

### *Public Comment*

Food & Water Watch also generally agrees with the proposed public comment procedures, but objects to the adoption of the 3-minute comment period. We would prefer to see a standard 5-minute comment period that is adjusted downward (i.e., first to 4, and only to 3 minutes if absolutely necessary) as needed to accommodate all speaking requests.

The 3-minute limit on public comments is a very challenging for organizations that can only send one person to a Board meeting, given the large number of topics that many groups want to cover. This gives an advantage to those who can afford to bring multiple people to the meetings to use more public comment slots.

### Materials Committee

#### *Aquaculture Petition Update*

Because there was no public document for this topic, we do not have specific comments to offer. But as the committee continues to discuss the appropriate criteria for evaluating materials that may eventually be petitioned for aquaculture operations, once aquaculture standards exist, we urge the committee to keep in mind several critical issues:

- the difference between open and closed systems when materials are being considered;
- the role of feed in aquaculture systems, especially open net pen systems, in impacting the surrounding environment;
- the potential for material inputs to serve as a crutch for poorly designed or operated systems or to compensate for overcrowded systems.

The following is the detailed comment we submitted at the November 2011 Board meeting on the discussion piece on materials for aquaculture operations. These issues are still relevant in a discussion of materials for aquaculture.

#### *Comment on the National Organic Standards Board Materials Committee Proposed Discussion Document "Aquaculture Materials Review Update"*

In response to the National Organic Standards Board Materials Committee's proposed discussion document "Aquaculture Materials Review Update," please accept these comments on behalf of Food & Water Watch, a national non-profit consumer advocacy organization. Our members and supporters support organic agriculture and are very concerned with the integrity of any organic standards that are developed for seafood. Additionally, Food & Water Watch has worked for many years on fisheries management issues, including the impact of large-scale aquaculture on the environment, fishing communities, and aquatic ecosystems.

Food & Water Watch believes that not all types of aquaculture are suited for the organic

label, because not all types of aquaculture will be able to meet bedrock organic principles of minimizing environmental impacts and protecting biodiversity. We believe that the use of wild-caught fish for fishmeal and oil as feed for aquacultured fish is incompatible with the principles of organic production. If only herbivorous fish can meet organic standards, then only herbivorous fish should be allowed to be certified as organic. As we pointed out at the last Board meeting, since the Board approved final recommendations on aquaculture in November 2008 (Final Recommendation on Aquaculture on Fish Feed & Related Issues and Final Recommendation on Aquaculture on Net Pens & Related Issues), new information has emerged on these two topics that make it worthwhile for the Board to reconsider its recommendations. We also urge the National Organic Program to consider this information before pursuing rulemaking to develop organic standards for aquacultured products. A summary of the new information that has emerged about open net pens and wild fish based feed is attached to this comment.

The appropriate place to start with an organic standard for aquacultured products is with closed, recirculating inland systems raising herbivorous fish. This avoids the problems of open net pens and wild fish based feed, which are incompatible with the principles of organic production.

In addition to urging the Board to reconsider the 2008 recommendations on aquaculture, we do have thoughts on the “trial balloon” process the Materials Committee is conducting on the issue of materials that could eventually be approved for organic aquaculture operations. We are supportive of the comments submitted on this topic by Beyond Pesticides, Center for Food Safety, the National Organic Coalition and the Recirculating Farms Coalition.

First, we have some general thoughts about criteria for evaluating aquaculture materials.

1. The evaluation process for materials to be used in aquaculture production must consider the type of operation – closed systems, in which water is recirculated and does not reach any body of water or open systems, in which the water can flow through the aquaculture operation and then enter the ocean or other body of water. The location of an aquaculture operation in open water means that any material used or waste generated there is very mobile and will quickly move into the surrounding aquatic environment. This is different than farming operations on land, which obviously can impact water quality, but do not immediately and constantly add materials into waterways.

2. Open water systems demand a level of evaluation for materials that specifically addresses the location of the facility and the likelihood that materials used there will end up in the surrounding environment. The impacts of materials added to an aquaculture system must be considered very broadly, to cover not only the animals raised there, but also the resulting water quality in the area where it is located, other marine organisms that could be exposed nearby and changes to the aquatic food web that could be caused by increased nutrients or other discharges from the aquaculture facility. In addition to considering impact of materials on phytoplankton, zooplankton, fish of all trophic levels and larger predators such as sharks that may be drawn to open ocean facilities because of

the concentration of food and waste generated there, materials should also be evaluated for impact on the chemistry and ecosystem of the benthic (bottom) layer of the ocean floor.

