NATIONAL ORGANIC AQUACULTURE WORKING GROUP

WHITE PAPER

May 24, 2005

PROPOSED NATIONAL ORGANIC STANDARDS FOR FARMED-AQUATIC ANIMALS AND PLANTS (AQUACULTURE) WITH SUPPORTING DOCUMENTATION AND INFORMATION

Prepared by the National Organic Aquaculture Working Group

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PREFACE

The challenge to develop national organic standards for farmed aquatic foods, or aquaculture, has been evident since initial efforts by the Livestock Committee of the National Organic Standards Board as early as 1998. Because of numerous unsolved issues and lack of consensus for national organic standards for aquaculture, there are no specific standards or references to aquatic species in the U.S. Department of Agriculture (USDA) Final Rule promulgated in 2002 for most terrestrial crops, livestock, and poultry. This absence of aquaculture standards is recognized by USDA, and it again seeks to develop aquaculture standards for proposal to the public for comment under the Organic Foods Production Act (OFPA) that provides the authority to promulgate such standards.

Although the Act clearly includes fish under the definition of livestock, the Final Rule specifically excludes aquatic animals. The National Organic Program (NOP) has since clarified that the term fish includes shellfish and plants to make definitions consistent for aquatic animals in the Act and Final Rule. The current lack of USDA organic standards for farm-grown aquatic animals has created an unlevel marketing situation for this highly desired healthy food category. This lack of USDA organic standards for aquaculture has resulted in inconsistent organic certification standards and labeling for aquaculture products, particularly by foreign producers. With the increasing interest by consumers for eco-labeled seafood, including organic, the lack of nationally recognized standards has impacted market opportunities, created confusion among seafood customers, and stirred criticism by consumer advocacy groups.

To create a nationally coordinated initiative to support the development of national organic standards for farmed aquatic species, the U.S. Department of Agriculture's Cooperative State Research, Education, and Extension Service recruited and solicited federal and state agencies, individuals, and companies to join a newly created National Organic Aquaculture Work Group (NOAWG). Since its beginning in December 2003, NOAWG under the joint leadership of Deborah Brister, George Lockwood and Richard Nelson, has mobilized expertise both nationally and internationally to review past efforts, consider international standards, evaluate alternatives, employ sound science, and to now propose organic standards for consideration by USDA.

This White Paper is a product of NOAWG and represents a peer-reviewed document that has been developed by many participants who are involved in a wide range of aquaculture and organic activities. It is intended to serve as a primary reference and discussion document for organic aquaculture in the United States. As such it is proposed to be reviewed and

deliberated within the process of the National Organic Standards Board and the National Organic Program to recommend organic standards for aquaculture. It is also intended to further educate interested persons to understand the unique aspects of aquatic-based organic production systems compared to more familiar terrestrial-based operations.

Lastly, the co-editors would appreciate comments and suggestions that can contribute to developing national aquaculture standards that comply with organic principles for production and handling, and that clearly meet consumer expectations for organic certified and labeled farmed aquatic foods.

ACKNOWLEDGEMENTS

We wish to thank the many persons who contributed their time and expertise freely and voluntarily to prepare this comprehensive White Paper. These individuals represent a broad range of knowledge and experience that are needed to address the variety of topics and complex issues presented. We also recognize the initiatives by the University of Minnesota in organizing the first National Organic Aquaculture Workshop convened in the United States in 2000 followed by an International Organic Aquaculture Conference held in 2003. These two events, in addition to numerous technical sessions at national aquaculture conferences, and presentations on organic aquaculture as early as 1998, offered important forums that have evolved over time into more focused, nationally coordinated efforts. In this regard, we appreciate the U.S. Department of Agriculture's Cooperative State Research, Education and Extension Service for facilitating the formation of the National Organic Aquaculture Work Group (NOAWG) that has assumed a national leadership role in supporting and developing much needed national organic aquaculture standards for U.S. consumers.

Another significant contributor to this White Paper is the previous work by the Aquaculture Working Group formed under the auspices of the National Organic Standards Board. Reports and recommendations from this Working Group in 2000 and 2001 provided a solid foundation of information along with more recent developments of organic aquaculture standards by numerous international organic certifying organizations. Lastly, we greatly appreciate the encouragement of the U.S. Department of Agriculture's National Organic Program to prepare this White Paper as a contribution to assist in promulgating national organic standards for farmed aquatic foods.

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ORGANIC AQUACULTURE STANDARDS

I. INTRODUCTION

This document is a peer-reviewed proposal for organic standards for aquaculture products in the United States. It is also intended to serve as a primary resource for the National Organic Standards Board (NOSB)Aquatic Animal Task Force as they develop aquaculture standards.

The recommended standards in this document are proposed for formal adoption through public rulemaking processes administered by the National Organic Program (NOP)of the US Department of Agriculture (USDA) pending recommendations by the NOSB. This document is submitted by the National Organic Aquaculture Work Group (NOAWG) that was formed in 2003 to create an alliance of interested parties in government, industry and academia, and to mobilize expertise to develop organic standards for aquaculture products in the United States (U.S.).

Consumption of organic products in 2001 was valued at $10.4 billion at the retail level in the U.S., with an annual growth of 20% in 2003. This value accounts for 1.4% of total food sales. Organic food is the fastest growing sector in agriculture. The United Nations Food and Agriculture Organization estimates that global organic aquaculture production will increase 240 fold by 2030.

Fish are highly nutritious and are highlighted as an important food category for a healthy diet in the Dietary Guidelines for Americans 2005. The record U.S. per capita consumption of seafood in 2004 demonstrates high consumer demand for aquatic food products, many of which are farm-raised. At present, one out of every three fish consumed in the U.S. is farm grown. Unfortunately, while U.S. consumption of aquaculture grown fish and shellfish is increasing, there are no USDA organic standards for this important and healthy food group. Interested consumers in the U.S. have no opportunity to purchase USDA certified organic farmed fish since none are available.

IMPLICATIONS OF THE LACK OF USDA ORGANIC STANDARDS FOR FARM GROWN FISH

The Final Rule for organic standards implemented on October 21, 2002 created consistent national standards and certification protocols to protect the integrity of the USDA organic seal and gain consumer confidence for organic labeled products. However, because USDA has no national regulation for organic aquaculture products, no enforcement ac-

tion can be taken relative to organic-labeled aquaculture products. This situation has created confusion among both retailers and consumers because of the prohibition to use the nationally recognized USDA organic seal, and implies a lack of consistent national standards similar to other agricultural products. The U.S. organic farming community also supports compliance with national organic standards and the high standards associated with the USDA organic seal for any food items making an organic certification claim.

Aquatic foods are the only major food category in the revised Federal Dietary Guidelines for Americans 2005 that are not referenced or included in the existing USDA national organic standards regulation. The new USDA Food Pyramid lists many food items including "Fish." All except fish are available to U.S. consumers with organic labels. This inequity is unfair to producers who may wish to grow organically certified aquaculture products as well as to consumers who value this choice in the market. Ultimately, consumers will drive the demand and acceptance of organic-labeled farmed aquatic products. Studies underway will provide more scientific data on consumer demand, preferences, and attitudes on organic-certified aquaculture products.

Retailers and fish farmers are aware of the strong demand by consumers for organically labeled seafood. As a result, foreign certification agencies and growers are establishing organic certification for the importation into the United States of foreign grown salmon, shrimp, tilapia, mussels and other species. Foreign producers and seafood importers are not required to comply with any U.S. national standard. This situation poses a major threat and disadvantage to U.S. producers.

The current situation may also impact the acceptance of fish by consumers in organic markets because fish are separated from other animal protein products that meet national organic standards and are sold with the USDA organic seal. According to FAO, active countries producing and certifying organic aquaculture products include Australia, Canada, Chile, Ecuador, Indonesia, New Zealand, Peru, Thailand, and Viet Nam. Additionally, many of the certifying agents accredited by USDA are foreign companies in countries with significant exports of farm-raised aquatic foods into U.S. markets.

PAST ORGANIC AQUACULTURE ACTIVITIES

In 1999, the National Organic Standards Board of the National Organic Program was completing its work in articulating proposed organic standards for a wide range of food items in preparation of final regulations with the establishment of the "Final Rule," and briefly considered possible standards for farm-grown fish. However, representatives of the aquaculture industry requested that industry, aca-

demic and other aquaculture professionals be directly involved in the preparation of such standards. In 2000 an Aquaculture Working Group of 11 people was formed that prepared two reports. "The mission of the group was to explore whether aquaculture is consistent with organic standards and provide a multi-stakeholder perspective to the NOSB for their deliberations." The two Aquaculture Working Group reports recommended that organic standards be adopted for aquaculture production. Copies of these reports are included as Appendix A and B.

In order to more fully examine the issues raised, the NOSB formed an Aquatic Animal Task Force at its June 6–7, 2000, meeting. In October 2001, this task force issued a general recommendation calling for the development of standards for the certification of aquaculture production and a prohibition on the development of standards for the certification of wild harvested aquatic animals. The full task force report is at: *http://www.ams.usda.gov/nosb/FinalRecommendations/Oct01/AquaticTaskForce.html.*

This Task Force concluded that aquaculture production could comply with the requirements of the Organic Food Production Act of 1990. However, since the final recommendations of the NOSB Aquatic Animal Task Force (October 2001) departed significantly from ad-hoc NOSB Aquaculture Working Group majority recommendations, the industry requested that the NOP not proceed further towards the establishment of organic standards for aquaculture at that time. To do otherwise would have placed some major species of potential organic certification (salmon, trout, catfish, shrimp, striped bass, sturgeon, and shellfish) into doubt.

Since 2001, the interest in the certification of aquatic animals has grown significantly. Some USDA accredited organic certification agents have developed private standards to address the market demand for these products.

NEW EFFORTS UNDERWAY

In 2004, the NOP suggested that the matter of national organic aquaculture standards be reviewed again. In response the National Organic Aquaculture Working Group (NOAWG) was formed to review prior efforts and to make further recommendations. This proposal is the result of that effort.

In the meantime, numerous foreign organic certification organizations have adopted standards for a variety of aquaculture products. Foreign growers are producing fish and shellfish to these foreign organic standards for exporting organically labeled fish into the U.S. and European markets.

An umbrella agency, the International Federation of Organic Agriculture Movements (IFOAM), has established *draft*

basic standards for aquaculture. Foreign organizations that certify aquaculture include Naturland (Germany), Soil Association (UK), KRAV (Sweden), and others in Switzerland, Canada, New Zealand, Australia, France, and Iceland. Some of these bodies certify internationally. For example, Naturland certifies farmed salmon production in Chile.

It is the intention of NOAWG to encourage the adoption by the USDA of science-based organic aquaculture standards that are equally rigorous to or exceed foreign standards, and that are consistent with existing NOP standards for diverse agricultural products. In the formulation of these recommended standards, however, NOAWG has referred to foreign standards to compare how common issues are addressed around the world.

STRUCTURE OF THIS WHITE PAPER – PROPOSED NEW SECTIONS FOR AQUACULTURE

This document proposes a number of additions for aquaculture as *amendments to the Final Rule*.

