

²⁰¹ 47 C.F.R. §1.767(i).

²⁰² DOS has authorized the FCC to act on applications when the FCC notifies it in writing of the filing of an application and DOS does not object within 30 days of the notification. The FCC also coordinates with other executive branch agencies on applications where a foreign citizen or foreign-organized entity, including a foreign government, would hold a 10% or greater direct or indirect equity or voting interest in the licensee.

Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector

On April 4, 2020, President Trump issued E.O. 13913,²⁰³ which established the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector, formalizing and renaming the existing interagency Team Telecom review process, which had operated in some form since 1997.²⁰⁴ The review process allows for review of applications that have foreign ownership or investment interests before applicants are allowed to operate in the United States. The FCC uses the recommendations from executive branch agencies to inform its licensing decision, and to confirm its decisions are in the public interest—an FCC mandate under the Communications Act.

E.O. 13913 defines the membership, retaining the existing executive branch agencies and members (e.g., Attorney General, Secretaries of Homeland Security and Defense), and allows expansion of the Committee to include any executive branch agency head and an assistant to the President, as the President may require. It designates national security, foreign policy, trade policy, and economic agencies as “Advisors” to the Committee,²⁰⁵ which the DOJ asserts should help the Committee’s recommendations reflect a balanced, coordinated review from executive branch agencies.²⁰⁶ The Committee must conduct a review of new license applications referred to it by the FCC. It *may* conduct a review of existing license applications, with the majority vote of the Committee; if it conducts such a review, it must notify the Advisors. It requires the Committee to review applications, and in most cases, make recommendations within 120 days, and no more than 210 days, and stipulates the types of recommendations the Committee can make to the FCC in response to referred applications.²⁰⁷

In September 2020, the FCC adopted rules codifying its review process and referral of applications to the Committee, to align with E.O. 13913.²⁰⁸ In March 2021, the FCC proposed a set of standardized national security and law enforcement questions related to reportable foreign ownership that applicants would be required to answer as part of the application review process to facilitate and expedite FCC and Executive Branch review of applicant documents.²⁰⁹

To protect U.S. interests, the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector may recommend the applicant enter into a National Security Agreement (NSA) with the U.S. government as a condition of licensing. NSAs define

²⁰³ Executive Office of the President, “Establishing the Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector,” 85 *Federal Register* 19643-19650, April 4, 2020.

²⁰⁴ FCC, “Foreign Participation in the U.S. Telecommunications Market,” 62 *Federal Register* 64741-64759, December 9, 1997.

²⁰⁵ Advisors include the Secretaries of Commerce, State, and Treasury; Directors of National Intelligence, the Office of Management and Budget, and the Office of Science and Technology Policy; the U.S. Trade Representative; the Administrator of General Services; Chair of the Council of Economic Advisers; the Assistant to the President for National Security Affairs and for Economic Policy; and any other Assistant as determined by the President.

²⁰⁶ DOJ, “The Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector—Frequently Asked Questions,” December 30, 2021, <https://www.justice.gov/nsd/committee-assessment-foreign-participation-united-states-telecommunications-services-sector-0>.

²⁰⁷ DOJ, “The Committee for the Assessment of Foreign Participation in the United States Telecommunications Services Sector—Frequently Asked Questions,” updated December 7, 2021, <https://www.justice.gov/nsd/committee-assessment-foreign-participation-united-states-telecommunications-services-sector-0>.

²⁰⁸ FCC, “Process Reform for Executive Branch Review of Certain FCC Applications and Petitions Involving Foreign Ownership,” 85 *Federal Register* 76360-76387.

²⁰⁹ FCC, “International Bureau Seeks Comment on Standard Questions for Applicants Whose Applications Will Be Referred to the Executive Branch for Review Due to Foreign Ownership,” 86 *Federal Register* 12312, March 3, 2021.

terms and conditions of network operations (e.g., they may require a carrier to house customer data within the United States, prohibit foreign government access to networks, and safeguard network information). NSAs also provide the U.S. government with “robust rights of audit and oversight, site visits, and the ability to demand documents.”²¹⁰

U.S. Army Corps of Engineers²¹¹

Project developers, such as those proposing commercial undersea telecommunication cables, generally must obtain a U.S. Army Corps of Engineers (USACE) approval for such work in regulated waters. USACE is not regulating the cable per se; it is regulating certain navigation impacts, and dredging and filling impacts of the portion of the cable that fall within its permitting authorities.

