The PG does not suggest a time within which slaughter and plucking should occur. Since birds may maintain some nerve sensitivity after death, CFS recommends that they should not be immersed in scalding tanks or plucked until at least 90 seconds have elapsed since major blood vessels in their necks have been severed. This will serve to limit pain, discomfort, and trauma to birds.

The PG allows for a maximum of 2% of birds to have broken or dislocated wings, and no birds should have broken legs. CFS believes by instituting employee training this maximum threshold can be lowered and damages to birds decreased.

Conclusions

All of the Poultry Guideline provisions should address animal welfare training for employees handling animals, especially those performing physical alterations. It is possible to reduce animal suffering by instituting training programs. As CFS has previously recommended, and as is practiced in the EU, it is common for animal welfare regulations to recommend that all employees handling animals attend animal welfare training courses.[39] Even limited training can provide farm workers with information on the sensitivity of animals to negative handling and the practical benefits in ease of management and productivity when positive procedures are adopted.[40] Training can focus on the most common and painful physical alterations, minimizing animal pain and suffering and promoting proper handling. Such limited training need not be cost prohibitive to small farmers, as local veterinarians and even veterinary students could be enlisted and costs potentially subsidized.

The Poultry Guideline should also require regular monitoring and recording of data on aspects of poultry operations to enable producers to track the effects of animal welfare practices on animal health. This data will also facilitate determining whether producers are in compliance with NOSB recommendations and their Organic System Plans.

Materials Committee—Aquaculture

Although the Materials Committee did not include a document on aquaculture for public comment and discussion at the upcoming NOSB meeting in New Mexico, since it is an agenda topic, CFS would like to reiterate its support for moving forward with the development of regulations on this important growth industry for organic.

CFS believes that organic aquaculture has the potential to provide consumers with a healthy, fresh, organic source of fish protein. However, a truly holistic organic regulatory system is needed — from facility siting to fish harvesting — to ensure that organic

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[39] *See, e.g.* Council Directive 2001/93, EC Laying Down the Minimum Standards for the Protection of Pigs, art. 5, 2001 O.J. (L 316) 36-38 (EU).

[40] EU Scientific Veterinary Committee, *The Welfare of Intensively Kept Pigs*, (Sep. 30, 1997) *available at* http://ec.europa.eu/food/animal/welfare/farm/out17_en.pdf (last visited April 8, 2010).

aquaculture systems of production uphold the NOSB's Principles of Organic[41] and the letter of the OFPA law. Moreover, we believe that organic aquaculture production systems can avoid the environmental and human health impacts associated with existing industrial aquaculture production methods and, instead, supply an alternative, efficient, environmentally sound, and humanely produced source of human food protein.[42]

That is why we support the careful development of organic aquaculture regulations, beginning with land-based, closed-loop, recirculating systems. Such systems eliminate fish escapes because they are closed to the outside environment and located removed from water bodies. They minimize environmental impacts by recycling clean water in closed systems with the aid of beneficial microbes and plant species. Small to medium scale aquaculture systems allow for the routine regulation, monitoring, and control of inputs, outputs, pH, water quality, and fish health and welfare. They also allow for the efficient use of energy, space, and water. Waste products generated within the aquaculture system can be utilized and incorporated into the system by the plants and animals living there, minimizing the need for waste disposal outside of the system. Wastes that cannot be avoided, can be repurposed, composted, used as fertilizers or managed in the same way that livestock waste is managed under the organic standards. Water discharged from cleaning and restocking must be made as clean as or even cleaner than when it entered the system.

This type of ecological fish farming system sharply contrasts with ocean-based facilities and open ocean net pens currently used for non-organic aquaculture production, which we do not support. CFS believes that such facilities should ever be allowed to be certified organic because fish escapes are impossible to prevent or control, as is evidenced by numerous case studies from around the world that have documented such releases.[43] Escapes from fish farms not only negatively impact marine biodiversity, but they also disrupt the natural behavior of marine life by introducing alternative food sources, foreign matter, species, diseases, and parasites into the marine environment.

CFS also does not support harvesting wild forage fish to feed farmed fish, under any circumstance, as was recommended by the NOSB in 2008. Organic aquaculture systems must never be allowed to compete with wild marine life for food. Not only is it ecologically unsustainable, but it is also inconsistent with the Principles of Organic[44] production. This is also one of the many reasons why carnivorous fish, such as salmon, which require a protein-rich diet that includes wild fish, fish meal and fish oil, should never be approved as "organic." Moreover, migratory fishlike salmon, whose natural behavior dictates that they migrate from the sea, up rivers, to breed in fresh water, are inappropriate species for fish farming in captivity.

