



## Mussel Evaluation Tool

To be used in conjunction with the Food Alliance Whole Shellfish Farm Inspection Tool. Mussels included are: Mediterranean/Galo (*Mytilus galloprovincialis*), Blue (*Mytilus edulis*), and Bay mussel (*Mytilus trossulus*).

<b>Operation Name:</b>	
<b>Address:</b>	
<b>Evaluation Date:</b>	
<b>Evaluator/Inspector:</b>	

**Scored Evaluation Criteria:** To have mussel production certified by Food Alliance, an operation must score an average of 3.0 out of 4 overall in the 3 areas listed below:

### Healthy and Humane Care for Shellstock

Cultural Conditions (growout)

Holding and Handling Operations and  
Facilities (nursery and growout)

### Production and Culture System Management

System Design and Maintenance  
Habitat Protection of Growout and Buffer  
Areas

Harvest  
Water Quality (growout/harvest)

### Pest Management

Predator Management (growout)

Noxious Weed Management

# Table of Contents

Instructions for Use.....	3
Healthy and Humane Care for Shellstock .....	4
Culture Conditions (growout).....	4
Holding and Handling Operations and Facilities (nursery and growout).....	4
Production and Culture System Management .....	5
System Design and Maintenance.....	5
Habitat Protection of Growout and Buffer Areas (growout).....	6
Harvest Management .....	7
Water Quality (growout/harvest) .....	7
Pest Management .....	8
Predator management (growout) .....	8
Noxious Weed Management (farm access areas) .....	9
Scorecard.....	10
Acknowledgements.....	11

## Instructions for Use

1. Production practices are evaluated according to Food Alliance criteria (listed on the following pages of this document) and then ranked in a 4-step process from Level 1 to Level 4: Points are only earned for the highest Level achieved.
2. Scoring partial points is allowed. Example: Half of the farm systems are designed to reduce environmental and social impacts. As a result, you may score 2.5 points, or half the increase between Level 2 and Level 3:
3. No points are earned for a criterion that is not applicable (N/A) to the operation or region.
4. For producers reviewing this evaluation tool: The scorecard at the end of this document identifies the minimum number of points required to be considered for certification. This is only a guideline for your use and does not guarantee acceptance of your application.
5. Inspectors should make notes on each criterion describing how they arrived at decisions, including means used to verify all specific producer claims. These notes will provide important background, which will be carefully considered in the final certification decision. A section for notes is also included at the end of this document. Please make note of any sections that were not applicable and the reason. Also include any Best Management Practices (BMPs) implemented by the producer that are not listed in this inspection tool.

## Healthy and Humane Care for Shellstock

### Culture Conditions (growout)

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**Level 1:** All legal requirements and industry association standards (if any) are met for proper densities. All the following apply:

- Manager is aware of legal requirements/industry standards.
- Manager can explain how farm operations meet those requirements.

**Level 2:** As per Level 1, animals are planted in suitable locations. All the following must apply:

- Water flows are assessed prior to establishing a farm site and/or monitored during farm operations.
- Water quality is assessed prior to establishing a farm site and/or monitoring during farm operations.
- Other (please specify):

**Level 3:** As per Level 2, and, all the following must apply:

- Manager takes care to avoid the crushing of shellstock during harvest.
- Boat wakes are minimized inside and near the farm site.
- Methods are employed to reduce loss or drop-off of animals during growout.
- Other (please specify):

**Level 4:** Growth and survival of the mussels indicate adequate food levels for the entire population during growth seasons. Food availability is enhanced by raft/longline orientation and regular net maintenance/cleaning. A written plan is available to describe these operations.

**Score:**

**Verification methods and notes:**

### Holding and Handling Operations and Facilities (nursery and growout)

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**Level 1:** Animals are handled carelessly. There is no regard to reducing time to temperature (cooling) after harvest or preventing body damage during seeding and harvest.

**Level 2:** Animals are handled with care. There is little sign of shell breakage during times of harvest and at handling facilities.

**Level 3:** As per Level 2, and growers/operators/harvesters are well trained and understand the factors that cause stress or injury to the mussels in culture. Facility maintenance and design are effective in reducing stress and injury. All the following apply:

- Grower/operator can discuss stress factors to watch out for, such as shell gape.
- Grower/operator can discuss facility maintenance and design such as cleanliness, etc. that may result in injury/disease to animals.
- Animals are not showing stress (e.g., a low percentage of shell gape).
- Mussels are processed and moved to storage facility (sink float, upland tank storage, refrigeration) within 12 hours after they are removed from the raft/longline.