3. The potential for bioaccumulation of any materials used in aquaculture systems must be considered, not only for the fish raised there, but also up the marine food chain in the area surrounding the facility. This should include the potential for accumulation of materials in the ocean floor beneath the aquaculture facility that serves as habitat for various organisms and the potential for magnification of toxic loads at higher levels of the food chain, as carnivorous fish accumulate the toxic load of the smaller fish and organisms they eat. This evaluation of the potential for bioaccumulation should occur for any materials being approved for aquaculture use, but also for the feed used at the facility, which will end up in the surrounding ecosystem. Because some of the fish from the aquaculture facility should be expected to escape from an open net pen system, and will therefore end up in the food chain of the surrounding water, their contribution to the potential for bioaccumulation of toxic materials should also be considered.

4. The materials evaluation process must consider the purpose of the material. Synthetic materials must not be used to fulfill system functions that should be filled by the underlying ecology of a well-designed system, but should only be permitted as non-routine inputs. It is critical that approved materials not serve as crutch for overcrowded or poorly designed systems.

5. Materials that are intended to change the appearance of fish raised in aquaculture facilities, such as dye fed to farmed salmon to make their flesh appear more pink, should not be approved, no matter if the source is synthetic or natural. The purpose of feeding dye to the fish is to compensate for a disadvantage in appearance that farmed salmon has in relation to wild salmon, which feed on a diet that naturally gives their flesh more color. Feeding dye to farmed fish to artificially imitate the appearance of wild fish is deceptive to consumers and should not be permitted in any future organic standard, no matter what the source of the dye might be.

6. The materials review process should encompass feed for aquacultured fish. Carnivorous species are more likely to need outside inputs, and will not be able to rely on the underlying ecology of the water in the location of the facility for food. This is why we believe that the best approach to developing organic standards for aquaculture is to start with vegetarian fish that can be grown in closed systems without the high energy demand of carnivorous fish. But if carnivorous fish are to be permitted, the materials review process should cover their feed. The evaluation criteria for feed should include:

- Prohibitions on feed ingredients included in standards for other types of livestock, including no genetically engineered crops used as fish feed.

- The environmental impact of feed production. This is critically important for fishmeal and fish oil. The production of fishmeal and fish oil from wild fish must be evaluated for the impact on wild fish stocks, since the fish used to make fishmeal and oil are often taken from ecologically sensitive species. This consideration of environmental impact

is also important for the development of feeds being proposed as alternatives to fishmeal and fish oil, such as soy. Some research indicates that carnivorous fish fed soy produce more waste than fish fed fishmeal and oil, and thus could potentially be more damaging to the marine environment and seafloor.

- The biodiversity impact of feed production. The production of fishmeal and fish oil from wild fish must be evaluated for the impact on marine ecosystems, since the fish used to make fishmeal and oil are often small species that are critically important links in the marine food chain.

- Potential human health impacts from eating fish with an accumulation of toxic materials from their feed. Fishmeal and oil produced from wild fish are the primary routes of entry for contaminants such as PCBs, dioxin, and methyl mercury into farmed fish. These persistent chemicals can accumulate in the bodies of wild fish and when these fish are converted into meal and oil, the toxins are concentrated in the feed. Studies on cod and salmon show that a large portion of the mercury found in feed accumulates in the edible fillet of farmed fish. It remains unclear if removing contaminants from fishmeal and oil is feasible. Simply requiring that regulatory levels be observed is not offering organic consumers any more protection than the standards used for conventional aquaculture feed.

7. Any new list of materials developed for aquaculture should be separate from other lists and not automatically include materials allowed for other purposes. Materials that are already listed for use for livestock or crops may not necessarily be acceptable for aquaculture uses. Materials should be reviewed individually for aquaculture.

#### Questions about the Development Process for Board Discussion and Public Comment

1. Are there international bodies or organizations with a good material review process? If so, who? How could we interact with these entities to address material evaluation issues that we have?

We have not found an international body with a particularly good materials review process for aquaculture. Existing certification programs used in the European Union do not have acceptable materials policies and allow substances like antibiotics to be used that should not be replicated in U.S. organic standards. However, several elements of the IFOAM Aquaculture norms are relevant and should guide the committee's thinking:

##### Animal Nutrition

Most of the nutritional needs must be supplied from organic plants and animals appropriate for digestive and metabolic system of the species and that meet their physiological needs.

