

**National Alignment of
Mariculture Seaweed Organic Certification Guidelines**

Final
Draft Best Practices for Organic Certification of Farmed Seaweed
Including
Response to Public Comments

October 31, 2025

Introduction

Due to a lack of specific aquaculture standards for organic certification, the USDA National Organic Program (NOP) currently applies standards developed for land-based agriculture to certify seaweed farms. The differences between soil and ocean-based farming presents challenges to application of the rule. The [USDA Transition to Organic Partnership Program \(TOPP\)](#) initiated the National Review and Alignment of Farmed Seaweed Organic Certification Guidelines (National Review) in January 2024 to develop Best Practices to be employed by entities certifying seaweed farms across US geographies under the NOP.

A [Certification Workgroup](#) with input and collaboration from [marine science](#) and [mariculture](#) experts led the development of these Draft Best Practices, which are intended to operate within the existing regulatory framework for certification of marine crops in natural bodies of water, excluding freshwater or non-nursery tank culture. The goal of the National Review process was to draft Best Practices that align with the Organic Foods Production Act (OFPA), interpret standards in a manner consistent with how they are applied in terrestrial agriculture, and to ensure this interpretation can be uniformly applied by certifiers and operations in different growing areas while being flexible enough for site-specific variations.

The Certification Workgroup first released the following Draft Best Practices on August 1, 2025 and solicited public review through September 15, 2025. The accompanying Public Review Response letter (see p. 6) provides detailed responses to all comments received and details immediate next steps in the development of the Draft Best Practices.

Draft Best Practices - as released on August 1, 2025

205.2 Definitions

- *Algal Planting Stock (or microscopic/germling or cutting).* Pre-juvenile and juvenile macroalgal propagules produced in a nursery intended for further ocean grow-out to harvest.
- *Commercially available.* The ability to obtain a production input in an appropriate form, quality, or quantity to fulfill an essential function in a system of organic production or handling, as determined by the certifying agent in the course of reviewing the organic plan.

- *Brown Seaweed Gametophytes*. Microscopic haploid stages in species belonging to Laminariales (colloquially referred to as “kelp” but may apply to other algal species).
- *Brown Seaweed Sporophytes*. The commercially available stage of the kelp (or other algal species) life history, diploid, and macroscopic. The sporophyte germinates from the fertilized egg (zygote) that is retained on the microscopic female gametophyte.
- *Red Seaweed Gametophytes*. Red seaweed gametophytes, carposporophytes, or tetrasporophytes are the commercially harvested life stages of red seaweeds. May be either diploid or haploid.
- *Red Seaweed Sporophytes*. A group of principally photosynthetic organisms with Chlorophyll a and an accessory red pigment called phycoerythrin. Red seaweed carpospores, tetraspores, or conchospores are microscopic haploid stages in species belonging to Rhodophyta (species include but not limited to dulse, Irish moss, and laver or nori). Conchospores are an alternate reproductive stage of laver and nori species, produced from specialized conchocelis that grow in shells (typically scallop shells).
- *Green Seaweed Gametophytes*. Green seaweed gametophytes release zoospores, free-swimming sperm or eggs, that fuse to form diploid zygotes, which then develop into diploid sporophytes.
- *Green Seaweed Sporophytes*. One of a group or division of aquatic plants with an abundance of chlorophylls a and b; early members of its lineage may have given rise to the bryophytes and vascular plants. Sporophytes release haploid zoospores that develop into haploid gametophytes.
- *Marine Crop*. Any plant, algae, or part of a plant or alga produced in an aquatic (non-terrestrial) growing area located in a naturally occurring marine body of water intended to be marketed as an agricultural product or fed to livestock. An organic marine crop producer is exempt from the requirements of 205.205 (Crop Rotation Standard).
- *Mariculture Vegetable Crop*. Refers to the entire life history of a marine macroalga, or any part of a species of marine macroalgae, intended to be marketed as an agricultural product, fed to humans or livestock, or used in terrestrial cropping systems to manage nutrients and soil fertility. Colloquially referred to as “seaweed.”
- *Point and Nonpoint Sources of Contamination*. As defined by the EPA under the Clean Water Act.
<https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution>
- *Propagule*. A spore or zygote. For our purposes, propagules **are analogous to seeds**. Propagules germinate into germlings, which are initially microscopic. Generally referred to as the biological material used to grow the crop in “cultivated” situations.
- *Reproductive Tissue*. The tissue where kelp spores or other algal species’ propagules are produced, which are then released to initiate the next generation of algal plants.