These amendments are proposed as additional new aquaculture sections of the Rule. They incorporate all existing standards for livestock that apply to aquatic animals. These new sections for aquaculture are proposed as separate because, while fish and shellfish are considered livestock in the Act, standards established for poultry, cattle, and other terrestrial animals are not always directly applicable to aquaculture production and handling conditions. To attempt to amend existing livestock regulations, standard by standard, to accommodate unique aspects of aquaculture would produce considerable confusion with potential for error and misunderstanding.

The various international organizations that have established organic standards for aquaculture also separate aquaculture from livestock. Separate sections clearly address the unique aspects of water-based systems compared to traditional soil-based systems, and account for the great diversity associated with aquatic systems and their environments.

Likewise, an amendment is proposed to establish a new section for aquatic plants. To attempt to include aquatic plants with existing standards for terrestrial plants would add considerable complexity and potential confusion as well. The proposed amendments articulated below are followed by an explanation or rationale. The appropriate livestock standards in the Final Rule, the two 2000 Working Group Reports, and information from scientific literature are the basis for the proposed amendments. In some cases parts of international standards are included to evaluate comparability and equivalency.

II. AUTHORITIES CITED

The Organic Foods Production Act of 1990 [7 U.S.C. 6051].

The entire text of this Act ("the Act") is found at << http://www.ams.usda.gov/nop/archive/archive.htm >>. It is the expressed purpose of this title:

(1) to establish national standards governing the marketing of certain agricultural products as organically produced products;

(2) to assure consumers that organically produced products meet a consistent standard; and

(3) to facilitate interstate commerce in fresh and processed food that is organically produced.

In Sec.2103 *Definitions*, the Act states:

As used in this title: (11) Livestock. The term "livestock" means any cattle, sheep, goats, swine, and 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. [Underline added.]

In Sec.2107 *General Requirements*, the Act provides:

(c) Wild Seafood. –

(1) In General.– Notwithstanding section 2107(a)(1)(A) requiring products be produced only on certified organic farms, the Secretary shall allow, through regulations promulgated after public notice and opportunity for comment, wild seafood to be certified or labeled as organic. [Underline added.]

In Sec.2110 *Animal Production Practices and Materials*, the Act requires:

(a) In General. – Any livestock that is to be slaughtered and sold or labeled as organically produced shall be raised in accordance with this title.

(b) Breeders Stock.- Breeder stock may be purchased from any source if such stock is not in the last third of gestation.

(c) Practices.- For a farm to be certified under this title as an organic farm with respect to the livestock produced by such farm, producers on such farm –

(1) shall feed such livestock organically produced feed that meets the requirements of this title;

(2) shall not use the following feed –

(A) plastic pellets for roughage;

(B) manure refeeding; or

(C) feed formulas containing urea; and

(3) shall not use growth promoters and hormones on such livestock, whether implanted, ingested or injected, including antibiotics and synthetic trace elements used to stimulate growth or production of such livestock.

(d) Health Care. –

(1) Prohibited Practices.— For a farm to be certified under this title as an organic farm with respect to the livestock produced by such farm, producers on such farm shall not –

(A) use subtherapeutic doses of antibiotics;

(B) use synthetic internal parasiticides on a routine basis; or

(C) administer medication, other than vaccinations, in the absence of illness.

(e) Additional Guidelines.—

(1) Poultry.— With the exception of 1 day-old poultry, all poultry from which meat or eggs will be sold or labeled as organically produced shall be raised and handled in accordance with this title prior to and during the period in which such meat or eggs are sold.

Sec.2118 *National List*.

(a) In General.— The Secretary shall establish a National List of approved and prohibited substances that shall be included in the standards for organic production and handling established under this title in order for such products to be sold or labeled as organically produced under this title.

There are other provisions in the Act controlling the National List for approved and prohibited substances that are important to aquaculture.

FINAL RULE

The Standards (or Rules) promulgated by the United States Department of Agriculture under the Organic Food Production Act of 1990 are posted at << http://www.ams.usda.gov/nop/NOP/standards/FullRegTextOnly.ht

ml >> as "Regulatory Text Only." This document is commonly referred to as the "Final Rule" and herein as the "Rule."

Under §205.2 *Terms Defined*. The Final Rule provides:

> Livestock. Any cattle, sheep, goat, swine, poultry, or equine animals used for food or in the production of food, fiber, feed, or other agricultural-based consumer products; wild or domesticated game; or other nonplant life, except such term shall not include aquatic animals or bees for the production of food, fiber, feed, or other agricultural-based consumer products. [Underline added.]

However, the exclusion of aquatic animals in this text is inconsistent with the Act. This Rule is to be amended in the future to delete "shall not include aquatic animals." Under the Act, livestock includes "fish used for food," and all regulations pertaining to livestock apply to aquaculture produced fish and shellfish.

Of particular importance for aquaculture in the Final Rule are the provisions relative to livestock including:

§ 205.2 Terms Defined.

§ 205.200 General.

§ 205.201 Organic production and handling system plan.

§ 205.236 Origin of livestock.

§ 205.237 Livestock feed.

§ 205.238 Livestock health care practice standard.

§ 205.239 Livestock living conditions.

§ 205.600 and § 205.604 "National List"

There are other provisions in the Final Rule that apply to aquaculture that must be considered.

The Organic Food Production Act of 1990 and the Final Rule are the authorities for compliance in the establishment of organic standards for aquaculture in the United States.

III. PROPOSED AMENDMENT TO THE FINAL RULE TO

§205.2 *TERMS DEFINED*

The following definitions shall be added to §205.2 Terms Defined. Some definitions are modifications to those in the National Aquaculture Act of 1980, Public Law 96-362, 16 U.S.C. 2801, et seq. and its amendments.

Aquaculture. The propagation and rearing of aquatic animals and plants.

Aquaculture facility. Any land, structure, or other appurtenance used for aquaculture. Such term includes, but is not limited to, any laboratory, hatchery, rearing pond, tank, raceway, net pen, cages, geographically defined seafloor for growing molluscs, or other structure or defined boundary used in aquaculture.

Aquaculture product. Any product of aquaculture, including but not limited to whole alive or dead aquatic animals, gutted fish, fillets and other forms of raw or processed meat, eggs for human consumption, eggs for reproduction, skin and other animal parts, and alive, fresh and dehydrated aquatic plants, either whole or processed. Byproducts from aquatic animals grown in aquaculture, such as, fish meal and oil, silage, and hydrolyzed offal, are included.

Aquatic animal. Any finfish, mollusc, crustacean, or other aquatic invertebrate, amphibian, or reptile, grown in fresh, brackish or saltwater, except birds and mammals.

Aquatic plant. Any plant grown in an aquaculture facility, including microscopic or macroscopic algae, except watercress, rice, water hyacinth, and hydroponic crops.

Aquaculture production system. A process for growing aquatic animals and plants in an aquaculture facility.

Bivalve molluscs. Molluscan shellfish including oysters, clams, mussels and scallops, but not including gastropods and cephalopods.

Broodstock (aquaculture). Sexually mature aquatic animals used to produce progeny that may be incorporated into an organic aquaculture production system.

Coldwater finfish. Finfish that spawn at temperatures below 23^{o}C, including trout, salmon, cod, marine flatfish, northern pike, muskellunge, walleye, sauger, and yellow perch.

Fishmeal and oil. Fishmeal is the clean, dried ground tissue of undecomposed whole fish or fish cuttings, either or both, with or without the extraction of part

of the oil. Fish Oil is the oil from rendering whole fish, fish cuttings, or cannery waste.

Finfish. Aquatic vertebrate animals not including mammals, birds, amphibians and reptiles.

Metabolic products (aquaculture). Solid and dissolved compounds released by aquatic animals during growth in an aquaculture production system.

Monosex stocks. Populations of aquatic animals of one sex obtained by artificially induced or natural processes, or by manual selection.

Shellfish. Aquatic invertebrate animals including molluscs and crustaceans.

Silage (fish). A mixture of solids and liquids obtained by the breakdown of fish tissue through anaerobic fermentation, acid treatment, and with natural enzymes.

Triploid. Aquatic animals with three sets (3n) of chromosomes. Most aquatic animals are naturally diploid (2n). Triploid aquatic animals are typically sterile (non-reproductive) and tend to grow faster than diploid aquatic animals.

Warmwater finfish. Finfish that spawn at temperatures at or above 23^{o}C, including tilapia, bass, sunfish, carp, eel, yellow tail, sea bream, milkfish catfish, paddlefish, ornamentals, and minnows.

Wild fish. Any species of fish or shellfish, raw or processed, harvested from wild sources used for food or in animal feeds, including feeds for aquatic animals.

EXPLANATION

Some definitions of terms are derived from the National Aquaculture Act of 1980, the US Code of Federal Regulations, and those of international organic standards organizations. Coldwater, coolwater and warmwater definitions are patterned after *Fish Hatchery Management* by Piper, McElwain, Orme, et al. Other definitions are original to this document.

National Aquaculture Act of 1980, Public Law 96-362, 16 U.S.C. 2801, et seq. and its amendments, Definitions:

(1) The term “aquaculture” means the propagation and rearing of aquatic species in controlled or selected environments, including, but not limited to, ocean ranching (except private ocean ranching of Pacific salmon for profit in those States where such ranching is prohibited by law).

(2) The term “aquaculture facility” means any land, structure, or other appurtenance that is used for aquaculture and is located in any State. Such term includes, but is not limited to, any laboratory, hatchery, rearing pond, raceway, pen, incubator, or other equipment used in aquaculture.

(3) The term “aquatic species” means species of finfish, mollusk, crustacean, or other aquatic invertebrate, amphibian, reptile, or aquatic plant.

US Code of Federal Regulations (Food and Drug Administration)

21CFR123.3(d) Fish means fresh or saltwater finfish, crustaceans, other forms of aquatic animal life (including, but not limited to, alligator, frog, aquatic turtle, jellyfish, sea cucumber, and sea urchin and the roe of such animals) other than birds or mammals, and all mollusks, where such animal life is intended for human consumption.

21CFR123.3(h) Molluscan shellfish means any edible species of fresh or frozen oysters, clams, mussels, or scallops, or edible portions of such species, except when the product consists entirely of the shucked adductor muscle.

International Standards Organizations

IFOAM defines aquaculture as “The managed production of aquatic plants and/or animals in fresh, brackish or salt water in a circumscribed environment.”

BIO-GRO (New Zealand) provides “Aquaculture includes the farming of many different species using divers forms of production in fresh-, brackish-, and saltwater.

“This standard covers aquatic plants and fish carnivorous, omnivorous and herbivorous organisms of all types and at all stages of growth, grown in any form of enclosure such as earthen ponds, tanks and cages (open and closed system). Wild, stationary organisms in open collecting areas can be certified organic.”

IV. PROPOSED AMENDMENT TO INCLUDE *ORGANIC AQUACULTURE GENERAL* §205.250 (new)

(a) These standards for aquaculture are in addition to all other applicable standards, including livestock standards, and do not replace them. Organic aquaculture facilities growing aquatic animals must comply with applicable livestock standards. Aquatic plants shall meet all the relevant standards for terrestrial crops. Documentation and records required for terrestrial crops and livestock also shall apply to aquaculture.

(b) Aquaculture facility managers shall take measures to minimize the release of nutrients and wastes into the environment. The use of water discharges and filtered metabolic products as nutrients for agricultural crops and constructed wetlands is encouraged to be included in organic production system plans. However, the amounts of such discharges and filtered products applied shall not exceed the requirements of targeted plants in the receiving area, and excessive amounts shall not runoff into unplanned areas.

