

# Roadmap to a thriving seaweed aquaculture industry in Washington State



# EXECUTIVE SUMMARY

## Background And Purpose

This report was led and coordinated by Washington Maritime Blue (Maritime Blue). Maritime Blue is a strategic alliance propelling the Pacific Northwest toward global leadership in sustainable maritime industries and ocean-based innovation by fostering collaboration among industry, government, academia, communities, and investors.

In late 2024, Maritime Blue received an 18-month planning grant from Builders Vision to support the collaborative advancement of Washington's emerging seaweed industry, supporting the four permitted growers

in the state as they sought to determine optimal approaches for market development, shared infrastructure, and industry growth. This Roadmap captures and organizes the outcomes of extensive facilitated discussions with these seaweed farmers (who represent all active, formerly active, and permitted seaweed farms in Washington state), as well as from a suite of supporting analyses and direct interviews with a diversity of seaweed industry stakeholders in the state and across the region. Case study discussions of one Washington seaweed farm and one Washington-based seaweed processing operation are presented to illustrate key challenges and opportunities.



Harvesting sugar kelp for Blue Dot Sea Farms in the northern part of the Hood Canal.

Photo c/o Jon Kroman / Blue Dot Sea Farms

Cover collage photos by Hailey Hoffman / Cascadia Daily News and Edmund Lowe

The report is structured in three primary sections:

1. A discussion of the **current state of the seaweed industry** in Washington state, including an articulation of **key challenges, barriers and knowledge gaps** that must be addressed.
2. A set of clear recommendations to progress concurrently along **two key pathways for overcoming these obstacles** and enabling the industry to reach its full potential, with detailed case studies for illustration.
3. A **conclusion and distillation of priority next steps** for immediate action by farmers, policy makers, support agencies, academic institutions, and investors seeking to support the industry's advancement.

Taken together, this Roadmap articulates a comprehensive blueprint for the development of Washington's regenerative seaweed industry and its role in the broader region. Washington has the opportunity to play a leading role in West Coast seaweed industry growth by expanding market access and supporting secondary processing needs that anchor both

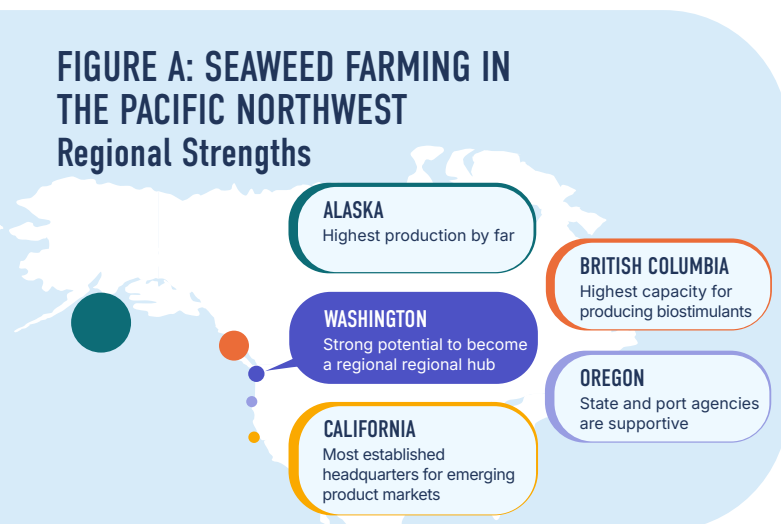
local and regional supply chains. Realizing that potential will also create more opportunities for current and future Washington-based seaweed farmers, allowing them to succeed while remaining small-scale, sustainable, community-rooted operations.

## Context and Need

Washington state currently has two active seaweed farms: **Blue Dot Sea Farms**, a 5 acre seaweed and shellfish farm located in the northern part of the Hood Canal, and **Lummi Island SeaGreens**, a 10 acre seaweed farm located off the coast of Lummi Island, on the eastern edge of the San Juan island archipelago. Washington's seaweed farming industry has developed more slowly than its neighbors to the north, with Alaska leading that growth over the past decade, driven largely by public funding investments in production and support. The industry in British Columbia is in a phase of expansion, and is anchored by a few key players – most notably Cascadia Seaweed – and a growing number of First Nations partnerships. To the south of Washington, interest in seaweed farming and related industry has also been growing in Oregon and California, but geographical and regulatory constraints have prevented significant growth in production in either of those states.