Installing undersea cables may require digging or drilling offshore to feed and guide the cable underground, typically through a manhole or other conduit, underground, and into the ocean, where cable companies bury the cables several feet below the seabed. Cable companies use ships with trenching machines to dig a trench, lay the cable in the trench, and backfill the trench with the displaced materials (e.g., fill materials). Federal statutes related to navigation and dredge and fill materials require that USACE approve projects for constructing structures and performing work in certain waters of the United States. The related USACE regulatory authorities are:

- **Section 10 Obstruction to Navigation:** USACE has regulatory responsibilities pursuant to Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. §403), under which the agency authorizes structures and work in or affecting the course, condition, or capacity of navigable waters; these waters extend from the mean high-water line to three nautical miles from the shore.
- **Limited Extension of Section 10 Obstruction to Navigation:** USACE also has responsibility for an extension of its Section 10 authority on the seabed of the outer continental shelf (43 U.S.C. §1333(e)) for certain activities—artificial islands, installations, and other devices.²¹² This extension results in the agency regulating the navigation impacts of submerged telecommunication cables on the seafloor of the outer continental shelf.
- **Section 404 Dredge and Fill:** USACE also has regulatory responsibilities pursuant to Section 404 of the Clean Water Act (33 U.S.C. §1344), under which the agency authorizes activities that may discharge dredge or fill material into waters of the United States, including wetlands; this authority extends seaward to the Clean Water Act’s three-nautical-mile limit of the territorial seas.²¹³

²¹⁰ Megan L. Brown, Nova Daly, Brandon Moss, “Companies Will Feel the Weight of Team Telecom,” *Law360*, June 4, 2018, <https://www.law360.com/articles/1049718>.

²¹¹ This section was written by Nicole T. Carter, Specialist in Natural Resources Policy, and Laura Gatz, Analyst in Environmental Policy.

²¹² Examples of activities that may be subject to the extended Section 10 authority include submerged telecommunication cables, submerged electric cables, offshore wind installations, offshore oil and gas platforms, aquaculture, and artificial reefs. Beyond 12 nautical miles, the installation of undersea telecommunication cables by a foreign entity on the outer continental shelf does not require a permit under Section 10 of the Rivers and Harbors Act of 1899 (email from USACE staff to CRS, January 10, 2022).

²¹³ In addition to the bulleted authorities, USACE has other regulatory and approval authorities that in selected circumstances may be relevant to undersea cables. USACE, with concurrence from the U.S. Environmental Protection Agency, has regulatory responsibilities pursuant to the Section 103 of the Marine Protection, Research, and Sanctuaries Act (33 U.S.C. §1413) to issue permits for the transportation of dredged material for ocean disposal. USACE also is (continued...)

USACE Permits

If a proposed project falls under both Section 10 and Section 404, U.S. Army Corps of Engineers (USACE) generally processes its regulatory responsibilities through a single action—one permit that covers both authorities. A proposed project’s potential impacts determine whether a standard individual permit or general permit from USACE is required.

- Standard individual permits are required when projects are expected to have more than minimal individual or cumulative impacts; such projects require a more comprehensive review.²¹⁴
- General permits are “streamlined” authorizations issued on a national, regional, or state basis to authorize categories of activities that are similar in nature and will cause only minimal individual and cumulative impacts.²¹⁵

While installation of some undersea cables may require a USACE standard individual permit, other fiber-optic undersea cable projects may be able to proceed pursuant to a general permit.

Projects requiring standard individual permits are subject to public notice, public hearing, public interest review, activity-specific environmental review, and case-by-case evaluation (including an evaluation of alternatives).²¹⁶ USACE develops a decision document, which may include applicable evaluations and documents required for compliance with NEPA.²¹⁷ The public interest review involves an analysis of impacts (both benefits and detriments) on public interest factors, such as economics, energy needs, general environmental concerns, water quality, wetlands, fish and wildlife values, land use, floodplain values, and the “needs and welfare of the people.”²¹⁸ USACE public interest review is limited to “navigation and national security” for installations on the regulated seabed that are within land under a Bureau of Ocean Energy Management (BOEM) mineral lease.²¹⁹ CRS did not locate additional documentation on how USACE evaluates national security (e.g., what characteristics and components of an undersea cable would be considered in the context of national security) during the agency’s public interest review specifically or in implementing its permitting authorities more broadly.

For general permits, USACE completes the public notice and comments, public interest review and activity-specific environmental reviews during the general permit decisionmaking process. The general permits, once issued, essentially pre-authorize categories of activities. Some general

required by Section 14 of the Rivers and Harbors Act of 1899, as amended, to grant permission if a nonfederal entity is interested in altering a USACE civil works project; this authority is also known as Section 408 based on its codification at 33 U.S.C. §408. These additional authorities are not discussed further in this report due to the focus of the report on the typical regulatory context for undersea telecommunication cables.

²¹⁴ 33 C.F.R. §323.2 (e)-(f); 33 C.F.R. §325.5.

²¹⁵ 33 U.S.C. §1344(e).

²¹⁶ 33 C.F.R. §325.2.

²¹⁷ *Ibid.*

²¹⁸ 33 C.F.R. §320.4.

