Enhancing International Legal Protections for Undersea Cables and Transoceanic Pipelines

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I. INTRODUCTION

This article addresses the critical need to strengthen the international legal framework governing the protection of undersea cables and transoceanic pipelines. Given the paramount importance of these assets to global communications, energy security, and international trade, the current legal regime's boundaries present challenges to international stability and economic prosperity.

The analysis begins with a comprehensive background section, which examines the current legal landscape governing these critical infrastructures and highlights the emerging threats that underscore the urgency of reform. The background provides context for the subsequent legal analysis, which forms the core of this paper.

Part II provides background on the current legal framework governing undersea cables and pipelines, tracing the evolution of international maritime law and its application to this critical infrastructure. It then delves into the emerging threats facing these assets, including recent incidents of sabotage and accidental damage. This section aims to contextualize the need for enhanced protections within the broader landscape of global security and economic interdependence.

Part III analyzes the legal challenges in protecting undersea cables and pipelines. It begins by examining the jurisdictional limitations inherent in the current regime, particularly focusing on the issues of flag state jurisdiction and the potential application of universal jurisdiction. The analysis then explores the inadequacies of the current framework in addressing threats from non-state actors and multinational corporations. Additionally, this section considers the application of environmental law principles to undersea infrastructure protection and assesses the implications of infrastructure vulnerabilities for global energy security.

Part IV addresses the potential solutions for enhancing the protection of undersea cables and pipelines. It focuses on five main areas: enhancing international cooperation, expanding jurisdiction, strengthening deterrence and environmental protections, improving monitoring and security, and updating regulatory frameworks. For each, the article will propose specific legal and institutional reforms, drawing on successful models from other areas of international law.

Part V offers recommendations for implementing the proposed solutions. These suggestions aim to balance the need for enhanced protection with the principles of freedom of navigation and the interests of various stakeholders in the international community.

All of this concludes by synthesizing the key points and reflecting on the broader implications of strengthening the legal framework for undersea infrastructure protection on international security, economic stability, and the future of global communications and energy systems.

II. BACKGROUND

A. Current Legal Framework

The primary international instrument governing undersea cables and pipelines is the United Nations Convention on the Law of the Sea ("UNCLOS").[1] While UNCLOS provides for the freedom to lay submarine cables and pipelines on the high seas (Article 87) and on the continental shelf (Article 79), it fails to establish a comprehensive regime for their protection, particularly in areas beyond national jurisdiction.[2]

UNCLOS grants coastal states limited jurisdiction over cables and pipelines on their continental shelf, allowing them to take "reasonable measures" for exploration and exploitation of natural resources.[3] However, these measures must not impede the laying or maintenance of cables.[4] In the exclusive economic zone ("EEZ"), all states enjoy the freedom to lay submarine cables, subject to the coastal state's rights and duties.[5]

The Convention for the Protection of Submarine Telegraph Cables of 1884 remains in force for its 36 signatories, criminalizing willful or negligent damage to submarine cables.[6] However, its effectiveness is limited by its age and specific focus.[7]

Recent incidents as discussed above have highlighted the vulnerabilities of submarine cables. In response to these threats, some states have taken unilateral action. The United States ("U.S.") passed the Undersea Cable Control Act in 2023, aiming to prevent adversaries from acquiring technologies used in cable development.[8] Australia has established "cable protection zones" with restricted activities.[9]

International bodies have also recognized the importance of cable protection.[10] The United Nations ("UN") General Assembly has passed resolutions emphasizing the critical nature of submarine cables as

1. *See* United Nations Convention on the Law of the Sea, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].
2. DOUGLAS R. BURNETT, ROBERT C. BECKMAN & TARA M. DAVENPORT, SUBMARINE CABLES: THE HANDBOOK OF LAW AND POLICY 63 (2d ed. 2014).
3. UNCLOS, *supra* note 1, art. 79(2).
4. *Id.*
5. *Id.* art. 58.
6. *See* Convention for the Protection of Submarine Telegraph Cables, Mar. 14, 1884, 24 Stat. 989, T.S. No. 380.
7. BURNETT ET AL., *supra* note 2.
8. Undersea Cable Control Act, H.R. 1189, 118th Cong. § 2(a) (2023).
9. *Zone to Protect Sydney Submarine Cables*, AUSTRALIAN COMMC'NS AND MEDIA AUTH., https://www.acma.gov.au/zone-protect-sydney-submarine-cables [https://perma.cc/382R-5MVC] (last visited Apr. 4, 2025).
10. *See Telecommunications Act 1997* (Cth) sch 3A (Austl.).

infrastructure.[11] The International Cable Protection Committee, while lacking formal authority, has issued best practice guidelines for cable protection.[12]

Despite these efforts, significant gaps remain in the international legal framework.[13] The lack of a comprehensive treaty addressing modern threats to submarine cables, including hacking and sabotage, leaves this critical infrastructure vulnerable.[14] As technology advances and geopolitical tensions rise, the need for an updated international regime becomes increasingly apparent.

B. Emerging Threats

Recent incidents have highlighted the vulnerabilities of submarine cables. Most recently, on November 18, 2024, a submarine data communications cable across the Baltic Sea between Finland and Germany broke, with Finnish authorities investigating the cause of the disruption.[15] This incident involving the C-Lion1 cable, Finland's only direct data communications link to central Europe, further emphasizes the ongoing vulnerabilities of critical undersea infrastructure.[16]

In March 2024, several undersea cables in the Red Sea were damaged—reportedly by the anchor of a ship that was struck and sunk during an attack by Houthi rebels.[17] This incident not only disrupted global communications but also highlighted the complex interplay between maritime security, geopolitical conflicts, and the protection of undersea infrastructure.

In February 2023, multiple undersea cables connecting Taiwan were damaged, disrupting internet connectivity.[18] While initial reports suggested

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11. *See* Scott Jasper, *Protecting Submarine Cables: The Security Gap in International Law,* 47 OCEAN DEV. & INT'L L. 362, 363 (2016).

12. *Government Best Practices for Protecting and Promoting Resilience of Submarine Telecommunications Cables (Version 1.2)*, INT'L CABLE PROT. COMM., https://www.iscpc.org/documents/?id=3507 [https://perma.cc/HV9G-46YE] (last visited Apr. 4, 2025).

13. RISHI SUNAK, UNDERSEA CABLES: INDISPENSABLE, INSECURE, 16, 17 (Pol'y Exch. 2017).

14. Amy Paik & Jennifer Counter, *International Law Doesn't Adequately Protect Undersea Cables—That Must Change*, ATL. COUNCIL (Apr. 17, 2024), https://www.atlanticcouncil.org/content-series/hybrid-warfare-project/international-law-doesnt-adequately-protect-undersea-cables-that-must-change/ [https://perma.cc/25QF-AUJ7].

15. *Germany and Finland Investigate a Severed Data Cable Through the Baltic Sea*, AP NEWS (Nov. 18, 2024), https://apnews.com/article/finland-germany-data-communications-cable-9b231aa47501545690a26a442fe106a5 [https://perma.cc/8VG8-RMTH].

16. *Sabotage Not Ruled Out in Break of Communications Cable in Baltic Sea*, EUR. CONSERVATIVE (Oct. 16, 2023), https://europeanconservative.com/articles/news/sabotage-not-ruled-out-in-break-of-communications-cable-in-baltic-sea/ [https://perma.cc/VH8R-BYQ4].

17. Sean Monaghan et al., *Red Sea Cable Damage Reveals Soft Underbelly of Global Economy*, CTR. FOR STRATEGIC & INT'L STUD. (Mar. 7, 2024), https://www.csis.org/analysis/red-sea-cable-damage-reveals-soft-underbelly-global-economy [https://perma.cc/43UH-HLUD].

