

OFFSHORE AQUACULTURE

OVERSIGHT HEARING

BEFORE THE

SUBCOMMITTEE ON INSULAR AFFAIRS,
OCEANS AND WILDLIFE

OF THE

COMMITTEE ON NATURAL RESOURCES
U.S. HOUSE OF REPRESENTATIVES

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OVERSIGHT HEARING ON OFFSHORE AQUACULTURE

Wednesday, September 9, 2009
U.S. House of Representatives
Subcommittee on Insular Affairs, Oceans and Wildlife
Committee on Natural Resources
Washington, D.C.

The Subcommittee met, pursuant to call, at 10:08 a.m. in Room 1324, Longworth House Office Building, Hon. Madeleine Z. Bordallo [Chairwoman of the Subcommittee] presiding.

Present: Representatives Bordallo, Faleomavaega, Sablan, Capps, Shea-Porter, Brown, and Cassidy.

STATEMENT OF THE HONORABLE MADELEINE Z. BORDALLO, A DELEGATE IN CONGRESS FROM THE TERRITORY OF GUAM

Ms. BORDALLO. The oversight hearing by the Subcommittee on Insular Affairs, Oceans, and Wildlife will now come to order.

Today we will hear testimony concerning a comprehensive Federal permitting and regulatory system for offshore aquaculture. Under Committee Rule 4[g] the Chairwoman and the Ranking Minority Member will make opening statements.

Approximately 80 percent of seafood consumed in the United States is imported, and half of those imports come from aquaculture. Offshore aquaculture, or the propagation and the rearing of marine species in the U.S. Exclusive Economic Zone, could increase domestic seafood production, as well as provide new employment opportunities for coastal communities that currently rely on declining wild fisheries.

However, offshore aquaculture is a young and untested industry, and has the potential to harm the marine environment and native fish populations, as well as conflict with other ocean uses. Given the scientific uncertainty over the potential impacts from offshore aquaculture, a comprehensive national offshore aquaculture regulatory framework with stringent environmental standards is needed to provide the certainty and the environmental safeguards necessary to sustainably guide this use in Federal waters.

A comprehensive approach, however, may be easier said than done. Last week the Gulf of Mexico Regional Fishery Management Council's Aquaculture Fishery Management Plan, which would create a regional, fragmented approach to offshore aquaculture regulation, took effect with the tacit approval of NOAA and the Secretary of Commerce. Many Members of Congress, including myself, had urged disapproval of the plan because of the risks of this piecemeal approach and the clear lack of authority to regulate offshore aquaculture through the Magnuson-Stevens Fishery Conservation and Management Act.

Plainly, offshore aquaculture is not fishing and it makes no sense to regulate it as such. Still, the plan has now been approved with a promise from NOAA to develop a national aquaculture policy that may or may not be consistent with the Gulf plan. One has to won-

der, then, why the agency would let the plan go forward if it is committed to a comprehensive approach as a national policy would imply.

So I look forward to hearing from them on that point today, and from all the other witnesses regarding the necessary components of a comprehensive Federal regulatory framework that should be in place before offshore aquaculture development takes place. And I will appreciate their recommendations on how offshore aquaculture can be conducted responsibly, balancing both the commercial and environmental concerns.

[The prepared statement of Ms. Bordallo follows:]

**Statement of The Honorable Madeleine Z. Bordallo, Chairwoman,
Subcommittee on Insular Affairs, Oceans and Wildlife**

Approximately eighty percent of seafood consumed in the United States is imported, and half of those imports come from aquaculture. Offshore aquaculture, or the propagation and rearing of marine species in the U.S. Exclusive Economic Zone, could increase domestic seafood production as well as provide new employment opportunities for coastal communities that currently rely on declining wild fisheries.

However, offshore aquaculture is a young, untested industry and has the potential to harm the marine environment and native fish populations, as well as conflict with other ocean uses. Given the scientific uncertainty over the potential impacts from offshore aquaculture, a comprehensive, national offshore aquaculture regulatory framework with stringent environmental standards is needed to provide the certainty and environmental safeguards necessary to sustainably guide this use in federal waters.

A comprehensive approach, however, may be easier said than done. Last week, the Gulf of Mexico Regional Fishery Management Council's aquaculture fishery management plan—which would create a regional, fragmented approach to offshore aquaculture regulation—took effect with the tacit approval of NOAA and the Secretary of Commerce. Many Members of Congress, including myself, had urged disapproval of the plan because of the risks of this piecemeal approach and the clear lack of authority to regulate offshore aquaculture through the Magnuson-Stevens Fishery Conservation and Management Act. Plainly, offshore aquaculture is not fishing, and it makes no sense to regulate it as such.

Still, the plan has now been approved with a promise from NOAA to develop a national aquaculture policy that may or may not be consistent with the Gulf plan. One has to wonder, then, why the agency would let the plan go forward if it is committed to a comprehensive approach as a “national policy” would imply.

I look forward to hearing from them on that point today and from all the other witnesses regarding the necessary components of a comprehensive, federal regulatory framework that should be in place before offshore aquaculture development takes place, and I appreciate their recommendations on how offshore aquaculture can be conducted responsibly, balancing both commercial and environmental concerns.

Ms. BORDALLO. And now as Chairwoman, I recognize the Ranking Republican Member of the Subcommittee on Insular Affairs, Wildlife, and Oceans for any statement he may have. The gentleman from South Carolina, Mr. Brown.

**STATEMENT OF THE HONORABLE HENRY E. BROWN, JR., A
REPRESENTATIVE IN CONGRESS FROM THE STATE OF
SOUTH CAROLINA**

Mr. BROWN. Thank you, Madam Chair. I appreciate you holding this hearing today, and I thank all the witnesses for traveling to be with us here today. I would like to especially thank Bill Cox, who traveled from South Carolina's Lowcountry to be here with us today and to represent all the hardworking fishermen of coastal South Carolina.

Today we will certainly hear the statistics that more than 80 percent of the seafood consumed in the United States is imported. While we have heard this statistic for a number of years now, we have done nothing about it. In addition, the amount of seafood consumed per capita in the U.S. has slowly risen and the domestic fishing industry is unlikely to be able to meet this demand. With the creation of a Federal program to permit offshore aquaculture, we have an opportunity to create jobs and to reduce our dependence on imported seafood, which is often either harvested or farm raised under conditions that would not meet U.S. environmental standards.

By developing an environmentally sound aquaculture program, we could reduce our dependence on foreign seafood and provide an economic boost to some of our coastal communities. Offshore aquaculture is clearly not going to be welcome everywhere in the U.S., but there are some regions of the country where there is interest in this new industry. If this new industry is likely to be successful, clear guidelines and permitting authorities must be developed. The hodgepodge of permitting agencies and environmental regulations will not help create a stable regulatory structure that business needs to make economic decisions.

I understand there are several witnesses that we will hear from today who have serious concerns about the development of offshore aquaculture authorization legislation. I respect their concerns, but I am also concerned that, to meet all of their criteria, legislation would be so restrictive or complicated that no offshore aquaculture industry would ever be possible. I am not sure this is a reasonable option.

Madam Chair, offshore aquaculture could provide an outlet for commercial fishermen who have been regulated out of business. I understand the two jobs are different and not all displaced commercial fishermen would like to get into the aquaculture industry, but some may be interested in continuing to work on the water, and a new offshore aquaculture industry could provide such an outlet. And while this Committee has not dealt with the issue of food security, a number of other Congressional committees are writing legislation dealing with how the United States can ensure that food imports are safe.

A domestic aquaculture industry would be a step in the right direction to ensure that a larger portion of our seafood is safe and healthy for the consumer. As I mentioned before, the concerns over the environmental effects of offshore aquaculture cannot be ignored, but at the same time we cannot write legislation or require legislation that is so stringent that no offshore aquaculture would ever be possible. There needs to be a realistic balance, and I hope all of our witnesses will agree on that point, even if we disagree on what that balance may be.

Finally, I understand that many commercial fishermen are concerned about the possibility that a domestic aquaculture industry could erode their share of the U.S. market, or could severely impact the price they get for their fish. The Gulf and South Atlantic shrimp fisheries and the Alaskan salmon fisheries are clearly examples of this concern. I have to believe that if we are importing

80 percent of our seafood needs, there is a role for a domestic aquaculture industry.

How we as policymakers deal with the effects of the wild harvest industry is critical. I look forward to working with the commercial industry as we address this concern. Madam Chair, as I mentioned, we have a problem with the level of foreign seafood imports, and we need to do something to keep our competitive edge in our own seafood market. Having said that, there are a number of difficult issues we need to address in any legislation which comes out of this Subcommittee. I would like to work with you, if and when you decide to develop legislation.

Before I close, I would like to ask unanimous consent to submit a letter from the National Fisheries Institute.

Ms. BORDALLO. No objection. So ordered.

Mr. BROWN. Thank you, Madam Chair. I yield back.

[The prepared statement of Mr. Brown follows:]

**Statement of The Honorable Henry E. Brown, Jr., Ranking Republican
Member, Subcommittee on Insular Affairs, Oceans and Wildlife**

Madam Chair, I appreciate you holding this hearing. I thank all the witnesses for traveling to be with us here today. I would like to especially thank Bill Cox who traveled from South Carolina's Lowcountry to be here with us today to represent all the hard working fishermen of coastal South Carolina.

Today, we will certainly hear the statistic that more than 80 percent of the seafood consumed in the United States is imported. While we have heard this statistic for a number of years now, we have done nothing about it. In addition, the amount of seafood consumed per capita in the U.S. has slowly risen and the domestic fishing industry is unlikely to be able to meet this demand.

With the creation of a Federal program to permit offshore aquaculture, we have an opportunity to create jobs and to reduce our dependence on imported seafood—which is often either harvested or farm-raised under conditions that would not meet U.S. environmental standards. By developing an environmentally-sound aquaculture program, we can reduce our dependence on foreign seafood and provide an economic boost to some of our coastal communities. Offshore aquaculture is clearly not going to be welcomed everywhere in the U.S. but there are some regions of the country where there is interest in this new industry. If this new industry is likely to be successful, clear guidelines and permitting authorities must be developed. A hodgepodge of permitting agencies and environmental regulations will not help create a stable regulatory structure that businesses need to make economic decisions.

I understand there are several witnesses that we will hear from today who have serious concerns about the development of offshore aquaculture authorization legislation. I respect their concerns but I am also concerned that to meet all of their criteria, legislation would be so restrictive or complicated that no offshore aquaculture industry would ever be possible. I'm not sure that is a reasonable option.

Madam Chair, offshore aquaculture could provide an outlet for commercial fishermen who have been regulated out of business. I understand the two jobs are different and not all displaced commercial fishermen are likely to want to get into the aquaculture industry, but some may be interested in continuing to work on the water and a new offshore aquaculture industry could provide such an outlet.

And while this Committee has not dealt with the issue of food security, a number of other Congressional committees are writing legislation dealing with how the United States can ensure that food imports are safe. A domestic aquaculture industry would be a step in the right direction to ensuring that a larger portion of our seafood was safe and healthy for the consumer.

As I mentioned before, the concerns over the environmental effects of offshore aquaculture cannot be ignored. But at the same time, we cannot write legislation or require regulations that are so stringent that no offshore aquaculture will ever be possible. There needs to be a realistic balance and I hope all of our witnesses will agree on that point even if we disagree on what that balance may be.

Finally, I understand that many commercial fishermen are concerned about the possibility that a domestic aquaculture industry could erode their share of the U.S. market or could severely impact the price they get for their fish. The Gulf and South Atlantic shrimp fishery and the Alaska salmon fishery are clear examples of this

concern. However, I have to believe that if we are importing 80 percent of our seafood needs, there is a role for a domestic aquaculture industry. How we, as policy makers, deal with the effect on the wild harvest industry is critical. I look forward to working with the commercial industry to see how we address this concern.

Madam Chair, as I mentioned, we have a problem with the level of foreign seafood imports and we need to do something to keep our competitive edge in our own seafood market. Having said that, there are a number of difficult issues we need to address in any legislation which comes out of this Subcommittee. I would like to work with you if, and when, you decide to develop legislation.

Before I close, I would like to ask unanimous consent to submit a letter from the National Fisheries Institute.

Thank you, Madam Chair.

[The letter from the National Fisheries Institute submitted for the record by Mr. Brown follows:]



September 8, 2009

Chairwoman Madeleine Bordallo
Subcommittee on Insular Affairs, Oceans
And Wildlife
1324 Longworth House Office Building
Washington, D.C. 20515

Ranking Member Henry Brown
Subcommittee on Insular Affairs, Ocean
And Wildlife
1329 Longworth House Office Building
Washington, D.C. 20515

Dear Chairwoman Bordallo and Ranking Member Brown:

I am writing to share the National Fisheries Institute's (NFI) thoughts on draft legislation designed to create an offshore aquaculture program in U.S. federal waters.

NFI and its member companies are committed to finding solutions to America's long-term fish production and consumption needs. Offshore aquaculture is a safe and effective method of raising fish to meet growing consumer demand for a healthy product. Moreover, this emerging industry has the potential to create new U.S. seafood-related jobs in areas of the country suffering from the economic downturn. To do this, however, we need to overhaul the existing patchwork of federal, regional and state regulations and oversight to create a more workable framework to pursue aquaculture solutions on a commercial scale.

We must simplify and streamline the existing regulatory scheme. As practitioners, we have a unique perspective on how to develop offshore aquaculture in US waters that is safe, viable, and environmentally sustainable. In that spirit of constructive engagement, we would like to offer the following observations and recommendations on the draft legislation.

We are deeply concerned that the approach envisioned by the draft treats offshore aquaculture as a problem to be managed rather than a burgeoning industry to be encouraged and nourished. Unfortunately, the draft ignores the fact that seafood aquaculture firms are actively developing new technologies and conducting extensive research to identify techniques that will increase production efficiency, with less impact on the environment. Instead of imposing new constraints and standards, we envision the goals of this legislation should be to embrace a more practical approach, reward innovation, and streamline the government permitting and oversight processes.

Specifically, we offer the following recommendations to modify the draft legislation in a manner that embraces the progressive and practical goals outlined above:

- **Permitting Framework** – eliminate the requirement that firms obtain both operational and site permits for every project request; extend the permitting timeframe for operations to twenty (20) years to allow companies to obtain the necessary financial backing to make the project commercially viable.

- Environmental Impact Statements – remove the requirement that every permit undergo an individual environmental impact statement; regional programmatic environmental impact statements are already mandatory.
- Tagging – We suggest very strong reconsideration of the requirement to tag all aquacultured fish. There are concerns regarding the mortality and stress on certain species with this process as well as many unknowns regarding how it can be accomplished safely and economically in several species in which the practice is not currently the norm (i.e. shrimp). A better solution may be to leave the tagging determination to the Regional Fishery Management Councils.
- Authority to Pull Permits – provide specific details of the Secretary’s authority to pull permits at any time for marine environment “emergencies”; failure to provide specific guidance creates the regulatory uncertainty that discourages investment and development.
- Public Comment – We support the concept of public involvement and comment on regional and possibly large project aquaculture decisions, however the mandatory 90-day comment periods required for all applications under both the siting and operations permitting processes is duplicative.
- Nearest Coastal States – reconsider the provision granting nearby coastal states *de facto* veto authority over projects; a federal program in federal waters should reflect the needs of the federal government and allowing individual states to opt out adds to regulatory uncertainty that discourages investment and development.
- Private Right to Sue – protect investors, farmers and customers from frivolous citizen law suits by removing the private right to sue.

We are committed to working with you to create a framework that promotes the creation of a viable and safe offshore aquaculture program for the United States. As international demand for farmed seafood grows, the domestic framework for aquaculture should grow accordingly so that we can take the lead in meeting this demand. We are concerned that the legislation, as drafted, would not allow U.S. companies to become world leaders in aquaculture production.

We would appreciate the opportunity to meet with you to discuss the legislation and our recommendations to improve the offshore aquaculture bill. It is our hope that together we can craft legislation that will create American jobs, help achieve greater sustainability in our wild capture fisheries, and provide seafood to meet the increasing global demand.

Sincerely,



Margaret Henderson
Vice President, Government Affairs

Ms. BORDALLO. I thank the gentleman from South Carolina for his opening remarks. And before I recognize our first panel, I would like to recognize Representative Cassidy from Louisiana for joining us this morning, and to invite those persons that are standing in the back of the room to please come forward and take these seats at the lower table here. This hearing may go on for quite some time. Thank you very much.

Our witnesses on the first panel this morning include Dr. James Balsiger, the Acting Assistant Administrator for Fisheries at the National Oceanic and Atmospheric Administration, and Mr. Michael Sutton, Commissioner of the California Fish and Game Commission.

As we begin, gentlemen, I would note for the witnesses that the red timing light on the table will indicate when five minutes has passed and your time has concluded. We would appreciate your cooperation in complying with these limits. Be assured that your full written statement will be submitted for the hearing record. At this

point, I would like to recognize Dr. Balsiger. And it is regretful that Administrator Lubchenco could not be here with us today, but I do appreciate that you have taken the time to come here and represent the Administration's position. So please begin with your testimony.

STATEMENT OF JAMES BALSIGER, ACTING ASSISTANT ADMINISTRATOR FOR FISHERIES, NATIONAL MARINE FISHERIES SERVICE

Dr. BALSIGER. Thank you very much, Chairwoman Bordallo, Members of the Subcommittee. Thank you for inviting me to testify on the issue of offshore aquaculture in the United States. I am Jim Balsiger, I am the Acting Assistant Administrator for NOAA Fisheries.

Within the Department of Commerce, NOAA is one of the primary Federal agencies charged with addressing U.S. aquaculture. Other components of the Department also have an interest in aquaculture from the perspective of seafood, industry investments from jobs, from trade concerns, and contribution to the U.S. economy. NOAA has a comprehensive approach to aquaculture that addresses farming of marine shellfish, fin fish, algae, as well as hatchery stock replenishment of commercial, recreational, and endangered species, and stock replenishment for habitat restoration.

Ms. BORDALLO. Doctor, could you put the microphone a little bit closer to you so we can hear? Is it moveable?

Dr. BALSIGER. I can lean forward, Ma'am.

Ms. BORDALLO. Thank you, thank you, Doctor.

Dr. BALSIGER. NOAA works with stakeholders and interest groups of environmental, economic, and social sustainability as integral to the agency's broad approach to aquaculture. In recent years the agency's focus has been to develop guidance and scientific knowledge that contributes to well informed, science based management of aquaculture activities within the context of NOAA's broader marine management, protection, and regulatory missions.

An increased healthy, safe, local seafood supply that complements wild catches creates jobs in U.S. coastal communities and sustains working waterfronts. It also allows for the restoration of depleted marine species, including important commercial and recreational fisheries such as salmon and Alaska king crab, and habitats such as native oyster restoration. In addition, NOAA has worked to address aquaculture in four key areas that include environmental and policy issues, science, the NOAA-U.S. Department of Agriculture Alternative Feeds Initiative, and aquatic animal health.

Worldwide aquaculture is a \$70 billion per year enterprise. The annual U.S. seafood trade deficit, second only to oil in the natural resources category, has grown to \$9.4 billion. Even with modest gains in domestic seafood supply, the United States will remain a net importer of seafood in the near term since more than 80 percent of the seafood consumed in this country is imported. About half of what we import from other countries is farmed.

Currently, U.S. aquaculture is a small but vibrant industry that supplies about 5 percent of our national seafood. Total U.S. aquaculture production is approximately \$1.2 billion annually, or just

1.5 percent of total global production. Approximately 20 percent of the U.S. aquaculture production is marine species, the rest is from freshwater species.

In the absence of a national approach that enables sustainable domestic aquaculture, the United States will likely continue increasing imports from potentially unreliable foreign sources. We will also suffer the continued loss of jobs and livelihoods that have made our coastal communities unique. Promoting and enabling sustainable aquaculture here at home makes good sense.

NOAA is the primary Federal authority for offshore marine aquaculture, which has long been interpreted to be encompassed by the Magnuson-Stevens Act's definition of fishing. While the U.S. Army Corps of Engineers and the Environmental Protection Agency have some regulatory authority over citing and monitoring the water quality impacts of offshore aquaculture operations, and the U.S. Food and Drug Administration has the regulatory authority over the safety of aquaculture products, NOAA has the mandate, technical expertise, and appropriate infrastructure to ensure such operations adequately safeguard our nation's living marine resources.

On September 3rd, 2009, the first regional permitting program for offshore marine aquaculture took effect in the Gulf of Mexico under the Magnuson-Stevens Act. As we work to create a national policy, the Department of Commerce did not believe it was prudent to take action on the fishery management plan for regulating offshore marine aquaculture in the Gulf at this time.

Under the Magnuson-Stevens Act, if the Secretary does not notify the Council within a certain time period that he has approved, partially approved or disapproved this action, the statute provides that the fishery management plan shall take effect as if approved. Because the statutory period passed without Secretarial action, the fishery management plan has entered into effect by operation of law.

Implementing regulations will need to be published before any aquaculture projects can take place in the Gulf of Mexico. The plan, which was developed by the Gulf of Mexico Fishery Management Council is far broader in scope than any aquaculture activity previously proposed or approved by NOAA. Although the program has legally taken effect, I do not believe that regional approaches to offshore aquaculture are in the nation's interest. Our review of the Council's program and related issues has highlighted the need for a comprehensive national policy that ensures a coordinated Federal regulatory process for permitting aquaculture facilities in Federal water.

If a national policy is adopted, it will be necessary to examine the plan in the context of that policy. There is a pressing need for a national approach to regulating offshore aquaculture. I urge the Committee to provide a broader aquaculture mandate than that which already exists in the Magnuson-Stevens Act to allow for a transparent regulatory structure consistent with ecosystem based management and marine spatial planning. It should also enable sustainable aquaculture production, safeguard environmental resources, and balance multiple uses.

Madam Chairwoman, Members of the Subcommittee, I look forward to working with you, the public, the fishing and aquaculture industries, and the environmental community to craft national marine aquaculture legislation. A strong, comprehensive framework that addresses Federal agency responsibilities, combined with Federal research financing, will offer the regulatory certainty that industry needs while safeguarding the marine environment. I will be happy to answer any questions you may have.

[The prepared statement of Dr. Balsiger follows:]

Statement of James W. Balsiger, Ph.D., Acting Assistant Administrator for Fisheries, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

Chairwoman Bordallo and members of the Subcommittee, thank you for the invitation to testify on offshore aquaculture in the United States. I am Dr. James Balsiger, the Acting Assistant Administrator of the National Marine Fisheries Service (NMFS) within the National Oceanic and Atmospheric Administration (NOAA). Within the Department of Commerce, NOAA is one of the primary federal agencies charged with addressing U.S. aquaculture. Other components of the Department of Commerce also have an interest in aquaculture from the perspective of seafood industry investment, jobs, production, trade, and contribution to the U.S. economy.

I appreciate the opportunity to appear before the Subcommittee today. In your invitation, you asked me to address three main areas:

- The need for a comprehensive Federal permitting and regulatory system for offshore aquaculture;
- The necessary components of such a system, including siting, permitting, and operating requirements and precautionary measures to protect the environment and coastal communities; and
- Additional issues that are important for the Subcommittee to consider.

I applaud this Subcommittee for its recognition of the important issues that necessitate today's discussion, including declines in many wild capture fisheries and rising worldwide seafood demand. The Subcommittee also has recognized that the development of U.S. aquaculture must not occur at the expense of the marine environment or native fish and shellfish populations. Aquaculture has the potential to provide a safe and nutritious local seafood supply to complement supply from U.S. commercial fisheries; create jobs in U.S. coastal communities; and maintain working waterfronts. But importantly, it must be conducted in a manner that safeguards U.S. coastal and ocean environments. I commend the Subcommittee for recognizing these important realities.

Madame Chairwoman, your invitation asked me to focus on offshore aquaculture, which generally refers to open ocean aquaculture in Federal waters, and the need for a comprehensive permitting and regulatory system for this emerging aquaculture sector. Before I address your specific questions, I want to put U.S. aquaculture and NOAA's efforts with respect to aquaculture into context. So often, the big picture gets lost in the issue of the day and, in this case, I want to make sure that the breadth of NOAA's long-established involvement with aquaculture does not get lost in a more specific discussion about a forward-looking regulatory program for offshore aquaculture—a component of the industry that is still in its infancy. Aquaculture could be an important source of future domestic seafood supply. I urge the Subcommittee to focus on a more comprehensive approach to sustainable aquaculture in general—not just offshore aquaculture—that helps to meet our need for additional domestic seafood supply and stock enhancement while protecting the marine environment.

NOAA's Current Aquaculture Efforts

NOAA and its predecessor agencies have been involved with commercial marine aquaculture and enhancement of wild finfish and shellfish stocks since the 1880s. To date, much of the scientific information and technology developed by NOAA has been used in the commercial aquaculture, commercial fishing, and recreational fishing sectors, where it has been instrumental in the development of finfish and shellfish hatcheries and culture operations.

Today, NOAA has a comprehensive approach to aquaculture that addresses farming of marine shellfish, finfish, and algae, as well as hatchery stock replenishment of commercial, recreational, and endangered species and stock replenishment for habitat restoration. NOAA works with stakeholders and interest groups to identify

and address major issues in aquaculture. The triple bottom line of environmental, economic, and social sustainability is integral to the Agency's broad approach to aquaculture. In recent years, the Agency has focused on developing guidance and scientific knowledge that contribute to:

- Well-informed, science-based management of aquaculture activities within the context of NOAA's broader marine management, protection, and regulatory missions;
- New technologies that enable sustainable marine aquaculture; and
- Restoration of depleted marine species, including important commercial and recreational fisheries (such as salmon and Alaska king crab) and habitat (such as native oyster restoration).

As examples of the breadth of NOAA's engagement in aquaculture, I wish to highlight current initiatives in four key areas environmental and policy issues, science, alternative feeds and aquatic animal health. Regarding environmental and policy issues, agency initiatives are providing policy and technical guidance to decision-makers on aquatic animal health, finfish genetics, marine spatial planning, and shellfish and the environment. In terms of science, NOAA is funding competitive research and development grants and in-house research at NOAA Science Centers. These investments help pioneer technologies and methods to support, monitor, and evaluate sustainable aquaculture initiatives. Another milestone effort by NOAA is the NOAA-USDA Alternative Feeds Initiative. Through this initiative, NOAA and the U.S. Department of Agriculture are identifying promising new technologies along with federal research priorities on alternative ingredients to fish meal and fish oil for aquaculture while maintaining the human health benefits of seafood. Finally, with respect to aquatic animal health, NOAA has worked with the U.S. Department of Agriculture and the U.S. Fish and Wildlife Service, through the Joint Subcommittee on Aquaculture, to develop a national health plan for aquatic animals. The plan, which is currently open for public comment, provides principles and guidelines for federal agencies with jurisdiction over aquatic animal health. Implementation of this plan will protect both farmed and wild resources, facilitate safe commerce, and make laboratory testing, training, and other programs available as needed to implement the plan.

Aquaculture in the Global Marketplace

Worldwide, aquaculture is a \$70-billion-per-year enterprise, according to the United Nations Food and Agriculture Organization. The annual U.S. seafood trade deficit "second only to oil in the natural resources category—has grown to \$9.4 billion. Even with modest gains in domestic seafood supply, the United States likely will remain a net importer of seafood in the near term since more than 80 percent of the seafood consumed in this country is imported. About half of what we import from other countries is farmed.

Currently, U.S. aquaculture is a small but vibrant industry that supplies about 5 percent of our national seafood supply. Total U.S. aquaculture production is approximately \$1.2 billion annually (just 1.5 percent of total global aquaculture production of \$70 billion, according to the United Nations Food and Agriculture Organization). Approximately 20 percent of U.S. aquaculture production cultures marine species, while fresh water species constitute the remaining effort. The largest single sector of the U.S. marine aquaculture industry is molluscan shellfish culture (oysters, clams, mussels), which accounts for approximately 65 percent of total U.S. marine aquaculture production, followed by salmon (approximately 25 percent) and shrimp (approximately 10 percent). Current production takes place mainly on land, in ponds, and in coastal waters under state jurisdiction. However, technological advances in aquaculture technology have enabled several commercial finfish operations to operate in more exposed, open-ocean locations in state waters in Hawaii and Puerto Rico. There are also commercial mussel farms in open-ocean locations in New Hampshire and California, and permit applications have been filed for open-ocean mussel farms in Massachusetts and Rhode Island.

In the absence of a national approach that enables sustainable domestic aquaculture, the United States likely will continue to increase imports from foreign sources which may not have similar conservation regulations, as well as suffer the continued loss of jobs and livelihoods that have made our coastal communities unique. Promoting and enabling sustainable aquaculture here at home makes good sense.

The Need for National Marine Aquaculture Legislation, Including a Comprehensive Federal Permitting and Regulatory System for Offshore Aquaculture

While the U.S. Army Corps of Engineers and the Environmental Protection Agency have some regulatory authority over siting and monitoring the water quality impacts of offshore aquaculture operations, and the U.S. Food and Drug Administra-

tion has the regulatory authority over the safety of aquaculture products, NOAA has the mandates, technical expertise and appropriate infrastructure to ensure such operations adequately safeguard our Nation's living marine resources. Additionally, because NOAA is within the Department of Commerce, it is well placed to balance the goals of developing an economically viable offshore aquaculture industry while protecting our Nation's valuable living marine resources and the ecosystems and communities they support.

On September 3, 2009, the first regional permitting program for offshore marine aquaculture took effect in the Gulf of Mexico under the Magnuson-Stevens Act. As we work to create a national policy, the Department of Commerce did not believe it was prudent to take action on the fishery management plan for regulating offshore marine aquaculture in the Gulf of Mexico at this time. Under the Magnuson-Stevens Act, if the Secretary does not notify the Council within a certain time period that he has approved, partially approved, or disapproved the action, the statute provides that the fishery management plan shall take effect as if approved. Because the statutory period passed without Secretarial action, the fishery management plan has entered into effect by operation of law. Implementing regulations will need to be published before any aquaculture projects can begin in the Gulf of Mexico. The Plan, which was developed by the Gulf of Mexico Fishery Management Council (Gulf Council), is far broader in scope than any aquaculture activity previously proposed to or approved by NOAA. Although the program has legally taken effect, I do not believe that regional approaches to offshore aquaculture are in the Nation's interests. Our review of the Gulf Council's program and related issues has highlighted the need for a comprehensive national policy that ensures a coordinated federal regulatory process for permitting aquaculture facilities in federal waters. If a national policy is adopted, it will be necessary to examine the plan in the context of that policy. If the Gulf Council plan is inconsistent with the national policy, we will consider appropriate action, which could include seeking an amendment or withdrawal of the plan through the Magnuson-Stevens Act process.

There is a pressing need for a national approach to regulating offshore aquaculture. But I urge the Committee to provide a broader aquaculture mandate than what already exists in the Magnuson-Stevens Act, to allow for a transparent regulatory structure consistent with ecosystem-based management and marine spatial planning that enables sustainable aquaculture production, safeguards environmental resources, and balances multiple uses. Additionally, legislation must ensure that relevant federal agencies and key stakeholders, including regional fishery management councils, coastal states, and the public, will be provided the opportunity to contribute to the development of environmental analyses, rulemaking, and permit decisions, including details on environmental requirements and siting criteria. Stakeholders also need access to information on proposed projects and potential environmental impacts. We would appreciate an opportunity to provide the Subcommittee with views on legislation concerning aquaculture.

Elements of a Comprehensive Federal Permitting and Regulatory System in National Marine Aquaculture Legislation

The Committee has asked that I discuss the necessary components of a potential permitting and regulatory system including siting, permitting, and operating requirements, as well as precautionary measures to protect the environment and coastal communities.

In brief, requirements for permitting, operating, and siting should have terms and conditions that are consistent with good ecosystem-based management, minimize the risks of escapes, disease transfer, water quality effects, food safety, negative impacts on wild stock or habitat, or overexploitation of forage fish, and provide protection for sensitive ecological areas and ecosystem functioning. These standards should ideally be established in the legislative provisions.

NOAA recognizes that stakeholders in the environmental community, the aquaculture industry, seafood processors, and other relevant industries want to ensure that the regulatory requirements are clear, the regulatory process is efficient, and the provisions provide suitable environmental and food safety protection while allowing the industry to develop and be a viable business model under appropriate standards. As is typical of many industries, earlier efforts (including NOAA's contributions), focused primarily on enhancing production—i.e., how to produce more product rapidly and at lower costs—and on creating markets and facilitating distribution. As the industry has matured, a more balanced focus is emerging on environmentally sustainable production. National legislation is needed to facilitate and ensure that aquaculture is truly sustainable. I commit NOAA to assisting the Subcommittee in drafting language that is protective of the environment and the rights of other ocean users, and assuring the safety of the products produced while encour-

aging investment and providing regulatory certainty for those considering investing in aquaculture development in federal waters.

Additional Issues That Are Important for the Subcommittee to Consider

One of the priorities of this Administration is to examine the existing regulatory and policy framework that governs the Agency's activities with regard to marine aquaculture. To that end, we are reassessing existing Department of Commerce and NOAA Aquaculture Policies. We believe this process will allow us to move forward more effectively with a national aquaculture policy that will address the Administration's goals and enhance opportunities for economically and environmentally sustainable U.S. aquaculture.

In addition, this national aquaculture policy will take into account the ongoing work of the Interagency Ocean Policy Task Force, particularly its charge to develop a recommended framework for effective coastal and marine spatial planning.

Our goal is to build on the past hard work and consideration as well as the ongoing work of the Ocean Policy Task Force to create a comprehensive framework that facilitates safe and sustainable aquaculture operations in U.S. federal waters. Requirements that emerge from our evaluation will ensure that all marine aquaculture proceeds in an environmentally responsible manner that protects wild stocks and the quality of marine ecosystems and is compatible with other uses of the marine environment.

Conclusion

Madame Chairwoman and members of this Subcommittee, I look forward to working with you, the public, the fishing and aquaculture industries, and the environmental community to craft national marine aquaculture legislation. A strong, comprehensive framework that addresses federal agency responsibilities in both offshore and coastal areas will offer the regulatory certainty that industry needs while safeguarding the marine environment, as well as create economic opportunities for Americans. The United States must take the initiative to become more self-sufficient in the production of healthy seafood, provide jobs for coastal communities, and reduce the seafood trade deficit. We must develop aquaculture as a tool to complement commercial fishing because we will need both to produce seafood to meet the growing demand.

Madame Chairwoman, I stand ready to work with you to these ends and again thank you for the opportunity to testify on this issue.

Response to questions submitted for the record by James Balsiger, Ph.D., Assistant Administrator (Acting) for Fisheries, National Oceanic and Atmospheric Administration, U.S. Department of Commerce

Questions from Chairwoman Madeleine Z. Bordallo (D-GU)

- 1. Has a fishery management plan ever entered into effect by operation of law without the approval, partial approval, or disapproval of the Secretary of Commerce (Secretary) before the Gulf of Mexico fishery management plan (FMP) for regulating offshore marine aquaculture?**

According to NOAA's National Marine Fisheries Service (NOAA Fisheries) records, there does not appear to be another instance where a fishery management plan (FMP) entered into effect by operation of law without the approval, partial approval, or disapproval of the Secretary of Commerce.

- 2. Why is the Gulf aquaculture FMP so unique that it warranted passage without Secretarial action?**

The Administration's view is that the United States should adopt a comprehensive national policy regarding marine aquaculture that would encompass this and any future efforts to develop offshore aquaculture. The scope of the FMP is far broader than any aquaculture measures previously submitted for Secretarial review, and we believe that permitting plans of this scope should be governed by a national policy rather than by regional regulatory frameworks. Therefore, the Secretary did not take action to approve the plan. In this case, the Secretary concluded that there was no viable legal basis on which to disapprove the FMP.

- 3. When will NOAA's national aquaculture policy be finished?**

NOAA intends to complete its national aquaculture policy addressing all forms of marine aquaculture in the next six months.

4. When are the Gulf Council's proposed regulations for the aquaculture FMP expected to be transmitted to the Secretary?

The Gulf of Mexico Fishery Management Council's proposed regulations for the aquaculture FMP were transmitted on May 29, 2009, the same day the FMP was transmitted for Secretarial review.

5. What specific authorities will NOAA exercise to ensure that the Gulf of Mexico's aquaculture FMP aligns with the forthcoming national aquaculture policy? Please note the relevant sections of the Magnuson-Stevens Fishery Conservation and Management Act in your response.

The Gulf of Mexico aquaculture FMP took effect on September 3, 2009. As we develop the forthcoming national aquaculture policy, NOAA Fisheries will examine whether the Gulf of Mexico aquaculture FMP aligns with its policy. If the FMP is inconsistent with NOAA's national aquaculture policy, we will consider appropriate action, which could include seeking amendment or withdrawal of the FMP pursuant to sections 303 and 304 of the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

6. If the Gulf Council proposes regulations that are consistent with the aquaculture FMP, but inconsistent with the forthcoming national aquaculture policy, does the Secretary have the authority to promulgate regulations? Do you expect the Secretary to promulgate regulations?

The Gulf of Mexico Fishery Management Council has proposed regulations to implement the Gulf of Mexico aquaculture FMP. NOAA is reviewing the draft regulations to determine whether they are consistent with the fishery management plan, the Magnuson-Stevens Act, other applicable law, and NOAA policy. When that review is completed, NOAA will take action consistent with applicable law. Until the national aquaculture policy is completed and the regulations are considered in context, NOAA cannot remark on the relationship between the regulations and the policy.

7. Can the Secretary repeal or revoke the Gulf aquaculture FMP if it is not consistent with the national aquaculture policy? Please explain.

Under the MSA, when a regional council develops and submits an FMP, the Secretary is required to immediately commence a review of the plan or amendment to determine whether it is consistent with the national standards contained in the MSA, other provisions of the MSA and any other applicable law. When disapproving a plan, the Secretary must specify the applicable law with which the plan or amendment is inconsistent. Since the national aquaculture policy does not have the effect of law, the Secretary could not disapprove an FMP if it is inconsistent with policy developed by NOAA. Under section 304(h), the Secretary may repeal or revoke an FMP for a fishery under the authority of a Council only if the Council approves the repeal or revocation by a three-quarters majority of the voting members of the Council.

8. Can the Secretary amend the Gulf aquaculture FMP through a Secretarial amendment or other authorities if it is inconsistent with the forthcoming national aquaculture policy? Please explain.

If amendments to the FMP are required to align the FMP with the forthcoming national aquaculture policy, NOAA Fisheries intends to work with the Council to consider the amendments under section 303 of the MSA. If the requirements of section 304(c) are met, NOAA Fisheries may consider preparation of a Secretarial amendment under that section.

Questions from Republican Members

1. What role should the regional fishery management councils play in the regulation of aquaculture species?

Regional Fishery Management Councils (Councils) are an important partner and stakeholder in the administration of federally-managed species whether they are wild caught or cultured. A well-defined role for the Councils will be integral to the regulation of aquaculture in federal waters. Councils should be consulted in the development of regulations and in the establishment of environmental and other requirements (especially as they relate to interactions with wild stocks managed by the Councils). Councils may also help identify areas of the U.S. Exclusive Economic Zone where offshore aquaculture would be least likely to interfere with known fishing and other activities.

2. How difficult will it be for NOAA to enforce fisheries restrictions when farm-raised fish may be on the market when domestic fisheries are closed?

Because some federally-managed species are already being farmed either on land or in state waters, NOAA has been working to implement mechanisms that allow enforcement personnel to distinguish farmed fish from illegally harvested wild fish. In some cases, a paper trail to track wild caught or farmed fish is sufficient. In others, farmed fish can be identified by some physical characteristic that distinguishes them from wild. If necessary, technologies exist for marking or tagging fish and for using genetic techniques to distinguish farmed from wild.

3. The Administration has come under heavy criticism for allowing the Gulf of Mexico Fishery Management Council to propose a fishery management plan (FMP) to allow for offshore aquaculture in the Gulf of Mexico and for now [sic] making any changes to that FMP. Can you tell us why the Council's proposal was accepted without change?

Regional Fishery Management Councils (Councils) may develop fishery management plans for fisheries under their authority that require conservation and management. In this case, the Council developed the aquaculture Fishery Management Plan (FMP) to establish a regionally-based regulatory framework for managing the development of an environmentally sound and economically sustainable offshore aquaculture industry in federal waters of the Gulf of Mexico. The goal of the aquaculture FMP is to increase fishery production in the Gulf of Mexico by supplementing the supply of wild caught species with cultured product. The Council's efforts took five years and included intensive stakeholder review and public comment on all aspects of the proposed FMP. The scope of the Council's aquaculture FMP is far broader than any aquaculture measures previously submitted for Secretarial review under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Under the Magnuson-Stevens Act, the Secretary may only approve, disapprove, or partially approve a fishery management plan or amendment submitted by a Council. It is NOAA's position that offshore aquaculture activities should be governed by a national policy rather than by regional regulatory frameworks to enable a comprehensive ecosystem-based approach to offshore aquaculture. As we develop a national policy, we will also examine the aquaculture FMP in the context of that policy. If we determine the FMP is inconsistent with that policy, we will consider appropriate action, which could include seeking amendment or withdrawal of the FMP through the MSA process.

4. Do you expect other councils to take similar action for their regions?

That is uncertain as the individual councils make that decision.

5. Will the new Administration be proposing draft legislation to allow for the federal permitting of offshore aquaculture?

Currently, the Administration has no plans to draft legislation to allow for the federal permitting of offshore aquaculture.

6. Legislation proposed by the last Administration would have allowed for foreign investment in aquaculture facilities. Is that still the position of the new Administration?

The current Administration has not taken a position on foreign investment in aquaculture facilities. Eligibility requirements in the Gulf of Mexico FMP require a permit holder to be a U.S. citizen or a permanent resident alien.

7. You are well aware of the State of Alaska's concerns with offshore finfish aquaculture. How can a state protect its fishing interests from federal offshore aquaculture proposed for an area off its shore? How do you protect states which are not directly adjacent from effects such as the escape of non-native species?

The Administration acknowledges Alaska's concerns over finfish aquaculture. NOAA also takes the protection of wild stocks very seriously. States that have a finfish aquaculture industry [e.g., Washington, Maine, Hawaii, and Florida] already have stringent environmental requirements for aquaculture. Also, existing federal laws and regulations for clean water, and protection of wild stocks, endangered species, marine mammals, and fish habitat apply to potential aquaculture operations. These state and federal regulations should form the basis of any national regulatory approach to offshore aquaculture.

8. Mark Vinsel suggests that there will only be industrial sized farms because of the necessary economics. Is it a reasonable expectation that the costs of investing in offshore aquaculture will mean that only large companies will be able to invest?

The size of operations that may be proposed for aquaculture in federal waters will not be known until a regulatory framework is in place and permit applications are submitted. Based on aquaculture operations using offshore technology in U.S. state waters and in open ocean locations in other countries, the size of operations proposed may vary widely. The two open ocean commercial finfish operations operating in state waters in Hawaii and the operation in Puerto Rico (currently suspended) could be described as small to mid-sized operations. The open ocean mussel farm in New Hampshire and the proposed mussel farms in Rhode Island and Massachusetts are, or will be, small scale operations owned by groups of fishermen. Larger offshore finfish farms are under consideration in other parts of the world.

9. Do you believe legislation is necessary to give federal agencies the ability to permit offshore aquaculture operations in federal waters? If so, what federal agencies should be involved in the permitting process or should have a role in the approval of any permit?

The goal of achieving a coordinated national approach to regulating offshore aquaculture would be aided by a more comprehensive mandate for regulating offshore aquaculture than the authority that currently is provided in the Magnuson-Stevens Fishery Conservation and Management Act. A national approach would allow for a transparent regulatory structure consistent with ecosystem-based management that enables sustainable aquaculture production, safeguards environmental resources, and balances multiple uses. National commissions have recommended that federal agency permits for aquaculture in federal waters be coordinated by NOAA and that a regulatory framework should ensure that federal agencies and key stakeholders, including regional fishery management councils, coastal states, and the public, be provided the opportunity to contribute to the development of environmental analyses, rulemaking, and permit decisions. In addition, the ongoing work of the Inter-agency Ocean Policy Task Force, particularly its charge to develop a recommended framework for effective coastal and marine spatial planning, will be taken into account.