(c) Aquaculture facility managers shall provide for the health and welfare of aquatic animals, preclude prohibited substances, and minimize contamination of aquaculture products from environmental sources.

(d) Metabolic products of one species are recognized as organic resources for one or more other species in an aquaculture production system. Metabolic products of aquaculture species are not considered animal manure under §205.2, Terms Defined, Manure, and §205.239 (c) Livestock Living Conditions. Where possible, the practice of polyculture of two or more different species grown in the same body of water is encouraged, as is the integration of additional species as water moves through the aquaculture facility or is discharged from it. The use of pond water or its solid metabolic products is encouraged for irrigation of organic terrestrial crops. Aquaponics, the combination of aquaculture and plant hydroponics, is encouraged in organic aquaculture production systems.

(e) Biodiversity of natural aquatic ecosystems, functional integrity of aquatic environments, and the quality of surrounding aquatic and terrestrial ecosystems must be protected. All aquatic animals possessed and grown at an aquaculture facility must be in compliance with all applicable local and national laws.

(f) Adequate measures shall be taken to prevent escapes of cultivated animals and plants from the aquaculture facility and to document any that do occur.

(g) Byproducts from aquatic animals, such as fish meal, fish oil, silage and hydrolyzed offal, produced in an organic production system, and appropriately handled, may be labeled organic.

EXPLANATION

IFOAM, Soil Association, and other international standards organizations all articulate standards for aquaculture that comply with livestock standards, but are separate from them.

Soil Association (UK) states "The general standards for aquaculture must be considered in the context of a whole farm or farming system that is being managed organically. Fish farmers applying for registration for a fish farming enterprise must therefore also comply with all other chapters of these standards as appropriate."

"Siting of production units must take into account the maintenance of the aquatic and terrestrial ecosystems and the impact of the unit on wildstocks of the same of other species in the area."

"The basic characteristics of organic fish farming systems are:

a. The production of fish of prime quality, free from artificial ingredients and with minimal contamination from the environment.

b. Production methods that use natural ingredients and minimize the use of external resources.

c. Management procedures that ensure minimal effect on the local environment.

d. Promotion of health and welfare of fish by minimizing stress, reducing the incidence of disease and nurturing the vitality of fish through meeting their physiological and behavioral needs.

e. Management to a high standard to minimize the need for veterinary intervention

f. The prohibition of pesticides.

g. The application of appropriate standards for the goods and services used by organic fish farms.

The encouragement of the use of local resources and services."

In (c), polyculture and integrated aquaculture mimic natural processes where metabolic products of one aquatic

product become nutrients for other aquatic products. What would otherwise be wasted can become resources for other organic crops.

From *Principals of Organic Production and Handling*

Submitted to the National Organic Aquaculture Work Group by Richard Mathews, Program Leader, National Organic Program:

1.1 Organic agriculture is an ecological production management system that promotes and enhances biodiversity, biological cycles, and soil biological activity. It emphasizes the use of management practices in preference to the use of off-farm inputs, taking into account that regional conditions require locally adapted systems. These goals are met, where possible, through the use of cultural, biological, and mechanical methods, as opposed to using synthetic materials to fulfill specific functions within the system.

1.2 An organic production system is designed to:

1.2.4 Maintain or enhance the genetic and biological diversity of the production system and its surroundings;

1.2.5 Utilize production methods and breeds or varieties that are well adapted to the region;

1.2.6 Provide livestock with optimal living conditions that promote their health and well being;

1.2.7 Recycle materials of plant and animal origin in order to return nutrients to the land, thus minimizing the use of non-renewable resources;

1.2.8 Minimize pollution of the soil, water, and air; and

1.2.9 Become established on an existing farm or field through a period of conversion (transition), during which no prohibited materials are applied and an organic plan is implemented.

1.7 Organic production and handling operations must comply with all applicable local, state, and federal laws and address food safety concerns adequately.

1.9 Genetic engineering (recombinant DNA technology) is a synthetic process designed to control nature at the molecular level, with the potential for unforeseen consequences. As such, it is not compatible with the principles of organic agriculture (either production or handling). Genetically engineered/modified organisms (GEO/GMO's) and products produced by or through the use of genetic engineering are prohibited.

1.10 Although organic standards prohibit the use of certain materials such as synthetic fertilizers, pesticides, and genetically engineered organisms, they cannot ensure that or-

ganic products are completely free of residues due to background levels in the environment.

V. PROPOSED AMENDMENT TO INCLUDE

ORIGIN OF ORGANIC AQUACULTURE ANIMALS §205.251 (new)

(a) Aquatic animals grown in aquaculture to be sold as organic must have been under continuous organic management beginning no later than the second day after the beginning of exogenous feeding, where applicable by species, or beginning no later than when 5% of total market weight has been achieved, whichever is greater. However, in either case, substances prohibited in §205.602 and §205.604 are not allowed during earlier life stages;

(b) Aquatic animals that are removed from an organic production system and subsequently managed on a non-organic facility may not be sold, labeled, or represented as organically produced.

(c) Broodstock that has not been under continuous organic management may not be sold, labeled, or represented as organic slaughter stock.

(d) The producer of an organic aquaculture facility must maintain records sufficient to preserve the identity of all organically managed animals and edible and nonedible animal products to assure reliable traceability from farm to market.

(e) Production of triploid fish from the application of temperature or pressure shock after fertilization and by crossing tetraploids with diploids is prohibited for fish to be sold as organic.

(f) Culture of monosex stocks obtained by crossing sex-reversed broodstock or by hybridization is permitted. Culture of monosex stocks selected by visual or manual means is allowed.

(g) Culture of monosex stocks obtained by direct treatment with steroidal or other hormones (including methyl-testosterone), or by other direct treatment artificial induction methods, is prohibited.

(h) Cultivation of genetically modified aquatic animals and plants is prohibited.

(i) In cases where hatchery progeny of aquatic animals are not commercially available, broodstock may be collected from the wild provided that they are collected in a sustainable manner, and where appropriate, in collaboration with government agencies, to assure that natural populations and the collected individuals are protected and that biodiversity in the ecosystem is supported.

EXPLANATION

Items (a), (b), (c), (d) and (i) are from livestock standards §205.236 *Origin of livestock*, modified for aquaculture. Item (a) is also a recommendation of the 2000 Working Group, while (e), (f), and (g) are new. Item (i) is from *Principles of Organic Production and Handling,* NOP, and Soil Association (UK) standards and complies with Excluded Methods in the Final Rule §205.2 Terms Defined.

Organic Food Production Act:

SEC.2100 [7 U.S.C.6509] Animal Production Practices and Materials reads:

> For a farm to be certified under this title as an organic farm with respect to the livestock produced by such farm, producers on such farm – (3)shall not use growth promoters and hormones on such livestock, whether implanted, ingested, or injected, including antibiotics and synthetic trace elements used to stimulate growth or production of such livestock.

Final Rule:

§205.2 Terms Defined includes:

> Excluded methods. A variety of methods used to genetically modify organisms or influence their growth and development by means that are not possible under natural conditions or processes and are not considered compatible with organic production. Such methods include cell fusion, microencapsulation and macroencapsulation, and recombinant DNA technology (including gene deletion, gene doubling, introducing a foreign gene, and changing positions of genes when achieved by recombinant DNA technology). Such methods do not include the use of traditional breeding, conjugation, fermentation, hybridization, in vitro fertilization, or tissue culture."

The establishment of monosex stocks is a traditional breeding method in both agriculture and aquaculture. Organic production allows many animal species to be grown in monosex culture. The use of all-female monosex flocks of chickens for egg production, and all-female herds of dairy cattle for milk production are standard organic practices.

International Standards Organizations

IFOAM requires that animals shall be raised organically from birth. If organic animals are not available, brought-in conventional animals shall accumulatively spend two thirds of their biomass life span in the organic sys-

tem. Operators shall not utilize artificially polyploided organisms.

Bio Suisse requires "the fish must have been bred at least 2/3 of their life on the organic operation in order to be sold as fully organic."

Naturland requires "The organisms must have been kept and fed at least for 2/3 of their lives in accordance with the Naturland standards before marketing with reference to Naturland is allowed."

Soil Association prohibits:

a. Triploid stocks.

b. Genetically engineered species or breeds.

c. All female stocks.

The prohibition on triploidy follows the British Soil Association and others.

Principals of Organic Production and Handling states:

1.9 Genetic engineering (recombinant DNA technology) is a synthetic process designed to control nature at the molecular level, with the potential for unforeseen consequences. As such, it is not compatible with the principles of organic agriculture (either production or handling). Genetically engineered/modified organisms (GEO/GMO's) and products produced by or through the use of genetic engineering are prohibited.

Alternatives Considered

Continuous organic management. For many or most aquatic animal species, hatchery systems that produce early life forms are by other operators than the organic producer. Therefore, the alternative of organic hatcheries for aquatic animals is impractical in many cases. This is not unlike poultry, where organic management begins the second day after hatch.

Following the poultry precedent, NOAWG proposes that organic management begin no later than the second day after the beginning of exogenous feeding, where applicable by species, or beginning no later than when 5% of total market weight has been achieved, whichever is greater.

Some international standards for organic aquaculture use percentage of market weight as the trigger for organic management. However, the NOAWG proposal that 5% of total

market weight be the trigger for organic management is substantially lower that these international standards.

Triploidy. The 2001 Working Group Report states "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." There are many good arguments to support this position.

However, SEC.2100 [7 U.S.C.6509] Animal Production Practices and Materials of the Act, and Section 205.2 of the Final Rule, proscribe triploidy for aquatic animals to be sold as organic. Therefore the production of triploid fish is not an allowed alternative for fish to be sold as organic.

The 2000 Working Group Report also says, "Additionally, it [triploidy] renders the fish sterile, thus providing a form of biological barrier, helping to protect from any risks posed by escapes of introduced species."

NOAWG proposes that triploid aquatic animals obtained by any means be allowed in an organic aquaculture system for animals that are use for pest control and that are not to be sold as organic. Alternative pest control by using chemicals is not allowed in most cases.

VI. PROPOSED AMENDMENT TO INCLUDE *ORGANIC AQUACULTURE FEED* §205.252 (new)

(a) The producer of organic aquaculture products must provide feeds composed of agricultural products that are organically produced and, if applicable, organically handled: except that nonsynthetic substances and synthetic substances allowed under §205.603 may be used as feed additives and supplements.

(b) Notwithstanding (a), sources of fishmeal and fish oils produced from wild sources are allowed in aquaculture feeds that are certified or labeled as organic. When used in organic aquaculture feeds, fish meal and fish oil must qualify under one or more of the following:

(1) be produced from wild sustainable fisheries stocks not otherwise suitable or destined for direct human consumption taking into account impacts upon by-catch species and the ecosystem.

(2) be trimmings of sustainably managed wild fish and shellfish destined for human consumption, including viscera, spent carcasses (frames), and roe extraction.

(3) be from incidental by-catches of fish captured for human consumption in fisheries where by-catch is legal and adequately regulated, to avoid waste of fishery resources.

(4) be from capture fisheries stocks that are sustainably harvested, taking into account impacts upon by-catch species and the ecosystem.