18. Elisabeth Braw, *China May Be Rehearsing a Cable Cutoff of Taiwan*, FOREIGN POL'Y (Feb. 21, 2023), https://foreignpolicy.com/2023/02/21/matsu-islands-internet-cables-china-taiwan/ [https://perma.cc/FE8W-77KX].

the damage may have been caused by Chinese vessels, the lack of a clear liability and compensation framework complicated efforts to address the incident's financial impact.[19] In 2022, multiple cable cuts near Svalbard and the Shetland Islands raised suspicions of deliberate sabotage, though definitive evidence remains elusive.[20] The sabotage of the Nord Stream gas pipelines in September 2022 sent shockwaves through the international community, demonstrating the potential for catastrophic damage to critical undersea assets.[21]

The legal challenges in addressing these threats are multifaceted. First, the attribution of responsibility for damage to undersea assets remains problematic. As demonstrated by the Nord Stream incident, even after extensive investigations, conclusively identifying the perpetrators can be exceedingly difficult.[22] This ambiguity complicates the application of existing legal frameworks and the pursuit of remedies under international law.

Second, the current legal regime fails to adequately address the evolving nature of threats. While the 1884 Convention for the Protection of Submarine Telegraph Cables criminalizes willful or negligent damage to submarine cables, it does not account for modern cyber threats or sophisticated state-sponsored attacks.[23] UNCLOS provides some provisions for the protection of submarine cables, but its effectiveness in deterring and responding to contemporary threats is limited.[24]

Third, the intersection of national security interests and the global nature of undersea infrastructure creates jurisdictional complexities. The involvement of multiple states, private entities, and international waters in the operation and protection of these assets complicates the application of domestic laws and international treaties.[25]

International organizations have also recognized the urgency of the issue. The North Atlantic Treaty Organization ("NATO") established a new center in 2023 focused on securing undersea infrastructure.[26] The UN General

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19. *See* Yachi Chiang, *A Legal Perspective on the Protection of Critical Infrastructure: The Case of Taiwan's Undersea Cables*, TAIWAN INSIGHT (Sept. 30, 2024), https://taiwaninsight.org/2024/09/30/a-legal-perspective-on-the-protection-of-critical-infrastructure-the [https://perma.cc/KMV3-FRKS].

20. *Damaged Cable Leaves Shetland Cut Off from Mainland*, BBC (Oct. 20, 2022, 12:00 AM), https://www.bbc.com/news/uk-scotland-north-east-orkney-shetland-63326102 [https://perma.cc/7EZ6-3XWJ].

21. *Incident on the Nord Stream Pipeline (updated 14/11/2022)*, NORD STREAM (Nov. 14, 2022), https://www.nord-stream.com/press-info/press-releases/incident-on-the-nord-stream-pipeline-updated-14112022-529/ [https://perma.cc/W2KS-LFTZ].

22. *Evidence Found In Nord Stream Sabotage Investigation*, K-LOVE (July 12, 2023), https://www.klove.com/news/U.S.%20&%20World/evidence-found-in-nord-stream-sabotage-investigation-44694 [https://perma.cc/HU86-3TJA].

23. *See* Convention for the Protection of Submarine Telegraph Cables, Mar. 14, 1884, 24 Stat. 989, T.S. No. 380.

24. *See* UNCLOS, *supra* note 1.

25. *See* Tara Davenport, *Submarine Cables, Cybersecurity and International Law: An Intersectional Analysis*, 24 CATH. U. J. L. & TECH. 57, 89–92 (2015).

26. *NATO Officially Launches New Maritime Centre for Security of Critical Undersea Infrastructure*, NATO (May 28, 2024), https://mc.nato.int/media-centre/news/2024/nato-officially-launches-new-nmcscui [https://perma.cc/8TD5-8B8D].

Assembly has passed resolutions emphasizing the critical nature of submarine cables as infrastructure.[27] However, these efforts have yet to translate into a cohesive and enforceable international legal framework.[28]

As technology advances and geopolitical tensions rise, the need for an updated international regime becomes increasingly apparent. Legal scholars argue for the development of a new multilateral treaty specifically addressing the protection of undersea infrastructure, including provisions for enhanced information sharing, coordinated response mechanisms, and clear attribution protocols.[29]

The emerging threats to undersea cables and pipelines underscore the urgent need for legal innovation in this domain. As these critical assets continue to form the backbone of global communication and energy systems, the international community must work towards a more robust and adaptive legal framework to ensure their protection and resilience in the face of evolving challenges.

III. LEGAL ANALYSIS

A. Jurisdictional Boundaries

The principle of flag state jurisdiction, as codified in UNCLOS Article 94, places primary responsibility for prosecution on the state of the perpetrator rather than the state of the cable or pipeline owner. This arrangement significantly impedes effective enforcement and accountability. The doctrine of universal jurisdiction, while applicable to certain international crimes, does not extend to offenses against undersea infrastructure, creating a lacuna in international criminal law.

The jurisdictional boundaries in protecting undersea cables and pipelines stem from the fundamental principles of maritime law and the unique nature of these critical infrastructures. The flag state jurisdiction principle, a cornerstone of maritime law, grants exclusive jurisdiction to the state whose flag a vessel flies over incidents occurring on the high seas. This principle, while essential for maintaining order in international waters, creates significant challenges in prosecuting offenses against undersea infrastructure.

UNCLOS Article 94 codifies this principle, stating that "every State shall effectively exercise its jurisdiction and control in administrative, technical and social matters over ships flying its flag."[30] While this provision ensures a clear chain of responsibility for vessels' conduct, it inadvertently creates a jurisdictional barrier for states whose undersea infrastructure is damaged or threatened by foreign vessels.

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27. Eoin Micheál McNamara, *Reinforcing Resilience: NATO's Role in Enhanced Security for Critical Undersea Infrastructure*, NATO REVIEW (Aug. 28, 2024), https://www.nato.int/docu/review/articles/2024/08/28/reinforcing-resilience-natos-role-in-enhanced-security-for-critical-undersea-infrastructure/index.html [https://perma.cc/3357-5Z45].

28. BURNETT ET AL., *supra* note 2.

29. *See generally* G.A. Res. 73/124, ¶ 119, U.N. Doc. A/RES/73/124 (Dec. 11, 2018).

30. UNCLOS, *supra* note 1.

The boundaries of this arrangement become apparent in cases of intentional damage to undersea cables. For instance, in the 2022 incident where multiple cables near the Shetland Islands were damaged, raising suspicions of sabotage, the inability of the affected state to directly prosecute potential perpetrators highlighted the challenges within the current legal framework.[31] The reliance on flag states to prosecute their own vessels creates a potential conflict of interest, particularly in cases where the flag state might be complicit or indifferent to the offense.

Moreover, the doctrine of universal jurisdiction, which allows states to prosecute certain international crimes regardless of where they occurred or the nationality of the perpetrator, does not extend to offenses against undersea infrastructure.[32] This doctrine—typically reserved for crimes such as piracy, war crimes, and crimes against humanity—reveals a notable gap in the protection of critical global communication and energy infrastructure.

The absence of universal jurisdiction for these offenses is particularly problematic given the transnational nature of undersea cables and pipelines. As noted by legal scholars, the current framework fails to account for the global importance of these infrastructures and the potential for widespread disruption from localized damage.[33]

Recent developments have highlighted the need for reform. The Undersea Cable Control Act of 2023 attempts to address some of these issues by extending U.S. jurisdiction over certain activities related to undersea cables.[34] However, such unilateral actions, while potentially effective for a single state, do not resolve the broader international jurisdictional challenges.