Federal agencies that already have a potential regulatory role in offshore aquaculture include (but are not limited to) the following: the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, the Food and Drug Administration, and the Animal and Plant Health Inspection Service of the Department of Agriculture. Additionally, because NOAA is within the Department of Commerce, it is well placed to balance the goals of developing an economically viable offshore aquaculture industry while protecting our Nation's valuable living marine resources and ecosystems and sustaining the communities they support.

10. What environmental standards are appropriate for legislation authorizing offshore aquaculture facilities? Should legislation spell these out or should legislation give the permitting agency a broad outline for these standards?

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time. Part of the policy will address principles to guide NOAA's position on aspects of aquaculture in federal waters, including consideration of environmental standards.

11. What standards are appropriate for the regulation of discharges from offshore aquaculture facilities? What agency or agencies should be responsible for developing discharge regulations?

The U.S. Environmental Protection Agency regulates discharges under the Clean Water Act.

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time. Part of the policy will address principles to guide NOAA's position on aspects of aquaculture in federal waters, including consideration of environmental standards.

12. What safeguards for the prevention of the escape of farm raised fish are appropriate for legislation authorizing offshore aquaculture facilities? What are the likely effects of the escape of non-native species on natural populations of fish and how should these impacts be dealt with in the legislation?

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

- 13. How should the siting process work for offshore aquaculture facilities? How will other federally-permitted activities or federally-leased areas for other activities (such as areas leased under the Outer Continental Shelf Lands Act) be reconciled? What other conflicts among user groups should be identified and considered?**

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

- 14. What impact will offshore aquaculture have on existing domestic wild harvest fisheries and how should those impacts be addressed? Should the federal government be responsible for mitigating these impacts or should the aquaculture industry be somehow required to mitigate these effects?**

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

- 15. What options should legislation include for states to have input into the process of either permitting or siting offshore aquaculture facilities? Should states have the ability to reject facilities off their shores in federal waters? Do states have this ability under the Coastal Zone Management Act?**

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

Section 307 of the Coastal Zone Management Act (CZMA) requires applications for federal permits to conduct an activity, in or outside of the coastal zone, that affects any land or water use or natural resource of the coastal zone of that state. A certification that the proposed activity complies with the enforceable policies of the state's approved program and that such activity will be conducted in a manner consistent with the program must be provided in the application to the licensing or permitting agency.

- 16. What U.S. ownership standards should be included in legislation authorizing offshore facilities? Should the ownership and control standards be comparable to those currently in place for fishing vessels and/or on-shore processing companies?**

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

- 17. What role should the regional fishery management councils have in regulating the fish, feed, size limits, seasons, and products from offshore aquaculture facilities? Should farm-raised fish only be allowed on the market when the same species of wild fish are allowed to be harvested to minimize enforcement of fishery management plans and regulations?**

NOAA believes offshore aquaculture activities should be governed by a national policy rather than by regional regulatory frameworks to enable a comprehensive ecosystem-based approach to offshore aquaculture. In the absence of new legislation, regional fishery management council actions under the Magnuson-Stevens Fishery Conservation and Management Act will be considered in the context of the national aquaculture policy that NOAA is currently developing. Subsequent to its completion of its national aquaculture policy, NOAA may ask a Council to amend or withdraw any fishery management plan(s) that are not consistent with the national policy.

- 18. Should legislation deal with issues such as the use of antibiotics and the types of fish food that can be used in the marine environment? Should the legislation require that the impacts of antibiotics and food from aquaculture facilities on the natural populations be regulated?**

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

- 19. Should legislation and/or regulations make distinctions between aquaculture that is primarily for hatchery purposes and those facilities that are primarily used for food fish production?**

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

20. Should the legislation and/or regulations make a distinction between shellfish and finfish aquaculture operations?

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

21. With the recent concerns about the safety of imported seafood, should food security issues increase the need for a domestic offshore aquaculture program?

U.S. consumers want to be assured that seafood is available, safe to eat, and comes from sustainable sources. By developing a more robust domestic aquaculture industry and enhancing U.S. food safety and quality programs, the United States will be better able to provide safe and nutritious local seafood from aquaculture to complement the supply from U.S. commercial fisheries, create jobs in U.S. coastal communities, and help maintain working waterfronts. Given the increased demand for seafood, the United States likely will continue to increase imports from foreign sources as well. NOAA will continue to work with other federal agencies to ensure the safety of the American food supply. Enabling sustainable aquaculture here at home is one very important component of achieving our goal for a safe and plentiful food supply.

22. Should this legislation deal with how aquaculture fish products are labeled?

NOAA is currently drafting a new aquaculture policy. As the policy is in development, we would prefer not to comment on this issue at this time.

23. The proposed offshore aquaculture authorization legislation sent to Congress in the last Administration proposed to waive the Jones Act. Why was this included in the proposal? Are there homeland security issues that should be considered with an authorization of foreign-flag vessels entering U.S. waters?

Legislation introduced in 2005 included a provision to waive the Jones Act, but this provision was not included in a revised version introduced in 2007 following several hearings and input from stakeholders. Homeland security considerations are beyond the scope of NOAA's authority.

24. Under the current Jones Act regulations, could foreign-flag vessels enter U.S. waters, receive fish from an offshore aquaculture facility, and leave without landing the fish at a U.S. port? If so, does the Administration support proposed legislation that would allow this practice to continue or should all products from offshore aquaculture facilities be required to be landed at a U.S. port and if so, would this require the use of a U.S.-flag vessel?

Under the Magnuson-Stevens Act, foreign flag vessels may not receive fish from an offshore aquaculture facility. Aquaculture within the exclusive economic zone is considered "fishing" under the MSA. "Fishing" also includes "operations at sea in support of, or in preparation for," the catch, take, or harvest of fish, including the transshipment of fish. Section 201(a) of the MSA prohibits foreign fishing except under certain conditions.

The Administration has not taken a position on legislative provisions on use of foreign-flag vessels or landing requirements. The Gulf of Mexico fishery management plan for aquaculture prohibits landing of cultured species at non-U.S. ports unless first landed at a U.S. port.

Questions from Congressman Gregorio Sablan, (D-MP)

1. As I mentioned at the hearing, the Northern Mariana College has an on-shore aquaculture facility that is showing promise in the CNMI. In addition, the waters of the CNMI show potential for offshore aquaculture as well. What technical assistance and financial resources can NOAA provide to the College and local businesses interested in pursuing offshore aquaculture in the CNMI?

Opportunities for NOAA funding include competitive grant programs such as the National Marine Aquaculture Initiative, the Small Business Innovation Research Program, and the Saltonstall-Kennedy Grant Program. The Fisheries Finance Program also provides loans for capital construction and certain other investment costs. Information on all of these programs can be found at <http://aquaculture.noaa.gov/funding/welcome.html>.

- 2. I know there was a Joint Sub-Committee for Aquaculture established in the 1980 legislation and revised to make the USDA permanent chair in 1985. However, NOAA considers that they are the lead on this issue, and many folks agree with that, but with all the issues surrounding Offshore Aquaculture, what role do you see the Sub-Committee playing to assist this Committee in developing a legislative framework?**

The mission of the Joint Subcommittee for Aquaculture (JSA) is to serve as a federal interagency coordinating group to increase the overall effectiveness and productivity of federal aquaculture research, technology transfer, and assistance programs. The JSA is a statutory committee that operates under the aegis of the National Science and Technology Council (NSTC) of the Office of Science and Technology Policy (OSTP) in the Office of the Science Advisor to the President. The JSA is one of five research and development committees established by NSTC to prepare coordinated research and development strategies and budget recommendations for accomplishing national goals. The JSA reports to the NSTC's Committee on Science. The federal agencies represented on the Joint Subcommittee on Aquaculture (JSA) consult and update each other on interagency aquaculture issues. Occasionally, the JSA establishes a working group to address an interagency initiative. For example, the JSA recently published in the Federal Register for public comment a draft National Aquatic Animal Health Policy for aquaculture. If warranted, the OSTP could task the JSA to consider or recommend approaches to federal regulation of aquaculture in federal waters.

- 3. The impact on recreational fisherman was not really addressed at the hearing. However, that is a very important industry that contributes to local economies, as fishermen stay in hotels, eat at local restaurants, etc., and has a positive multiplier effect on local economies. What actions will NOAA take, or are taking, to ensure that recreational fishermen are not negatively impacted in the CNMI as well as other places in the U.S. as you move forward in developing an offshore Aquaculture regulatory framework? With an increase in aquaculture, will there be a less robust effort to increase stocks for commercial and recreational fishing?**

NOAA understands the importance of recreational fisheries and acknowledges the benefits they generate for many coastal communities. NOAA's new aquaculture policy will address the potential effects on commercial and recreational fishing and consider how aquaculture can be used to complement both recreational and commercial fisheries to provide sustainable seafood and increased economic opportunities for coastal communities. NOAA will continue to work with stakeholders—including recreational fishermen—to identify and address these issues.

- 4. As you know and have seen, our coastal and ocean communities are continually facing severe weather. The issue of escaping fish was a major concern at the hearing and has been expressed by others; specifically, recreational fisherman. With hurricanes and severe weather in the oceans, how can you stop escapement when a hurricane/typhoon hits an open water Aquaculture facility?**

NOAA currently is drafting a new aquaculture policy. Part of the policy will address principles to guide NOAA's position on aspects of aquaculture in federal waters, including the importance of reducing and/or mitigating the risk of escapement.

- 5. What role can Recirculating Aquaculture Systems (RAS) have in decreasing the seafood trade deficit? With increased health concerns and given the environmental concerns of many, this seems like a very viable alternative that not only creates healthy seafood, but also creates jobs. Do you agree that this is a technology/process worth pursuing? Does NOAA plan to review this technology when developing an Offshore Aquaculture policy?**

Recirculating Aquaculture Systems (RAS) are one of several promising aquaculture technologies. NOAA and other federal agencies, along with universities and private research institutions, have been studying RAS, offshore aquaculture, and other innovative aquaculture technologies for some time. RAS are in use at NOAA laboratories for hatchery and research work. Also, NOAA grants have been awarded for the study of RAS for culture of marine species including cobia and black sea bass. All aquaculture technologies raise production, cost, job creation, and environmental issues including RAS. NOAA scientists expect to continue to evaluate the range of technologies available for aquaculture production, including RAS, so as to

expand the scientific knowledge about aquaculture available to policy makers and stakeholders.

Ms. BORDALLO. Thank you very much, Dr. Balsiger, for your testimony. And we will have questions.

But first I will recognize Mr. Sutton. It is a pleasure to welcome you before this Committee, and you are now recognized for five minutes.

STATEMENT OF MICHAEL SUTTON, COMMISSIONER, CALIFORNIA FISH AND GAME COMMISSION, VICE PRESIDENT, CENTER FOR THE FUTURE OF OCEANS

Mr. SUTTON. Good morning, Madam Chairwoman and Members of the Subcommittee. My name is Michael Sutton, and I serve as Vice President of the Monterey Bay Aquarium on the Central California Coast. In 2007, Governor Schwarzenegger appointed me to the California Fish and Game Commission. The Commission sets policy and regulates all wildlife and fisheries in the state, including marine fisheries, and establishes marine reserves and other protected areas in state waters.

We also regulate aquaculture operations on land and in state coastal waters out to three miles offshore. In fact it is worth noting that virtually all fish farms in the United States today are regulated by the states. That is because they are located on land or in coastal waters under state jurisdiction. So the states have a lot of relevant experience to share that can inform the development of Federal law.

Now California is home to a thriving but relatively small aquaculture industry, shellfish such as oysters and clams, mussels, abalone, and so forth. We also have a few fin fish farms that culture a wide variety of species on land and in our estuaries. But the fact is the United States, as you have pointed out, is a relatively minor player in global aquaculture. Most fish are farmed overseas, and, Madam Chairwoman, as you said earlier, we import more than 80 percent of our seafood in the United States, much of it from fish farming.

Like it or not, aquaculture is growing exponentially and is on track to surpass wild fisheries as a source of most of our seafood by the end of this year, in fact. And that means we are seeing the same phenomenon in our oceans as we saw on land years ago. Farming is replacing hunting as the primary source of our food supply. In our oceans, fish farming is beginning to replace fishing as the source of our seafood.

Now, this industry is growing so fast around the world that inland and coastal fish farming is no longer enough. The industry is already expanding offshore. For example, in Southern California, the Hub SeaWorld Research Institute has applied for permits to grow up to 3,000 tons of native fish in offshore pens each year. The absence of a Federal regulatory regime means that their progress has been slow. They have had to apply for permits to all kinds of different agencies.

So today the Federal Government has a terrific opportunity. You are in the enviable position of developing a regulatory regime for offshore aquaculture before the industry develops and proliferates

rather than trying to regulate existing practices. We cannot allow our aquaculture industry to follow the boom and bust history of our marine fisheries that we are all so familiar with. It is important that we get this right from the outset. That is because our oceans and coasts are too important from both an economic and an ecological perspective to put at risk.

Our ocean and coastal economy contributes more to our gross national product than all of agriculture combined. That contribution depends in large part on healthy ocean and coastal ecosystems. Aquaculture has a number of associated environmental risks that are enumerated in the written testimony prepared for this hearing. Dr. Leonard has provided a poster here, and he is going to talk about this later outlining these risks.

For now, suffice it to say that these risks pose serious potential threats to our oceans and coasts. Congress's foremost job in developing a comprehensive regime to manage offshore fish farming is to consider and manage these risks. That is what we have done in California. In 2006 we enacted a state law known as the Sustainable Oceans Act in anticipation of aquaculture development in state waters. California thus became the first jurisdiction in the United States to set standards and implement a comprehensive management regime for marine aquaculture.

The law in California requires a programmatic environmental impact review prior to the development of any offshore fish farming, and that review is currently underway, and we expect it to be completed by the end of this year. Congress should impose a similar requirement for a programmatic environmental impact statement on a regional basis before authorizing offshore aquaculture in Federal waters.

Many provisions of our Sustainable Oceans Act can serve as useful precursors for Federal legislation. For example, California bans the farming of nonindigenous species in the oceans, such as Atlantic salmon. It is one thing to farm exotic species like tilapia and barramundi on land, where we can control escapes and so forth, but we cannot afford to have exotic species introduced into our ocean waters.

My written testimony spells out other provisions of California law that may serve as good models for Federal legislation, and I want to enter into the record California Senate Joint Resolution 18, which was introduced by five California Senators recently. It encourages and requests Congress to develop a comprehensive Federal regulatory framework for marine aquaculture that is at least as tough as the law we have in California.

Let me conclude by encouraging Congress to include several provisions in your legislation that we have found important in California and elsewhere around the country. First of all, national standards. It is vital that Federal legislation include a clear and concise national standard for offshore aquaculture similar to the national standards that we have for marine fisheries spelled out in the Magnuson-Stevens Act. This may be the single most important element of your bill, and legislation advanced by the Bush Administration in the last decade failed to include these standards, and that was a fatal flaw.

Second, your legislation should embody the precautionary approach and mandate adaptive management. That is to say, those wishing to develop offshore fish farms should bear the burden of demonstrating they will not harm ocean ecosystems and our fisheries. Offshore aquaculture should also be managed with associated ecosystem in mind, ecosystem based management. And the development of fish farms should be considered in a broader regime of marine spatial planning or ocean zoning.

Now, as you know, the Coastal Zone Management Act gives states the authority to review Federal projects offshore for consistency with an approved coastal plan. That has proven a vital check and balance, and Congress should preserve it in any legislation. And finally, any management regime for offshore aquaculture should involve the entire range of stakeholders at all stages. We have learned the hard way in California that there is no substitute for a bottom up approach to rulemaking, especially when competing interests are involved as in this case.

Madam Chairwoman, thank you again for inviting me to testify this morning. May I say it is refreshing to be here to speak in support of your legislative effort rather than opposing an ill advised Administration bill as in past years. The discussion draft being circulated by your staff is an excellent start, and I encourage you to maintain the tough standards in that draft. We must support the growth of this industry in a manner that ensures the continued integrity of our vital ocean and coastal ecosystems and economy. Thank you.

[The prepared statement of Mr. Sutton follows:]

**Statement of Michael Sutton, Vice President, Monterey Bay Aquarium,
Member, California Fish and Game Commission**

Chairwoman Bordallo and Members of the Committee, thank you for inviting me to testify before you today on the development of offshore aquaculture in the United States. My name is Michael Sutton and I serve as Vice President of the Monterey Bay Aquarium where I direct the Aquarium's Center for the Future of the Oceans. In 2007, Governor Schwarzenegger appointed me to the California Fish and Game Commission, where I participate in regulatory decisions related to the management and sustainable use of the state's fish and wildlife resources. I am testifying today regarding what we can learn from California's experience in the governance of marine aquaculture to help inform the development of a federal aquaculture program.

Aquaculture: A Worldwide Phenomenon

Marine fish farming, or aquaculture, is a global "megatrend"; it is now the fastest growing segment of the international food system. Today, nearly half of the fish consumed worldwide are raised on farms rather than caught in the wild. The contribution of aquaculture to global seafood supply has grown dramatically in the last 50 years—from a production of less than 1 million tons in the early 1950s to 51.7 million tons in 2006. The growth rate of seafood production from aquaculture is outpacing production from capture fisheries, which leveled out in the mid-1980s. Just as we replaced hunting with farming on land, we are in the process of replacing fishing with farming in our oceans. But the environmental damage caused by the "Green Revolution" to terrestrial ecosystems is now well understood, and its lessons are sobering as we contemplate a "Blue Revolution" in our oceans. As we develop the U.S. aquaculture industry to keep pace with the demand for seafood, our challenge will be to ensure that fish farming is conducted in a way that sustains the health of our ocean and coastal ecosystems.

Today, nations in Asia and the Pacific Rim produce the vast majority of seafood from aquaculture. China alone produces 67 percent of the world total. Most fish grown there are omnivorous species like carp, tilapia, and catfish farmed in freshwater. Mariculture, or marine fish farming, is less common and in addition to shellfish such as oysters and abalone, it often involves carnivores of far higher value such as shrimp, tuna, and salmon. Farming such carnivores in the ocean and coast-

al zone tends to have greater impacts on the environment than freshwater aquaculture of omnivores and thus is more challenging to regulate.

Here in the United States we import more than 80 percent of our seafood from overseas, much of which is farmed. For many years, the United States has been a relatively minor player in aquaculture, except species like catfish in the southern states. Most U.S. aquaculture is either conducted inland (in freshwater) or in the coastal environment and is therefore regulated by the states. In California, for example, coastal shellfish farming alone—oysters, clams, and mussels—is worth more than \$16 million each year (Kuiper 2009). Today, as our aquaculture industry considers expansion into offshore waters, we have a terrific opportunity to develop an effective regulatory regime from the outset. That is, our government in a good position to create a framework for the orderly and environmentally-responsible development of marine aquaculture in U.S. waters. We also have the opportunity to learn from our past and forego allowing aquaculture to follow the “boom and bust” history of our marine fisheries. Now is the time to establish a national offshore aquaculture policy and set of clear and concise national standards to support marine fish farming that is environmentally sustainable. Fortunately, we’ve learned some lessons in California and other states that may be useful as we develop a federal regulatory framework.

The First Step: Assessing Environmental Risks

The nation’s oceans and coasts drive our economy and sustain our way of life. In 2007, coastal and Great Lakes states generated 83 percent of the nation’s economic output. In California alone the ocean and coastal economy generates more than \$46 billion annually. More than three-quarters of U.S. growth between 1997 and 2007 was in coastal states, whether measured by population, employment or Gross Domestic Product (Kildow et al, 2009). This means that the same ocean and coastal ecosystems that help generate our economic wealth are becoming increasingly vulnerable to a growing number of human activities. For this reason, the first and most important step in developing a management framework for offshore aquaculture is to fully address potential environmental risks.

The ecological risks associated with aquaculture vary according to the production system: Open-water cages or net pen farms rank as a “high”, or “very high” risk for seven key ecological risks, including habitat alteration or destruction, pollution and eutrophication, contamination with pesticides and other drugs, genetic risks of escaped culture animals, introduction of exotic species, spread of disease to wild species, and use of wild fish for feed (Leung and Dudgeon, 2008).

Given these risks, the first step in developing an offshore aquaculture industry should be the preparation of a Programmatic Environmental Impact Statement, similar to the Programmatic Environmental Impact Review currently underway for marine aquaculture in California (see below). Fortunately, we know what to look for thanks to a large body of peer-reviewed scientific research on the risks involved in marine fish farming, the most notable of which include the following:

Escapes of farmed fish and harmful interactions with native ecosystems

Accidental or intentional introductions of non-native species have become an alarming global environmental problem (Leung and Dudgeon, 2008). Aquaculture is considered one of the major pathways for introducing non-native aquatic species that may become harmful invasives (Weigle et al, 2005; Casal, 2006). The risk of accidental escape of farmed fish is especially high in open-water aquaculture systems and we can predict with absolute certainty that fish will escape from offshore facilities. In addition to the complex ecological interactions, the overall economic costs of harmful invasive species in the United States alone have been estimated at US\$ 120 billion annually (Pimentel et al, 2000, 2005). Forty two percent of the species listed as threatened or endangered with extinction in the United States are at risk primarily because of exotic invasive species (Pimentel et al, 2005).

California prohibited the farming of non-native fish species in the state’s ocean waters in 2003 in response to concerns about the potential impacts from escapes. Subsequently, California enacted several additional statutes to help protect the state from other ways in which non-native species can be introduced, including laws that prohibit ships from exchanging ballast water in ports; restrict the importation and transportation of a number of live animals and plants; restrict the placement of live aquatic animals or plants in state waters; and prohibit the cultivation, spawning, or incubation of any exotic species or any species of salmon.

Native farmed fish can also be genetically distinct from wild members of the same species due to domestication and selective breeding. The escape of native but genetically different farmed fish is associated with a variety of ecological impacts; for example, interbreeding with reproductively compatible populations in the wild can re-

sult in loss of adaptation in natural populations, introgression of new genetic material into species' gene pools and, in the extreme case, loss of locally adapted populations (Hallerman, 2008; McGinnity et al, 2003).

Pollution from excess nutrients, waste feed, and release of drugs and chemicals

Like terrestrial farm animals, aquatic animals—when raised in high numbers and dense concentrations—produce substantial quantities of waste (Islam, 2005). Due to economies of scale and the logistical challenges of operating some distance offshore, open-ocean fish farms are likely to be substantial in size. In California, for example, Hubbs-SeaWorld Research Institute in San Diego is proposing to produce 3,000 tons of farmed fish annually in offshore pens. A production biomass of 3,000 tons not only represents a substantial number of individual fish (about 2 million 1.5 kg fish), but also requires more than double this amount in feed.

The nitrogen and phosphorous-rich effluent resulting from the incomplete digestion of feed by farmed fish represents a substantial point source of pollution. Open net-pen production systems rely on the free ecosystem service provided by water currents and the surrounding environment to disperse, dilute, and break down farm wastes. The direct impacts of soluble and particulate wastes on offshore habitats are poorly understood. In addition, uneaten feeds usually attract other species outside the nets, causing unnatural aggregations of predators (e.g., sharks), and a subsequent need to control those predators (sometimes through lethal measures) for human safety. Therefore, effluent effects of open-ocean net pens should not be assumed to be negligible solely on the basis of dilution.

Another major area of concern for aquaculture is the environmental contamination and human health risks associated with veterinary drugs, particularly pesticides and antibiotics (Phillips and Subersinghe, 2008).

Introduction and spread of disease, pathogens, and parasites to the ocean environment

The importation of gametes, eggs, fry or breeding stocks for aquaculture have been responsible for the introduction of non-native pathogens and parasites (e.g. Briggs et al, 2005), and for the amplification and retransmission of native pathogens and parasites occurring naturally in the environment (Krkosek, 2007). Commercially devastating viral, bacterial and parasitic pathogens associated with a wide variety of aquaculture species have been introduced across the globe and have infected native wild populations (Kibenge et al, 2009).

In California, for example, the South African sabellid worm was introduced through the importation of abalone stock for aquaculture. The worm stunted the growth of cultured abalone and spread to the wild where it also impacted black turban snails. Researchers at the University of California, Santa Barbara had to remove more than a million infected snails in Southern California to eradicate the worm from the wild. This represents a rare example of the successful extermination of an invasive species; usually the ecological and socioeconomic impacts of invasive species introductions are unpredictable and irreversible.

In British Columbia, native sea lice have infected salmon farms and spread to wild fish in the same area. This caused high mortality rates in wild Pink and Chum salmon, threatening to eradicate some local stocks within generations if current levels of disease transmissions continue (Krkosek, 2007). The entire Chilean salmon farming industry, once the world's dominant salmon aquaculture producer and the leading exporter to the United States, has been crippled by the spread of a viral disease known as Infectious Salmon Anemia.

Heightened pressure on ocean ecosystems through wild capture of forage fish for feed

While many of the dominant aquaculture species produced globally can be cultured in freshwater ponds without the artificial feeding (e.g. carp, tilapia and catfish), offshore aquaculture in U.S. waters likely will be dominated by high-value species such as tuna and striped bass that are carnivorous (fish-eating) by nature. These species typically require a diet high in protein and often high in fat (Naylor et al, 2000). Fishmeal and fish oil are the two ingredients most commonly used to meet these nutritional requirements.

Scientists estimate that aquaculture annually consumes the equivalent of more than 16 million tons of wild fish; marine finfish require approximately twice as much wild-caught fish in the form of feed as they produce (Tacon and Metian, 2008). Some argue that even at this ratio, the conversion efficiency of wild forage fish to farmed fish is more efficient than the same farmed species of fish feeding and growing in the wild. But this argument ignores the other invaluable services provided by a functioning natural ecosystem in which these forage fish—such as sardines, herring, and anchovies—play a central role, namely the transfer of energy to recreational and commercial fish and wildlife and the stability of marine food webs to

disturbances and climate change. If removed from their natural ecosystems to feed aquaculture species, forage fish no longer play these functions and much of their nutritional content is wasted in the conversion to farmed species.

Risks associated with capture-based aquaculture

Capture-based aquaculture, also known as “ranching”, relies on the collection of wild juvenile or adult fish for fattening in sea cages similar to offshore feedlots. For example, entire schools of bluefin tuna are captured by purse seines and transferred to net pens in Mexico and Australia where they are fed sardines and fattened for export. The capture of wild fish for ranching inevitably maintains or increases fishing pressure on wild fish stocks, both on the farmed species and the small fishes caught for feed. Today, ranching in coastal or offshore sea cages is only commercially viable for high-value species such as tuna, which are typically already heavily overfished (e.g., bluefin tuna). Because the wild-caught fish are not landed, their capture may not be recorded as catches or be taken into account in fishery statistics and management. Contrary to the notion that fish farming relieves pressure on wild stocks, capture-based aquaculture that catches juveniles before they are able to reproduce is one of the most effective paths to commercial fishery collapse.

Existing ranching operations rely almost exclusively on bait fish, such as sardines and anchovies, for feed. Indeed, virtually the entire Pacific sardine catch (California’s largest volume fishery) goes to feed penned tunas in Mexico and Australia. But the conversion of sardines and other small pelagic fishes into ranched tuna and other species is typically very inefficient. It takes between 7 and 25 pounds of wild bait fish to grow one pound of ranched bluefin tuna, and ranching increases fishing pressure on these feed fisheries (Zertuche-González et al, 2008). Unlike the global trade in fishmeal and oil, fishing pressure to supply fresh wild fish for tuna ranching is typically concentrated locally in the region of the ranching operation. Over-exploitation of the fisheries used to feed the pens can cause the collapse of the ranching operations themselves.

Developing a Comprehensive Framework to Manage Offshore Aquaculture

Currently, federal authority to manage aquaculture involves many different agencies under the authority of multiple laws. The absence of a coordinated and comprehensive governance system means regulatory uncertainty for fish farmers and a lack of unified criteria on which to base effective and environmentally-responsible management decisions. The following examples illustrate the need for clear federal guidance for offshore aquaculture development.

In southern California, numerous federal and state agencies currently are reviewing a proposal by Hubbs-SeaWorld Research Institute (HSWRI) to establish a commercial-scale offshore aquaculture project in federal waters. The goal of the project is to produce 3,000 metric tons a year of striped bass, white sea bass, yellowtail jack, and California halibut in surface cages located five miles off the coast of San Diego. Without a comprehensive federal framework to guide it, the regulatory process to approve the Hubbs-SeaWorld project has been ad hoc and piecemeal. It includes a patchwork of permits from the U.S. Army Corps of Engineers, Environmental Protection Agency, and other federal and state agencies, none of which was developed specifically for the purpose of siting an offshore aquaculture facility. No single federal agency with marine management expertise is responsible for ensuring the integrity of the overall project, or for additional projects in the region that will likely be proposed in the near future.

A similar situation is occurring in the Gulf of Mexico, where the Gulf Regional Fishery Management Council has stepped in to fill a void caused by the lack of an overarching regulatory framework for offshore aquaculture. Last week, NOAA tacitly approved the Council’s Open Ocean Aquaculture Fishery Management Plan but made it clear that final approval of offshore fish farming under the plan would await the development of a comprehensive national policy. Many fear that this will set a precedent for similar, fragmented approaches to aquaculture management in other U.S. offshore regions. It could also undercut the role of Congress in considering federal legislation to establish an appropriate, dedicated management framework that will set the course for sustainable offshore aquaculture development in all U.S. waters.

Offshore Aquaculture in California—The Sustainable Oceans Act

In recent years, California has taken significant steps towards achieving the goal of economically-productive and environmentally-responsible marine aquaculture development. In 2006, California enacted the Sustainable Oceans Act (SB 201) in anticipation of the impending growth of the marine finfish aquaculture industry in California. With SB 201, California became the first among state and federal governments to establish an overarching policy and set of standards for sustainable ma-

rine aquaculture in U.S. waters. Since 2006, the State has been engaged in a thoughtful and comprehensive effort to develop a regulatory program for offshore aquaculture. Currently State agencies are working to complete a Programmatic Environmental Impact Report (PEIR) on offshore aquaculture—mandated by SB 201—and are expected to complete it by December 2009.

The PEIR process is an essential step in the development of California's offshore program as it provides an opportunity to evaluate potential impacts of aquaculture operations on a large scale prior to ushering in new development. Significantly, it enables the state to address potential cumulative impacts on ecosystem health from multiple aquaculture operations in a given region, as well as the additive ecosystem effects of other human activities in the same area. If done properly, the PEIR process will also result in the creation of a streamlined permitting process, the development of a common set of best management practices, and the identification of the most appropriate locations to site aquaculture operations. To help ensure these outcomes, SB 201 requires the final PEIR to provide a management framework that, at a minimum, adequately considers all of the following:

- Appropriate areas for siting marine finfish aquaculture operations to avoid adverse impacts, and minimize any unavoidable impacts on user groups, public trust values, and the marine environment.
- The effects on sensitive ocean and coastal habitats.
- The effects on marine ecosystems, commercial and recreational fishing, and other important ocean uses.
- The effects on other plant and animal species, especially species protected or recovering under state and federal law.
- The effects of the use of chemical and biological products, pollutants, and nutrient wastes on human health and the marine environment.
- The effects of interactions with marine mammals and birds.
- The cumulative effects of a number of similar finfish aquaculture projects on the ability of the marine environment to support ecologically significant flora and fauna.
- The effects of feed, fish meal, and fish oil on marine ecosystems.
- The effects of escaped fish on wild fish stocks and the marine environment.
- The design of facilities and farming practices so as to avoid adverse environmental impacts, and to minimize any unavoidable impacts.

California, like other coastal states, has Public Trust responsibilities for the submerged lands, waters, and marine resources under its jurisdiction—typically up to three miles offshore. As such, California is obliged to manage activities that affect these areas and resources on behalf of all citizens, including future generations, which means recovering at least the cost of managing aquaculture operations for public benefit. The California Fish and Game Commission is in the process of modernizing the management of all aquaculture leases to better reflect these responsibilities, and require lessees to help cover management costs, including the costs of issuance, monitoring, and enforcement of leases. The state's management responsibilities are also reflected in the set of standards for leases in SB 201 that include:

- The lease site is considered appropriate for marine finfish aquaculture in the programmatic environmental impact report.
- A lease shall not unreasonably interfere with fishing or other uses or public trust values, unreasonably disrupt wildlife and marine habitats, or unreasonably harm the ability of the marine environment to support ecologically significant flora and fauna. A lease shall not have significant adverse cumulative impacts.
- To reduce adverse effects on global ocean ecosystems, the use of fish meal and fish oil shall be minimized, and alternatives to these feed ingredients shall be utilized where feasible; and
- Lessees shall establish best management practices for each lease site that includes a regular monitoring, reporting, and site inspection program.
- The lessee shall provide baseline benthic habitat and community assessments of the proposed lease site.
- Finfish numbers and density shall be limited to what can be safely raised while protecting the marine environment.
- The use of all drugs, chemicals, and antibiotics shall be minimized.
- All farmed fish shall be marked, tagged, or otherwise identified as belonging to the lessee, unless deemed unnecessary.
- All facilities and operations shall be designed to prevent the escape of farmed fish into the marine environment.
- The lessee shall meet all applicable water quality requirements and shall prevent discharges to the maximum extent possible.

Essential Elements of a Management Framework

The development of a federal offshore aquaculture program can benefit tremendously from what we know about risks to ocean ecosystem health, and from California's leadership in advancing a sustainable management regime. The following essential components of a federal program are based on this understanding.

Mandate a precautionary approach

As noted above, the environmental risks associated with offshore aquaculture activities have the potential to dramatically alter ocean ecosystems on a large scale. These risks should be addressed both on an individual project basis and in the context of other human uses of ocean ecosystems. We still have a lot to learn about the cumulative impacts of multiple aquaculture operations on the marine environment, and about the additive effects of aquaculture and other human activities in ocean regions. For this reason, the United States should use a precautionary approach to guide the expansion of offshore aquaculture operations. The developers of potential offshore fish farms should be required to demonstrate that they will not harm associated marine ecosystems before permits are issued. Once permits are issued, robust research and monitoring programs must be mandated to continuously improve aquaculture management in U.S. waters. The goal of this program should be to increase our understanding of how to design and operate productive aquaculture facilities in ways that are compatible with healthy, functioning ocean ecosystems.

Articulate clear national standards

Throughout its history, Congress has understood the importance of providing national leadership with comprehensive policy and standards for the management of our natural resources. For example, the nation's principal law governing marine fisheries—the Magnuson-Stevens Fishery Conservation and Management Act—includes a set of ten National Standards that clearly articulate the nation's interest in achieving healthy, sustainable fisheries through effective management measures. Like the standards in California's Sustainable Ocean Act, the National Standards in the Magnuson-Stevens Act set goals for and provide direction to agencies regarding the management of marine resources. A similar set of strong and comprehensive standards must be included up-front in federal offshore aquaculture legislation.

Require ecosystem-based management and marine spatial planning

The ecosystem services provided by our oceans are dependent on biological, oceanographic, and geological processes that may be vulnerable to the impacts of offshore aquaculture. Examples of important ecological areas that are susceptible to aquaculture impacts include fish spawning areas, sensitive seafloor habitats (canyons, seamounts, corals, rocky reefs, etc), migratory corridors for highly mobile species (such as tunas, sharks, and whales), and foraging areas for seabirds, marine mammals, and commercial fish species. These areas should be identified in a comprehensive manner as a precursor to specifying appropriate areas to permit offshore aquaculture. Given the local and regional impacts that are inevitable with open ocean aquaculture, it is critical that these operations are located extremely carefully, so as to minimize the spatial footprint of each operation and its effects on important ecosystem functions.

At the same time, the U.S. Exclusive Economic Zone is host to a growing number of ocean uses, including aquaculture, oil and gas development, renewable energy development, shipping, sand and gravel mining, tourism, scientific research, military operations, and many others. In recognition of our growing impact on the ocean environment, President Obama recently issued a memorandum calling for the development of a national ocean policy to guide the long-term conservation and use of ocean resources. The President also called on an Interagency Ocean Policy Task Force to recommend a framework for effective marine spatial planning that would establish an orderly and coordinated process for addressing emerging ocean uses such as offshore aquaculture and improving the management of existing activities. Accordingly, the management of offshore aquaculture activities should be guided by the national ocean policy, and integrated with the national marine spatial planning framework, once they are established.

Adequately address environmental risks

National standards for offshore aquaculture in federal waters should address the full suite of potential ecosystem impacts of these activities. The comprehensive standards and criteria included in California's Sustainable Oceans Act should be used to guide the development of the federal program; federal standards should be at least as protective as those codified in SB 201, and set the following goals:

- Prohibit the production of non-native species in offshore facilities.

- Prevent escapes of farmed species.
- Prevent the introduction, incubation, and spread of disease, pathogens, and parasites.
- Minimize the impact of nutrient discharges to the maximum extent practicable by mandating specific, measurable limits.
- Forestall negative impacts on native fish and wildlife, and their use of marine habitats.
- Avoid contributing to the overexploitation of forage fish or disruption of marine ecosystems.

These and other environmental standards should be incorporated into a programmatic review of the federal regulatory framework to evaluate the potential effects of this framework on a large and comprehensive scale. This review should include the same requirements prescribed in SB 201, and result in a greater understanding of the cumulative impacts of aquaculture operations, the development of a common set of best management practices, a streamlined permitting process, and the identification of the most appropriate places to locate aquaculture operations.

Preserve opportunities for coastal state review

Coastal states play an important role as stewards of ocean and coastal areas and resources. With the Coastal Zone Management Act (CZMA), Congress entrusted coastal states with the responsibility to manage coastal resources and review activities beyond the state's coastal zone that may affect it. CZMA authorizes states to reject offshore activities that are inconsistent with an approved coastal plan. As discussed earlier, there are a number of environmental risks associated with the operation of offshore aquaculture facilities that have the potential to dramatically alter ocean ecosystems on a large scale. The potential for these impacts to affect state waters increases the closer these facilities are to the state's three-mile limit. This is the case with the Hubbs-SeaWorld project, which is to be located just five miles off the southern California coast. For these reasons, federal offshore aquaculture legislation should recognize and incorporate states' coastal management responsibilities into the federal regulatory program, and preserve the authority of coastal states under the CZMA.

Effectively address stakeholder interests

Input from stakeholders and other citizens in the program development and permitting process is critical for addressing the public's interest in the management of ocean resources, and for meeting the needs of user groups to the highest extent possible. In California, an Aquaculture Development Committee, first authorized in 1982, was recently reconvened to work with the Department of Fish & Game to provide advice on marine aquaculture under state jurisdiction. Members of the committee work with Department staff on various aspects of the state's program. Committee membership is comprised mostly of industry representatives, with NGO partners acting as observers. At the national level, a similar advisory body should be established to enable the entire range of interests—industry, academia, conservationists, fishermen, and others—to contribute to effective management of aquaculture in U.S. waters. In addition, federal offshore aquaculture legislation should include robust public participation and comment opportunities at key points in the regulatory process.

Conclusion

As aquaculture continues to grow across the globe, industry pressure for the development of offshore fish farming in U.S. waters likely will accelerate. Congress has the rare opportunity—and responsibility—to construct an entirely new regulatory framework to effectively manage a nascent industry in U.S. waters. Based on the potential significant risks to the ocean and coastal environment from aquaculture operations, this framework must place a high priority on the protection of wild fish and ecosystems. It must include clear and comprehensive standards to guide industry development, and adopt a precautionary and adaptive-management approach to scaling up aquaculture operations in U.S. waters. Following the example set by California, the federal program should support industry growth in a way that ensures the continued integrity of the overall ocean ecosystem and economy.

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Ms. BORDALLO. Thank you very much, Mr. Sutton. And you don't know how pleased we are that you are on the right side of the fence this time. I want to thank you for bringing up all of the insights on California's approach to offshore aquaculture.

And I will now recognize Members for any questions that they may wish to ask, alternating between the majority and the minority. And I will begin with myself.

I have three questions for Dr. Balsiger. The Joint Ocean Commission Initiative's recent recommendation stated that current and emerging activities in the ocean are governed in a piecemeal fashion resulting in user conflict that risks our environment. Given the Administration's efforts to resolve these conflicts with an inter-agency ocean policy task force charged to develop a comprehensive ocean policy, why did the Administration approve the Gulf aquaculture plan before recommendations for a national ocean policy were developed?

Dr. BALSIGER. Thank you, Madam Chairwoman. It is perhaps a fine point that the Secretary did not approve the Gulf of Mexico's Fisheries Management Plan amendment, rather the Secretary made no comment on it, which allowed the plan to go into effect by operational law. We thought that it was important that we allow that to go into effect.

Ms. BORDALLO. So for the record, Doctor, what you are saying is that the Administrator did not approve but it went into effect.

Dr. BALSIGER. That is correct. The Magnuson-Stevens Act has a provision that allows the Secretary of Commerce to approve, disapprove, or partially disapprove actions taken by the Councils, and if the Secretary declines to take any of those actions then the law goes into effect by operation of law without specific comment by the Secretary of Commerce, and that is what happened on the Gulf of Mexico Fishery Management Plan's offshore aquaculture bill. We thought it was important that the bill go into effect because in absence of that, there is no overlying structure that would prohibit a flurry of offshore aquaculture operations in the Gulf of Mexico.

There are, of course, provisions for review by the Environmental Protection Agency and by the Corps of Engineers, but concerns about fish management or concerns about the habitat that those fisheries and species might consume, would not have been considered. So there is a law in effect now that governs that process. There is no vacancy there, and it sets it up for the development of a national framework so, as you have said, it would allow a consistent approach to permitting offshore aquaculture across the country.

Ms. BORDALLO. At the same time, Doctor, that the Administration is developing recommendations for a national ocean policy, we now learn that you are also planning to develop a national aquaculture policy. So many policies. How will the agency reconcile the Gulf aquaculture plan with the yet-to-be-developed national policy on offshore aquaculture?

Dr. BALSIGER. Madam Chairwoman, I think that is a very astute observation. We are looking at a number of policies. I think it demonstrates the new Administration's concern for sustainable use of marine resources based on ecosystem approaches and based on the best science we have. So there are a number of policies we are looking at. I don't believe that there is an inconsistency between the simultaneous development of these policies. Obviously, there is a lot of work to do to coordinate and make sure that they are consistent with each other and they all fit under the same umbrella, but I think that there are good reasons that these are all being looked at, at this time.

Ms. BORDALLO. I have another question here. What is the primary objective of the national aquaculture policy to regulate aquaculture, to make recommendations to the councils?

Dr. BALSIGER. The primary purpose of the national policy or framework is to make certain that all of the best practices that have been learned in the world over the past 50 years on aquaculture are incorporated every time an offshore operation is put in place. The reason we want a national approach is to make sure we have a consistent approach throughout the country and not different approaches in the Gulf of Mexico or in other areas where

other councils might have ideas. We do think that it is important to have regional input, regional development of these plans, but they need a broad framework within which to fit those regional development plans. And that broad framework, that national consistency, that outlook is not available just yet.

Ms. BORDALLO. Thank you very much, Doctor.

I have some questions for you, Mr. Sutton. First, would Federal legislation modeled on the California bill provide a good foundation for the offshore aquaculture industry to grow while protecting commercial fisheries and coastal ecosystems in the United States?

Mr. SUTTON. Thank you, Madam Chairwoman. I believe the answer to that question is yes. It is worth noting that the California bill is seven pages long, the discussion draft at the Federal level is 60 pages long. That must mean that the Federal legislation, as drafted, does an even better job than California. But I should say that while California's legislation governs only coastal waters, and we are talking here about offshore aquaculture more than three miles offshore, nonetheless, it is my sense that California's bill would provide at least a good precursor to Federal legislation because it comes to grips with many of the same issues that Federal legislation will have to deal with. And as I said before, your discussion draft is a very good start at that.

Ms. BORDALLO. Thank you very much, Mr. Sutton.

I will now turn the questions over to our Ranking Member, Mr. Brown from South Carolina.

Mr. BROWN. Thank you, Madam Chair.

Mr. Sutton, I would like to follow up on that question that the Chairlady just introduced. Since the enactment of the California aquaculture legislation, which many seafood industry representatives feel is somewhat restrictive, how many offshore permits have been submitted for approval?