The definitions above may be more or less applicable depending on the specific scenarios being reviewed for compliance by the certifier. This is not meant to be an exhaustive list of definitions, rather to be sufficient to support organic integrity and verification of compliance. For example, in the laver or nori or gim group (including the genera: Porphyra/Pyropia/Wildemania, etc.) the conchocelis goes through multiple stages before the conchosporangial filaments release their haploid conchospores. The conchocelis can be propagated in mass, either freely or in shells.

205.200 Interpretation

Proposed:

Marine crop production must occur at a scale and intensity appropriate to maintain or improve the natural resources of the operation, including seafloor and water quality, by:

- a. Ensuring production does not exceed the maximum quantity of algae which can be supported without negatively affecting the integrity of the proximate aquatic environment.
- b. Marine crop production may only use nutrients naturally occurring in the approved aquatic growing area, except:
 - i. in nursery facilities consistent with the germling and cutting restrictions below.
- c. Ropes, lines, and other equipment used in the aquatic environment in direct contact with organic marine crops must not be treated with synthetic fungicides, preservatives, antifouling agents, sanitizers, or disinfectants except those allowed in the National List. Synthetic lines must not be allowed to degrade or otherwise contaminate the marine environment.

205.202 Interpretation

Proposed:

Organic marine crops must be produced in delineated aquatic growing areas of high ecological quality. Production areas must not be located near known sources of contamination by plant nutrients, heavy metals, pathogenic organisms, or prohibited substances. The minimum separation distance between organic and non-organic production shall be based on the natural situation, distances, tidal flow, and the upstream and downstream location of the organic production unit.

1. An applicant for certification of organic marine crops must demonstrate their growing area is situated at a sufficient distance from point and nonpoint sources of contamination to prevent the possibility of contamination of organic marine crops beyond baseline unavoidable residual environmental levels.
2. An application for organic certification of marine crops must include a map of the growing area and adjacent marine and land areas that includes the boundaries of the delineated growing area and identification of prevailing currents, prevailing winds, and any potential source of point and nonpoint contamination including but not limited to overboard and sewage discharge areas, wastewater treatment facilities, small and major harbors, boat building facilities, drilling sites,

Concentrated Animal Feeding Operation (CAFOS), nuclear facilities, thoroughfares, and other clear hazards (including but not limited to dredging and/or dredging spoils) within 3 miles of the growing area.

3. An application for organic certification of marine crops must include a plan for managing potential sources of contamination identified above, which may include:
 - a. A buffer of no less than 1000' from any identified point and nonpoint source pollutants OR
 - b. A buffer of appropriate size to prevent contamination of organic marine crops given:
 - i. Situating of growing areas up-current and/or up-wind from any identified point and nonpoint source of pollutants such that prevailing currents and/or winds mitigate drift of contaminants AND
 - ii. A method or methods agreed upon by the operation and the certifying agent for establishing the risk presented to organic marine crop production by potential sources of contamination identified above such that an alternate size marine buffer is sufficient to prevent contamination.

205.204 Interpretation

Proposed:

The producer of an organic marine crop operation must use organically produced germlings or cuttings: *Except, That*

- a. Nonorganically produced germlings/cuttings that have been treated with a nonsynthetic or synthetic substance included on the National List (*restricted to 205.601*) may be used to produce an organic marine crop when an equivalent organically produced variety is not commercially available.
- b. Nonorganically produced germlings that have been treated with a substance not included on the National List may be used to produce an organic marine crop when an equivalent nonorganic variety treated with a nonsynthetic or synthetic substance included on the National List is not commercially available: *Provided*,
 - i. Applications of synthetic substances not on the National List are limited, and must not be used once the crop species/organism germinates (analogous to seed germination in terrestrial crop settings). Algal planting stock must be transferred to pure seawater or an approved growth medium. Documentation is critical to determining compliance by the certifier.
 - ii. Reproductive tissue used for producing nonorganic germlings may be sourced from wild parent stocks.