(c) Fish meal and oil from organically raised aquatic animals of a different species are encouraged.

(d) The use of oils rich in Omega-3 fatty acids produced by organically certified microbial processes is allowed.

(e) A minimum of 50% of fish meal used as an ingredient for aquaculture feed shall be derived from products of fish allowed in (b)(1-3) above, or from organic aquaculture, with the balance that is not so derived from marine fisheries described in (4). There are no restrictions on amounts of fish oil obtained from (1), (2), (3) or (4).

(f) Silage from fish in (b) and(c) that are enzyme processed, or produced with acids and bases that are organically certified or approved on the National List, is allowed.

(g) For fish meal and oil used in organic feeds, levels of environmental contaminants must not exceed levels commonly recognized and accepted as low. Such contaminants include dioxins, polychlorinated biphenyls (PCBs), polybrominated diphenyl ethers (PBDEs), lead, cadmium and mercury.

(h) Feed and feeding practices must meet the minimum nutrient requirement for the aquatic animal and minimize the nutrient contribution to receiving waters. Specific protocols shall remain under the purview of the producer, certifying agent, and feed manufacturer.

(i) Where practical, it is encouraged that aquatic animals be provided their natural feed sources as closely as possible.

(j) Meal and oil from certified organic grain products are allowed in aquaculture feeds.

(k) Feeds for aquaculture products for human consumption must assure high human food safety standards, healthfulness, and integrity of nutritional benefits.

(l) Natural sources of pigmenting compounds approved by the U.S. Food and Drug Administration for inclusion in feeds are allowed.

(m) Mineral supplements in feeds shall not exceed requirements of the specific aquatic animal.

(n) The producer of an organic aquaculture system shall not:

(1) incorporate any type of antibiotic or hormone in feeds;

(2) provide feed supplements or additives in amounts above those needed for adequate nutrition and health maintenance of the species at its specific stage of life;

(3) feed by-products from mammalian or poultry slaughter;

(4) use manure from terrestrial animals as either feed or fertilizer;

(5) use feedstuffs extracted with synthetic solvents not approved on the National List;

(6) use feed, feed additives, and feed supplements in violation of the U.S. Federal Food, Drug, and Cosmetic Act;

(7) use artificial and/or synthetic pigments or artificial coloring agents;

(8) use synthetic amino acids in aquatic animal feeds; or

(9) use any genetically modified organism or product thereof as a feed ingredient.

EXPLANATION

Wild fishery resources are not certifiable as organic by USDA accredited organic or other certifiers under established organic standards, while aquaculture feed utilizing fish meal and oil that meet specified criteria in this section may be certified organic. The Stevens amendment copied below is the legal authority for the use of fishmeal and oil from wild resources in organic aquaculture feeds.

USDA-NOP and NOSB Policy Statements copied below also provide authority for the inclusion of fishmeal in feed for aquatic animals.

Paragraph (b)(1) of this proposed standard applies to wild fishery resources where little, if any, product is used for human consumption. This includes menhaden. Paragraph (b)(4) covers fisheries where a significant amount of the harvest is for direct human consumption. This includes certain species of sardines and anchovies. The maximum amount of 50% specified in (e) for fish meal under (b)(4) is intended to conserve those fisheries capable of providing fish for human consumption.

The conditions in (b)(1) and (b)(4) requiring consideration of impacts upon by-catch and the ecosystem apply, for example, to higher trophic level fish of commercial value and other life that depend upon the target fishery from which meal and oil are produced.

Paragraphs (a) and (h) are modifications of livestock feed standards §205.237. Paragraph (b) is recommended in the 2000 Working Group Report, modified in this proposal to include additional requirements, including some from various international standards. Paragraphs (e), (g), (i), and (n) include conditions from various international standards. Others including (c), (d), (f), (j), (k), and (m), are new in this proposal. Paragraph (k) is included to assure that organically produced fish contain levels of Omega-3 fatty acids comparable to their natural counterparts.

Alternatives Considered

Fishmeal provides a natural supply of essential amino acids in feeds to meet critical nutritional requirements for salmon, trout, shrimp and catfish, and other commercially important aquatic animals, during part or all of their life-cycle, in amounts greater than 5% of their ration. This maximum level of 5% was recommended in the 2001 Aquatic Animal Task Force Report. Of the most highly consumed aquaculture seafood in the United States, only tilapia can be grown with this restriction. Furthermore, even if feasible, the use of such low amounts of fish meal in the diets of carnivorous fish would be unnatural. Therefore, this alternative is unsuitable.

The 2000 Working Group report recommended unlimited amounts of fishmeal from sustainably managed fisheries.

NOAWG, after considering the 2000 Working Group Report, numerous international precedents, NOSB and NOP guidelines, and other information, proposes standards for restricted use of fishmeal. NOAWG also recognizes the sustainability of fisheries used for fishmeal production, and possible heavy-metal, PCB, dioxin, and pesticide contaminants.

The Stevens amendment reads:

"This section complies with Sec.2107 *General Requirements*, of the Organic Food Production Act of 1990, as amended, that provides:

(c) *Wild Seafood. –*

> *(1) In General.– Notwithstanding section 2107(a)(1)(A) requiring products be produced only on certified organic farms, the Secretary shall allow, through regulations promulgated after public notice and opportunity for comment, wild seafood to be certified or labeled as organic."*

Commonly accepted definitions of "seafood" include "edible marine fish and shellfish." "Edible" means "fit to eat." Most dictionaries searched do not limit "edible" to human consumption. In nature, wild carnivorous fish find other wild fish "fit to eat."

Therefore, for purposes of interpreting the Stevens amendment to OFPA, fishmeal and oil produced from any species of wild fish are allowed in organic aquaculture feed rations.

USDA-NOP and NOSB Policy Statements

In addition to the Stevens amendment, a recent Guidance Statement and Policy Statements by NOP and NOSB allow the use of fish meal in feeds for aquatic animals.

NOP Guidance Statement, 4/13/2004C

"This statement provides for the use of fishmeal as a protein source in feeding organic livestock because section 205.237 [of the Final Rule] allows the use of supplements in livestock feed provided they are not used in amounts greater than those needed for adequate nutrition and health maintenance."

National Organic Program Policy Statements

http://www.ams.usda.gov/nop/NOP/PolicyStatements/USDANOSBFeedback3_10_05.pdf

USDA-NOP Policy Statements include "*fishmeal is nonsynthetic" and "fishmeal preserved with natural substances may be allowed as a feed additive or feed supplement;" "use of fishmeal must comply with FFDCA* [Federal Food Drug and Cosmetic Act] *requirements;" and that "any synthetic preservatives added to fishmeal must first be added to the National List through rulemaking."*

In addition, NOSB states:

- o Fishmeal is nonsynthetic.
- o Fishmeal preserved with natural substances and that would not be harmful to human health or the environment should be allowed as a feed additive or feed supplement for organic production, in accordance with 7 CFR §205.237(a), 7 CFR §205.237(b)(2) and 7 CFR §205.238(a)(2).
- o The use of fishmeal must comply with all applicable requirements of the Federal Food, Drug, and Cosmetic Act (FFDCA, 21 U.S.C. 301 et seq.), as required by 7 CFR §205.237(b)(6).
- o Nonsynthetic (natural) preservative ingredients are allowed in fishmeal used in organic production.
- o Synthetic preservative ingredients may only be used in fishmeal after petition, review, and placement on the National List.

NOSB Statement on Future Work:

o The status of fishmeal for use in organic aquaculture should be considered during the development of NOP aquaculture standards. Issues including the sustainability of fisheries exploited for fishmeal production and possible heavy-metal, PCB, dioxin, and pesticide contaminants in fishmeal should be addressed during the development of aquaculture standards.

o If NOP standards and definitions are developed for the production of organic fishmeal, then only organic fishmeal can be used as a feed, feed supplement, or feed additive for any organic livestock, in accordance with 7 CFR §205.237(a), which requires the use of organic feed.

International Standards Organizations

A review of international standards indicates that some organic standards organizations require one or more additional requirements that fish meal and oil must be:

* by-products from organic and wild sources not otherwise suitable for human consumption
* from the same geographical region
* from fisheries certified that they are sustainably harvested, taking into account impacts upon by-catch species and the ecosystem
* from trimmings of fish processed for human consumption from by-catches of captures for human consumption

Some standards limit:

* fish meal and oil to 30% of total feed ration
* levels of residues

Some prohibit:

* fish meal and oil processed from fish that are harvested from food grade fisheries
* slaughter products for the farmed species, or from terrestrial animals
* artificial, synthetic or nature identical pigmentation, synthetic antioxidants and preservatives, and artificial coloring agents
* feedstuff derived by solvent extraction (e.g., hexane)

* high energy diets of more than 28% oil
* containing high levels of persistent organic compounds with low contamination of PCBs, lead, cadmium and mercury
* pure amino acids
* genetically engineered organisms or products thereof

2000 Working Group Report

The Working Group recommended that fishmeal and fish oils from sustainably managed fisheries 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.

The 2000 Working Group also recommended that a producer of an organic aquaculture 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).

International Standards Organizations

IFOAM recommends that “animals shall be fed organic feed.

Operators may feed a limited percentage of non-organic feed under specific conditions for a limited time in the following cases:

• organic feed is of inadequate quantity or quality.

• areas where organic aquaculture is in early stages of development.

In no case may the percentage of non-organic feed of agricultural origin exceed 15% dry matter calculated on an annual basis.

Operators may use non-organic aquatic animal protein and oil sources provided that such sources:

a) are harvested from independently verified sustainable sources;

b) are verified to have contamination levels below limits established by standard setting body; and

c) do not exceed 50% of the diet.

Non-organic feed sources may not exceed 50% of the ration.”

Naturland (Germany) has the following requirements regarding fishmeal/-oil as feed:

“Principally, fishmeal/-oil shall originate from the same geographical region as the aquaculture operations isoperations are located in. The following sources are permitted:

* Fishmeal/-oil from fisheries certified independently as sustainable, taking into account as well impact on target species as on by-catch species and the ecosystem
* Fishmeal/-oil from trimmings of fish processed for human consumption
* Fishmeal/-oil from by-catches of captures for human consumption.

"The use of fishmeal/-oil from other sources may be applied for the solely purposes of safeguarding quality and only up to a limited amount (maximum 30% of total fishmeal/-oil, referring to total life span of fish)."

Soil Association (UK) provides "A minimum of 50 per cent of the feed ingredients of aquatic origin must be derived from the by-products of wild caught fish from human consumption. The balance not derived from such by-products must be derived from wild marine resources independently certified as sustainable by an approved certification body (such as through the Marine Stewardship Council)."

"The following are prohibited:

a. Fishmeal from dedicated fishmeal harvesting and manufacturing operations that are not independently certified as sustainable.
b. Fishmeal or other processed ingredients derived from the same species or from farmed salmonids or terrestrial animals.
c. Artificial, synthetic or nature identical pigmentation.
d. Growth regulators, hormones or appetite stimulants.
e. Feedstuffs derived by solvent extraction.
f. Genetically modified organisms or products/ingredients derived from them.
g. Synthetic binders.
h. High energy diets (defined as more than 28 per cent oil) aimed at enhancing fish production or fast tracking."