International legal experts have proposed various solutions to address the jurisdictional boundaries. One approach suggests expanding the concept of universal jurisdiction to include serious offenses against critical global infrastructure.[35] Another proposal advocates for the development of a new multilateral treaty specifically addressing the protection of undersea cables and pipelines, including provisions for shared jurisdiction and enforcement mechanisms.[36]

The International Law Association's Committee on Submarine Cables and Pipelines is currently examining these issues, with the aim of clarifying and potentially reforming the international legal regime governing undersea

31. R.R. CHURCHILL & A.V. LOWE, THE LAW OF THE SEA 208 (3d ed. 1999).

32. UNCLOS, *supra* note 1.

33. *Shetland Communication Restored After Subsea Cable Damage,* BBC (Oct. 21, 2022), https://www.bbc.com/news/uk-scotland-north-east-orkney-shetland-63337473 [https://perma.cc/ATZ2-C94Z] (illustrating the potential for widespread disruption from localized damage to undersea cables).

34. *See* H.R. 1189, 118th Cong. (2023).

35. Davenport, *supra* note 25, at 84.

36. *See* Undersea Cable Control Act, H.R. 1189, 118th Cong. (2023).

infrastructure protection.[37] Their work may provide a foundation for future legal developments in this area.[38]

As geopolitical tensions rise and the vulnerability of undersea infrastructure becomes increasingly apparent, the need to address these jurisdictional boundaries grows more urgent. The current legal framework, rooted in 19th-century principles, struggles to cope with 21st-century threats to global communication and energy networks.[39] Reform of the international legal regime governing undersea cables and pipelines is essential to ensure their adequate protection and the stability of the global systems that rely on them.

B. Non-State Actors and Multinational Corporations

The traditional state-centric approach of international law fails to adequately address potential threats from non-state actors or large multinational corporations. The principle of state responsibility, as articulated in the International Law Commission's Articles on State Responsibility, [40] does not fully capture the complexities of attributing responsibility in cases involving these entities. The concept of "due diligence" in international law, as elucidated in the *Pulp Mills* case (ICJ 2010), could potentially be extended to create obligations for states to prevent non-state actors from damaging undersea infrastructure.[41]

The increasing prominence of non-state actors and multinational corporations in the global arena has exposed significant gaps in the international legal framework, particularly concerning the protection of critical infrastructure such as undersea cables and pipelines. The state-centric nature of international law, while foundational to the current system, faces difficulties in addressing the multifaceted realities of modern global interactions and potential threats.[42]

The principle of state responsibility, codified in the International Law Commission's Articles on State Responsibility, primarily focuses on attributing wrongful acts to states. Article 8 of the Articles states that the conduct of a person or group shall be considered an act of a state if the person

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37. *Submarine Cables & Pipelines Under International Law*, INT'L LAW ASS'N (Dec. 14, 2020), https://discovery.ucl.ac.uk/id/eprint/10149627/3/Azaria_Interim%20Report%20of%20the%20ILA%20Committee%20on%20Submarine%20Cables%20and%20Pipelines%2015%20Sept%20final.pdf [https://perma.cc/W7TD-CAU8].

38. *See* Dr. Tara Davenport, *Third Interim Report of the ILA Committee on Submarine Cables and Pipelines*, 81ST BIENNIAL CONFERENCE INT'L L. ASS'N (June 28, 2024), https://cil.nus.edu.sg/wp-content/uploads/2024/07/ILA-Biennial-Submarine-Cables-and-Pipelines-Presentation-Athens-28-June-2024-final.pdf [https://perma.cc/3Q5W-EL2R].

39. *See* Elizabeth A. O'Connor, *Underwater Fiber Optic Cables: A Customary International Law Approach to Solving the Gaps in the International Legal Framework for Their Protection*, 66 NAVAL L. REV. 29, 30, 34-37 (2020).

40. *See* Int'l Law Comm'n, Rep. on the Work of Its Fifty-Third Session, U.N. Doc. A/56/10, at 43 (2001).

41. Pulp Mills on the River Uruguay (Arg. v. Uru.), Judgment, 2010 I.C.J. 14 (Apr. 20).

42. James Green, *The ICJ's Flawed Approach to Non-State Actors and International Law*, 41 U. MELB. J. INT'L L. 43, 45 (2008).

or group is acting on the instructions of, or under the direction or control of, that state in carrying out the conduct.[43] However, this framework proves inadequate when addressing potential threats from non-state actors or multinational corporations operating with significant autonomy across national borders.

The concept of "due diligence" in international law, as elaborated in the *Pulp Mills case (Argentina v. Uruguay, 2010)*, offers a potential avenue for addressing these gaps.[44] By applying due diligence standards, states might be held accountable for failing to prevent such damage, thereby bridging the gap between state-centric international law and the realities of modern global interactions involving multiple actors. In this case, the International Court of Justice ("ICJ") held that states have an obligation to use all the means at their disposal to avoid activities which take place in their territory, or in any area under their jurisdiction, causing significant damage to the environment of another state. This principle could potentially be extended to create obligations for states to prevent non-state actors from damaging undersea infrastructure.

However, the application of due diligence to non-state actors and multinational corporations in the context of undersea infrastructure protection remains largely unexplored. The ICJ's approach in the *Pulp Mills* case, while groundbreaking in environmental law, does not directly address the unique challenges posed by these entities in the realm of critical infrastructure protection.[45]

Recent developments in international law have begun to grapple with these issues. The UN Guiding Principles on Business and Human Rights, adopted in 2011, represent a significant step towards recognizing the responsibilities of non-state actors.[46] While not legally binding, these principles establish a framework for addressing human rights impacts of business activities. A similar approach could be considered for critical infrastructure protection.

Moreover, the increasing recognition of the concept of "shared responsibility" in international law offers another potential avenue for addressing these challenges. This concept, as discussed by André Nollkaemper and Dov Jacobs, acknowledges that multiple actors may contribute to a single harmful outcome, necessitating a more nuanced approach to responsibility attribution.[47]

In the specific context of undersea infrastructure, the International Cable Protection Committee ("ICPC") has advocated for enhanced legal

43. Int'l Law Comm'n, Rep. on the Work of Its Fifty-Third Session, U.N. Doc. A/56/10, at 47 (2001).

44. André Nollkaemper & Dov Jacobs, *Shared Responsibility in International Law: A Conceptual Framework*, 34 MICH. J. INT'L L. 359, 401 (2013).

45. *See* Pulp Mills on the River Uruguay (Arg. v. Uru.), Judgment, 2010 I.C.J. 14 (Apr. 20).

46. *See* John Ruggie, Special Representative of the Secretary-General, *Guiding Principles on Business and Human Rights: Implementing the United Nations "Protect, Respect and Remedy" Framework*, U.N. Doc. A/HRC/17/31 (Mar. 21, 2011).

47. Nollkaemper & Jacobs, *supra* note 44, at 365-66.

protections.[48] Their recommendations, while not legally binding, emphasize the need for a more comprehensive approach to cable protection that includes measures to address threats from non-state actors.[49]

As geopolitical tensions rise and the vulnerability of undersea infrastructure becomes increasingly apparent, the need to address these legal gaps grows more urgent. The current framework, rooted in state-centric principles, struggles to cope with the complex realities of potential threats from non-state actors and multinational corporations. A reevaluation of international legal principles, potentially extending the concept of due diligence and incorporating elements of shared responsibility, is essential to ensure adequate protection of critical global communication and energy networks.

C. Environmental Concerns

The precautionary principle and the concept of "common concern of humankind" offer potential avenues for strengthening the international legal framework for protecting undersea cables and pipelines, which are currently inadequately addressed in UNCLOS. Applying these environmental law principles to critical submarine infrastructure could justify more robust protections given the global importance of these assets.