205.206 Interpretation

Crop pest, weed and disease management standard – The producer must use management practices to prevent epiphytes, diseases, and nonindigenous (“invasive”) algae and invertebrates. Management practices include cultural, mechanical and physical controls. If management practices fail, substances on the National List NOP 205.601 may be used. Bio-fouling shall be removed by mechanical means and disposed of appropriately or, if necessary, by substances allowed under NOP 205.601 or 205.605.

205.206(f) and [NOP Handbook document 5036](#) reference treated lumber usage. In a sea vegetable environment, these restrictions apply. In a marine environment, appropriate measures must be in place to minimize the potential for leaching. No floats, docks, or pilings that contain pressure treated wood can be within the production area.

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Introduction

The USDA National Organic Program (NOP) standards were originally developed for land-based agriculture, with no specific provisions for aquaculture operations. Since 2011-2012, when the NOP first indicated to certifiers that Kelp used in livestock feed must be organic, certifiers have been interpreting and applying terrestrial crop standards to marine environments without formal guidance. This application of land-based regulations to ocean farming presents unique challenges due to fundamental differences between soil and marine production systems.

The National Review and Alignment of Farmed Seaweed Organic Certification Guidelines was initiated in January 2024 under the Transition to Organic Partnership Program (TOPP) as a response to this long-standing need for consistency and clarity within the certification community. This effort aims to develop Best Practices for certifying cultivated seaweed farms (aka mariculture operations) under the existing NOP framework, providing the direction that certifiers have been seeking for over a decade.

The [Draft Best Practices](#) were released for public review and comment on August 1, 2025 through September 15, 2025. This document provides responses to the comments received.

Scope and Authority

It is critical to understand that this document presents Best Practices, not new regulations. This initiative does not constitute rulemaking, nor does it attempt to circumvent established regulatory processes. Rather, it represents a collaborative effort within the certification community to document current practices by certifiers and provide consistency in applying existing NOP standards to marine environments. These Best Practices operate within the existing regulatory framework, interpreting standards in a manner consistent with how they are applied in terrestrial agriculture and ensuring this interpretation can be uniformly applied by certifiers and operations in different growing areas.

The development of these Best Practices follows established NOP directives and policy interpretations, including:

- [PM 12-1 \(2012\)](#) - Policy memorandum on marine algae
- [NOP 5027 \(2013\)](#) - "The Use of Kelp in Organic Livestock Feed," which established that all kelp used in organic livestock feed must be certified organic

- [NOP 5036 \(Draft\)](#) - "Pressure Treated Wood Guidance," addressing contact between prohibited materials and organic production

These Best Practices acknowledge the existing NOP regulatory processes, including the National Organic Standards Board (NOSB) review process, sunset provisions for materials on the National List, and the formal petition process for adding new materials. Producers seeking to request rulemaking changes, including adding materials such as germanium dioxide or F/2 medium to the National List, should follow the established petition procedures outlined on the [USDA NOP website](#).

Development Process and Legitimacy

This effort is supported by the USDA Transition to Organic Partnership Program (TOPP), which falls under the USDA Organic Transition Initiative and is administered by the USDA Agricultural Marketing Service (AMS) National Organic Program (NOP). A Certification Workgroup composed of organic certifying bodies currently involved in seaweed certification leads the process, with input from a Marine Science Advisory Group and a Mariculture Industry Advisory Group.

This work represents pre-competitive collaboration aimed at developing consistency and sharing information to support market development, activities that are both appropriate and beneficial for the organic sector. The project conducts deep analysis of organic kelp certification, identifies areas of potential inconsistency, and recommends paths forward to support both the organic kelp market and certifiers in consistently verifying compliance and upholding organic integrity.

Importantly, this process does not place certification decisions in arbitrary assessment of certifiers, but rather ensures such decisions are made within a congruent framework across certifiers. USDA maintains significant oversight through accreditation and certifier audits, compliance monitoring, and determining certifier capacity to operate in specific areas. These oversight mechanisms remain unchanged by this work.

Continuous Improvement and Next Steps

These Best Practices recognize the emerging nature of organically certified cultivated marine crops and embodies the principle of continuous improvement that characterizes the NOP system itself. They are not intended to solve every potential issue but rather to provide a foundation for consistent application of existing standards while identifying areas that may benefit from future regulatory development.

