August 27, 2012

Joint Subcommittee on Aquaculture
Office of Science and Technology Policy

Comments on the National Aquaculture Research and Development Strategic Plan

Dear Committee:

I am submitting comments on bahlf of the Northwest Atlantic Marine Alliance, a regional organization serving the interests of fishing communities, their fishermen, and the marine ecosystem of the Northwest Atlantic Ocean from the Maine-Canada border to Cape Hattaras, North Carolina. We appreciate the opportunity to comment on the *National Aquaculture Research and Development Strategic Plan*. We hope you will find these comments helpful and would be pleased to provide more information if you decide to pursue some of our suggestions.

Aquaculture could support wild fisheries

As supporters of community fishermen and healthy fishery ecosystems, we object to US aquaculture being developed to provide seafood products that compete with wild fisheries and, when farmed in the sea, pose real threats to the environment and survival of wild fish populations. It is important that any US aquaculture development be done with the full understanding that **aquaculture of popular seafood species are rarely effective in reducing the pressure on wild fish populations or in providing a means of conservation for those species**. To the contrary, aquaculture may further degrade them. Fish farming in particular has threatened wild fish stocks, with salmon being the prime example. Typically a species is chosen and farmed in ecosystems that are home to their commercially valuable wild cousins, and the farmed fish (i) threaten wild populations with diseases that flourish on fish farms and are spread into the wild; (ii) escape in large numbers posing the risk of competition for food and space and the possibility of interbreeding with and weakening the genetics of wild fish of the same species; and (iii) cause nutrient and toxic pollution from the effluent and runoff from fish stock and operations, which can effect all sealife.

Instead of reinforcing competition for access to resources and markets between wild fisheries and aquaculture, **the US should play a leadership role in developing the full potential of aquaculture to support fisheries**. Among other outcomes, aquaculture can restore

degraded estuarine and coastal habitats so they can support more marine life including fishery stocks.

Integrating food production

Policy makers have been too quick to rush to the conclusion that aquaculture must supply seafood to a growing human population. They have not explored whether there would be enough seafood if fish habitat improved to support greater production of wild fish. That should be a prime objective of the research and development strategy. Furthermore, more people would have fish to eat if the distribution and marketing of wild-caught fish were less wasteful and improved to serve local communities populations that need the fish.

When profit is the objective, private aquaculture industry could be developed to provide sustainable sources of processed marine products such as fishmeal and omega supplements (e.g. from farmed algae or marine herbivorous fish). To be ecologically benign, these might be land-based aquaculture facilities. That could reduce fishing pressure on forage, leaving it in the ocean where it can continue to be available to feed wild fish stocks. These types of innovations would give the US marketable technologies and would require the kinds of skilled workforce that are promoted in the draft Plan. In contrast, fish farms usually provide few new jobs and even fewer skilled jobs, and can end up causing the loss of jobs in other part of the food producing system.

Integration of aquaculture with agriculture is not uncommon around the world, but offers some innovative farming that has not been fully appreciated in this country. Nutrient runoff from farms can become a valuable source of nutrition for algal aquaculture and culturing fish that feed on those algae can produce rich waste useful as organic fertilizer for crops. A variety of systems could be developed based on this nutrient cycle.

We also suggest that more attention be given to aquaculture that is not exposed to natural ecosystems—such as greenhouse aquaculture and closed-system land-based fish culture. Not all these systems will meet high ecological, social, and humane standards of the strategic plans, but those that do may provide a viable alternative to aquaculture immersed in natural aquatic ecosystems.

A sensibly integrated food system

We recommend that you consider the entire food system in the context of your draft Strategic Plan. Aquaculture should be integrated into a food system that mutually supports all the food sources (i.e. does not pit one source against another), is socially and environmentally responsible, and supports local food sovereignty. Part of this picture is market structure and distribution that enables consumers to acquire the freshest and most healthful food and farmers/fishermen to be fairly compensated for their efforts.