Mr. SUTTON. Thank you, sir. As I said in my testimony, it is premature for anyone to apply for a permit under the California legislation because we have not yet finished the programmatic environmental impact review that is required by the legislation. We are on track to complete that by the end of the year, and we should be able to start approving permits for offshore aquaculture by early next year.

Mr. BROWN. When was the bill passed?

Mr. SUTTON. The bill was passed in 2006, but as you know we have been experiencing a fiscal crisis in California lately, and everything is moving pretty slowly.

Mr. BROWN. Well, I can understand if you are restricting jobs. and one of the problems California has is people out of work. The other day, we tried to pass a bill where some little fish restricted some 500,000 acres of land from being developed for agriculture that is now sitting idle, and 65,000 people are out of work.

Mr. SUTTON. Well, sir, in California, as I suspect in many coastal states, the majority of our jobs in the coastal zone have nothing to do with aquaculture or even fisheries. They have to do with coastal tourism and shipbuilding. The coastal economy is enormous in California, it returns about \$46 billion a year. We can't afford to put those jobs at risk by ill advised aquaculture operations. That is why we are taking our time to make sure we get it right in the

coastal zone before we start issuing aquaculture permits left and right.

Mr. BROWN. But you will have to agree that 80 percent of our needs are being developed someplace else, and we are not quite sure what kind of environmental conditions they are being developed in either. Do you think it will take another year for the environmental impact to be completed?

Mr. SUTTON. I think we will be finished with our programmatic environmental impact review by the end of the year. And you are right, sir, there is no way we are going to see aquaculture off California that looks like aquaculture in Thailand or Malaysia or Indonesia or anywhere else that we import from, because in many of those places there are no environmental standards and we don't want to see the kinds of destruction that we have seen in the mangrove forests of India and Thailand off our coast. We can't afford that, our coastal economy is too valuable.

Mr. BROWN. And, as you know, I represent a coast myself in South Carolina, so I understand the fragile coastal environment there. But somehow or another we have to be able to become more of a producer and not a consumer. And this is something we are not only concerned with in aquaculture but in our total manufacture environment.

As we talk about so many restrictions being put upon the development of industry in the United States, this is certainly one that we feel like is a no-brainer. And I would hope to get some results back from your environmental impact statement to see if there is a problem, because listening to the Chairlady it sounds like we are looking for some kind of a model that we can use. Do you have any forums at all there? I know you said some were developed under the previous regulations.

Mr. SUTTON. We actually have a thriving aquaculture industry in California both land based and estuarine along the coast line. The shellfish aquaculture industry alone returns at least \$16 million a year to the California economy, and many of those shellfish farms leave the water cleaner than it started. And, of course, I agree with you that we need to do whatever we can to reverse the seafood deficit in this country. But in fact, sir, even if we were to launch a massive commitment to offshore aquaculture, it would be very difficult to reverse the seafood deficit that now stands at 82 or so percent of our seafood is imported.

Mr. BROWN. And going up, right. Well, we certainly appreciate your coming today from California to give us this insight, and we are certainly anxious to see the conclusion of your environmental impact statement because I know that we have to address our food supply chain here in America, not only just for the economics but I think for the world safety.

Mr. SUTTON. Well, thank you, sir. We also are very mindful, as I know you are, about the need to protect our fisheries and make sure that nothing we do in the aquaculture front threatens our thriving fisheries, and in many cases our rebuilding fisheries from past depletion. We are rebuilding those fisheries, we can't afford to have aquaculture operations interfering with that process. But in fact aquaculture, as we have seen in California with white sea bass, for example, can serve to help restore our native fisheries.

Mr. BROWN. Right. And I think we will hear from folks from Alaska later who will speak to the salmon industry, and a lot of the production of the salmon is certainly in some kind of commercial incubator and such. It is a major concern. We feel like we have lost the car industry and our petroleum industry, and some other industries, but we feel like fisheries are a no-brainer that we can gather that back. Thank you very much.

Mr. SUTTON. Thank you.

Ms. BORDALLO. I thank the gentleman from South Carolina, Mr. Brown.

And now as Chair I would like to recognize the gentleman from American Samoa, Mr. Eni Faleomavaega.

Mr. FALEOMAVAEGA. Thank you, Madam Chair. I apologize I was not able to make it earlier to hear the testimony of our two friends, witnesses from the Administration and from California. I do want to commend you and our Ranking Member for calling this hearing. This is not a new issue. My gosh, we have been banging this issue for how many years now about the critical need for better development of our marine aquaculture development program.

If I am correct, Dr. Balsiger, in terms of the statistics that you mentioned in your testimony, given the fact that the worldwide industry as far as marine aquaculture is concerned is in the range of about \$70 billion as a worldwide industry, and our own country has to import over \$9 billion of fish and other marine related seafood from the world because simply, in other words our \$9 billion in my humble opinion should stay here in our own country in developing our own domestic aquaculture development program.

It is not only to provide jobs for our people here, but it has been my experience that there is always this fighting that goes on between the regulatory agencies versus the Department of Commerce—on one hand, trying to promote commercial aspects of marine aquaculture and, on the other hand, we can't do it because of environmental reasons, or because other fishing interests in our country that don't want aquaculture development. Maybe you could help me on that, Dr. Balsiger, to put me through the whole litany of issues here.

Our largest industry of freshwater species and oysters, clams, and mussels provide about 75 percent production of our local marine aquaculture. You cited here also 25 percent is salmon, 10 percent is shrimp, and where is my tuna? I would say that we probably exported at least that much in times past from the territories. Even in my own district, we export somewhere between \$400-to-\$500 million worth of canned tuna to the United States every year. I haven't seen one statistic here in the report, Dr. Balsiger, whether or not tuna should be just as important as our production of salmon and shrimp and oysters and clams or mussels. How come my tuna is not included in your analysis? Maybe tuna is a little too big?

Dr. BALSIGER. Sir, tuna is a very important species for us, especially from your part of the world. I will make certain we reference tuna from this point on. There are operations that are raising tuna in open ocean waters and other parts of the country. We can get some information on that. I appreciate your bringing that to my attention.

Mr. FALEOMAVAEGA. Well, right now my tuna industry is going dead simply because of the keen competition that we are getting from some 20 other countries in the world. Thailand has probably well over 20,000 workers that get paid \$.60 an hour in cleaning tuna and exporting tuna to the United States. The biggest producer of canned tuna and manufacturing or processing comes from Thailand and several other Asian countries, and I am totally disappointed in the fact that the Administration doesn't seem to pay that much attention to my tuna. Would you be willing to help me try to figure out some way so that if we are able to provide subsidies for sugar and all other items that we have been doing for so many years, can we also get some kind of a subsidy for my tuna?

Dr. BALSIGER. Sir, I am not certain that is in my area. I understand your tuna issues. The Administration does spend quite a bit of time and effort on tuna. At the Southern Tuna Conference of the Western and Central Pacific Fisheries Commission, the WCPFC, we have supported tuna research and operations in our La Jolla, California labs.

Mr. FALEOMAVAEGA. But the problem, Dr. Balsiger, and I am sure you will agree with me, is we have been studying, studying, studying tuna for the last hundred years. And guess where all this data and information go to become the beneficiaries? We should do the studies, but also the followup, to better improve our tuna industry. Our data goes to these foreign countries that turn around and export the tuna to our country.

So we are pretty good in studying, but then on the followup in terms of what can be done to help the development of our own marine fisheries program, I don't seem to see a sense of balance. I think, what is the saying, Madam Chair, paralysis by analysis. We keep studying, studying, and this is what we have been doing for all these years. Twenty years ago, I visited the fish farms. Little countries, like Taiwan, have tanks about half as big as this room, and a certain production level. The fish are done by literally having fish tanks.

And guess where that fish goes, it is sold all over Asia, probably even exported to the United States. And here we are still grumbling over whether or not that fish is clean enough to be processed. We have a problem with catfish, and I fully respect and am concerned about how clean we raise our catfish versus how they raise catfish in Vietnam, for example. I understand the problems of making sure that catfish doesn't have other problems that will affect the health conditions of our consumers in that regard.

But I am totally disappointed in the fact that there is nothing in here that mentions the \$400-to-\$500 million industry in my district, where tuna isn't even given any sense of concern by NOAA. I suspect you are aware of the fact that Australia now has been able to create these eggs, and I am sorry I am not a marine biologist, but they are bluefin tuna, the highest quality fish in the world, that cost about \$10,000 a pop in Tokyo fish markets; but they don't have to worry about the bluefin tuna going all over the Pacific. They can hatch it—they can do seedlings and produce the seed for tuna by fish farming.

The State of Hawaii has been doing experimentations of having tanks to do this, and yet it is all experimental. All experimental.

When are we going to do it so that it can become a productive industry and so that we don't have to import over \$9 billion worth of fish? Why shouldn't that \$9 billion go around California, Florida, all of our coastal states, and even to my own little district, may I ask?

Dr. BALSIGER. Sir, I agree with you that there should be a structure in place that businesses can rely on so they understand the rules, they understand their investments, they can develop business plans that might allow them to do such things. That is part of the reason that we believe we need a national offshore aquaculture policy. We need a framework so businessmen can understand what their investments are, what their risks are. And so that is what we are trying to achieve.

Mr. FALCOMA. Dr. Balsiger, I look forward to working with you. Madam Chair, I know my time is way past, but I will wait for the second round. Thank you.

Dr. BALSIGER. Thank you.

Ms. BORDALLO. I thank the gentleman from American Samoa.

I would like now to recognize the gentleman from Louisiana, Mr. Cassidy.

Mr. CASSIDY. Dr. Balsiger, I am trying to understand the Gulf plan. And so let me just pick your brain if I may. There are preferred options, there are alternatives, how would the regulatory agency make a decision between preferred alternative 2 as opposed to alternative 3? Does that make sense, does my question make sense?

Dr. BALSIGER. Yes it does. Those preferred alternatives are explored in the environmental impact statement that was developed, the NEPA documentation, that was developed to support the Council's decision. So they have chosen those alternatives.

Mr. CASSIDY. So the preferred option therefore would be the one that would be employed as opposed to alternative 3 for example? Or I guess what I am trying to figure out, is this, OK in this particular situation we prefer option 2 but at times we may do option 3 if a set of criteria are reached? I am not begging an answer, I am actually asking.

Dr. BALSIGER. The plan that was adopted by the Gulf of Mexico Council which has gone into effect by operation of law identifies a number of criteria that would be examined and before any permits could be processed or given out to anyone. And, of course, the regulations that will be developed to enact that particular law are in process. And so all of those issues are not fleshed out in regulation, that is a process that is ongoing. I think that if you look at that Gulf plan it speaks to most of the things that we have been hearing here this morning about concerns for the environment, about native species, the regular list of concerns that rise when we talk about offshore aquaculture operations. So those types of things would be handled in the regulations as they are being developed.

Mr. CASSIDY. So again, just so I understand, I am sorry to be dense, if it says, preferred alternative 2 versus alternative 3, the preferred alternative 2 would be the one that would be the basis for further permitting?

Dr. BALSIGER. Mr. Cassidy, I must confess I have lost track of the alternative numbers that were examined.

Mr. CASSIDY. I was just doing that conceptually, if it says preferred alternative 2 versus 3, does that mean the alternative which is preferred will be the one used as the basis for permitting?

Dr. BALSIGER. That is correct, that is the Gulf plan's decision which has now gone into effect.

Mr. CASSIDY. Now, as I read those, those speak about having an area two times as large as the area to be used for aquaculture to allow, I gather, some rotation. So what would be the impact upon, our gulf is very busy, we have shipping lanes, we have recreational fishermen, we have commercial fishermen, et cetera. How is that balance going to be achieved between, this territory is mine therefore do not do recreational fishing in it, versus something else?

Dr. BALSIGER. Those are concerns that the regulations will speak to, and as Chairwoman Bordallo mentioned, we have other tasks force looking at things like marine spatial planning, and so I hope that these will develop simultaneously both for commercial wild species catching and for aquaculture so that we can have a record of all the required uses and make a good business decision on those.

Mr. CASSIDY. So although it has become effective and the Gulf Council can theoretically start issuing permits, I should actually consider this a work in progress—as opposed to a *fait accompli*, like Mr. Sutton says. It is still going to be a while before we will most likely see a permit issued, is that fair?

Dr. BALSIGER. The Gulf of Mexico's plan is in law but it does not allow the issuance of permits until the regulations have been developed. So the Gulf of Mexico Council is not in a position to issue permits for offshore aquaculture right now. In that sense it is a work in progress as those regulations are being developed.

Mr. CASSIDY. And my next question is, as we speak of national guidelines, I have learned in previous hearings on other issues that there is somewhat of a difference between the California coast, for example, and the Gulf of Mexico, and again difference between some place else. So just for my information, when you develop national guidelines, will it still allow some sort of regional variance to account for the fact that the water is a lot colder in northern California than it is off the coast of Louisiana and Mississippi?

Dr. BALSIGER. Yes, sir. I believe I mentioned that we think it is important that offshore aquaculture plans be developed regionally by the experts that know that particular geography. And the purpose of the national guidelines would be to make certain that the regionally developed plans are all consistent particularly with respect to environmental protections, opportunities for businesses to understand the rules to make investments, to understand their risks, and those kinds of things. So in our opinion they should be regionally developed.

Mr. CASSIDY. OK, thank you.

Ms. BORDALLO. I thank the gentleman for his questions.

And I would like now to recognize the gentleman from the Northern Marianas, Mr. Sablan for any questions.

Mr. SABLAN. Thank you. Thank you, Madam Chair, and thank you for your leadership and continued leadership in fisheries and the affairs of the territories. Dr. Balsiger, sir, the Northern Mariana Islands, we have organizations or agencies that are looking

into aquaculture out in the ocean, and I am not sure if they are doing as well in looking into it as your organization is in studying it as my colleague from American Samoa says.

But we are surrounded by water, and potentially year-round production seasons, pathogen-free waters, and close proximity to the Asian markets for seafood-consuming countries. Would you consider eventually looking at opportunities in the territories for studies. I mean, take whatever studies you already have and we could use it to develop aquaculture in the territories, which basically have very few resources to develop on their own. Has that possibility ever occurred to anyone?

Dr. BALSIGER. Well, thank you for that question. NOAA Fisheries does have an aquaculture office where we have people that have worked in aquaculture and understand the characteristics that are necessary for successful operations. We would be more than happy to have that group of people work with you, consult with you, or industries, entrepreneurs who are interested in that kind of stuff, to help out on the start of that kind of a program.

Mr. SABLAN. Thank you. Thank you, Madam Chair.

Ms. BORDALLO. I thank the gentleman from the Northern Marianas.

And now I would like to recognize the gentlelady from California, Ms. Lois Capps.

Mrs. CAPPS. Thank you, Madam Chair, and thank you for holding this important hearing.

Mr. Sutton, as you are well aware, California's aquaculture bill, SB-201, is neither hostile to nor supportive of offshore aquaculture. Instead it is my impression that the intent of the bill is to make sure that we do aquaculture correctly, with the idea that this can only be helpful to the environment and public health. Do you believe this is a good model for national policy? And you may have stated this in your opening remarks, but I want it to be underscored for the record please.

Mr. SUTTON. Thank you, ma'am. I did say before that I think this California legislation is a very good precursor for Federal legislation. The United States has more ocean area under its jurisdiction than any country in the world, much of which is in our territories, and the three Members here from our territories are well aware of that. We have to get this right. Our fisheries are too valuable to put at risk from aquaculture operations, and so one of the things that the California legislation does, and that we try to do within the state regulatory process, is carefully balance two competing interests.

One interest in the promotion of aquaculture development, and the other interest is in protecting our native species and our fisheries and our coastal ecosystems and so forth. We think we can strike the right balance there, and it is important to strike that right balance at the Federal level too. And our legislation is part of that. We are constantly weighing those two competing interests. We have to make sure we get that right. It is very important to protect our native ecosystems and our fisheries at the same time we promote aquaculture opportunities offshore.

Mrs. CAPPS. Thank you very much. Dr. Balsiger, I am going to pose the same question to you. Do you believe the California Sen-

ate Bill 201 is a good model for a national bill, keeping in mind the kind of questions that Mr. Cassidy has already posed to you, that it is one thing to talk about a California coast, actually our coastline is quite diverse as well, but we are now going to address this from a national point of view and there are a lot of questions similar to what Mr. Cassidy has raised. Would you offer your perspective from the NOAA point of view?

Dr. BALSIGER. Thank you, yes. The California bill speaks to the issues that we believe are most important, which include the environmental concerns, which I won't list here again, we have talked about them at some length. So I think that there is a lot to be learned from there. Certainly we will be looking at that at NOAA as we develop the national policy. We will look at other documents, we will look at old policies, and so I think that is an important piece of material that we have to include, and I think it is in alignment with the things that we are concerned about nationally.

Mrs. CAPPS. Are there any components of a national policy that you wish to elucidate at this point in addition to what you have already said? Speaking to the development of a sustainable offshore aquaculture.

Dr. BALSIGER. Sustainability, of course, is very important. As I mentioned, we are in the Department of Commerce, so we are anxious for businesses to understand the rules of the games early on, and so I think those kinds of things have to be included in the national policies as well.

Mrs. CAPPS. I want to ask for your pledge really, and I know we can count on it, to work with me on legislation that I am preparing, and the Natural Resources Committee is moving forward to craft such legislation. Can we count on the Administration's support in some of the ways that have been outlined in this first panel and in the testimony of our later panel?

Dr. BALSIGER. Yes, ma'am, you can count on that.

Mrs. CAPPS. I appreciate it. Madam Chair, I have maybe a couple more seconds left, but I want to ask for your indulgence that I have an important hearing, I need to leave, I am not able to stay for a second round, I do have one further question for Dr. Balsiger, could I extend my time a little bit now?

Ms. BORDALLO. You can ask your further question.

Mrs. CAPPS. Thank you. If I could just get a different take on this now, I believe the debate over aquaculture cannot be viewed in a vacuum and that to ensure the health of our marine ecosystems we must also consider our policies with respect to the wild fisheries. Clearly one of the biggest concerns surrounding aquaculture is its potential impact on wild fisheries, in particular the use of forage fish as feed. Given the crucial role of forage fish as food for high level predators and the importance of these fish to the overall health of our ecosystem do you think it would be prudent for NOAA to develop more conservative catch limits for forage fish as we move forward with national aquaculture policy?

Dr. BALSIGER. Well, thank you for that question. It is interesting that in Alaska the North Pacific Fish Management Council actually has put a prohibition on the harvest of forage fish. So the idea of protecting forage fish has not escaped NOAA's ideas nor the Fish Management Councils. I do think that it is important that we look

at those issues. As we have pointed out, regional circumstances are quite different, and so I think it is important that we look at alternative feeds for aquaculture use.

We do have an initiative on that working with the U.S. Department of Agriculture, looking at different ways to finish fish in aquaculture situations. It is interesting that some remarkable progress has been made where relative to fish in the wild, fish in aquaculture pens can be reared on much less fish, and so I think that is a very important point and we intend to look at that.

Mrs. CAPPS. Thank you. These are the kind of considerations that I believe should be part of any comprehensive approach to offshore aquaculture. And again the fact that you are already considering this I think is indication that we will pursue this, we want our wild fisheries to know that their vantage points, their business, their whole way of life is not going to be ignored as we entertain the topic and work with you and all of the various groups to develop this kind of legislation. Thank you very much.

Dr. BALSIGER. Thank you.

Ms. BORDALLO. I thank the gentlelady from California, Ms. Capps.

And now we will have a second round. I have a couple of questions here for first Mr. Sutton. Mr. Sutton, in your experience, what are the benefits of employing a precautionary approach to the development of offshore aquaculture?

Mr. SUTTON. Thank you, Madam Chairwoman. The precautionary approach, it is a simple concept. It means that in cases of uncertainty we err on the side of conservation, not exploitation. So what that means in terms of offshore aquaculture is that the burden should be on those who would like to develop offshore aquaculture to demonstrate that it is not going to harm native ecosystems, fisheries in the area, and so forth.

I think the benefits of a precautionary approach are pretty clear. We have seen the opposite of that in our fisheries for so many years in many parts of the country, we have seen anti-precaution, we have seen fishing levels that encourage depletion rather than sustainability. We cannot afford to do that kind of boom and bust cycle in aquaculture, we have to get it right from the beginning.

And, of course, that is much easier to do when you are starting fresh without an industry in place, it is much easier to regulate from the outset from a precautionary perspective than to try to regulate an existing industry and make changes. So Congress has a terrific opportunity here as we have in California to make sure we get this right, to employ a precautionary approach from the beginning so that the industry develops in a sustainable manner rather than trying to engineer that after the fact.

Ms. BORDALLO. Thank you. And could you please expand upon your recommendation that NOAA and Congress should require offshore aquaculture operations to be operated consistent with state laws governing marine aquaculture operations?

Mr. SUTTON. Thank you, ma'am. As you know, the Coastal Zone Management Act contains a very important provision that requires Federal activities offshore in many cases be consistent with the approved coastal plan of any state. California is a good example. Our Coastal Commission is diligent in reviewing Federal permits and

projects offshore for consistency with California's coastal plan, and in fact has rejected a number of Federal activities offshore that the California Coastal Commission has deemed inconsistent with California's protection of its coast.

Aquaculture offshore is a good example of a Federally permitted activity that could have enormous impacts on coastal resources, escapes of farm fish, pollution, diseases for example. We have lots of evidence from other parts of the world, as you will hear about in the second panel, where aquaculture operations offshore have had an impact onshore. That is why we believe that it is very important to retain the states' and the territories' ability to review offshore projects like offshore aquaculture for consistency with their own conservation regimes that are in place onshore.

Ms. BORDALLO. Thank you. And a final question, how is California's aquaculture development committee been able to balance the varied interests in marine aquaculture? Should a similar advisory body be established at a national level?

Mr. SUTTON. Thank you, ma'am. As I said in my testimony, there really is no substitute for rulemaking from the bottom up. We have learned in California that the best rulemaking involves all stakeholders in the development of the rules rather than simply reviewing them after the fact. And so one of the best ways to do that is to appoint an advisory committee as we have done in California that incorporates all of the various interests in aquaculture, the industry itself, scientists, nonprofit organizations with an interest and knowledge of aquaculture operations, fisheries' interests.

The Aquaculture Development Committee in California is a vital part of the development of our industry and has actually come up with very useful advice for the regulators like the Commission. And I would suggest, as is in your discussion draft, that the Federal Government would be well advised to follow suit and establish an aquaculture Federal advisory committee made up of representatives from all interest groups and stakeholders to make sure that the development of Federal aquaculture proceeds with all interests in mind.

Ms. BORDALLO. Thank you very much.

Now I would like to recognize the Ranking Member for any questions for the second round.

Mr. BROWN. Thank you, Madam Chair. And I guess I will just ask this to both the participants. Projected global population growth would indicate that by 2025 the world will require 21 percent more seafood than in 2007. If we must regulate wild harvests for sustainable purposes, where do you anticipate we get that necessary seafood from besides Vietnam or someplace else?

Dr. BALSIGER. Thank you for the question. Our best understanding is that there will be very little increase in production from wild sources. There aren't many opportunities to increase harvest in seafood from stocks that are at large. So the answer to your question I guess is that any increase will have to come from some aquaculture operation, some farmed operation. I don't believe there is an alternative to the kinds of increases you are speaking of except from that.

Mr. SUTTON. Thank you, sir. United Nations Food and Agriculture Organization tells us that if we managed our wild fisheries

better in this country and others, we could realize a yield of 10 to 20 million tons more from our wild fisheries. I know that the United States and other countries are endeavoring to improve their fisheries management, but the fact is I think Dr. Balsiger is right. We can't count on greater catches or increased catches from the ocean.

It seems clear that aquaculture is a global megatrend. We are going to be living with aquaculture whether we like it or not from all over the world for many years to come. And the fact is that it is growing so fast that any increase in our seafood supply is likely to come from aquaculture. In my mind that means that is all the more reason to make sure we get this right and we develop a Federal regime that is comprehensive, integrated, and results in a sustainable industry rather than one that simply peaks and goes bust as we have seen in our fisheries.

Mr. BROWN. With that in mind, how long do you think it will take you to finish your environmental impact statement?

Mr. SUTTON. Well, sir, we are well underway as we speak. In California, as you know, the only way we raise new revenue is to sell bonds and we have a number of bond initiatives. Proposition 84 was the last one. We are probably going to have another bond sale in the fall, and that will provide the necessary funding to complete our programmatic environmental impact review on the California coast. And may I say, the requirement that is in your discussion draft for regional programmatic environmental impact statements is exactly right because, as you and Mr. Cassidy have pointed out, our coastline is very different in New England, in the Gulf, in California. We have to make sure that the review of environmental impacts as a precursor to aquaculture development is specific to each region of the country.

Mr. BROWN. Do you know whether there is any other environmental impact or permitting process that is being conducted now in other parts of the United States?

Mr. SUTTON. Sir, in southern California, the application that has been made by Hub SeaWorld Research Institute to start farming native fish offshore has been slowed by the fact that they don't know who to go to. They have gone to the Corps of Engineers, they have gone to state authorities. At the moment, in the absence of a comprehensive Federal regulatory regime it is very difficult for aquaculture operators to know who to go to for permits. And so that has slowed the entire process. Again, a good reason for Congress to take action in developing a comprehensive regime.

Mr. BROWN. How about NOAA, Dr. Balsiger, aren't you permitting aquaculture now?

Dr. BALSIGER. We are permitting some small parts of aquaculture under pilot programs under experimental fishing permits consistent with the Magnuson Act. But in the offshore waters we do not have any aquaculture operations in the Federal waters.

Mr. BROWN. How about off of Hawaii?

Dr. BALSIGER. In Hawaii there is open ocean aquaculture, but it is in state water.

Mr. BROWN. Isn't Hawaii's limit three miles too?

Dr. BALSIGER. Yes, sir, it is.

Mr. BROWN. How about in South Carolina?

Dr. BALSIGER. I am unaware of any examination by environmental impact statement in Federal waters off of South Carolina. I will review that and be certain if I am wrong to get back to you.

Mr. BROWN. OK, how about the Gulf?

Dr. BALSIGER. In the Gulf, of course, there was a NEPA environmental examination done as the Gulf of Mexico Fishery Management Council put its plan in place. So that has been looked at. Many of the details as we have mentioned earlier will be taken up as regulations come in place and individual operations make applications. But in general for the overall program, that NEPA work has been done.

Mr. BROWN. But there are no formal applications filed in either location?

Dr. BALSIGER. That is correct, sir.

Mr. BROWN. Thank you. Thank you, Madam Chair.

Ms. BORDALLO. I thank the Ranking Member.

And I would like to recognize the gentleman from American Samoa, Mr. Faleomavaega.

Mr. FALEOMAVAEGA. Thank you, Madam Chair. I just wanted to say to Mr. Sutton I am very impressed with your insights in terms of this issue. And it is not a simple issue, I realize that. I have always seen this somewhat of an imaginary illusion on my part where this fish starts out with fresh water, and I understand the Department of Agriculture has jurisdiction over this freshwater fish. Then it starts swimming along the river and all of a sudden as it gets to the ocean then the Department of Commerce has jurisdiction over it.

So what we have here sometimes is a tremendous little battle going on between our regulatory agencies seeing that this fish stays healthy, and I guess wait until it dies so let it be because we are very concerned about the health of the fish. In the meantime, my understanding of what NOAA and the Department of Commerce are supposed to do is to promote commerce, promote industry, promote lessening this \$9 billion deficit that we have in the consumption of marine fisheries resources because we don't produce enough of it domestically.

And so, Mr. Sutton, I notice you say we have 56 coastal zone management plans from states and territories versus the fuzziness of the Federal Government itself in trying to figure what exactly we are going to do with the whole industry. And when you mention about offshore aquaculture, how far, within three miles? Because when it goes out into the blue ocean then you have an entirely different regulatory system applying to this whole issue of aquaculture development.

And my only concern, and I wanted to ask you gentlemen, how can we lessen the deficit where we have to depend on the importation of over \$9 billion of marine fisheries for the American consumer where we cannot produce enough of it ourselves to lessen that deficit. Could you both, gentlemen, help me understand how we can go about doing this? You mentioned about an offshore aquaculture advisory committee. Doesn't the Department of Commerce already have some kind of division within NOAA or some other related agency in the Department of Commerce that pushes for bet-

ter development of our agriculture programs whether it be offshore or within the shore or inside the rivers or whatever?

Mr. SUTTON. Thank you, sir. You are exactly right that the current jurisdiction, especially over anadromous fish like salmon, is very confusing and very fragmented. In fact at the California Fish and Game Commission, we control the fishing of salmon within state waters and in the rivers, while the salmon are in the rivers, when they go offshore NOAA controls fishing for salmon. And, of course, we regulate salmon fishing only within the framework provided by NOAA.

One of the things that we are hopeful that a Federal regime will do for aquaculture is streamline the permitting authority, make it clear to those who would apply who they should go to, who is in charge. And it is suggested in the discussion draft that NOAA be the agency in charge, and I think that makes sense. California has always worked well with NOAA, we have constant contact with NOAA regulators, and we endeavor to make sure that state and Federal regulations are consistent.

Of course if the Congress chooses to follow the lead of California and our legislation regulating offshore aquaculture at least in California, the Federal and state regulatory regimes will be quite consistent. I served for a number of years on the Commerce Department's Marine Fisheries Advisory Committee, which does occasionally discuss aquaculture.

Mr. FALEOMAVAEGA. It is not on the radar screen, am I correct to say? I mean, we talk about it. We have been talking about it for years and years and years, but it really is not a high priority in our whole realm of Federal priorities that should be given any attention the importance of this industry.

Mr. SUTTON. That is why I think the discussion draft has got it right that this industry is growing so fast and is important enough that it deserves its own Federal advisory committee to oversee aquaculture development throughout U.S. waters.

Mr. FALEOMAVAEGA. Dr. Balsiger, I don't want to sound like I am badgering you or anything, I just wanted to ask you an honest assessment. What can NOAA and the Department of Commerce do to get this thing moving?

Dr. BALSIGER. We are very anxious to make progress on a framework, and so we are starting a fairly accelerated program to develop the national framework, and so I think that will help a lot. In terms of your question about where the fish is going to come from, Mr. Sutton was correct that we do have even in this country still some 40 stocks of fish that suffer from overfishing. And so rebuilding those stocks, which we are required to do under the Magnuson-Stevens Act and which we will accomplish, will produce some fish, but it will not cover the gap in requirements, it won't meet the demand requirements. And so I think the requirement will be for aquaculture production in the out years in order to meet.

Mr. FALEOMAVAEGA. Well, I know what you mean. We had well over 150 swordfish fishing vessels out of New England, and the fleet had to dissipate simply because of overfishing. So, now they are all in Hawaii fishing for tuna because swordfish is overfished, and there is overfishing on all kinds of different species, tuna being

one of those. Over 50 percent of the tuna consumed in the world today is from the Pacific because the Atlantic is overfished. A tremendous shift of overfishing.

And I suppose, Dr. Balsiger, I just wanted to get the sense, you say that, when we talk about offshore aquaculture we have to measure it by way of say, if it is beyond three miles then you are talking about Hawaii and the island territories, if you are talking about within the three miles then you are talking about mainly a lot of the coastal states are impacted. So shouldn't the Department of Agriculture also be part of this whole dialogue and discussion simply because of the regulatory aspects of it and we really haven't, I don't know maybe you could help me out on that?

Dr. BALSIGER. Sir, I think you are correct that we do need to work with not just Agriculture but Interior as well, the Food and Drug Administration. We are having dialogues with those people as we go forward with developing the national framework. That is a very good point.

Mr. FALEOMAVEGA. Thank you, Madam Chair.

Ms. BORDALLO. I thank the gentleman.

I would like now to recognize the gentleman from Louisiana, Mr. Cassidy.

Mr. CASSIDY. A couple things. Dr. Balsiger, again I am just learning, in the Gulf issues they speak of having a 24-hour web based form where the aquaculture entity would report entanglement of a marine mammal with the apparatus whatever that apparatus would be. It seems like if you have a marine mammal entangled at the bottom of a big net it would die within 24 hours. Is that actually adequate protection or is that just a reporting requirement? Does that make sense? Will that minimize the impact upon marine mammals?

Dr. BALSIGER. Sir, thank you for the question. I am not certain that it will. Twenty-four hours, as you point out, probably would be a period of vulnerability for that individual animal. But the reporting requirement is pretty stringent and, of course, there are other guidelines that will be put in place to try to prevent those entanglements, but certainly we want to know if there are entanglements taking place so we can take other mitigating features.

Mr. CASSIDY. So you would bust them if they had too many marine mammals and expect them to take corrective action so to speak? I think bust is a technical term.

Dr. BALSIGER. Accepting that technical term, yes, sir, that is correct.

Mr. CASSIDY. OK. Second, would the Jones Act apply to this? You may not know this, but I am asking. I see that, as I read the regulations, technically a boat could come from a foreign port, pick up the fish, and bring it to a domestic port. It just says that it has to be offloaded at a domestic port, but as far as I can see that doesn't keep a foreign owned vessel from coming, grabbing, and then bringing into the American port. Does that make sense?

Dr. BALSIGER. I understand the question. I think the Jones Act does apply. I would like to talk to our lawyers and make sure I understand that correctly and get back to you.

Mr. CASSIDY. If you could let me know that, I would appreciate that.

Mr. Sutton, now I like "The Log from the Sea of Cortez". I am seeing where you work and I am thinking, "Oh my gosh, this is the book I used to read." I was reading your testimony regarding capture-based aquaculture, and again just for my own information, as opposed to grabbing the juveniles from the wild to seed, if you will, their pens, why don't you just grab the juveniles from your raised fish? After you begin the process, kind of like making bread, once you begin it, why don't you just take a little bit and move it into the next pen?

Mr. SUTTON. Well, sir, if you enjoyed "The Log from the Sea of Cortez" by Steinbeck, two years ago we cosponsored a return to the Sea of Cortez and they wrote the Blog of the Sea of Cortez, so it was an interesting update on what Steinbeck had seen and the changes that have been wrought since in the Gulf of California. You bring up an interesting issue in terms of what is known as ranching rather than farming. Ranching is where you capture fish, usually juvenile fish, tuna for example, from the wild and you bring them into captivity into a pen and you fatten them up in what is essentially an oceanic feed lot.

In fact California's largest fishery today, the Pacific sardine which has recovered from past overfishing, virtually the entire California sardine catch goes for one purpose, and that is feeding tuna in pens in Mexico and Australia, places like that, almost the entire sardine catch is exported to feed tunas. So one of the questions that Congress is going to have to grapple with, and on which there are a number of divergent opinions, is whether or not the United States should allow ranching, this captive fattening of wild species, in our waters or not. We don't have any examples of that today. Most of our aquaculture is from animals that are raised from egg, that is captive breeding.

Mr. CASSIDY. But why don't you again just take juveniles, once you have done the initial ranch, why don't you then domesticate the fish, if you will, just taking the juveniles and moving them into the next pen.

Mr. SUTTON. Well, that is in fact what happens in some kinds of land based aquaculture, is that the animals are propagated and each generation is, it is a self propagated form of fish farming. But that is very distinct from ranching which is, taking animals from the wild. As the delegate from American Samoa pointed out, we are now beginning to develop the technology around the world to propagate tuna from the egg, which is actually quite difficult to do. We have made some progress on that at our Tuna Research and Conservation Center in Monterey with Stanford University as well. I think personally that is the wave of the future, or should be for aquaculture, is raising these animals from the egg and propagating them that way.

Mr. CASSIDY. Then let me ask you something else then, because your testimony actually almost sounds a little different tone than your written statement. And in your written statement you are very cautious about the impact of growing a top-of-the-pyramid fish, and you just mentioned the sardines, how they are used to feed the ranched fish. But, nonetheless, you also said that the sardine population has come back. So what I gather from you, despite the implied pessimism in your written testimony, you can actually

manage the feed stock if you will so it is not depleted even as you grow increasing numbers of, say, tuna.

Mr. SUTTON. It is true that the sardine fishery in California has come back, has recovered from past depletion. The question is whether we should be using those sardines to feed people or whether we should be using those sardines to feed tunas. If you use them to feed tunas, the feed conversion ratio, that is to say how many pounds of sardines you need to produce one pound of tuna, is something like 15 to 20 pounds of sardines for a single pound of tuna. Now whether that is a good use of our fishery resources or not I will leave to you.

But you are going to hear testimony on the second panel about the impact of the forage fisheries, species like sardines and herring and anchovies, for aquaculture. Many people are concerned that those small fish like sardines play a really important role at the base of the marine food chain. Taking out millions of pounds every year from the ecosystem to feed high value species like tuna is very disturbing to a number of people. And that is why the discussion draft presumably has a prohibition on that kind of ranching operations within U.S. waters.

Mr. CASSIDY. Thank you.

Ms. BORDALLO. I thank the gentleman for his questions.

Ms. BORDALLO. And I would like to now thank the witnesses on the first panel, Dr. Balsiger and Mr. Sutton. Thank you very much for your testimony. And if the Members here have asked for any particular information, please send it in to the Committee as soon as possible. Thank you very much.

And now I would like to recognize the second panel. Dr. George Leonard, Director, Aquaculture Program, the Ocean Conservancy; Mr. Ken Hinman, President, National Coalition for Marine Conservation; Mr. Mark Vinsel, Executive Director, United Fishermen of Alaska; Mr. Neil Sims, President, Kona Blue; Mr. Bill Cox, Board Vice Chair, South Carolina Seafood Alliance; and Mr. Robert Alverson, Executive Director, Fishing Vessel Owners Association.

Before we begin our questioning again, I would like to repeat that our staffers and friends and guests that are standing at the back, you are more than welcome to sit up here at the table. Thank you.

I would like to welcome Dr. Leonard and thank him for appearing before the Subcommittee, and as I mentioned for the previous panel, the red timing light on the table will indicate when your time has concluded. Be assured that your full written statement will be submitted for the hearing record. And now, Dr. Leonard, please proceed.

**STATEMENT OF GEORGE LEONARD, DIRECTOR,
AQUACULTURE PROGRAM, OCEAN CONSERVANCY**

Dr. LEONARD. Hi. Thank you, Chairwoman Bordallo, Ranking Member Brown, other Members of the Subcommittee. Can you see me? I am hiding over here on the side of the table. Thank you for convening this hearing today and inviting me to testify. For the record my name is George Leonard, I direct Ocean Conservancy's Aquaculture Program. I have a PhD in marine ecology and evolutionary biology, and for the last decade I have worked to protect

the long term health of our oceans by identifying a viable and environmentally responsible seafood supply that is critical to both America's environmental and economic strength.

As we have heard already this morning, traditional wild capture fisheries are increasingly falling short of the growing demand for seafood. We have heard the figure that today nearly 80 percent of the world's commercial fisheries are either overfished or awful close to it. And in response to that, fish farming in general, also known as aquaculture, is expanding rapidly around the globe. And indeed a paper published just two days ago has identified, as Mr. Sutton indicated, that by the end of this year half of our world seafood will come from aquaculture.

Now, much of the world's farmed fish are herbivores, feeding relatively low in the food chain, often raised in closed containment systems, and generally pose relatively small environmental risks. But the small, rapidly growing open ocean aquaculture sector poses much larger risks, and that is what we are here to discuss today. These farms often raise species in large open-net pen systems that are subject to a free flow of ocean water, and as such they are in direct contact with the ocean ecosystem.

A large and growing body of peer reviewed scientific literature has identified a host of the environmental and socioeconomic risks of this kind of fish farming. And experience internationally, where farming is much more widespread than it is here in the U.S., tells a similar cautionary tale. There is reason to believe that the kinds of risks involved in open ocean aquaculture are universal, and they are likely to apply to species that could be raised here in the U.S.

So as has been made referenced, the graphic to my left illustrates some of the serious ecological impacts of poorly regulated off-shore fish farming. And just to quickly mention them, escaped fish can introduce exotic species into native environments, with potentially devastating impacts. But even when farmed fish are native, escapes can compete against and interbreed with wild fish. Intensive fish farming has also introduced and amplified pathogens and disease in wild fish.

And nutrients from excess feed and fish excretion pose additional stresses to the surrounding ecosystem, as do the drugs and chemicals that are often used by the aquaculture industry, including antibiotics, pesticides and antifoulants. There are also impacts on predator populations to consider. A large concentration of captive fish held in an open net pen attracts predators, and these animals have been entangled or drowned by the techniques that are sometimes used, and fish farmers have sometimes intentionally killed sharks and other predators that have become problems around fish farms.

Now, perhaps counter intuitively, this kind of fish farming can actually result in an increase in fishing pressure on wild stocks, and I am sure we will hear more about this from Mr. Hinman. But the feed for so called carnivorous farmed fish contains very high percentages of fishmeal and fish oil. These are derived primarily from wild caught forage fish, and the demand for fishmeal and fish oil for aquaculture removes key prey species from economically and environmentally important wild species.

And finally, beyond the environmental risks and the human health issues, we must not forget the socioeconomic concerns. Overproduction of farmed salmon in the late 1990s hurt U.S. commercial salmon fishermen, and the recent spread of a viral disease in Chile, infectious salmon anemia, has actually identified that there can be large losses in jobs for the aquaculture industry as well from the development of offshore aquaculture.

Now, despite these real and scientifically documented risks, the United States appears to be on the verge of an expansion of this new industry before Congress has a chance to act and without a national framework in place to address these risks. Just last week we have heard that a legally dubious, and I might add oxymoronic, aquaculture fishery management plan, that would dramatically expand open ocean aquaculture in the Federal waters of the Gulf of Mexico, went into effect.

Meanwhile in my home State of California, Hub SeaWorld Research Institute has announced plans to build the first ever fish farm in the U.S. Federal waters to be located west of San Diego. This is a large facility, slated to occupy about 300 football fields of space, and as Mr. Sutton indicated it is going through a rather ad hoc regulatory process that essentially ensures that no single agency will be responsible for the entire environmental and socioeconomic performance of the project. And then finally, plans are afoot in Hawaii state waters that if approved could pave the way for additional development of offshore aquaculture out in Federal waters.

Now, the good news is that Congress has a window to act before development begins and to establish a national framework that makes its priority the protection of wild fish and natural ecosystems. We have an opportunity to get it right, right from the start. If we take a precautionary approach first and foremost and let science based principles guide us, marine aquaculture may play a role in responsible U.S. seafood production. But if we don't, we can almost guarantee that it will not.

My written testimony includes detailed recommendations on specific provisions that should be part of a precautionary Federal bill. Any such bill must, as I indicated, prioritize the protection of wild fish, habitats, and functional marine ecosystems. It should build on the recommendations of the Pew Ocean Commission, the U.S. Commission on Ocean Policy, the Marine Aquaculture Task Force, and as Mr. Sutton indicated, draw heavily on California's Sustainable Oceans Act, currently the most comprehensive law in the U.S. on marine aquaculture.

Recent developments make it clear that the expansion of an unregulated offshore aquaculture industry in U.S. Federal waters presents an imminent threat that Congress must not ignore. Now is the time for strong leadership by this Committee to draft a strong legislative framework that will ensure protection of our nation's ocean waters. Doing anything less is a gamble that we simply should not take. Thank you.

[The prepared statement of Dr. Leonard follows:]

**Statement of George H. Leonard, Ph.D., Aquaculture Program Director,
Ocean Conservancy**

INTRODUCTION

Thank you Chairwoman Bordallo, Ranking Member Brown and other members of the Subcommittee on Insular Affairs, Oceans and Wildlife for convening this hearing at such an important juncture, and for inviting me to testify. My name is George Leonard and I direct Ocean Conservancy's Aquaculture Program. I have a Ph. D. in marine ecology and evolutionary biology. For a decade I have worked to protect the long-term health of our oceans by identifying a viable, environmentally responsible seafood supply that is critical to America's environmental and economic strength.

A healthy ocean and a healthy seafood industry are critical to America's environmental and economic strength. Based on my assessment of the scientific literature and recent policy developments, it is my conclusion that the development of an unregulated offshore aquaculture industry in U.S. federal waters presents an imminent threat to ocean and seafood health that Congress cannot ignore. I strongly believe this committee must be responsive to recent developments and work to establish a comprehensive federal permitting and regulatory system for offshore aquaculture before an unregulated industry takes hold. Such a system must create a precautionary framework to ensure that any open-ocean aquaculture in the U.S. avoids the adverse impacts on marine ecosystems, human health and coastal communities that have accompanied the industry's development elsewhere.

