

UNDERWATER NOISE POLLUTION: A CRITICAL ANALYSIS OF THE NEXUS BETWEEN UNDERWATER ENVIRONMENTAL CRIMES AND MONEY LAUNDERING

Mr Rushi Bhagat¹
Dr Jiya Matharani²

Abstract

The administration of fisheries is at a critical stage, facing not only the challenges of overfishing but also the sinister rise in unregulated practices. This paper highlights the complicated, hidden realities of illegal, unreported, and unregulated (IUU) fishing, claiming that an effective management strategy must look beyond catch quotas to address the broader criminal ecosystem that enables it. IUU fishing is closely tied to a web of environmental crimes, particularly underwater noise pollution, a subject that remains underexplored in both legal and ecological discourse. Through a doctrinal analysis, this research aims to find the contradictions of the existing legislative frameworks. In contrast, international agreements and domestic regulations, from the London Convention to national (Coastal Regulatory Zones) CRZ rules, other acts and conventions that aim to manage marine environments, have consistently failed to account for the cumulative and destructive impact of noise emissions. These results of human activities, from merchant shipping to resource extraction, often operate with impunity. These issues degrade marine ecosystems, which are the habitats of the aquatic fauna that global fisheries depend on. Furthermore, financial exploitation in the form of Money Laundering increases profits from IUU fishing, which is laundered globally, creating a cascading effect on conservation efforts. This paper, therefore, calls for a paradigm shift, one that recognises IUU fishing as a nexus of environmental and financial crime.

Keywords- *Environmental Crimes, Money Laundering, CRZ Rules, Underwater Noise Pollution, Conservation.*

1 Research Scholar, GLS University, Ahmedabad.

2 Assistant Professor, GLS University, Faculty of Law, Ahmedabad.

Introduction

The discourse on environmental governance in India reveals an enduring tension between the imperatives of ecological sustainability and the demands of economic development. While industrial expansion, deforestation, and urbanisation have long been recognised as sources of air, land, and water degradation, a relatively underexamined dimension lies beneath the marine surface: underwater noise pollution. Anthropogenic acoustic disturbances generated by merchant shipping, offshore resource extraction, seismic surveys, naval operations, and coastal infrastructure projects have been increasingly documented as disrupting marine ecosystems.³ These disruptions compromise the ability of aquatic species to communicate, migrate, and reproduce, often resulting in physiological harm, behavioural anomalies, and population decline.

Compounding this ecological crisis is the prevalence of illegal, unreported, and unregulated (IUU) fishing, which operates within a complex web of environmental crime and transnational financial flows. Scholarly and policy discourses have highlighted that IUU fishing is not only an ecological concern but also an enabler of illicit financial practices, particularly money laundering through global seafood supply chains and processing networks.⁴ However, current legislative mechanisms, ranging from India's Coastal Regulation Zone rules to international frameworks such as the London Convention, the Convention on Biological Diversity, and the Convention on Migratory Species, largely fail to incorporate the cumulative impact of noise emissions within their regulatory ambit.

This lacuna underscores the need for a paradigm shift in marine environmental governance, one that integrates ecological, legal, and financial dimensions. By critically examining the intersection of underwater noise pollution, IUU fishing, and money laundering, this study situates itself within the emerging discourse on environmental crimes as multi-layered phenomena, where financial incentives and regulatory inadequacies sustain ecological degradation. In doing so, it contributes to the development of a more holistic regulatory architecture that addresses both the symptomatic ecological harms and the systemic financial enablers of marine environmental crimes. Underwater noise emissions have emerged as a

3 Christine Erbe, Caitlin Reichmuth, Anna C. Thomas, Mark P. Costa & Brandon L. Southall, The Effects of Ship Noise on Marine Mammals—A Review, 147 *Frontiers in Marine Sci.* 1 (2019).

4 UNODC. "UNODC Approach to Crime in the Fisheries Sector." UNODC, https://www.unodc.org/documents/Wildlife/UNODC_Approach_to_Crimes_in_the_Fisheries_Sector.pdf.

critical but under recognised dimension of marine environmental degradation. Anthropogenic acoustic disturbances originate from a range of human activities, including commercial shipping, offshore oil and gas exploration, military sonar operations, the laying of submarine communication cables, and coastal or deep-sea construction. Such emissions are not benign externalities; they intrude directly upon the life processes of marine fauna, disrupting communication, orientation, migration, and predation behaviours. Cetaceans such as whales, dolphins, and porpoises are particularly vulnerable due to their reliance on echolocation and acoustic signalling. Documented impacts range from temporary or permanent hearing loss to disorientation, stress-induced behavioural changes, and in severe cases, mortality.⁵

It is crucial, however, to distinguish anthropogenic noise from the natural acoustic baseline of marine environments. Oceans are not inherently silent; they are characterised by geophysical and biological soundscapes generated by wave action, seismic activity, iceberg calving, and the communicative signals of marine organisms themselves.⁶ What marks anthropogenic noise as an ecological threat is its scale, intensity, and persistence, which cumulatively overwhelm the adaptive thresholds of marine species. The masking of biologically relevant signals and the chronic stress imposed on ecosystems underscore the urgency of treating underwater noise as a substantive environmental concern within both ecological science and regulatory frameworks.

