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2/2/26
Fisheries Story 1

Lines in the Water: The Limits of Top-Down Regulation in Whale Conservation in the Gulf of Maine Fisheries

In the Gulf of Maine, hauling traps is not solely a job. It is an inherited practice, a language passed and upheld generationally. The lobster fishery, which generates over \$500 million annually and grounds coastal communities where alternatives are scarce, is as much a cultural institution as an economic one (Maine DMR 2024). Maine's fishing heritage stretches back centuries, long before statehood, to a time when the coast's identity and economy were singular, inseparable in the way that land and the people who work it become. It is precisely this depth and layering of tradition and livelihood across generations that makes the escalating conflict between commercial fishing and North Atlantic right whale conservation so consequential.

Fewer than 350 North Atlantic right whales remain, with fewer than 70 reproductive females, placing the species among the most critically endangered large mammals on Earth (NOAA Fisheries 2024). Entanglement in vertical buoy lines from lobster and crab gear is one of the leading causes of right whale injury and death, contributing to a population that has declined steadily over the past decade despite federal protections (Pace et al. 2021). The Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Magnuson-Stevens Fishery Conservation and Management Act each carry mandates that, read together, demand that this species be protected and that fisheries remain economically viable (NOAA Fisheries 2024). These are not abstract legislative conflicts. They exist out in real time on the water, both in the lives of people whose families have fished these grounds for four and five generations and for an entire species whose existence hinges on the decisions made of people coming into their own habitat, their home.

The regulatory response to this crisis has been aggressive and, in many quarters of the Maine coast, deeply resented. NOAA Fisheries has implemented seasonal area closures, gear modification requirements including weak links and reduced line diameters, increased monitoring technology, and an escalating push toward ropeless fishing technology, all designed to limit the vertical lines that whales can become ensnared in (NOAA Fisheries 2024). These measures carry real, necessary conservation logic. Research on right whale carcasses has documented the physical toll of entanglement: whales dragging hundreds of pounds of gear for months, their bodies scored by rope, before eventually drowning or starving (Moore et al. 2021). Each death in a population this small is not an ecological footnote, it is a generational loss.

Right whales are apex filter feeders whose foraging patterns cycle nutrients through the water column, supporting the same zooplankton and forage fish communities that underpin the Gulf of Maine's fisheries productivity (NOAA Fisheries 2024). Their disappearance would reverberate through an ecosystem that coastal food security, including Maine's own, depends on. With this said, the anthropocentric cost and benefit analysis of what whales are worth to us should not be the threshold for their right to exist. North Atlantic right whales are being killed specifically, measurably, and documented death by death by human industry. A species does not need to earn its survival by demonstrating utility to the people responsible for its extinction,

and the urgency of this by influence to the Gulf of Maine's entire ecosystem is not manufactured.

The manner in which these regulations have been designed and imposed reveals a fundamental misunderstanding of what it means to govern a commons embedded in community life. Ropeless gear, which deploys traps without a surface line, releasing them acoustically when a fisher is ready to haul, remains prohibitively expensive and still largely developmental, with per-unit costs that can run into the thousands of dollars (Sremba et al. 2022). Seasonal closures restructure not just fishing windows but the rhythms of coastal life that have organized these communities for generations. What the regulatory process has too often lacked is the recognition that fishermen are not simply stakeholders to be managed, but that they are knowledge holders whose daily, decades-long presence on the water constitutes a form of ecological literacy that no economic model fully captures.

Local knowledge has been long underutilized in conservation strategy and uptake by the public of these changes. Maine lobstermen know which areas whales use and when, which gear configurations snag and which do not, how current and weather patterns affect line behavior in specific stretches of water their families have worked for a century. They're the ones out on the water, the ones connecting to it, living through it. Maine's gear traceability initiative, a push to color-code rope by permit area so that entanglement events can be traced to specific fishing zones, emerged partly from fishermen's own interest in defending their practices from blanket blame (Maine DMR 2024). That initiative represents exactly the kind of collaborative, locally-informed approach that makes conservation more effective and more just simultaneously. Where whales are and when they are there, and whose gear is the proximate cause of entanglement, remains scientifically uncertain; entanglements are rarely observed in real time, and carcasses yield incomplete forensic data (Moore et al. 2021). Fishermen operating under regulations designed around this uncertainty bear the cost of that uncertainty disproportionately, and they know it. Asking communities to absorb that burden without genuine partnership in designing the rules is not conservation, it is extraction, and it makes conservation a fight instead of an adoption by these communities.

The domestic record offers an instructive comparison. On the West Coast, Dungeness crab fisheries have grappled with humpback and blue whale entanglements in ways that, while contentious, have produced models worth examining. California's risk assessment tool, developed collaboratively with industry, uses ocean conditions, prey distribution, and whale aggregation data to issue dynamic closures - targeted interventions rather than blanket prohibitions (Feist et al. 2021). The tool is imperfect, and fishermen have raised legitimate concerns about its economic impacts, but it reflects a fundamentally different philosophy: regulations built with fishermen's knowledge rather than imposed against their opposition. That philosophy has been largely absent in the Gulf of Maine context, where the adversarial dynamic between the industry and federal regulators has hardened to the point where even broadly supported conservation goals become flashpoints.

The science of entanglement risk is still catching up to the complexity of the problem. Right whales are highly mobile, their distributions shifting with prey availability in ways that are increasingly difficult to predict as the Gulf of Maine warms, faster than 99% of the global ocean,

and the zooplankton communities whales depend on reorganize accordingly (GMRI 2024). Static seasonal closures calibrated to historical whale presence may not track where whales actually are in a rapidly changing ocean. Dynamic management, updated in time series using survey data, acoustic monitoring, and oceanographic models, offers a more targeted alternative, but requires sustained federal investment in monitoring infrastructure (Pace et al. 2021). That investment has been inconsistent, and the burden of regulatory uncertainty has fallen on fishing communities rather than on the agencies charged with resolving it.

A species at 350 individuals is almost gone, and the law's conservation mandates are not optional. Policy that treats Maine's lobster fishery as an obstacle to conservation rather than a partner in it will not succeed. Not ecologically, and not politically. The knowledge embedded in generations of place-based fishing practice is a resource that whale conservation policy has largely failed to integrate, and that failure is both a justice problem and a practical one. What is needed is not simply better regulations but a different process for making them, one that brings fishermen, tribal nations, marine scientists, and conservation advocates into genuine co-design of management measures with lawyers and policymakers rather than in a comment period that follows decisions already made. It means funding gear technology development and cost-sharing programs that make ropeless fishing economically feasible at scale, investing in the dynamic monitoring infrastructure that could make closures more targeted and therefore more defensible, and recognizing that the long-term survival of both the right whale and the Maine lobster fishery depends on a relationship of genuine partnership across cultural, economic, and political levels. It requires understanding the full depth of what is at stake on both ends of the line.

References

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