OFFSHORE AQUACULTURE: DEMAND AND RISK

Securing a safe and sustainable food supply for an increasingly hungry planet is one of the world's biggest challenges. Fish provides an important source of protein. But, as the globe's appetite for seafood has grown, traditional wild-capture fisheries have been unable to keep up. Overall, 80 percent of the world fish stocks for which assessment data are available are reported as fully exploited or overexploited and are thus unable to withstand additional fishing pressure. Driven in part by the decline of wild fish, aquaculture is expanding rapidly worldwide. It now provides nearly half of the world's supply of seafood. It is the fastest growing sector of the food economy. Nearly 400 species are farmed around the world.¹

Much of the world's farmed fish are herbivores, often raised in closed containment systems, posing limited environmental risks. However, a smaller but rapidly growing sector includes species high in the food chain, grown in large net pens in ocean waters. These farms pose much larger threats to the ocean—in part because net pens are open systems through which water flows freely, directly affecting the surrounding ecosystem.² At present the United States is a relatively small contributor to global aquaculture production. However, some in industry and government are seeking to foster the growth of domestic open-ocean aquaculture; and recent developments in California and the Gulf of Mexico have pushed that goal far closer to reality.

To date, advocates for domestic open-ocean aquaculture have paid insufficient attention to the significant risks that would accompany the growth of such an industry. A large body of peer-reviewed scientific literature has identified a host of environmental risks and impacts that accompany the farming of fish in open net pen systems. International experience also presents us with a cautionary tale that we ignore at our peril. While much of our understanding to date comes from salmon farming, data from other farmed species suggest these risks are universal and likely to apply to cod, halibut, sablefish, tuna and other species that could be raised in U.S. waters. However, if we proceed with caution, placing a high priority on the protection of wild fish and ecosystems, and let science-based principles guide us, open-ocean aquaculture may be able to play a role in responsible U.S. seafood production. But if done without proper protections in place, open-ocean aquaculture is likely to have serious adverse consequences for human health, ocean ecosystems and coastal communities.

I would welcome the opportunity to share with the committee a detailed scientific assessment of these risks. A large body of peer reviewed scientific research has been published on many of the impacts of aquaculture, including the severe environmental and socioeconomic consequences that have stemmed from developing an industry without proper precautions in place. Below, I summarize the ecological and socioeconomic impacts of primary concern:

1. *Escapes*: Aquaculture is known to be a major vector for exotic species introduction, causing concern over the ecological impacts that escaped species can have on wild species.³ Whether they are native or exotic, escaped farmed fish can negatively impact the environment and wild populations of fish.⁴ For example,

- it is well known that farmed salmon regularly escape from net pens, negatively impacting wild salmon through competition and interbreeding.⁵
2. *Diseases and Parasites:* It is well documented that intensive fish culture, particularly of non-native species, has been involved in the introduction and/or amplification of pathogens and disease in wild fish populations.⁶ The most striking example concerns the dramatic consequences of the spread of parasitic sea lice from salmon farms to wild salmon⁷ but disease outbreaks in other fish grown in open net pens around the world appear to be common as well.⁸
 3. *Nutrient and Habitat Impacts:* By design, wastes from open net pen systems are released untreated directly into nearby bodies of water, and this can have negative impacts on the surrounding environment.⁹ Dissolved nutrients (from excess feed as well as fish excretion) flow freely beyond the farm site while particulate matter often settles directly to the bottom where it can substantially alter both the chemistry and biodiversity of the farm's benthic habitats.¹⁰ New and emerging science suggests the adage "dilution is the solution to pollution" in open ocean-environments is an oversimplification and not justified by science.¹¹
 4. *Impacts on Predator Populations:* The presence of large numbers of captive fish held in high density naturally attracts predators such as birds, sharks and marine mammals. Techniques to keep some of these predators at bay often impact their natural behavior and pose entanglement and drowning risks.¹² Some predators that have become habituated to the presence of net pens, and hence a threat to human safety, have been killed by fish farmers.¹³
 5. *Impacts of Drugs and Chemicals:* Aquaculture often uses a variety of chemicals including antibiotics, pesticides, fungicides, and antifoulants.¹⁴ In some aquaculture systems, use of antibiotics has resulted in bacterial resistance in the environment¹⁵ and influenced antibiotic resistance in humans.¹⁶ Probable human carcinogens in fish feed (most notably PCBs, dioxins, and other organohalogenes) have been shown to result in potentially unsafe concentrations in high trophic-level farmed fish¹⁷. Dietary guidelines recommend limited human consumption to avoid deleterious health effects¹⁸.
 6. *Increased Fishing Pressure on Wild Fish Stocks:* Feed for many of the "carnivorous" species likely to be farmed in open-ocean environments contains very high percentages of fishmeal and fish oil derived from wild-caught forage fish.¹⁹ As a result, these species consume two to five times as much wild fish as they produce in farmed product.²⁰ As global aquaculture has grown dramatically over the past two decades, the total demand for fishmeal and fish oil for use in aquaculture feeds has expanded. If the farming of carnivorous fish continues to grow at its current rate, the demand for fish oil will outstrip world supply within a decade, while a similar result is expected for fish meal by 2050.²¹ This will likely impose additional pressure on wild forage fish stocks with the potential to undermine marine food webs by removing key prey species on which economically and environmentally important wild species depend. Separating fish farming from its reliance on wild fish must occur if aquaculture is to be considered a sustainable means to increase seafood supply.
 7. *Socioeconomic Impact on Fishermen and Fishing-Dependent Communities Beyond the environmental risks and human health issues, it is well known that farmed fish compete with wild fish in the marketplace. The increase in farmed salmon in the late 1990's drove down the price of wild salmon to levels that made it difficult for fishermen to stay in business.*²² While price declines may be good for consumers, they can have a range of direct and indirect negative environmental and economic impacts, including industry consolidation, overproduction and elevated fishing pressure on wild fish stocks to compensate for reduced profit margins.

A NATIONAL FRAMEWORK

Despite these real and scientifically-documented risks, the United States appears to be on the verge of an expansion of this new industry into its federal waters—before Congress has a chance to act, and without a national framework in place.

In the Gulf of Mexico, the previous administration contorted the Magnuson-Stevens Fishery Conservation and Management Act (MSA) to justify the development of a legally-dubious (and oxymoronic) "Aquaculture Fishery Management Plan" (FMP) through the Gulf Fishery Management Council. This plan would dramatically expand open-ocean aquaculture in the federal waters of the Gulf of Mexico. Last week, the Secretary of Commerce refused to take definitive action on the FMP, giving tacit approval to the plan. But Congress designed the MSA to regulate the capture of wild fish, not to create and regulate fish farming. The MSA includes neither the key safeguards nor regulatory tools and approaches necessary to ensure

that aquaculture is developed and managed to be ecologically sustainable. Furthermore, this piecemeal approach entirely bypasses the high-level consideration of serious policy questions relating to open-ocean aquaculture that is needed before the Nation decides how to proceed.

Meanwhile in California, Hubbs-SeaWorld Research Institute has announced plans to build the first-ever fish farm in federal waters, located west of San Diego. This facility, slated to occupy a space equivalent to 300 football fields, is going through an ad hoc regulatory approval process that includes a patchwork of permits from the Army Corps of Engineers, the Environmental Protection Agency and other federal and state agencies. Because of the disjointed, overlapping and confusing federal regulatory landscape, no single agency would be responsible for the entire environmental and socioeconomic performance of this project.

Plans are also afoot in Hawaii state waters, which, if approved, could pave the way for additional development in offshore waters. Hawaii Ocean Technology is presently seeking permits to develop a massive deep-water fish farm that would hover just below the ocean surface in nearly 3000 feet of water. Unlike existing technology, the farm would not be attached to the bottom but instead hover in the water column. Should it prove technologically feasible, this would open the door for fish farms to move farther into the federal EEZ.

In all of these cases, what is missing is a national framework that codifies consistent, national expectations for this nascent industry. Most importantly, there is no mechanism for monitoring and addressing the cumulative impacts of the industry, which could be far greater than the sum of any individual facilities' impacts. Until today, Congress has not significantly considered the consequences of these industry developments, and no bill has yet been introduced in the 111th Congress that would seek to regulate the industry before it takes hold.

What is clear is that legislation is urgently needed in advance of industry development. If decisive action is not taken by Congress soon, open-ocean aquaculture will likely emerge in federal waters in a piecemeal fashion, without Congress establishing a legislative framework and without the most basic standardized protections in place.

PROVISIONS OF FEDERAL LEGISLATION

A key starting point for development of a strong, precautionary bill should be the recommendations of the high-level commissions and advisory bodies that have already examined this issue. Most notable of these are the Pew Oceans Commission (2003),²³ the U.S. Commission on Ocean Policy (2004),²⁴ and the Marine Aquaculture Task Force (2007).²⁵ Provisions should also draw heavily on California's Sustainable Oceans Act (SB 201), currently the most comprehensive law in the U.S. on marine aquaculture.²⁶ SB 201 contains many of the environmental, socioeconomic and liability provisions necessary to protect marine ecosystems yet allow a responsible industry to develop. It is a good model upon which to build an environmentally sound and socially responsible national framework.

GOVERNANCE AND AUTHORITY

To ensure aquaculture development in offshore waters is ecologically sustainable, federal legislation, the National Oceanic and Atmospheric Administration, and the U.S. aquaculture industry must all adopt a precautionary approach, combined with adaptive management, as their guiding principles. Federal legislation should assign NOAA the lead role and responsibility in the environmental evaluation, planning, siting, permitting and regulation of aquaculture in federal waters. As the primary regulatory agency, NOAA should be authorized to require removal of fish stocks, closure of facilities, revocation of permits, imposition of penalties, and other appropriate remedial measures. This power should be exercised where a permittee is not in compliance with national standards; where the permittee's activities have damaged, are damaging or are likely to damage the marine environment in the foreseeable future; or where the permittee is not in compliance with permit requirements. NOAA should be empowered to take immediate remedial action to avoid or eliminate damage—or the threat of damage—to the marine environment.

NATIONAL STANDARDS

Federal legislation must set legally-binding national standards that prioritizes the protection of wild fish, associated habitats and functional marine ecosystems. They must ensure that offshore aquaculture poses negligible risks to fisheries, marine wildlife, and the ecosystems on which they depend; protects the long-term public interest in healthy marine ecosystems (including conserving genetic diversity and the integrity of aquatic ecosystems); incorporates appropriate public input; and develops in an orderly manner.

National standards should include specific management objectives, including measurable performance standards and identification of how impacts are to be assessed, monitored and addressed. For maximum effectiveness, standards should be structured to reward facilities for performance beyond minimum requirements, and must include significant penalties for facilities that fall short.

BROODSTOCK MANAGEMENT AND FISH ESCAPES

Federal legislation should mandate that offshore aquaculture be limited to native species of the genotype native to the geographic region of the fish farm. Hatchery-raised fish, derived from native species, must be cultured in a manner that ensures that any fish escapes will not harm the genetics of local wild fish. To do so, stocked fish should be no more than two generations removed from the relevant wild stock, and have been exposed to no intentional selective breeding. Species of special concern or those of protected status under the Endangered Species Act should not be cultured. Furthermore, “ranching”, a farming practice where wild juvenile fish are caught and fattened before being sent to market, should be banned.

All facilities and operations must be designed, operated, and shown to be effective at preventing the escape of farmed fish into the marine environment and withstanding severe weather conditions and marine accidents. All farmed fish should be marked, tagged, or otherwise identified as belonging to the permittee. To the extent systems fail and escapes occur, facility operators must document such escapes and the circumstances surrounding them, report them immediately to NOAA and maintain publicly available records of such events.

DISEASE AND PATHOGEN PREVENTION

Legislation should require NOAA, as the lead federal agency, to develop and implement risk-averse management regulations to prevent ecosystem impacts from disease and pathogen amplification and retransmission. Individual permitting decisions must be informed by an analysis of reported industry-wide, on-farm disease and pathogen data as well as a scientific understanding of disease and pathogen distribution in the wild.

Legislation should mandate that offshore aquaculture facilities be designed, located and operated to minimize the incubation and spread of disease and pathogens without relying on the use of antibiotics, pesticides or other harmful chemicals. However, should chemical treatments be required and multiple treatment options exist, legislation should require that the one with the least environmental impact be used, and that such use be reported and records maintained that are publicly available. In all circumstances, the use of all drugs and chemicals—and amounts used and applied—must be minimized.

HABITAT AND ECOSYSTEM IMPACTS

Legislation should require aquaculture facilities to minimize nutrient discharge and ensure that resulting discharge does not negatively impact the local and regional environment. The use of Integrated Multi-Trophic Aquaculture (IMTA)—where finfish, seaweeds and filter feeders or deposit feeders are grown in close proximity to limit the impact of nutrient inputs—should be given a preference over facilities that grow only a single species of fish. Incentives should also be developed to encourage use of other technologies, such as closed-containment farming systems, that fully prevent nutrient discharge.

Legislation should also require that the EPA, in consultation with NOAA, establish numeric effluent limitations for aquaculture facilities operating in federal waters. Those limitations should meet water quality standards, and discharge permits should explicitly address cumulative and secondary impacts at the local and regional level.

INTERACTIONS WITH AND IMPACTS ON MARINE WILDLIFE

Legislation should require permittees to develop, and implement a comprehensive, integrated predator management plan that employs non-lethal deterrents. As part of this plan, performance metrics, best available technologies and site selection should be required to avoid entanglement, disruption of migration, and predator attraction or repulsion so as not to affect wildlife or their use of marine habitats. Underwater acoustic deterrent devices should not be permitted. Furthermore, fish farmers must not be allowed to intentionally kill predators of farmed fish unless human safety is under immediate threat.

USE OF WILD-CAUGHT FORAGE FISH FOR FEED

Wild caught fish ingredients should be used only if they are sourced from populations whose biomass is at or above that which yields optimal yield and from fisheries that are managed using explicit ecosystem-based management measures that

take into account the need for a sufficient prey base within marine ocean food webs. Legislation should require that the use of fish meal and fish oil derived from fisheries not primarily intended for direct human consumption be minimized, and that alternatives to fish meal and fish oil (or fish meal and fish oil made from seafood harvesting byproducts) be used.

REGIONAL ENVIRONMENTAL ANALYSIS

In keeping with a precautionary approach, federal legislation should require regional Programmatic Environmental Impact Statements (PEIS) before committing to any individual project. These analyses should review existing scientific information, anticipate environmental impacts, and provide a region-specific framework for managing marine aquaculture in an environmentally sustainable manner.

Each PEIS should evaluate whether appropriate areas in the relevant region exist for aquaculture development and, if so, siting of marine finfish aquaculture operations appropriately within those areas to avoid adverse impacts on marine ecosystems and ocean user groups. Effects on marine ecosystems, sensitive ocean and coastal habitats, other plant and animal species, and human health should all be considered. Most importantly, the PEIS should evaluate the potential cumulative impacts of multiple facilities in the region, so that a regulatory regime can be developed in advance to avoid the cumulative impacts that only become evident with industry expansion.

RESEARCH AND DEVELOPMENT PROGRAM FOR OFFSHORE AQUACULTURE

Legislation should mandate that a comprehensive, ecologically-based research and development program be designed and supported by NOAA. The program should collect information necessary to ensure permitting and regulation of commercial operations are done in a precautionary manner, and ensure ecological sustainability and compatibility with healthy, functional ecosystems.

The research program should evaluate environmental conditions and operational practices that prevent overexploitation of forage fish and other harm to the structure and function of marine food webs; prevent the escape of farmed fish and resulting negative impacts on wild fish; prevent the incubation and spread of disease and parasites from farmed fish to wild fish without the use of drugs and chemicals; prevent nutrient discharge from impacting marine ecosystems; prevent negative impacts on predators and other wildlife; prevent cumulative environmental impacts of multiple offshore aquaculture facilities; and prevent negative impacts on fishermen and fishing-dependent communities.

The information obtained from this research program, along with the findings of the PEIS, should be regularly reviewed and incorporated into permitting and rule-making decisions on an ongoing basis.

SITE AND OPERATING PERMITS FOR OFFSHORE AQUACULTURE

Legislation should direct NOAA to establish a full, meaningful, balanced and open process for siting and permitting decisions that provides ample opportunity for state, local and public stakeholder input. It should also mandate that decisions about siting and permitting give priority to the protection of the health of the marine environment in the face of uncertainty about effects on public resources. No permit should be issued if NOAA determines that doing so is contrary to the public interest.

Legislation should also require separate site and operating permits. To provide the long-term access to ocean space needed for capital investment, while simultaneously requiring more frequent review of environmental performance, the length of the site permit should be longer than the length of the operating permit. The initial term for site permits should not exceed 10 years while the initial term for operating permits should not exceed five years.

There should also be a legislative mandate that permits not interfere with existing fishing (including access to fish stocks and fishing grounds) or other uses or public trust values; disrupt wildlife and marine habitats; or alter marine ecosystems. Congress should require that permits not contribute to adverse cumulative environmental or socioeconomic impacts.

Legislation should require NOAA, in consultation with relevant state and federal agencies, to develop criteria for site permits, including: prohibition in sensitive habitats; proximity to other farms; proximity to other ocean users; site size; preliminary habitat and community assessment data; water conditions (e.g., depth, currents, and substrate type), and distribution of other species. Furthermore, it should mandate that the selection of sites be driven by the findings of the regional environmental analysis, and that the applicant demonstrate the site location is optimal to avoid adverse effects on ocean resources and users.

FEES, RESOURCE RENTS, FINANCIAL ASSURANCES AND LIABILITY

Fees for marine finfish aquaculture permits should, at a minimum, be sufficient to pay for the costs of administering the marine finfish permitting program, and for monitoring and enforcing the terms of the permits. In addition, a reasonable portion of the resource rent generated from marine aquaculture projects that use ocean resources held in public trust should be collected from aquaculture operators. Legislation should establish a fee structure to achieve this goal.

Legislation should also require that all structures be removed from the site at the permittee's expense upon termination of operations, and that the area be restored to its original condition, if necessary. NOAA should be required to obtain financial assurances from each permittee to ensure that structures are removed and any necessary restoration is performed.

Legislation should make operators of aquaculture facilities in federal waters liable for environmental damage, including damage from escaped fish, as well as costs for natural resource damage assessment caused by their operations. A citizen suit provision should be included as an additional means to enforce violations should federal agencies fail to do so.

ROLE OF REGIONAL FISHERY MANAGEMENT BODIES

Legislation should require NOAA and other federal agencies to consult with the regional fishery management councils, interstate fishery commissions, and First Nations on all matters related to open-ocean aquaculture. No commercial aquaculture facility should be permitted without approval from the fishery management body with jurisdiction in the area in which the aquaculture facility would be located. Where more than one fishery management body has authority, both bodies should be required to work together to resolve how to proceed with open ocean aquaculture. Aquaculture development should not interfere with access to traditional fishing grounds or access to recreational or commercial fish stocks.

FEDERAL AND STATE CONSISTENCY

Legislation must give states and territories the authority to "opt out" of aquaculture development in federal waters adjacent to their state waters. If one state decides to "opt out" but a neighboring state does not, states should be required to work together to resolve how to proceed. There should be a requirement that any resulting permits be consistent with authorized Coastal Zone Management Plans. Finally, permitting of offshore aquaculture facilities should be integrated with any federal marine spatial planning efforts.

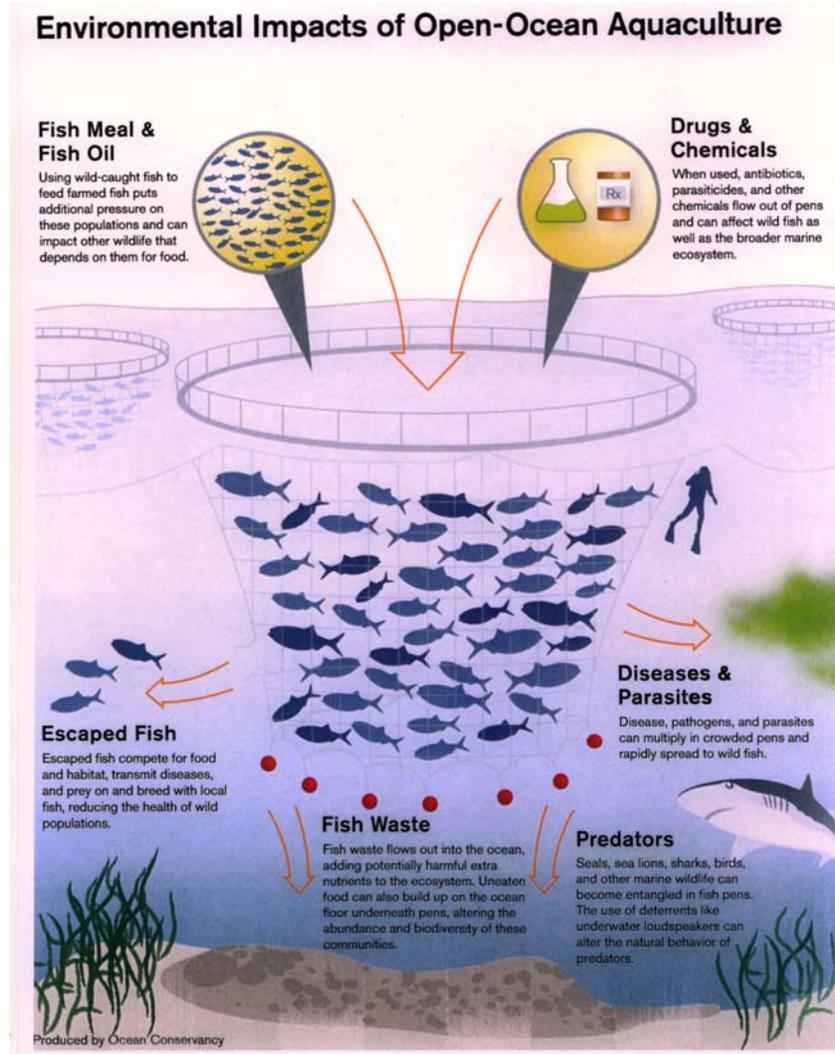
CONCLUSION

Now is the time for strong leadership from Congress on the future of open-ocean aquaculture in the United States. If Congress fails to act, an unregulated industry is likely to develop, and the environmental consequences could be severe. But with bold action, this committee can play a central role in crafting the legislative framework that will ensure strong protection of U.S. federal waters, and an environmentally and economically responsible industry.

Congress has a unique opportunity—and a public responsibility—to craft a national vision that will foster "a race to the top," precisely at a time when past missteps by other countries have created a "race to the bottom" that they have come to regret. This is no more evident than in Chile, a country that until recently was the world's largest producer of farmed salmon.²⁷ Without a sufficiently precautionary national plan, Chile increased its production of farmed Atlantic salmon by 2,200% from 1991 to 2006. But by 2007, with too many farms located too close together, disease began to spread rapidly through the industry. Just two years later, there has been over a 50% decline in salmon production and revenue for the industry and over 7,500 direct jobs have been lost. Only after the salmon industry was decimated by the spread of this disease did Chilean authorities take the first steps toward developing a national framework to manage farms via "neighborhoods" to break the disease cycle by limiting both farm-level and regional fish production.²⁸ If they had approached the development of the salmon farming industry more cautiously from the beginning they may have averted this calamity.

Here in the United States, Congress must articulate a precautionary national framework now, before industry development, to ensure protection of the ocean, ocean users—and fish farming businesses—from the ravages that Chile has experienced.

Doing anything less is a gamble with our oceans that we simply should not take.



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Ms. BORDALLO. Thank you, Dr. Leonard, for your comments and for your organization's commitment to responsible offshore aquaculture.

I would now like to recognize Mr. Hinman to offer his testimony. Before I do that, I would like to recognize another Member who has joined our Committee, and that is Congresswoman Carol Shea-Porter from New Hampshire.

Thank you, Mr. Hinman, for joining us. And you may begin.

**STATEMENT OF KEN HINMAN, PRESIDENT,
NATIONAL COALITION FOR MARINE CONSERVATION**

Mr. HINMAN. Thank you, Madam Chair, Subcommittee Members. I appreciate this opportunity to speak to you today on offshore aquaculture and how it fits into the broader vision we have for the future of our oceans, for the fishermen and fishing communities that depend on the seas for sustenance and recreation.

In our view, the Commerce Department's approach to offshore aquaculture illustrates what is wrong with the way we have been addressing this issue. The Administration approved a poorly conceived and grossly ambitious plan to farm waters of the Gulf of

Mexico. After giving the Gulf the go-ahead, NOAA says it will now begin developing a national policy. To use an expression from down on the farm, that is putting the cart before the horse.

Congress needs to step in now, bring this cart to a halt, and begin a true national dialogue on offshore aquaculture. The first priority before the first permit is issued should be to adopt strict national environmental standards that will keep our ocean's fisheries healthy and wild. Now, my organization, the National Coalition for Marine Conservation, was founded in 1973 by sport fishermen, and like the sportsmen before them who pioneered wildlife conservation on land, they evolved naturally into passionate protectors of the fish and the wild world we share.

Fish are wild animals and they need wild places, and we are dedicated to keeping the ocean wild in order to preserve fishing opportunities for the fishing public. But we wonder where we will fit in the future, where wild places are locked away in marine parks that are surrounded by a network of fish farms and other industrial uses. Is this the future we want for the oceans? How will the fishing public fit into this scenario?

And this is not to say there isn't room for aquaculture in the sea, but aquaculture is not fishing. And the way it is being developed in many parts of the world and being contemplated here in the U.S. is simply not sustainable and comes with high environmental costs which are real and many and not easily remedied. NOAA has committed to an ecosystem based approach to fisheries management for all marine fisheries, but we find this hasty move into farming the seas anathema to such an approach.

We are told that offshore aquaculture will help take pressure off wild stocks of fish. In fact it is likely to do the opposite. It will put increased pressure directly on forage fish through use as aquafeed, and indirectly on other species by taking food out of the mouths of predators, fish, marine mammals, and seabirds. Forage fish serve the critical ecosystem function of transferring energy from primary or secondary producers to higher trophic levels. These species are already subject to as much or in some cases more fishing than their populations can withstand.

Despite their important ecological role, forage fish limits are set without explicitly taking into account the needs of predators in the ecosystem. This is particularly alarming because the recent boom in global offshore aquaculture has placed unprecedented pressure on forage stocks to satisfy the demand for aquafeed. The aquaculture industry is the largest consumer of fishmeal and fish oil, using more than half of the global supply now. And this demand is projected to more than double in the next decade as offshore aquaculture expands to meet projected consumer demands.

Now, advocates of offshore aquaculture development in the U.S. acknowledge that using fish to feed fish in aquaculture operations is a concern but downplay it, claiming that there is not a net loss of protein, that in fact wild fish generally consume more protein per pound than farmed fish. Such fish are no longer available as food for wild predators. The food base for these predators and the ability of the ocean to support them is reduced accordingly. As far as the ocean environment is concerned, it is a net loss of protein.

If we are to rebuild and maintain our wild fish stocks at healthy population levels so they can continue to support recreational and commercial fisheries, our current national management goal, it also means ensuring an abundant supply of forage fish to sustain them. We urge Congress to include as a key feature in any Federal offshore aquaculture legislation strict, measurable standards for the use and management of forage fish.

We call on Congress to address the issue of forage fish and feeds from both the demand side and the supply side. Minimize with the goal of phasing out the use of wild fish as feed ingredients in aquaculture. Permit the use of wild fish as feed ingredients for aquaculture only if they are sourced from fisheries utilizing an ecosystem based approach to management. Require all fishery management plans for forage fish to feature ecological reference points, targets and limits set to make sure an adequate forage reserve is maintained for the ecosystem. And until such time as ecosystem based management measures are implemented, freeze the allowable harvest of forage fish for reduction into fishmeal and fish oil.

Now, in addition to our written comments, we have appended a paper that we prepared on ecological reference points for forage fish that explains this issue in much more detail based on a review of the scientific literature and policies and practices that have been recommended or implemented in forage fisheries here and abroad. And we also have requested that a paper that just came out yesterday entitled 'Feeding Aquaculture in an Era of Finite Resources' in a peer reviewed journal by Nailer et al. be included in the record, which addresses the issue of making sure that when we proceed with aquaculture that we are not depleting the ocean by using forage fish for aquafeed and that we use alternative feeds.

Ms. BORDALLO. No objection. So ordered.

[The prepared statement of Mr. Hinman follows:]

**Statement of Ken Hinman, President,
National Coalition for Marine Conservation**

My name is Ken Hinman, and I am here as president of the National Coalition for Marine Conservation, an independent non-profit organization devoted exclusively to conserving ocean fish and their environment. I have been actively involved in marine fisheries issues since 1978, a period that corresponds with the evolution of marine fish conservation in the United States. During this time, I've witnessed the many changes Congress has made to our fisheries laws, in response to both the changing needs of our fisheries and our increasing knowledge about the fish, their behavior, their habitat and, more recently, the ocean ecosystems they are such a critical part of.

Madame Chairman, subcommittee members, I appreciate this opportunity to speak to you today on the extremely important issue of offshore aquaculture and how it fits into the broader vision we have for the future of our oceans, for the fishermen and fishing communities that depend on the sea for sustenance and recreation.

The Department of Commerce's approach to offshore aquaculture announced on September 3rd, and repeated here today, illustrates what's wrong with the way we are addressing this issue. The Administration approved, by not approving, a poorly-conceived and grossly ambitious plan to farm waters of the Gulf of Mexico for up to 64 million pounds of fish a year. After giving the gulf the go-ahead, the National Oceanic & Atmospheric Administration says it will now begin developing a national policy.

To use an expression from down on the farm, that's putting the cart before the horse. Congress needs to step in now, bring this cart to a halt, step back, and begin a true national dialogue on offshore aquaculture. The first priority is to develop

strict national environmental standards that will keep our ocean fisheries healthy and wild.

The National Coalition for Marine Conservation (NCMC) was started in 1973 by conservation-minded fishermen. Like the sportsmen before them who pioneered wildlife conservation on land, they evolved, naturally, into passionate protectors of their prey and the wild world we share. Fish are wild animals and they need wild places. The NCMC is dedicated to finding a way to keep the ocean wild in order to preserve our wild fisheries for the fishing public.

But we wonder where we will fit in the future. We see policies being developed that support a future of wild places preserved in marine parks, where little or no fishing is permitted, soon to be surrounded by farms and other industrial uses. Is this the future we want for our oceans? How will the fishing public fit into this scenario? The millions of individual anglers, who simply want to catch a few fish for the home table, or who release their catch because it's the experience they value most? Or the conscientious commercial fishermen who fish selectively and with restraint, scaled-down to serve their communities, not corporations?

This is not to say there isn't room for aquaculture in the sea. But the way it's being done in many parts of the world, and now contemplated here in the United States, is not sustainable and comes with high environmental costs. Aquaculture is not fishing. Done on a large scale, as proposed in the Gulf plan, it is agribusiness at sea, or aqua-business for want of a better word.

The environmental threats are real and many and not easily remedied. Fish meal and oil containing PCBs that accumulate in the flesh of farmed salmon. Forage fish taken from the food chain in mass quantities to feed fish reared in saltwater pens. Large numbers of fish that escape their net-pens, competing with less abundant wild stocks for food and habitat. Escapees breeding with wild fish, creating cross-breed populations that are genetically weaker and more vulnerable to disease and parasites. Waste by-products along with pesticides and chemical fertilizers used in the aquaculture process that leak into the marine environment.

NOAA has committed to an ecosystem-based approach to fisheries management for all marine fisheries. But we find this hasty move into farming the seas anathema to such an approach. We are told that offshore aquaculture will help take pressure off wild stocks of fish. In fact, it is likely to do the opposite. It will put increased pressure directly on forage fish that are used as aqua-feed, and indirectly on other species by taking food out of the mouths of predators; fish, marine mammals and seabirds.

Forage fish, including menhaden, herrings, sardines, anchovies, mackerels, whiting, and krill, are small, abundant, schooling fish that are prey for many other species of fish, marine mammals and seabirds. They serve the critical ecosystem function of transferring energy from primary or secondary producers to higher trophic levels. Despite their important ecological role, forage fish catch limits are currently set without explicitly taking into account the needs of predators in the ecosystem. This is particularly alarming because the recent boom in global offshore aquaculture has placed unprecedented pressure on forage stocks to satisfy the demand for aqua-feed.

None of the U.S. fishery management plans covering forage fish adequately address all areas vital to maintaining a healthy forage base. Only recently has NOAA begun to develop federal guidance on employing more conservative standards for forage fish. Without more conservative standards, the risk of harvesting these fish at levels that damage the food web and irreversibly harm ecosystems is substantial.

The aquaculture industry is the largest consumer of fishmeal and fish oil, using more than half of the global supply, and this demand is projected to more than double in the next decade as offshore aquaculture expands to meet projected consumer demands. In 2003, 28.8 million tones of fish were captured for reduction into meals and oils for non-human consumption, mostly feeds for agriculture and aquaculture. At current rates of expansion, according to the FAO, it is predicted that the global aqua-feed industry will require 70% of the average historical fish meal supply and 145 percent of the fish oil supply by 2015. The global demand for fish meal for aqua-feeds will exceed total available supplies around the year 2020 and for fish oil well before the year 2010.

While aquaculture is promoted as a solution to reduce pressure on wild fish stocks, the most highly-prized aquaculture species are carnivorous finfish that require significant amounts of fish-based feed. Up to three pounds of wild-caught for-

age fish are needed to raise a single pound of salmon. Forage needed to rear a pound of bluefin tuna is estimated from 7 to 25 pounds. Most major forage fish species are fully- or over-exploited and cannot sustain increased fishing pressure. Current fishing levels may already be hindering the recovery and sustainability of predator populations.

* * * * *

Advocates of offshore aquaculture development in the U.S. acknowledge that using fish to feed fish in offshore aquaculture operations is a concern, but then downplay it—unscientifically. They claim, for instance, that there is not a net loss of protein, that wild fish generally consume more protein per pound than do farmed fish.

Whether or not wild fish consume more protein than farmed fish is irrelevant. Farmed fish are separate and apart from the ocean ecosystem. Fish caught to feed farmed fish are removed from the ocean and therefore no longer available as food for wild predators. The food base for these predators, and the ability of the ocean to support them, is reduced accordingly.

As we noted, one of the main arguments advanced in support of offshore aquaculture is that it will take pressure off already stressed wild fish stocks. But if taking pressure off wild stocks is to allow us to rebuild and maintain them at healthy population levels so they can continue to support wild fisheries, commercial and recreational—which is our current national management goal—it also means ensuring an abundant supply of forage fish (sardines, anchovy, menhaden, mackerel, etc.) to sustain them.

Again as we noted, the growth of offshore aquaculture is expected to more than double the global demand for aqua-feeds over the next decade, putting additional pressure on forage fish populations that are already subject to as much or in some cases more fishing than their populations can withstand. Harvesting forage species to feed penned fish is no different than feeding them to chickens or hogs. It takes substantial amounts of food out of the mouths of wild fish and other marine predators. As far as the ocean environment is concerned, it is a net loss of protein.

* * * * *

Americans ate an average of 16 1/2 pounds of seafood per person in 2006, according to the Department of Commerce. What would seem to be good news for the fishing industry is tempered by the fact that 83 percent of the fresh, frozen or canned fish and shellfish we consume are imported from overseas. Forty percent of that comes from fish farms.

The Administration is using these figures to bolster support for legislation to promote a big-time U.S. offshore aquaculture industry to close the trade deficit by making the country more seafood self-sufficient. The Commerce Department claims aquaculture will take pressure off wild stocks as seafood demand in the U.S. is expected to exceed supply—stocks are already strained beyond capacity—by 4 million metric tons by 2025.

But will farming take the pressure off? Can we really get more fish out of the ocean without taking more fish? Only two of the five largest capture fisheries produce seafood directly for our dinner table, according to the Woods Hole Oceanographic Institution. The other three “reduce” fish such as menhaden, sardine and mackerel to fish meal and oil for agriculture and aquaculture feeds. So the 16 lbs per person is deceiving. It’s actually a lot more than that—up to 4 times, by one estimate—when you factor in the animals nourished on fish feed—chickens, pigs and, yes, farmed fish.

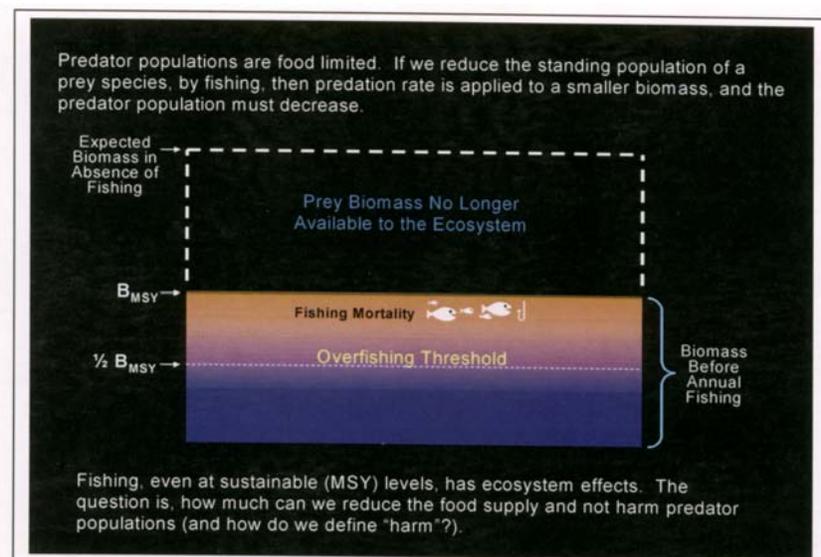
With the exploding global growth of marine aquaculture, including penning or ranching carnivorous fish like salmon and tuna, we’re likely to see a sizeable increase in the amount of fish removed from the ocean to feed them. Diverting fish to the table through farming is an inefficient way to use protein from the sea. Stocks of key forage fish are not well managed around the world and cannot handle the increased fishing pressure. Even here in the U.S., fishery management goals for forage fish are set to sustain the fisheries, not predators.

As for whether aquaculture will take pressure off the stocks of the fish being farmed, that hasn’t happened with salmon, because wild-caught fish are more valuable. And in the Mediterranean, where farming bluefin tuna is big business, the result has been vastly increased captures of wild tuna to “grow” in the pens, without a commensurate drop-off in the established market fisheries. Farming adds an estimated 25,000 tons a year to what’s already being taken from the Med. Annual catches are now over 50,000 tons, in a fishery that scientists say shouldn’t take more than 15,000.

In order to protect the ocean's forage base, a fundamental element of an ecosystem-based approach to managing fisheries and conserving living marine resources, the National Coalition for Marine Conservation believes we must make preserving an adequate supply of prey for predators the primary goal of fishery management plans for key forage fish. To this end, the NCMC urges Congress to include as a key feature in any federal offshore aquaculture legislation, strict, measurable standards for the use and management of forage fish.

We make the following recommendations:

- Prohibit fish ranching, defined as the catching of wild fish to rear and fatten in pens for harvest.
- Permit the use of wild fish as feed ingredients for offshore aquaculture only if they are sourced from fisheries utilizing an ecosystem-based approach to management.
- Until such time as ecosystem-based management measures are in place, cap the harvest of forage fish used for reduction.
- Require all Fishery Management Plans for forage fish to feature ecological reference points to ensure an adequate forage reserve is maintained for the ecosystem.
- Define ecological reference points as targets and limits, such as stock biomass and fishing mortality rate, set to achieve ecosystem-based management goals. These reference points should include target and threshold population size, target population age structure, target population density, and target fishing mortality. As an example, we append to these comments a white paper we prepared entitled "Ecological Reference Points for Atlantic Menhaden," which is based on a review of the scientific literature and policies recommended and/or implemented in fisheries for key forage species here and abroad.
- Define "forage fish" for which the above standards apply as a suite of species that provide a critical link between lower and upper trophic levels. These species (e.g., menhaden, herrings, sardines, anchovies, mackerels, whiting, and krill) generally exhibit one or more of the following characteristics:
 - Fish and invertebrates that are important prey for upper trophic levels (e.g., small schooling pelagic fish);
 - Prey throughout much of their life-cycle;
 - Their abundance highly influences productivity of predators;
 - Are key forage species at the juvenile stage (small size, location nearshore).



[NOTE: "Feeding Aquaculture in an Era of Finite Resources" submitted for the record has been retained in the Committee's official files.]

Ecological Reference Points for Atlantic Menhaden

Ken Hinman
National Coalition for Marine Conservation
June 2009

Among the ASMFC's tasks this year for conserving and managing Atlantic menhaden, according to the commission's 2009 Action Plan, is to "explore the development of ecological reference points."¹ To this end, the Policy Board in February tasked the Management and Science Committee (MSC) with providing advice to the Menhaden Management Board on developing new reference points; targets and limits designed to protect menhaden's vital role in the ecosystem, in accordance with the objectives of the Interstate Fishery Management Plan², with particular emphasis on providing adequate forage for predatory fish, marine mammals and seabirds.

The Menhaden Management Board initiated an addendum to the Atlantic Menhaden FMP in 2005 to conserve menhaden with a temporary cap on reduction harvest in Chesapeake Bay (through 2010), while addressing concerns about localized depletion in the Bay and the possibility of compromised predator-prey interactions, in particular reduced availability of forage for resident and migratory striped bass. A research program recommended by the Menhaden Technical Committee is underway to try and determine if reduced abundance of menhaden is related to observed predator deficiencies (e.g., low weight-to-length ratios and stress-related disease in striped bass) and low larval menhaden recruitment.³

A new benchmark stock assessment for menhaden will be conducted in 2009 and peer reviewed in 2010. This assessment, unfortunately, will employ the coast wide model used in the last assessment and biological reference points developed for stock replacement, not to preserve ecological function.⁴

Current Reference Points are Insufficient For Ecosystem-Based Management

As the Peer Review Panel pointed out in its review of the last benchmark stock assessment for menhaden, the ASMFC's coast wide, single-species assessment model and the reference points established for assessing the status of the stock cannot measure the stock's capacity to provide adequate forage for other species in the ecosystem, nor can it "detect localized depletion and reduced ecological function that could occur when the fishery is concentrated in one part of the coast," such as in and near Chesapeake Bay.⁵

The biological reference points currently in use are two: a fishing mortality (F) target and threshold; and a population fecundity (number of eggs) target and threshold.⁶ These reference points are intended to assure that the stock is capable of sufficient reproduction to replenish itself and that the stock is maintained at a size capable of supporting a viable fishery. As targets and thresholds linking the status of the stock to management goals and actions, they do not account for nor can they prevent the possibility that a fishery, especially one exploiting a key forage species like menhaden, could be overfished in an ecosystem context even if it is not overfished in a single-species context.⁷

Developing ecological reference points for menhaden is similar to the process used to establish the current reference points, in that both are targets and thresholds set to achieve specified management goals. Once again, the current limits are set to determine whether overfishing is occurring or the stock is overfished on a coast wide, single-species basis; that is, to ensure the rate of fishery removals does not exceed the ability of the stock to replenish itself. Ecological reference points, on the other

¹ASMFC 2009 Action Plan. p. 5

²ASMFC 2001. Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden. Fishery Management Report No. 37.

³ASMFC 2005. Addendum II to Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden. pp. 6-7

⁴The Menhaden Management Board in February asked the Stock Assessment Subcommittee to consider an alternative assessment model developed by L.B. Christensen and S.J.D. Martell of the University of British Columbia. Atlantic Menhaden Stock Status Report: New Advice (unpublished manuscript). Although this model also assumes a coast wide stock and uses existing reference points, it suggests that "the Atlantic menhaden stock is currently overfished, and that overfishing is occurring."

⁵ASMFC 2004a. Terms of Reference & Advisory Report to Atlantic Menhaden Stock Assessment Peer Review. Stock Assessment Report No. 04-01. p. 4-5. See also 2009 Review of the Fishery Management Plan and State Compliance for the 2008 Atlantic Menhaden Fishery. Atlantic Menhaden Plan Review Team. ASMFC. May 2009.