Underwater noise emissions have emerged as a critical yet underexplored dimension of marine environmental degradation. While oceans naturally contain ambient sounds such as waves, marine organisms, seismic activity, and iceberg calving, the intensification of anthropogenic noise has created unprecedented ecological stress. Commercial shipping, offshore oil and gas exploration, oil extraction from rigs, underwater construction, military sonar, and submarine cable laying contribute cumulatively to elevated acoustic levels. In the Indian context, such emissions often contravene Environmental Impact Assessment standards and the Coastal Regulation Zone Notification, which are intended to prevent anthropogenic disturbances in coastal and marine zones.

5 Brandon L. Southall, Ann E. Bowles, William T. Ellison, James J. Finneran, Roger L. Gentry, Charles R. Greene Jr., David Kastak, Diane R. Ketten, James H. Miller, Paul E. Nachtigall, William J. Richardson, Jeanette A. Thomas, Peter L. Tyack & Randall R. Yerkes, Marine Mammal Noise Exposure Criteria: Initial Scientific Recommendations, 33 *Aquatic Mammals* 411 (2007)

6 Gordon M. Wenz, Acoustic Ambient Noise in the Ocean: Spectra and Sources, 34 *J. Acoustical Soc'y Am.* 1936 (1962).

The ecological consequences are profound. Marine fauna, including cetaceans such as whales, dolphins, and porpoises, experience disrupted communication, impaired navigation, and altered migratory and hunting behaviours. Prolonged exposure leads to auditory damage, physiological stress, and, in extreme cases, mortality. In invertebrates and smaller fish, acoustic stress manifests as digestive disruption, compromised predator defence behaviours, and abnormal aggression, thereby altering trophic dynamics.⁷

Beyond these ecological harms, underwater noise facilitates environmental crimes, particularly illegal, unreported, and unregulated (IUU) fishing. Acoustic disturbances obscure illegal fishing operations, enabling vessels to operate with reduced detection and enforcement oversight. These activities generate substantial illicit revenue, which is often laundered through seafood supply chains, processing hubs, and offshore corporate structures, creating a dual threat: environmental degradation and financial opacity.⁸

This duality highlights a critical regulatory gap. Existing instruments, such as the London Convention (1972) and its 1996 Protocol, the Convention on Biological Diversity, and the Convention on the Conservation of Migratory Species, provide ecological safeguards but remain largely silent on the financial crimes enabled by anthropogenic noise.⁹ Likewise, domestic EIA and CRZ frameworks, while mitigating direct ecological harm, are not integrated with anti-money laundering regimes, leaving a governance blind spot at the intersection of environmental and financial law.

The novelty of this perspective lies in framing underwater noise emissions as a “multiplier pollutant”, one that exacerbates ecological fragility while enabling financial crimes. By reconceptualising acoustic disturbances as both ecological and criminogenic factors, this approach advances an integrated model of environmental governance. Such a model emphasizes monitoring and mitigation strategies that combine marine acoustic regulation, biodiversity protection, and financial intelligence frameworks, thereby addressing the dual threats posed by underwater noise pollution. This framework positions India as a critical case

7 Peng, Changsong, Xinguo Zhao & Guangxu Liu, *Noise in the Sea and Its Impacts on Marine Organisms*, 12 INT L J. ENVTL. RES. & PUB. HEALTH 12304 (2015), <https://doi.org/10.3390/ijerph121012304>

8 Id. at no.7

9 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter art. I, Dec. 29, 1972, 1046 U.N.T.S. 120; 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Nov. 7, 1996, 36 I.L.M. 1; Convention on Biological Diversity arts. 7–10, June 5, 1992, 1760 U.N.T.S. 79; Convention on the Conservation of Migratory Species of Wild Animals, arts. II–IV, June 23, 1979, 1651 U.N.T.S. 333.

study for global policy innovations in acoustic environmental governance and the financial regulation of environmental crimes.