²¹⁹ For installation on the regulated seabed that is within lands under a mineral lease from the Department of the Interior (DOI)’s BOEM, USACE has established in its implementing regulations a special policy. The regulation (33 C.F.R. §322.5(f)) states that USACE’s decision will be made based on a more limited evaluation due to BOEM conducting a more complete evaluation; in this circumstance, USACE will evaluate the impact of the proposed work on “navigation and national security.” 33 C.F.R. §322.5 refers to the Minerals Management Service; the regulation was published prior to the reorganization of that agency. BOEM is now the relevant agency for USACE special condition at 33 C.F.R. §322.5(f). USACE published the special policy in 1970 (35 *Federal Register* 79-81, January 3, 1970); a similar limitation on USACE reviews for mineral-leased areas has been included in subsequent revisions to USACE implementing regulations.

permits require the project applicant to submit a pre-construction notification to give USACE the opportunity to confirm that the activity will cause no more than minimal adverse environmental effects. Examples of general permits that may be used for undersea cables include Nationwide Permit 3 and Nationwide Permit 57. Nationwide Permit 3 authorizes certain maintenance activities.²²⁰ Nationwide Permit 57 authorizes activities required for the construction, maintenance, repair, and removal of electric utility lines, telecommunication lines, and associated facilities in waters of the United States as long as the activity does not result in the loss of greater than one-half acre of waters of the United States for each single and complete project.²²¹

Selected Aspects of Permit Process and Applicable Requirements

In carrying out its regulatory authorities, USACE complies with applicable federal requirements. USACE may establish special conditions to its permit or approval for a proposed activity to ensure that the activity complies with federal law, including requirements under USACE's Section 10 and Section 404 permitting authorities. USACE conducts environmental reviews required under the National Environmental Policy Act that inform its decisions on permitting. (For more on NEPA, see the box titled "Environmental Review Requirements and Agency Permitting.") Special conditions may also correspond to federal environmental review and consultation requirements established under other laws. For example, in addition to NEPA,²²² prior to issuing a permit, USACE must ensure compliance with applicable requirements in various other laws such as state water quality certification requirements under the Clean Water Act (33 U.S.C. §1341), and the following acts (which are described in more detail under "National Oceanic and Atmospheric Administration"):

- Endangered Species Act (ESA, 16 U.S.C. §§1531-1544);
- Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §§1801 et seq.); and
- Coastal Zone Management Act (CZMA, 16 U.S.C. §§1451 et seq.).

The nature of USACE's review for developing its permit decision may be in part shaped by the specific area that is involved.²²³ For example, compliance with Section 404 of the Clean Water Act is a function of the effects of the proposed project's discharges into Section 404 regulated waters (e.g., discharges into regulated waters from installation disturbances in the on-shore landing portion of an undersea cable).

²²⁰ USACE reissued Nationwide Permit 3 in December 2021. See Department of the Army, USACE, "Reissuance and Modification of Nationwide Permits," 86 *Federal Register* 73522, December 27, 2021. See also USACE, *Decision Document: Nationwide Permit 3*, December 2021, <https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll7/id/19768>.

²²¹ USACE promulgated Nationwide Permit 57 in January 2021. See Department of the Army, USACE, "Reissuance and Modification of Nationwide Permits," 86 *Federal Register* 2744, January 13, 2021. See also USACE, *Decision Document: Nationwide Permit 57*, January 2021, <https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll7/id/16848>.

²²² 42 U.S.C. §§4321 et seq.

²²³ USACE does not generally require the government of a foreign nation or a corporation incorporated in a foreign nation that is not incorporated in the United States to obtain a Section 10 permit for those portions of an undersea telecommunication cable laid on the OCS seabed seaward of 12 nautical miles.

National Oceanic and Atmospheric Administration²²⁴

Part of the mission of NOAA, an agency within the Department of Commerce, focuses on conserving and managing coastal and marine ecosystems and resources. NOAA may become engaged in aspects of undersea telecommunication cable installation and operation through a number of laws administered primarily by two agency line offices—the National Ocean Service (NOS) and the National Marine Fisheries Service (NMFS). NOAA may support the installation and maintenance of undersea cables in other ways not discussed below as well, such as through its navigational charting responsibilities.²²⁵

National Ocean Service

The National Ocean Service (NOS) provides data, tools, and services to support coastal economies.²²⁶ NOS administers two laws that address aspects of commercial undersea telecommunication installations and operations:

- National Marine Sanctuaries Act (NMSA),²²⁷ and
- Coastal Zone Management Act (CZMA).²²⁸

The Secretary of Commerce has delegated most of the responsibilities under these two acts to NOS. NMSA authorizes the Secretary of Commerce to designate and protect areas of marine environments due to their “conservation, recreational, ecological, historical, scientific, cultural, archeological, educational, or esthetic qualities” through a process described in statute and regulations; these areas are typically referred to as marine sanctuaries.²²⁹ Under NMSA, a federal agency proposing an action, including permits, licenses, or leases for private activities, that is likely to “destroy, cause the loss of, or injure any sanctuary resource” must consult with the Secretary of Commerce and provide the Secretary with a written statement about the action and its potential effects.²³⁰

The Secretary of Commerce must recommend alternatives for the federal agency to take if the Secretary finds that agency action is likely to destroy, cause the loss of, or injure a sanctuary resource.²³¹ The federal agency must then consult with the Secretary of Commerce on the alternatives and may decide to implement them. If the federal agency does not implement the alternatives and in turn causes the destruction of, loss of, or injury to a sanctuary resource, the agency is required to prevent and mitigate further damage and restore and replace the sanctuary resource. In addition, the Secretary of Commerce may issue special use permits to authorize activities compatible with the sanctuary purposes and may assess and collect fees for the conduct

²²⁴ This section was written by Eva Lipiec, Analyst in Natural Resources Policy and Anthony Marshak, Analyst in Natural Resources Policy.