⁶ASMFC 2004b. Addendum 1 to Amendment 1 to the Interstate Fishery Management Plan for Atlantic Menhaden.

⁷Pikitch, E.K. et al. 2004. Ecosystem-Based Fishery Management. *Science*. 305: 346-7.

hand, also use traditional benchmarks, such as stock biomass and mortality rate, but are set with ecosystem-based management goals in mind.

As the Peer Review Panel noted, ecological reference points require management goals that specify an allocation of menhaden as forage.⁸ As an example, the Panel suggests that a reference point that would be “responsive to menhaden as a forage species would be one which maximizes population abundance taking into regard the allocation of fish between F (fishing mortality) and M (natural mortality).”⁹

First consideration, then, should be given to how targets and thresholds for menhaden population abundance and total mortality (the relationship of F to M) might be established in an ecosystem-based context. We offer the following recommendations, based on a review of the scientific literature and approaches recommended and/or implemented in fisheries for other key forage species.

Managing for Greater Abundance

The standard population, or biomass, associated with maximizing yields to fisheries is B_{MSY} . The ASMFC in 2004 opted to replace the use of a proxy for an MSY-based spawning stock biomass (SSB) with a fecundity target and threshold.¹⁰ Aside from whether SSB or fecundity is a more accurate indicator of stock reproductivity, standing biomass—or population size—does constitute a better measure of the amount of prey available to meet the needs of dependent predators.

The National Marine Fisheries Service (NMFS) issued new Guidelines effective February 17, 2009 for implementing annual catch limits consistent with the Magnuson-Stevens Act’s National Standard 1. In these Guidelines, NMFS recommends setting a population target for forage species higher than the B_{MSY} level in order to maintain adequate forage for all components of the ecosystem.¹¹ This more precautionary approach for forage species abundance is well established in the scientific literature.¹² How much higher than the B_{MSY} level depends on a number of factors, among them the uncertain effects of climate variability and change on fluctuations in prey populations, the uncertain effects of reduced biomass on prey distribution and availability to predators throughout the range of the prey species, and uncertainties in data and scientific advice.

Recent research on forage fish such as Atlantic herring and mackerel suggests that fully accounting for predation demand¹³ in stock assessments and associated reference points—including expected increases in demand from predatory fish and seabirds that are the object of recovery efforts—can dramatically increase estimates of the population size needed to sustain both predators and fisheries, while lowering the yields available to the fishery.¹⁴

While ecosystem models under development attempt to quantify the relationship between predator and prey with the goal of enabling fishery managers to understand the precise trade-offs among various management strategies for each, their application is likely years away. Until we are able to develop assessment models to determine what some scientists call the ecologically sustainable yield¹⁵ for forage fish such as menhaden, precautionary interim management strategies are warranted.¹⁶

⁸ ASMFC 2004a, p. 5.

⁹ ASMFC 1999. Terms of Reference & Advisory Report for the Atlantic Menhaden Stock Assessment Peer Review. Stock Assessment Report No. 99-01. p. 5.

¹⁰ ASMFC 2004b.

¹¹ 50 CFR Part 600.310(e)(3)(iv)(C).

¹² Collie, J.S. and H. Gislason. 2001. Biological reference points for fish stocks in a multispecies context. *Canadian Journal of Fisheries and Aquatic Sciences*. 58: 2167-2176.

¹³ Prey demand is the prey required to meet dynamic predator population needs, as opposed to merely estimating present predator consumption.

¹⁴ W.J. Overholtz, L.D. Jacobson, and J.S. Link. An ecosystem approach for assessment advice and biological reference points for the Gulf of Maine—Georges Bank herring complex. *North American Journal of Fisheries Management*, 28. 2008. and H. Moustahfid, J.S. Link, W.J. Overholtz, and M.C. Tyrrell. The advantage of explicitly incorporating predation mortality into age-structured stock assessment models: an application for Atlantic mackerel. *ICES Journal of Marine Science*, January 16, 2009.

¹⁵ Zabel et al. Ecologically Sustainable Yield, *American Scientist*, March-April 2003. The authors, from the Northwest Fisheries Science Center of NMFS, recommend moving away from traditional single-species approaches to management to what they call ecologically sustainable yield (ESY), because “the cost of mismanaging a community might be far greater than the cost of mismanaging a fishery. Although overfished stocks have been known to recover, revival of communities that have changed states can be excruciatingly slow or even impossible.”

¹⁶ Department of Fisheries and Oceans, Canada. Policy on Fisheries for Forage Species. <http://www.dfo-mpo.gc.ca/fm-gp/peches-fisheries/reports-rapports/amac-cmb/annex4-annexe4-eng.htm>. Biological Pre-requisites for Commercial Fisheries on Forage Species: “It should be possible to estimate the risk that the proposed level of harvest poses to the forage species and ecologically

To cite an example of an interim strategy already in practice, the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR), recognizing the key role of krill in the ecosystem, adopted more conservative reference points than the ones commonly applied in single-species fisheries management.¹⁷ “(T)he requirements of krill predators were incorporated by establishing a level of krill escapement of 75% of the pre-exploitation biomass, instead of the 40-50% level normally used in single-species management. This has been called the “predator criterion” and it reflects an arbitrary level that needs to be revised to take into account information on the functional relationship between abundance of prey and recruitment in predator populations as it becomes available.”¹⁸

The corollary to maintaining a higher target population for key forage species is setting a higher overfished threshold. With each increment of reduction in the target prey population level, the predator population is left with less available food and its population must shrink in size in order to come into equilibrium with the amount of prey available.¹⁹ The standard single-species definition of an overfished stock—the point at which fishing ceases and rebuilding begins—is approximately $\frac{1}{2}$ B_{MSY} —a population level that may still be capable of rebuilding—but which is about $\frac{1}{4}$ or less of an un-fished population.²⁰

In an ecosystems context, it is clearly risk-prone to assume that the biomass of a target forage species can be reduced to below half its pre-exploitation state without causing reduction in the ecosystem’s capacity to support healthy and abundant populations of predator species.²¹ Therefore, an overfished threshold should also be set substantially higher than in the traditional single-species approach, and probably no lower than B_{MSY} .

Avoiding Localized Depletion

Ecological reference points may also account for the fact that setting a more conservative target population goal does not fully account for and protect a prey fish’s role in the ecosystem. Fishing a prey population down to a fraction of its un-fished level in order to increase fishery yields causes not simply a reduction in the number of prey (total population), but also a change in the type of prey available (size/age) and distribution throughout their natural range.²² Each of these factors is important to predators finding an adequate supply of food where and when they need it.

The Policy on Fisheries for Forage Species of Canada’s Department of Fisheries and Oceans states: “Management plans for commercial fisheries on forage species should include explicit provisions to ensure that fisheries do not unduly concentrate harvest and do not produce local depletions of the forage species...Forage species should be managed in ways which ensure local depletion of population components does not occur. Local depletion of the forage species could result in food shortage for the dependent predators, even if the overall harvest of the forage species was sustainable.”²³

To avoid localized depletion and maintain prey availability, ecological reference points for Atlantic menhaden should establish, in addition to population biomass targets and thresholds:

- Target population age structure, i.e., an age distribution reflecting that of a natural, pre-exploitation population; and,
- Target population density, i.e., prey availability distributed in time and space to avoid local or regional depletions. Time-area limits (caps) can be used to distribute catches geographically.

dependent species. In situations where risk presented by a particular level of harvest and consequences of over-harvesting are especially uncertain, exceptionally risk-averse decisions are necessary.”

¹⁷ Gascon, V. and Werner, R. CCAMLR and Antarctic Krill: Ecosystem Management Around the Great White Continent. Sustainable Development Law & Policy. Fall 2006. p. 14-16.

¹⁸ Constable, A.J., de la Mare, W.K., Agnew, D.J., Everson, I., and Miller, D. 2000. Managing fisheries to conserve the Antarctic marine ecosystem: practical implementation of the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). ICES Journal of Marine Science, 57: 778-791.

¹⁹ Rounsefell, G.A. Ecology, utilization, and management of marine fisheries. C.V. Mosby Co. 1975.

²⁰ The National Marine Fisheries Service (NMFS) estimates the stock size at MSY at approximately 40% (range 36.8% to 50%) of the un-fished or pre-exploitation stock size. NMFS National Standard 1 Guidelines (1998): 63 FR 24216.

²¹ T. Ragen. 2001. Maximum sustainable yield and the protection of marine ecosystems: a fisheries controversy in Alaska. Author’s unpublished manuscript. The author is Executive Director of the U.S. Marine Mammal Commission.

²² Ragen. 2001.

²³ DFO, Canada. Policy on Fisheries for Forage Species.

Allocating Prey to Predators

Collie and Gislason, in examining the use of single-species reference points in a multi-species or ecosystem context, conclude that such reference points are inappropriate for forage species which have natural mortality rates that fluctuate substantially. They suggest a more appropriate alternative for forage fish is to manage for total mortality by decreasing fishing mortality when natural mortality increases.²⁴

In an un-fished population at a natural equilibrium, total mortality (Z) for a species equals natural mortality, which for a forage fish like menhaden is primarily predation. In a population that is at a fishing-induced equilibrium, the amount of predation is reduced to accommodate desired fishery yields. As a result, estimates of natural mortality (M) used in single-species assessments are influenced by the fishing mortality rate (F). The M that is “determined” is therefore an a priori allocation to predators, rather than a determination of actual predator needs.

Some management bodies have recommended that an ecosystem-based approach to managing forage fish would be to allocate prey to predators first, before allocating to the fisheries. The NOAA Chesapeake Bay Office’s FEP, Fisheries Ecosystem Planning for Chesapeake Bay, recommends that fishery managers “(c)onsider explicitly strong linkages between predators and prey in allocating fishery resources. Be precautionary by determining the needs of predators before allocating forage species to fisheries.”²⁵

Following on Collie and Gislason, doing this would entail estimating an amount of prey fish to set aside to supply predators at desired levels, then determining the sustainable fishing mortality rate; or, $Z - M = F$. The predation mortality used in the menhaden stock assessment (M_2 , a subset of M), which is estimated from the Multispecies VPA, is thought to produce a more accurate fishing mortality rate for the purpose of staying within current biological reference points. But as the ASMFC has pointed out, the MSVPA cannot provide information about the size and composition of striped bass and other predator populations a given menhaden population can support.²⁶

The natural mortality rate used in the stock assessment, based on the MSVPA, is 0.45. The current fishing mortality reference points for menhaden are an F_{TARGET} of 0.75 and an $F_{THRESHOLD}$ of 1.18.

One class of reference points used to approximate fishing at the MSY level for data poor stocks, or when there is a high degree of uncertainty about stock status, is $F=M$ or where F is a fraction of M , e.g., $F=0.75M$.²⁷ It is commonly assumed that when harvesting at MSY, F is roughly equal to M . If the goal is to maintain a higher biomass, as in the case of forage species, then F should be set no higher than M and preferably lower. Indeed, one author of the Chesapeake Bay FEP, referencing Collie and Gislason, has recommended that for menhaden, F should as a rule be less than or equal to M .²⁸ The North Pacific Fishery Management Council, which uses a tiered system for setting buffers between overfishing limits and target catch levels based on stock life history and uncertainties in the assessment, establishes an overfishing level (MSY) for walleye pollock, an important forage fish in Alaskan waters, that is equal to M and a target F that is set at $0.75M$.²⁹

Summary

Ecological reference points for Atlantic menhaden used as an alternative to the commonly used single-species reference points could nonetheless use stock biomass and fishing mortality rate as reference points for setting targets and thresholds to achieve more conservative, ecosystem-based fishery management goals.

In Table 1 (below), we present what ecological reference points for menhaden might look like, based on the preceding discussion on the scientific literature and

²⁴ Collie, J.S. and H. Gislason. 2001.

²⁵ Fisheries Ecosystem Planning for Chesapeake Bay, NOAA Chesapeake Bay Office, 2006. pp. 320-1.

²⁶ Brad Spear, Senior Fishery Management Plan Coordinator for Policy, ASMFC. Coast-wide Stock Assessment of Atlantic Menhaden. Proceedings of the Menhaden Science and Policy Symposium. Narragansett, RI. November 30, 2007. p. 14. The MSVPA includes only three predators—striped bass, bluefish and weakfish—on a prey species known to be preyed on numerous fish, marine mammals and seabirds.

²⁷ Field, J.C. 2002. A review of the theory, application and potential ecological consequences of F40% harvest policies in the northeast Pacific. School of Aquatic and Fisheries Sciences. University of Washington. Prepared for the Alaskan Oceans Network.

²⁸ Houde, E.D. University of Maryland Center for Environmental Science. Developing, Adopting, and Implementing EBFM in Chesapeake Bay. A presentation to the Conference on Ecosystem Based Management: The Chesapeake and Other Systems. Baltimore, MD. March 23, 2009.

²⁹ Fishery Management Plan for Groundfish of the Bering Sea and Aleutian Islands Management Area. North Pacific Fishery Management Council. April 2009. p. 15.

approaches used to manage forage fish elsewhere. B is the stock biomass, B_{MAX} is the biomass in the absence of fishing, $B_{MAX75\%}$ is 75 percent of the un-fished biomass, and B_{MSY} is the biomass associated with producing the maximum sustainable yield. F is the fishing mortality rate, M is the natural mortality rate and $F=.75M$ is a fishing mortality rate that corresponds to 75% of the natural mortality rate.

Table 1. Ecological Reference Points for Atlantic Menhaden

<i>Reference Point</i>	<i>Target</i>	<i>Threshold</i>
Biomass	$B_{MAX75\%}$	B_{MSY}
Fishing Mortality Rate	$F = .75M$	$F=M$

Ms. BORDALLO. Thank you very much for joining us, Mr. Hinman.

And now we have Mr. Vinsel. I would like to ask you to proceed with your testimony.

**STATEMENT OF MARK VINSEL, EXECUTIVE DIRECTOR,
UNITED FISHERMEN OF ALASKA**

Mr. VINSEL. Thank you, Madam Chair and Committee Members. My name is Mark Vinsel, and I represent United Fishermen of Alaska. We are an umbrella association of 37 member groups that participate in all the different commercial fisheries in and offshore Alaska waters. And these fisheries are seen as a model for sustainable fisheries nationwide, and the key is that the fish come first.

We manage our fisheries with a public process, including local meetings with all stakeholders where decisions are vetted before policies move forward. The United Fishermen of Alaska's current position is to oppose offshore aquaculture that would grow fin fish to market size. However, we are willing to listen to the concerns of others and consider any legislation on its merits. As of yet, we have not seen any legislation introduced that would protect the fragile economies of the nation's fishing dependent communities.

Alaska's Legislature banned finfish farming in Alaska in 1990 after convening a task force that studied the risks and benefits. The concerns anticipated at that time to the ecosystem, fishery stocks, the economy, have not diminished. In setting a national policy for offshore aquaculture, we ask Congress to take existing wild fishery resources, participants, and communities into account as a priority over new industrial aquaculture, and ensure the development of potential U.S. aquaculture is not simply moving economic activity away from traditional fishing communities and into other new businesses.

Congress should ask, along with recognition of the very serious risks to ocean environments and communities, what are the benefits of bringing industrial scale aquaculture to the United States? Because these are unlikely to be small business ventures. We question whether development of an offshore fish farm industry is really likely to improve the nation's seafood balance of trade. Seafood is a global market, and labor, energy, and real estate for processing in U.S. coastal areas may not prove competitive with foreign countries.

We also question whether farming of carnivorous fish to adult size is a net gain in protein or food production, and remain concerned about the harvest of krill and other important forage from national ocean food webs to feed farmed fish. We question whether introduction of industrial scale aquaculture into the open ocean can be done without negative consequences based on the volume of fish waste and concern that sea lice infections affect wild salmon stock that pass near concentrations of fish farms in British Columbia.

In addition to a clear priority for wild fisheries, if you deem that the public interest is served by Federal legislation for offshore aquaculture, we also recommend that the following be included as essential safeguards in any legislation. Programmatic environmental impact statements at the national level, regional level, and for individual projects. Analysis of environmental effects and effects of fish farm production on the economies of fishing communities. We need to see consideration of cumulative impacts of multiple sights.

We would like to see development funding for aquaculture have parallel investments in wild capture fishery research and development and not be at the expense of funding for fisheries research for our wild capture fisheries. We would like no siting of fish farms on or near oil production platforms or essential fish habitat, migration paths, or marine sanctuaries. We call for no nonlocal species or genetically modified species as there is no proven technology to prevent escapes and the consequences of introducing these into natural systems cannot be predicted.

We ask for approval of the regional fishery management councils on proposals for species that are currently fished and within areas of jurisdiction of a council. And we ask that legislation secure the funding that the additional workload and staff for this addition to the council process. We call for approval of adjacent states to the extent of the Exclusive Economic Zone not only 12 miles. In this we support the State of Alaska's position from 2007 at this Committee.

And similarly, the ability of states to opt in and selectively allow which aquaculture activities in the EEZ adjacent to their waters to ensure that any programs are compatible with that state's fishery management program. The bill should not include any phrases such as 'to the extent feasible' that undermine requirements. It is not always feasible to conduct an industrial activity while ensuring the sustainability of wild fisheries and resources, and when not, no permits should be allowed.

We also call for no piecemeal approach. United Fishermen of Alaska does not have a position on matters before the Gulf of Mexico Fishery Management Council, but we do not favor moving for-

ward with individual projects without strong Federal protections and a framework for closely researching and addressing the consequences on the public, especially communities that depend on fishery resources. In conclusion, we hope that you will scrutinize this issue with consideration for the social and economic well being not only of Alaskans but other coastal and fishing dependent communities and especially the fish that we depend on. Thank you for listening to our concerns.

[The prepared statement of Mr. Vinsel follows:]

**Statement of Mark Vinsel, Executive Director,
United Fishermen of Alaska**

Thank you for the opportunity to testify. Our perspective from Alaska on a framework for sustainable management of our fishery resources and the habitats that these depend on can simply be stated as "the fish come first".

United Fishermen of Alaska (UFA) represents 37 commercial fishing organizations, including fisheries of every species commercially fished in the U.S. Exclusive Economic Zone (EEZ) of the North Pacific and the state waters of Alaska. These fisheries represent roughly 60% of U.S. domestic seafood production, and are seen as a model for sustainable fisheries management worldwide. The seafood industry of harvester and processor businesses represents the largest private sector employer in Alaska, with many of these jobs located in rural areas that do not have other employment options available. UFA's mission is "to promote and protect the common interests of the Alaska commercial fishing industry, as a vital component of Alaska's social and economic well-being." This social and economic well-being depends first and foremost on the health of our fisheries resources, and on the vitality of the tens of thousands of fishing businesses, with the majority of these being small family businesses spanning multiple generations.

Recognition of the dependency of our state on its fishery resources has been pivotal in Alaska's development as a U.S. state, and how we manage our resources. The public process based on sound science is the key. Alaska state management through the Board of Fisheries and federal management through the North Pacific Council are based on science, current information, and adaptability, with the overriding idea that the long term health of the resource comes first. The federal Council and state Board of Fisheries processes include local meetings in affected communities, with all stakeholders invited. The inclusion of all stakeholders in the process is essential to acceptance of the outcomes.

Alaska's legislature banned finfish farming in Alaska in 1990 after convening a task force that studied the risks and benefits. The concerns anticipated at that time, to the ecosystem, fish stocks, and economy, have not been diminished. UFA's current position is to oppose offshore aquaculture that would grow finfish to market size, however, we are willing to hear the concerns of others and consider any legislation on its merits. As of yet we have not seen legislation introduced that would provide the protections we feel are called for to protect the fragile economies of Alaska and the nation's fishing dependent communities.

National Standard 8 of Magnuson-Stevens calls for conservation and management measures to take into account the importance of fishery resources to fishing communities in order to:

- (1) Provide for the sustained participation of such communities; and
- (2) To the extent practicable, minimize adverse economic impacts on such communities.

Major shifts in markets in recent memory have hurt Alaska fishing communities, as expansion of industrial scale fish farms raised production to the extent that prices, even for their own farmed fish, decreased by roughly half. We cannot forget that an overproduction of farmed salmon in excess of market demand caused much hardship and dislocation from multi-generational fishing businesses, and severely harmed the social and economic well-being of Alaska.

Now just a few years later, we have a lot to learn from the example in Chile where fish farm growth was most pronounced. Layoffs in the tens of thousands, the widespread disease of infectious salmon anemia, and the use of pesticides that are not allowed in the U.S. and many other markets will continue to plague Chile as evidence that the environmental effects and social and economic well-being were not adequately considered.

Thankfully this is not the story in the U.S. We thank this committee for not rushing forward with previous legislation that did not adequately address the dire risk

to the environment, and the social and economic stability of fishing dependent communities.

In setting a national policy for offshore aquaculture, we ask Congress to take existing wild fishery resources, participants and communities into account **as a priority over new industrial offshore aquaculture**, and ensure that development of a potential U.S. aquaculture industry is not simply moving economic activity away from traditional fishing communities and into other businesses.

Congress should ask, along with recognition of the very serious risks to ocean environments and communities, what are the benefits to the public of bringing industrial scale aquaculture to the United States, because these are unlikely to be small business ventures.

We question whether development of an offshore fish farm industry in the U.S. is really likely to improve the nation's seafood balance of trade. Seafood is a global market, and labor, energy, and real estate for processing in U.S. coastal areas may not prove competitive with foreign countries.

We also question whether farming of carnivorous fish to adult size is a net gain in protein or food production, and we remain concerned about the harvest of krill and other important forage from the natural ocean food web to feed farmed fish. Additionally, what are the impacts of alternative feeds, like soy, in the marine environment?

We question whether the introduction of industrial scale aquaculture into the open ocean can be done without negative consequences, based on the volume of fish wastes, and concern that sea lice infections affect wild salmon stocks that pass near concentrated fish farms in British Columbia. We well know that the ocean is not an unlimited receptacle for the wastes of human endeavors.

In addition to a clear priority for wild fisheries, if you deem that the public interest is served by federal legislation for offshore aquaculture, we also recommend that the following be included as essential safeguards in any legislation:

- Programmatic Environmental Impact Statements at the regional level, subject to public comment and regional council approval, before individual site applications are invited.
- Analysis of economic conditions, markets, and effects of fish farm production on the economics of fishing communities. The State of Alaska testified in 2007 here and asked for a five year moratorium on offshore aquaculture for these studies, and they are still needed.
- Consideration of cumulative impacts. It should clearly be stated that a previously approved operation is no basis for any subsequent operation, on the contrary it should be noted that necessary precautions must be taken to ensure no damage from additive impacts of multiple operations.
- A fair playing field. Development funding for aquaculture should have parallel investment in wild capture fishery research, development and technology. If aquaculture operations are provided benefits in U.S. Department of Agriculture programs, we ask for similar treatment for wild harvest producers. If funding is provided for research, management, and pilot projects, we ask that this funding not be at the expense of funding for fisheries research, development and management.
- No siting of fish farms on or near oil production platforms. Previous legislation has included large sections specifically to allow conversion of obsolete energy platforms that would be otherwise be required to be dismantled. The cost that would have been paid for dismantling would be an artificial incentive for development of fish farms.
- No genetically modified species. Beyond the food safety questions that many share regarding genetic modifications, there is no proven technology that is guaranteed to prevent escapes, and the consequences of introducing genetically modified species into natural ecosystems cannot be predicted.
- No non-local species. Alaska continues to host escaped farmed Atlantic from British Columbia with the potential for displacement or interference with wild salmon. We also recommend that industrial fish farming not proceed with species for which there are wild capture species.
- Approval of Regional Fishery Management Councils on proposals that include species covered under existing Fishery Management Plans, or within the area of jurisdiction of a Council. And we ask that you secure the funding that the additional workload and staff for this addition to the Council process.
- Approval of adjacent states to the extent of the EEZ, not only twelve miles. We strongly support the State of Alaska 2007 position on this.
- Ability of states to "opt in" to selectively allow offshore aquaculture activities in the EEZ adjacent their waters, to ensure that any programs are compatible

with the state's fishery management program, where these are developed in longstanding practice.

- The bill should not include phrases such as "to the extent feasible" that undermine requirements. It is not always feasible to conduct an industrial activity while ensuring sustainability of wild fisheries resources, and when not—no permit should be allowed.
- No piecemeal approach. As we represent fisheries in and offshore from Alaska, United Fishermen of Alaska does not have a position on matters before the Gulf of Mexico Fishery Management Council. But we do not favor a "piecemeal" approach that would move forward with individual projects without strong federal protections and a framework for closely researching and addressing the environmental, social and economic consequences on the public, especially communities that depend on fishery resources.

In conclusion, we hope that you will scrutinize this issue with consideration for the social and economic well-being not only of Alaskans but other coastal and fishing dependent communities.

Thank you for listening to our concerns.

MEMBER ORGANIZATIONS

Alaska Crab Coalition—Alaska Independent Fishermen's Marketing Association—Alaska Independent Tendermen's Association—Alaska Longline Fishermen's Association—Alaska Scallop Association—Alaska Trollers Association—Alaska Whitefish Trawlers Association—Armstrong Keta—At-sea Processors Association—Bristol Bay Reserve—Bristol Bay Regional Seafood Development Association—Cape Barnabas Inc.—Concerned Area "M" Fishermen—Cook Inlet Aquaculture Association—Cordova District Fishermen United—Crab Group of Independent Harvesters—Douglas Island Pink and Chum—Fishing Vessel Owners Association—Groundfish Forum—Kenai Peninsula Fishermen's Association—Kodiak Regional Aquaculture Association—North Pacific Fisheries Association—Northern Southeast Regional Aquaculture Association—Petersburg Vessel Owners Association—Prince William Sound Aquaculture Corporation—Purse Seine Vessel Owner Association—Seafood Producers Cooperative—Sitka Herring Association—Southeast Alaska Fisherman's Alliance—Southeast Alaska Regional Dive Fisheries Association—Southeast Alaska Seiners—Southern Southeast Regional Aquaculture Association—United Catcher Boats—United Cook Inlet Drift Association—United Southeast Alaska Gillnetters—Valdez Fisheries Development Association—Western Gulf of Alaska Fishermen

Response to questions submitted for the record by Mark Vinsel, Executive Director, United Fishermen of Alaska

Dear Chairman Bordallo and Committee Members,

Thank you for the opportunity to provide more detail on our perspective on the prospects of aquaculture in the open oceans of the U.S. We appreciate the breadth of questions as a sign of your interest in our concerns. I have copied your questions below in italics, with our responses.

Questions from Chairwoman Madeleine Z. Bordallo (D-GU)

1. Can you explain your statement that offshore aquaculture as presently proposed could only be done by large or multi-national corporations?

I have not read a transcript of my verbal testimony, but I believe that I did not divert from my written testimony, and said that "these (offshore farms) are unlikely to be small business ventures." This is based on the history of salmon farming in Chile and British Columbia, where many small individual business ventures have been bought up by the expansion and globalization of three major companies that now control a large percent of the production from these two regions.

2. Can wild fisheries and aquaculture be complimentary?

The United Fishermen of Alaska recognizes that it may be possible for other aquaculture programs to compliment wild fisheries, but this is unlikely without a wild fisheries priority in the design of the program, including its regulation, siting, and production. Careful coordination with existing fisheries is required and must be an essential component of the enabling legislation.

Some aspects are inherently not complimentary, for instance the footprint of net pens would preclude fishing in that specific area, and most likely transit as well. Through careful coordination in the regulatory framework, with a criteria to be complimentary with existing fisheries, this should be possible. If there is not a priority in legislation for existing commercial fisheries, and it is just left to chance, it seems

highly unlikely that the resultant program would be complimentary to wild fisheries.

3. Would offshore aquaculture of any marine species be acceptable to fishermen?

Individual fishermen will always have a complete range of strongly felt opinions, but we do not feel that there is widespread opposition to shellfish aquaculture, edible algae, and other potential products. There are also many fishermen that feel that closed containment facilities would not incur the risks to natural ecosystems that have proven detrimental in current practice of open net pen fish farms.

4. In considering legislation to authorize a federally regulated offshore aquaculture program, what measures are needed to ensure the sustainability of wild fisheries-dependent communities and businesses?

The single biggest factor would be to recognize a priority for natural fishery resources, and a permitting process that considers the program's impacts on wild fish resources and fishing communities. The permitting process should include public and stakeholder input to identify potential detrimental effects, and an integration of the best available science to address those impacts in the ecosystem and in the market to prevent damage to ocean resources and fishing communities.

Questions from Republican Members

1. Your concerns seem to be both environmental and economic. While the environmental effects may be anticipated and monitored, how do you anticipate the economic effects on fishing communities?

By looking at economic effects in retrospect, it is easy to envision what could lie ahead for commercial fishermen in the face of large scale fish farming. When salmon farms expanded faster than market capacity in the 1990s, salmon prices for both farmed and wild caught fish fell precipitously. This was followed by economic hardship and consolidation in fish farming communities as well as salmon fishing communities. The average price for all species of Alaska salmon dropped to 30 cents per pound, far more for some fisheries, and processing facilities in many communities closed. Many Alaskan fishermen were left with no market and many communities were left with little or no economic activity.

2. You raise a concern that is raised by other witnesses—the use of forage fish as food for farmed fish. Is there a market for using fish meal from the unused portions of wild harvest fish left over from processing that could be used for this purpose? If so, would the fishermen see any of this additional economic use of processed wild fish?

Fish waste is currently used by some Alaska processors for fuel, some is refined for fish oil supplements, and some is used for agricultural fish meal or pet food. The feasibility of each of these uses is a matter of local infrastructure, transportation, cost of fuel, and markets. Full utilization is a worthy goal, and the facilities and infrastructure required to make this feasible seems a worthwhile investment. It is unclear how much, if any, commercial fishermen would directly benefit from the increased sale of fish byproducts, particularly since byproducts are already on the market. Because processors and others who specifically sell byproducts are the most likely recipients of any benefits associated with additional added value opportunities, the financial impact on fishermen might be more indirect, such as having a processor to deliver to if that income makes the difference between a processing facility staying open or shutting down.

3. For species like salmon, would the Chilean fish farmers have been better off if they timed their entrance into the U.S. market for the times of the year when the domestically harvested salmon were unavailable? Would such market timing lessen or even benefit the domestic harvest sector? If so, would this lessen your organization's opposition to fish farming for those fisheries which are seasonal?

We'll leave it to the fish farmers to say what strategies would have then and would now benefit their operations.

Alaska's fisheries are to a great extent seasonal, but product enters the market throughout the year, with a majority of it frozen, canned, or processed into ready to cook product forms. Farmed fish also come in a variety of product forms and will have an impact on our markets no matter when they are sold.

One way to minimize the impact on commercial fisheries would be for farmers to raise species that are not commercially harvested. Their products would then seem more complimentary and additive to the U.S. seafood program, which may lessen the concerns of some individuals.

However, the environmental impacts on wild stocks and habitat, as well as siting issues, are of big concern no matter what species is raised and would have to be dealt with for fishermen to support a program.

4. Mr. Sutton testified that fish farming is—the fastest growing segment of the international food system.” Do you think that the U.S. should let other countries continue to increase their fish production and that the U.S. should continue to increase their imports of seafood?

This question falls outside our area of expertise. We are not aware of what influence the U.S. has in how much fish other countries produce.

5. Do you believe regulations should be different for finfish and shellfish?

Yes, the culture of shellfish has many differences from finfish, and different risks. Shellfish should fall under the same set of overriding statutes, and be regulated under many of the same regulations as finfish. Special sections would be required to allow for differences between the species, and the design of operating plans will vary between activities.

6. Are there international protocols for hatchery breeding programs that would be applicable to aquaculture operations?

We are not aware of international hatchery breeding protocols.

7. Do you believe legislation is necessary to give Federal agencies the ability to permit offshore aquaculture operations in Federal waters? If so, what Federal agencies should be involved in the permitting process or should have a role in the approval of any permit?

This question is outside our area of expertise. There is a wide range of federal agencies with interest and jurisdiction over activities in our ocean waters, as well as multiple legal opinions about whether or not authority right now exists to permit aquaculture in federal waters.

8. What environmental standards are appropriate for legislation authorizing offshore aquaculture facilities? Should legislation spell these out or should legislation give the permitting agency a broad outline for these standards?

To protect existing uses of the EEZ, any legislation should include at a minimum standards to protect water quality and marine ecosystems, standards on treatments to prevent against diseases, standards on production concentrations, and a clear process for stakeholder and public input. It is impossible to predict the possible effects on others uses and users in this hypothetical exercise, and ocean science is ever evolving yet with much still unknown.

Legislation must establish a set of overarching principals and set up the framework for strong regulations, and the matter of what is most appropriate for statute and regulation should be thoroughly discussed in the process of developing legislation.

9. What standards are appropriate for the regulation of discharges from offshore aquaculture facilities what agency or agencies should be responsible for developing discharge regulations?

The EPA regulates discharges in seafood processing and marine vessels. At this time we do not have specifics on what standards are appropriate for offshore aquaculture, but the legislation should support strong regulations with an adequate program of monitoring and enforcement to protect ocean resources.

10. What safeguards for the prevention of the escape of farm raised fish are appropriate for legislation authorizing offshore aquaculture facilities? What are the likely effects of the escape of non-native species on natural populations of fish and how should these impacts be dealt with in the legislation?

Aquaculture that is conducted in closed-containment can prevent escapes. We do not know of any current net pen technology that can be expected to withstand attempts by large marine predators such as sea lions and larger sharks. We also call for the marking and tagging of farmed fish, to allow identification of escaped farmed fish.

Predictable effects of farmed fish escapes include but are not limited to: competition with wild fish for food; interference with spawning; interbreeding; disease and parasite transmission; and the spread of antibiotic resistant bacteria.

11. How should the siting process work for offshore aquaculture facilities? How will other Federally-permitted activities or Federally-leased areas for other activities (such as areas leased under the Outer Continental Shelf Lands Act) be reconciled? What other conflicts among user groups should be identified and considered?

The federal process for reconciliation among various uses is outside our area of expertise, and we await clarity from the current administration on its proposed programmatic “spatial planning” of our ocean environments. We ask that existing users and their uses, both with and without quota or leaseholds should be protected from new business ventures that would interfere with fishing, transit, or infrastructure of other industries. An open and public stakeholder process can help identify these in the area of a given permit application.

12. What impact will offshore aquaculture have on existing domestic wild harvest fisheries and how should those impacts be addressed? Should the Federal government be responsible for mitigating these impacts or should the aquaculture industry be somehow required to mitigate these effects?

Impacts on markets can be addressed by identifying a proper mix of species to augment the seafood sector as opposed to threaten it. We would also look to the federal government to help ensure that there are no unfair trade advantages for the aquaculture industry and to mitigate the cost to the states of improving infrastructure to accommodate new industry.

13. What options should legislation include for states to have input into the process of either permitting or siting offshore aquaculture facilities? Should states have the ability to reject facilities off their shores in Federal waters? Do states have this ability under the Coastal Zone Management Act?

We reiterate the position of the State of Alaska—States should have the ability to reject facilities off their shores, including federal water to the extent of the EEZ, that are not deemed to be compatible with the interests of the state.

14. What U.S. ownership standards should be included in legislation authorizing offshore facilities? Should the ownership and control standards be comparable to those currently in place for fishing vessels and/or on-shore processing companies?

The term “Exclusive Economic Zone” is clear to mean that the intention is that business opportunity should be provided for U.S. owned businesses. Yes, ownership and control provisions of farms should follow the current practice in fisheries.

15. What role should the regional fishery management councils have in regulating the fish, feed, size limits, seasons, and products from offshore aquaculture facilities? Should farm-raised fish only be allowed on the market when the same species of wild fish are allowed to be harvested to minimize enforcement of fishery management plans and regulations?

It is the position of UFA that regional fishery management councils should have authority over aquaculture permitting in their respective regions, based on our appreciation of the work of the Council’s and the public process that involves all stakeholders and integrates the best available science into fisheries management decisions. It is these elements that lead us to recommend Council authority.

The wide ranging effects and interrelationships of all of the factors you list, and the dynamic nature of ocean ecosystems, markets, resources, and communities should have full and open consideration by the public in regulating aquaculture. At the very least, regional councils should have authority over siting and species at every stage of the EIS and permitting processes.

The question of market timing should be addressed by Councils and stakeholders in the permitting process, as this will be dependent on current markets and the proposed project.

16. Should legislation deal with issues such as the use of antibiotics and the types of fish food that can be used in the marine environment? Should the legislation require that the impacts of antibiotics and food from aquaculture facilities on the natural populations be regulated?

Yes. The federal government should be very concerned about all uses of antibiotics, and especially those that circulate outside containment. We should be identifying and eliminating all mechanisms by which bacteria develop their resistance to

antibiotics. This goes far beyond aquaculture, but you certainly would not want to add to the already growing global health problem of antibacterial-resistance.

We call your attention to the recently released paper (attached):

“Human Health Consequences of Use of Antimicrobial Agents in Aquaculture,” Ole E. Heuer,^{1,a} Hilde Kruse,^{2,b} Kari Grave,³ P. Collignon,⁴ Iddya Karunasagar,⁵ and Frederick J. Angulo⁶. CID, 2009

The Abstract of this paper reads:

“Intensive use of antimicrobial agents in aquaculture provides a selective pressure creating reservoirs of drug-resistant bacteria and transferable resistance genes in fish pathogens and other bacteria in the aquatic environment. From these reservoirs, resistance genes may disseminate by horizontal gene transfer and reach human pathogens, or drug-resistant pathogens from the aquatic environment may reach humans directly. Horizontal gene transfer may occur in the aquaculture environment, in the food chain, or in the human intestinal tract. Among the antimicrobial agents commonly used in aquaculture, several are classified by the World Health Organization as critically important for use in humans. Occurrence of resistance to these antimicrobial agents in human pathogens severely limits the therapeutic options in human infections. Considering the rapid growth and importance of aquaculture industry in many regions of the world and the widespread, intensive, and often unregulated use of antimicrobial agents in this area of animal production, efforts are needed to prevent development and spread of antimicrobial resistance in aquaculture to reduce the risk to human health.”

17. Should legislation and/or regulations make distinctions between aquaculture that is primarily for hatchery purposes and those facilities that are primarily used for food fish production?

Yes. All aspects of fish farming will need to be carefully regulated and those operations producing juveniles for a farm are likely to be different than those growing out the fish to market size, so should be regulated accordingly.

18. Should the legislation and/or regulations make a distinction between shellfish and finfish aquaculture operations?

Yes. Legislation should include consistency in overarching standards and statutes, with the insertion of appropriate sections for finfish, shellfish, and aquatic plants.

19. With the recent concerns about the safety of imported seafood, should food security issues increase the need for a domestic offshore aquaculture program?

Perhaps. However, right now there are opportunities to increase the domestic use of wild capture fisheries products, by implementing new fisheries on under-utilized resources and reviewing the catch rates in some existing fisheries that are not now harvesting at optimum and sustainable levels. The U.S. could also encourage an increased focus on domestic marketing and sales of commercial fisheries products. These things could all play a role in increasing U.S. domestic food security.

Shellfish aquaculturists also may be capable of increasing domestic food production, as some of these species can obtain their food from filter feeding and can have a net positive protein production.

If finfish aquaculture methods and crop species can be developed that provide a net increase in high value protein production and nutrition to our citizens, with minimal environmental damage or socio-economic dislocation, then aquaculture could certainly provide a benefit to U.S. food security. In many areas, our nation's food production model currently fails to achieve these goals, so it stands to reason that U.S. food security should be reviewed in total.

20. Should this legislation deal with how aquaculture fish products are labeled?

The USDA Country of Origin Labeling (COOL) program for wild and farmed seafood is a start, but excludes canned or cooked, as well as seafood in products with “substantial transformation”. We ask for labeling of wild & farmed for canned, smoked, and cooked seafood products, because the public has the right to know the country of origin and method of production of its foods, and as this is not currently provided by the USDA. It would be useful for the legislation to include these provisions.

Question from Congressman Gregorio Sablan (D-MP)

- 1. What role can Recirculating Aquaculture Systems (RAS) have in decreasing the seafood trade deficit? With increased health concerns and given the environmental concerns of many, this seems like a very viable alternative that not only creates healthy seafood, but also creates jobs. Do you agree that this is a technology/process worth pursuing?**

Absolutely. Closed containment systems have the potential to alleviate a host of problems that we have seen with open ocean net pens and should certainly be explored. UFA strongly supports closed containment strategies and believes that such systems should be encouraged.

UFA favors identifying healthy oceans and wild fisheries as the national priorities guiding any offshore aquaculture program. We ask that any new research and funding for aquaculture be in addition to, and not at the expense of, the important science and research necessary to sustain the health of our oceans and the sustainability of our commercial fisheries.

Thank you for your interest and consideration,

[NOTE: The attachment, "Human Health Consequences of Use of Antimicrobial Agents in Aquaculture," has been retained in the Committee's official files.]

Ms. BORDALLO. Thank you, Mr. Vinsel, for your testimony and expressing your concerns about conflicts between commercial fishing and offshore aquaculture.

Mr. Sims, welcome to the Subcommittee, and please begin with your testimony.

**STATEMENT OF NEIL ANTHONY SIMS, CO-FOUNDER AND
PRESIDENT, KONA BLUE WATER FARMS INC.**

Mr. SIMS. Thank you for the opportunity to testify today. I am trained as a marine biologist and have worked throughout the Pacific. Very early in my career, it became clear to me that we have to change the way that we work with the ocean. We need to stop thinking of marine creatures solely as extractive resources. We need to move toward a culture of nurture, growing more of our own seafood. And we need this to be mariculture, raising marine fish in the ocean where they belong. Growing fish anywhere else is like growing a fish out of water.

I speak here as the President of the Oceans Stewards Institute, a trade association advocating for rational, sustainable, open ocean mariculture development. We are the true revolutionaries of the blue revolution. I am also the co-founder and CEO of Kona Blue Water Farms. Last year we produced over 1 million pounds of our trademark, sashimi grade Kona Kampachi® from our open ocean site in Hawaii waters, a half mile offshore from a pristine coral reef. Yet our operation has no significant environmental impact.

We grow a hatchery reared, native species. See the data on our web site. You cannot tell the difference in water quality from upcurrent of the net pens to downcurrent of the net pens. We feed our fish a sustainable diet that is largely vegetarian. Monterey Bay Aquarium's Seafood Watch Program ranked our Kona Kampachi® as a good alternative, the first time that any fish grown in the ocean has ever been ranked as anything other than red avoid.

I urge you please to establish a framework that encourages the growth of open ocean mariculture in Federal waters. There are examples out there for us to follow. Hawaii's ocean leasing legislation provides a good working model, and the Mediterranean sea bass and sea bream industry produces over 150,000 tons per year with very little emotion and very few objections. We just want to be able

to move into deeper water further offshore where it is better for the fish and better for the ocean. To do this, we need access to Federal waters.

The U.S. must lead this industry forward and establish high standards for product quality and sustainability. If we do not, then rest assured it will happen elsewhere except without the standards. And remember, it is all one ocean, and sooner or later it all washes up on our shores. Three imperatives compel us toward responsible open ocean mariculture. It is an ecological imperative. Wild fisheries worldwide cannot sustain any greater fishing pressure. It is a public health priority. Americans need to eat more seafood.

And it is an issue of national responsibility. The \$9 billion seafood trade deficit offends me not so much for the economic implications but more for how we as a nation are exporting our ecological footprint overseas. We ask others to bear the burden for our seafood demands. America relies on imported seafood with virtually no input into the foreign farm practices, no input into environmental standards, and no input into the food safety standards or public health risks. Where is the moral authority in that?

The Oceans Stewards assert that an integrated national ocean policy must include four essential elements. Extensive marine protected areas, individual fishing quotas for commercial fisheries. We need to eat closer to the base of the food chain and we need responsible open ocean mariculture. If we are going to implement these first three steps, and we must, then we must absolutely also implement the fourth. Setting up MPAs and IFQs will by necessity involve reductions in commercial fisheries. We will need to replace these fish by growing our own.