French Ministry of Agriculture and Fisheries "In view of the specific nature of these specifications owing to the nature of the living environment of the animals concerned and the fact that the specific diet of certain families of fish (salmonids, bass, char, etc.) mainly bred and consumed is primarily carnivorous, the protein and lipid fractions

of the feed must be predominantly of aquatic origin. Fish meals and oils shall originate from pelagic fishing of wild fish of species managed by quotas, or from “fallen” fish originating from fishing intended for human consumption, or from fodder fish bred in accordance with organic production so as to reduce the pressure on fish stocks.

“Fish meals and oils and also fish protein concentrates analysed must not reveal contamination by synthetic chemical pollutants and heavy metals greater than the indicative values set out below:

PCBs: 2 ppm maximum per kg at a moisture rate of 12%

Lead: 10 ppm maximum per kg at a moisture rate of 12%

Cadmium: 2 ppm maximum per kg at a moisture rate of 12%

Mercury: 0.5 ppm maximum per kg at a moisture rate of 12%

“Nevertheless, and in order to limit the impact of such an obligation on fish stocks and marine ecosystems, the proportion of plant or animal ingredients originating from organic production used in the feed formula intended for farmed fish must be at least 30% for all species. This maximum proportion is to be raised to 40% three years after the publication in the Official Gazette of the French Republic of these “fish” specifications for non-carnivorous species. In the case of carnivorous species, this proportion is to be increased while taking account of the nutritional needs of each species and avoiding pollution brought about by an imbalance in the feed.

“Any incorporation of meat products and of meat and bone meals from terrestrial animals in the fish feed shall be prohibited, whatever the origin (whether or not organically produced). Other products of terrestrial animals (milk products or egg products) must originate from organic production.

“Fish meals used may only be manufactured by processes which do not impair their nutritional qualities. Soluble fish protein concentrates obtained solely by physical processes are permitted.”

“Feed for fish reared extensively in fresh water must, as far as the live part is concerned, originate from flora and fauna produced by the breeding environment managed the operator.”

BIO SUSSE (Switzerland) “For salmonides [sic] and other carnivorous fish species, the addition of fish meal and fish oil is allowed. It has to be produced either from

residues of edible fish processing or come from provably sustainable fishing."

AgriQuality (New Zealand) requires "Aquaculture feeds shall generally contain 100% certified organic components or wild feed resources. When supplying food collected from the wild, the "Code of Conduct for Responsible Fisheries" (FAO, 1995) shall be followed. In systems using brought in feed inputs, at least 50% of the aquatic animal protein in the diet shall come from by-products or other waste and/or other material not suitable for human consumption."

TUN (Iceland) "Certified organic by-products and wild marine resources otherwise not directly suited for human consumption should be used as feeding ingredients. Feed produced from wild marine species must, as much as possible, be derived from certified sustainable fisheries. Feed materials from wild aquatic resources must be from certified sustainable fisheries by a certifier recognized by TUN. If such materials are unavailable at least 50% of the aquatic animal protein in a diet shall be from byproducts, and the rest shall be from species not usually intended for human consumption.

Substances prohibited for use in feed products:

a. Synthetic growth promoters, stimulants and appetizers.
b. Synthetic antioxidants and preservatives, artificial coloring agents and urea.
c. Materials from the same specie as to be fed.
d. Feedstuff subjected to solvent (e.g. hexane) extraction.

Pure amino acids.

VII. PROPOSED AMENDMENT TO INCLUDE *ORGANIC AQUACULTURE HEALTH CARE* §205.253 (new)

(a) The aquaculture producer must establish and maintain preventive health care practices, including:

(1) Selection of aquatic animals and plants with regard to suitability for site-specific conditions;

(2) Provision of a source of nutrition or feed sufficient to meet nutritional requirements, including vitamins, minerals, protein and/or amino acids, fatty acids, and energy;

(3) The maintenance of healthy water rearing conditions including control of potentially toxic metabolic compounds (ammonia and carbon dioxide) within acceptable ranges for the species, appropriate water temperatures, adequate levels of oxygen, and pH, with the prevention of extended excursions to stressful extremes. Efforts to maintain such conditions must be documented by a suitable monitoring and record keeping program for key water quality parameters that affect health. The frequency of such monitoring shall depend on the culture system, site, species, life stage, and environmental characteristics;

(4) Establishment of biosecurity measures to protect against entry of pathogens into the aquaculture production system, and operational procedures and sanitation practices to minimize the occurrence and spread of pathogens;

(5) Provision of conditions that allow for freedom of movement and minimization of stress appropriate to the species;

(6) Implementation of physical accommodations to the aquaculture facility as needed to promote the animal's welfare and minimize pain and stress; and

(7) Administration of vaccines, other veterinary biologics, and approved natural supplements, such as supplementation or treatment of healthy animals with endemic beneficial bacteria, appropriate to the species and location.

(b) When preventive practices and veterinary biologics are inadequate to prevent disease, a producer may administer synthetic medications, provided that such medications are allowed under §205.603. Parasiticides allowed under §205.603 may be used on:

(1) Brood stock, but none that are to be sold, labeled, or represented as organically produced.

(c) The producer of organic aquaculture products must not:

(1) Sell, label, or represent as organic any aquatic animal or edible product derived from any aquatic animal treated with antibiotics, any substance that contains a synthetic substance not allowed under §205.603, or any substance that contains a nonsynthetic substance prohibited in §205.604.

(2) Administer any type of animal medication, other than approved vaccinations, in the absence of illness;

(3) Administer hormones for growth promotion;

(4) Administer synthetic parasiticides;

(5) Administer animal drugs in violation of the U.S. Federal Food, Drug, and Cosmetic Act; or

(6) Withhold medical treatment from a sick animal in an effort to preserve its organic status. All appropriate medications must be used to restore an animal to health when methods acceptable to organic production fail. Aquatic animals treated with a prohibited substance must be clearly identified and shall not be sold, labeled, or represented as organically produced.

EXPLANATION

This section is from the 2000 Working Group Report, which was drafted, in part, from §205.238 Livestock health care practice standard

International Standards Organizations

IFOAM states that "Organic management practices promote and maintain the health and well-being of animals through balanced organic nutrition, stress-free living conditions appropriate to the species and breed selection for resistance to diseases, parasites and infections.

Operators should identify the cause of outbreaks of disease or infection.

Operators should implement management practices including siting criteria that can diminish the causative events and future out-breaks of disease.

Operators should use natural methods and medicines, as the first choice when treatment is necessary.

Prophylactic use of veterinary drugs is prohibited.

Use of antibiotics is prohibited.

Synthetic hormones and growth promoters are prohibited.

Soil Association (UK) requires: "If illness does occur, treatment should be directed at complementing the stock's natural ability to recover and correcting the imbalance that created the disorder, rather than just dealing with the symptoms. Rapid diagnosis must be made and appropriate action taken in consultation with the farm's veterinary surgeon. Where possible the affected stock should be isolated and quarantine procedures brought into operation.

"Treatment must be given even if the stock will lose its organic status. Failure to treat could lead to the fish farm losing certification.

"Withholding periods for stock treated with licensed veterinary medicines shall be twice that defined in the product license or by the prescribing veterinarian and shall not be less than 14 days.

"Vaccines that have not been genetically engineered may be used where there is a known disease risk to the operation as part of a disease prevention strategy. Any vaccines should be directed at the specific disease risk in question, not administered as a general preventative."

VIII. PROPOSED AMENDMENT TO INCLUDE

***ORGANIC AQUACULTURE LIVING CONDITIONS* §205.254** (new)

(a) Aquaculture systems must establish and maintain living conditions that accommodate the health and natural behavior of the aquatic animals, including:

(1) an environment operated within the tolerance limits characteristic of the aquatic animal and stage of development by monitoring and maintaining water qualities appropriate for the production system and species including temperature, pH, salinity, photoperiod, dissolved oxygen, ammonia, and nitrite concentrations, without sudden changes or prolonged exposure to extremes;

(2) containment that allows the animals:

(i) freedom of movement and opportunity to exercise within the culture system; and

(ii) minimal potential for injury.

(b) Cultured organisms that are species-distinct or genetically-distinct populations from native organisms in adjacent aquatic environments must 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 (including floods), or facility damage.

(c) Predators must be discouraged from damaging or stressing fish stocks by the use of effective means that are preferably non-destructive both to target and non-target species. Proactive preventive measures such as site selection, physical barriers, repellents, and legal predator harassment and control methods are preferred. When such measures fail, legal lethal measures may be taken only when necessary and with appropriate documentation. Relevant statutory bodies shall be consulted in cases where specific predator problems arise.

(d) Non-organic aquatic animals may be used in aquaculture production systems for controlling pests, such as weeds, snails, and algae. Triploided animals may be employed provided that the animals are legal to culture, are not labeled organic, and are readily separated at harvest from the aquatic animals under organic management.

EXPLANATION

2000 Working Group Report

The Working Group recommended that an organic aquaculture plan should ensure that cultured organisms that are species-distinct or genetically-distinct populations from native organisms in accessible aquatic environments 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.

IX. PROPOSED AMENDMENT TO INCLUDE

ORGANIC AQUACULTURE FACILITIES §205.255 (new)

(a) Location of organic aquaculture facilities shall take into consideration the maintenance of the aquatic environment and surrounding aquatic and terrestrial ecosystem.

(b) Water sources for aquaculture facilities must be carefully selected and managed to avoid potential environmental contaminants that can harm human health.

(c) Facility boundaries shall be clearly identified.

(d) Organic aquaculture facilities shall be at appropriate distances from contamination sources including pesticide drift and other possible contaminants from conventional aquaculture.

(e) Pond berms and tank tops shall be at sufficient elevations to prevent contamination from the environment during floods.

(f) Negative environmental impacts from aquaculture production must be minimized. Effluent discharges must not contribute to degradation of the environment by suspended and dissolved solid metabolites.

(g) Recycling of nutrients is encouraged.

(h) It is recognized that in some situations metabolic discharges may enrich and benefit the local environment.

(i) Effluent discharges must comply with all local, state and national water quality laws and regulations, and include treatment when necessary.

(j) Facilities must include preventative measures against possible escapes into the natural environment of the aquatic animals in production, including during local floods.

(k) Open water net-pens and enclosures are permitted where water depth, current velocities and direction, stocking densities, and other factors act to adequately disperse metabolic products in order to minimize accumulation of discharged solids on the bottom sediments under the net pens. However, water currents should not be excessive to cause the fish to expend excessive energy to swim and to be unable to consume food. Monitoring shall be employed to ensure that the natural assimilative capacity at the site is not overburdened. Use of multiple species of aquatic plants

is encouraged to recycle nutrients. Chemical treatment of biofouling organisms on nets is not allowed. An organic conversion period of at least one year, or one crop cycle, whichever is less, shall be required.

(l) Production systems with direct soil-water contact are allowed provided that a conversion period of one year or one crop cycle, whichever is less, occurs under organic management before production can be certified organic as specified in §205.202, Land requirements.

(m) Organic conversion periods for production systems with containment vessels of plastic, metal or concrete surfaces shall be at least one year, or one crop cycle, whichever is less.

(n) Recirculating systems are permitted if the system supports the health, growth, and well-being of the species, including:

(1) minimization of disease organisms being introduced vertically through eggs or otherwise from parents, from water inflows, from feeds, from vectors including birds, and humans, or other sources.