Industrial scale seafood production should not be a goal for US aquaculture development, but we fear it is. The environmental and social problems typically associated with such scales of operation are not acceptable, and this is not remedied simply by moving operations offshore—out of sight, out of mind. Massive farms proposed for deep offshore waters or high densities of fish pens in nearshore waters, where they put marine fish and other wildlife at risk (as described above), present navigation hazards, and are significant sources of pollution. But industrial scales are also found inshore, in expansive and intensive aquaculture development in shallow coastal areas, such as occurs in Washington State. Here there are common complaints that citizens' access to and appreciation of the shore is restricted, and wild shellfish beds may be displaced.

The National Ocean Policy emphasizes ecosystem-based management (EBM); and here is an ideal opportunity to put it into motion. Yet the draft Strategic Plan, by making aquaculture a "sector" moves away from truly integrating the activity with ecosystem functions and services. While it does attempt to put together a number of different objectives for aquaculture and repeatedly stresses the importance of being in harmony with the ecosystem, it turns out to look more like mixed coins in a piggy bank. All the elements are there (and some we'd prefer were not there), but it glosses over the challenge of conflicting objectives and short-term vs. long-term outcomes. Ideally, the Strategic Plan will be a roadmap for how to successfully weave together diverse objectives, diverse methodology, and diverse species so that the overall outcome is an improved marine ecosystem and a more productive, diverse, and ecologically sound food system that enhances food sovereignty.

Good research leads to better research

We also suggest that you make a greater effort to become familiar with the recent history of aquaculture research and its rich literature, which may contain some of the answers and guidance you are seeking. The agencies should not have to repeat what has already been done. You should also consult with (or read about, as some are deceased) researchers and visionaries—including several in the US—who have explored the potential for aquaculture far beyond the narrow and constraining objectives of existing national and global private industry. The breathtaking brevity of the references listed at the end of the draft Strategic Plan suggests that few or none of these scientific resources have been explored.

Instead of devoting important financial resources to copying the rest of the world, and "improving" the status quo or moving into new territory with huge, industrial, expensive-seafood aquaculture, let some of the truly innovative ideas be the core of the R&D strategy. Let aquaculture become a problem solver. The problem is not how to intensify cultured food production, it is how to keep the ecosystem healthy so it can produce more food naturally and provide critical ecosystem services at the same time. Innovative aquaculture can help with that.

There are a number of individual items in the Strategic Plan that we might support if they are clearly integrated into the plan. Certainly the acknowledgment that aquaculture can and should be employed to improve environmental quality. There has been some incredibly imaginative research and effective design of systems that employ diverse aquaculture to clean up nutrient pollution and treat human sewage. Hopefully the Strategic Plan will lead to an expansion of these kinds of solutions.

However, we are less favorably impressed with the emphasis on expanding and increasing productivity and efficiency and genetic breeding for aquaculture. That sounds too much like the kind of industrialization that drove agriculture development and eventually ruined the soil and the quality of food produced. A different approach needs to be taken with aquaculture. Innovation, ecological consistency, and long-term benefit to humankind should trump improved technology, economic gain for private industry, and international trade. We recommend that you re-examine and properly nest the priorities in the face of growing environmental crisis and the important role of the world ocean in moderating global change and aiding our ability to adapt to it.

The Vision

The draft Strategic Plan is guided by a vision with elements and overarching principles that need to be reprioritized—possibly standing the proposed vision on it's head. The US aquaculture should and still can follow a different model than aquaculture in other aquaculture and different than the model agriculture followed here. While not identifying industrial scale monoculture of seafood as the primary goal, it appears that several of the goals and outcomes would lead to that. So if anything, it should be stated that this is not the desired outcome.

Inappropriate elements in the draft vision:

1) "Globally competitive," should not be the primary vision for US aquaculture since it immediately sends us down the same biologically and socially disastrous road taken by other aquaculture-driven countries like Norway, Canada, Chile, Ecuador, and others. Competition is not an issue, if the US takes an entirely different approach (see below). Taking a different approach, of course, is likely to meet with resistance from those who think it's easier and more profitable to just do what others are doing only do it more successfully with short term economic rewards. That's competitive. That's not what we need.
2) Aquaculture should not be viewed as a separate "sector" since it integrates with the food production system, or with ecosystem restoration, or with abatement of negative environmental impacts of other endeavors.
3) Seafood aquaculture should not be a primary vehicle for economic growth or global trade – food is a necessity for life, not an optional commodity.

