

## **Aquaculture Working Group Report**

### **Foreword:**

In October, the National Organic Standards Board (NOSB) established an Aquatic Animal Task Force and two related working groups to advise the NOSB in the consideration of organic certification standards for operations that produce aquatic animals. The NOSB defines aquatic animals as any finfish or shellfish used for human consumption, whether taken from regulated but free roaming marine and fresh water populations ("wild harvested") or propagated and raised in a controlled or selected environment (aquaculture). The Task Force includes six members of the NOSB and two non-NOSB members who serve as chairs of working groups on wild harvest and aquaculture production systems. Working independently, the wild harvest and aquaculture working groups evaluated the appropriateness and suitability of organic standards for aquatic animal production systems.

This report summarizes the conclusions, including majority and minority positions, of the aquaculture working group. The Task Force will consider all analyses forwarded by the working groups, and prepare its own recommendation to submit to the NOSB. At the time that the Task Force forwards its conclusions to the NOSB, those recommendations will be made available for public review and comment. The NOSB will take the Task Force recommendations and public comment under consideration while developing its own recommendations for the National Organic Program. The Task Force intends to release its recommendations in time for public review and comment at the NOSB meeting scheduled for March 2001. This schedule should allow the full NOSB to make its recommendation on the certification of operations that produce aquatic animals at its meeting tentatively scheduled for June 2001.

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### **Aquaculture Working Group Report to the National Organic Standards Board November 17, 2000**

### **Working Group Members:**

- Deborah Brister, currently a PhD candidate and graduate research assistant at the University of Minnesota, coordinator of the organic aquaculture project and coordinated the National Organic Aquaculture Workshop in June at the University of Minnesota (attended by many in our working group).
- Dan Butterfield, operates Butterfield Catfish Farms in Tuscaloosa, AL. He has been operating a polyculture system for over 30 years, producing catfish and many minor food use species.
- Robin Downey, Executive Director, Pacific Coast Shellfish Growers Association
- Chris Duffy, currently operates a re-circulating system that produces flounder. Previously worked as a commercial ocean going fisherman in the North Atlantic.
- Gary Fornshell, Extension Specialist at the University of Idaho, trout production
- Becky Goldberg, NOSB member and Senior Scientist at Environmental Defense

- John Hargreaves, Assistant Professor at Mississippi State University, specializing in catfish production.
- George Lockwood, currently a consultant, has been involved in aquaculture since the mid 1970's. Has commercially grown salmon, oysters, abalone, and marine algae. Former President of the World Aquaculture Society.
- Richard Nelson, co-owner and manager of Nelson and Sons, Inc, manufacturer of commercial fish feeds for all segments of the aquaculture market.
- Eric Sideman, NOSB member and Director of Technical Services for Maine Organic Farmers and Gardeners Association.
- Margaret Wittenberg, CHAIR: Aquaculture Working Group, VP of Governmental & Public Affairs for Whole Foods Market, Inc. and former NOSB member 1995-2000.

### Mission:

The mission of the group was to explore whether aquaculture is consistent with organic standards and give a multi-stakeholder perspective to the NOSB for their deliberations.

Guiding Question: Is certified organic aquaculture feasible?

The group was asked to explore general principles rather than detailed practices and standards. The Organic Foods Production Act of 1990 was used as the guiding basis for our work. The current National Organic Proposed Rule was also used as a reference for examples of livestock regulations developed based on OFPA. The working group was reminded that the designation "organic" refers to a production process, not food safety or residue testing.

The 5 areas we were asked to discuss included:

- 1) breeding
- 2) feed
- 3) healthcare
- 4) living conditions
- 5) record-keeping

Specific questions discussed by the group also included the following questions asked by the USDA in the March 23, 2000 Federal Register when they announced the public meetings on aquatic animals and organic:

- What should the criteria be for evaluating the suitability of a production site for an organic aquaculture operation? Specifically, how can standards be developed for the site of production to address nutrient concentration, the emergence and transfer of disease, the escape of captive species to the wild, and detrimental impacts on indigenous species?
- What characteristics of fishmeal are pertinent to the requirement in the OFPA that producers supply livestock with organically produced feed that meets the requirements of OFPA?

- What guidelines are needed to ensure that the predator control practices used in aquaculture operations are consistent with organic principles?
- Should the induction of triploidy in fish species be classified as an allowed or prohibited practice?
- How should standards address the origin of livestock requirements for aquaculture operations that obtain stock or fry from wild populations?