And if we eat lower on the marine food chain, it is immaterial if it is anchovies or Kona Kampachi® or other fish that approach the one-to-one fish in to fish out ratio. Critics often say that we are just feeding fish to grow fish. However, sustainable mariculture is more than 60 times more efficient use of the ocean's limited bait fish resources. How is this possible? Well, our fish are mostly vegetarian so they are trophically far more efficient than purely carnivorous wild fish.

Our fish are harvested for optimum yield, yet wild fish must migrate long distances to spawn, must hunt for food, must avoid predation, and then are harvested at some large, inefficient size. And open ocean mariculture has no bycatch whereas wild fisheries' bycatch can be as high as eleven pounds of fish thrown away, either undersize, overfed or unsalable, for every one pound of fish that is retained.

So imagine on your plate if you will a pound of Chilean sea bass or swordfish or bluefin tuna or other wild carnivore, or a pound of sustainably raised Kona Kampachi®. The wild fish represent about 100 pounds of anchovies. The Kona Kampachi® represents one and a half pounds. This 60 to 1 difference is a measure of the relative impact on ocean resources. Which would you choose to eat?

Now, these are complex issues. And I would suggest that nothing helps illuminate them better than coming face to face with our fish out in the deep blue of the open ocean. I would therefore invite each of you and your staff to come to Kona so that we might host you in our hatchery and get you in the water on our offshore farm

site where you can see for yourself the blue horizon of the future, the way that the world should see seafood. Thank you, and aloha.
[The prepared statement of Mr. Sims follows:]

Statement of Neil Anthony Sims, Co-Founder and CEO, Kona Blue Water Farms, Inc., Kailua-Kona, Hawaii, and President, Ocean Stewards Institute, Kailua-Kona, Hawaii

Chairwoman Bordallo and Members of the Subcommittee:

Thank you for the opportunity to testify today. I am speaking here as the founding President of the Ocean Stewards Institute, and as the co-Founder and CEO of Kona Blue Water Farms, Inc.,—one of the world's leading open ocean mariculture companies, and one of the two pioneering commercial ventures in Hawaii waters. I am also speaking as a recreational SCUBA diver, and a fisherman and a sailor, and a free-diver and surfer. I have taught my son to spearfish—to know the myriad fish species of the coral reef near our home the way a hunter knows the forest and its creatures, and to understand the cycles and rhythms of the sea, and to respect its power, and its bounty—and to take only what we need.

I am trained as a marine biologist, and have always lived and worked in, on, or around the ocean. I have spent my entire professional life working in Hawaii and other Pacific Islands.

My first professional position was as the government marine researcher and fisheries manager for the Cook Islands—15 small, remote islands in the Central Pacific. The atoll lagoons of the Cooks are microcosms of our planet's ocean, and managing commercial fisheries for giant clams, or pearl oysters or parrotfish was challenging, to the point of being downright discouraging. Very early on, it became clear to me that we needed to change the way that we worked with the ocean. We need to stop thinking of marine creatures solely as extractive resources. We need to give back to the oceans, rather than to just keep on taking. We need to develop a sense of stewardship, and a culture of nurture. We need to move towards mariculture: growing more of our seafood in the ocean.

Last year, Kona Blue produced over 1 million lbs of our trademarked, sashimi-grade Kona Kampachi® from our offshore farm site in the lee of the Big Island. Our farm is located a half-mile off the coast of Kona, Hawaii, in Hawaii State waters, over a 200 ft deep bare sand bottom, in brisk currents. We grow a native, deep-bottom species that—in the wild—is considered a trash fish, yet through culturing we render it into a superb product that has graced the tables of The French Laundry in Napa, Hook in DC, and has even been served to President Obama.

At the same time, our operation has no significant impact on the ocean ecosystem. Indeed, you cannot even detect any impact on water quality—there is no measurable difference in water quality upcurrent of the net pens, compared with downcurrent of the net pens. We monitor the oceanic water quality and the substrate beneath our farm on a regular basis, and make these results available to the public on-line, through our web-site. We feed our fish a sustainable diet that is largely vegetarian, but that also includes fish by-products from sustainably-managed marine fisheries. We work very hard to reduce our footprint on the oceans. We were therefore very gratified when Kona Kampachi® was accorded the honor last year of being ranked by Monterey Bay Aquarium's Seafood Watch Program as a "Good Alternative". This is the first time that any fish grown in the ocean has ever been ranked as anything other than "Red Avoid".

The Ocean Stewards Institute is an open-ocean aquaculture trade association, including corporate partners and individuals, that provides leadership and reasoned advocacy for the best use and management of our open oceans. Our membership includes investor groups; representatives from the insurance industry; grain growers from America's heartland; feed companies; offshore cage designers and manufacturers; open ocean fish farmers; the sustainable seafood trade including leading chefs, restaurateurs, retailers, distributors and wholesalers; as well as academics and non-profits interested in ocean conservation.

We, the Ocean Stewards, assert that increased production of environmentally-sound, healthful, high quality seafood from open ocean waters is an environmental, economic and public health imperative. Yet we also understand and attest that this opportunity must be balanced by a strong sense of protection of the ocean's fragile ecosystems. We recognize that we are operating within the public domain, and we want to see this industry—and other uses of open ocean waters—develop in a way that meets the expectations of the community and the seafood consumer. The Ocean Stewards are the true revolutionaries of the Blue Revolution.

As this is solely an informational hearing, I address below the principles and imperatives of open ocean mariculture. Issues of law and regulation we presume will be resolved another day.

Responsible Open Ocean Mariculture is where the future of seafood lies. If the U.S. does not embrace, endorse and encourage these much-needed innovations, and if we do not lead this industry forward, then we are doing our seafood economy a disservice; and we are also abrogating our responsibility as a steward of our oceans and a citizen of the planet. If we do not pursue responsible open ocean mariculture here in the US, then rest assured, it will happen elsewhere—in waters that are adjacent to ours, or perhaps not. The location is immaterial, because the world's waters are truly interconnected in the same way that our atmosphere is interconnected, and any insult that is visited on the ocean in one part of the planet or other, sooner or later washes up on our shores.

Three imperatives compel us to establish sustainable open ocean mariculture

There are three imperatives that should drive your thinking in how and when the U.S. becomes involved in open ocean mariculture. The development of open ocean mariculture is an ecological imperative, it should be a public health priority, and it is a matter of accepting responsibility as a nation.

An ecological imperative

The ecological imperative should be abundantly clear to all on this Subcommittee—and indeed anyone who reads a newspaper or watches television: we cannot just keep taking more and more and more from the oceans. We need to learn to give back. Wild stock fisheries worldwide cannot sustain any greater fishing pressure. Wild fish production has been flat for at least the last decade, despite increasing subsidies, greater horsepower and electronic wizardry that compounds fishing power. The oceans now give about all that they can bear.

Recent studies suggest that 90% of the ocean's top-end predators are gone from the seas. Around 25% of fish stocks globally have "collapsed", which means that they are less than 10% of their original biomass. But now that these stocks are largely depleted, the fishing power that rendered them so has not simply gone away. It has moved on to the 75% of the stocks remaining. And with new technologies and new efficiencies, the wild fishing industry can always continue to fish harder and deeper and longer.

The ecological imperative is not just about numbers, it is about fragile ecosystems in waters that are already under pressure from nutrient pollution or sedimentation run-off or acidification. It is about lessening the indignities that we visit upon the ocean through destructive fishing practices such as dredging and bottom-trawling. It is about working with the ocean, and investing in stewardship and long-term ecosystem health.

A public health priority

There is almost universal agreement that Americans need to be eating more seafood, yet consumers are themselves consumed with fears of mercury and PCBs in their farmed seafood. Yet the definitive meta-analysis of seafood health impacts by Mozaffarian and Rimm (*Journal of the American Medical Association*, 2006), from the Harvard School of Public Health, found that a modest increase in seafood consumption, to the point of two meals of oily fish per week, would result in a 35% decrease in heart disease, and an overall 17% decrease in adult mortality.

A more recent assessment of the risks and benefits of seafood consumption by the FDA (2009) found that a 50% increase in seafood consumption could save up to 19,000 American lives per annum.

These are compelling numbers. We need to eat more seafood, not less. If the seafood is simply not there, then our nation's health will suffer.

An issue of national responsibility

Yet if we are to eat more seafood, from whence must it come? Do we eat other people's share? Or do we urge our fishermen to increase their efforts? Or—do we begin to accept responsibility as a nation for what we eat?

The \$8 billion seafood trade deficit is often cited. Over 80% of U.S. seafood consumption comes from imported products, and over 50% of these are farmed. However, we believe that our dependency on seafood imports represents something more important. It reflects the fact that we, as a nation, are exporting our ecological footprint overseas. We are asking others on this planet to bear the burden of ecological impacts to sustain our seafood demands. While ever America relies largely on imported seafood, we have virtually no input into the foreign farm practices, no input into the environmental standards under which it is farmed, and no input into the

food safety standards or public health risks to which producers or consumers are subject. We also have diminished moral standing in any discussions of ocean conservation.

Rather than exporting our ecological footprint, Americans should begin to grow our own seafood in our own waters. We need to do this both to alleviate the pressure on other country's resources, but also to meet the growing demand for locally-grown products, to reduce the carbon footprint of air-freighting fresh seafood products to the US, to develop innovative methods for offshore aquaculture, and to pioneer for the rest of the world the most sustainable technologies, and to engage in the market incentive program of sustainability certification—not just as a market, but as a producer. We need to accept responsibility for what we eat.

And the footprint of open ocean mariculture, if done right, is minuscule. Our current lease area in Kona is around 0.14 square miles. Most of this lease area is empty ocean, occupied solely by mooring lines. The net pens themselves are located in the central 9 acres, or in an area around 0.014 square miles. The United States' exclusive economic zone, however, is the largest in the world, covering around 4.4 million square miles. The minute percentage of EEZ ocean space that our lease represents underscores the "blue horizon" opportunity of open ocean mariculture.

Moving "Beyond Salmon"

We understand and appreciate that there is a lot of emotion that swirls around the issues of fish farming.

However, most of the emotion about fish farming—we would contend—comes from farmed salmon. This is not necessarily the salmon farmers' fault. Certainly, some thirty years ago, when salmon farming was first developing, the science was very poorly understood and the methods were rustic. But there have been tremendous advances in feed science and fish physiology and ocean engineering since then. It took man some 10,000 years to domesticate cattle, and to figure out that the best way—for the environment and for the cow—is to ranch on the open range. In 30 years, we have brought fish farming from fragile pens tucked in the back of Norwegian fjords, to robust net pens that can withstand the furies of the North Sea. We are now ready for the ocean's open range.

I would posit that most of the emotion about farmed salmon is linked not to the methods used by the farms, but rather to the emotional and ecological significance of salmon. The fisheries biologist in me recognizes that salmon are phenomenal fish, with fantastic life-histories, that migrate by mechanisms that we can barely comprehend, with discrete genetics in adjacent watersheds. These species are ecological cornerstones upon which pivot the entire Pacific Northwest. They are cultural touchstones that connect native peoples to their natural and spiritual world, and that perpetuate traditions of food and fishing and life. And salmon are commercially important to fishing fleets all along the Pacific Coast from San Francisco Bay to the Yukon—they are the economic lifeblood of many communities.

Yet salmon farming has now transformed these fish into a commodity that is available year round, and it nearly brought salmon fishermen to the brink of broke. Salmon's life history also renders them acutely vulnerable to perturbances in watersheds from pesticide or herbicide run-off, from logging, or siltation or dredging or dams. Many of these salmon runs are fast disappearing, but is salmon farming solely to blame? The nearest salmon farm to the Sacramento River delta—now almost completely devoid of Chinook for the past two years—is some 800 miles away, in the Straits of Juan de Fuca.

So I do not want to focus on salmon farming. It is not just emotionally loaded, but it is not a valid model for what we propose with mariculture in the open ocean. In the open ocean, farming marine fish, we are working with high-value species that are either not commercially targeted, or that have been reduced to scarcity by commercial fishing. Marine fish species are usually broadcast spawners, often with large spawning aggregations, and so they have no discrete genetic differentiation on any fine scale. Marine fish do not have the vulnerable migration patterns through rivers and estuaries, and are not subject to fragile freshwater ecosystem health. Marine fish are a world away from salmon.

A better model for sustainable open ocean mariculture might instead be the Mediterranean seabass and sea bream industries. These operations produce around 150,000 tons of fish annually, across the coastlines of Spain, France, Italy, Greece and Turkey. There is very little emotion attendant to these operations, and very few objections from environmentalists or local communities. The reasons are threefold: (1) these are marine fish that are well adapted to culture in the ocean (2) these products meet the tremendous market demand for high-value marine fish, and (3) commercial fisheries have pretty much wiped out the wild seabass and sea bream stocks, so there is no alternative.

The debate that rages in the U.S. about fish farming is very Salmo-centric. But we need to think B.S.—we need to think “Beyond Salmon”. There are over 20,000 other marine species of fish out there, and while they may not all be suitable for commercial culture, there is a bounty and a diversity that should surely allow us to produce seafood in a way that does not impact wild stocks.

Our Kona Kampachi®, for example, known as *Seriola rivoliana*, is found throughout the warm waters of the world. It is usually located in deep water—in the same depth profile as the valuable deep water snapper fisheries for opakapaka, ehu, onaga and gindai. These stocks have been severely depleted by both recreational and commercial fishing pressure. However, *S. rivoliana* is considered a trash fish in the wild, as they are subject to internal parasites in the flesh, and they frequently accumulate ciguatoxins from the reef algae *Gambierdiscus*. In the wild, the fish also only has around a 4% body-fat content. By culturing this species, however, we are able to render it into a safe, sustainable, delicious sushi-grade fish, with no internal parasites, no risk of ciguatera, and over 30% body fat. Because our land-based hatchery is able to rear the fingerlings, then we do not need to catch fish from the wild to stock our net pens. This is very important to us for our claims of sustainability, but it also affords us the highest possible measure of quality assurance—we know what our fish eat, all the way from hatch-to-harvest.

Other marine species slated for culture in U.S. waters—cod, cobia, moi (Pacific Threadfin)—usually share such attributes. They are vastly different from salmon in their life histories and commercial fishing stocks. And we are proposing to culture them in a way that is vastly different—in terms of location and potential for environmental impact—from the negative images that emotional activists conjure up from the past.

A historical analogy

US investors stand ready to commit capital, within a clear regulatory framework, to companies with secure tenure and sound plans for seafood growth. The U.S. fishing waterfront is hungry for work. And there are hundreds of researchers and entrepreneurs across the country that are tinkering, and dreaming of ways to do this better. There is an opportunity here that can mesh perfectly with President Obama’s exhortation for us to create clean, green industries, here at home. But if America does not take action, or does not encourage action, then we risk losing the technological edge to other countries. The key here is that we must create a regulatory environment that not only allows this industry to grow, but that gives investors and pioneers some encouragement for this growth—within reasonable frameworks.

The situation is perhaps analogous to the U.S. aviation industry in around 1919. One wonders where our economy, our airlines and our travel industries would be now if, in 1919, Congress had said “OK, you can build an airline industry, but only if every aircraft is 100% safe, and there are no negative environmental impacts, and you cannot use any farmland for airports, and you cannot unfairly compete with the railroad industry.” All of the innovation and investment would have left the U.S. for overseas, and you would have to catch a train to Canada or Mexico to connect to a flight, and we would have no input into international air traffic safety standards or passengers’ Bill of Rights, because Congress would have effectively said “We do not want it here”, even as they wrote so-called enabling legislation.

If we then want a responsible open ocean mariculture industry to develop in the US, we will need to create legislation that not only permits it to operate, but that encourages innovation and investment, and that creates an environment where this industry can grow, and succeed, and fulfill its potential.

We must ensure that we are not overly prescriptive in legislation or regulations, to the point that we limit innovation and creativity. Let us define our goals, clarify where there are concerns, and then allow American entrepreneurship to find the solutions.

An integrated National Ocean Policy

As a fisheries biologist, I heartily embrace and applaud the steps taken by the Obama Administration to move towards an integrated National Ocean Policy. We can no longer let freedom reign over the seas, any more than we can manage our terrestrial resources without zoning and regulation.

We would assert that any National Ocean Policy must include four fundamental tenets for marine resources management:

1. We need to establish an extensive network of Marine Protected Areas (MPAs),
2. We need to set up universal Individual Fishing Quotas (IFQs) for commercial fisheries,
3. We need to encourage fisheries that target the base of the marine food chain, and

4. We need to create a regulatory climate that is conducive to building a responsible open ocean mariculture industry.

The first three points are widely accepted. The fourth point, however, is a direct corollary and consequence of the first three points.

MPAs are as equally essential to our marine environment health as National Parks and State Forestry Reserves are to land conservation efforts. There need to be extensive areas that are set aside for either complete protection from all human impacts, or that permit only restricted fishing or other productive uses, within clearly defined frameworks.

Individual Fishing Quotas are the only rational way to manage commercial fisheries in the face of the reality of increasing fishing power, inherent incentives to overcapitalize, and the dangers and disincentives in derby-style fisheries. Garrett Hardin's famous "Tragedy of the Commons" essay made this clear a generation ago: rational management of any common-property resource can only be effected if there are private interests harnessed to this end.

Our seafood diet should be mostly anchovies and sardines, or their equivalents. Marine scientists all agree: the most significant way to lessen mankind's footprint on the oceans is if we would eat lower on the marine food chain. However, not everyone likes to eat anchovies. I'll eat more than my fair share, but few will join me. It is a quandary for both public health and marine resource efficiencies.

If we are going to implement these first three steps towards rational management of our marine resources, then we also must absolutely implement the fourth: responsible open ocean mariculture. Setting up MPAs and IFQs will, by necessity, involve reductions in overall fish harvests. With reduced supplies, we will need to find some way to replace these fish. There are almost no other underexploited or unexploited stocks out there—we need to start to grow our own.

Responsible open ocean mariculture—if it is done right—can even safely be inside the Marine Protected Areas. Our Kona Blue operation, for example, is located within the Hawaii Islands Humpback Whale National Marine Sanctuary. Over almost five years, there has been no evidence of any impact—negative or attractive—of our operation on whale abundance or movements. Offshore mariculture sites provide productivity and structure to otherwise barren ocean space; Fish Aggregating Device, or FAD effects from farms might enhance an area's value for stock protection or replenishment. And the presence of farms can provide added security for vast areas that may be difficult to police. A round Palawan, in the Philippines, where I once worked, the few patches of remaining pristine reefs were all directly underneath the pearl farm rafts. The reef there is accorded the pro-bono protection from dynamite fishing, due to the presence every night of pearl farm guards.

And if we are to also eat lower on the ocean's trophic web, one deliciously palatable way to do this is to efficiently convert anchovies, sardines, and the like into great-tasting sashimi like Kona Kampachi®, or other sustainably-maricultured fish. If we can do this at an ecologically efficient conversion rate of one to one (i.e. a Fish-in : Fish-out ratio of 1:1), then it makes no difference—from a global perspective—whether the consumer eats anchovies or Kona Kampachi®.

Open ocean mariculture up to 60 times more efficient use of marine resources

Critics may well say that we are just "feeding fish to grow fish". The truth is that sustainably maricultured fish represent perhaps more than 60 times greater use of the ocean's limited resources than targeting the top of the wild food chain for species such as swordfish, or Chilean Seabass. How is this possible? There are three main factors: trophic efficiencies, life-cycle efficiencies, and by-catch efficiencies.

Trophic efficiencies: Our "carnivorous" maricultured species are far more efficient at utilizing the ocean's food resources than wild fish. Sustainably maricultured fish are primarily vegetarians, with the bulk of the diet coming from sustainable agricultural oils and proteins, such as soy, canola, wheat and corn (which underscores what a tremendous opportunity we have to connect America's heartland with the U.S. EEZ). In controlled tank trials, our Kona Kampachi® can yield around one pound of great-tasting sashimi for every one pound of Peruvian anchovies—a fish-in : fish-out ratio of 1:1. This makes eating our fish the trophic equivalent of eating Peruvian anchovies. Wild fish, however, can only generate around 10% transfer efficiency through each step up the food chain. If there are two trophic steps up the food chain, then these inefficiencies compound to around 1% (10% of 10%).

Life-cycle efficiencies: Sustainably maricultured fish are reared in a hatchery, raised in protective net pens, and harvested at the optimum size for meat yield. Wild fish, however, have to migrate long distances, they expend resources in spawning, they have to hunt and avoid being eaten, and they are harvested at some large, inefficient size.

By-catch efficiencies: Some wild catch fisheries have by-catch ratios of around 11:1; i.e. 11 pounds of fish thrown away as either undersize, over-quota, or unsaleable, for every one pound of marketable fish that is retained. Shrimp fisheries have by-catch ratios of around 5:1. Globally, estimates of by-catch hover around 30%. Yet responsible open ocean mariculture has no by-catch whatsoever.

And while some may liken open ocean mariculture to “growing tigers of the sea”, then the analogy should—in all fairness—be extended: commercial fishing might then perhaps be considered like hunting tigers for food. If you need to eat tigers to stay healthy, then you should surely prefer that they be sustainably farmed on a largely vegetarian diet, rather than simply hunted from the wild.

Hawaii as a model

We believe that there are good models out there that could form the basis for workable legislation that finds the right balance between conservation and incentive, and between law and rule and the marketplace.

Hawaii’s ocean leasing legislation, over the past ten years, has allowed two companies to move forward with offshore operations, yet has seen at least four other proposals that were vetted through departmental and public hearing processes and were either disapproved or withdrawn. There is ample opportunity for public input, on all aspects of a proposal. Permit applications require an Environmental Assessment, or where significant impacts are anticipated, an Environmental Impact Statement. The permitting process is complex, and convoluted. As well as a State permit and State lease, projects also require a Department of the Army Section 10 Permit (Army Corps of Engineers, ensuring compliance with all other applicable Federal rules and regulations), an NPDES Permit from the State Department of Health with Federal EPA oversight, and a Coastal Zone Management review from the Office of State Planning that ensures compliance with all other Federal and State laws. The process could stand some simplification. Nevertheless, it has resulted in nothing like the “gold-rush land-grab” that some predicted a decade ago.

Once approved, however, the 20 year lease term allows for entrepreneurs to recoup their investment, and hopefully make a profit, while working within the assimilative limits of the ecosystem. Any shorter lease term would probably encourage less of a sense of stewardship. This tenure period has enabled us to attract investors to our business that share our vision of a sustainable, stable, productive industry, rather than those investors that might instead just be seeking short-term gains, without heed to attendant triple-bottom-line costs.

Each mariculture operation in Hawaii is required to have a Management Plan that provides for ongoing environmental monitoring, extensive reporting, and adaptive responses to contingencies. All of Kona Blue’s monitoring is conducted by third parties. Kona Blue makes our water quality and benthic monitoring reports available both at the local harbor, and on our web site.

Farms in Hawaii are only allowed to stock native species. While selective breeding is not precluded, Kona Blue has chosen to not engage in this practice, and to only use broodstock that are no more than two generations removed from the wild, to ensure that there is no significant genetic difference between fish inside the cage and those outside the cage.

Kona Blue has pursued a relentless drive for greater feed efficiency. This has not been mandated by any legislation or regulation, but instead reflects the market forces that are at work in the seafood sector. It was through our close working relationship with Environmental Defense Fund and Monterey Bay Aquarium that we were able to craft more sustainable feedstuff solutions. Over the last five years, the inclusion rate of Peruvian anchovies in our feed has dropped from around 80%, through a 50% formulation, to a current level of around 29%. We use meal and oil from trimmings from other commercial fisheries, as well as other sustainable agricultural proteins and lipids. We are currently testing two diets that include no Peruvian anchovies or other forage fish whatsoever. These diets would then rate as zero on the FIFO (Fish-in : Fish-out) index. We believe that this exemplifies the ample market incentives that should be allowed to drive solutions about sustainability. Government’s role should be to support research in these areas, and to provide incentives for re-use of trimmings from commercial fisheries such as pollock and salmon.

An invitation...

This hearing is a most welcome start to the discussion that must now ensue, to ensure that we find the right balance of regulation, oversight and entrepreneurial empowerment. However, in our experience, nothing helps illuminate these issues better than coming face-to-face with our fish, out in the deep blue of the open ocean. Allow me therefore, please, to invite each of you, and your staff, to come to Kona,

so that we might host you on our open ocean mariculture operation. We want to walk you through our hatchery where we first rear the fish. We want to show you the harbor where Kona's commercial fishermen once worked, landing yellowfin tuna and onaga that are now only found far offshore. And we want to then take you offshore with a mask and snorkel, so that you can immerse yourself in the reality of this opportunity. We want you to see our fish in their environment, in the open ocean. You will see the clarity of the water, and the swirl of life that is drawn to our site, and the way that we can indeed work within our ecosystem's assimilative capacities. You will see for yourself the future ". the way that the world should see seafood.

Sustainable. Healthful. Delicious. We look forward to your visit.
Thank you, and aloha.

Ms. BORDALLO. Thank you very much, Mr. Sims, for highlighting the possibilities and the challenges of offshore aquaculture. And we may take you up on your invitation to Kona.

Mr. Cox, I invite you to present your testimony next.

**STATEMENT OF BILL COX, VICE CHAIRMAN,
SOUTH CAROLINA SEAFOOD ALLIANCE**

Mr. COX. Good morning, Madam Chairwoman and Committee Members. My name is Bill Cox and I represent the South Carolina Seafood Alliance from Charleston, South Carolina.

Our position is, there is a need for an adequate Federal permitting and regulatory system or policy for offshore aquaculture. In regulating the industry, care must be exercised so as not to overregulate because of the opposition to perceived possible environmental harm of ocean farming. There are risks as in any other business, but risk can be managed. In the past, the proposed permitting and regulatory standards formulated for offshore aquaculture were far too restrictive to expect a U.S. commercial venture to produce profitably given risk return ratios.

The cards now are stacked in favor of imports because of low labor costs and nonrestrictive regulations in exporting companies. If the EEZ is to assist in seafood production, the permitting and regulatory agencies must consolidate and streamline the process for obtaining permits and operating an offshore aquaculture business. We recommend an agency at the Federal or regional level implement a general policy or law as soon as possible providing the framework for the regulations and let the regulations grow with the industry.

Establish contingencies in the framework where you can regulate quickly in the event of unanticipated problems, but allow the business to develop first under a general framework versus trying to preregulate every possible occurrence prior to it happening. Past proposed acts have all been too restrictive for commercial business operations to conduct business in an efficient manner. The details of these acts have been extensive and would overburden entrepreneurs and commercial businesses to the point that the projects cannot be profitable or feasible.

Permitting procedures and property rights are critical factors in obtaining and maintaining a viable offshore aquaculture business. So since so many different government agencies have jurisdiction connected to the EEZ, conflicting enforcement policies can unnecessarily interfere with normal business activity. We would recommend the issuance of a general permit from one lead agency,

which in turn would coordinate all permitting issues with other agencies on specifics. The process of permit review, approval or denial should be a prompt and efficient process with delays initiating automatic permit approval to minimize delays for commercial businesses.

Some groups are against offshore aquaculture because they think the EEZ should preserve recreational use only. The resources of the EEZ are common property of all U.S. citizens and should be managed to benefit all. Some object to offshore aquaculture production because of competition, ignoring the free market system in this country. Other groups feel that the offshore aquaculture techniques must be perfected before allowing any development of aquaculture due to environmental and ecosystem impact. Unfortunately, this expectation is unrealistic because the ocean cannot be emulated on land.

The regional fishery management councils, especially the South Atlantic Fishery Management Council, are regulating many commercial and charter fishermen out of business. While these regulations are required by law, they are also devastating the seafood industry. This drastic reduction in wild caught seafood not only causes job and revenue loss, but also reduces the high quality protein available for U.S. citizens.

We have two choices, to accept this reduction in wild caught seafood and loss of jobs and increase imports, or to produce more seafood and U.S. aquaculture sector providing much needed jobs by a primary producing industry. The real question is, will the United States seriously consider offshore aquaculture or be satisfied with the continuing increase of imported seafood from sources employing methods more damaging to the environment.

If the growing is done here, then total control of the entire process from conception to consumption will be done here, and it will be accomplished using some of the strictest environmental regulations in the world. Ecosystem management and business practice are separate issues. The regulatory measures on the business side of the house should be flexible and recognize market economics as a driving force. Interference in normal business issues like setting production limits, specifying use of unproductive sites, categorizing environmentally cleansing species, such as shellfish, with other species, could dampen the enthusiasm of entrepreneurs interested in participating in this new industry.

On the 3rd of September, 2009, NOAA approved plans to permit open ocean aquaculture in the Gulf of Mexico. However, companies are not allowed to begin operations until NOAA develops a comprehensive national policy for sustainable marine aquaculture. But given past timelines, how long will this take? We have been working on aquaculture acts for 29 years based on the documents that we reviewed in the last few weeks.

U.S. aquaculture producers have proven that we can operate and work with regulatory agencies in the development of safe operating practice in land based systems in an environmentally safe and responsible manner time and time again. We are a responsive commercial industry, and if we utilize the EEZ for seafood production we will need sensible, prompt, proactive oversight from the govern-

ment, industry representatives, and environmentalists to ensure marine environmentally safe and profitable industry.

However, we must all be prompt to act and react to the industry's needs as they develop. This is the nature of the aquaculture business. The United States has the technology, resources, science, and entrepreneurial skills to manage successful offshore aquaculture operations in an environmentally safe manner. Therefore we ask that you expedite the establishment of desired policy, issue the permits, and let us put some people to work.

[The prepared statement of Mr. Cox follows:]

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9 September, 2009

The Honorable Madeleine Z. Bordallo
U.S. House of Representatives
Natural Resources Committee
Subcommittee on Insular Affairs, Oceans and Wildlife
Washington, D.C. 20515-5301

Dear Congresswoman Bordallo:

Time is of the essence if the United States is to catch up with the rest of the world in offshore aquaculture.

In the past the proposed permitting and regulatory standards formulated for offshore aquaculture were far too restrictive to expect a U.S. commercial venture to compete in the present global market. The cards are now stacked in favor of imports because of low labor costs and nonrestrictive rules and regulations in the exporting countries. If the United States is expected to compete in aquaculture production, the permitting and regulatory agencies must consolidate and streamline the process for obtaining permits and operating an offshore aquaculture business.

Offshore aquaculture will change the norm in various areas and cost/benefit must be weighed against actual and perceived negative factors. Too much regulation will restrict or prevent business development

There definitely is a need for an adequate federal permitting and regulatory system for offshore aquaculture. In regulating the industry care must be exercised so as not to over regulate because of opposition unrelated to the actual potential harm of ocean farming.

Some groups are against offshore aquaculture because they think that the Exclusive Economic Zone (EEZ) should be reserved for recreational use only. Their argument is that the zone should be treated as federal land and rules and regulations must mirror those that regulate deer, wild turkey, bear and other game hunted on land. The resources of the EEZ are common property of all U.S. citizens and should be managed to benefit all, not just those that can physically access the resources because of proximity or economic means.

Some object to offshore aquaculture production because of competition, ignoring the free market system in this country.

Other groups feel that offshore aquaculture techniques must be perfected before allowing any development of commercial aquaculture. Unfortunately, this expectation is unrealistic. Allowing carefully monitored development of a viable offshore aquaculture industry is past due.

The world population growth, coupled with projected increases in seafood consumption and curtailment of U.S. wild-caught seafood, will result in a marked rise in imports. Already, the United States trade balance in seafood is a negative \$9 billion.

Over 80 percent of all seafood consumed in the United States is imported, almost half of this is aquaculture, and the largest aquaculture producers are across the Pacific Ocean in Asia. The transport of seafood over this great distance leaves a very large carbon footprint, which in turn negatively impacts the health of the ocean.

The regional fishery management councils, especially the South Atlantic Fishery Management Council, are regulating many commercial and charter fishermen out of business. While these regulations are required by law, they are also devastating

to the seafood industry. This drastic reduction in wild-caught seafood not only causes job and revenue loss but also reduces the high quality protein available for U.S. citizens.

We have two choices, to accept this reduction in U.S. caught seafood and increased imports, or to produce more seafood in the U.S. aquaculture sector providing much needed jobs by a primary producing industry.

The maximum potential for world capture fisheries was reached some years ago and is now in a static mode of about 93 million metric tons per year. Any increases in production will come from fish farms both onshore and offshore either U.S. or foreign grown, preferably United States grown.

The overarching question is, will the United States seriously consider offshore aquaculture or be satisfied with a continuing increase of imported seafood from sources employing methods much more damaging to the environment? If the growing is done here then total control of the entire process from conception to consumption will be done here, and it will be accomplished using some of the strictest environmental regulations in the world.

Emphasis on the need for a comprehensive federal permitting and regulatory system should not stand in the way of accomplishing the task for which the regulatory system is being developed.

Permitting procedures and property rights are critical factors in obtaining and maintaining a viable offshore aquaculture business. Since so many different government agencies have jurisdiction connected to or inside the EEZ conflicting enforcement policies can unnecessarily interfere with the normal flow of business activity.

Ecosystem management and business practices are separate issues. The regulatory measures on the business side of the house should be flexible and recognize market economics as the driving force. Interference in normal business issues like setting production limits could dampen the enthusiasm of entrepreneurs interested in participating in this new industry.

Already much work has been accomplished in formulating rules and regulations governing the culturing and growing of fish and shellfish in open ocean waters. It started almost three decades ago.

1980—National Aquaculture Act (NAA) “It is in the national interest, and it is national policy, to encourage the development of aquaculture in the United States.”

1985—Reauthorized and renewed The National Aquaculture Improvement Act (NAIA)

Some Changes:

- 1) capture fisheries could be adversely affected by competition from commercial aquaculture
- 2) extent and impacts of the introduction of exotic species in the U.S. waters as a result of aquaculture activities

1988—The changes were addressed in, “Aquaculture and Capture Fisheries: Impacts in U.S. Seafood Markets”

2005—National Offshore Aquaculture Act of 2005 (S. 1195) Senators Stevens and Inouye, to establish and implement a regulatory system for offshore aquaculture in the U.S. (EEZ) amendments SA 766, 767, 768, and 769

2007—National Offshore Aquaculture Act of 2007

2009—The Gulf of Mexico Fishery Management Council (GMFMC) completed a Fishery Management Plan (FMP) for offshore aquaculture activity for the Gulf of Mexico

After 29 years last Thursday, 3 September, 2009, the National Oceanographic and Atmospheric Administration (NOAA) approved plans to permit open-ocean aquaculture in the Gulf of Mexico; however, companies are not allowed to begin operations until NOAA develops a comprehensive national policy for sustainable marine aquaculture.

Extra effort should be exerted to complete this comprehensive national policy. Any increases in U.S. production of seafood that counters imports will help to reduce the negative \$9B seafood trade balance and provide much needed jobs to those who lost their jobs in the wild catch fisheries because of reductions to correct overfishing.

Ironically much of the research and technology that paved the way for profitable aquaculture ventures in foreign countries, especially in Asia, were developed in the United States. These countries have devised systems to permit, regulate, grow and export great quantities of their aquaculture products very efficiently and the U.S. imports much of this seafood.

Continuing to import these seafood products from questionable sources while not allowing or restricting U.S. production is a transfer of responsibility. In this instance, the U.S. is abdicating its ability to control certain aspects related to health, safety, sustainability and quality.

Thank you for the opportunity to provide our comments.

Sincerely,
 William A. Cox
 Vice Chairman (SCSA)

[A letter submitted for the record by William A. Cox, Vice Chairman (SCSA), follows:]

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18 September, 2009

The Honorable Madeleine Z. Bordallo
 U.S. House of Representatives
 Natural Resources Committee
 Subcommittee on Insular Affairs, Oceans and Wildlife
 427 Cannon HOB
 Washington, D.C. 20515-5301

Dear Congresswoman Bordallo,

Thank you for the opportunity allowing the SC Seafood Alliance to testify in regard to the need for a comprehensive Federal and regulatory system for offshore aquaculture; 2) the necessary components of such a system including siting, permitting, and operating requirements and precautionary measures to protect the environment and coastal communities; and additional issues that are important for the Subcommittee to consider on September 9th, 2009. We have a few additional comments we would like have added to the record if you would consider them at this late date.

1. The discussions and most proposed Acts and regulations to date appear to be couched with extreme precautionary measures to protect the environment which is very important. However, much of the written text is mostly about finfish farming in the open ocean and environmental impact from finfish aquaculture offshore does not apply to shellfish. For the record, we would like to state that shellfish aquaculture offshore just as it is accomplish inshore, has a very positive effect on the environment because the organisms are filter feeders and cleanse the water they live in. In certain geographical regions of the country, there is opportunity to grow certain species of shellfish in cages, on underwater or bottom longline systems that would have a positive effect on the environment and would not interfere with many of the other concerns continuously brought up in referenced discussions about ocean aquaculture. Although we have been speaking generally about all ocean aquaculture in trying to develop common ground on which to move forward toward an offshore aquaculture policy, we ask that you consider shellfish as part of ocean aquaculture, but consider the positive effects it could have on the ocean and ecosystem versus all the negative issues that are constantly being readdressed as possible problems. Shellfish are different from finfish and if there are projects which could be moved forward in this area, we would like to see them allowed or a policy which allows for pilot projects pending federal policy development if that becomes the end result.
2. A constant fallback position which was discussed during the hearing and mentioned several times, as it has been for years was the fact that we are using wild caught forage fish from the ocean to develop feed for aquaculture fish at ratios of 2:1 or more. This is almost automatically brought up in every discussion about offshore and inshore aquaculture and is an easy argument for opponents of ocean aquaculture. We feel this argument is getting old and in fact is an opportunity in itself for an entirely new aquaculture research and commercial production industry on land. Although many companies and researchers are working with agriculture commodities to develop better feeds with less fish meal and oil required from wild caught fish, the reality is that we could put our researchers to work developing fish farms on land hatching and growing out the feed fish we need to feed the aquaculture fish growing in the ocean. Hatchery International is a magazine that we watch and other countries are already thinking in these terms. If we hatch and grow out the fish we need in land based systems to generate food for ocean aquaculture species, we are

not taking from the ocean, reducing forage for sustainable natural ocean species, or trading fish in the ocean for fish as some people say. This in itself could be an entirely new industry developed on land to support the ocean aquaculture industry to minimize or eliminate this problem and easy argument that gets thrown out every time there is a discussion on fish feed and impacting the ecosystem.

3. As mentioned in some of the prior proposed Acts, there should be stringent requirements for removal of all gear at project completion or failure and penalties for companies or individuals who do not remove such equipment. Bonding, sureties, or insurance may be required to accomplish this, but this has been an issue which can be protected against given appropriate controls prior to project approval. These requirements must be reasonable enough not to be cost prohibitive for the project but should be in place.
4. At the hearing although we all desire to operate on the side of caution as we move forward with ocean aquaculture policy, it is apparent that many obstacles will be thrown up to block any successful attempt to get a policy in place that will work for commercial industry. One individual stated "we have to get this right" and we do for the sake of the environment. However, other countries are in the ocean now, and have been operating for some time. They are exporting the very food they are growing in the ocean to the U.S. consumer and we truly have no idea of the conditions of which the product is grown or processed before it is frozen and shipped to the U.S. There are training courses for hatching and growing grouper in Indonesia offered now thru the Network of Aquaculture Centers in Asia Pacific (NACA) while we are shutting down the snapper grouper fishery in the southeast. By the time we have our industry shut down thru the various fisheries amendments, they will be hatching and growing grouper and exporting it to the U.S. at a gain of jobs for Asia and a loss of jobs for the U.S. We need to come to a compromise from the various groups against this industry for the sake of jobs and food safety in the U.S. We would like to commend the Congresswoman from we believe New Hampshire who challenged the commercial grower from Kona Blue and an opponent to offshore aquaculture, because during that short discussion, she was able to find common ground between the two which means we can find compromising solutions to all issues this testimony was based on, if we work at it quickly and together.
5. We cannot compete with cost of labor of the other countries flooding the U.S. with imports putting many people out of work. We cannot compete with their cost of materials due to their cost of labor to develop their materials for production. We as a country, do not believe we can afford to go into a mode of protectionism with tariffs high enough to make us competitive due to foreign financial investment in the U.S. Therefore, we must move faster and get to compromises that we can all live with, and develop new industries such as ocean aquaculture and many more unless we just want to become a nation of consumers without jobs to pay for the consumption. It appears (and this is not to be taken as negative connotation), in regard to ocean aquaculture, we may be taking the "not in my back yard" approach. We as Americans are better than that. The gentleman from Kona Blue I believe put it in perspective. On the record, they mentioned they are setting up operations in Mexico. Obviously, they feel they can get what they need done there easier than in the U.S. at lower cost. Are we sending another industry abroad before it even gets off the ground in the U.S.?

Again, thank you for allowing us to make our comments and hopefully we have contributed to your goal of establishing an offshore aquaculture policy.

Sincerely,

William A. Cox
Vice Chairman (SCSA)

**Response to questions submitted for the record by William A. Cox,
Vice Chairman, South Carolina Seafood Alliance**

Questions from Congressman Gregorio Sablan (D-MP)

- 1. What role can Recirculating Aquaculture Systems (RAS) have in decreasing the seafood trade deficit? With increased health concerns and given the environmental concerns of many, this seems like a very viable alternative that not only creates healthy seafood, but also creates jobs. Do you agree that this is a technology/process worth pursuing?**

Response: Recirculating Aquaculture Systems (RAS) are worth pursuing and will be useful as a requirement for housing brood stock, developing hatchery technique, and culture of smaller organisms such as marine ornamentals. However, it is cost prohibitive in most cases for grow out of large animals particularly for larger pelagic organisms for several reasons: 1.) Size of tanks needed, 2.) Cost of real estate near coasts to obtain seawater required, 3.) Cost of producing seawater artificially inland, 4.) Biological requirements of individual species, 5.) Difficulty and complexity in maintaining water quality requirements from a biological and diseases control standpoint at stocking densities required, 6.) The mere fact that very desirable species in the market place with high market demand and price do not do well in tank systems. Even snappers and groupers which are commonly seen in aquariums do not do well enough in recirculating systems at high densities needed for grow-out in an economically feasible manner. The large scale production of RAS systems to offset a \$9.4 billion dollar trade deficit is not worth pursuing for the production of the finish product required. It does have a role which is very important to ocean aquaculture, ocean stock enhancement for depleted or unsustainable species and to produce the larvae, fingerlings, or juveniles required depending on species. This will produce some jobs but many of the RAS systems to date have failed because they were just not cost effective. The capital investment to build one on a production scale is significant then you must add the operating cost for up to 2 years to get product on line. There have been several RAS projects proposed over the years such as indoor shrimp farming in greenhouses at super intensive densities in the U.S. Several years ago this was tried at Harbor Branch Oceanic Institute and it failed was shut down because it was not cost effective. This was when shrimp prices were relatively high. However, much grant money has been and must be spent to develop these systems and some projects have been waiting years to get venture capital to start such ventures to the point that it is truly too late. The last thing we need is more shrimp produced in this country today in high volume given the current status of the U.S. shrimp industry unless the cost including amortization of capital investment can be brought below \$.90 per lb for 16-20 count shrimp. This is just one example. If RAS systems are to be used, use them for what they are most cost effective at and where they apply. The ventures into RAS systems should be reviewed very carefully as well, to ensure they are not just short term ventures for obtaining grant funding and a few jobs versus providing for development of a new industry which has potential for creation of many jobs over the long term in the U.S., while truly solving the 9.4 billion dollar seafood deficit problem. Another problem with technology development in these type systems is the technology tends to get exported to the third world countries rapidly through consultants and we end up setting ourselves up for more imports at cheaper prices.

Questions from Republican Members

- 1. Under the recommendations made by several of the witnesses here today, do you believe any business will ever invest in U.S. offshore aquaculture?**

Response: There are already companies that are pursuing and investing in offshore aquaculture, many of which have had difficulty in obtaining permits for work in federal waters. The University of New Hampshire's Open Ocean Aquaculture from what we understand has lead to commercial offshore mussel farms. There are also farms as you know (Kona Blue) in Hawaii producing finfish in offshore net pens. However, many companies that have pursued offshore aquaculture have met with permitting issues and have developed the hatchery technology domestically and are exporting fingerlings and or larvae to grow out in other countries offshore or in ponds. One company in S.C. is interested in conducting offshore aquaculture with two shellfish species as technology is developed but again it must be allowed to be permitted off the 3 mile limit.