We suggest the vision contain the following prioritized elements, which include the following:

1) Aquaculture that is developed in concert with and is supportive of natural ecosystems, ecosystem and environmental services, wildlife habitat needs, wild fisheries, recreational values, and a diverse national food system in harmony with local food sovereignty.
2) Aquaculture that is:
    a. diverse in design and species grown;
    b. designed to restore healthy ecosystems and improve habitat for and production of fish populations
    c. consistent with natural diversity and ecosystem carrying capacity;
    d. non-exploitive of natural resources;
    e. an enhancement to environmental and/or ecosystem services;
    f. without negative environmental impacts
3) Aquaculture for food production that has one or more of the following assets:
    a. part of an integrated food system
    b. integrated with aquatic ecosystem restoration (see *b* above)
    c. integrated with agriculture;
    d. small scale and non-disruptive of ecosystems
    e. primarily supportive of local markets and local food sovereignty;
    f. contributing to affordable, safe, high-quality protein needs of communities;
    g. designed with appropriate trophic level choices and, when appropriate, polyculture with multiple interacting trophic levels
    h. guided by humane standards of husbandry, stock densities, health and handling of livestock, etc.
4) Aquaculture models that are environmentally and socially responsible, small scale, locally focused, and are transferable to other locations globally.
5) Distribution and marketing system for seafood (both wild caught and cultured) that is locally focused, minimizes waste, and feeds a broad spectrum of people and is fairly priced for both producers and consumers.

Goals and outcomes

The nine strategic goals identified in the draft Plan vary greatly in scope and importance. They should be consolidated into a few broad goals. We also suggest that you consider additional goals that integrate aquaculture with other interconnected endeavors and systems. Some of the goals listed in the draft Plan seem more appropriate as outcomes associated with other goals—e.g. as described below. The milestones and performance measures, however, lead deeply into the weeds, so we suggest those be redone later in light of a revised and approved Strategy Plan.

Following these guidelines and with a view toward the vision, we recommend the following strategic goals:

1. Review and advance scientific knowledge concerning aquaculture and the effects of aquaculture on the environment, and identify opportunities for innovative design and integration of aquaculture with other systems for mutual benefit.

2. Enable sustainable aquaculture that provides services, products, and jobs in harmony with healthy, productive, and resilient freshwater and marine ecosystems and natural resources.
    a. Advance the integration of aquaculture with wild fisheries to enhance the habitat supporting the reproduction, growth, and food chain supporting those fisheries.
    b. Advance the integration of aquaculture development with environmental conservation, services, and restoration.
    c. Develop aquaculture that may serve to moderate global change such as climate change and ocean acidifiation.

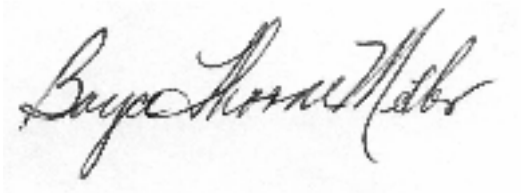
3. Develop a national food system that integrates agriculture, fisheries and aquaculture for the benefit of all three, and in addition:
    a. supports local food sovereignty;
    b. provides fresh and healthful food to citizens living at all economic levels;
    c. provides reasonable compensation to farmers and fishers;
    d. is environmentally, socially, and humanely responsible;
    e. is governed by principles of ecosystem based management

4. Develop knowledge, tools and innovative aquaculture systems in support of the previous goals that can be transferred to and utilized by other nations to support their populations and environment.

In this framework, outcomes, milestones, and performance measures need not be developed separately for each goal, as all the agencies should be considering all the goals in the research and development they undertake in accordance with the Aquaculture R&D Strategic Plan. It is the outcomes that will likely guide specific research projects, but all research should ultimately be compatible with all the goals. Several appropriate outcomes could be modified from goals and outcomes listed in the draft.

The US can and should be a leader in truly innovative aquaculture purposes, technology, and development fully integrated with fisheries, agriculture, and conservation.

Yours truly,



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