The precautionary principle, which advocates taking protective action before there is complete scientific proof of a risk, has gained prominence in international environmental law since the 1992 Rio Declaration.[50] While not explicitly applied to undersea cables in UNCLOS, the principle could inform a more proactive approach to safeguarding this infrastructure. As undersea cables transmit over ninety-five percent of international data,[51] disruptions could have severe global consequences, even if the full extent of potential damage remains uncertain. Applying the precautionary principle would support preventive measures and enhanced protections despite incomplete knowledge of specific threats.

Similarly, the doctrine of "common concern of humankind," which has evolved in environmental law to address issues of global importance transcending national boundaries,[52] could provide a conceptual basis for strengthening international cooperation on undersea cable protection. Given the critical role of submarine cables in global communications and the

48. Daniel Hernandez-Benito, *Damages to Submarine Cables and Pipelines in Times of Peace and War: The Nord Stream Sabotage*, 16 AMSTERDAM L.F. [3], [6] at n.21 (Summer 2024).

49. Rishi Sunak, *Undersea Cables: Indispensable, Insecure*, POL'Y EXCH. 19, 36 (Dec. 1, 2017).

50. *See* Jon M. Van Dyke, *The Evolution and International Acceptance of the Precautionary Principle*, *in* BRINGING NEW LAW TO OCEAN WATERS 357, 363 (David D. Caron & Harry N. Scheiber eds., 2004).

51. Pierre Morcos & Colin Wall, *Invisible and Vital: Undersea Cables and Transatlantic Security*, CSIS (Apr. 28, 2021), https://www.csis.org/analysis/invisible-and-vital-undersea-cables-and-transatlantic-security [https://perma.cc/GX5G-WQGP].

52. Jutta Brunnée, *Common Areas, Common Heritage, and Common Concern*, OXFORD HANDBOOK OF INT'L ENV''L. 551, 553 (2007).

interconnected nature of the digital economy, their security could be framed as a common concern requiring collective action by the international community.

The potential application of environmental law principles to undersea cable protection finds some support in evolving interpretations of UNCLOS. In the South China Sea Arbitration, the tribunal recognized that the convention should be interpreted in light of developments in international law, including environmental principles.[53] This suggests that concepts like the precautionary principle could inform the interpretation and application of UNCLOS provisions related to submarine cables.

Incorporating these principles into the legal framework for undersea infrastructure protection could take several forms:

i. Complementing UNCLOS with a new treaty or adopting a new protocol specifically addressing undersea cable security, incorporating precautionary measures and recognizing cables as a common concern.
ii. Developing soft law instruments, such as UN General Assembly resolutions or guidelines, that apply these principles to submarine infrastructure protection.
iii. Encouraging national legislation and regional agreements that incorporate precautionary approaches and recognize the global importance of undersea cables.
iv. Establishing an international body or expanding the mandate of existing organizations (e.g., the International Cable Protection Committee) to coordinate global efforts on cable security.

While challenges remain in translating environmental law principles to the context of undersea infrastructure, doing so could provide a stronger legal foundation for addressing this critical issue of global concern. As the international community grapples with evolving threats to submarine cables and pipelines, drawing on established environmental law concepts offers a promising path forward for enhancing their protection under international law.

D. Energy Security

Disruptions to transoceanic pipelines can have profound implications for global energy markets and national energy security, underscoring the critical importance of protecting this vital infrastructure. The interconnected nature of the global energy system means that damage to key pipelines can lead to supply shocks, price volatility, and geopolitical tensions, with far-reaching consequences for both energy-exporting and energy-importing nations.

53. S. China Sea Arbitration Award (Phil. v. China), PCA Case Repository 2013-19 (2016).

The legal framework for protecting transoceanic pipelines remains limited, particularly in international waters. While UNCLOS provides some general provisions for the protection of submarine cables and pipelines, it lacks specific mechanisms for addressing modern threats to energy infrastructure. Article 113 of UNCLOS requires states to adopt laws criminalizing the breaking or injury of submarine cables or pipelines, but enforcement in international waters remains challenging.[54]

In response to these vulnerabilities, some nations have begun to take unilateral action. The U.S., for example, has introduced legislation aimed at enhancing the protection of critical energy infrastructure. The Safe and Secure Transportation of American Energy Act, introduced in the U.S. Senate in September 2024, seeks to expand criminal penalties for those who vandalize, tamper with, or disrupt the operation or construction of pipelines. While primarily focused on domestic infrastructure, this legislation reflects growing concern over energy security and the need for stronger legal protections.[55]

International efforts to address pipeline security have also gained momentum. The International Maritime Organization ("IMO") has initiated discussions on developing guidelines for the protection of submarine cables and pipelines. These efforts aim to establish best practices for safeguarding undersea infrastructure and improving coordination among states in responding to threats or incidents.[56]

The concept of energy security as a matter of "common concern" to the international community has gained traction in legal scholarship.[57] An approach drawing on principles from international environmental law could provide a basis for more robust international cooperation in protecting critical energy infrastructure.[58] Framing energy security as a common concern could justify collective action and the development of new legal instruments to address transnational threats to energy infrastructure.

Courts have also begun to grapple with the legal implications of pipeline disruptions. In the South China Sea Arbitration, the tribunal recognized the importance of protecting submarine communications cables, which could potentially be extended to energy pipelines.[59] The tribunal's emphasis on the duty of states to exercise due diligence in protecting marine environment could serve as a basis for developing more specific obligations regarding undersea energy infrastructure.

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54. UNCLOS, *supra* note 1, art. 113.

55. *See Young, Commerce Republicans Introduce Bill to Protect American Energy*, TODD YOUNG U.S. SENATOR FOR IND. (Sept. 17, 2024), https://www.young.senate.gov/newsroom/press-releases/young-commerce-republicans-introduce-bill-to-protect-american-energy/ [https://perma.cc/DGG7-937A].

56. *See* INT'L L. ASS'N COMM. SUBMARINE CABLES & PIPELINES, SUBMARINE CABLES AND PIPELINES UNDER INT'L L. ¶ 5 (2024), https://www.ila-hq.org/en/documents/ilathi-1 [https://perma.cc/YYS8-K7KP].

57. *See* Lakshman Guruswamy, *Energy and the Environment: Confronting Common Threats to Security*, 16 N.C. J. INT'L L. 255 (1991).

58. *See* S. China Sea Arbitration Award (Phil. v. China), PCA Case Repository 2013-19 (2016).

59. *See* DANIEL YERGIN, THE NEW MAP: ENERGY, CLIMATE, AND THE CLASH OF NATIONS 24 (Penguin Press, 2020).

To address the challenges posed by potential disruptions to transoceanic pipelines, several steps should be considered:

i. Developing a new international agreement specifically focused on the protection of undersea energy infrastructure, building on the principles established in UNCLOS and other relevant treaties.
ii. Enhancing information sharing and coordination mechanisms among states to improve threat detection and response capabilities.
iii. Establishing clear protocols for investigating and attributing responsibility for attacks on undersea pipelines, potentially through the creation of an international body dedicated to this purpose.
iv. Incorporating energy infrastructure protection into broader maritime security initiatives and naval cooperation agreements.
v. Encouraging the development of redundant supply routes and diversification of energy sources to mitigate the impact of potential pipeline disruptions.

As the global energy landscape continues to evolve, protecting transoceanic pipelines will remain a critical component of ensuring energy security. The international community must work towards developing a more robust legal and operational framework to address this challenge, balancing the needs of energy-producing and consuming nations while safeguarding the stability of global energy markets.

IV. RECOMMENDATIONS

A. Enhance International Cooperation

The protection of undersea cables and pipelines requires enhanced international cooperation to address the growing threats to this critical infrastructure. Given the boundaries of existing legal frameworks, there is a compelling case for establishing a specialized UN body or expanding the mandate of the International Telecommunication Union ("ITU") to develop a comprehensive protection regime. Additionally, the creation of a multilateral treaty specifically addressing the protection of transoceanic pipelines could provide a more robust legal foundation for safeguarding these vital assets.