Washington benefits from a robust marine environment, well-developed transportation networks, diverse logistics capabilities, and established processing facilities for traditional seafood and agricultural foods. These systems provide a strong foundation crucial for the growth, distribution and commercialization of seaweed products. However, seaweed aquaculture industry growth has been stalled

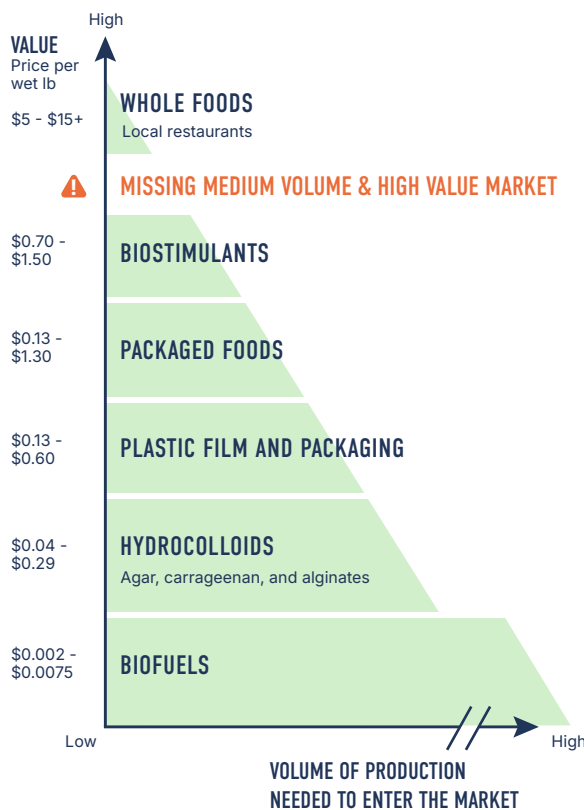
**FIGURE A: SEAWEED FARMING IN THE PACIFIC NORTHWEST**  
Regional Strengths



across the U.S., and in particular along Pacific West Coast, by the interplay of two critical logistical challenges:

- A lack of strong market demand disincentivizes growth in production, but current production volumes are insufficient to catalyze market growth (**the “chicken and the egg” challenge**), and
- Insufficient processing capacity hinders growth in both markets and production, but investment in expanded processing capacity before industry scale demands it carries significant risk (**the “cart before the horse” challenge**).

**FIGURE B: PRIMARY SEAWEED MARKETS BY RELATIVE VOLUMES REQUIRED AND VALUES RETURNED TO FARMERS**



Specific barriers driving these two challenges include regulatory and spatial complexity that create high hurdles for entry; hatchery and production challenges that lead to uncertainty, instability in production, and crop failures; limited production scales that offer minimal protection against harvest variability; lack of access to established and developing markets that require higher volumes and lower price points than small farms can currently sustain; gaps in processing technology and appropriate co-packing agreements that further limit market access; and high uncertainty in return on investment that make private capital scarce.

In addition, a suite of **fundamental knowledge gaps** – in particular, around how kelp farms will interact with local species and environments and how they will interact with climate change-driven system changes – are preventing progress on all of the system challenges, creating regulatory hurdles, undermining social license, and stalling investment.