The system must be designed so that production area comprises entire food with minimal outside inputs.

Taken together, these requirements do not allow for routine use of synthetic or non-organic inputs for feed or other inputs.

#### Prohibitions

IFOAM prohibits the following in aquaculture systems:

- Prophylactic use of veterinary drugs
- Use of chemical allopathic veterinary drugs and antibiotics
- Synthetic hormones and growth regulators
- Synthetic pesticides and fertilizers

These are prohibitions that should be adopted by the Board. Also experimental veterinary drugs and dyes fed to change fish's flesh color should be prohibited.

#### Location of facility considerations

The siting of facilities must include, among other considerations:

- Distance to sources of contamination
- Distance to conventional agriculture

Sites near some sources of contamination, particularly nutrient-rich flows, such as those from agricultural runoff or sewage, offer one example of how broad the consideration of materials inputs must be in aquaculture, because of the high mobility of synthetic chemicals in an aquatic environment.

2. How do we ensure that our organic aquaculture material review process is viewed from an aquaculture lens rather than a crop or livestock lens, while not compromising organic farming and environmental principles? In other words, how do we maintain the level of review of materials consistent with crops and livestock uses, while viewing materials in their unique application to aquaculture systems?

The materials review process should incorporate the "Principles for Organic Production and Handling" adopted by the board October 17, 2001. Like organic crop and livestock production, aquaculture operations that are certified organic should rely on the underlying ecology to feed plants and animals, rather than outside inputs. Synthetic materials must not be used to fulfill system functions, but must be used only as non-routine inputs. The materials review process should also take into account the unique aspects of the aquatic environment and aquatic ecosystems in assessing inputs for their impacts on the products of aquaculture, the health of people eating those products, the water quality of the surrounding aquatic environment, and the health of other organisms, from plankton to larger marine animals, in the surrounding environment. This is especially true for open systems where the mobility of an aquatic environment offers unique ability for materials used in aquaculture production, including feed, to enter the surrounding environment immediately and continuously.

3. How can the review of aquaculture materials proceed cautiously while not compromising consumer expectation of the organic label? What do consumers expect from organically produced aquaculture products, and how does that translate into specific requirements concerning materials, e.g., environmental impacts, hormones, organic feed, etc.?

The simplest way to meet consumer expectations for the organic standards is to revisit the recommendations made by the Board in 2008. The use of open net pen production and the allowance of wild fish-based meal and oil do not meet consumer expectations that organic production minimizes environmental impact and promotes biodiversity. Revising the 2008 recommendations on aquaculture is an important first step in ensuring that an organic standard for aquacultured products will not damage the credibility of the organic program for consumers.

Consumers expect that livestock will be fed organic feed and not be fed or treated with hormones or antibiotics. Any standard for organic aquaculture must make sure these materials are not permitted. The Board can best “proceed cautiously” by limiting consideration of organic standards to contained, recirculating inland systems producing plants and herbivorous fish.

Further, the Board can ensure that consumer expectations of organic are met by establishing a strong set of criteria for how materials are evaluated. As the committee considers the criteria for evaluating materials for aquaculture production, we urge them to ensure that antibiotics, hormones, and synthetic anti-microbials, parasiticides and fungicides are prohibited, including:

- Florfenicol (sold as Aquaflor): Antibiotic.
- Formalin (sold as Parasite-S, Formalin-F, Formmacide-B and Paracide-F): Fungicide and parasiticide.
- Sulfadimethoxine and Oremetoprim (sold as Romet 30 and Romet TC): Antibiotic.
- Oxytetracycline Hydrochloride (sold as Oxytetracycline HCL Soluble Powder-343, Terramycin-342, and Tetroxy Aquatic Soluble Powder): Antibiotic.
- Oxytetracycline Dihydrate (sold as Terramycin 2002): Antibiotic.
- Tricaine Methanesulfonate (sold as Finquel and Tricaine-S): Temporary immobilizer.
- Chorionic gonadotropin (sold as chorolun): Injectable hormone used to aid in spawning.
- Chloramine-T: Oxidizing agent being evaluated for use in controlling bacterial infections.
- Diquat: Being evaluated for use in controlling bacterial infections.
- Potassium Permanganate: Used to control parasitic, bacterial and fungal infections.
- Copper Sulfate: Used to control parasitic, bacterial and fungal infections.