The International Tribunal for the Law of the Sea ("ITLOS") presents a natural and efficient solution as the primary enforcement mechanism for undersea cable protection under any new treaty framework. The tribunal's extensive experience in maritime disputes, combined with its established procedures for urgent proceedings under Article 290 of UNCLOS, positions it ideally to handle cases involving cable and pipeline interference.[60] ITLOS has already demonstrated its capability in handling complex infrastructure-

60. UNCLOS, *supra* note 1, art. 290.

related disputes through its provisional measures' cases and advisory opinions.[61]

The tribunal's existing framework could be expanded through specific provisions in the new treaty, granting it compulsory jurisdiction over cases involving undersea cable damage or interference. This approach would leverage ITLOS's maritime expertise while avoiding the substantial costs and delays associated with creating entirely new institutional mechanisms.[62] The tribunal's established rules of procedure could be supplemented with specific provisions for expedited proceedings in cable-related cases, recognizing the time-sensitive nature of infrastructure protection.

Furthermore, ITLOS's experience in balancing competing maritime interests makes it particularly well-suited to handle the complex interplay between cable protection, freedom of navigation, and environmental considerations.[63] The tribunal could develop specialized chambers for cable and pipeline cases, similar to its existing chamber for fisheries disputes, ensuring that cases are heard by judges with relevant technical expertise. This specialized jurisdiction would promote consistent interpretation of the new legal framework while building on ITLOS's established legitimacy in the international maritime community.[64]

1. Establishing a Specialized UN Body or Expanding ITU Mandate

The establishment of a dedicated UN entity or the expansion of the ITU's mandate to focus on undersea infrastructure protection would provide a centralized mechanism for addressing this critical issue. Such an initiative could:

i. Develop comprehensive guidelines and best practices for the protection of undersea cables and pipelines, drawing on expertise from various sectors including telecommunications, energy, and maritime security.
ii. Facilitate information sharing and coordination among states, industry stakeholders, and international organizations to improve threat detection and response capabilities.
iii. Provide a forum for addressing jurisdictional challenges and developing protocols for investigating and attributing responsibility for attacks on undersea infrastructure.

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61. *See* Press Release, Int'l Tribunal L. Sea, Today, 6 July 2019, the Tribunal Delivered Its Order in the M/T "San Padre Pio" Case (Switzerland v. Nigeria), Provisional Measures (July 6, 2019) (on file with author).

62. *See* Seline Trevisanut, *Twenty Years of Prompt Release of Vessels: Admissibility, Jurisdiction, and Recent Trends*, 48 OCEAN DEV. & INT'L L. 300, 301-302 (2017).

63. *See* James Harrison, *Safeguards Against Excessive Enforcement Measures in the Exclusive Economic Zone – Law and Practice*, *in* JURISDICTION OVER SHIPS: POST-UNCLOS DEVELOPMENTS IN THE LAW OF THE SEA 217, 229-30 (Henrik Ringbom ed., 2015).

64. *See* Helmut Tuerk, *The Contribution of the International Tribunal for the Law of the Sea to International Law*, 26 PENN ST. INT'L L. REV. 289, 290-291 (2007).

iv. Coordinate research and development efforts to enhance the resilience and security of undersea cables and pipelines.

UNCLOS currently does not have specific mechanisms for addressing modern threats. The recent Joint Statement on the security and resilience of undersea cables, welcomed by the European Commission in September 2024, demonstrates this concept.[65]

2. Creating a Multilateral Treaty for Transoceanic Pipeline Protection

The development of a multilateral treaty specifically addressing the protection of transoceanic pipelines, drawing inspiration from the International Convention for the Prevention of Pollution from Ships ("MARPOL"), could provide a comprehensive legal framework for addressing the unique challenges posed by this critical infrastructure.[66] Key elements of such a treaty could include:

i. Clear definitions of prohibited acts against pipelines, including sabotage, unauthorized tapping, and negligent damage.
ii. Establishment of an international inspection regime to ensure compliance with security standards.
iii. Creation of a liability and compensation framework for damage to pipelines, similar to the Civil Liability Convention for oil pollution damage.
iv. Provisions for capacity building and technical assistance to help developing states implement protective measures.
v. Mechanisms for dispute resolution and enforcement of treaty obligations.

3. Legal Considerations and Challenges

The development of new international instruments for undersea infrastructure protection must navigate complex legal and jurisdictional issues.[67] Any new treaty or institutional framework must be carefully crafted to complement and enhance existing legal regimes, rather than conflict with them.

Recent jurisprudence, such as the South China Sea Arbitration, has recognized the importance of protecting submarine communications cables,

65. *New York Joint Statement on the Security and Resilience of Undersea Cables in a Globally Digitalized World*, EUR. COMM'N (Sept. 26, 2024), https://digital-strategy.ec.europa.eu/en/news/commission-welcomes-joint-statement-security-and-resilience-undersea-cables-un-general-assembly-new [https://perma.cc/M6MY-C2UB].

66. *See* INT'L L. ASS'N COMM. SUBMARINE CABLES & PIPELINES, INTERIM REPORT 2020 (2021), https://discovery.ucl.ac.uk/10149627/3/Azaria_Interim%20Report%20of%20the%20ILA%20Committee%20on%20Submarine%20Cables%20and%20Pipelines%2015%20Sept%20final.pdf [https://perma.cc/M6MY-C2UB].

67. UNCLOS, *supra* note 1.

which could potentially be extended to energy pipelines.[68] This evolving legal landscape provides an opportunity to develop more robust protections for undersea infrastructure within the existing framework of international law.

V. IMPLEMENTATION AND ENFORCEMENT

A. Requirements for Implementation

Effective implementation and enforcement of any new protection regime will require:

i. Development of clear protocols for investigating and attributing responsibility for attacks on undersea infrastructure.
ii. Establishment of an international body to oversee compliance and facilitate dispute resolution.
iii. Integration of undersea infrastructure protection into broader maritime security initiatives and naval cooperation agreements.
iv. Encouragement of domestic legislation to implement treaty obligations and criminalize attacks on undersea infrastructure.

The recent establishment of NATO's Critical Undersea Infrastructure Coordination Cell in February 2023 demonstrates growing recognition of the need for coordinated military responses to threats against undersea infrastructure.[69] Any new international regime should seek to complement and enhance such existing security arrangements.

In conclusion, enhancing international cooperation through the establishment of a specialized UN body or expanded ITU mandate, coupled with the development of a comprehensive multilateral treaty for transoceanic pipeline protection, offers a promising path forward for addressing the critical challenge of safeguarding undersea infrastructure. As the global community becomes increasingly reliant on these vital communication and energy networks, the development of robust legal and institutional frameworks for their protection is not merely desirable, but essential for ensuring international security and economic stability.

B. Expand Jurisdiction

The protection of undersea cables and pipelines requires a robust legal framework that can effectively address the transnational nature of threats to this critical infrastructure. Expanding jurisdiction through amendments to UNCLOS and potentially including serious damage to undersea infrastructure as a crime under the Rome Statute of the International Criminal Court ("ICC")

68. *See* S. China Sea Arbitration Award (Phil. v. China), PCA Case Repository 2013-19 (2016).

69. *See NATO Stands Up Undersea Infrastructure Coordination Cell*, NATO (Feb. 15, 2023), https://www.nato.int/cps/en/natohq/news_211919.htm [https://perma.cc/6NJL-4L8G].

could significantly enhance the international community's ability to deter and prosecute such offenses.