²²⁵ NOAA, Office of Coast Survey, “Chart Source Data,” available at <https://nauticalcharts.noaa.gov/learn/chart-source-data.html>.

²²⁶ NOAA, National Ocean Service, “About the National Ocean Service,” <https://oceanservice.noaa.gov/about/>.

²²⁷ 16 U.S.C. §§1431–1445c.

²²⁸ 16 U.S.C. §§1451–1466.

²²⁹ 16 U.S.C. §1431(a)(2). Regulations implementing the National Marine Sanctuaries Act were promulgated in 15 C.F.R. §922. The NOAA Office of National Marine Sanctuaries manages a network of 15 national marine sanctuaries and, in conjunction with the U.S. Fish and Wildlife Service, Papahānaumokuākea and Rose Atoll marine national monuments. For more information, see <https://sanctuaries.noaa.gov/> and the section “Marine National Monuments.”

²³⁰ 16 U.S.C. §1434(d).

²³¹ 16 U.S.C. §1434(d)(2).

of any activity under a special use permit,²³² such as the continued presence of commercial undersea cables in sanctuaries.²³³

CZMA establishes a national framework for coastal states and territories to manage coastal resources under a coastal zone management program submitted to and approved by the Secretary of Commerce.²³⁴ Once the Secretary approves a state's management program, federal agencies must ensure that their activities or issuance of licenses or permits for certain nonfederal activities, within or affecting the coastal zone resources, are consistent with the management program's enforceable policies "to the maximum extent practicable."²³⁵

For commercial undersea telecommunication cables, entities filing a cable landing license application with FCC must certify whether the state in which the cable is to land requires that the project comply with the approved state management program.²³⁶ If it does, the applicant is required to coordinate with the state to affirm the project is consistent with the state's program. Upon documentation from the applicant or notification from the state that the license application is consistent with the program, FCC can take action on the application. Federal statutes and regulations also specify the ways the Secretary may in some cases mediate appeals and disagreements between the state, federal agencies, and applicants.²³⁷

National Marine Fisheries Service

The National Marine Fisheries Service (NMFS) is responsible for the stewardship of the nation's biological ocean resources.²³⁸ The Endangered Species Act (ESA),²³⁹ the Marine Mammal Protection Act (MMPA),²⁴⁰ and the Magnuson-Stevens Fishery Conservation and Management Act (MSA)²⁴¹ may require federal agencies authorizing or funding the installation of commercial undersea telecommunication cables to seek review by, consultation with, or permits from the Secretary of Commerce. The Secretary has delegated these responsibilities to NMFS. That is, if an agency, such as USACE, is considering issuing a permit that would allow cable laying, it generally reviews the specifics of the portion of the cable project relevant to the permit to determine whether its action requires review by or consultation with NMFS under these laws. More information about ESA, MMPA, and MSA and their application and requirements is provided below.

²³² 16 U.S.C. §1441.

²³³ 16 U.S.C. §1434(d)(4).

²³⁴ 16 U.S.C. §§1454-1455. The act defines "coastal state" to include states bordering on "the Atlantic, Pacific, or Arctic Ocean, the Gulf of Mexico, Long Island Sound, or one or more of the Great Lakes." 16 U.S.C. §1453(4). The definition also explicitly includes as coastal states Puerto Rico, the Virgin Islands, Guam, the Commonwealth of the Northern Mariana Islands, the Trust Territories of the Pacific Islands, and American Samoa. 16 U.S.C. §1453(4). The discussion of CZMA in this report uses "state" as a term inclusive of these states and territories.

²³⁵ 16 U.S.C. §1456(c).

²³⁶ 47 C.F.R. §1.767(a)(10) See Note specifying compliance with CZMA.

²³⁷ 16 U.S.C. §§1456(h) and 1465, and 15 C.F.R. Part 930.

²³⁸ NMFS is also known as NOAA Fisheries. NOAA Fisheries, "About Us," <https://www.fisheries.noaa.gov/about-us>.

²³⁹ 16 U.S.C. §§1531 et seq. The requirement to consult with NMFS or the FWS is found at 16 U.S.C. §1536(a)(2). For more about the Endangered Species Act, see CRS Report R46677, *The Endangered Species Act: Overview and Implementation*, by Pervaze A. Sheikh and Erin H. Ward.

²⁴⁰ 16 U.S.C. §§1361 et seq.

²⁴¹ 16 U.S.C. §§1801 et seq.