- SLICE (emamectin benzoate): Used to control external parasites, particularly sea lice.
- LHRHa: Spawning hormone.
- Common Carp Pituitary: Used to induce maturation in fish.
- 17a Methyltestosterone: Hormone used to produce male populations.
- Ovaplant: Hormone used to induce spawning.
- Catfish Pituitary: Hormone used to induce maturation and spawning.
- Benzoak: Anesthetic or sedative.
- Aqui-S 20E: Anesthetic or sedative.
- Magnesium Sulfate: Solution to treat external nematode and crustacean infections.
- Potassium Chloride: Osmoregulation.
- Povidone Iodine: Egg surface disinfectant and antibacterial.
- Calcium Hypochlorite – Oxidant.
- Aluminum Sulfate – Coagulent.
- Ferric Chloride – Coagulent.
- Chelated Copper – Used to kill unwanted algal growth.

It is important to note that while some of these drugs are only explicitly approved for certain uses or species, some are used as investigational new animal drugs or for other extra-label uses. This should also be prohibited for organic production. Some of these materials are permitted for organic crop production. However, that does not mean they are appropriate for aquaculture production because of the mobility of the aquatic environment and because these materials when added to the water in an aquaculture system will be coming into direct contact with the food.

There are some materials that may be appropriate for aquaculture operations, depending on the use and type of system. Hydrogen peroxide is one example. It is used as a microbicide and can be acceptable for use in controlled setting at allowed levels. However, due to toxicity to the aquatic environment, it is less safe to use in the open ocean than in closed system environments.

Iron is another example. It may be added to aquaculture diets in order to achieve proper nutrient balance or added to closed-containment aquaculture systems in order to promote the growth of beneficial phytoplankton and algae. But iron should not be added as a “fertilizer” to open ocean aquaculture operations or land-based systems that are not entirely contained, due to the possibility of unexpected or uncontrollable eutrophication and algal blooms, which could be disruptive to the aquatic food web.

Other materials designed to stimulate phytoplankton growth may be appropriate for closed systems, but not open systems due to the risk of driving eutrophication in surrounding water that will disrupt the balance of that ecosystem.

Like potassium and other nutrients, calcium is monitored in ponds and closed aquaponic systems to control pH and ensure that plants have the proper nutrients. Some calcium compounds raise toxicity concerns and should not be permitted.

In addition to considering potential toxicity to humans, aquatic animals and aquatic plants, materials should be evaluated for use in open systems for their potential to cause eutrophication. Materials that should not be permitted under this criteria include:

- Ammonium Sulfate
- Ammonium Nitrate
- Sodium Nitrate
- Potassium Nitrate
- Calcium Nitrate
- Triple Superphosphate
- Mono- and di- ammonium phosphate
- Phosphoric Acid
- Potassium Chloride
- Sodium Silicate
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#### Questions Concerning the Material Evaluation Process

1. What criteria are specific to open systems? Closed systems?

##### Open systems

We do not believe that open water systems can be certified organic. In order for these systems to meet consumer expectations for organic, they must meet high standards of preventing impacts outside the aquaculture system and preventing pollutants from affecting the organic aquaculture system.

In an open system, there is constant flux between the water inside the net pen and the surrounding water. Water-soluble materials have no boundaries, solid materials will fall out of the net pens, and there will be constant movement of algae and small animals in and out of the pens. Frequent escapes of the farmed fish from net pens add to the potential transfer of materials or diseases from the facility to the surrounding environment. Any material added to the system will be an input to the larger ecosystem if extraordinary measures are not taken to confine it.

Since extraordinary measures are needed to contain inputs to an open system, the review of materials should be based on the assumption that the materials will not be contained and will be released into the surrounding environment. Impacts to aquatic plants and larger organisms must be considered. Predators like sharks and other fish are drawn to open net pens by the food and waste found there, addition to escaped fish. The impact of materials on species found on the ocean floor must also be considered.



Because open net pen systems are located in open water, the water in that location is a critical component of the production environment. It is hard to control, even with years of management, unlike farmland. Any consideration of materials on an open system must take into account the likelihood of synthetic chemical pollutants entering the system from open water.

### Closed systems

We believe that land-based, contained recirculating aquaculture systems may be able to meet expectations for organic production. But there are still challenges in both preventing unwanted toxic inputs and preventing impacts on the surrounding environment that must be addressed when materials are being evaluated.

Materials destined for use in closed systems must be evaluated for the potential to accumulate in the fish or in the other organism or plants found in the system, because as the water is recirculated, there is less or no loss of the material to the surrounding environment. Therefore, the consequences of recirculating the material throughout the system after it is first used must be considered, and care must be taken not to use more of any material than is needed.