**Level 4:** As per Level 3, and holding and transport facilities match the natural conditions (e.g., temperature, salinities, etc.) of the animals and grower/operator can discuss and document the features. All the following apply:

- Holding and transport facilities are kept at cool temperatures and records are available to document this action.
- Holding facilities are either sink floats or incorporate cool and properly maintained recirculating or flow through salt-water holding tanks.
- Producer has a written operations plan and identified handling procedures manual.
- Shell gape frequency is recorded and ways to decrease shell gape and increase shelf life are explored.
- Other (please specify):

**Score:**

**Verification methods and notes:**

## Production and Culture System Management

### System Design and Maintenance.

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**Level 1:** Coast Guard and local jurisdiction navigational standards/rules are followed when building floating systems (rafts/longlines).

**Level 2:** As per Level 1, and navigational aids (signs) are updated/maintained on a regular basis to retain their effectiveness.

**Level 3:** As per Level 2, and systems are designed to reduce environmental and social impacts. All the following must apply:

- The system is maintained in an orderly and clean appearance.
- Systems are designed to reduce visual impacts and storm damage while also increasing system longevity and navigational safety.
- Operational waste is disposed of in a timely manner to reduce accidental pollution and to increase recycling/reuse.
- Removal of fouling organisms is performed in deep water (if permitted) or at inland facilities where possible odors are not transmitted to adjacent property owners.
- Mobile fouling organisms are provided an opportunity to be released in the marine environment during harvest/cleaning (netting) operations.

**Level 4:** As per Level 3, and the producer has written records of performed maintenance. Two or more of the following apply:

- Signs are incorporated into the farm system to educate recreational users of the water body of the farm operation.
- Systems are monitored on a quarterly basis for damage/excessive fouling.
- Invasive species densities are monitored and reported yearly to appropriate local/federal agencies.

- Systems incorporate recycled materials in their construction.
- Other (please specify):

**Score:**

**Verification methods and notes:**

### **Habitat Protection of Growout and Buffer Areas (growout)**

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**Note:** Habitat protection includes areas leading to and underneath the culture system.

**Level 1:** Manager has no plan for protecting Endangered Species Act (ESA) listed species and Essential Fish Habitat (EFH) such as submerged aquatic vegetation (SAV), and to document spawning grounds beyond what is required by law.

**Level 2:** If applicable, EFH buffers exist, are maintained and can be documented. Buffer is appropriate to site and environmental conditions. Management plan is minimal or nonexistent, but efforts are in place reduce benthic impacts. Check all that apply:

- SAV does not appear to be trampled/destroyed/removed at staging sites.
- Depth of mussels or netting does not reach within 2 feet above the seafloor allowing for increased flows and benthic and pelagic organism access.

**Level 3:** As per Level 2, and the farm management plan specifically protects EFH areas and other benthic habitats. Records are kept to verify the following. Check all that apply:

- SAV areas are visually monitored annually.
- Documented forage fish spawning areas are known and protected during spawning periods.
- Production is managed to protect or enhance EFH.
- Rafts/longlines are not placed over areas containing native eelgrass.
- Rafts/longlines are not located in shallow areas where they can effectively shade SAV.
- Staging areas or paths are avoided in areas containing native eelgrass.
- Sulphide levels are monitored or video surveys are conducted to assure anoxic conditions are not present beneath the farm.
- Other: (please specify).

**Level 4:** Written production management plan specifically considers EFH areas and their enhancement or maintenance in good condition, which include 2 or more of the following:

- SAV presence is annually systematically monitored and mapped. This knowledge is spread to farm employees. This information is also used to make management decisions to better protect the SAV resource.
- Stocking density reduction or bed removal is listed as an option to protect EFH.
- Farm manager participates in forage fish spawning surveys (state, federal, or provincial).
- Other management techniques that protect high quality water column and benthic characteristics (please specify):

**Score:**

## Verification methods and notes:

### Harvest Management

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**Level 1:** All laws and regulations are followed, but manager does not have harvest guidelines/plans.