2. Do you believe regulations should be different for finfish and shellfish?

Response: Shellfish and Finfish are different species completely. We believe that they are both viable candidates for ocean aquaculture. However, so much controversy over the entire issue is hindering the possibility that either will be approved. Ideally both could be regulated under one set of regulations. However, because of the potential difference in gear and placement and absolute positive environmental impact of shellfish as agreed upon and documented by the EPA several years ago, and the fact that feeding via fish food of some sort is a requirement of finfish versus the lack thereof for shellfish, it is our belief that depending on the operational plan, shellfish should be allowed to move forward in open ocean aquaculture while the many controversial issues of finfish production gets worked thru. The current regulations for shellfish and finfish aquaculture differ, so what would be the logical reason for not having separate regulations in the ocean. Shellfish do not have the discharge issues that finfish have due to feeding and finfish do not have as many issues with algal blooms that the shellfish industry has. Moving part of the shellfish culture industry offshore will actually minimize some of the environmental impacts that the shellfish industry potentially may have in time with submerged aquatic vegetation. Shellfish are currently used to clean up the environment so it would be counterproductive to current legislation and uses of shellfish to develop regulations that restrict shellfish growth based on issues such as nutrient input, as no artificial feeds are used in shellfish aquaculture once they leave the hatchery. Shellfish offshore regulations would be much simpler to start with than finfish and it would allow the industry to establish a precedent of being successful offshore before moving into more complicated and controversial species and regulations.

Most associations, organizations, private enterprises, and government institutions do not want to see this separation. They are like everyone we have heard from regardless of perspective on this subject and have pretty much taken the stance "all or none." We do not believe from the SC Seafood Alliances perspective that we will ever get anywhere with this approach and time is moving on.

3. Do you have any problem with a requirement that only native species be raised in Federally-permitted fish farms?

Response: No, It would be a wise decision and we would highly recommend from an aquaculture and wild harvest perspective that only indigenous species to the region be used for Federally "permitted fish farms to minimize ecological and disease problems unless proven by extensive research and development by certified unbiased U.S. research institutions that a particular species would have no negative impact in a particular area. However, we would recommend much research be accomplished before allowing this to occur. There are examples where the use of non-native species for aquariums, sport fishing, or food supply thru aquaculture have had detrimental effects on the environment therefore this practice should be avoided if possible.

4. Mr. Sims also makes the argument that if the U.S. doesn't step up on aquaculture, countries with little or no environmental controls will be providing our seafood needs and cause further harm to the oceans we share. Do you agree with his assessment?

Response: Yes, we agree with Mr. Sims. Currently 90 species are cultured in Japan alone in or related to ocean aquaculture based on a report issued several months ago. As the loop is closed on the spawning and growth of tuna by Japan and Australia, that industry could expand exponentially and yet again set up the U.S. for more imported high priced product at their job gain and U.S. job loss. Other countries in the Asian sector do not have the environmental controls or discipline that the U.S. operators have. We will have no control over what environmental impact other countries are having on producing food for the U.S. consumer. Nor will we have a handle on the therapeutics or antibiotics they will use that will stay with the product as the U.S. consumes the product. The FDA has stated in the past they do not have the funding or manpower to inspect the vast quantity of shrimp shipments coming into the U.S. for Taura Syndrome Virus, White Spot Virus, or use of antibiotics. All of these could be problematic to the U.S. in that the consumer does not know what quantity of foreign substances he or she is taking in. Taura Syndrome Virus is a shrimp virus only and does not affect humans, but even after frozen, if a block of frozen TSV laden shrimp imported into the U.S. was dropped into a U.S. shrimp pond, the virus becomes active and can be transferred to the U.S. pond shrimp killing 99% of shrimp in the pond.

What Mr. Sims states is already happening whereas most shrimp demand in this country is being filled by farm raised shrimp which originated from brood stock in

the U.S. The exporting countries such as Brazil and Vietnam as examples continue to destroy mangrove habitats and chemicals such as malachite green are still legal to use. So, there is no question that if the U.S. does not establish an ocean aquaculture industry soon to set the standards as a lead nation in doing things right, we will be impacted by the result of actions from other countries based on their past aquaculture behavioral patterns. We should feel that we have an obligation to set the standards for the rest of the world in ocean aquaculture.

5. What species do you think would be appropriate for aquaculture facilities off the coast of South Carolina?

Response: Bivalves, such as ocean specific clams, mussels, and scallops would be viable off the coast of SC and could be easily incorporated into existing markets. Finfish could be more complicated depending on hatchery technology development in SC, but Cobia is a species that the life cycle has already been cultured, and would greatly benefit from having domestic grow out offshore rather than exporting fingerlings to South America for grow out in ponds which would further the importation of fish into the U.S. Bait fish such as menhaden would be another potential aquaculture opportunity creating a year round supply for both the commercial and recreational fishing industry and also for production of fish feeds thus supplying the industry with a farmed product for feed production versus fish feeds produced from wild caught fish. Other species that could have potential to be successful offshore of SC would be the snapper and groupers, while the life cycle work has been initiated the economics behind commercial culture has not. With the closing of the commercial snapper grouper fishery in the southeast, ocean aquaculture can play a crucial role in meeting high demand and helping restore these populations. Ocean aquaculture coupled with coastal hatchery or even offshore hatchery production could be an emergency measure supporting stock rebuilding of the snapper grouper complex to get the commercial fisherman back to work if closures are approved. This type of scenario could possibly employ many of the snapper grouper fishermen put out of work and allow them to participate with a job in rebuilding the stocks to levels that allow them to fish again. Mahi mahi, pompano, and certain tunas at some point in time may also be candidates for SC ocean aquaculture production. Many people, scientist, and government agencies would be critical of these possibilities and can find all kinds of information to dispute these possibilities, but we have seen how much can be hatched in SC and produced commercially and these species can be viable in SC given the resources and permitting.

6. One argument for offshore aquaculture is that it might provide jobs for fishermen who have been displaced from their fishing jobs. Do you believe South Carolina shrimpers might be interested in working in the aquaculture industry?

Response: Quite honestly, the shrimpers in SC are an independent group of fishermen with great pride, heritage and culture in what they and their families have done for generations. An immediate switch would take convincing. However, several prior shrimpers are spending more time culturing clams, harvesting oysters and many have moved on to other ocean or watermen related jobs such as pushing barges with tug boats etc. Given today's shrimp prices, and no chance in reduction of shrimp imports, we believe that many may be reluctant at first. This is especially true due to the fact that imported shrimp from aquaculture is what is putting them out of business. But they value their livelihoods on the water, and given a good dependable salary or hourly wage with training in a new but related industry, many would get involved with an ocean aquaculture industry, particularly the next possible generation given what's left of the industry.

7. Do you believe legislation is necessary to give Federal agencies the ability to permit offshore aquaculture operations in Federal waters? If so, what Federal agencies should be involved in the permitting process or should have a role in the approval of any permit?

Response: The lack of regulatory framework for aquaculture in federal waters and a complicated permitting process is what has led to companies and researchers spending years in the permitting formulation process. Hubbs-Sea World we understand spent 2 years waiting to start the Grace Mariculture Project for the Federal Agencies to make determination on which agency was the lead on the permit. It has become apparent to us from the Hearing and the tremendous amount of information that has been circulating on this subject that NOAA, EPA, USACE, USDA, and the USCG and many more feel they should have input and jurisdiction over any ocean aquaculture policy. In addition to this, each coastal state, some more verbal than others are voicing their input both opposing and proposing policy. The situation at

hand appears realistically unworkable given the way the U.S. government works today.

After careful consideration on this matter and thinking way “out of the box” (which our government today needs to consider given the current economic situation either real or perceived), we are of the thought process that although the EEZ is in federal waters, the individual coastal states should have the ability to permit and control the offshore aquaculture operations from their states. Provide the states, which all but a handful, are in dire need of resources and jobs, with the resources to coordinate the efforts with the federal organizations to get the permitting approved. Each state can allow or not allow ocean aquaculture in their area of the EEZ. These areas could be designated by extensions of state lines thru the EEZ. The lead state agency would then develop requirements for ocean aquaculture and take applications in their respective states. They would require operational plans, containment plans, eradication plans, hurricane plans, etc. Then the state could issue the permit if it so desires. If state prefers not to allow ocean aquaculture for whatever reason, then so be it. After all discussion that we have read about and heard, not much has been said about the fact that the individual state and its Department of Natural Resources or equivalent is the first contact agency in the event of a problem or an issue. They are the first line of response in many cases even when the Coast Guard is involved. Many states are for the possibility of ocean aquaculture and many are against it. In the Hearing, the representative from California indicated that although there was much controversy, they were for the offshore aquaculture program, but they had to get their finances in order first. This could take forever, and why hold back opportunities for states with 10% to 12% unemployment rates that need jobs now? We know this will not set well with any of the large Federal agencies but it is food for thought and could cut through a lot of red tape. The most important factor here that should be considered is, each state Department of Natural Resources or equivalent knows their waters 0-200 miles offshore better than any other state or federal agency. They are closest to the front line and therefore perhaps should be the permitting or no permitting agency. The state agencies get data, R&D and information from all the federal agencies and could coordinate with them while being the direct permitting agency for commercial operators with federal agencies mandated to expedite state requests. This will (we are sure) be a very unpopular idea and will go against all infrastructure in place by region etc, on a federal level such as the argument of whether NMFS should regulate ocean aquaculture by established regions. However, this could get ocean aquaculture moving and satisfy some states regardless of other state positions. There have been many aquaculture success stories whereas the states themselves regulated the industry versus the federal government. Industry was not always happy with the results, but it has been generally a successful and expeditious process compared to what is going on now just trying to get a policy in place.

8. What environmental standards are appropriate for legislation authorizing offshore aquaculture facilities? Should legislation spell these out or should legislation give the permitting agency a broad outline for these standards?

Response: If you propose this question to 50 people involved in commenting on the proposed federal policy, you will get possibly 50 various sets of standards. Environmental standards also vary from state to state on many issues. The legislation should not get bogged down in this level of detail. The permitting agency should provide the requirement for an environmental impact statement or plan and that agency should establish the details of the environmental standards based on a specific operating plan for specific species in their various geographical locations.

9. What standards are appropriate for the regulation of discharges from offshore aquaculture facilities what agency or agencies should be responsible for developing discharge regulations?

Response: Most offshore aquaculture farms will be net pens, longlines, or some sort of bottom or midwater cage systems. The discharge from these aquaculture facilities is not a point source discharge that can be easily measured coming out of a pipe. Therefore providing standards for this will be difficult. What can be regulated are the types of feed, feed additives, and the frequency and volumes of feed if feed applies. This will differ based on site locations, species cultured, tide, current, and turbulence in a given aquaculture site. So having closely defined standards would make it difficult to balance the flow rates at a site with the feed requirements of a species cultured. For shellfish there will be no discharge so there will not need to be a regulation on this. NOAA combined with the state in which the site is located would be the best team to develop discharge regulations or guidelines because

they both will have the knowledge of ocean currents in a given area and the knowledge of the species being cultured.

10. What safeguards for the prevention of the escape of farm raised fish are appropriate for legislation authorizing offshore aquaculture facilities? What are the likely effects of the escape of non-native species on natural populations of fish and how should these impacts be dealt with in the legislation?

Response: Safeguards to prevent escape from farms would include having closed cages with high quality marine grade materials, but also appropriate brood stock and hatchery management to insure that there are not genetics that create a bottleneck which creates distinctly different farmed raised from wild fish. The use of indigenous species from a specific area with limited number of spawning per generations and family would keep farm raised fish and wild fish genetically similar. In the event an escape did occur, they would not create negative impacts to genetically local populations. Non-native species should not be used in ocean aquaculture if avoidable.

11. How should the siting process work for offshore aquaculture facilities? How will other Federally-permitted activities or Federally-leased areas for other activities (such as areas leased under the Outer Continental Shelf Lands Act) be reconciled? What other conflicts among user groups should be identified and considered?

Response: The siting process is going to be the most important and most likely the most difficult part of the regulatory process. Siting is going to have to address several factors, first being that it has the water quality, flow rates, and accessibility to support the life cycle of the proposed species. This will differ for each species and will also limit the number of sites appropriate for offshore aquaculture based solely on the biological and physical requirements to culture the species. Then there is the user conflicts such as navigation, oil and gas industry, and fishing. Proper site location can minimize these user conflicts and some of the industries could co-exist. Such as no longer used oil and gas platforms serving as locations for setting nets or even housing hatchery facilities. The company proposing the aquaculture facility is going to have to work with the permitting agency to minimize the user conflicts at proposed sites or identify other areas that are appropriate for that type of culture. Companies interested in conducting offshore aquaculture have or are in the process of identifying sites.

12. What impact will offshore aquaculture have on existing domestic wild harvest fisheries and how should those impacts be addressed? Should the Federal government be responsible for mitigating these impacts or should the aquaculture industry be somehow required to mitigate these effects?

Response: For aquaculture, many of the finfish species stocks used could be closed to the commercial fisheries due to sustainability issues or there is not enough U.S. supply to meet demand. In most aquaculture settings the aquaculture of a species will ease the fishing pressure on a species and in some cases can be used to directly restock the populations which needs to occur in the southeast region. There are potential impacts to the fishery if brood stock is continually taken on an annual or more basis from the wild. This could lead to stresses similar to overfishing, but can be mitigated by having facilities that cultured closed fishery species and that obtain brood stock from the wild on regular basis, put a certain percentage of produced animals back in to the wild. There are potential disease and genetic issues but both can be managed through proper hatchery and production management. It is not in the best interest of aquaculture facilities to stock at densities so high that it leads to disease issues or to have a low gene flow. To ensure that each aquaculture facility is properly managing brood stock and grow out, each company should have to develop or follow previously developed Best Management Practices (BMP's) for that particular species and culture method in their operations plan. Companies that do not submit operational or management plans for permit approval that follow BMP's should not be permitted. With a \$9.4 billion dollar seafood trade deficit, competition with wild harvesters who are being regulated out of the business in the U.S. is not the real issue to be addressed.

13. What options should legislation include for states to have input into the process of either permitting or siting offshore aquaculture facilities? Should states have the ability to reject facilities off their shores in Federal waters? Do states have this ability under the Coastal Zone Management Act?

Response: As we noted above, we believe states should have input into the process of permitting and siting offshore aquaculture facilities. If a state desires not to allow offshore aquaculture, then it should be that states right to hold that position based on our response to question number 7. The Coastal Zone Management Act requires the states to develop a Coastal Management Plan and a Coastal Use Permitting system in order to receive certain types of funding. As part of the Coastal Management Plan, the states were required to delineate their coastal zone. There are no plans at this time where the Coastal Zone extends into Federal waters, so states could not object to an aquaculture facility under the CZMA. If a facility were located in State waters then it would currently fall under their jurisdiction and would at a minimum require a coastal use permit, which includes public comment and addressing public concerns.

14. What U.S. ownership standards should be included in legislation authorizing offshore facilities? Should the ownership and control standards be comparable to those currently in place for fishing vessels and/or on-shore processing companies?

Response: Offshore ocean aquaculture facilities should be leased by designated area for a period of time, given option for renewal based on a successful project for the commercial operator, the state, and all federal agencies and ensuring that it has met all environmental and ecological obligations. This period of time should be long enough to ensure business success, financial support, and guarantee the site is allowed to continue to be used if desired under the extended lease by the original user with a no sublease clause included. Fees for these leases should be reasonable at the start of this new industry and increased based on success of the industry. The permitted operator should be considered the controlling interest of that area and has all lease rights of his operation and therefore be given full protection from other violators of the operators' rights. Other than this, the ocean bottom should not be owned by a company and should be treated as fishing vessels and on shore processing operations.

15. What role should the regional fishery management councils have in regulating the fish, feed, size limits, seasons, and products from offshore aquaculture facilities? Should farm-raised fish only be allowed on the market when the same species of wild fish are allowed to be harvested to minimize enforcement of fishery management plans and regulations?

Response: Fishery Management Councils should not have a role in regulating the ocean farm raised fish, feed, size limits, seasons, and products of the offshore facilities other than monitoring the effectiveness of stock enhancement efforts (if allowed) of the fisheries by aquaculture operations such as for the snapper grouper fishery. There should no relationship as to when farm raised fish are allowed on the market as compared to the same species of wild fish. Operational plans will specify optimum harvest sizes for farm raised fish and price versus cost will also drive the timing of harvest of farm raised fish. Permits for offshore fish facilities can include that fish be tagged or ocean aquaculture dealers licenses could be required to sell the fish identifying them as ocean farm raised to delineate them from wild caught to allow enforcement of current wild capture rules and regulations. These types of specific details can also be addressed at the state level in commercial operational or management plans.

16. Should legislation deal with issues such as the use of antibiotics and the types of fish food that can be used in the marine environment? Should the legislation require that the impacts of antibiotics and food from aquaculture facilities on the natural populations be regulated?

Response: There are existing regulations addressing the use of antibiotics. In offshore settings antibiotics should be tightly regulated or prohibited. Regulating the types of feed and feed additives and the amount of feed used will have to be part of BMP's as the types of food and frequency of feedings differ between species. This is another regulation that will not be needed to apply to shellfish in the ocean environment particularly because no feed will be needed to be added. The BMP's should address the ways in which feeds and additives will impact the natural environment

However, as a general rule, we would recommend against the use medicated feeds in the offshore environment unless approved by FDA, USDA, and NOAA.

17. Should legislation and/or regulations make distinctions between aquaculture that is primarily for hatchery purposes and those facilities that are primarily used for food fish production?

Response: Yes, the two facilities types will have different BMP's that will need to be developed separately to address the issues. Those facilities that are primarily hatcheries will have much lower feed requirements and nutrient output due to smaller size of animals. Those facilities producing market size fish will have most likely higher feed requirements and nutrient output. Again this is another situation where it depends on the species that is cultured.

18. Should the legislation and/or regulations make a distinction between shellfish and finfish aquaculture operations?

Response: Yes, see our response to question number 2. Shellfish are a totally different species from finfish and when managed properly cleanse the environment.

19. With the recent concerns about the safety of imported seafood, should food security issues increase the need for a domestic offshore aquaculture program?

Response: Yes, most of the U.S. seafood consumption is imported from other countries, particularly countries in the third world where until recently there were little water quality and environmental regulations. Some countries have updated and begun to more closely regulate aquaculture, but most countries have more relaxed regulations on the use of chemicals such as malachite green, which are banned in the U.S. Many of the shrimp are cultured in ponds that not only may have been treated with banned chemicals, but also destroy critical mangrove habitat to develop the ponds and facilities. Importing cultured species from these countries is not only a food safety issue but an environmental sustainability issue as well that at this time we cannot or desire not to monitor as well as we should for the well being of the U.S. consumers.

20. Should this legislation deal with how aquaculture fish products are labeled?

Response: Legislation could develop a labeling system for farmed fish similar to the grading for beef and other farmed products, but there are already Country of Origin and many NGO labels for sustainability. If a labeling system were to be developed through regulation, it would need to be universal and uniform throughout the country so as not to increase the confusion among consumers that already exists between foreign, farmed, and sustainably harvested products.

Ms. BORDALLO. Thank you. Thank you very much, Mr. Cox, for your testimony.

And now we will introduce our final witness, Mr. Alverson. You are welcome to begin.

**STATEMENT OF ROBERT ALVERSON, EXECUTIVE DIRECTOR,
FISHING VESSEL OWNERS ASSOCIATION**

Mr. ALVERSON. Thank you. My name is Bob Alverson. I am manager of the Fishing Vessel Owners Association out of Seattle, Washington. The Association is a trade association of 95 family owned fishing vessels. We target primarily Pacific halibut and sable fish in Alaska with long line gear. Both of these species have recently received the London based Marine Stewardship certification for sustainability. Our vessels operate as far south as the port of Fort Bragg, California, and as far north as the waters adjacent to the boundary line of Russia in the Bering Sea and the Western Aleutians.

I want to thank the Committee and the Chairwoman for the opportunity to testify on this important subject this morning. The members of the Association have concerns regarding high seas aquaculture, particularly that aquaculture that would take place

over the continental shelf, which include interactions with forage species, escaped farm fish, waterborne illnesses, economic and regulatory parity, and the wild fish industry, and interaction with marine mammals.

With regard to forage species, fish pens in Canada and other parts of the world in order to offset feed costs have used bright lights at night to attract forage species such as herring and sand lance. These smaller fin fish species often swim through the fish pens and the farm species are able to feed on these forage species which supplement feed costs. These forage species are very important to the wild fish industry, as well to many species that are listed or declared overfished.

Dr. Balsiger pointed out that the North Pacific Council does not allow the commercial take of krill, sand lances, lantern fish, or smelts, and the Pacific Council does not allow a commercial operation on krill. However, if such interceptions are allowed, any permit take of forage species by domestic operations needs to be in compliance with the existing Magnuson-Stevens Act and the allowable biological catch requirements that are set forth in that Act.

With regard to waste, we oppose the open net caged fish farm operations that we see in Puget Sound and in British Columbia that allow the fecal waste to be dropped into the open ocean. Studies show that 25 to 50 percent of dried feed ends up as feces. Indeed, the 600,000 tons of farmed salmon that is produced out of British Columbia in 2000 contributed to as much nitrogen as the untreated sewage of 682,000 people. The problem with these pens is they typically are located in sheltered coves and inlets where small fish need to rear, and these areas have been preempted now because the grounds are soured because of the fallout of the waste.

Parity with wild fish producers. Currently our processors that our vessels deliver to must abide by very strict EPA water quality restrictions, national and state employment requirements, minimum wage requirements, the Jones Act, as well as the Marine Mammal Act. In the past legislation that came up in the Senate two years ago, farmed operations were specifically exempted from the Jones Act and certain state and national wage requirements. This would be an unfair situation.

It bears repeating that since wild fish and farmed fish both compete for U.S. market and will operate in the same EEZ, compliance to all U.S. laws regarding these minimum wage, U.S. labor standards, EPA requirements, Marine Mammal Act, need to apply to both industries. One of the wild fish complaints in the Pacific Northwest is to Canadian salmon and sable fish pen operators having equal access to markets in the United States even though Canadians are permitted to receive licenses to shoot and kill marine mammals.

The United Kingdom allows acoustic devices which we are not allowed to use as well. The Secretary of Commerce should be authorized and directed to determine and publicize that foreign farmed species have not been raised in compliance with U.S. marine mammal standards, especially in view of the fact that the Canadians are permitted to shoot transboundary stocks of marine mammals that the U.S. protects.

In summary, the Association requests Congress to require aquaculture operations to adhere to the same kinds of foreign species restrictions that the North Pacific and Pacific Council have imposed, and there needs to be parity between the wild fish harvesters and the high seas aquaculture operations with regard to the regulations and laws of Congress that I have listed. Thank you again for the opportunity to testify on this important hearing. I will be pleased to respond to any question.

[The prepared statement of Mr. Alverson follows:]

**Statement of Robert D. Alverson, Manager,
Fishing Vessel Owners' Association**

My name is Bob Alverson. I am Manager of the Fishing Vessel Owners' Association (FVOA) of Seattle, Washington. The FVOA is a trade association of 95 family-owned fishing vessels. The vessels are generally between 50 and 85 feet in length, with crews of 4-to-7 persons. We target primarily Pacific halibut and sablefish with longline gear. The fish are dressed and iced at sea and delivered to shorebased processors. Our vessels operate as far south as the port of Fort Bragg, California to as far north as the waters adjacent to the boundary line with Russia in the Bering Sea and Western Aleutian Islands. I want to thank the Committee for the opportunity to testify on this important subject.

The members of the FVOA have concerns regarding high seas aquaculture, including interaction with foraging species; escaped farm fish; water-born illnesses common for fish species that are grown in crowded conditions; economic and regulatory parity with the wild fish industry; and interaction with marine mammals.

Foraging species. Fish pens in Canada and other parts of the world, in order to offset their feed costs, have used bright lights at night to attack forage species such as herring and the sand lance. These smaller fin fish species often swim through fish pens and the farmed species are able to feed on these forage species which supplement feed costs. These forage species are important to the wild fish species, including many that are listed as endangered or are overfished. The interception of forage species should not be allowed. Any allowed harvest by fish pens of these species would negatively affect the Allowable Biological Catch limits of all wild commercial fish species. Notably, the Pacific Fishery Management Council has banned the harvest of krill off Washington, Oregon and California because that species is considered a very important food source for many wild fish and marine mammal species. The North Pacific Fishery Management Council has similarly restricted any commercial harvest of important forage species such as Capelin, smelts, lantern fishes, deep sea smelts, Pacific sand lance, as well as krill. High seas aquaculture farms should not be allowed to have their farmed species grazing on these important forage species as they are critical to the overall health of the wild fish species.

Nevertheless, if such interceptions are allowed, any permitted take of forage species by domestic operations must be in compliance with existing laws and regulations, including establishment of harvest limits associated with approved Allowable Biological Catch (ABC) limits regulated by the Magnuson-Stevens Act. Foreign operations affecting U.S. fish stocks must be addressed by international agreements, or if foreign cooperation is lacking, by targeted trade sanctions.

Escaped Farmed Species. There are several troubling aspects of farmed fish that are released or escape from fish pens. Any diseased fish, of course, risk contamination of wild species. The public was told at one time that farmed salmon in the Pacific Northwest would not present a problem, should they escape as they are modified such that they could not reproduce. Salmon have escaped from pens from Puget Sound and Canada and have been documented entering river systems in order to spawn, thus competing for limited spawning areas with wild species, some of which are listed. The development of modified genetic species also presents a risk to the wild fish environment. This is a potentially great concern as a threat to wild fish ecosystems. Aqua Bounty Farms is about to receive approval from the U.S. Food & Drug Administration for a cross of Atlantic and Pacific King salmon that include the Chinook growth hormone. High seas aquaculture species need to be contained and genetic modification carefully restricted. The burden must be on aquaculture operations to prove that genetic modification will not have adverse effects on wild species and their environment, and the threshold for approval must be appropriately high to avoid significant risk.

Farmed fish are typically raised under crowded conditions and hence, diseases are quickly spread. Farmed salmon in Chile have recently had a problem with infectious

salmon anemia (I.S.A.). As reported in SeafoodSource.com, harvest of farmed fish in Chile will be reduced by 67% to 120,000 mt in 2009. Fish do escape and infected species will interact with the larger ecosystem. It is very important that the containment of aquaculture be well monitored. There should be a federal observer or inspection program to complement any high seas aquaculture program. I note that the West Coast fisheries have significant federal observer programs currently in place for the wild fish harvest.

Waste. We are opposed to open net cage fish farm operations that allow the fecal waste to be dropped into the open ocean. Studies show that 25-to-50 percent of dry feed ends up as feces. Fish pens that are not self-contained contribute to large amounts of waste settling on the sea floor and resulting in the deoxygenation of the area. By placing sediment traps beneath farms, researchers have shown that for each square meter of seabed, 14.7 - 52 kilograms of waste can accumulate beneath the farm and 4.9 kilogram at the farm's perimeters each year. (David Suzuki Foundation). High seas fish pens must be self contained and adhere to all regulations that the wild fish industry are governed by, including EPA restrictions and the Clean Water Act.

"The 49,600 tons of farmed salmon produced by British Columbia in 2000 contributed as much nitrogen as the untreated sewage from 682,000 people or as much phosphorous as the sewage from 216,000 people." "David Suzuki Foundation

The wild fish industry, while operating within the United States Exclusive Economic Zone (EEZ), is limited as to their discharges by EPA regulations and the Clean Water Act. If fish pens are going to operate in the same ecosystem as the wild fish industry, then the same pollution standards that apply to wild fish fishers need to apply to the aquaculture of pen operations. Additionally, since the farmed products and wild harvest are likely destined to similar markets, it would be unfair to treat one sector differently than the other on this matter.

Parity with wild fish producers. Currently, the processors that our vessel owners deliver to must abide by very strict EPA water quality restrictions, national and state employment requirements, including minimum wage requirements, the Jones Act requirements relative to employers' liability while on the high seas, and the Marine Mammal Act. In the past, proposed aquaculture legislation would have exempted the farmed fish operations specifically from the Jones Act and the state and national wage requirements.

It bears repeating that, since wild fish and farmed fish both compete for the U.S. market and will operate in the same EEZ, compliance to all U.S. laws regarding minimum wage and U.S. labor standards, compliance to EPA waste water restrictions, and adherence to the U.S. Marine Mammal Act should not be any different for fish pen operations than for the wild fish operators.

In Canada fish pen operators can receive a permit to shoot and kill nuisance harbor seals and California sea lions. One of the wild fish objections is to Canadian salmon and sablefish pen operators having equal access to markets in the United States, even though Canadians are permitted to receive licenses to shoot and kill marine mammals. Our fishermen would lose their fishing rights and go to jail for taking such actions. Other countries also permit the use of lethal takings to protect fish pens. The Secretary of Commerce should be authorized and directed to determine and publicize that foreign farmed species have not been raised in compliance with U.S. Marine Mammal standards. Especially in view of the fact that Canadians are permitted to shoot transboundary stocks of marine mammals the U.S. protects, there should be either a negotiated end to such practices in Canada, or a regime of sanctions to be imposed on imports into the U.S. of fish products from operations that kill marine mammals from such shared stocks.

In summary, the members of the Fishing Vessel Owners' Association request Congress to require aquaculture operations to adhere to the same kinds of forage species restrictions as those developed by the Pacific and the North Pacific Fishery Management Councils, and require pens to be as self-contained as possible in order to limit the number of escaped fish and fecal waste materials. There needs to be parity between the wild fish harvester and their processors and high-seas aquaculture operations. The rules relative to national wage requirements, the Jones Act, EPA restrictions, the Clean Water Act, and the Magnuson-Stevens Act need to be fairly applied to both wild fish harvesters and aquaculture interests where appropriate. The aquaculture industry should not be exempted from any of these acts.

Foreign operations that produce for the U.S. market should be subject to the same, reasonable restrictions as those applying to or proposed here for U.S. aquaculture operations. In particular, Canadian operations that affect shared stocks of forage species and marine mammals must be brought into line with sound management practices or be subjected to U.S. sanctions.

Thank you, again, for the opportunity to testify at this important hearing. I would be pleased to respond to any questions.

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**Response to questions submitted for the record by Robert D. Alverson,
Manager, Fishing Vessel Owners' Association**

1. What measures should be included in federal legislation to develop a comprehensive regulatory system for aquaculture to ensure that it does not negatively impact the sustainability of existing commercial, tribal and recreational fisheries, and wild fisheries-dependent communities and businesses?

The following measures should be in place in order to ensure that high seas aquaculture does not negatively impact existing coastal fishing dependent communities.

- (a) There needs to be EPA involvement to monitor discharges and water quality. The standards should be similar to what are required from shorebased facilities in order to provide economic parity.
- (b) Species that coastal communities are economically dependent on should not be promoted for aquaculture. The government must recognize that promoting aquaculture for species already providing coastal community jobs can be economically disastrous potentially for aquaculture interests and wild fish fishermen due to over supply of the market. Additionally, the U.S. Government makes loans to many quota share fishermen on the West Coast (i.e. halibut, sablefish, and crab). The economic stability of these quota share fishermen could be significantly damaged should aquaculture focus on these species.

2. What measures must be put in place concerning use of genetically modified fish in offshore aquaculture operations?

The measures needed concerning genetically modified species should include approval from the Food and Drug Administration, which is currently the case, as well as approval from the coastal states that may be affected. Currently, on the West Coast, several species of salmon are listed as endangered or threatened and several rock fish species are listed as overfished. With regard to approval for salmon, the coastal states should be involved in approval, and for groundfish, the regional councils set up under the Magnuson-Stevens Act should be involved for approval.

3. Why is it important to have an observer program for offshore aquaculture?

Observers or electronic monitoring of the aquaculture site would help inform the regulatory bodies on water quality levels, net pen integrity with regard to escapes, sharks and marine mammal entanglements, and monitoring any restrictions relative to forage fish interceptions. The observers required on commercial fishing vessels monitor similar activities.

Republican Member Questions

1. There has been talk of Canadian grow-out facilities for halibut. Did that ever happen to that proposal and what was the potential effect on the U.S. halibut market?

There was an attempt five or six years ago by Canadians who held wild halibut quota shares to catch them in the wild, keep them alive in a tank on board a fishing vessel and deliver them to a pen for feeding. The operation was tested for two years, then stopped. The fish became infected with orange sea lice, while in the net pen, there was accelerated die off due to stress, and a high percent of the meat, when butchered, became "chalky," which is a discoloration due to stress and certain acids that build up in the meat. This operation is not functioning at this time.

2. Do you believe aquaculture regulations should be different for finfish and shellfish?

Aquaculture regulations should be appropriately specific for the species being cultivated. The requirements should be different for shellfish from finfish. However, any genetic changes that could affect wild species, managed by coastal states, should require specific approval, whether shellfish or finfish.

3. Are there international protocols for hatchery breeding programs that would be applicable to aquaculture operations?

Yes, there are some international protocols for hatchery breeding programs that may be applicable to aquaculture operations. In Norway, fish pens are monitored for density, in order to minimize diseases, and the pens are required to be moved for specific periods of time in order to let areas recover from the fish waste. These

types of restrictions might be considered for high seas aquaculture, if the fish pens are over the continental shelf. For fish pens outside the continental shelf, some restrictions could be modified.

4. Other than competition for market share, what are your biggest concerns with a U.S. aquaculture industry if it uses native species and were grown in closed pens?

With due respect, our two biggest concerns would be competing against a subsidized aquaculture industry with subsidies similar to those already provided the farming industry. Those who would invest in high seas aquaculture have the means to run us out of our market with predatory pricing tactics. This is why high seas aquaculture projects should focus on species that United States fishing communities are not currently dependent upon.

5. Mr. Sims' example shows that there could be a market for currently underutilized species. What do you think of this idea?

We think Mr. Sims has a good idea and his idea complements our concerns that new high seas aquaculture should focus on species not significantly relied upon by U.S. fishing communities.

6. Some have discussed requiring a fee of bonding requirement to offset any negative effects to fishermen who see a price drop due to a flood of farm-raised fish that directly compete with the domestic fishing industry. What do you think of that idea?

We think the need for bonding for price drops can be avoided, if there is a policy that encourages the development of aquaculture species not currently important to wild fish operations. Instead of a bond for price drops, perhaps a fee should be charged on aquaculture species that goes into a regional marketing group that helps grow everyone's market. All fish are potentially competitive with each other, but the American consumer is also very knowledgeable about certain species. This has resulted in high end species, such as Pacific halibut, selling well alongside very cheap Vietnamese catfish. The wild fish industry off Alaska assesses landing fees to promote their products. Where there are no such marketing programs, we would suggest a cooperative marketing program between aquaculture and wild fish interests to grow the markets overall. This type of cooperation is achievable, if there is a policy not to promote aquaculture products that are the same species that the wild fish fishermen are dependent upon.

7. Do you believe legislation is necessary to give Federal agencies the ability to permit offshore aquaculture operations in Federal waters? If so, what Federal agencies should be involved in the permitting process or should have a role in the approval of any permit?

Yes, we believe permitting is the correct procedure for new aquaculture ventures in the EEZ. The permitting agencies should include the Commerce Department, which has jurisdiction over fishing activities in the EEZ and is the regulatory agency responsible for coastal sustainable fisheries. The Commerce Department also has safety and health requirements for processed fish products. The Environmental Protection Agency has responsibility for water quality and should be a permitting agency as well.

8. What environmental standards are appropriate for legislation authorizing offshore aquaculture facilities? Should legislation spell these out or should legislation give the permitting agency a broad outline for these standards?

The Congress should direct that high seas aquaculture pens adhere to the same environmental standards as all other United States maritime industries. We do not believe the legislation needs to specify these standards. The standards need to be set by the appropriate federal agencies, including the Department of Commerce and the Environmental Protection Agency.

9. What standards are appropriate for the regulation of discharges from offshore aquaculture facilities what agency or agencies should be responsible for developing discharge regulations?

The standards for regulation of discharges from offshore aquaculture facilities should be similar to those for shorebased processing and aquaculture ventures. The lead agency for this should be the Environmental Protection Agency.

10. What safeguards for the prevention of the escape of farm raised fish are appropriate for legislation authorizing offshore aquaculture facilities? What are the likely effects of the escape of non-native species on natural populations of fish and how should these impacts be dealt with in the legislation?

The safeguards need to include, but may not be limited to, double netting around the pens, installation of a Automatic Identification System (AIS), that warns vessels where and what is anchored on the high seas, and some form of sound identification in case of fog. We would expect escapes occurring from shark and marine mammal encounters, the general deployment of net cages, and from at-sea collisions with high seas vessel traffic.

The best solution to minimize the impact of escaping non-native species on natural populations is to prohibit aquaculture of non-native species. There are plenty of native species that can be raised.

11. How should the siting process work for offshore aquaculture facilities? How will other Federally-permitted activities or Federally-leased areas for other activities (such as areas leased under the Outer Continental Shelf Lands Act) be reconciled? What other conflicts among user groups should be identified and considered?

From a West Coast perspective, aquaculture pens should be limited to seaward of the continental shelf. This will limit many conflicts with potential vessel collisions and many usage disputes. The Commerce Department could provide potential sites outside the continental shelf area and invite investors to use the area. How to reconcile differences between competing federal agencies is an open issue.

12. What impact will offshore aquaculture have on existing domestic wild harvest fisheries and how should those impacts be addressed? Should the Federal government be responsible for mitigating these impacts or should the aquaculture industry be somehow required to mitigate these effects?

If the aquaculture of species that wild fish fishermen are primarily interested in is going to be encouraged, there will be significant long-term economic damage to coastal communities. The federal government should fund and/or match funds from the aquaculture investors and wild fish purchasers to promote and grow the overall seafood markets. Much of the damage could be mitigated, if the aquaculture of important species to fishing communities is not permitted.

13. What options should legislation include for states to have input into the process of either permitting or siting offshore aquaculture facilities? Should states have the ability to reject facilities off their shores in Federal waters? Do states have this ability under the Coastal Zone Management Act?

The states should comment on any aquaculture pen operations directly off their coasts and/or if the operation is raising species that could impact anadromous or groundfish species. Additionally, if a pen operation is going to raise species that the coastal communities depend on and will impact the markets for coastal fishermen, then the states should be involved. States should be able to veto the permitting of aquaculture pens that could negatively impact coastal species and/or coastal communities. We are unaware of states having this ability under the Coastal Zone Management Act.

14. What U.S. ownership standards should be included in legislation authorizing offshore facilities? Should the ownership and control standards be comparable to those currently in place for fishing vessels and/or on-shore processing companies?

The ownership restrictions should be the same as required by the Magnuson-Steven's Act for owning and controlling quota shares. The ownership and control standards should be comparable to those currently in place for fishing vessels. The ownership of onshore plants is more liberal for foreign interests. There are plants in Alaska that have 100% foreign investment.

15. What role should the regional fishery management councils have in regulating the fish, feed, size limits, seasons, and products from offshore aquaculture facilities? Should farm-raised fish only be allowed on the market when the same species of wild fish are allowed to be harvested to minimize enforcement of fishery management plans and regulations?

The role of the Councils should be to review the fish pens relative to their location. The location of a fish pen may present serious concerns for safety, if placed in areas of high vessel traffic, or may have negative environmental impacts near or on areas deemed to be critical habitats, or in a Marine Protected Area. If the aquaculture species is non-native to the area, this may present an invasive species threat to native marine species when escapes occur and the Council should comment on the effect of fish pen waste on wild species. We see no need for the Councils to determine feed, size limits, or seasons for offshore aquaculture facilities.

16. Should legislation deal with issues such as the use of antibiotics and the types of fish food that can be used in the marine environment? Should the legislation require that the impacts of antibiotics and food from aquaculture facilities on the natural populations be regulated?

Yes, legislation should deal with issues such as the use of antibiotics and the types of fish food that can be used in the marine environment. The legislation should additionally require ongoing monitoring of potential impacts of antibiotics and food from aquaculture facilities on natural populations of marine wildlife. Presumably, this would involve the Food and Drug Administration.

17. Should legislation and/or regulations make distinctions between aquaculture that is primarily for hatchery purposes and those facilities that are primarily used for food fish production?

Legislation may be different for aquaculture that is primarily for hatchery programs as opposed to facilities that are primarily used for food fish production. However, the use of antibiotics, genetic manipulation, and raising species that coastal communities are reliant upon should be prohibited either as a hatchery or grow-out facility. The net benefit to the nation will be seriously affected, should aquaculture simply destroy the coastal community's economic viability, only to transfer that to new aquaculture ventures. Hatcheries that raise species that coastal communities are dependent upon, should not be encouraged.

18. Should the legislation and/or regulations make a distinction between shellfish and finfish aquaculture operations?

Yes, the legislation should make a distinction between finfish and shellfish, except that non-native species of either should not be permitted.

19. With the recent concerns about the safety of imported seafood, should food security issues increase the need for a domestic offshore aquaculture program?

Yes, the concern for safe seafood has increased the need for domestic offshore aquaculture. The need for domestic aquaculture operations to be properly monitored under either the Food and Drug Administration and/or the National Marine Fisheries Service, HACIP programs to ensure safe food is essential.

20. Should this legislation deal with how aquaculture fish products are labeled?

Yes, the legislation should require aquacultured fish to be labeled as such.

Ms. BORDALLO. Thank you very much, Mr. Alverson, for your testimony.

And I will now recognize Members for any questions they may wish to ask, alternating between the majority and the minority. And I will begin with myself.

Dr. Leonard, I have a question for you. How robust is the science behind your assertion that unregulated offshore aquaculture presents an imminent threat to marine ecosystems in addition to the science community who supports a Federal framework for permitting and regulating offshore aquaculture?

Dr. LEONARD. Thank you for the question. The answer to your question is, the science is strong, it is robust, it is deep, and it is to be expected. We could spend probably an hour talking about each of the risks that I identified in the diagram over here, and I would be happy to provide some additional material so that we don't have to do that today. But I think it is worth recognizing that much of the science around the environmental risks of aquaculture has really emerged from the academic community that has sort of an ecological framework, an ecological background, because many of those risks are inherent in the ways that animals interact with each other in the wild.

So details around disease dynamics, details around how escaped fish impact wild fish, these are natural processes that we know a lot about from studying natural populations. And in fact when you look at the impacts in aquaculture farms, you see the very same dynamic taking place. So the science is robust, it is deep, it is complicated, it is contentious. But there is quite a bit there that I think both identify the risks and help identify some of the solutions as well.

Ms. BORDALLO. I have another question for you. Why is it irresponsible to claim that offshore aquaculture is being conducted successfully around the world and that the United States is behind the curve in developing its own industry?

Dr. LEONARD. Let us see, I am trying to parse that question. You are saying, why is it irresponsible to maintain there are not problems elsewhere, is that correct?

Ms. BORDALLO. Yes, why is it irresponsible to claim that offshore aquaculture is being conducted successfully around the world?

Dr. LEONARD. Well, I would suggest that because the evidence suggests that there are environmental impacts that have been identified in a host of areas where marine fin fish farming has happened, and that has been pretty well documented. A couple examples, a couple of science papers, one published a couple of years ago that looked at the global impacts of the salmon farming industry and identified that in all the regions where salmon farming had proliferated compared to areas where salmon farming had not proliferated there had been about a 50 percent reduction in wild salmon populations per generation. Pretty striking global analysis.

In addition, I think if you look, for example, in Chile recently, over the last couple years there has been a rampant disease problem in Chile that is clearly related to overdevelopment of the industry. It has been well documented, there is a lot of very detailed scientific information around how that disease moves around and some of the aspects of it. But perhaps most importantly from the industry perspective, there has been a loss of 7,500 jobs and a 50 percent reduction in the production value to the industry itself. So there has been some pretty major business consequences of poorly regulated aquaculture that have gone along with the environmental impacts.

Ms. BORDALLO. Mr. Hinman, I have a question for you. When global demand for fishmeal for aquaculture feeds exceeds total available supplies, what will the impacts be on forage fish and their ecosystem?