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[41] National Organic Standards Board. (2001) "NOSB Principles of Organic Production and Handling," *NOSB Policy and Procedures Manual,* Revised April 29, 2011.
[42] Research has shown that it takes over three tons of wild fish to produce one ton of farmed salmon. (Naylor. Rosamond et al. (2000). "Effect of aquaculture on world fish supplies," *Nature,* 405: 1017-1024.
[43] See Appendix 1: Chart of Fish Escapes.
[44] National Organic Standards Board. (2001) "NOSB Principles of Organic Production and Handling," *NOSB Policy and Procedures Manual,* Revised April 29, 2011.

Fish feed is one of the critical components of a certifiable organic aquaculture system. In order for farmed fish to be certified organic, OFPA[45] requires that they are fed organically produced feed, as required of other livestock, and reflected in the Organic Rule.[46] The Courts have interpreted these provisions to require that organic livestock receive a 100% organic feed ration. This cannot in any way be legally interpreted to mean that wild forage fish can be considered certified organic because they are not grown and managed in accordance with OFPA.

The only exception to the 100% organic feed ration requirement is allowances for non-synthetic and permitted synthetic substances that are feed additives and feed supplements in §205,252(e). According to OFPA regulations, "feed" includes all "edible materials which are consumed by livestock for their nutritional value" and "encompasses *all* agricultural commodities."[47] Wild fish meal and fish oil do not fall into this category of allowable supplements and additives because they are considered feed.

Keeping these and other important organic parameters in mind, it is clear that not every type of fish farm or fish species can be certified organic. That is why we support the development of organic aquaculture regulations, beginning with land-based, closed-loop, recirculating systems. To that end, we believe that the following principles should provide the foundation for an organic aquaculture system and future regulatory development:

1. Enhancing the biodiversity and aquatic ecology within the system to minimize external inputs. This includes growing plants, bivalves, other shell fish and bottom feeders within the system to filter waste, supply nutrients, and provide habitat and shelter.

2. Prohibiting dangerous inputs and outputs. This includes materials already prohibited in organic such as: antibiotics, genetically engineered inputs, hormones, growth regulators, synthetic pesticides and fertilizers, synthetic dyes and colorants, and all other substances that are prohibited under OFPA.

3. Supplying nutritious, 100% certified organic feed, as is required for all organic livestock and poultry producers under OFPA. The use of wild or non-organic farmed fish meal and fish oil in feed must be strictly prohibited.

4. In an organic aquaculture system, synthetic materials of any type must not be used to fulfill system functions such as feeding and filtering, and they must not be used as a crutch to prop up overcrowded or poorly designed systems. The limited synthetics that are permitted must be thoroughly vetted through a newly established Materials Review process specifically tailored for aquaculture systems. Synthetic Materials already on the National List cannot automatically be allowed in organic aquaculture systems, due to the

[45] 7 U.S.C. §6509 (c)(1)
[46] 7 C.F.R. §205.237
[47] 7 C.F.R. §205.2

different ways in which materials react, persist, dissolve, spread, and are absorbed in water versus soil environments.

5. Stocking rates and the living environment of the system must promote and maintain the health and welfare of fish and other living organisms in a harmonious manner and non-stressful environment that is appropriate to the species, their reproductive needs, and the region in which the facility is located.

6. An Organic System Plan must be required, complete with records and audit trails, to allow certifiers to verify the integrity of the system and track fish products from the aquaculture facility to the point of purchase.

To ensure that such systems can adhere to strict organic standards, we advocate requiring a trial period to test and evaluate model systems, beginning with herbivorous fish species before organic aquaculture is widely commercialized. This would help avoid the pitfalls of permitting a type of fish or system that cannot meet the spirit, intent, and letter of OFPA.

Thank you for your consideration of these comments by the Center for Food Safety.

Respectfully submitted by,

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**Appendix 1:
Escapes from Fish Farms
By Year, Country, Species & Number of Escapes
1996 — 2011**