**Level 2:** All laws and regulations are followed and 2 or more the following apply:

- Trainings are conducted to increase efficiency and to reduce shell breakage during harvest.
- Engines for compressors, pumps, booms, winches, and/or mechanized harvesters are selected or muffled to reduce noise levels, especially during night time harvests.
- Harvest activities are conducted to avoid conflicts (e.g., sedimentation when cleaning mussels) with documented forage fish spawning grounds and native eelgrass.
- Mobile fouling organisms are provided an opportunity to be released in the marine environment during harvest operations.
- During harvest, efforts (e.g., moving the harvest/cleaning area, operate in areas with stronger currents) are made to reduce high turbidities/siltation and potential benthic disruption.

**Level 3:** As per level 2 and all from Level 2 apply. Pre-harvest evaluations are conducted to assure an effective/targeted harvest.

**Level 4:** As per level 3, and a written harvest plan is available and periodically updated to reflect current science, regulations, and recommendations.

**Score:**

## Verification methods and notes:

### Water Quality (growout/harvest)

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**Level 1:** All local, state/provincial, and national water quality laws and regulations are followed.

**Level 2:** As per Level 1, and manager has knowledge of local or regional water quality issues and potential effects on farm operations.

**Level 3:** As per Level 2, and producer actively participates in efforts to restore/maintain high standards of water quality. All the following apply:

- During harvest and product cleaning, efforts (e.g., moving the harvest/cleaning area, operate in areas with stronger currents) are made to reduce high turbidities/siltation and potential benthic disruption.

- Biotxin issues are considered and management participates/assists in sample collection/holding.
- Culture systems are composed of non-toxic materials.

**Level 4:** As per Level 3, and, farm operates from a written water quality plan that addresses most culture/raft/longline issues. Two or more of the following apply:

- Food community (detritus/phytoplankton/zooplankton) health issues are considered and management is directed towards the issue.
- Manager participates in research studies on marine toxins and water quality issues.
- Adding certifiable growing areas or upgrading current growing area is considered and management is directed towards the issue (e.g., lowering fecal coliform contamination from uplands/watersheds).
- Grower participates in or supports upland surveys of possible fecal coliforms sources.

**Score:**

**Verification methods and notes:**

## Pest Management

### Predator management (growout)

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**Level 1:** Predators (Scoter ducks, crab, starfish, moon snails, etc.) are routinely destroyed when found on the farm site. No anti-predation devices are employed.

**Level 2:** Anti-predator devices such as netting, or bags are employed to reduce predation. Devices are selected with no regard to benthic access and tanglement issues for other species. Benthic predators are not routinely destroyed. When anti-predator devices are ineffective, predators are relocated or destroyed. If predators are destroyed, producer/manager can explain why removal from the farm and relocation to other areas in the water body is ineffective for controlling predators.

**Level 3:** Devices are selected so other species have access to the benthic environment (via bag spacing, mesh size, etc.) while still providing protection to the farmed mussels. When anti-predator devices are ineffective, predators are relocated or destroyed. If predators are destroyed, producer/manager can explain why removal from the farm and relocation to other areas in the water body is ineffective for controlling predators. All the following apply:

- Anti-predator devices are laid out in an orderly fashion.
- Anti-predator devices are maintained to prevent loss of material and to improve efficacy.
- Anti-predator devices are removed when no longer useful.

**Level 4:** As per Level 3, and alternative anti-predator devices or beneficial species are researched and tested on grower supplied areas to increase benthic access and farm production.



**Score:**

**Verification methods and notes:**

### **Noxious Weed Management (farm access areas)**

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**Note:** This criterion only applies in areas with a history of, or geographical proximity to, infestations of *Spartina alterniflora*. Currently only *Spartina alterniflora* (smooth or saltmarsh cordgrass) is targeted by herbicides in the aquatic environment. Total eradication is required.

N/A: No chemicals are applied to the aquatic environment.

**Level 1:** Herbicides are applied every year to the same noxious weeds or all conspicuous weed species at the same place.

**Level 2:** Every 2 or more years, an inventory is taken or monitoring activity is performed to determine location of new noxious weed infestations and effectiveness of previous year's treatment methods. Herbicides are used only after areas are scouted.

**Level 3:** As per Level 2, and every year an inventory is taken or monitoring activity is performed to determine location of new noxious weed infestations and effectiveness of previous year's treatment methods. Herbicide use is limited to targeted/spot applications.