*Endangered Species Act*²⁴²

Federal agencies generally must consult with NMFS for marine and anadromous species and FWS for terrestrial, catadromous, and freshwater species if their activities or projects may affect threatened or endangered species listed under ESA or their designated critical habitat.²⁴³ Specifically, Section 7 of ESA requires certain federal agencies (referred to as “action agencies”) to ensure actions they undertake, authorize, or fund are not likely to jeopardize threatened or endangered species (i.e., listed species) or adversely modify designated critical habitat for listed species.²⁴⁴

To satisfy this mandate, Section 7 generally requires action agencies to consult with either FWS or NMFS (together, the Services), as applicable, when the action agencies’ proposed actions may affect listed species or critical habitat.²⁴⁵ Section 7 and its implementing regulations outline procedures for this consultation process.²⁴⁶ This multistep process, referred to as Section 7 consultation, is generally used to evaluate the effects of agency actions on listed species and critical habitat and to consider reasonable and prudent alternatives to minimize those effects, as needed.²⁴⁷ Unless the Services and action agency determine that the action is not likely to adversely affect listed species or critical habitat, the process generally concludes with the Services’ opinion on the effects of the action (referred to as a biological opinion or BiOp).²⁴⁸ If the BiOp concludes that the action is not likely to jeopardize listed species or adversely modify critical habitat, or the Services identify reasonable and prudent alternatives that would avoid such harm, the BiOp includes an incidental take statement.²⁴⁹ The incidental take statement allows the action agency and any associated nonfederal entities to take certain actions that affect listed species without violating the prohibitions of ESA.

Actions subject to Section 7 may include infrastructure projects, such as the installation of undersea telecommunication cables, undertaken by action agencies or by nonfederal entities with federal authorization (e.g., permits, contracts) or funding. Agencies may be required to consult with NMFS if the installation of a cable that they are carrying out, authorizing, or funding would likely affect listed marine species. For example, USACE consults with NMFS to inform its final permitting decision.

In the event a nonfederal entity seeking to install and maintain a commercial undersea cable does not require any federal authorization or funding for the project, the entity may have to obtain an incidental take permit (ITP) under Section 10 of ESA if the installation or maintenance of the

²⁴² This section is adapted from CRS Report R46867, *Endangered Species Act (ESA) Section 7 Consultation and Infrastructure Projects*, by Erin H. Ward and Pervaze A. Sheikh; and CRS Report R46677, *The Endangered Species Act: Overview and Implementation*, by Pervaze A. Sheikh and Erin H. Ward. See also 16 U.S.C. §1536.

²⁴³ Fish are catadromous if they are born in salt water, migrate to fresh water to mature, and then migrate back to salt water to spawn. For example, the American eel (*Anguilla rostrata*) can be catadromous, though the species also can remain in marine or brackish water during maturation. Fish are anadromous if they spend most of their lives in salt water and then swim up a river to spawn. Young anadromous fish hatch and then swim downstream to grow to adulthood in the ocean. For example, most salmon and some sturgeon species are anadromous.

²⁴⁴ 16 U.S.C. §1536(a)(2).

²⁴⁵ 16 U.S.C. §1536(a)(2).

²⁴⁶ See generally 16 U.S.C. §1536 and 50 C.F.R. Part 402.

²⁴⁷ 16 U.S.C. §1536(a)-(c).

²⁴⁸ 16 U.S.C. §1536(b).

²⁴⁹ 16 U.S.C. §1536(b)(4). For ESA, the term *take* is broadly defined as “to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct” (16 U.S.C. §1532(19)).

undersea cable may result in the incidental take of listed species.²⁵⁰ To obtain an ITP, the nonfederal entity must submit a permit application and a habitat conservation plan (HCP).²⁵¹ HCP describes the anticipated effects of the nonfederal applicant's action on listed species, as well as the steps to be taken to minimize and mitigate that impact, funding for the mitigation, alternatives that were considered and rejected, and any other measures the Services may require.²⁵² HCPs also must comply with other policies by including biological goals and outcomes for the species covered by HCP, adaptive management provisions, monitoring protocols, permit duration, and public participation in the process.²⁵³

Once the permit application and draft HCP are completed, they generally are submitted to the Services along with an implementation agreement. The Services evaluate the permit application (including HCP) and determines if it meets and abides by the criteria specified under ESA. Since the Services consider the issuance of an ITP a federal action, FWS or NMFS must complete an intra-Service consultation subject to Section 7 and issue a BiOp assessing the effects of an ITP on the listed species and critical habitat before they may issue an ITP.²⁵⁴

Marine Mammal Protection Act

MMPA prohibits the *take* of all species of marine mammals by any person unless exempted by MMPA or authorized under a permit issued by NMFS or FWS.²⁵⁵ MMPA allows the Secretary of Commerce to permit, for periods of up to five years, the incidental take of certain marine mammals that occurs during otherwise lawful activities (e.g., approved laying of undersea cables) if it finds that the total take during that time is expected to have a negligible impact on the affected species (or stock), and the total take is expected to not have an unmitigable adverse impact on the availability of the species (or stock) for subsistence purposes.²⁵⁶ After receiving an application for a permit, the Secretary of Commerce publishes a notice in the *Federal Register* and can either issue a permit with terms and conditions or deny issuance.²⁵⁷ A permit issuance or denial are both eligible for judicial review. For actions that may result in the take of marine mammals listed as endangered or threatened species, the applicant must obtain permits under both ESA and MMPA.