When ponds or tanks are emptied and cleaned, the water should be of a quality that does not have negative impacts on any receiving water in the environment. One criteria for evaluating materials, even in closed systems, is the ecological impact when water is discharged—either purposely or accidentally.

Any waste that is generated by closed systems should be treated carefully, in a manner similar to livestock manure, before it is incorporated into terrestrial crop production.

2. Which evaluation questions in current crops/livestock evaluations are relevant to aquaculture materials?

Category 1. Adverse impacts on humans or the environment?

1. Are there adverse effects on environment from manufacture, use, or disposal?

This evaluation should include the potential impact on the aquatic environment surrounding open facilities, the potential impact of catching wild fish for fishmeal and oil, the potential impact from closed facilities from discharge of water when tanks or ponds are cleaned or emptied, and the potential impact when waste is removed from closed systems.

2. Is there environmental contamination during manufacture, use, misuse, or disposal?

This evaluation should include the potential impact on the aquatic environment surrounding open facilities, the potential impact of catching wild fish for fishmeal and oil, the potential impact from closed facilities from discharge of water when tanks or ponds are cleaned or emptied, and the potential impact when waste is removed from closed systems.

3. Is the substance harmful to the environment and biodiversity?

The evaluation of harm to the environment should include not only the aquatic environment surrounding open facilities, including water quality and the benthic environment beneath the facility, but also the full range of animals and organisms in the area, including the birds, mammals and other animals drawn to these facilities. For closed systems, consideration must include the environment where any occasional discharge will go and the environment where any waste will be disposed of or used as a fertilizer.

4. Does the substance contain List 1, 2, or 3 inerts?

5. Is there potential for detrimental chemical interaction with other materials used?

8. Is there a toxic or other adverse action of the material or its breakdown products?

The degradation pathways and persistence of materials being evaluated must be determined specifically in aquatic systems.

9. Is there undesirable persistence or concentration of the material or breakdown products in the environment?

It is particularly important to consider the persistence of materials in an aquatic environment, for both open systems and closed systems where materials will be recirculated. The potential for bioaccumulation up the food chain is also critically important for both the fish being produced in the aquaculture facility and those in the surrounding environment that may be exposed to the material from an open system.

10. Is there any harmful effect on human health?

The issue of residues present in the fish produced by the facility, or in wild caught fish in the surrounding area, must be considered. This is especially true for the persistent toxins found in the aquatic food chain such as mercury, PCBs and dioxin.

Category 2. Is the Substance Essential for Organic Production?

1. Is the substance formulated or manufactured by a chemical process?

2. Is the substance formulated or manufactured by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources?

3. Is the substance created by naturally occurring biological processes?

7. Is there a wholly natural substitute product?

9. Is there any alternative substance?

10. Is there another practice that would make the substance unnecessary?

This is a critical question that should be used to evaluate materials intended for use in aquaculture. The purpose for the material is a critical factor that must be evaluated. Materials should not be approved for routine use that can serve as a crutch for poorly designed or overcrowded systems, or to push production to the point that environmental or other impacts are exacerbated.

Category 3. Is the substance compatible with organic production practices?

2. Is the substance consistent with organic farming and handling, and biodiversity?

We would urge the board to consider aquaculture feed as well as impacts on the surrounding environment.

3. Is the substance compatible with a system of sustainable agriculture?

This question should also drive an evaluation of aquaculture feed for carnivorous fish. The use of wild fish-based meal and oil is not sustainable because it depletes ecologically sensitive species that are a foundation of many marine food chains, and because it is not efficient, resulting in a net loss of protein (in which a pound of wild fish based feed results in less than a pound of aquacultured fish.)

Other materials can be considered in this lens, especially if materials are being proposed for routine use as a way to substitute inputs that should be available from the underlying environment in a well-designed system.

7. Is the substance used in production and does it contain an active synthetic ingredient in the following categories:

- a. copper and sulfur compounds
- b. toxins derived from bacteria
- c. pheromones, soaps, horticultural oils, fish emulsions, treated seed, vitamins, and minerals?
- d. livestock parasiticides and medicines?
- e. production aids including netting, tree wraps and seals, insect traps, sticky barriers, row covers, and equipment cleaners?

3. Which evaluation questions do not apply, or need to be modified?

Category 1. Adverse impacts on humans or the environment?