**Level 4:** A yearly evaluation of noxious weed infestations is performed consistent with a written noxious weed control plan that includes 3 or more of the following items. Herbicides are only used when conditions are assessed, and only with carefully timed and targeted applications.

All the following apply:

- Regular inventory and monitoring done to determine location of new noxious weed infestations and effectiveness of last year's treatment methods.
- Monitoring information used to plan current year's noxious weed control and at least 2 or more years into the future, specifically target small new infestations where treatment takes least resources, is most effective, and very low costs.
- Control methods are applied based on plant phenology, so they have the most impact on target weed.
- Other (please specify):

**Note:** If area is relatively free of noxious weeds, manager must be aware of potential problems, and monitor the area regularly. They must also have a plan to control calling for some of the elements in Level 4 to score at Level 4:

**Score:**

**Verification methods and notes:**

## Scorecard

CRITERIA	SCORE/LEVEL
<b>Healthy and Humane Care for Shellstock</b>	
Culture Conditions (growout)	
Holding and Handling Operations and Facilities ( nursery and growout)	
<b>Production and Culture System Management</b>	
System Design and Maintenance	
Habitat Protection of Growout and Buffer Areas (growout)	
Harvest Management	
Water Quality (growout and harvest)	
<b>Pest Management</b>	
Predator management (growout)	
Noxious Weed Management	
<b>Total points earned</b>	
<b>Total points available</b>	<b>32</b>
<b>Total points N/A</b>	
<b>(Total points available) - (Total points N/A) = Total applicable points</b>	
<b>(Total points earned)/(Total applicable points) = Average score</b>	

## Acknowledgements

The evaluation criteria included in this inspection tool were developed using information from many sources, including\*:

British Columbia Ministry of Agriculture, Food and Fisheries, “BC Shellfish Aquaculture Code of Practice”, Final Submission, July 03, 2002.

National Organic Standards Board (NOSB), Livestock Committee, “Recommendation on 205.257 Molluscan Shellfish Standards,” September 9, 2009.

Pacific Coast Shellfish Grower’s Association” Environmental Codes of Practice for the Pacific Coast Shellfish Farmers”, January 2009.

Sustainable Shellfish, “Recommendations for responsible aquaculture”, Heather Deal, David Suzuki Foundation, 2005.

Taylor Shellfish, “Environmental Codes of Practice”, December 19, 2008.

United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service, “Endangered Species Act – Section 7 Programmatic Consultation Biological and Conference Opinion and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation, Nationwide Permit 48 Washington” (State), April 28, 2009.

United States Fish and Wildlife Service, “Endangered Species Act -Section 7 Consultation, Biological Opinion, U.S. Fish and Wildlife Service Reference: 13410-2008-F-0461 , Nationwide Permit #48 for Shellfish Aquaculture, State of Washington”, March 2009.

Aquaculture on State Owned Aquatic Lands in Washington State, June 13, 2006.

Washington Department of Ecology’s Shellfish Aquaculture Regulatory Committee, “Guidelines for Geoduck Aquatic Operations”, Developed under the Authority of Section 4 of Second Substitute House Bill 2220 Chapter 216, Laws of 2007, January 2009, Publication no. 09-06-001.

Washington Department of Natural Resources, “Best Management Practices (BMP’s) for Geoduck.

World Wildlife Fund’ “Draft Environmental and Social Standards for Bivalve Aquaculture,” February 1, 2010.

These evaluation criteria were developed in collaboration with Andrew D. Suhrbier, Senior Biologist with the Pacific Shellfish Institute, Olympia, WA., suhrbier@pacshell.org.

Brian Kingzett, Blue Revolution Consulting Group, reviewed and provided comment on the evaluation criteria\*\*:

\*Not all practices from these sources were incorporated into the final draft of these evaluation criteria, so acknowledgement of their use does not constitute an endorsement of these criteria.

\*\*Not all reviewer comments and suggestions were incorporated in the final draft of these evaluation criteria, so recognition of their contribution does not constitute an endorsement.

Document Review:

11/9/2018	Complete document review, removed copyright notion, removed fillable form function, updated footer.	Completed by Shaila Cook, Certification Manager
10/20/2022	Complete document review, updated footer, corrected spacing/white space, converted to pdf fillable, added document review table.	Completed by Shaila Cook, Certification Manager