(2) frequent testing to provide for the maintenance of healthy water conditions that meet the natural requirements of the species with respect to control of potentially toxic metabolic compounds (ammonia, carbon dioxide, etc.), optimum temperatures, adequate levels of metabolic inputs (oxygen and feed), and pH, all within acceptable ranges depending upon the species, with the prevention of excursions to stressful extremes, and with sufficient dewatering and rewatering to prevent accumulation of toxic compounds.

(3) minimization of other health compromising stresses.

(4) stocking density levels that take into consideration animal health and overall well-being, including the natural schooling characteristics of the species.

(5) the provision of adequate backup life support systems to provide appropriate maintenance of water quality and dissolved oxygen levels in the event that primary life support systems fail.

EXPLANATION

Item a) is modified after the Soil Association (UK). Item d) is new. Item e) is from the 2000 Working Group report.

Various international standards require different conversion conditions for aquaculture facilities, including:

- No conversion period necessary for open water facilities
- At least one life cycle of the organism
- Converting and non-organic units must be adequately separated and clearly identified in order to prevent cross-contamination or accidental mixing

Other requirements include:

* Maximum stocking densities of 10 kg fish/m^3 in net pens
* Artificial lighting, when necessary, shall not exceed 16 hours
* Artificial aeration/oxygen not permitted
* Inlets and outlets to ponds must be adequately screened
* Prohibiting and allowing certain construction materials
* Prohibit the destruction of certain environments for the construction of ponds

2000 Working Group Report

For 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 for organic aquaculture.

The group reported that significant progress is being made in aquaculture regarding nutrient management in open waters, making siting of net pens in such areas appropriate for organic aquaculture. It also underscored that open ocean net pens provide natural environments for some fish, even more so than fish ponds or closed systems.

The report states that recirculating systems are usually indoor systems but, depending on the climate, can also be outdoor systems, or a combination. Culture water is sometimes filtered and recycled back to the fish, or circulated through beds of vegetables, fruits, grasses, or flowers.

International Standards Organizations

IFOAM recommended standards state “Conversion in organic aquaculture production reflects the diversity of species and production methods.

Production units should have an appropriate distance from contamination sources and conventional aquaculture.

The conversion period shall be at least one life cycle of the organism or one year whichever is shorter.

Operators shall ensure that conversion to organic aquaculture addresses environmental factors, and past use of the site with respect to waste, sediments and water quality

Organic management maintains the biodiversity of natural aquatic ecosystems, the health of the aquatic environment, and the quality of surrounding aquatic and terrestrial ecosystem.

Production should maintain the aquatic environment and surrounding aquatic and terrestrial ecosystem by using a combination of production practices that:

- Encourage and enhance biological cycles
- Provide for biodiversity through polyculture and maintenance of riparian buffers with adequate plant cover.

Converting material of plant and animal origin into animal production results in nutrient and energy losses. For this reason feed sources based on by-products and waste materials of biological origin not suitable for human consumption should be encouraged.

Operators shall take adequate measures to prevent escapes of introduced or cultivated species and document any that are known to occur.

Operators shall take verifiable and effective measures to minimize the release of nutrients and waste into the aquatic ecosystem.”

Naturland requires “Stocking densities in net cages (for salmonids) shall not exceed 10 kg fish/m^3, based on the anticipated harvest weight. In no case the animals shall display any injuries (e.g. of the fins) indicating too high stocking densities.”

“The husbandry conditions must enable the animal to behave in a way natural to the species…” “The water quality (e.g., temperature, pH, salinity, oxygen, ammonium and nitrate concentrations) must conform to the natural requirements of the species in question. If artificial light is provably necessary, then the simulated day length shall not

exceed 16 hours." "Permanent artificial aeration/oxygen is not permitted."

Soil Association (UK) requires "The conversion period shall generally be at least one production cycle of the organisms in question. During that period the stock must be managed to full organic standards, including implementation of the integrity management system.

"During the progressive conversion of a holding, the organic, converting and non-organic units must be adequately separated and clearly identified in order to prevent cross-contamination or accidental mixing. There must be sufficient physical and managerial separation between the units to ensure that the organic operation is inspectable and can maintain its integrity. All stock on one and the same unit must be managed to the same standards.

"Siting of production units must take into account the maintenance of the aquatic and terrestrial ecosystems and the impact of the unit on wild stocks of the same or other species in the area.

"Nets and floating structures must be securely moored, properly maintained and regularly checked to ensure that they remain secure and undamaged. The construction material of net pens should be smooth enough to prevent risk of injuring fish during stormy conditions.

"The impact on the sea/lake bed below net pen sites must be minimal and fall within the specific limits defined in the integrity management manual."

"Densities in saltwater pens – maximum of 10kg/m^3 (one per cent)."

Naturland (Germany) requires: "The sea bottom below the new cages should be regularly inspected for organic deposits caused by excrements and feed residues."

"In pond farms … inlet and outlet of the farm shall be protected from invasion by wild fishes as well as from stock escaping. Net cages shall be secured by means of firm anchoring, strong net walls and a type of construction taking into account the prevailing conditions against damage and related escaping of stocks."

Alternatives Considered

Containment facilities. Ponds, tanks and raceways are the major production system types used in aquaculture facilities for some aquatic animals such as catfish, shrimp and trout. Open ocean net pens or cages are a common system type for aquaculture facilities growing salmon and other ma-

rine aquatic animals. Recirculating aquaculture systems are widely used for all life stages of tilapia, and in salmon and trout hatcheries.

All of these system types, inland ponds, open ocean net pens, and indoor recirculating systems are basic alternative systems for aquaculture production with the choice depending on the site and economic considerations. NOAWG proposes that with proper site selection, construction methods, and management practices, each can be acceptable for producing organic aquatic animals and plants. This is consistent with various International Standards.

X. PROPOSED AMENDMENT TO INCLUDE *AQUACULTURE ADDITIONAL* §205.256 (new)

(Reserved)

XI. PROPOSED AMENDMENT TO INCLUDE *MOLLUSCAN SHELLFISH* §205.257 (new)

Organic standards for farmed shellfish, including oysters, clams, scallops and mussels are an important part of aquaculture. A group of shellfish experts from across the U.S. working independently of NOAWG submitted a report to the National Organic Program on May 20, 2005 entitled *Organic Aquaculture Standards for Molluscan Shellfish*. As with other farmed aquatic animals, organic shellfish need to be clearly differentiated from conventional sources.

2000 Working Group Report

"Feasibility of organic standards for bivalve shellfish: Although we do not suggest that organic standards be developed at this time for bivalve shellfish, we urge the NOSB to keep the option open for the future, pending new developments and innovations in that industry that support organic production practices.

"For hatchery produced bivalve shellfish, organic management would start with spat."

International Standards Organizations

IFOAM *Second Revision* draft standards include "Wild, sedentary/sessile organism in open collecting areas may be certified as organic if they are derived from an unpolluted, stable and sustainable environment." [*The Final Revision* draft does not include this provision.]

BIO-GRO (New Zealand) has established standards for organic shellfish. These standards recognize that "Filter-feeding shellfish can concentrate pollutants, pathogens and algal toxins that may be present. Marine farms applying for certification must have a bio-toxin risk management plan approved by BIO-GRO. This must detail:

- Previous toxic blooms detected in the area;
- Proposed water and/or product testing;
- The level of toxin at which harvesting would cease; and
- Product withholding periods that will protect the consumer.

"Harvesting may need to be restricted after heavy rainfall as under certain conditions shellfish can accumulate levels of contaminants that are potential risks to consumers. The minimum standard is defined in the Ministry of Fisheries' *Shellfish Sanitation Standards.* These must be detailed in the application along with a general description of land use in the surrounding area."

"Oyster and mussel farms rely on the natural productivity of the site to supply food for the stock."

Naturland (for mussels only). "Water quality shall be class 1(A) {Number of faec. *Escherichia coli* in mussel tissue is regarded as a valid measure for water quality in marine mussel culture (Class 1 (A): ≤ 3 faec. *E.Coli* counts/g tissue.)} Water quality shall be determined at least monthly by an independent institution. Results have to be documented continually.

"It is not allowed to cultivate mussels loose on the sea bottom and to harvest them by dredge."

XII. PROPOSED AMENDMENT TO INCLUDE

***FARMED ORGANIC AQUATIC PLANTS* §205.258** (new)

(a) Aquatic plant production in any aquaculture production system shall meet all relevant crop production standards.

(b) Aquatic plants may be grown in organic systems for human consumption and as feed for aquatic species that utilize algae for food, provided that:

(1) any pond or containment vessel from which algae are intended to be represented as "organic," must have had no prohibited substances as listed in §205.105, applied for a period of 3 years immediately preceding harvest of the crop, except, non-organic macro-nutrients and micro-nutrients, including trace metals, vitamins, and chelating compounds, are allowed to have been in prior uses where non-synthetic nutrients and compounds suitable for the algae species were not available.

(2) aquatic plants may be provided dissolved non-organic macro-nutrients and micro-nutrients, including trace metals, vitamins, and chelating compounds, where non-synthetic nutrients and compounds suitable for the algae species are not available; however, the dissolved amounts shall not exceed those necessary for healthy growth of the plants, and such culture media shall be disposed of in a manner that does not adversely impact upon the environment.

(3) the pond or containment vessel have adequate berm elevations with distinct defined boundaries and buffer zones with runoff diversions to prevent the unintended application of a prohibited substance to the pond or containment vessel, or allow contact with a prohibited substance applied to adjoining land that is not under organic management.

(c) Manure from terrestrial animals may not be used to fertilize aquatic plants.

EXPLANATION

This is a modification of §205.201 Organic production and handling system plan, and §205.202 Land requirements.

2000 Working Group

No recommendations were made

International Standards Organizations

IFOAM states “Organic aquatic plants are grown and harvested sustainably without adverse impacts on natural areas. The act of collection should not negatively affect any natural areas.

Aquatic plant production shall comply with the relevant requirements of chapters 2 and 4. [crop production standards.]

Harvest of aquatic plants shall not disrupt the ecosystem or degrade the collection area or the surrounding aquatic and terrestrial environment.

XIII. PROPOSED AMENDMENT TO INCLUDE *HARVEST, TRANSPORT, POST HARVEST HANDLING, AND SLAUGHTER* §205.259 (new)

(a) Handling of stock during harvesting, transport, and slaughtering operations must be carried out with minimal disturbance and stress to the aquatic animal. Transportation and slaughter must be done as fast and humanely as possible.

(b) Harvest operations must cause minimal disturbance to the natural environment.

(c) Aquatic animals transported to slaughter and processing, or to live haul markets, shall be transported under conditions appropriate to the species and in such manner to meet the aquatic animal's specific needs and minimize the adverse effects of:

(1) diminishing water quality
(2) time spent in transport
(3) animal density
(4) metabolic substances
(5) escape

(d) Where applicable, animals must be provided a recovery period after transport.

(e) Fish should be held in high quality water for the duration of a fasting period prior to transport and slaughter for a period that allows the clearance of the stomach and gut contents.

(f) Just prior to slaughter, finfish must be killed by a method that renders them instantly insentient before or immediately after they are taken from the water.