Legislative Mechanisms and Financial Nexus in Marine Environmental Crimes

The legislative and policy framework for safeguarding the marine ecosystem from underwater noise and other pollution reflects a complex interplay between international obligations, domestic regulations, and enforcement challenges. At the international level, the United Nations General Assembly (UNGA) recognises the severity of marine resource exploitation, declaring June 5 as the International Day for the Fight Against Illegal, Unreported, and Unregulated (IUU) Fishing to highlight the systemic risks of IUU fishing to marine ecosystems and global food security.¹⁰ In India, the sector's significance is undeniable: as the world's second-largest fish producer, the country contributes approximately 7.56% of global production and generates employment for nearly 14.5 million individuals.¹¹ The Government of India's Pradhan Mantri Matsya Sampada Yojana (PMMSY) seeks to augment this contribution, aiming to increase production to 22 million metric tonnes by 2024–25 with an investment of nearly ₹20,000 crore, structured through both central and centrally sponsored schemes.¹²

However, despite these ambitious developmental commitments, the ecological threats remain acute. India's northern Indian Ocean region has recorded more than 390 IUU fishing incidents, many linked to the presence of nearly 250 foreign vessels, raising concerns not only of ecological degradation but also of maritime security.¹³ Regulatory instruments such as the Environmental Impact Assessment Notification mandate project proponents to disclose potential environmental risks and outline mitigation measures prior to clearance, including when projects extend onto the ocean floor.¹⁴ Non-compliance allows the government to suspend access to resources, impose penalties, and, in some cases, terminate such projects. Complementarily, the Coastal Regulation Zone Notifications of 1991 and 2011 prohibit activities such as blasting, dredging, and coral exploitation within regulated zones.¹⁵ However,

10 G.A. Res. 72/72, 1 (Dec. 5, 2017).

11 Dep't of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying, Annual Report 2020–21, at 15 (2021).

12 Id. At no. 11

13 Dinakar Peri, *Over 390 Instances of Illegal Fishing by Chinese Vessels in Indian Ocean: Navy Chief*, THE HINDU (Dec. 3, 2022), <https://www.thehindu.com>.

14 Ministry of Env't, Forest & Climate Change, Environment Impact Assessment Notification, S.O. 1533(E) (Sept. 14, 2006)

15 Ministry of Env't & Forests, Coastal Regulation Zone Notification, 1991, S.O. 114(E) (Feb. 19, 1991).

the CRZ-IV carve-out for traditional fishing has created enforcement gaps, facilitating opportunistic IUU activity, oil and gas exploration, and pollution from shipping-related activities.¹⁶

Internationally, instruments such as the London Convention of 1972 and its 1996 Protocol require parties to prevent all forms of marine pollution, extending the concept to include underwater noise.¹⁷ The Convention on Biological Diversity, through COP 12 Decision XII/23, explicitly addressed underwater noise, urging governments to classify sources of acoustic disturbance, develop quieter technologies, and incorporate noise considerations into marine planning and management.¹⁸ Likewise, the Convention on Migratory Species calls for acoustic monitoring and habitat mapping to protect vulnerable migratory marine fauna.¹⁹

The ecological risks of underwater noise pollution have a deeper economic and criminological dimension. Prolonged exposure can cause temporary or permanent hearing loss in cetaceans, impairing reproduction, communication, and predator avoidance.¹⁹ Incidents such as the mass stranding of 450 pilot whales on Tasmania's coast in 2020 underscore the devastating consequences of seismic blasting and noise-linked stressors.²⁰ These ecological disruptions indirectly intensify IUU fishing opportunities, facilitating the laundering of illicit gains through the fishing supply chain. Offenders may inject illicit capital into vessels, processing facilities, or gear, disguise cash payments to crew, or obscure transactions through shell corporations with opaque beneficial ownership structures.²¹ Trade-based money Laundering, invoice forgery, and tax evasion further exacerbate regulatory detection challenges.

India's position in the 2023 IUU Fishing Index, ranked fourth globally out of 153 states, demonstrates worsening vulnerability, with systemic risks stemming from weak coastal monitoring, flag state compliance gaps, and port-related enforcement limitations.²² The illicit proceeds derived from IUU often originate not from fishing itself but from auxiliary services, shipping agencies, unregistered vessels, and forged documentation.²³ Combating this nexus

16 Ministry of Environment & Forests, Coastal Regulation Zone Notification, 2011, S.O. 19(E) (Jan. 6, 2011)

17 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, Dec. 29, 1972, 1046 U.N.T.S. 120

18 Conference of the Parties to the Convention on Biological Diversity, Decision XII/23, 2–5, U.N. Doc. UNEP/CBD/COP/DEC/XII/23 (Oct. 17, 2014).