²⁵⁰ 16 U.S.C. §1539.

²⁵¹ 16 U.S.C. §1539(a)(2).

²⁵² 16 U.S.C. §1539(a)(2).

²⁵³ 16 U.S.C. §1539(a)(2).

²⁵⁴ FWS and NOAA, *Habitat Conservation Planning and Incidental Take Permit Processing*, FWS and NOAA Handbook, December 21, 2016, pp. 3-27, https://www.fws.gov/endangered/esa-library/pdf/HCP_Handbook.pdf.

²⁵⁵ Marine mammal is defined as “any mammal which (A) is morphologically adapted to the marine environment (including sea otters and members of the orders Sirenia, Pinnipedia, and Cetacea), or (B) primarily inhabits the marine environment (such as the polar bear); and, for the purposes of this chapter, includes any part of any such marine mammal, including its raw, dressed, or dyed fur or skin” (16 U.S.C. §1362(6)). For the Marine Mammal Protection Act, the term *take* is broadly defined as “to harass, hunt, capture, or kill, or attempt to harass, hunt, capture or kill” (16 U.S.C. §1362(13)). NMFS is responsible for regulating whales, dolphins, porpoises, seals, and sea lions under the MMPA. FWS is responsible for regulating walruses, manatees, sea otters, and polar bears. For an example of a take related to undersea cables, see National Oceanic and Atmospheric Administration, “Takes of Marine Mammals Incidental to Specified Activities; Taking Marine Mammals Incidental to Conducting Subsea Cable Operations and Maintenance Activities in the Arctic Ocean,” 82 *Federal Register* 22099-22117, May 12, 2017.

²⁵⁶ 16 U.S.C. §§1371(a)(5) and 1374, and 50 C.F.R. Part 216.

²⁵⁷ 16 U.S.C. §1373(d).

Magnuson-Stevens Fishery Conservation and Management Act

Under MSA, federal agencies must assess and consult with the Secretary of Commerce on any action or proposed action that a federal agency authorizes, funds, or undertakes to determine whether it may adversely affect *essential fish habitat*,²⁵⁸ such as laying and maintaining undersea cables.²⁵⁹ Essential fish habitat areas are identified and refined by regional fishery management councils in coordination with NOAA. During consultation, the Secretary works with the federal agency, or in some cases a state agency, to identify ways to avoid, minimize, mitigate, and offset any impacts from the proposed action through essential fish habitat conservation recommendations.²⁶⁰ The federal agency must respond to the recommendations, and explain its actions if it decides to not implement the recommendations.²⁶¹

Marine National Monuments

NOAA, together with FWS, administers marine national monuments.²⁶² The proclamation creating each monument, as well as any implementing federal regulations or monument management plan, govern which activities are prohibited, permitted, and exempted from permitting.²⁶³ The agencies may issue permits for permissible uses within the marine national monument. The installation and maintenance of undersea cables within a particular marine national monument may be prohibited, permitted, or exempt from permitting requirements. To the extent a permit is required for such activities, the responsible party would have to obtain a permit from the agencies and comply with its terms. For more about permitting in national monuments, see the “U.S. Fish and Wildlife Service” section below.

In some cases, a refuge in the National Wildlife Refuge System (see “U.S. Fish and Wildlife Service”) may overlap with or fall within the boundaries of a marine national monument and be subject to additional restrictions or regulations. For marine national monuments, the proclamation may limit or preclude FWS and other federal agencies from permitting activities they could otherwise authorize. For example, two of the three units of the Marianas Trench Marine National Monument (MTMNM)—the Trench Unit and Volcanic Unit—have also been designated as national wildlife refuges and are managed as components of the National Wildlife Refuge System.²⁶⁴ Pursuant to the proclamation that created the MTMNM, the Secretaries of the Interior and Commerce “shall not allow or permit any appropriation, injury, destruction or removal of any feature of this monument except as provided for by this proclamation or as otherwise provided by

²⁵⁸ The term *essential fish habitat* is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. §1802(10)).

²⁵⁹ 16 U.S.C. §1855(b) and 50 C.F.R. Part 600, Subpart K.

²⁶⁰ 16 U.S.C. §1855(b)(4)(A) and 50 C.F.R. Part 600, Subpart K.

²⁶¹ 16 U.S.C. §1855(b)(4)(B) and 50 C.F.R. §600.920(k).

