

U.S. Restorative Aquaculture

Realizing Our Farmed Ocean Food Future

Together, we can realize a future where our ocean is healthier because of how we produce food, not despite it.



Policy Brief

Restorative seafood production from aquaculture needs optimism and intervention, 2025, ICES Journal of Marine Science. <https://doi.org/10.1093/icesjms/fsaf223>



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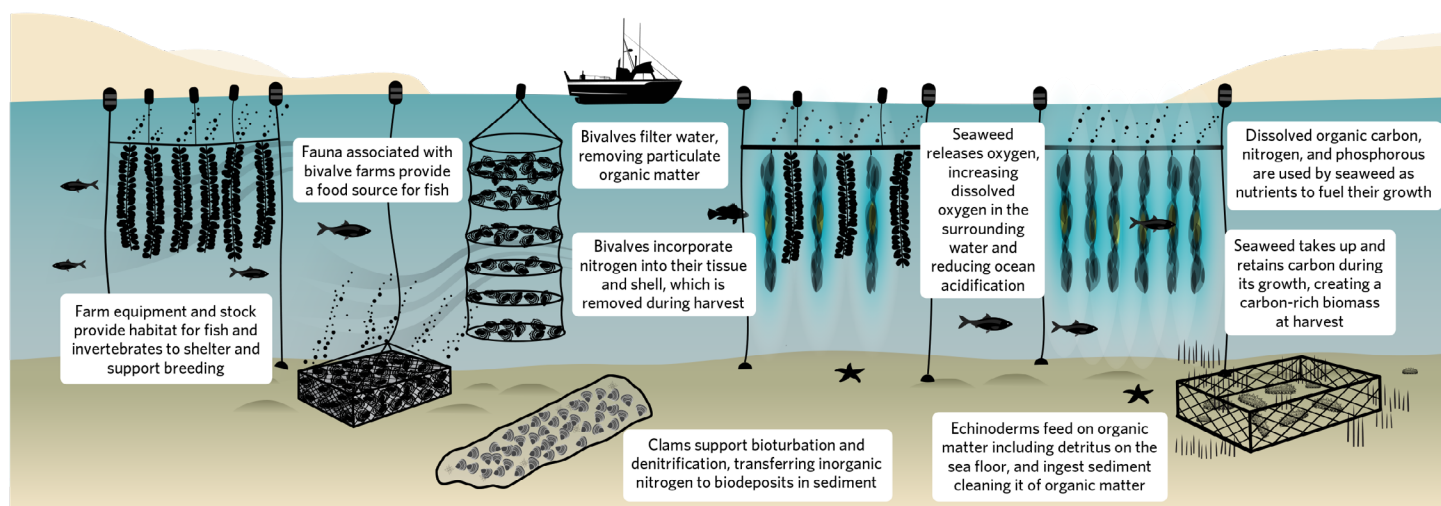
Introduction

Aquaculture represents one of the fastest-growing food production sectors globally. When practiced with nature in mind, it can deliver high-quality protein while also providing social and environmental benefits. The United States has the potential to be a world leader in sustainable seafood production through restorative aquaculture—farming methods that not only minimize environmental impacts but actively improve ocean health and community wellbeing, using practices that:

- Support resilient coastal economies.
- Filter and improve water clarity.
- Remove excess nutrients reducing the pressure of land-based runoff.
- Create habitat for wild marine species.
- Provide climate-friendly protein with minimal inputs.

Less than 10% of total domestic seafood production by weight in the United States currently comes from marine aquaculture.

There are marine aquaculture farms along the Atlantic, Gulf, and Pacific coasts (including Alaska and Hawai'i). Marine aquaculture's footprint is minimal—0.01% of the country's Exclusive Economic Zone—and the demand for sustainable seafood continues to climb.



The Path Forward:

A Vision for 2035

From 2024 to 2025, TNC, in collaboration with industry stakeholders and academic institutions, completed a scenario planning exercise to identify two future states of restorative aquaculture to 2035: a Probable/Business-As-Usual (BAU) and a Preferable-and-Plausible future.