(1) Permitted procedures include:
  (i) concussion to the head promptly followed by severing the gill arches or decapitation.
  (ii) electrical stunning immediately followed by severing the gill arches or decapitation.
  (iii) electrocution.
  (iv) ice slurry for warmwater finfish; provided that this method will be only permitted for five years after the date when organic standards for farmed aquatic animals are promulgated as an amendment to the Final Rule.

(2) Prohibited are:
  (i) slaughtering of cold water finfish using ice or ice slurry.
  (ii) use of carbon dioxide.
  (iii) Use of synthetic anesthetics, including MS-222.

(iv) Use of natural plant anesthetics, including clove oil, not approved by the U.S. Food and Drug Administration for this purpose.

(v) Suffocation or asphyxiation (leaving fish to die in air).

(vi) Exsanguination (bleeding) without stunning.

(g) Slaughter using ice or ice slurry is allowed for crustaceans, molluscs, and other aquatic animals that are non-sentient.

(h) All applicable U.S. Food and Drug Administration Hazard Analysis Critical Control Point requirements for raw material acquisition, processing and handling must be followed.

(i) Maintenance of the cold chain from the point of slaughter up to the sales point must be strictly observed in order to prevent any deterioration in product quality. Appropriate time-temperature records shall be maintained.

(j) Strict hygiene must be observed during slaughtering and evisceration to ensure adequate cleanliness.

(k) The disposal of harvest water, blood water, viscera and disinfectant should pose no threat to wild or farmed fish or the environment and comply with existing laws.

(l) The provisions of §205.272 *Commingling and contact with prohibited substances prevention practice standard* from the point of slaughter up to the sales point must be strictly observed.

EXPLANATION

This proposed section has been complied from the applicable standards of IFOAM, Soil Association, and Naturland, coupled with the provisions of §205.272 of the Final Rule.

Ice Slurry in Fish Slaughter

Animal welfare guidelines for the slaughter of sentient or potentially sentient animals recognize that the animal must be rendered insensible (stunned) just prior to slaughter. Blunt trauma to the head and application of sufficient electrical current to render the animal insensible are acceptable methods of humane finfish stunning.

However, for many warm water finfish, blunt trauma and electrical stunning are logistically impractical. The technology for application of a precise blow to the head to stun large numbers of warm water finfish has not been developed. With the exception of channel catfish, the specifications for reliable electrical stunning for most warm water fish have not been developed.

The most common method of slaughter for warm water fish is immersion in ice slurry, which is not recognized as a humane method of fish slaughter. Ice slurry does not render the fish instantly insensible, but causes physiological shock and eventual asphyxiation. To overcome technological limitations, death by immersion in ice slurry is proposed to be temporarily approved for organic certification, governed by the following conditions:

1. In 5 years after adoption of these organic standards for aquaculture, warm water finfish slaughter by immersion in ice slurry will be prohibited.
2. In the interim, research is encouraged to develop technology for humane slaughter practices for warm water species to meet the humane criteria for rapid and effective stunning.
3. Welfare considerations and humane slaughter criteria must be considered in future establishments of welfare and slaughter standards for aquaculture.

Alternatives Considered

Conventional aquaculture practices include suffocating finfish in carbon dioxide enriched ice slurry, leaving fish to die in the air, and bleeding without stunning. These are unacceptable for aquatic animals that are sentient, specifically finfish.

Stunning finfish into an insentient condition prior to killing with blows or electrocution without ice slurry is feasible for certain cold water fish and is proposed by NOAWG. For warmwater aquatic species, such methods require further development. It is expected that during the specified five year time period progress will be made with humane stunning methods for the exempted species of finfish.

References in Scientific Literature (See Appendix C)

2000 Working Group

No recommendations were made.

International Standards Organizations

IFOAM states that “Organic animals are subjected to minimum stress during transport and slaughter. A person specifically responsible for the well being of the animals should be present during transport. To avoid unnecessary suffering, organisms should be in a state of unconsciousness before slaughter.

Operators shall comply with relevant requirements of Section 5.8.[animal husbandry]

The operator shall handle live organisms in ways that are compatible with their physiological requirements.

Operators shall implement defined measures to ensure that organic aquatic animals are provided with conditions during transportation and slaughter that meet animal specific needs and minimize the adverse effects of:

- diminishing water quality
- time spent in transport
- stocking density
- toxic substances
- escape

Operators shall ensure that equipment used to stun animals is sufficient to remove sensate ability and/or kill the organism and is maintained and monitored.

Animals shall be handled, transported and slaughtered in a way that minimizes stress and respects species-specific needs. Finfish shall be anaesthetized before bleeding out."

Naturland requires: "Transportation and slaughter must be done in a way as fast and considerate as possible in order to avoid any unnecessary suffering of the animals. The method of proceeding and the materials used has to be in any case oriented towards the needs of the respective animal species (sensitivity to higher temperature or to stress). Slaughter of fishes shall be carried out by means of incision of gills or immediate evisceration. Prior to this, fishes shall be anaesthetized by means of concussion, electrocution, carbon dioxide and, if need be, by natural plant anesthetics)."

"Live fishes must be provided with adequate oxygen during their transport. A transport density of 1 kg of fish to 8 liters of water shall not be exceeded. Water exchange with water of the same temperature shall be done after a maximum of 6 hours of transport duration. A transport duration of 10 hours shall not be exceeded."

"Maintenance of the cold chain from the point of slaughter up to the sales point must be strictly observed, in order to prevent any deterioration in the product quality."

"The wastewater from the slaughtering and processing plants must be subjected to appropriate purification process."

Soil Association (UK) requires:

- The handling of stock during harvesting and slaughtering operations must be carried out with minimal disturbance and stress …
- Fish should be held in high quality water for the duration of the allowed fasting period prior to slaughter.
- Fish must be killed by a method that renders them instantly insensible immediately after they are taken from the water.
- Strict hygiene must be observed during slaughtering and evisceration to ensure adequate cleanliness. The disposal of blood water, viscera and disinfectant should pose no threat to wild/farmed fish or the environment.
- Concussion to the head following by severing the gill arches is permitted
- Electrocution is permitted.
- Slaughtering using ice, ice slurry or carbon dioxide is prohibited.
- Suffocation (leaving fish to die in air) is prohibited.
- Exsanguination without stunning is prohibited. [Bleeding].

XIV. SUBSTANCES FOR PETITIONING FOR INCLUSION IN §205.600 through §205.604 *NATIONAL LIST OF APPROVED AND PROHIBITED SUBSTANCES*

§ 205.600 Evaluation criteria for allowed and prohibited substances, methods, and ingredients.

The following criteria will be utilized in the evaluation of substances or ingredients for the organic production and handling sections of the National List:

(a) Synthetic and nonsynthetic substances considered for inclusion on or deletion from the National List of allowed and prohibited substances will be evaluated using the criteria specified in the Act (7 U.S.C. 6517 and 6518).[below]

(b) In addition to the criteria set forth in the Act, any synthetic substance used as a processing aid or adjuvant will be evaluated against the following criteria:

(1) The substance cannot be produced from a natural source and there are no organic substitutes;

(2) The substance's manufacture, use, and disposal do not have adverse effects on the environment and are done in a manner compatible with organic handling;

(3) The nutritional quality of the food is maintained when the substance is used, and the substance, itself, or its breakdown products do not have an adverse effect on human health as defined by applicable Federal regulations;

(4) The substance's primary use is not as a preservative or to recreate or improve flavors, colors, textures, or nutritive value lost during processing, except where the replacement of nutrients is required by law;

(5) The substance is listed as generally recognized as safe (GRAS) by Food and Drug Administration (FDA) when used in accordance with FDA's good manufacturing practices (GMP) and contains no residues of heavy metals or other contaminants in excess of tolerances set by FDA; and

(6) The substance is essential for the handling of organically produced agricultural products.

(c) Nonsynthetics used in organic processing will be evaluated using the criteria specified in the Act (7 U.S.C. 6517 and 6518). [below]

§ 205.601 Synthetic substances allowed for use in organic crop production. [see definitions below]

In accordance with restrictions specified in this section, the following synthetic substances may be used in organic crop production: Provided, That, use of such substances do not contribute to contamination of crops, soil, or water. Substances allowed by this section,…

Amend (a)(3) Copper sulfate to include as an algicide in aquaculture ponds.

Amend (a)(5) Ozone gas to read: Ozone gas – for use as an irrigation system cleaner ~~only.~~ and to disinfect water in aquaculture production systems.

Amend (e)(3) Copper sulfate to include as a pest control agent in aquaculture ponds.

(n) [new] As nutrients for aquatic plants in aquaculture. Ammonium sulfate, di-ammonium phosphate, ammonium nitrate, mono-potassium phosphate, potassium hydroxide, potassium chloride, phosphoric acid, and sodium nitrate and sodium nitrate.

(o) [new] As trace elements for growing aquatic plants in aquaculture. Zinc sulfate, ferric chloride, ferric sulfate, magnesium sulfate, copper sulfate, cobalt sulfate, calcium chloride, and calcium nitrate.

(p) [new] Edetate (Versene) as a chelator of trace elements for growing aquatic plants in aquaculture.

(q) [new] Dolomite, dolomitic limestone, calcite, aragonite, gypsum, calcium hydroxide, calcium oxide, limestone, and bicarbonate and carbonates of sodium as sources of magnesium, calcium, and carbonate from natural sources for growing aquatic plants in aquaculture.

(r) [new] Carbon dioxide gas for pH adjustment and plant nutrition.

§205.602 Nonsynthetic substances prohibited for use in organic crop production.

The following nonsynthetic substances many not be used in organic crop production:

(j) [new] Manure from terrestrial animals, including poultry and livestock, in aquaculture.

§205.603 Synthetic substances allowed for use in organic livestock production.

In accordance with restrictions specified in this section the following synthetic substances may be used in organic livestock production:

(a) As disinfectants, sanitizer, and medical treatments as applicable.

(5) Chlorine materials – disinfecting and sanitizing facilities and equipment, and water in aquaculture. Except in aquaculture, residual chlorine levels in the water shall not exceed the maximum residual disinfectant limit under the Safe Drinking Water Act.

(15) [new] Ozone gas to disinfect water in aquaculture systems.

(16) [new] Sodium chloride (NaCl) to kill parasites and epiphytes on aquatic animals and in tanks, ponds and raceways used in aquaculture.

(17) [new] Chloraminet, formalin, benzalkonium chloride (as a disinfectant and treatment), Chloramine-T, and iodophors in aquaculture.

(18) [new] Sanitizers used in aquaculture processing plants.

(d) As feed additives.

(2) Trace minerals, used for enrichment or fortification when FDA approved.

(3) Vitamins, used for enrichment or fortification when FDA approved.

(4) [new] In aquatic animal feeds:

(i) Fish meal and oil.

(ii) Ethoxyquin as an antioxidant.

(iii) Natural astaxanthin.

(iv) Calcium iodate, potassium iodate, sodium selenite, manganese sulfate, manganese oxide, monocalcium phosphate, dicalcium phosphate, deflourinated phosphate, and sodium phosphate.

(v) Formic acid in the preparation of silage.

(vi) Propionic acid in the preparation of silage.

(e)[new] For water quality control in aquaculture production systems.

(1) Carbon dioxide gas for pH control.

(2) Sodium carbonate for carbon dioxide removal.

(3) Potassium permanganate for emergency oxygen supplementation in aquaculture ponds.