²⁶² The Antiquities Act (54 U.S.C. 320301-320303) authorizes the President to proclaim national monuments on federal lands that contain historic landmarks, historic and prehistoric structures, or other objects of historic or scientific interest. For more about national monuments, see CRS Report R41330, *National Monuments and the Antiquities Act*, by Carol Hardy Vincent. For more about the existing marine monuments, see FWS, “Marine National Monument,” at <https://www.fws.gov/glossary/marine-national-monument>.

²⁶³ Presidential Proclamation 9496, September 15, 2021; Presidential Proclamation 8335, January 6, 2009; Presidential Proclamation 8336, January 6, 2009; Presidential Proclamation 8337, January 6, 2009; 50 C.F.R. Part 404; 50 C.F.R. Part 665, Subparts G, H, I.

²⁶⁴ The Trench Unit is also the Mariana Trench National Wildlife Refuge and the Volcanic Unit is also the Mariana Arc of Fire National Wildlife Refuge. For more information, see <https://www.fws.gov/national-monument/marianas-trench-marine>.

law.”²⁶⁵ Further, the Secretaries are to provide “monitoring and enforcement necessary to ensure that scientific exploration and research, tourism, and recreational and commercial activities do not degrade the monument’s coral reef ecosystem or related marine resources or species or diminish the monument’s natural character.”²⁶⁶

Department of the Interior

Agencies within the Department of the Interior (DOI) have authority to grant certain rights-of-way and permits for activities on the federal lands they manage, including submerged lands. In particular, the U.S. Fish and Wildlife Service and the National Park Service (NPS), both within DOI, manage coastal and ocean protected areas within the National Wildlife Refuge System and the National Park System, respectively. FWS also administers ESA, together with NMFS, as described above. BOEM, also within DOI, regulates undersea power transmission cables. BOEM may coordinate with other agencies and undersea telecommunication cable owners—for example, to avoid siting conflicts between energy and telecommunication cables—or may direct offshore wind developers to do so.

U.S. Fish and Wildlife Service²⁶⁷

FWS is dedicated to the conservation, protection, and enhancement of fish, wildlife, and plants, and their habitats. FWS is involved with undersea cables through the ESA (see “Endangered Species Act” above) and when cables traverse marine national wildlife refuges.²⁶⁸ FWS manages the National Wildlife Refuge System in accordance with its statutory mission “to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.”²⁶⁹ Of approximately 560 national wildlife refuges in the System, 180 are ocean or coastal refuges.²⁷⁰

Entities may lay undersea cables within these refuges provided they receive a permit from FWS. The National Wildlife Refuge System Administration Act gives FWS two sources of authority to issue such permits. First, FWS may “permit the use of any area within the System for any purpose, including but not limited to hunting, fishing, public recreation and accommodation, and access whenever he determines that such uses are compatible with the major purposes for which

²⁶⁵ U.S. President (George W. Bush), Proclamation 8335 of January 12, 2009, “Establishment of the Marianas Trench Marine National Monument,” 74 *Federal Register* 1557-1563, January 12, 2009. Hereinafter, *Proclamation 8335*.

²⁶⁶ *Proclamation 8335*.

²⁶⁷ This section was written by Pervaze A. Sheikh, Specialist in Natural Resources Policy and Erin H. Ward, Legislative Attorney.

²⁶⁸ FWS also administers the Coastal Barrier Resources Act (CBRA; 16 U.S.C. §3501 et seq.), which restricts federal financial support in some coastal locations. These restrictions could potentially influence cable owners’ siting of some new undersea telecommunication cables infrastructure such as cables funded through federal grants, such as the Middle Mile Grant Program, funded under Title IV, Section 60401 of the Infrastructure Investment and Jobs Act (P.L. 117-58). Under CBRA, “no new expenditures or new financial assistance may be made available under authority of any Federal law for any purpose” within coastal areas designated as System Units, with few statutory exceptions. System Units encompass nearly 1.4 million acres of land and associated aquatic habitat. For more information, see FWS, “Coastal Barrier Resources Act,” <https://www.fws.gov/program/coastal-barrier-resources-act>; for System Unit maps, see FWS “Coastal Barrier Resources Act: Overview,” <https://www.fws.gov/program/coastal-barrier-resources-act/maps-and-data>.

²⁶⁹ 16 U.S.C. §668dd(a).

²⁷⁰ FWS, “Marine Areas, Islands, and Coasts,” <https://www.fws.gov/story/marine-areas-islands-and-coasts>. See also map of Wildlife Refuge Systems, available at <https://www.fws.gov/media/map-national-wildlife-refuge-system>.

such areas were established.”²⁷¹ Second, FWS may allow the use of or grant easements in, over, across, upon, through or under any areas within the System for purposes such as laying power lines and telephone lines, among others, provided such uses are compatible with the refuge’s purpose.²⁷²

A criterion for issuing a permit under either authority is that that activity be *compatible with the purposes of refuge*; this criterion is assessed through a *compatibility determination*. Regulations state that a compatible use is any use that, “based on sound professional judgment, will not materially interfere with or detract from the fulfillment of the National Wildlife Refuge System mission” or contradict the purposes for which the individual refuge was created.²⁷³ Typically, each refuge manager is responsible for determining compatible uses within individual refuges. If the relevant refuge manager determines that undersea cables are compatible with the refuge’s purpose, they may issue a right-of-way permit to allow the cable to be laid.²⁷⁴

In some cases, a refuge in the National Wildlife Refuge System (see “U.S. Fish and Wildlife Service (FWS)”) may overlap with or fall within the boundaries of a marine national monument and be subject to additional restrictions or regulations. If any undersea cables were proposed to be laid within these national refuges, FWS would have to consider not only each refuge’s purpose but also whether the cables might degrade the monument’s ecosystem or related resources, or otherwise diminish its character, before issuing any right-of-way permit. For more on the overlap with marine national monuments, see “Marine National Monuments.”