Seven of the Aquaculture Working Group's members also participated in the 2-day National Organic Aquaculture Workshop held June 2000 at the University of Minnesota. A multi-stakeholder discussion on the feasibility of U.S. certified organic aquaculture was the focus for the workshop, an event attended by members of the organic community, environmentalists, aquaculture producers and researchers, and government representatives. The group worked together to craft general principles for organic aquaculture with the intent to present them as input from the multi-stakeholder group for the NOSB to use in its own deliberations of the issue. The group used the IFOAM draft aquaculture standards as a template. General principles discussed included basic conditions; location of production units; location of collecting areas; health and welfare; spawning, reproduction, and breeding; harvesting; transportation of living aquatic organisms; and slaughter. Further discussion of the group continued after the workshop via a Discussion Room website.

### Summary of the Aquaculture Working Group Deliberations

Although all members of the Working Group agreed that, technically, it would be feasible to have aquaculture systems be certified as organic, there was clearly a majority opinion and a minority opinion as to what this meant in practice.

Feed was the most contentious issue.

The majority position:

The producer of an organic aquaculture operation must provide the aquatic organisms with a total feed ration composed of agricultural products that are organically produced and, if applicable, organically handled:

Except that non-agricultural products and synthetic substances allowed under 205.603 may be used as feed additives and supplements and non-organically produced agricultural products allowed under 205.606 may be allowed as ingredients in organic feed.

The producer of an organic operation must NOT:

1. Use animal drugs, including hormones, to promote growth;
2. Provide feed supplements or additives in amounts above those needed for adequate nutrition and health maintenance for the species at its specific stage of life;
3. Use terrestrial animal livestock products (the majority felt that the precautionary principle and consumer preference would preclude the use of animal byproducts in aquaculture fish labeled as organic).

The primary issue involved the use of fishmeal/oils. The majority believed that fishmeal and fish oils from sustainably managed fisheries should be allowed as a non-organic feed component for fish from certified organic aquaculture systems. They based this on the fundamental principal that:

1. An organism should be provided its natural feed source as closely as possible. As cold and cool water carnivorous and omnivorous species are genetically predisposed to fish consumption (fishmeal and fish oil), we, therefore, have an obligation to meet the nutritional requirements of the species-if these species are to be grown organically. Without fishmeal, synthetic amino acids must be added to the feed to artificially create the good balance of amino acids in fishmeal.
2. Organic livestock production standards encourage the utilization of the most natural feed sources appropriate for that animal and with minimum loss of feed to the environment. With the use of grain protein, indigestible phosphorus would be discharged in the fish waste. Phosphorus discharges from fish farms are a major regulatory concern of the EPA.
3. Consumers will demand that fish be raised and fed as fish, not as goats, cattle, or chickens, and therefore taste like fish and provide the healthy benefits of fish.
4. The evolution of the husbandry of cattle, swine, and sheep has involved breeding and selecting animals that consume low cost feeds, including grasses and grains. In contrast, aquaculture does not have those thousands of years of "selection" and, therefore, relies upon fish as the natural food of some fish and not grains and grasses.

Fishmeal is not the majority component within feed formulas. A rough calculation of fishmeal content in current production (adult) feed formulas would be:

Channel catfish: 4%

Tilapia: 5-6%

Trout: 18-20%

Sturgeon: 18-20%

Hybrid striped bass: 18-35%

Steelhead trout: 36-38%

Salmon: 25-45%

Shrimp: 15-30% (new eco-friendly feeds possible at 7%)

Note: Although diets are changing, salmon, steelhead, and trout feeds may also contain fish oil derived from wild caught fish in addition to fishmeal (e.g. high protein/high fat salmon feeds that some producers use often contain 20% fish oil). Many other fish feeds contain a couple of percent fish oil. The new trend in feeds is to reduce fishmeal and increase energy from fish oil sources.

Accordingly, the majority suggests to the NOSB that fishmeal and fish oil be considered for inclusion on the National List according to section 205.606: "Non-organically produced agricultural products allowed as ingredients in or on processed products labeled as organic or made with organic ingredients".

In free range poultry operations certified as organic, the birds are allowed to eat insects, weed seeds, grit, etc, none of which is certified organic, further supporting the allowance of fishmeal for certified organic aquaculture operations. All feed provided for them, which is the bulk of their diet, must be certified organic.

The majority also believed this allowance for wild feeds should apply to molluscs and the food they filter from their designated culture areas.

The minority position believes that feed for certified organic aquaculture should be organic since a basic principle of organic livestock production is organic feed. As such, they do not agree that the wild harvested fishmeal/oil should be allowed in organic feed, stating that while harvesting fishmeal sustainably is important, it does not make the fish meal or fish oil organic.

Given that it is difficult to determine whether or not a fishery is sustainable, they also question whether organic certifiers will be able to legitimately certify fisheries as sustainable.