6. Are there adverse biological and chemical interactions in agro-ecosystem?

This should be defined in the context of an aquaculture system. It could include oxygen depletion, or any biological or chemical change that would lead to a need for intervention, such as fungus or disease control or “balancing” chemistry levels of the water in the facility to maximize production.

7. Are there detrimental physiological effects on soil organisms, crops, or livestock?

Organic aquaculture, like other forms of organic agriculture, must rely on the underlying ecology to feed plants and animals, rather than outside inputs. Synthetic materials must not be used to fulfill system functions, but must be only non-routine inputs. Therefore, we suggest the following modification:

7. Are there detrimental physiological and ecological effects on aquaculture crops, animals, or the organisms supporting the aquatic system?

Category 3. Is the substance compatible with organic production practices?

6. Is the primary use to recreate or improve flavors, colors, textures, or nutritive values lost in processing (except when required by law, e.g., vitamin D in milk)?

This is a question worth adding to any list of criteria used to evaluate materials for use in aquaculture. One example of a material that should not be allowed in organic aquaculture under this criteria would be dyes fed to farmed carnivorous fish like salmon, in order to make their flesh appear pink. The purpose of the dyes, no matter if their source is synthetic or from natural sources, is to mask a deficiency in the color of farmed salmon when it is compared to wild salmon. This is deceptive to consumers and should not be allowed in organic production.

4. What new questions need to be asked about aquaculture materials?

Does the material contain bioconcentrating synthetics? There is some precedent for giving special consideration to chemicals that concentrate in the food supply, such as the pesticide residue in processed foods. Similarly, bioaccumulative synthetic chemicals should be considered as synthetic inputs into an aquaculture system when they concentrate above the levels found in the ambient water through the addition of these chemicals from feed made from fishmeal or oil.

5. What information needs to be considered in assessing the essentiality of a material in the context of cultural practices as they apply to water instead of soil ecosystems?

If an aquatic system is managed according to organic principles, it will promote and enhance biodiversity and biological cycles. It will promote and enhance those elements of an aquatic ecosystem that support plant and animal growth, without requiring outside inputs or synthetic materials to fulfill system functions. Synthetic materials, if used, will not be routine.

6. Do different questions need to be asked about carnivorous and herbivorous fish? Carnivorous fish pose additional problems, as has been pointed out by commenters. Because of the bioaccumulation of toxic chemicals, it is difficult to find clean natural foods for carnivorous fish.

Bioaccumulative toxic contaminants in fish used for feed must be considered to be synthetic additives when they are in feed used in aquaculture. The difficulty in finding clean natural foods for carnivorous fish is a compelling reason to exclude carnivorous fish from organic certification and to revisit the 2008 recommendation to focus organic certification on herbivorous fish raised in closed systems.

### Conclusion

The significant and long-term impacts of open net pens on the surrounding environment and ecosystems are incompatible with the principles that organic production should minimize environmental harm and promote biodiversity. Since the Board made recommendations on these two issues in 2008, more information about the impact of open net pens on surrounding ecosystems and the use of wild fish as feed has come to light, calling these recommendations into question. We urge the Board to re-evaluate their recommendations on aquacultured products. A more appropriate standard would require closed, recirculating systems that do not release waste or water into the environment as well as not allow the use of wild fish or fishmeal as feed.

If these criteria can only be met by closed inland systems raising vegetarian fish such as shrimp or tilapia, then that is an appropriate place for the organic aquaculture industry to start. We propose this idea because such systems can provide experience with organic aquaculture systems while minimizing known problems associated with aquaculture systems outside of this scope. We suggest that any standards for aquaculture must include:

- Regulation and monitoring of control inputs, outputs, and fish health and welfare.
- Feeding 100 percent organic feed, as required for all organic livestock and poultry producers. Wild fishmeal and oil must be prohibited in feed.
- Escapes of farmed fish into inland waterways or the ocean must be prohibited.
- Fish must be reared in closed, recirculating systems that do not release waste or water into waterways.
- Aquaculture wastes can be used on farms as fertilizers provided that run-off is contained and does not reach inland waterways or the ocean. Wastes from organic aquaculture facilities must be composted and otherwise managed in the same way that livestock waste is required to be handled under the organic standards.
- Stocking rates for organic herbivorous fish must avoid overcrowding.
- Antibiotics, genetically engineered inputs, hormones and any other substances that are prohibited under OFPA cannot be used in certified organic aquaculture systems, without exception. This includes antibiotics administered directly to fish or added to feed and water. Extra-label uses of drugs and experimental drugs must also be prohibited.