Mr. HINMAN. We believe there is already an impact from present fishing pressure on forage species that is affecting ecosystems and predators. There is increasing demand, and the demand exceeds the supply, as I think you were just talking about, which exacerbates the problems that exist. We said that the fishing on the forage fish populations are probably either fished to their maximum now or even beyond the ability of their populations to withstand that kind of fishing. And we look at this from an ecosystem standpoint.

The assessments we do on these forage fish right now is really their ability to sustain the fishery yields that we have desired to get out of those, maximum sustainable yield from these fisheries. They take into account what is being taken by predators but they don't take into account what is needed by predators to support those populations at healthy levels, and especially fish predators that we are trying to rebuild.

So we believe that there has to be a change in the way we manage these fish that is going to protect them in greater abundance. And the demand that is coming from offshore aquaculture, it is already happening, and that is just exacerbating a problem that already exists right now. And I do want to mention that this is something that goes beyond what the U.S. does in terms of regulating its own aquaculture fishery.

This is why we have emphasized the supply side management side of protecting forage fish is the demand is coming from all around the world. And even if we do not develop our own offshore aquaculture fishery here in the U.S., that demand is going to continue and our forage fish supplies that are off our shores are going to be caught to meet that demand. So we have to deal with the supply side to make sure these populations are protected from that increased demand.

Ms. BORDALLO. Thank you. Thank you very much. I have two quick questions here. Mr. Vinsel, industry advocates claim we need to develop offshore aquaculture because, number one, the U.S. has a seafood deficit, number two, the domestic demand for seafood is rising, and three, the world needs a healthy source of protein. Are these arguments valid in your opinion?

Mr. VINSEL. Well, I wouldn't argue with the fact that we need to look at food supply of the country and make sure that we have enough food. But I question whether or not offshore aquaculture or the kind of fish farming growing carnivorous fish to adult size is any net benefit in food production based on testimony of the other speakers here. I think that argument could probably be made with respect to Mr. Sims's operation.

And in Alaska we have our own forms of aquaculture with shellfish aquaculture, and we also have what we would call ocean ranching, although it is different than was described in the previous panel. But there is a need to increase the food security of the nation, but we would say that Alaska's model of putting the fish first and concentrating on the health of the oceans is the best and most productive way to get food from the ocean.

Ms. BORDALLO. Thank you. Mr. Sims, would you support the establishment of environmental standards similar to the California bill in Federal legislation on offshore aquaculture?

Mr. SIMS. Thank you, Congresswoman. The Ocean Stewards are adamant that we want to see rigorous standards in open ocean aquaculture. We want this industry to be recognized by U.S. consumers as something that is sustainable and wholesome. But we need to be a little bit careful that we don't become overly prescriptive in the legislation. What we should do perhaps in the legislation is establish goals and then allow the regulations to be more specific.

Because this is a rapidly growing industry and we need some flexibility. We need to be able to have adaptive management. One of the concerns that I have, among several, with the California legislation is that it speaks specifically to the inclusion rate of fishmeal and fish oil. Now, the Ocean Stewards are very concerned, we are environmentalists as well as open ocean aquaculture advocates, and we are very concerned about the issue of forage fisheries worldwide. But let us manage the problem, let us manage the forage fisheries. Don't try and manage it by throttling U.S. aquaculture growth, because then you are simply going to go and provide competitive advantage for aquaculture everywhere else.

Why don't we encourage innovation in alternative feed stuffs, work with USDA and NOAA to develop alternative feed stuffs, work with the commercial fishing industry so that the byproducts, the trimmings from commercial fisheries that currently go largely over the back of the boat or are burnt in the generators to create electricity, those trimmings should be used as byproducts of inclusion in fishmeal and fish oil in food for aquaculture. This is where commercial fisheries and aquaculture can partner together and we can grow an industry where it benefits each.

Ms. BORDALLO. Thank you. Thank you very much.

Now I would like to recognize the Ranking Member, Mr. Brown, with questions.

Mr. BROWN. Thank you, Madam Chair. And thank you, this is a real cross section of opinions, and it is pretty interesting how that all sorts out. Mr. Sims, how long did it take you to get your permit?

Mr. SIMS. The better part of my life, Congressman. It has been indeed the better part of my life to be doing what we are doing out in Hawaii. But it was about a three-year process. We were involved in the redrafting of Hawaii's ocean leasing legislation back in 1997 and 98. And then we began the discussions with the community in Kona in 2000 and 2001.

We were very careful to make sure that there was extensive consultation through that process. We didn't want to go out and ram this down the throat of the community, we knew that there were a lot of concerns such as have been voiced here. And so we wanted to make sure that those concerns were aired. We still have on our web site today, we have the original draft environmental assessment, so the final environmental assessment that includes all of the comments that came back, and they were wide and varied there, that addressed a lot of these concerns here that are voiced this afternoon.

But the process for obtaining the actual permit—once we file the environmental assessment—in Hawaii they have 180 days to make a decision. That is one thing I would say we need to have here is the inclination toward including a programmatic environmental im-

fact statement in the legislation, but please put a clock on it. I don't think it makes sense to have something that will run on until you get the opportunity to go and have another bond to raise more money to do it. We can make decisions on these issues, we just need to get together in a room and identify what the problems are and then work out how we are going to regulate those, how we are going to manage those.

Mr. BROWN. Well, I noticed that in the testimony we just heard, there were a lot of real concerns about the species escaping, or maybe some of the predators getting tied up in your nets. Is that an accurate assumption, that those things actually take place?

Mr. SIMS. They are risks, Congressman, but they are very minimal risks. The industry has been working very diligently to resolve these. We are as equally concerned with these sorts of issues as the environmental community. For example the concerns about marine mammal entanglement, we are actually operating within the Hawaii Island Humpback Whale National Marine Sanctuary, and we have had very close scrutiny from NOAA and the Sanctuary staff over the four years that we have been operating out there.

And the kinds of net pens that are used in open ocean aquaculture are not predisposed to entanglement issues. It is net pens that are used in protected shallow bays that are more inclined toward entanglement issues. There are innovative materials such as this new netting material, that is a rigid plastic material called Kikko Net, that are very unlikely to involve any entanglement at all. There are brass materials out there that are rigid that would not involve entanglement.

So on any number of these issues, the other issues of escape and effluent water quality, I think the industry has made tremendous advances over the last few years. There are more advances to be made. And that is why I would urge caution about being too prescriptive in the legislation. Let us allow some flexibility and some adaptive management in the regulations.

Mr. BROWN. Are you using basically the same amount of inventory every year, is your output basically the same, or are you growing your operation?

Mr. SIMS. We had applied to the State of Hawaii for permits to expand our operation. And that met with some objections from some people in the local Hawaiian community. And so we sought to expand at the moment in Mexico. We currently are moving forward with expansion down in the Sea of Cortez. That is both because the Mexican government is very encouraging of growth in this industry, but it is also because then we would be able to drive our fish up across the border into LA rather than having to fly it.

The carbon footprint for growing our sashimi grade product, it demands a premium, it is fresh, and we are growing it on the most isolated archipelago on the planet. Every time we put it on a plane it costs us about \$1.80 a pound to get it to market. And so we need to be able to move our operations closer to the market. I tried to make the argument to my board, to our investors, that we should be applying for a permit in state waters under the California legislation, and they said, absolutely not, Neil. Why would you do that, why would we set ourselves up for the lawsuits that were involved in that?

Mr. BROWN. Have you looked at South Carolina?

Mr. SIMS. I have looked at the Eastern Seaboard, Congressman. And it is attractive, there are some concerns there because of the Gulf Stream. And so the technology that we have at the moment is not appropriate to all locations, but this is where American innovation can come into play. This is what America does best, that is why people with funny accents such as mine come to this country, because America encourages innovation and can resolve these challenges.

Mr. BROWN. Well, I just thank you very much for your ingenuity and persistence. I think it is certainly a viable process and that we have to find some solution to 80 percent imports. Thank you very much. Thank you, gentlemen, for all your input. It has been very interesting.

Ms. BORDALLO. I thank the Ranking Member.

I would like to recognize the Representative from New Hampshire, Carol Shea-Porter.

Ms. SHEA-PORTER. Thank you, Madam Chairwoman. You know, listening to this reminds me of the debate that they have on land when they talk about large chicken farms and large pig farms and the waste and the runoff and the inability for smaller farmers to compete. And you naturally have sympathy for both groups because we understand that the smaller private fishermen or fisherwomen who are trying to make a living for their families and have been at it for so many years are getting pushed and are getting squeezed. And yet we also recognize there is some need to increase the amount of food.

However, having said that, I am listening and I would have to actually disagree with you, Mr. Sims, because you said, just put everybody in a room together and you can work it out and find some kind of compromise if I am quoting you correctly. And there does not seem to be a lot of room for compromise here. So not to play one against the other, but I was going to ask Mr. Alverson and you to talk to me about where you think you both find common agreement and where you are disagreeing with one another, because what I am hearing from Mr. Alverson's testimony is that this concern about genetic modification, and I wondered if you had some concern about that too.

Mr. SIMS. Absolutely, Congresswoman. I would not support in any sense—

[Away from microphone.]

Ms. SHEA-PORTER. OK, have you spoken out against it or has your industry spoken out against that?

Mr. SIMS. Yes, that has always been the Ocean Stewards' position. And I think to address your question about whether we can reach a compromise, I think that the Hawaii ocean leasing legislation represents a good compromise. I think that the draft legislation that was moving around the Senate committee at the last Congress represented a good compromise. And Dr. Leonard and a number of others both from industry and from the environmental community spent a lot of time poring through that draft legislation, and we found common ground pretty much everywhere except for a couple of sticking points that George and I need to arm wrestle over still, duration of permits and the liability provisions.

Ms. SHEA-PORTER. OK. Mr. Alverson, do you think there is room for compromise that Mr. Sims is suggesting?

Mr. ALVERSON. Madam Chairwoman, I am glad to hear his comments about his concern for genetically modified fish. In our written testimony we indicated that Aqua Bounty Sea Farms is about to receive from Food and Drug the approval to have a fish that is a cross between the chinook and a smaller salmon, the Atlantic salmon. And those type of concerns greatly bother us on the West Coast, and I am glad to hear that he has similar concerns.

In regards to growing the market for the aquaculture industry and keeping parity with the wild fish industry, I would point out that we provide a huge market for this 80 percent, and we provide it freely without restrictions to these foreign countries, Canada, Thailand, Vietnam. And their environmental standards, we would go to jail, we would have our fishing rights taken away from us if we behaved in the same manner.

If we went out and shot marine mammals and got caught doing that, those are the types of restrictions that Dr. Balsiger would have to have his people come after us. In any legislation that goes forward for the protection of U.S. aquaculture and U.S. wild fish fishermen, the Secretary should be able to impose some sort of sanction or make it publicly known that certain aquaculture operations and their products coming into the U.S. market do not meet the standards—

[Electronic interference.]

Ms. SHEA-PORTER.—and how you all come under that fairly rigid Federal observer program, and would like to see the same thing happen I think to Mr. Sims. Mr. Sims, would you agree with that?

Mr. SIMS. Absolutely, Congresswoman. We have encouraged members of the environmental community, we have offered the same invitation that I offered here this afternoon to the environmental community because we believe that bringing people onto the farm site and letting them see what we are doing helps to change minds.

Ms. SHEA-PORTER. Do you speak for your industry, do you think, is that the common thought that they want to see that same kind of Federal?

Mr. SIMS. Yes, Congresswoman. Transparency is very important to us because we realize that there is a lot of misinformation out there, and the truth really will set us free.

Ms. SHEA-PORTER. OK. And then I wanted to talk a little bit about the waste. You said that a quarter to half of the dry feed ends up as feces. And what would you say to that, Mr. Sims, how would you solve that?

Mr. SIMS. I am not sure about what the term 'ends up as feces,' but any feed that is that inefficient, the feed manufacturer would very quickly go out of business. The whole point of providing a compound pellet diet for when you are culturing fish is that it is very efficiently assimilated, that it is very efficiently digested. And you are paying good money for the feed, you want to make sure that feed is transferred into marketable sashimi.

Ms. SHEA-PORTER. And yet we have seen problems on corporate farms in spite of what you are talking about, on land farms we have seen problems with chickens and pigs et cetera. So that is

your philosophy, but do you think you actually could control that as an industry? And Mr. Alverson, do you think they could control that as an industry?

Mr. SIMS. I think control is the wrong word, Congresswoman. I think that the very nature of an open ocean mariculture operation is very different from a concentrated feed lot where you have a single effluent point. The appropriate way to do open ocean mariculture is to space your net pens out widely so that you are working within the assimilative capacities of the ecosystem so that you do not have any significant impact on water quality or on the substrate underneath. And that is the beauty of being able to move out into open ocean, into deeper water, because then the potential to spread out further, you are having less impact on other competing uses, and you have less ecological footprint.

Ms. SHEA-PORTER. Mr. Alverson?

Mr. ALVERSON. I think the spacing is an extremely important issue. And in my testimony I pointed out our concern of aquaculture pens over the continental shelf. On the West Coast we have a fairly narrow shelf, anywhere from 80 to say 40 miles in breadth in southern California. So that leaves about 160 to 120 miles for potential aquaculture operations. And the problem that we have seen in the Pacific Northwest is where you have very enclosed, shallower habitat where these fish farms are put. So if they can go deeper and be better spaced, I think those are two issues that should be part of any future consideration for permitting.

Ms. SHEA-PORTER. Thank you. And my last question has to do with the fact that I read that Americans actually prefer carnivorous fish, and so that means they will not be eating all the vegetarian material that you suggested but rather they would be working through the food chain. And how would you take care of that problem?

Mr. SIMS. I am sorry, Congresswoman, that question was directed to me?

Ms. SHEA-PORTER. Yes, both of you. Because what I am seeing here is, are we actually producing more protein than we are using up? And I think that has been part of the debate there, how much new food are we actually creating?

Mr. SIMS. Congresswoman, I would like to correct the use of the term 'carnivorous'. Our fish don't need to eat meat, they are just carbohydrate intolerant. They like to eat a diet that is high in proteins and oils. And they are not particularly fussy where that comes from so long as it is the right balance of amino acids and fatty acids. And so this is why we are able to use agricultural grains and other agricultural proteins and oils, we can connect the heartland with America's EEZ.

This is a great opportunity for soybean, canola, wheat, corn, and other sustainable agricultural proteins and oils. We cannot then become a net protein producer, but we are able to get in terms of marine proteins we are able to get very close to one to one. But then it is just a choice of, would people prefer to eat anchovies or would they prefer to eat Kona Kampachi® sashimi.

We are actually in Kona a couple of days ago we started some trials with a new diet that for its marine proteins and oils uses solely byproducts from tuna and squid fisheries. And so it uses no

forage fishery fishmeal or fish oil. This is what we would term a zero fish in to fish out ratio, so it is all bonus marine proteins and oils.

Ms. SHEA-PORTER. Would that satisfy Mr. Alverson?

Mr. ALVERSON. Well, I am not sure exactly what he said, but if forage species are going to be allowed to be used for feed and they come out of our EEZ, they need to be in compliance with that extraction of our ABCs that are set through our council process. As for the American palate not potentially liking carnivorous fish, I think the answer to that is a good Julia Child's French sauce, and that would help things a lot I think.

Ms. SHEA-PORTER. Thank you. And I yield back. Thank you.

Ms. BORDALLO. Thank you very much.

The Chair now recognizes Congressman Cassidy from Louisiana.

Mr. CASSIDY. Dr. Leonard, you had said that recent developments suggest there is an imminent threat, and I presume you are speaking about the Gulf of Mexico management plan. And yet the gentleman from NOAA clearly stated this is a work in progress, and as I read through the plan, it basically says, this isn't going to happen unless NOAA signs off.

And in this, the preferred alternatives, which I gather will be the guidelines by which permitting is done, say that it has to comply with pesticides and with water quality and environmental concerns et cetera, taking into account the native species, it can only be native species. All these other things that seem to I think address your concerns. So why would this be the imminent threat that you describe?

Dr. LEONARD. I was referring really to three issues, but certainly the Gulf Council is the most recent. It is certainly true that there will not be fish farms tomorrow, but in terms of the continuation of the development of the regional approach to this under the Magnuson Act, that is a fishing law, to try to control aquaculture, the tacit approval by NOAA and the Department of Commerce a week or so ago clearly moves that process forward.

Mr. CASSIDY. Now, they made the point that if they had not tacitly approved it, permitting could have taken place. Indeed, by tacitly approving this, this remains their jurisdictional prerogative to, if you will, forbid some practices.

Dr. LEONARD. Sure, but the FMP now stands as law, and because it fits under the Magnuson Act, there are now requirements under Magnuson to develop regulations. So they may decide to defer that, but the process is clearly continued. So we view that as another step in the wrong direction if you will. I think the other two aspects was, as I mentioned, the Hub SeaWorld Institute is proposing developing a farm off of California. It is a very different issue, but it would be the first farm in the water in Federal waters, and clearly is a precedent-setting action.

And then the third I referenced was Hawaii Ocean Technologies is another company in Hawaii that is proposing to develop a new farm in Hawaii state waters. But what is unique about that is that rather than being attached to the bottom it would actually hover in the water column. There are some questions about whether that is technologically feasible, but if it turned out to be such, they

could very easily move out into Federal waters. So I think all three of those combine to represent the sort of imminent threat.

Mr. CASSIDY. You mentioned the environmental impact, the deleterious environmental impact. Mr. Sims in his written testimony says much of this is based upon the problems with salmon fishing, which is in closed water not open water. Indeed, when you spoke of the negative environmental impact, you specifically spoke of salmon. He says that the effluent, if you will, from his is just as clean as the influent. The upstream and the downstream are of similar water quality. So is it true that the concerns are based upon salmon, which is frankly a different model, than the open water such as Mr. Sims is conducting?

Dr. LEONARD. First, the largest body of scientific information on the environmental risks has emerged from the salmon farming industry, precisely because it is the largest global marine fin fish open net pen industry, right? So there is often a lot of criticism that that literature doesn't apply to the open ocean. But I would argue that because many of these impacts are essentially basic functions of how ecology works, about how marine ecosystems and animals function, we should expect that those risks would also be relevant to the open ocean.

Now, the question then becomes what is the relative magnitude of those risks? Which are the big ones to be concerned about and which are the low ones to be concerned about? Along that list, I actually think that the nutrient effluent issue is probably the least important. It is certainly true that there is more dilution in ocean waters, that is pretty basic. At the same time there is new science that suggests that some of the dilution as the solution ideas that are often portrayed are in fact scientifically inaccurate, there is some new work that suggests that nutrient effluents from fish farms actually hold together much more than was anticipated.

Mr. CASSIDY. But does the fact that his water quality is the same downstream as upstream suggest that they have a very efficient process? You put food in, the fish absorbs it, and the fecal material is, whatever, there is no difference is what he said. Either we challenge that or we accept it.

Dr. LEONARD. Sure, and part of that I think—I mean, this is actually an interesting area where actually I think there could be some really interesting collaboration between the aquaculture industry and some of the findings that are emerging using the current sampling technology and some of the new science that is using a more sophisticated hydrodynamic model with a lot of complex math associated with it, which suggests there is a mismatch there. And so that is actually an area in which if we apply some of the new science we might get a better understanding of what those impacts are.

Mr. CASSIDY. Madam Chairman, may I extend my remarks just for one more question?

Ms. BORDALLO. You may.

Mr. CASSIDY. Mr. Hinman, as I was reading your testimony, I was a little confused because on the one hand you mentioned concerns over the forage fish such as menhaden, we call them pogies back home, being harvested to such an extent that they are not

available for higher in the food chain, and yet pogies or menhaden are part of what is being farm fished, if you will, in aquaculture.

There is a proposal off the Louisiana coast, I don't know if it will ever come into being, where they would take our dead zone where the Mississippi River is putting all the nitrogen rich material from farms in the Missouri Valley out into the Gulf, and use that as the feed stock for the algae which would be the feed stock for the pogies which would be the feedstock for something else. It almost seems that you answer your issue in your own testimony. If you grow the pogies, then you in turn have the pogies to feed to the larger fish and thereby you mitigate the ill effects of harvesting the pogies. Does that make sense?

Mr. HINMAN. I am not aware of this operation you are talking about.

Mr. CASSIDY. Well, it is not to scale yet, it is only theoretical.

Mr. HINMAN. A hatchery to produce menhaden, but that does not alleviate my concerns. If you are suggesting that we can farm our own forage fish, then use them to produce feed for other farmed fish, that this is somehow an answer to the problems that are going on in the ocean, my response would be that all these things I hear about potential remedies or best practices that are going on in some of the fish farms where, well we don't feed our fish fishmeal, we feed them vegetarian diets, we don't have waste problems, the fact is that in most operations they do feed their fish fishmeal.

They do take them out of the wild and put them in pens, they do have waste problems, they do have these other environmental problems. And at the same time we are being told by industry that we can do these things, this is what is possible, we can alleviate those problems, but it is almost, trust us because we don't want you to be prescriptive, we don't want you to tell us how to run our business.

And the fact is that just leaving these things up to markets, the markets to supply what we are going to feed our fish, is leaving it up to prices and availability, and that is not going to be enough to protect these forage fish populations, but have to put rules into place that limit. And I assume you would support that then, you would support a regulation in the Gulf plan that did not allow them to use wild caught menhaden as fish feed in fish farms in the Gulf.

Mr. CASSIDY. Well, I think what I have gathered here are two things. What I have gathered here is that you can't mitigate some of the ill effects. That I have learned from the gentleman from California, Mr. Sutton, that the sardine population has come back in California with appropriate regulation, and Mr. Sims said something which, so even though it is being harvested to feed to these ranch farms.

And what Mr. Sims said I also found interesting, that when the fish are caught by commercial fishermen, I am by the way I am agnostic on this legislation, I am just trying to understand it, when they are caught there is a great deal of waste. So some fish are too small, some are too big, so you discard those and you are left with those that can actually go to market, whereas they can have more of a uniform product so therefore you have greater efficiency. And I could actually see that. So the status quo could potentially be im-

proved upon. Are you denying there would be any potential advantage of the aquaculture as opposed to the current status quo?

Mr. HINMAN. I would repeat what Mr. Sutton said this morning, and in response to the question about the sardine fishery and the fact that sardine have come back but that is totally separate from the issue of where sardine are going today, which is primarily exporting to fish farms.

Mr. CASSIDY. But apparently they can coexist.

Mr. HINMAN. We don't know that at this time. Right now, the question is, are you allocating the sardines to fish farms to feed other fish, are you allocating, and he mentioned the other as to human consumption, and the third one left out was allocating them to the ecosystem. And there are a lot of predators on the West Coast that are showing predator deficiencies in their diet.

Mr. CASSIDY. So even though there are an adequate number of sardines, nonetheless, we may blame the decrease in predator fish population upon the sardine population even though there is an adequate population of sardines? I don't follow the logic.

Mr. HINMAN. There may not be an adequate population of sardines, that is the issue.

Mr. CASSIDY. So Mr. Sutton would be wrong on that?

Mr. HINMAN. No, he said they came back. They were one of the most depleted resources.

Mr. CASSIDY. I see.

Mr. HINMAN. In the last century they almost disappeared. He said they came back, and they can sustain a fishery at this point. But we don't know if we are leaving enough of those in the water to sustain predators on the west coast. And we are now taking them out of the ecosystem and putting them in to feed other fish. But you asked me the question of whether I thought there is a place for aquaculture or whether I thought we didn't need it.

My concern is that if it is just a zero sum game where we are replacing wild fisheries with farmed fish, I would have to question what we are doing and what really is the net benefit of that. I think if we are going to have a lot of losses in jobs and a lot of losses in the wild fisheries and we are not going to get really an increase in actual food for the population, what we are going to get is just a change in the ocean and the means of production. And I think Mr. Sims actually described that future where he thinks that is a better way to utilize the ocean to produce fish.

And I think that is what you see in a lot of concern about people is that we are going to greatly impact our wild fisheries whether it is directly by squeezing them out, as the Congresswoman from New Hampshire mentioned we have done to so many of the smaller farmers, or whether it is indirectly by taking things out of the ecosystem and putting them into farms and then denying other fisheries, other predators, what they need. So we have to be very careful about that.

Ms. BORDALLO. Thank you, thank you very much. I have a question myself, and Mr. Brown the Ranking Member and I have conferred, and we would like a quick answer to this question. So I am going to have Mr. Brown ask the question.

Mr. BROWN. I would just like to ask one quick question, Mr. Sims. I know you are contemplating I think you said moving either

your operation or starting a new operation in Mexico, the waters of Mexico. What is the permitting timeline in Mexico?

Mr. SIMS. Congressman, in Mexico, they have a number of fish farm leases that were established back six or seven years ago as tuna ranches both in around Ensenada and down and around La Paz. Most of those lease areas sit idle because, big surprise, they can't catch the tuna anymore. And so we were able to go down there and look at these available leases that were already permitted and say, we have a hatchery technology here that we can produce the fingerlings to stock pens here, would that be of interest to you?

And the response was an overwhelming resounding yes. It is not to say there aren't environmental regulations or requirements that we still have to meet there for ongoing monitoring and if we wanted to go and expand, we would have to go and go through the same permit process. But the current situation there is that the government is very welcoming, there are existing leases.

Mr. BROWN. How long will it take? How long will it take you to get in operation? How long will it take you to begin operations?

Mr. SIMS. We already have a lease there at the moment, Congressman, that we have acquired from another company.

Mr. BROWN. I understand, but so how long will it take you to develop that into some production?

Mr. SIMS. We have fish in our hatchery in Kona now that in a month's time will be large enough that we will be flying them down to La Paz to start to stock into the net pens there.

Mr. BROWN. OK, thank you very much. I just think that it is a major concern of mine that we are importing 80 percent of our production and that production is going to rise as certain as the population of the United States increases plus the population of the world. I understand the fears and some of the concerns that we have. There are always concerns. We probably couldn't permit a corn patch today if we had to go through all the permitting processes to make that operate. We have to develop workable solutions, not road blocks. And I thank you very much. I thank everybody for their testimony. I hope that we can come to some consensus. Whether we get everybody in one room or not, we have to find a solution to this problem. Thank you.

Ms. BORDALLO. Mr. Sims, I am going to follow up on Mr. Brown's question because I think what he was trying to get is, you took up a lease, right? So there wasn't any time period. From the moment that you decided to continue the lease that was available to you and the time that you started operating, what was the timeframe there?

Mr. SIMS. It took us about a year to raise the financing for the expansion into Mexico.

Ms. BORDALLO. So that is your answer then, about a year.

Mr. SIMS. If I understand your question correctly.

Ms. BORDALLO. Yes, from the time that you contacted, were interested in Mexico, they had leases available, you applied for the lease, you got your operation organized, so it took about a year, is that correct?

Mr. SIMS. That is about the best estimate, yes, Congresswoman.

Ms. BORDALLO. All right, thank you. Well, I want to thank all of the witnesses for their participation in the hearing today. Members of the Subcommittee may have some additional questions for you, and we will ask you to respond to these in writing. In addition, the hearing record will be held open for ten days for anyone who would like to submit additional information for the record.

If there is no further business before the Subcommittee, the Chairwoman again thanks the Members of the Subcommittee and our witnesses for their participation here this morning and this afternoon. The Subcommittee stands adjourned.

[Whereupon, at 12:50 p.m., the Subcommittee was adjourned.]

[Additional material submitted for the record follows:]

[The prepared statement of Congresswoman Lois Capps follows:]

**Statement of The Honorable Lois Capps, a Representative in Congress
from the State of California**

Thank you, Madame Chairwoman, for holding this hearing to discuss the important issue of offshore aquaculture. Thank you also to all of our esteemed witnesses for traveling here today to testify.

In January of this year, the Gulf of Mexico Fishery Management Council adopted a fishery management plan to establish a permitting system for offshore aquaculture. And just last week NOAA took the unusual step of making no active decision on the plan, allowing the plan to enter into effect.

I believe this sets a dangerous precedent, where aquaculture is regulated on a case-by-case basis, with an inconsistent application of regulations and standards. This piecemeal approach lays the groundwork for a fragmented regulatory system for offshore aquaculture in the United States that could result in significant and potentially irreversible environmental consequences, including water pollution from waste products and chemicals, threats of disease transmission to wild fish populations, harmful effects on native marine species from escaped farmed species, and an increase in the use of wild forage fish for aquaculture feeds.

The enactment of the Gulf of Mexico Fisheries Management Plan, coupled with the ever-increasing stress on our fisheries and marine ecosystems, makes it clear that the time for action is now. We must establish an overarching, federal regulatory system for offshore aquaculture that includes standardized, precautionary measures to protect the environment and coastal communities.

In my home state of California, we have enacted a bill that I believe can serve as a model to inform our process on the federal level. The California bill, SB 201, is neither hostile to, nor supportive of, offshore aquaculture. Instead, the intent of the bill is to make sure we do aquaculture right, with the idea that this can only be helpful to the industry and ensure that we protect the environment and the public's health.

I am not here today to say no to offshore aquaculture. If done right, offshore aquaculture can help alleviate pressure on wild fisheries and create jobs in the U.S. And I pledge today to work with constituencies, the Administration, and my colleagues in Congress to ensure that we have a bill that makes sure we do offshore aquaculture right.

But I also want to emphasize that a good offshore aquaculture policy is no substitute for good fisheries management. If we are going to protect our oceans for future generations, we must be constantly vigilant and take a comprehensive approach—an approach that is not just focused on one industry or one species, but considers the entire ecosystem as a whole.

[A letter submitted for the record by John R. MacMillan, Ph.D.,
President, National Aquaculture Association, follows:]

NATIONAL
Aquaculture
ASSOCIATION

September 9, 2009

The Honorable Madeleine Z. Bordallo
U. S. House of Representatives
Natural Resources Committee
Subcommittee on Insular Affairs, Oceans and Wildlife
427 Cannon HOB
Washington, D.C. 20515-5301

Dear Congresswoman Bordallo:

The NAA is the largest farmed fish trade association in the United States. We represent producers of domestic fish and shellfish aquaculture. Our members produce a variety of food fish, recreational fishing stock and baitfish, aquarium ornamental fish and shellfish. The NAA mission is to foster development of environmentally sustainable aquaculture in the United States. To do this, we strive to partner with various Federal agencies to develop policies and regulations that are protective of the environment and public health, practical and cost-effective, and based on credible scientific information.

The NAA has commented on several occasions on the development of offshore aquaculture in the United States including the work of the U.S. Commission on Ocean Policy and various legislative efforts to provide a framework to develop the offshore marine production capabilities needed to serve domestic needs. The following five points summarize the position of the NAA as voiced with respect to such prior efforts and remain important considerations for the success of a federal program to establish a sustainable and economically viable offshore aquaculture industry in the United States.

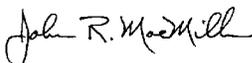
1. In order for the private sector to undertake sustainable aquaculture projects in federal ocean waters there must be a reasonable expectation that such operations will be profitable. Open ocean aquaculture presents significantly greater technical and financial risks than other forms of aquaculture. Legislation that further increases technical or financial burdens or risks will prevent domestic open ocean aquaculture development.
2. Existing federal regulatory standards provide a core of requirements that ensure that ecologically sustainable domestic aquaculture occurs. Redundant and conflicting standards should be avoided. Opponents of open ocean aquaculture ignore the rigorous, scientifically based rulemaking programs of the US Environmental Protection Agency, the US Food and Drug Administration and other federal regulatory agencies. In addition, aquaculture is not fishing and aquaculture production should not be regulated under fisheries management concepts applicable to natural populations such as "sustainable yield" standards. The size or production capacity of offshore aquaculture facilities should not be limited based on potential market impacts or protectionist measures for other industries.

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 The Honorable Madeleine Z. Bordallo
 September 9, 2009

3. Prescriptive feed use standards are not science-based, punish a fledgling U.S. offshore industry and will have no effect on this complex, multi-industry and international management issue. Data from the UN Food and Agriculture Association indicates landings of industrial or feed fish have remained fairly stable over the past 20 years.
4. Any federal offshore aquaculture legislation should resolve questions regarding appropriate state-federal authorities in federal waters, avoid project-specific "veto" authorities, and redefine the role of the fishery management councils so that private producers may reasonably assess the business risks in seeking permits and conducting operations.
5. Offshore aquaculture legislation should establish a lease period conducive to aquaculture business investment. The National Aquaculture Association supports 25-year leases with long-term renewal periods. Regardless of whether this authorization is labeled a lease or a permit, there must be no uncertainty with respect to the rights of the aquaculturist and special care must be given to avoid unintended consequences if such authorizations, if defined as a "license," are tied to unrelated program requirements and processes such as those arising under the Magnuson-Stevens Act.
6. Any new open ocean aquaculture operating standards necessary to specifically address new issues should be developed through transparent rulemaking and based on objective scientific research findings rather than attempting such task in the legislative process.

Thank you for the opportunity to provide our comments. Please contact us if you have any questions.

Sincerely,



John R. MacMillan, Ph.D.
 President

JRM/kg

[A list of documents retained in the Committee's official files follows:]

- Cufone, Marianne, Esq., Director, Fish Program, Food and Water Watch. Letter to members of the Subcommittee on Insular Affairs, Oceans and Wildlife regarding: Oversight Hearing on Offshore Aquaculture, September 9, 2009.
- Flynn, Eileen. Letter submitted for the record on behalf of Food and Water Watch. "Recirculating Aquaculture System" Brochure.
- Food and Water Watch. "Fish Farms Updates" Brochure.
- Food and Water Watch. "Water Usage in Recirculating Aquaculture/Aquaponic Systems" Fact Sheet.
- Food and Water Watch. "Commercial Facility Based on the University of the Virgin Island's Aquaponic System" Fact Sheet.
- Food and Water Watch. "Fishy Farms: The Problems with Open Ocean Aquaculture" Report.
- Food and Water Watch. "Kona Blue's Ocean Aquaculture: Marketing the Myth of Sustainability" Fact Sheet.
- Food and Water Watch. "Ocean Fish Farming" Fact Sheet.
- "Feeding Aquaculture in an Era of Finite Resources" submitted for the record by Ken Hinman, President, National Coalition for Marine Conservation
- Senate Joint Resolution No. 18 (State of California) submitted for the record

[A letter submitted for the record by Robert B. Rheault, Ph.D., Executive Director, East Coast Shellfish Growers Association, follows:]

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Toms River, NJ 08755
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Tom Kehoe
President
Tom Leggett
Vice President
Karen Rivara
Secretary
Gef Filmlin
Treasurer

September 9, 2009

The Honorable Madeleine Z. Bordallo
U. S. House of Representatives
Natural Resources Committee
Subcommittee on Insular Affairs, Oceans and Wildlife
427 Cannon HOB Washington, D.C. 20515-5301

Dear Congresswoman Bordallo:

The East Coast Shellfish Growers Association represents over 1,000 small farms from Maine to Florida that collectively provide several thousand jobs in rural towns while harvesting over \$95 million in clams and oysters annually. Shellfish aquaculture provides tangible environmental benefits and proven ecosystem services and is widely praised for its sustainability. We use no drugs, antibiotics, chemicals or feeds; our crops feed by filtering microscopic phytoplankton from the water. Our growers are energetic stewards of the marine environment.

The issues surrounding the regulation of aquaculture in federal waters have delayed the development of a coherent policy for over a decade. This effectively prevents any investment and drives the development of aquaculture projects to other nations. Since capture fisheries have been exploited to their limit, aquaculture is the only avenue remaining to address our growing national appetite for seafood. This glaring void was recognized in the 2004 Ocean Blueprint (Recommendation 6.2).

Congressional legislative efforts to address this gap in our regulatory matrix have been thwarted by environmental groups claiming that aquaculture poses unacceptable environmental risks. Having worked on this issue for almost a decade, I can vouch for the fact that under current laws, any aquaculture projects in offshore waters would still have to comply with a panoply of pertinent environmental laws and regulations. These are all exhaustively compiled in a 118-page University of Delaware report (Cicin-Sain et al. 2005). This multi-disciplinary team found few gaps in the regulations designed to protect the environment. Instead they called for streamlining of permits and centralization of regulatory authority. I strongly recommend that the recommendations in this report be considered when drafting any future legislation.

Draft Aquaculture Acts that call for creating additional environmental regulations would replicate existing authorities with unnecessary, duplicative and contradictory regulations. From a policy point of view these protections belong not in legislation developed by lawmakers, but in regulation developed through rulemaking. Open ended liability clauses and the potential for citizen-generated lawsuits will ensure that no offshore aquaculture industry develops in US waters.

In their zeal to block the development of salmon farms, environmentalists are unintentionally blocking the development of offshore mussel farms – farms with proven environmental benefits that have been lauded for their sustainability. International mussel farms produce nearly 2 million metric tons of mussels and production grows every year. Legislatively creating a mechanism to permit offshore shellfish farms entails little political risk for politicians, while forcing regulators to deal with issues of governance, enforcement, site selection and user conflicts without the claims of potential environmental damage clouding the discussion.

In the absence of rational workable legislation to authorize offshore aquaculture leasing and permitting the US will continue to miss out on opportunities to develop sustainable aquaculture in our EEZ, jobs will go to other countries and the US will be forced to import an ever increasing share of its seafood from other more progressive nations.

If you have any questions about my suggestions please don't hesitate to contact me.

Sincerely,

Robert B. Rheault, Ph.D.
Executive Director, East Coast Shellfish Growers Association
bob@moonstoneoysters.com
(401) 783-3360

[A letter submitted for the record by Scientists, Fisheries Managers, and Industry Representatives, follows:]

September 17, 2009

The Honorable Madeleine Z. Bordallo
Chair, Subcommittee on Insular Affairs, Oceans and Wildlife
Natural Resources Committee
U.S. House of Representatives
427 Cannon HOB
Washington, D.C. 20515-5301

The Honorable Henry E. Brown
Ranking Member, Subcommittee on Insular Affairs, Oceans and Wildlife
Natural Resources Committee
U.S. House of Representatives
103 Cannon HOB Washington, D.C. 20515-5301

Dear Members:

We write as concerned scientists, fisheries managers and industry representatives regarding the September 9th, 2009, Subcommittee on Insular Affairs, Oceans and Wildlife hearing on Offshore Aquaculture. We request that this letter be included in the Official Record.

First, we applaud the Subcommittee for recognizing the urgency and importance of addressing the issues surrounding the development of sustainable offshore aquaculture. As noted, over 80% of the seafood consumed in the United States is imported and approximately half of those imports come from aquaculture. Worldwide, aquaculture is a \$70 billion per year industry of which U.S. aquaculture production is \$1.2 billion annually or just 1.5% of total worldwide production. If the status quo remains, the United States will continue to increase its imports from foreign sources, many of whom may not share our conservation ethics and environmental concerns. Another consequence of depending on seafood imports is the continued loss of U.S. jobs and the opportunities to develop the future of America's working waterfronts. We agree with the Subcommittee that a comprehensive national offshore aquaculture regulatory framework providing certainty with the world's best environmental standards is needed.

We concur with the testimony of Dr. James Balsiger, NOAA Acting Administrator for Fisheries who recognized the rising worldwide demand for seafood, the inability of our capture fisheries to expand to meet that demand, and the potential for domestic aquaculture to help meet those needs. Dr. Balsiger also noted that the Subcommittee has recognized that the development of U.S. aquaculture must not occur at the expense of the marine environment or native fish and shellfish populations. In summary, Dr. Balsiger noted that "aquaculture can provide safe and nutritious seafood supplies to complement commercial fisheries; to create jobs in U.S. coastal communities; and maintain working waterfronts."

We are aware of all the issues raised about aquaculture at the hearing. Indeed, we have been working on them for many years. Fortunately, the latest scientific data reflects that significant progress has been made. The technological advances of the last 30 years have addressed the known and projected environmental concerns. Our understanding has advanced with the results of research supported by the Federal, State and private research agencies in the United States as well as other countries. The U.S. aquaculture industry has adopted many of the technological advances as well as "Best Management Practices." We will share all the latest information with you which demonstrates conclusively that all the perceived shortfalls of the aquaculture industry no longer exist.

For additional insights, we urge the Subcommittee to look at the real world experience offered by the regulations and management practices that exist in the States of Maine and Washington. Washington has had a performance-based regulatory framework for both finfish and shellfish farming in existence for over 30 years which provides environmental safeguards and allows for adaptive management to address changing needs and scientific developments. The United States has a proven track record for environmentally sustainable and economically profitable finfish and shellfish farming in state waters; this should not be overlooked.

We would welcome the opportunity to meet with the Subcommittee and representatives of environmental lobbying organizations to debate the pros and cons of the United States developing a comprehensive Offshore Aquaculture framework with strong environmental safeguards and standards. We believe that American scientists have led the world in investment in sustainable aquaculture research which has provided these safeguards, and it is time to move forward. The aquaculture

products that we import and consume provide a wide contrast to American products as to both the level of environmental protection and consumer safety, yet these facts are never mentioned by the anti-aquaculture advocacy groups.

The United States should look to the expansion of an environmentally sound domestic aquaculture industry to revitalize many of our coastal communities and economies, and provide a sustainable, safe and nutritious protein source.

We look forward to meeting with you and being part of a national debate based on the latest and best available science to assist the Subcommittee in moving forward with a comprehensive Offshore Aquaculture framework. The development of a framework that is independent of the best available science will simply result in regulations that preclude the advancement of a sustainable industry, rather than increasing our domestic supply of seafood. This would further increase our reliance on imports and provide little social, economic or environmental benefits to the United States.

Respectfully yours,

Maine

Sebastian Belle, Ph.D.
Maine Aquaculture Association

New Hampshire

Elizabeth Fairchild
University of New Hampshire

Hunt Howell, Ph.D.
University of New Hampshire

Rich Langan, Ph.D.
University of New Hampshire

Rhode Island

Barry Costa-Pierce, Ph.D.
Professor of Fisheries & Aquaculture
University of Rhode Island

South Carolina

Mike Denson
South Carolina Department of Natural Resources
Marine Scientist

Florida

Dan Benetti, Ph.D.
University of Miami

William Hogarth, Ph.D.
University of Southern Florida
Dean, College of Marine Science
NOAA Asst Admin for Fisheries (retired)

Ken Leber, Ph.D.
Mote Marine Lab
Director, Center for Fisheries Enhancement

Kevan Main, Ph.D.
Mote Marine Lab
Director, Center for Aquaculture Research & Development

Mississippi

William E. Hawkins, Ph.D.
Director
Gulf Coast Research Laboratory
University of Southern Mississippi

Jeffrey Lotz
Professor and Chair of Coastal Sciences
University of Southern Mississippi

Tom McIlwain, Ph.D.
Professor Emeritus
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Texas

Delbert M. Gatlin III
 Professor and Associate Head for Research and Graduate Programs
 University and Texas AgriLife Research Faculty Fellow
 Department of Wildlife and Fisheries Sciences and
 Intercollegiate Faculty of Nutrition

Bob Stickney, Ph.D.
 Professor,
 Texas A&M University

California

Peter Collins
 Professor of Endocrinology,
 University of California, Santa Barbara

Mark Drawbridge
 President,
 California Aquaculture Association

Donald Kent
 President,
 Hubbs-SeaWorld Research Institute

Michael McCoy
 Executive Director,
 California Aquaculture Association

Raúl H. Piedrahita, Ph.D.
 University of California, Davis
 Professor, Bio & Ag Engineering

Tony Schuur
 Aquaculture Management Service

Washington

Peter Becker Ph.D.
 Marketing Director
 Little Skookum Shellfish Growers LLC
 Chairman, Pacific Aquaculture Caucus

Ken Chew, Ph.D.
 Professor Emeritus,
 University of Washington

John Forster, Ph.D.
 Forster Consulting, Inc.

Conrad Mahnken, Ph.D.
 Aquatic Resources Consultants
 Commissioner

Rollie Schmitten
 Assistant Administrator, NOAA Fisheries (retired)

Dan Swecker
 Washington State Senator

National

Betsy Hart
 National Aquaculture Association

cc: Department of Commerce Secretary Gary Locke
 Under Secretary of Commerce for Oceans and Atmosphere and National
 Oceanic and Atmospheric Administration Administrator Jane Lubchenco,
 Ph.D.
 Acting Assistant Administrator for Fisheries James W. Balsiger, Ph.D.