1. Complementing UNCLOS to Establish "Effects Jurisdiction"

The concept of "effects jurisdiction" would allow states affected by damage to undersea cables or pipelines to pursue legal action against perpetrators, regardless of their nationality or the location of the offense. This approach draws inspiration from the "effects doctrine" in antitrust law, which has been used to assert jurisdiction over foreign conduct that has substantial effects within a state's territory.[70] To expand jurisdiction, we propose developing a new protocol or agreement that would complement UNCLOS without directly amending it. This approach could include:

i. A new article explicitly establishing effects jurisdiction for offenses against undersea cables and pipelines.
ii. Provisions detailing the criteria for determining when a state is sufficiently "affected" to assert jurisdiction.
iii. Mechanisms for resolving potential jurisdictional conflicts among affected states.

The lack of clear jurisdictional authority in such cases highlights the boundaries of the current legal framework.

Implementing effects jurisdiction would require careful consideration of potential conflicts with existing principles of international law, particularly the respect for state sovereignty. However, precedent for extraterritorial jurisdiction in cases of transnational crime exists in various international instruments, such as the UN Convention against Transnational Organized Crime.[71]

2. Including Serious Damage to Undersea Infrastructure In the Rome Statute

Proposing the inclusion of serious damage to undersea infrastructure as a crime under the Rome Statute of the ICC would elevate the significance of such offenses in international law. This approach could:

i. Provide a mechanism for prosecution when national courts are unwilling or unable to act.
ii. Deter potential offenders through the threat of international criminal liability.

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70. *See* James Harrison, *The Effects Doctrine in International Law: A Historical Perspective*, 45 HARV. INT'L L. J. 127, 135-38 (2012).
71. *See* G.A. Res. 55/25 (Sept. 29, 2003).

iii. Ensure a consistent approach to investigating and prosecuting these crimes across jurisdictions.

The principle of complementarity, a cornerstone of the ICC's jurisdiction, would ensure that national courts retain primary responsibility for prosecuting these offenses, with the ICC serving as a court of last resort.[72] This approach respects state sovereignty while providing a backstop for cases where national prosecution is not feasible or effective.

Including this offense in the Rome Statute would require demonstrating that it meets the threshold of "the most serious crimes of concern to the international community as a whole." Given the critical importance of undersea infrastructure to global communications and energy security, a strong case can be made for its inclusion.

Recent jurisprudence from the ICC, such as the 2021 decision confirming charges in the Abd-Al-Rahman case, demonstrates the Court's willingness to interpret its mandate broadly to address evolving threats to international peace and security.[73] This precedent could support arguments for expanding the Court's jurisdiction to cover serious attacks on undersea infrastructure.

3. Legal and Practical Considerations

Implementing these proposals would face several challenges:

i. Complementing UNCLOS and the Rome Statute requires broad international consensus, which may be difficult to achieve given divergent national interests.
ii. Defining "serious damage" to undersea infrastructure in a way that is both comprehensive and specific enough for criminal prosecution.
iii. Addressing potential conflicts with existing national laws and jurisdictional claims.
iv. Ensuring that expanded jurisdiction does not infringe on legitimate military activities or scientific research.

To address these challenges, a phased approach could be considered.

First, pursue amendments to UNCLOS to establish effects jurisdiction, as this may face less resistance than expanding the ICC's mandate.

Simultaneously, work towards building consensus for including serious damage to undersea infrastructure in the Rome Statute, potentially through a UN General Assembly resolution recognizing the gravity of such offenses.

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72. *See* Rome Statute of the International Criminal Court, *opened for signature* July 17, 1998, 2187 U.N.T.S. 90 (entered into force July 1, 2002).

73. *See* Prosecutor v. Abd-Al-Rahman, ICC-02/05-01/20, Decision on the Confirmation of Charges (July 9, 2021).

Develop model legislation for states to implement expanded jurisdiction domestically, ensuring consistency with international law principles.

4. Enforcement and Implementation

Effective enforcement of expanded jurisdiction would require:

i. Enhanced international cooperation in investigations and evidence gathering.
ii. Development of specialized expertise within national law enforcement agencies and the ICC to handle complex cases involving undersea infrastructure.
iii. Establishment of clear protocols for information sharing and mutual legal assistance in these cases.

The recent establishment of NATO's Critical Undersea Infrastructure Coordination Cell in February 2023 demonstrates growing recognition of the need for coordinated responses to threats against undersea infrastructure.[74] Any expansion of legal jurisdiction should be complemented by such operational initiatives to ensure effective enforcement.

In conclusion, expanding jurisdiction through a new treaty to complement UNCLOS and potentially including serious damage to undersea infrastructure in the Rome Statute offers a promising approach to enhancing the protection of this critical global resource.[75] While significant challenges remain in implementing these proposals, the growing threats to undersea cables and pipelines necessitate bold legal innovations to ensure their security in the 21st century.

C. Strengthen Deterrence and Environmental Protections

The protection of undersea cables and pipelines requires a multifaceted approach that strengthens deterrence against intentional damage and enhances environmental safeguards. Developing a protocol to UNCLOS establishing an international liability and compensation fund could address accountability gaps for transnational harm. Coupled with this, the adoption of an "Undersea Infrastructure Impact Assessment" ("UIIA") requirement, inspired by Environmental Impact Assessments ("EIAs") under international law, could further bolster the legal frameworks.[76]

74. *See NATO Stands Up Undersea Infrastructure Coordination Cell*, NATO (Feb. 15, 2023), https://www.nato.int/cps/en/natohq/news_211919.htm [https://perma.cc/6NJL-4L8G].
75. *See* BURNETT ET AL., *supra* note 2, at 155-58.
76. *See* Harrison, *supra* note 70 (discussing EIAs as general principles of law).

1. International Liability and Compensation Fund

The establishment of an international liability and compensation fund for damage to undersea cables and pipelines, modeled after the International Oil Pollution Compensation Funds ("IOPC Funds"), would provide a robust mechanism for addressing the financial consequences of infrastructure damage and serve as a deterrent against intentional acts of sabotage.

The IOPC Funds, established under the auspices of the International Maritime Organization ("IMO"), provide compensation for oil pollution damage resulting from spills of persistent oil from tankers.[77] This model could be adapted to address damage to undersea infrastructure, with key features including:

i. Strict liability for damage to cables and pipelines, regardless of fault.
ii. Compulsory insurance requirements for vessels operating in areas with undersea infrastructure.
iii. A tiered system of compensation, with primary responsibility falling on the vessel owner and supplementary compensation provided by the fund.
iv. Contributions to the fund from states party to the protocol, based on the volume of data or resources transmitted through cables and pipelines under their jurisdiction.

Recent incidents and current international tensions underscore the need for such a mechanism. Implementing this fund would require careful consideration of several legal issues:

i. Defining the scope of compensable damage, including both direct physical damage and consequential losses from service disruptions.
ii. Establishing procedures for claims assessment and dispute resolution.
iii. Addressing potential conflicts with existing liability regimes under national laws.
iv. Ensuring compatibility with the principle of freedom of navigation on the high seas.

2. Undersea Infrastructure Impact Assessment

The adoption of an "Undersea Infrastructure Impact Assessment" ("UIIA") requirement for activities that may affect cables or pipelines would provide a proactive mechanism for identifying and mitigating potential risks to this critical infrastructure. This requirement could draw on the principles established in the Convention on Environmental Impact Assessment in a Transboundary Context ("Espoo Convention"), adapting them to the specific

77. *Funds Overview*, INT'L OIL POLLUTION COMP. FUNDS, https://iopcfunds.org/about-us/ [https://perma.cc/BR46-394W] (last visited Apr. 4, 2025).

context of undersea infrastructure.[78] Key elements of the UIIA requirement could include:

i. Mandatory assessment of potential impacts on undersea cables and pipelines for activities such as seabed mining, offshore energy development, and marine scientific research.
ii. Transboundary notification and consultation procedures for activities that may affect infrastructure in areas beyond national jurisdiction.
iii. Public participation in the assessment process, recognizing the global importance of undersea communication networks.
iv. Provisions for post-project analysis and monitoring to ensure ongoing protection of infrastructure.