National Park Service (NPS)²⁷⁵

NPS manages more than 80 National Park System units that include ocean, coastal, or Great Lakes areas within their boundaries.²⁷⁶ In some instances, undersea telecommunication cables could potentially cross through NPS-administered areas.²⁷⁷ Provisions of law at 54 U.S.C. §100902 authorize the Secretary of the Interior to grant rights-of-way through NPS units for public utilities and power and communication facilities, including “poles and lines for communication purposes.”²⁷⁸ A right-of-way granted under this section must be found to be “not incompatible with the public interest.”²⁷⁹ NPS policies further state that, before granting a telecommunication right-of-way, the agency must find that the proposed use “will not cause unacceptable impacts on park resources, values, or purposes.”²⁸⁰ In addition to a right-of-way for

²⁷¹ 16 U.S.C. §668dd(d)(1)(A).

²⁷² 16 U.S.C. §668dd(d)(1)(B).

²⁷³ 50 C.F.R. §29.21. To the extent there are any conflicts between the mission of the System and the purpose of the refuge, priority is given to activities consistent with the refuge’s purpose. 16 U.S.C. §688dd(a)(4)(D).

²⁷⁴ Before a right-of-way permit is issued, FWS may conduct an environmental assessment that evaluates the effects of FWS issuing a right-of-way permit for a proposed undersea cable under NEPA (42 U.S.C. §4321 et seq.).

²⁷⁵ This section was written by Laura B. Comay, Specialist in Natural Resources Policy.

²⁷⁶ NPS, “Ocean and Coastal Resources,” <https://www.nps.gov/orgs/1439/oceans.htm>. (According to the agency, some 2.5 million acres of ocean, coastal, and Great Lakes areas lie within national park boundaries.)

²⁷⁷ For example, see URS Alaska, LLC, TERRA Southwest Broadband Telecommunications Project, April 2011, p. I-13, <https://www.gc.noaa.gov/documents/alaska-eis.pdf>.

²⁷⁸ 54 U.S.C. §100902(b)(1).

²⁷⁹ 54 U.S.C. §100902(b)(3).

²⁸⁰ NPS, *Management Policies 2006*, Section 8.6.4.2, https://www.nps.gov/subjects/policy/upload/MP_2006.pdf.

passage through NPS areas, an undersea cable might require a special use permit from NPS to authorize construction and installation activities.²⁸¹

Bureau of Ocean Energy Management²⁸²

BOEM administers offshore energy development on the U.S. outer continental shelf (OCS), under the Outer Continental Shelf Lands Act of 1953.²⁸³ BOEM regulates energy-related infrastructure on the OCS, including undersea power transmission cables (e.g., for electricity generated from offshore wind), but does not have a permitting role for undersea telecommunication cables.²⁸⁴ BOEM may coordinate with other agencies, or direct offshore energy developers to coordinate with agencies or telecommunication cable owners, to avoid siting conflicts between energy

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²⁸¹ CRS communication with NPS Office of Legislative and Congressional Affairs, December 22, 2021. NPS policies on special use permits are contained in NPS Director's Order 53, "Special Park Uses," <https://www.nps.gov/policy/DOOrders/DO53.htm>; and related reference manuals are available at https://www.nps.gov/subjects/policy/upload/RM-53_amended.pdf and <https://www.nps.gov/subjects/policy/upload/RM-53B.pdf>. The latter reference manual, *NPS Reference Manual 53B*, states on p. 21: "If any new infrastructure is to be built, it is usually appropriate in any of these cases to simultaneously issue two separate permits: a short-term SUP [special use permit] for construction and installation and a ROW permit for operation and maintenance. The construction SUP (36 C.F.R. 5.7) includes any terms and conditions specific to construction, and may authorize the use of additional park lands only needed during the construction phase. The construction permit may have a term of several years to include enough time to fully restore and revegetate the area."

²⁸² This section was written by Laura B. Comay, Specialist in Natural Resources Policy.

²⁸³ 43 U.S.C. §§1331-1356b. The federal submerged lands of the outer continental shelf in most cases extend from 3 nautical miles (nm) to 200 nm offshore; submerged lands within 3 nm are state-owned.

²⁸⁴ CRS communication with BOEM Office of Congressional Affairs, December 22, 2021.

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