The immediate next steps include:

- Formation of an Accredited Certifiers Association (ACA) working group
- Submission of Draft Best Practices to the NOP by the end of 2025

- Continued refinement based on practical application, scientific data, challenges to organic integrity of marine crops, and stakeholder feedback

This document focuses specifically on marine (ocean water) crops grown in natural bodies of water, excluding freshwater crops and non-nursery tank culture systems. The guidelines aim to ensure consistency with the Organic Foods Production Act (OFPA) and the USDA NOP while maintaining the flexibility necessary to accommodate site-specific variations in marine environments.

Comprehensive Response to Public Comments

Based on the public comments received and working group discussions, we provide the following detailed responses organized by theme:

Materials and Equipment Concerns

- **Synthetic Rope Degradation** The concern about rope degradation is understood and aligns with how synthetic materials are treated in terrestrial organic production. The language "must not be allowed to degrade" establishes a benchmark, not an absolute prohibition. Just as plastic mulch and row covers are permitted in terrestrial organic farming with the expectation of responsible management, synthetic ropes are acceptable when properly maintained. Certifiers will evaluate this similarly to how they assess plastic tools and materials on land, looking for egregious neglect rather than normal wear. Visibly fraying rope that releases significant plastic fibers would warrant citation, while normal weathering would not. This approach maintains consistency with NOP §205.206 requirements for removing plastic mulch unless there's risk of soil erosion.
- **Treated Lumber and Other Potential Sources of Contamination** The prohibition on pressure-treated wood within production areas aligns with NOP §205.206(f) and NOP Handbook document 5036, which states that treated lumber must not contact soil, crops, or livestock. The working group acknowledges concerns about additional potential contamination sources including lead weights, paint, and diesel engine exhaust from vessels. These contamination sources parallel terrestrial organic farming, where, for example, diesel tractors work directly over crops and painted equipment is routinely used without compromising certification. The working group will refer concerns about lead weights to the ACA working group for further consideration, examining analogous situations like paint on tractors and barn structures. Per §205.201, certifiers evaluate contamination based on actual risk to organic integrity, not simply the presence of materials in the production system. This ensures marine organic producers operate under equivalent standards to terrestrial operations while recognizing practical necessities of food production in both environments.
- **F/2 Medium and Germanium Dioxide** The Best Practices acknowledge industry reliance on these materials in nursery operations. However, adding materials to the National List requires following the formal NOSB petition process outlined at §205.607. The current provision in §205.204(b) allows use of nonorganically produced germplings treated with prohibited substances, provided applications cease once germination occurs

and stock is transferred to pure seawater. This mirrors the terrestrial planting stock requirements. Producers seeking permanent approval for F/2 and GeO2 should petition the NOSB, understanding this is a multi-year process involving technical review, public comment, and USDA rulemaking.

Buffer Zones and Contamination Management

- **Buffer Distance Flexibility** The 1000-foot buffer represents a default minimum that certifiers may adjust based on site-specific risk assessment, consistent with §205.202 requirements. The provision for alternative buffer sizes (§205.202(3)(b)) explicitly allows certifiers to consider prevailing currents, winds, and other mitigating factors. This mirrors terrestrial practices where buffer zones vary based on topography, wind patterns, and contamination risks. Certifiers routinely make such determinations for land-based operations near conventional farms, roads, and industrial facilities.
- **Three-Mile Mapping Requirement** While mapping may seem burdensome, it parallels requirements for terrestrial operations to document adjacent land use and contamination risks. Many digital tools now make this more accessible. Certifiers retain discretion to modify this requirement in low risk situations. The goal is risk identification, not paperwork for its own sake. The ACA working group will further discuss appropriate scaling of this requirement.
- **Dynamic Environmental Conditions** Comments about shifting winds, tides and variable proximity to sea floor are valid. The term "prevailing" indicates dominant patterns, not exclusive conditions. Certifiers understand marine environments are dynamic and will evaluate contamination risk holistically, not based on single factors. This aligns with how terrestrial certifiers consider seasonal wind patterns, storm events, and irrigation practices rather than assuming static conditions.