Additional support of the "no fishmeal" position include:

1. The open ocean is not monitored, therefore, it cannot fulfill the three-year requirement that the organic farm/site be free of the application of prohibited materials or that it is free of prohibited materials during the period of certification.
2. Even if an individual fishing operation located in an open ocean could be monitored and perhaps certified as an organic producer, the effects or practices of other fishing operations in the general area could not be monitored and thus could jeopardize the organic nature of the certified organic product.
3. Species that feed at low trophic levels can be raised without fishmeal and fish oil in their diets
4. Synthetic materials used in fishmeal production may or may not be suitable for organic feeds and would need to be approved by the NOSB for inclusion on the National List.

The minority group would consider allowing fishmeal and fish oil as a food supplement as a natural source of amino acids and Omega 3 fatty acids, up to a certain percentage, perhaps 5%. However, there remains a question as to whether feed supplements—other agricultural products used to balance a ration—would have to be organic. However, at least some of the minority are willing to consider using byproducts from fish processing to produce fishmeal. Optimally, the byproducts would be from organic farmed fish.

Additionally, fishmeal from fish cultured specifically for organic fishmeal would be an acceptable form of feed for organic aquaculture operations.

### **Nutrient Management**

The group as a whole believed that aquaculture could achieve what is stated in the current National Organic Proposed Rule: Livestock Living Conditions 205.239(b)4c:

"Risk to soil or water quality: The producer of an organic livestock operation must manage manure in a manner that does not contribute to contamination of crops, soil, or water by plant nutrients, heavy metals, or pathogenic organisms and optimizes recycling of nutrients."

Currently, aquaculture is regulated under the National Pollutant Discharge Elimination System permit and at the local level—usually the state division of environmental quality.

Additionally, the EPA is working on national effluent limitation guidelines and standards for US aquaculture facilities, similar to the NRCS guidelines that were developed for manure and agriculture. The EPA's work in developing these effluent limitation guideline will assess:

- the quality of wastewater generated and discharged at different types of aquaculture facilities;

- the types of treatment technologies and/or Best Management Practices applicable to treating this wastewater;
- the environmental and water quality impacts caused by aquaculture facilities;
- the costs of treatment and/or practices to address adverse environmental impacts; and
- the ability of aquaculture facilities to afford treatment and/or adopt Best Management Practices.

### Minority Position

Considering the EPA's proposed standards for terrestrial livestock nutrient management (e.g. hog "lagoons"), the minority question the strength, depth, and, therefore, the acceptability of the standards within the environmental and sustainable agriculture. Since EPA's guidelines for aquaculture systems are unlikely to be completed until June 2004, it would be inappropriate to rely on compliance with these guidelines as a guarantee of adequate nutrient management by organic farmers.

### Siting Issues

Several issues were discussed in conjunction with siting of aquaculture operations: nutrient management issues, net-pens, escape of captive species to the wild, residue testing, water quality, type of operation, and whether the 3 year "no prohibited substances" also applied to water systems.

Examples of general siting principles:

"Location of production units shall take into consideration the maintenance of the aquatic environment and surrounding aquatic and terrestrial ecosystem. Production units should be at an appropriate distance from contamination sources and conventional aquaculture. Negative environmental impact from aquaculture production should be minimized." (crafted at University of Minnesota National Organic Aquaculture Workshop).

From Iowa Aquaculture Standards:

"Aquaculture tanks should not be located in sites open to pesticide drift or other harmful contaminants. During operation, basic water quality sampling for pH, oxygen, nitrogenous wastes, and toxins should be conducted by the operator. Operations must be in compliance with all local, state and federal health agency water quality regulations."

[Note: no federal health agency regulates water quality.]

et-pens and siting in open waters

The majority of the group stated that significant strides are being made in aquaculture regarding nutrient management in open waters, making siting in such areas appropriate for organic aquaculture. It also underscored natural environments for fish, even more so than constructed fish ponds or closed systems.

Water depth is one of the key variables that needs to be considered in siting aquaculture facilities directly within open waters. The distance between the bottom of the rearing units and the lake (or ocean) substrate must be far enough to allow maximum water exchange. Speed of the current and direction are also important variables for determining how quickly material will fall out of suspension. Currents must not only be fast enough for dispersion of aquaculture wastes, they must be slow enough so that fish do not expend excessive energy swimming and are able to

retrieve food before it is drawn out of the rearing unit. To reduce the amount of settleable solids, feed management changes such as switching to high nutrient dense diets that are highly digestible and nutrient/energy dense are extremely important.