The need for such assessments is highlighted by the growing interest in seabed mining and other activities that could pose risks to undersea cables. For example, the International Seabed Authority is currently developing regulations for deep-sea mining, which could potentially impact existing and future cable routes.[79] However, implementing the UIIA requirement would face several challenges:

i. Defining the threshold for activities requiring assessment, balancing protection with the need to avoid undue burdens on maritime activities.
ii. Establishing mechanisms for information sharing that protect sensitive data about cable and pipeline locations.
iii. Addressing potential conflicts with the principle of freedom of scientific research under UNCLOS.
iv. Ensuring effective enforcement in areas beyond national jurisdiction.

3. Legal and Practical Considerations

Implementing these proposals would require careful navigation of existing international legal frameworks and potential conflicts with national interests. The development of a protocol to UNCLOS would need to address concerns about the convention's integrity and the potential for fragmentation of the law of the sea regime.

Recent jurisprudence, such as the South China Sea Arbitration, has recognized the importance of protecting submarine communications cables, which could provide a basis for expanding legal protections to include liability and impact assessment requirements.[80] However, the tribunal's

78. *See* Convention on Environmental Impact Assessment in a Transboundary Context app. I, *opened for signature* Feb. 25, 1991, 1989 U.N.T.S. 309, 340-41 (entered into force Sept. 10, 1997).

79. INTERNATIONAL SEABED AUTHORITY, DRAFT REGULATIONS ON EXPLOITATION OF MINERAL RESOURCES IN THE AREA pt. V ¶¶ 12-14, (2019).

80. *See* S. China Sea Arbitration Award (Phil. v. China), PCA Case Repository 2013-19 (2016).

emphasis on the duty of states to exercise due diligence in protecting the marine environment would need to be balanced against concerns about overly burdensome regulations.

In conclusion, the development of an international liability and compensation fund, coupled with the adoption of an UIIA requirement, offers a promising approach to strengthening deterrence and environmental protections for undersea cables and pipelines. While significant challenges remain in implementing these proposals, the growing threats to this critical infrastructure underscore the urgent need for enhanced legal frameworks to ensure its protection and resilience.

D. Improve Monitoring and Security

The protection of undersea infrastructure requires enhanced monitoring and security measures to address the growing threats to these critical assets. Establishing an International Undersea Infrastructure Monitoring Organization ("IUIMO") and developing a legal framework for the deployment of autonomous underwater vehicles ("AUVs") for infrastructure monitoring are two promising approaches to improve the security of undersea cables and pipelines.

1. Establishing an International Undersea Infrastructure Monitoring Organization

The creation of an IUIMO, vested with the authority to conduct inspections and share intelligence among member states, could significantly enhance the international community's ability to protect undersea infrastructure. This organization could be modeled on existing international bodies such as the International Atomic Energy Agency ("IAEA"), adapting its inspection and information-sharing mechanisms to the maritime domain. Key features of the IUIMO could include:

i. A mandate to conduct regular inspections of undersea infrastructure in international waters and, with coastal state consent, in territorial seas and exclusive economic zones.
ii. Authority to collect and analyze data on potential threats to undersea infrastructure.
iii. A mechanism for sharing intelligence and best practices among member states.
iv. The power to issue recommendations for enhancing the security of undersea infrastructure.

The need for such an organization is underscored by recent incidents, such as the January 2024 damage to multiple undersea cables connecting Taiwan, which disrupted internet connectivity and raised suspicions of

intentional sabotage.[81] An IUIMO could help prevent such incidents by improving threat detection and response capabilities. Implementing this proposal would require careful consideration of several legal issues:

i. The scope of the organization's authority in different maritime zones, particularly in light of coastal state sovereignty concerns.
ii. Procedures for ensuring the confidentiality of sensitive information while promoting effective information sharing.
iii. Mechanisms for resolving disputes between the organization and member states or between member states.

The establishment of the IUIMO could draw inspiration from recent developments in international maritime security cooperation. For example, NATO's establishment of the Maritime Centre for the Security of Critical Undersea Infrastructure in May 2024 demonstrates growing recognition of the need for coordinated action in this area.[82] The IUIMO could build on this momentum, expanding the scope of cooperation beyond NATO member states to create a truly global monitoring and security regime.

2. Legal Framework for AUV Deployment

Developing a legal framework for the deployment of AUVs for infrastructure monitoring is essential to harness the potential of these technologies while addressing potential conflicts with the freedom of navigation. AUVs offer significant advantages for undersea infrastructure monitoring, including the ability to operate for extended periods in harsh environments and access areas that are difficult or dangerous for human divers.[83] Key elements of this legal framework could include:

i. Clear definitions of the types of AUVs covered and their permissible uses for infrastructure monitoring.
ii. Rules governing the operation of AUVs in different maritime zones, including provisions for coastal state consent where necessary.
iii. Mechanisms for ensuring that AUV operations do not interfere with legitimate maritime activities or infringe on the rights of other states.
iv. Provisions for the collection, use, and sharing of data gathered by AUVs during monitoring operations.

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81. Joyu Wang, *Chinese Vessel Cuts Taiwan Internet Cable in Apparent Sabotage*, WALL ST. J. (Jan. 6, 2025), https://www.wsj.com/world/asia/chinese-vessel-cuts-taiwan-internet-cable-in-apparent-sabotage-81e0d3b1 [https://perma.cc/62YV-A4YD].

82. *See NATO Officially Launches New Maritime Centre for Security of Critical Undersea Infrastructure*, NATO (May 28, 2024), https://mc.nato.int/media-centre/news/2024/nato-officially-launches-new-nmcscui [https://perma.cc/8TD5-8B8D].

83. *What is an AUV?*, NOAA OCEAN EXPL., https://oceanexplorer.noaa.gov/facts/auv.html [https://perma.cc/DW3G-Q9MT] (last visited Apr. 4, 2025).

Recent jurisprudence, such as the South China Sea Arbitration, has recognized the importance of protecting submarine communications cables, which could provide a basis for expanding legal protections to include AUV-based monitoring activities.[84] However, the tribunal's emphasis on the duty of states to exercise due diligence in protecting the marine environment would need to be balanced against concerns about potential interference with navigation rights. Therefore, implementing this legal framework would face several challenges:

i. Defining the threshold for activities requiring coastal state consent, balancing the need for effective monitoring with respect for coastal state sovereignty.
ii. Addressing potential conflicts between AUV operations and other maritime activities, such as fishing or scientific research.
iii. Ensuring that AUV deployment does not become a cover for unauthorized intelligence gathering or other activities that could threaten international security.

The development of this legal framework could build on existing initiatives, such as the IMO's ongoing work on Maritime Autonomous Surface Ships ("MASS").[85] While focused on surface vessels, the MASS regulatory scoping exercise provides valuable insights into the challenges of integrating autonomous systems into the existing maritime legal regime.

In conclusion, establishing an IUIMO and developing a legal framework for AUV deployment offer promising approaches to improving the monitoring and security of undersea infrastructure. While significant challenges remain in implementing these proposals, the growing threats to undersea cables and pipelines underscore the urgent need for enhanced international cooperation and legal innovation in this critical area.

E. Update Regulatory Frameworks

The protection of undersea cables and pipelines requires a comprehensive update to existing regulatory frameworks at both the international and national levels. Proposing amendments to the International Telecommunication Regulations ("ITRs") and advocating for a UN General Assembly resolution on harmonizing national laws could significantly enhance the legal protections for this critical infrastructure.

84. *See* S. China Sea Arbitration Award (Phil. v. China), PCA Case Repository 2013-19 (2016).