(4) Sodium chloride, sea salt, mined salt, gypsum, magnesium sulfate, and potassium manganese sulfate for osmotic and ionic adjustment.

(5) Sodium chloride (NaCl) to control nitrate toxicity in aquatic animal ponds.

(6) Potash, muriate of potash, and magnesium potassium sulfate as a source of potassium to balance pond salinities.

(7) Agricultural limestone (calcitic or dolomitic), dolomite, calcite, aragonite, gypsum, calcium hydroxide, calcium oxide, natural chalk, marl, crushed seashells, and bicarbonate and carbonates of sodium.

(8) Zeolite for ammonia control

(9) Epsom salt in aquaculture

(10) Yucca extract for ?

(11) Pond bacteria amendments for ?

(12) Barley and hay as natural algacides.

(13) Derris root (rotenone) as a natural piscicide.

(f) [new] Bentonite (a natural occurring clay) for reducing seepage rates in earthen bonds.

§205.604 Nonsynthetic substances prohibited for use in organic livestock production.

The following nonsynthetic substances may not be used in organic livestock production:

(a) Strychnine.

(b) [new] Malachite green in aquaculture

(c) [new] Tricaine (MS-222) for any use, including anesthesia, in aquaculture

(d) [new] Methyl testosterone in aquaculture

(e) [new] Manure from terrestrial animals including poultry and livestock in aquaculture.

Definitions
(from the Final Rule and the Act)

Synthetic. A substance that is formulated or manufactured by a chemical process or by a process that chemically changes a substance extracted from naturally occurring plant, animal, or mineral sources, except that such term shall not apply to

substances created by naturally occurring biological processes.

Nonsynthetic (natural). A substance that is derived from mineral, plant, or animal matter and does not undergo a synthetic process as defined in section 6502(21) of the Act (7 U.S.C. 6502(21). For the purpose of this part, nonsynthetic is used as a synonym for natural as the term is used in the Act.

Sec.2103.[7 U.S.C.6502] Definitions

As used in this title:

(21) SYNTHETIC. – The term "synthetic" means a substance that is formulated or manufactured by a chemical process or by a process that chemically changes a substance extracted form naturally occurring plant, animal, or mineral sources, except that such term shall not apply to substances created by naturally occurring biological processes.

ORGANIC FOOD PRODUCTION ACT

SEC.2118.[7 U.S.C. 6517] NATIONAL LIST.

(a) IN GENERAL.—The Secretary shall establish a National List of approved and prohibited substances that shall be included in the standards for organic production and handling established under this title in order for such products to be sold or labeled as organically produced under this title.

(b) CONTENT OF LIST.—The list established under subsection (a) shall contain an itemization, by specific use or application, of each synthetic substance permitted under subsection (c)(1) or each natural substance prohibited under subsection (c)(2).

(c) GUIDELINES FOR PROHIBITIONS OR EXEMPTIONS.—

(1) EXEMPTION FOR PROHIBITED SUBSTANCES.—The National List may provide for the use of substances in an organic farming or handling operation that are otherwise prohibited under this title only if—

(A) the Secretary determines, in consultation with the Secretary of Health and Human Services and the Administrator of the Environmental Protection Agency, that the use of such substances—

(i) would not be harmful to human health or the environment;

(ii) is necessary to the production or handling of the agricultural product because of

the unavailability of wholly natural substitute products; and

(iii) is consistent with organic farming and handling;

(B) the substance—

(i) is used in production and contains an active synthetic ingredient in the following categories: copper and sulfur compounds; toxins derived from bacteria; pheromones, soaps, horticultural oils, fish emulsions, treated seed, vitamins and minerals; livestock parasiticides and medicines and production aids including netting, tree wraps and seals, insect traps, sticky barriers, row covers, and equipment cleansers;

(ii) is used in production and contains synthetic inert ingredients that are not classified by the Administrator of the Environmental Protection Agency as inerts of toxicological concern; or

(iii) is used in handling and is non-synthetic but is not organically produced; and

(C) the specific exemption is developed using the procedures described in subsection (d).

(2) PROHIBITION ON THE USE OF SPECIFIC NATURAL SUBSTANCES. —The National List may prohibit the use of specific natural substances in an organic farming or handling operation that are otherwise allowed under this title only if—

(A) the Secretary determines, in consultation with the Secretary of Health and Human Services and the Administrator of the Environmental Protection Agency, that the use of such substances—

(i) would be harmful to human health or the environment; and

(ii) is inconsistent with organic farming or handling, and the purposes of this title; and

(B) the specific prohibition is developed using the procedures specified in subsection (d).

(d) PROCEDURE FOR ESTABLISHING NATIONAL LIST.—

(1) IN GENERAL.—The National List established by the Secretary shall be based upon a proposed national list

or proposed amendments to the National List developed by the National Organic Standards Board.

(2) NO ADDITIONS.—The Secretary may not include exemptions for the use of specific synthetic substances in the National List other than those exemptions contained in the Proposed National List or Proposed Amendments to the National List.

(3) PROHIBITED SUBSTANCES.—In no instance shall the National List include any substance, the presence of which in food has been prohibited by Federal regulatory action.

(4) NOTICE AND COMMENT.—Before establishing the National List or before making any amendments to the National List, the Secretary shall publish the Proposed National List or any Proposed Amendments to the National List in the Federal Register and seek public comment on such proposals. The Secretary shall include in such Notice any changes to such proposed list or amendments recommended by the Secretary.

(5) PUBLICATION OF NATIONAL LIST.—After evaluating all comments received concerning the Proposed National List or Proposed Amendments to the National List, the Secretary shall publish the final National List in the Federal Register, along with a discussion of comments received.

(e) SUNSET PROVISION.—No exemption or prohibition contained in the National List shall be valid unless the National Organic Standards Board has reviewed such exemption or prohibition as provided in this section within 5 years of such exemption or prohibition being adopted or reviewed and the Secretary has renewed such exemption or prohibition.

APPENDIX A

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 Goldburg, 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. [Note: fishmeal would have to be from sustainably managed sources.]

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 system.
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.]

Net-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 certifiying 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 being 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.

APPENDIX B

AQUACULTURE WORKING GROUP FINAL REPORT
FEBRUARY 6, 2001

Aquatic Livestock Health Care Practice Standard

(a) The producer must establish and maintain preventive livestock health care practices, including:

(1) Selection of species with regard to suitability for site-specific conditions and resistance to prevalent diseases and parasites;

(2) Provision of a source of nutrition or feed ration sufficient to meet nutritional requirements, including vitamins, minerals, protein and/or amino acids, fatty acids, and energy sources

(3) Establishment of appropriate containment and sanitation practices to minimize the occurrence and spread of diseases and parasites including pathogens introduced vertically through eggs or parents,
water inflows, feeds, or other vectors including mammals, birds, and humans;

(4) Provision of conditions that allow for minimal stress from adverse water quality, and human, intraspecific or interspecific interactions, appropriate to the species and stage of development;

(5) Maintenance of healthy water quality appropriate to the species and stage of development; including prevention, where possible, of unnatural rapid environmental changes (e.g. temperature, pH, oxygen, toxins)

(6) Performance of physical alterations as needed to promote the animal's welfare and in a manner that minimizes pain and distress; and

(7) Administration of vaccines and veterinary biologics

(i) When preventive practices and veterinary biologics are inadequate to prevent sickness, producer may administer synthetic medications: provided that, such medications are allowed under §205.603.

(ii) Parasiticides allowed under § 205.603 may be used on brood stock

(b) The producer of an organic livestock operation must not:

(1) Sell, label, or represent as organic any animal or edible product derived from any animal treated with antibiotics, any substance that contains a synthetic substance not allowed under §205.603, or any substance that contains a non-synthetic substance prohibited in § 205.604.

(2) Administer any animal drug other than vaccinations in the absence of illness;

(3) Administer hormones for growth promotion;

(4) Administer animal drugs in violation of the Federal Food, Drug, and Cosmetic Act or biologics in violation of the Virus, Serum, and Toxin Act; or

(5) Withhold medical treatment from a sick animal in an effort to preserve its organic status. All appropriate medications must be used to restore an animal to health when methods acceptable to organic production fail. Aquatic livestock treated with a prohibited substance must be clearly identified and shall not be sold, labeled, or represented as organically produced.

To insert within general organic livestock section of Final Rule:

§ 205.239 Livestock living conditions.

(a) The producer of an organic livestock operation must establish and maintain livestock living conditions that accommodate the health and natural behavior of animals, including:

(1) Access to the outdoors, shade, shelter, exercise areas, fresh air, and direct sunlight suitable to the species, its stage of production, the climate, and the environment;

Except that:

(2) Recirculating systems for aquaculture are permitted if the system being used supports the health, growth, and well-being of the species

NOTE: We understand that the general organic livestock section that requires access to the outdoors will not be changed. However, the Aquaculture Working Group highly recommends that (a)(2) would be inserted to include the option for recirculating systems of aquaculture. The stipulations for what constitutes the qualifier of the recirculating system supporting the health, growth, and well-being of the species are as follows:

a) Minimization of disease organisms being introduced vertically through eggs or otherwise from parents, from water inflows, from feeds, from vectors including birds, and humans, or other sources.

b) The maintenance of healthy water conditions with respect to control of toxins (ammonia, carbon dioxide, etc.), optimum temperatures, adequate levels of metabolic inputs required (oxygen and feed), and pH, all within certain acceptable ranges depending upon the species, with the prevention of excursions to stressful extremes.

c) Prevention of other health compromising stresses.

d) Stocking density must take into consideration animal health and overall well-being.

Aquatic Livestock Living Conditions

(a) The producer of an organic livestock operation must establish and maintain livestock living conditions which accommodate the health and natural behavior of animals, including:

(1) Access to an aquatic environment operated within the tolerance limits characteristic of the species, stage of development, climate, and the environment;
(2) Appropriate water quality conditions;
(3) Containment areas that allow for:
(i) Comfort behaviors, freedom of movement and opportunity to exercise within the culture system;.
(ii) Water quality, including temperature, pH, salinity, photoperiod, and dissolved oxygen, ammonia, and nitrite concentrations within established tolerance limits of the species; and
(iii) Minimal potential for injury;

(b) The producer of an organic livestock operation may provide temporary confinement for an animal because of:
1) Inclement weather
(2) The animal's stage of development;
(3) Conditions under which the health, safety, or well-being of the animal could be jeopardized; or
(4) Risk to soil or water quality
(5) Transport to another organic operation, where transport of livestock should be done under water quality conditions appropriate to the species and in such a manner to minimize stress and harm

(c) Post harvested aquatic animals transported to slaughter/processing or live haul market should be transported under water quality conditions appropriate to the species and in such manner to minimize stress and harm.

(d) The producer of an organic livestock operation must manage inputs
and 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

Feasibility of organic standards for bivalve shellfish:
Although we do not suggest that organic standards be developed at this time for bivalve shellfish, we urge the NOSB to keep the option open for the future, pending new developments and innovations in that industry that support organic production practices.

Modification in November 17th Aquaculture Working Group Report to the NOSB:
Within “Breeding” section: insert ‘bivalve” to describe specific type of shellfish, to read: "For hatchery produced bivalve shellfish organic management would start with spat."

APPENDIX C

References

General

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