In summary, net cage operations could be appropriate for organic aquaculture provided

1. the aquaculture facilities are appropriately sited (including possible cumulative effects from surrounding facilities);
2. the use of appropriate stocking densities and appropriate feed that is highly digestible and nutrient dense; (under these balanced conditions, nitrogen, phosphorus, and solids emissions from net-pen operations can remain valuable components in the entire food web complex in marine systems.)
3. the use of appropriate monitoring to ensure the natural assimilative capacity is not overburdened;
4. the use of multiple species when possible to recycle nutrients--in polyculture animals and seaweeds can utilize nutrients that would otherwise be lost to bacterial degradation.

Regarding concerns about unacceptable residues and pollutants, in the current proposed rule, if there is a question or concern about the presence of pollutants, the certifying agent can require a residue testing of the product as well as testing on the soil, water, and waste produced. The Organic Foods Production Act supports this. The OFPA also suggests that "unavoidable residual environmental contamination" may occur. (See 6511(c)2B).

Accordingly, the current proposed rule has a definition for "unavoidable residual environmental contamination" (UREC): "Background levels of naturally occurring or synthetic chemicals that are present in the soil or present in organically produced agricultural products that are below established tolerances."

The minority position emphasized that the 3 year "no prohibited materials" precluded open water systems since the waters were not under management control as directed by organic principles. The lack of control of pollutants in the open waters is also a concern.

The minority also believe that the densely packed feedlot-type environments in many net-pens mean that net-pen environments are not necessarily "more natural" than other types of aquaculture systems.

### **Escape of captive species to the wild**

All states in the United States regulate the species that may be grown within their borders, usually through either the Fish and Game departments or departments of agriculture. Therefore, there is an underlying consideration by States of the acceptability of the potential impacts of escaped fishes.

The organic aquaculture plan would ensure that cultured organisms that are species-distinct or genetically-distinct populations from native organisms in accessible aquatic environments will be managed with appropriate security measures (mechanical, physical, and biological barriers) to reduce, minimize and prevent the likelihood of escape due to predators, adverse weather conditions or facility damage.

### **Pond systems**

There was consensus within the group that confined outdoor pond systems, the most common aquaculture systems in both the US and the world as a whole, are appropriate systems to consider for organic aquaculture.

Recirculating aquaculture systems as an option

Discussion still in progress within the group

Recirculating systems are usually indoor systems but, depending on the climate, can also be outdoor systems or a combination. Culture water is recycled back to the fish or circulated through beds of vegetables, fruits, grasses, or flowers. No consensus emerged whether indoor systems fit into the organic paradigm.

### **Health Care:**

Aquaculture operations would be able to comply with the health care standards required in organic livestock regulations: no antibiotics, hormones, synthetic parasiticides. Well-managed systems minimize the occurrence of disease. OFPA allows the use of vaccines.

### **Breeding:**

Like poultry production, aquaculture depends largely on hatcheries. The OFPA states that organic management of poultry must begin no later than the 2nd day of life—one day old post-hatch chicks can be shipped from hatcheries to growout farms. In organic aquaculture, organic management for finfish would likewise start post hatch fry, and for hatchery produced shellfish organic management would start with spat.

Aquaculture brood stock regulations would be similar to terrestrial livestock brood stock regulations.

### **Triploidy:**

The group supported triploid fish from the application of temperature or pressure shock after fertilization as acceptable in organic aquaculture practices since triploidy itself can occur naturally within various species of fish. In fact, some crops (wheat) are polyploid. Nothing new or different is introduced into the animal's chromosomes—just an extra set. Additionally, it renders the fish sterile, thus providing a form of biological barrier, helping to protect from any risks posed by escapes of introduced species.

### **Mollusc culture:**

Discussion of this topic is still pending. The group did not have time to discuss how mollusc culture fit within general aquaculture standards.

Harvest, Post-harvest, & Transportation Standards

Discussion of this topic is still pending. The group did not have time to discuss harvest, post-harvest, and transportation related to organic aquaculture standards.

### **Supplemental:**

Organic Foods Production Act: Sections related to Aquaculture and Organic

6502(1) Agricultural Product. The term "agricultural product" means any agricultural commodity or product, whether raw or processed, including any commodity or product derived from livestock that is marketed in the United States for human or livestock consumption.

6502(4) Certified Organic Farm. The term "certified organic farm" means a farm or portion of a farm, or site where agricultural products or livestock are produced, that is certified by the certifying agent under this chapter as utilizing a system of organic farming as described by this chapter.

6502(11) Livestock. The term "livestock" means any cattle, sheep, goats, swine, poultry, equine animals used for food or in the production of food, fish used for food, wild or domesticated game, or other non-plant life.

6504 National Standards for Organic Production. To be sold or labeled as an organically produced agricultural product under this chapter, an agricultural product shall

(2) except as otherwise provided in this chapter and excluding livestock, not be produced on land to which any prohibited substances, including synthetic chemicals, have been applied during the 3 years immediately preceding the harvest of the agricultural products