Using multiple methods, including an online survey and regional workshops, this research revealed optimism across all stakeholder groups. **More than 84% of aquaculture businesses surveyed indicated a desire to expand in the next five years; 67% of aquaculture businesses said they would likely prioritize restorative practices when expanding.**

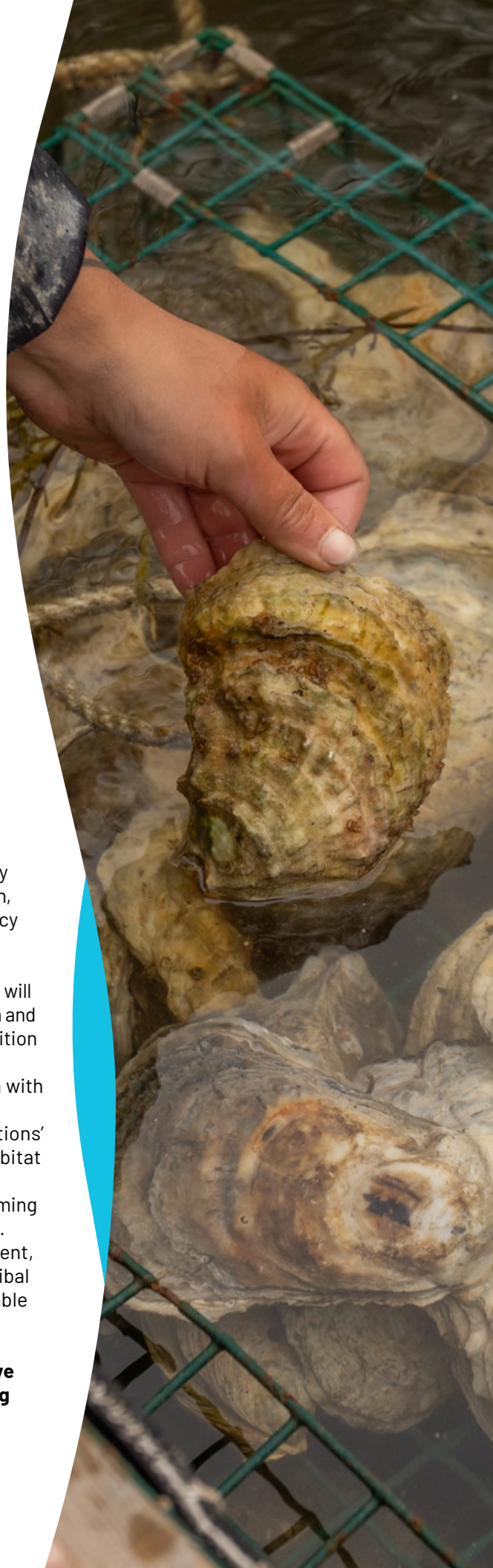
However, this research also identified significant constraints that would likely prevent the United States from realizing the full potential of restorative aquaculture, in particular:

- **Regulatory challenges:** 74% of industry respondents cited complex, costly, and time-consuming permitting processes as a significant constraint. Many farmers spend years and considerable resources navigating multiple agencies with overlapping jurisdictions.
- **Public perception:** 74% of respondents identified low social understanding and acceptance of aquaculture as a major barrier, often resulting in opposition to new farms despite potential environmental and social benefits.
- **Limited financial support:** Over half of industry respondents indicated that insufficient access to capital, grants, and investment is a limiting factor for expansion and adoption of restorative practices.
- **Ecosystem service recognition:** The environmental benefits provided by shellfish and seaweed farms—such as water filtration, habitat creation, and carbon cycling—lack formal recognition and compensation in policy frameworks.

Without addressing these barriers, restorative aquaculture in the United States will see only modest, uneven growth by 2035, with continued industry consolidation and limited environmental benefits. But with targeted interventions, we can transition from BAU to a preferred future where:

- **Streamlined, science-based regulations** enable responsible growth with reasonable timeframes and clear pathways for restorative projects.
- **Ecosystem service markets** compensate farmers for their operations' environmental benefits, including water quality improvements, habitat creation, and climate mitigation and adaptation.
- **Public-private partnerships** drive innovation in species selection, farming techniques, and monitoring tools to optimize environmental benefits.
- **Community support** grows through education, workforce development, and meaningful engagement with coastal stakeholders, including Tribal and Indigenous communities with traditional knowledge of sustainable ocean farming.

If implemented, these changes could substantially boost restorative aquaculture acreage, production, and benefits by 2035, while supporting thousands of sustainable jobs in coastal communities.