85. *Autonomous Shipping*, INT'L MARITIME ORG., https://www.imo.org/en/MediaCentre/HotTopics/Pages/Autonomous-shipping.aspx [https://perma.cc/TF2M-4E5N] (last visited Apr. 4, 2025).

1. Amending the International Telecommunication Regulations

The ITRs, last revised in 2012, provide a global framework for international telecommunications. However, these regulations do not adequately address the security challenges facing undersea cables in the modern era.[86] Proposed amendments to the ITRs could include:

i. Specific provisions on the physical and cybersecurity of undersea cables, including requirements for risk assessments and security measures.
ii. Obligations for states to cooperate in protecting undersea infrastructure, including information sharing and joint response mechanisms.
iii. Guidelines for the resilience and redundancy of cable networks to ensure continuity of global communications.
iv. Provisions addressing emerging technologies, such as quantum communications, that may impact undersea cable security.

The need for such amendments is underscored by recent incidents and initiatives. For instance, the Joint Statement on the security and resilience of undersea cables, welcomed by the European Commission in September 2024, demonstrates growing international recognition of the need for coordinated action in this area. The statement, proposed by the U.S., lays out principles to ensure undersea cable infrastructure is "secure, reliable, sustainable and resilient."[87] Incorporating these principles into the ITRs would provide them with greater legal weight and global applicability. However, implementing these amendments would face several challenges:

i. Balancing security requirements with the principle of free flow of information, as enshrined in existing international telecommunications law.
ii. Addressing potential conflicts with national sovereignty, particularly regarding security measures in territorial waters.
iii. Ensuring that new regulations do not unduly burden developing countries or impede their access to global telecommunications networks.

86. *See Final Acts of the World Conference on International Communications*, INT'L TELECOMM. UNION (2012), https://www.itu.int/en/wcit-12/Documents/final-acts-wcit-12.pdf [https://perma.cc/6JTT-K9M3].

87. *Commission Welcomes Joint Statement on the Security and Resilience of Undersea Cables at UN General Assembly in New York*, EUR. COMM'N (Sept. 26, 2024), https://digital-strategy.ec.europa.eu/en/news/commission-welcomes-joint-statement-security-and-resilience-undersea-cables-un-general-assembly-new [https://perma.cc/M6MY-C2UB].

2. UN General Assembly Resolution on Harmonization of National Laws

Advocating for the adoption of a UN General Assembly resolution calling for the harmonization of national laws regarding the protection of undersea infrastructure could provide a crucial impetus for strengthening legal protections globally. Such a resolution could:

i. Call on member states to review and update their national laws to address modern threats to undersea infrastructure.
ii. Provide guidelines for key elements to be included in national legislation, such as criminal penalties for intentional damage to cables and pipelines.
iii. Encourage the establishment of national focal points for undersea infrastructure protection and international cooperation.
iv. Promote the development of regional cooperation mechanisms for infrastructure protection.

The need for harmonized national laws is evident in the disparate approaches currently taken by different states. For example, while some countries have recently updated their legislation to address undersea cable security, others lack specific legal provisions on this issue. A UN resolution could help bridge these gaps and create a more consistent global legal framework.[88]

Recent developments underscore the timeliness of such an initiative. NATO's establishment of the Maritime Centre for the Security of Critical Undersea Infrastructure in May 2024 demonstrates growing recognition of the need for coordinated action in this area.[89] A UN resolution could build on this momentum, expanding the scope of cooperation beyond NATO member states to create a truly global approach to undersea infrastructure protection. Implementing this proposal would require addressing several legal and practical considerations:

i. Respecting the diversity of legal systems and traditions among UN member states while promoting harmonization.
ii. Balancing the need for robust protection measures with concerns about potential infringements on maritime freedoms.
iii. Addressing the challenges of enforcement in areas beyond national jurisdiction.

In conclusion, updating regulatory frameworks through amendments to the ITRs and a UN General Assembly resolution on harmonizing national

88. Tara Davenport, *Submarine Communications Cables and Law of the Sea: Problems in Law and Practice*, 43 OCEAN DEV. & INT'L LAW 201, 201 (2012).

89. *See NATO officially launches new Maritime Centre for Security of Critical Undersea Infrastructure*, NATO (May 28, 2024), https://mc.nato.int/media-centre/news/2024/nato-officially-launches-new-nmcscui [https://perma.cc/8TD5-8B8D].

laws offers a promising approach to enhancing the protection of undersea cables and pipelines. While significant challenges remain in implementing these proposals, the growing threats to this critical infrastructure underscore the urgent need for a comprehensive and coordinated global legal response.

VI. CONCLUSION

The proposed recommendations for enhancing the protection of undersea cables and transoceanic pipelines represent a comprehensive approach to addressing the significant gaps in the current international legal framework. These measures aim to leverage established principles of international law while introducing innovative legal mechanisms to bolster the security and resilience of critical global infrastructure in an era marked by increasing geopolitical tensions and technological vulnerabilities.

The urgency of these reforms is underscored by recent incidents that highlight the vulnerability of undersea infrastructure. The January 2024 damage to multiple undersea cables connecting Taiwan, which disrupted internet connectivity and raised suspicions of intentional sabotage, serves as a stark reminder of the potential consequences of inadequate protection. Similarly, the 2022 explosions that damaged the Nord Stream pipelines in the Baltic Sea demonstrated the vulnerability of transoceanic energy infrastructure and the geopolitical ramifications of such incidents.

The proposed establishment of an International Undersea Infrastructure Monitoring Organization ("IUIMO") and the development of a legal framework for autonomous underwater vehicle ("AUV") deployment address the critical need for enhanced monitoring and security measures. These initiatives build upon existing international cooperation frameworks, such as NATO's Maritime Centre for the Security of Critical Undersea Infrastructure, launched in May 2024, while expanding their scope to create truly global mechanisms for infrastructure protection.

The recommendation to amend the International Telecommunication Regulations (ITRs) to include specific provisions on undersea cable security aligns with growing international recognition of the need for coordinated action in this area.

The proposed development of an international liability and compensation fund for damage to undersea cables and pipelines, modeled on the International Oil Pollution Compensation Funds, addresses a critical gap in the current legal framework. This mechanism would not only provide a means for addressing the financial consequences of infrastructure damage but also serve as a deterrent against intentional acts of sabotage.

The advocacy for a UN General Assembly resolution calling for the harmonization of national laws regarding undersea infrastructure protection recognizes the importance of creating a consistent global legal framework. This approach builds on the principle of common concern for the protection of critical global resources, as articulated in various international environmental instruments and increasingly recognized in the context of cybersecurity and critical infrastructure protection.

The proposed expansion of jurisdiction through a new treaty complementing UNCLOS and the potential inclusion of serious damage to undersea infrastructure as a crime under the Rome Statute of the International Criminal Court represent bold steps towards addressing the transnational nature of threats to this infrastructure. These measures draw inspiration from evolving concepts of universal jurisdiction and the recognition of certain crimes as being of concern to the international community.

While these recommendations face significant challenges in implementation, including potential conflicts with established principles of maritime law and concerns about national sovereignty, they offer a path forward for addressing the critical vulnerabilities in the current legal framework. As the International Law Commission noted in its 2023 report on sea-level rise in relation to international law, the law of the sea must evolve to address emerging challenges that were not contemplated when UNCLOS was drafted.

In conclusion, the proposed recommendations represent a comprehensive and forward-looking approach to enhancing the protection of undersea cables and transoceanic pipelines. By combining established legal principles with innovative mechanisms, these measures seek to create a robust international legal framework capable of addressing the complex challenges posed by threats to critical global infrastructure in the 21st century. As the international community continues to grapple with these issues, the implementation of these recommendations could play a crucial role in ensuring the security and resilience of the global communications and energy networks that underpin modern society.