Definitions and Terminology Clarifications

Technical Definitions

- "Pure seawater" means natural seawater without synthetic additives, consistent with organic principles of using natural inputs
- "Marine crop" explicitly excludes shellfish by limiting definition to "plants and algae," preventing misinterpretation
- Red seaweed lifecycle terminology will be reviewed with science advisors to ensure accuracy while maintaining practical applicability for certification
- "Limited applications" in §205.204(b)(i) means restricted to the minimum necessary during early propagation stages, ceasing at germination

The definitions section acknowledges that certifiers are not expected to identify specific algal life stages for compliance purposes. The goal is practical verification of organic integrity, not marine biology expertise.

Certification Process and Standards

- **Certifier Competence** NOP §205.501 requires certifiers to demonstrate adequate expertise for operations they certify. Certifiers must ensure inspectors receive

appropriate training for seaweed operations, just as they do for other specialty crops. The variation in knowledge is being addressed through this collaborative process and ongoing training initiatives.

- **Testing Requirements** Testing is not mandated for terrestrial organic crops and cannot be required for marine crops beyond existing NOP provisions. As a component of accreditation certifiers cannot require as a condition of certification that any client comply with any production or handling practice other than those required by the USDA organic regulations. Per §205.670, testing occurs based on risk, suspicion, or random sampling-not as routine requirement. Water quality standards and heavy metal testing fall under FDA food safety jurisdiction, not organic certification. Certifiers may request testing when contamination is suspected, consistent with terrestrial practices.
- **Determining Scale and Ecological Impact** The language about "appropriate scale and intensity" (§205.200) mirrors terrestrial requirements to maintain or improve natural resources. Certifiers evaluate this through desk audits and on-site inspections, considering factors like stocking density, nutrient depletion, and ecosystem impacts. State leasing and permitting processes often provide baseline environmental assessments that inform these determinations.

Production Practice Guidance

- **Co-cultivation with Shellfish** Multi-trophic aquaculture systems are analogous to polyculture and integrated farming in terrestrial systems, which are encouraged under organic principles. Shellfish can provide ecosystem services similar to beneficial insects or cover crops on land. As long as production maintains organic integrity and prevents contamination (e.g., from treated shellfish equipment), co-cultivation is permissible. Science advisors may provide research supporting these systems' benefits for maintaining or improving aquatic environments.
- **Nursery Operations** The Best Practices clarify that nursery facilities may use inputs listed in §205.601 and, under specific conditions outlined in §205.204(b), may use prohibited substances only until germination (the stage of growth considered analogous to seed germination in terrestrial crop settings). This parallels terrestrial greenhouse operations where young plants receive different management than field crops. The requirement to transfer to pure seawater after germination ensures prohibited substances don't continue through the production cycle.
- **Bio-fouling Management** The language will be considered for revision from "shall" to "may" remove biofouling, acknowledging that some fouling organisms provide ecological benefits. This aligns with integrated pest management principles in §205.206, where intervention occurs only when necessary. European organic standards take similar approaches, and harmonization supports global market development.

Implementation and Compliance Support

- **Resource Accessibility** The final document will include hyperlinks to:
 - National List sections (§205.601, §205.602, §205.605, §205.606)
 - NOP Standards (7 CFR Part 205)
 - Petition guidelines and processes

- Relevant NOP Handbook documents
- **Flexibility and Certifier Discretion** Throughout these Best Practices, certifier discretion mirrors terrestrial organic certification. Just as certifiers evaluate in terrestrial systems whether plastic mulch must be removed, whether buffer zones are adequate, or whether pest pressure justifies intervention, certifiers will continue to make site-specific determinations based on risk, environmental conditions, and organic principles within a marine environment.
- **Continuous Improvement** These Best Practices represent current interpretation within existing regulations. Issues requiring regulatory change, such as adding materials to the National List or establishing specific aquaculture standards, must follow formal USDA rulemaking processes. This document lays groundwork for potential future rulemaking by identifying areas needing regulatory clarity.

Conclusion

These responses demonstrate that most concerns are addressed either through existing NOP regulations applied consistently with terrestrial practices or through the flexibility built into certifier oversight. The Best Practices do not create new requirements but rather document how existing standards apply to marine environments, ensuring consistency while maintaining the adaptability necessary for diverse growing conditions. Where regulatory gaps exist, we've identified appropriate channels (NOSB petitions, future rulemaking) for pursuing changes.