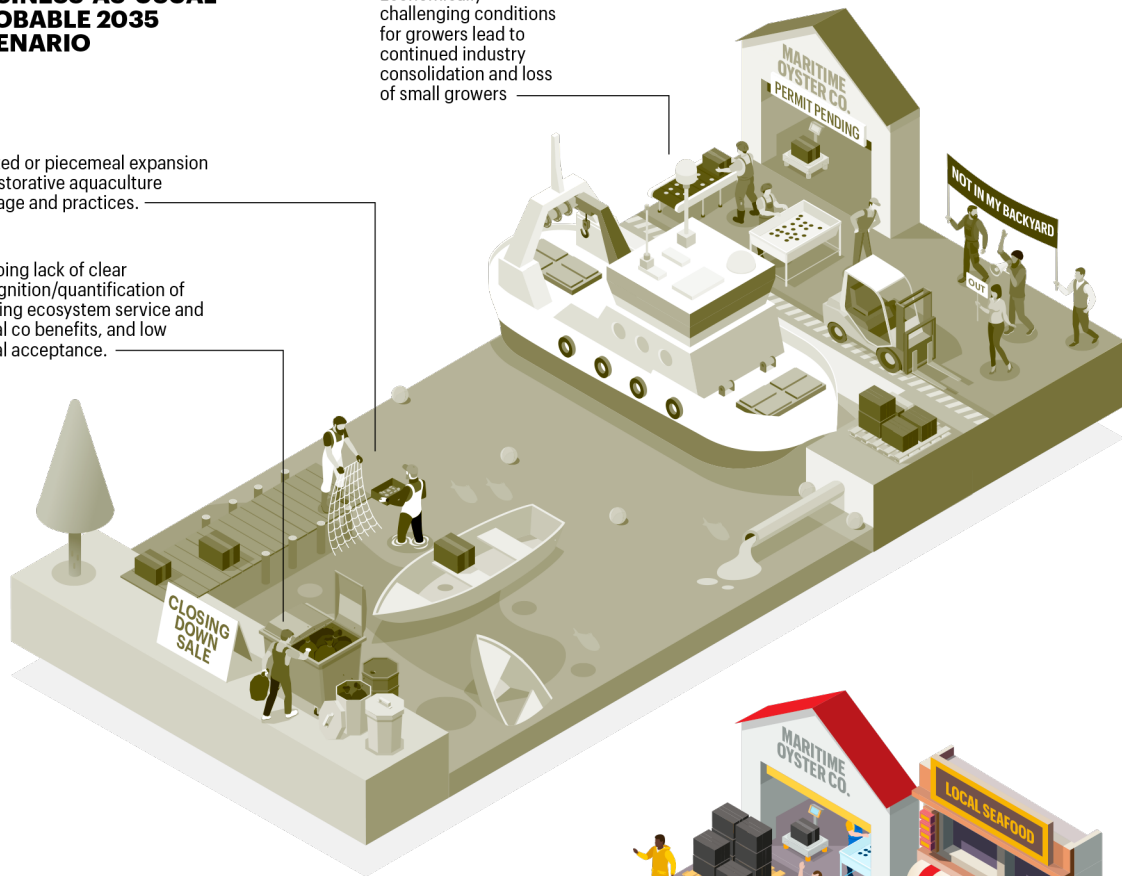


BUSINESS-AS-USUAL PROBABLE 2035 SCENARIO

Limited or piecemeal expansion of restorative aquaculture acreage and practices.

Ongoing lack of clear recognition/quantification of existing ecosystem service and social co benefits, and low social acceptance.

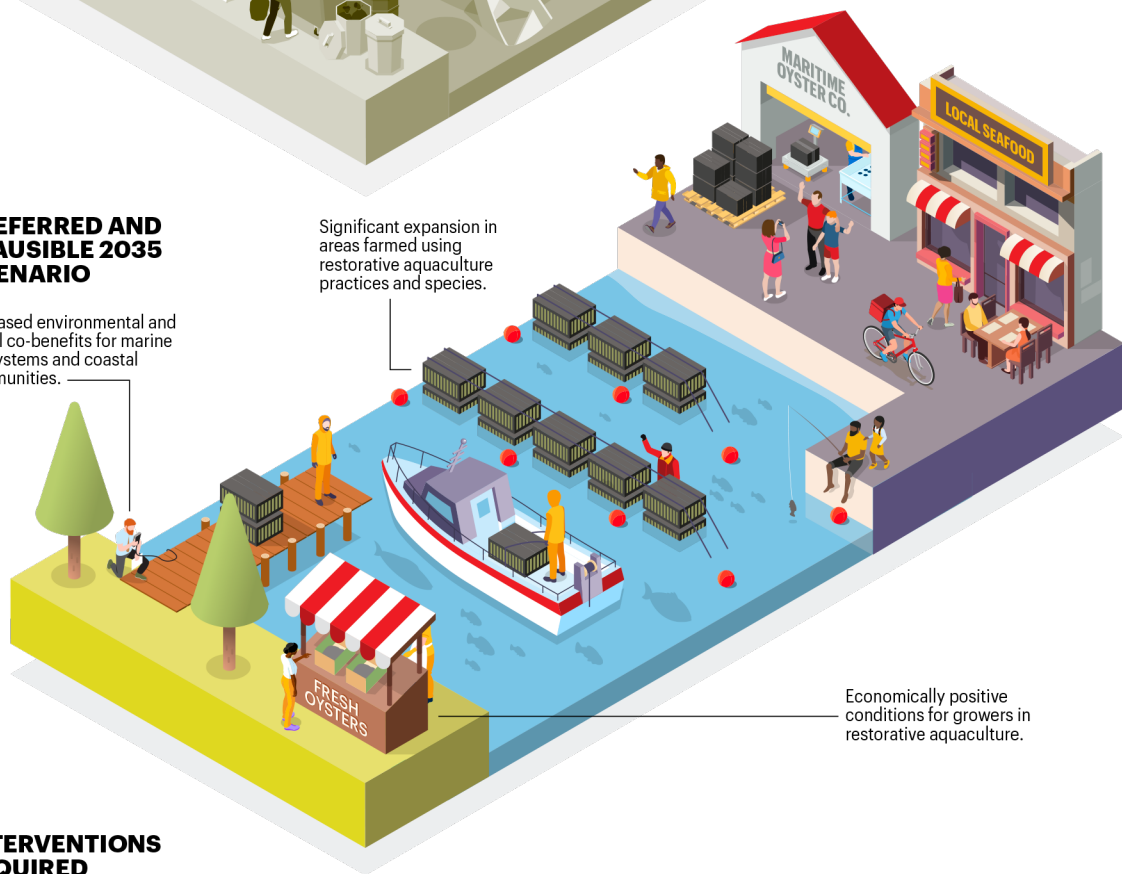
Economically challenging conditions for growers lead to continued industry consolidation and loss of small growers