19 Convention on the Conservation of Migratory Species of Wild Animals, June 23, 1979, 1651 U.N.T.S. 333.

20 Sinay Maritime Data Solutions, *Noise Pollution: Impact on Marine Life* (Mar. 2022), <https://sinay.fr>

21 Rafqa Touma, *Hundreds of Whales Dead in Mass Stranding on Tasmania's West Coast*, THE GUARDIAN (Sept. 23, 2020), <https://www.theguardian.com>

22 Julian Dixon, *The Convergence of Financial Crime and Environmental Crime* (2021), <https://www.finextra.com>.

23 Poseidon Aquatic Resource Mgmt. Ltd., *The IUU Fishing Index 2023*, at 24 (2023).

requires integrating anti-money laundering frameworks into marine governance. Data-driven monitoring, including satellite technology and initiatives such as Global Fishing Watch, enables banks and regulators to trace beneficial ownership and disrupt financial flows associated with IUU fishing.

Given that nearly 90% of global trade is maritime, India must prioritize white shipping agreements and enhanced regional cooperation to safeguard its coastlines, particularly high-risk areas such as Gujarat, Maharashtra, Goa, Odisha, Andhra Pradesh, and Tamil Nadu.²⁴ Environmental audits, if strengthened with forensic financial scrutiny, could offer a novel tool: cross-verifying declared production, warehouse inventories, and tax returns against government records to expose laundering practices embedded within marine resource exploitation. This integrated legislative-financial framework represents the only sustainable path toward mitigating both ecological degradation and the laundering of its illicit profits.

Suggestions and Conclusions

The interplay between environmental crimes, particularly underwater noise pollution and IUU (illegal, unreported, and unregulated) fishing and the laundering of illicit proceeds necessitates a paradigm shift in regulatory thinking. Traditional environmental law mechanisms have mainly focused on deterrence through penal sanctions, whereas financial crimes are prosecuted under anti-money laundering regimes. However, the convergence of these domains underscores that fragmented regulation is insufficient to address technologically complex, financially sophisticated transboundary crimes.

First, algorithmic detection mechanisms should be designed not only to track anomalous financial transactions but also to correlate such transactions with environmental data points. For example, integrating transaction monitoring under the Prevention of Money Laundering Act, 2002, with satellite-based surveillance systems (such as Global Fishing Watch) would enable regulators to establish evidentiary linkages between suspected financial flows and IUU fishing vessels. Such convergence would strengthen both prosecutorial capacity and deterrence.

Second, institutional collaboration must extend beyond conventional memoranda of understanding between financial institutions and the state. Private actors engaged in maritime

²⁴ Andrew Arlotto, *How Banks Can Help Stop Illegal Fishing and Money Laundering*, WORLD ECON. F. (Aug. 15, 2022), <https://www.weforum.org>.

commerce should be bound by mandatory disclosure obligations under a “precautionary-polluter pays” framework, ensuring that ecological costs are internalised within financial accounting. This would resonate with the jurisprudence of the Indian Supreme Court, which has consistently expanded the scope of the public trust doctrine to include natural resources. Third, corporate responsibility must be reconceptualized. Mere compliance with Section 135 of the Companies Act, 2013, which prescribes CSR expenditure, is insufficient. Instead, corporations whose activities are maritime-intensive should be subjected to environmental audit mandates, with findings made publicly accessible. This transparency would both deter complicity in laundering proceeds from environmental crimes and promote ethical stewardship of marine ecosystems.

Fourth, international cooperation should be re-energised by operationalising obligations under the Convention on Biological Diversity and the Convention on Migratory Species. Presently, these treaties remain under-enforced due to weak domestic incorporation. National authorities must create enforceable pathways for treaty-based obligations to directly intersect with AML frameworks, thereby bridging the gap between environmental protection and financial regulation.

Finally, achieving the United Nations Sustainable Development Goals (SDGs) 12, 13, 14, and 15 requires embedding environmental crime into mainstream AML discourse. Doing so would allow states to treat IUU fishing, seabed exploitation, and underwater noise pollution not merely as ecological harms, but as predicates to financial crime. This reframing would enhance both normative clarity and legitimacy of enforcement, ensuring that marine ecosystems are preserved for intergenerational equity.

In conclusion, the nexus between underwater environmental crimes and money laundering should not be viewed as two parallel, but rather as two interrelated challenges. Instead, their fusion represents a novel legal frontier that calls for a harmonised regulatory design that merges environmental jurisprudence, financial regulation, and technological surveillance. Only through such an integrated framework can both ecological sustainability and financial integrity be realized.