Year	Country	Species	# of Escapes
2011	Canada/United States	Salmon	Unreported escaped fish being found in Canada and Maine rivers.[i]
2010	Canada	Salmon	13,000[ii]
2010	Canada	Salmon	138,000[iii]
2010	Canada	Atlantic Salmon	33,000;[iv] fish found in Maine rivers
2010	Scotland	Salmon	100,000[v]; hole in the net
2010	Norway	Salmon	70,000[vi]
2009	Canada	Salmon	40,000[vii]
2009	Scotland	Salmon	37,000[viii]
2009	Scotland	Atlantic Salmon	132,051[ix]
2009	Scotland	Rainbow Trout	8,591[x]
2009	British Columbia	Atlantic Salmon	40,000;[xi] holes found in net
Dec. 2008-Jan. 2009	Chile	Salmon & Trout	More than 700,000[xii]; bad weather, multiple farms
2008	Canada	Atlantic Salmon	29,616[xiii]
2008	Scotland	Salmon	58,641[xiv]; 8 instances
2007	United States	Yellowtail	1,500[xv]; cage left open
2007	Norway	Salmon	290,000[xvi]
2007	Scotland	Salmon and Trout	More than 200,000[xvii]
2007	British Columbia	Atlantic, Chinook & Coho salmon	19,168;[xviii] 28 instances
2007	Chile	Salmon	12 million;[xix] occurred during earthquake
2007	World	Salmon	Estimated 3 million;[xx] annual figure
2006	Norway	Salmon	921,000[xxi]*
2004	Chile	Salmon	1 million[xxii]
2000	United States	Atlantic Salmon	More than 100,000[xxiii]; snow storm
2001-2009	Norway	Rainbow Trout	980,000 (110,000 per year)[xxiv]
2001-2009	Norway	Atlantic Cod	1.05 million (175,000 per year)[xxv]
2001-2009	Norway	Atlantic Salmon	3.93 million (436,000 per year)[xxvi]
1997	United States	Atlantic Salmon	300,000[xxvii]
1996	United States	Atlantic Salmon	100,000[xxviii]

* Peak year for Norway fish escapes, the annual number of escapes has declined since then.
(Compiled by the Center for Food Safety, October 2011)

Implications of Escapes

Escapes of farmed fish from open ocean aquaculture facilities, salmon in particular, represent a significant environmental and food security threat, especially given the fragility of wild salmon stocks across the U.S. Detrimental impacts on wild, native fish populations include the following:

- Studies have clearly shown that escaped farm salmon breed with wild populations to the detriment of the wild stocks and that diseases and parasites are passed from farm to wild salmon. Increased production of farmed salmon leads to greater escapes, which leads to a reduction. In some cases, it causes a more than 50 percent reduction in native species.
  - Ford, Jennifer S., and Ransom A. Myers. 2008. A Global Assessment of Salmon Aquaculture Impacts on Wild Salmonids. Plos Biology 6, no. 2 (February 12). http://www.plosbiology.org/article/info%3Adoi%2F10.1371%2Fjournal.pbio.0060033 (accessed November 2, 2011).
- Recurrent sea lice infestations of wild juvenile pink salmon caused by salmon farms have reduced wild pink salmon populations and may result in their rapid local extinction. "It was observed that the mortality of pink salmon due to sea lice was more than 80 percent and surpasses previous fishing mortality. The findings suggest that salmon farms can induce parasite outbreaks that degrade the capacity of the coastal ecosystem to support populations of wild salmon."
  - Krkošk, Martin, Jennifer S. Ford, Alexandra Morton, Subhash Lele, Ransom A. Myers, and Mark A. Lewis. 2007. "Declining Wild Salmon Populations in Relation to Parasites from Farm Salmon." Science 318, no. 5857: 1772-1775. Academic Search Premier, (accessed November 3, 2011).
- The productivity of native juvenile salmon was reduced by more than 30 percent in the presence of farm and hybrid juveniles. A 2003 study found that the lifetime success of hybrids was only 27 to 89 percent as high as that of their wild relatives. Seventy percent of the embryos in the second generation died. "These results provide strong evidence of how interbreeding might drive vulnerable salmon populations to extinction."
  - R. Naylor, Kjetil Hindar, Ian A. Fleming, Rebecca Goldberg, Susan Williams, John Volpe, Fred Whoriskey, Josh Eagle, Dennis Kelso, and Marc Mangel. 2005. Fugitive Salmon: Assessing the Risks of Escaped Fish from Net Pen Aquaculture. Bioscience 55, no. 5 (May). http://foodsecurity.stanford.edu/publications/fugitive_salmon_assessing_the_risks_of_escaped_fish_from_netpen_aquaculture/
- Threats to wild salmon populations are long-lasting and so severe that some researchers have concluded that: "escaped farmed salmon are sufficiently prevalent in eastern North American rivers to pose a potentially serious risk to the persistence of wild salmon populations, especially in those rivers that are adjacent to existing aquaculture sites."

- Morris, R.J., Dylan J. Fraser, Anthony J. Heggelin, Frederick G. Whoriskey, Jonathan W. Carr, Shane F. O'Neil, and Jeffrey A. Hutchings. 2008. Prevalence and recurrence of escaped farmed Atlantic salmon (Salmo salar) in eastern North American rivers. Can. J. Fish. Aquat. Sci. 65 (September): pp 430.

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