PREFERRED AND PLAUSIBLE 2035 SCENARIO

Increased environmental and social co-benefits for marine ecosystems and coastal communities.

Significant expansion in areas farmed using restorative aquaculture practices and species.



Economically positive conditions for growers in restorative aquaculture.

INTERVENTIONS REQUIRED



Streamlined, affordable permitting and leasing processes commensurate with risk and appropriate safeguards



Continued grower innovation in species, practices, gear, partnerships, markets



Increased public-private funding for research and development, infrastructure, monitoring



Policy and market incentives such as nitrogen trading credits and ecosystem service payments



Robust science quantifying localized environmental benefits of restorative farms



Expanded consumer and community awareness, appreciation and demand for restorative products

Creating an Enabling Environment

With strategic investments and policy development, the United States can grow an ocean economy that:

- Creates resilient jobs in coastal communities.
- Actively improves ocean health and ecosystem services.
- Reduces America's seafood trade deficit and dependence on imports.
- Produces nutritious protein with minimal environmental impact.

Collaboration and support can help make this vision reality. Through targeted funding for pilot projects, regulatory reform initiatives, public education campaigns, and research, we can accelerate the growth of restorative aquaculture and position the United States as a global leader in sustainable seafood production.

This research confirmed that policy development is critical to growing the restorative aquaculture industry. Good policy can ensure effective regulation without being burdensome, accommodate social preferences for aquaculture and other marine activities, and encourage investment.

Policy options that state and federal governments and supporting organizations in the United States could consider include:

- Establishing and using a **clear definition** of restorative aquaculture in policy and regulations to set a benchmark for nature-positive aquaculture practices.
- **Identifying existing farms or models** that demonstrate restorative practices and support replication.
- Developing databases of **examples of ecosystem services** from aquaculture that can be used:
 - in impact assessments for new lease applications;
 - to answer community questions and concerns when they arise; or,
 - to build the capability of policy makers and supporting organizations to develop approaches that effectively measure ecological and social co-benefits.
- **Developing favorable policy conditions** for restorative farms, such as streamlined, science-based permit changes or lease terms.
- Undertaking **spatial planning processes** or better integrating aquaculture into broader marine spatial planning processes to support the development of restorative aquaculture in locations that will optimize the benefits it can provide, including co-locating aquaculture practices with other uses, such as energy generation.
- Pursuing supportive financing mechanisms such as grants and **ecosystem service crediting** approaches, establishing appropriate methodologies to compensate and encourage farmers.

In addition to these actions, discussions with aquaculture producers, decision makers, and other stakeholders in coastal states could provide further insights on policy barriers and opportunities, while additional engagement with Tribal communities and small-scale fishers/farmers experimenting with restorative practices could highlight Indigenous knowledge and local innovations to build upon.

**The time to invest in the United States' ocean economy is now.
Together, we can transform our coastal waters, growing the
sustainable prosperity that can feed our nation and heal our oceans.**

Acknowledgments

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