### Pathways & Recommendations to a Thriving Industry

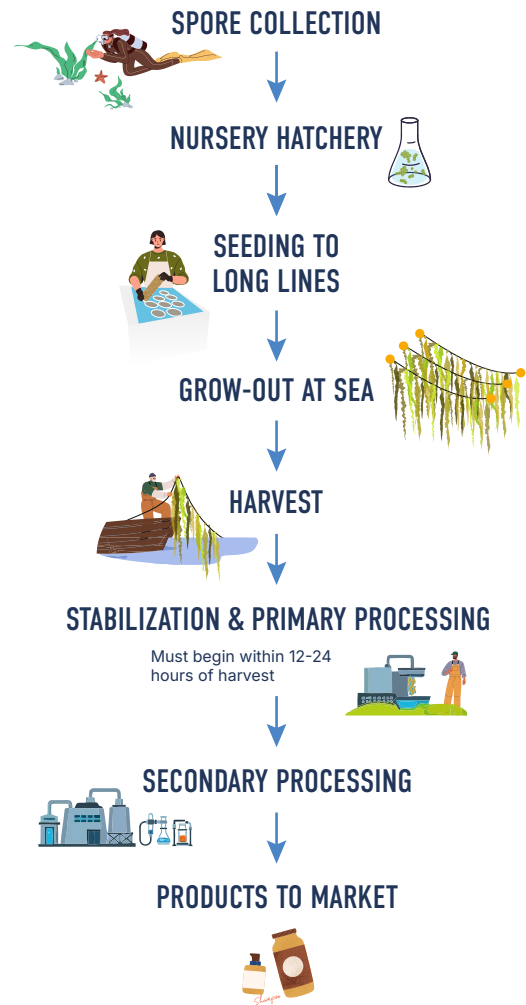
In order to achieve the goal of a thriving seaweed farming industry in Washington state and overcome these interconnected challenges, it will be necessary to **advance down two key pathways simultaneously**. These two pathways will interact with and support each other, but they require different actions and partnerships:

**Pathway 1: Supporting the economic viability of small-scale seaweed farms in Washington Waters.** Realizing a “bottom-up” industry requires addressing the high barriers to entry and viability for local producers. This

pathway focuses on stabilizing the economic foundation of farms within Washington’s waters by reducing capital expenditures through shared processing equipment, catalyzing the development of right-size markets and diversifying product streams, and reducing uncertainties driving permitting and licensing barriers. Advancing along this pathway ensures that the industry remains rooted in local communities and provides direct ecological benefits – such as nutrient removal and habitat restoration – within the Puget Sound and coastal estuaries. Success will require:

- **Expanding “right-sized” markets** through catalyzation of innovation and **supporting vertical integration and low-risk product diversification** for economic viability at small scales of production;
- **Addressing the processing bottleneck in the near term through strategic shared-use and co-packing agreements** that capitalize on existing processing capacity and infrastructure in other sectors while **moving towards a shared, modular processing hub** as production and market expansion dictate;
- **Addressing seed failures and nursery challenges** through dedicated efforts to expand skilled spore collection and nursery capacity in the state;
- **Identifying additional entities to collaborate** on processing, marketing, and innovation, potentially including seaweed farmers in southern B.C. or shellfish growers seeking to valorize nuisance *Ulva* or to expand into the sub-tidal zone;

**FIGURE C: SEAWEED FARMING LIFECYCLE**



- **Building an expanded network of industry advocates** across sectors and **launching a coordinated regional research initiative** to advance critical research, in particular exploring the potential for kelp farming to support or augment kelp restoration efforts and increase system-wide climate resilience.

**Pathway 2: Supporting development and expansion of Washington’s role in the regional seaweed farming industry.** While local production will remain small-scale, Washington is uniquely positioned to serve as the critical secondary processing and distribution hub for the entire West Coast. By leveraging Washington’s established maritime infrastructure, transportation networks, and food-processing density, and supporting equitable benefit sharing and region-wide collaboration through the formation of a West Coast Coalition, this pathway ensures Washington can capture significant economic value, while providing synergistic support to neighboring regions like Alaska and British Columbia. Success entails:

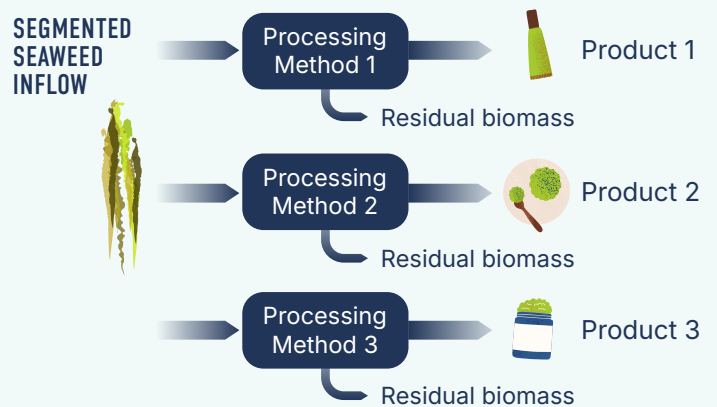
- **Creating and funding a non-regulatory West Coast Seaweed Industry Coalition** to cultivate relationships and identify opportunities for synergy and collective action across the region.
- **Implementing a phased approach to develop Washington’s capacity to act as a regional secondary processing hub,** with emphasis on **high-value, medium-volume product streams** that complement other developments across the region.
- **Investing in modular and/or cascading processing technologies** that allow for the segmented or sequential production of multiple product formats and extraction of multiple compounds to maximize value and minimize waste.
- **Improving the “Alaska-Washington kelp pipeline”** through development of aggregation hubs, expansion of low-cost

pathways for transportation of stabilized kelp from rural areas, and exploration of opportunities for regulatory streamlining.

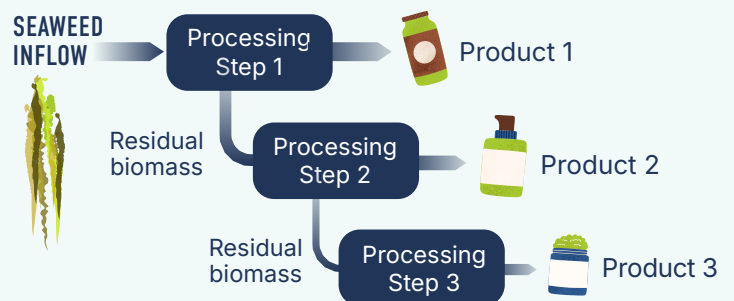
- **Developing and implementing participatory ownership models** (such as federated cooperatives) to ensure that industry benefits flow equitably across the region.
- **Creating a blended finance mechanism,** where a mix of public, philanthropic, and private funding are used to establish revolving loan funds that de-risk early-stage investments for growers and processors.

**FIGURE D: MODULAR VS. CASCADING PROCESSING STRATEGIES**

**Modular Processing**



**Cascading Processing**



# WASHINGTON SEAWEED FARMING INDUSTRY ROADMAP

## Figure E: Two Interdependent Pathways to a Thriving Seaweed Industry

### THE INTERCONNECTED CHALLENGES IN THE SEAWEED INDUSTRY

⚠️ **MARKETS ↔ PRODUCTION (CHICKEN OR THE EGG)**

⚠️ **PROCESSING ↔ PRODUCTION (CART BEFORE THE HORSE)**

⚠️ **PRIORITY KNOWLEDGE GAPS**

#### PATHWAY 1

### Support Small-Scale Viability for Washington Farms

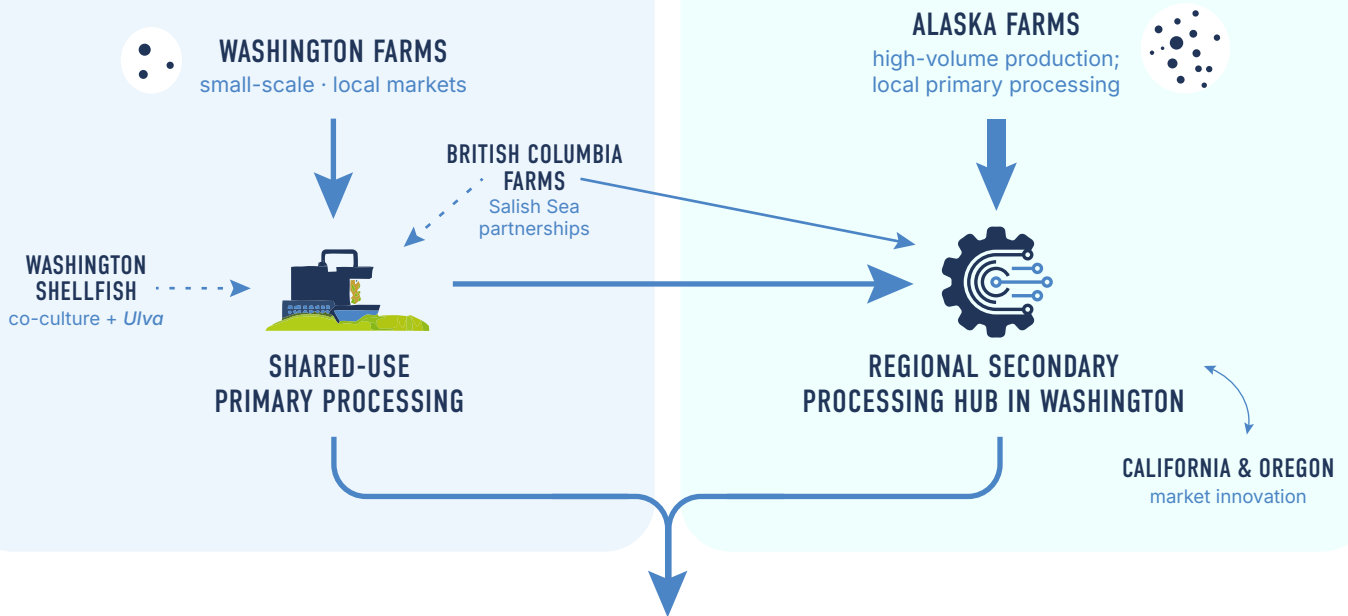
- Expand right-sized, high-value markets
- Address seed failures & nursery gaps
- Build shared-use agreements to address the processing bottleneck
- Explore collaborations and partnerships across sectors and regions
- Launch coordinated research initiative to address uncertainties driving regulatory hurdles

#### PATHWAY 2

### Establish Washington as Regional Processing Hub

- Build a West Coast Seaweed Industry Coalition
- Invest in shared, regional secondary processing capacity
- Advance modular or cascading processing platforms to preserve market flexibility
- Optimize Alaska–Washington kelp pipeline
- Ensure equitable ownership and benefit-sharing

### REGIONAL SEAWEED INDUSTRY FROM PRODUCTION THROUGH PROCESSING VIA THE TWO PATHWAYS



### A THRIVING, EQUITABLE, REGENERATIVE SEAWEED ECONOMY

**ECONOMIC VIABILITY**  
JOBS · REVENUE · TAX BASE

**ECOLOGICAL HEALTH**  
HABITAT · WATER QUALITY · RESILIENCE

**SOCIAL EQUITY**  
SMALL-SCALE FARMS · LOCAL BENEFITS

**REGIONAL COLLABORATION**  
WEST COAST COALITION · INNOVATION

By collectively advancing these two pathways concurrently, Washington’s seaweed industry has the potential to evolve from its nascent stage into a cornerstone of the Pacific Northwest’s blue economy. With the confluence of a profound cultural heritage tied to the coast, a large base of environmentally-aware consumers, and an experienced workforce in the seafood and agricultural processing sectors, **Washington seaweed farms could reverse broader industry trends and serve as a “bright spot” case study for successful small-scale seaweed farming with global relevance.** Additionally, the state possesses a unique combination of established port infrastructure, a skilled maritime workforce, and strategic geographic positioning with respect to both shipping and ground transportation lines that allows it to serve as a high-value anchor for the entire West Coast industry. **Washington can leverage these assets to become a regional hub for secondary processing, distribution, and innovation of seaweed products.** Achieving this vision will generate meaningful economic opportunities, provide sustainable food and material resources, and significantly bolster the health and resilience of our marine ecosystems.

While navigating the sector’s current regulatory, logistical, and market hurdles requires persistent effort, this Roadmap



Kelp harvest for Lummi Island SeaGreens.  
Photo by Mike Spranger of Lummi Island SeaGreens

provides the strategic blueprint necessary to move from planning to implementation. By fostering collaboration across the West Coast, prioritizing equitable benefit-sharing, and investing in both the viability of our local growers and the state’s regional processing infrastructure, Washington can transform its seaweed sector into a globally competitive model of regenerative ocean innovation.

Download the full report [here](#).