

# noaa aquaculture program

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## NOAA - USDA Alternative Feeds Initiative

The National Oceanic and Atmospheric Administration (NOAA) in partnership with the U.S. Department of Agriculture (USDA) launched the Alternative Feeds Initiative on November 15, 2007, to accelerate the development of alternative feeds for aquaculture. The text below describes the purpose of the joint initiative, and provides background information on aquaculture feeds, upcoming events, and publications of interest. For more information, contact the NOAA Aquaculture Program at [NOAA.Aquaculture@noaa.gov](mailto:NOAA.Aquaculture@noaa.gov).

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### Overview of the Alternative Feeds Initiative

The purpose of the [NOAA-USDA Alternative Feeds Initiative](#) is to identify alternative dietary ingredients that will reduce the amount of fishmeal and fish oil contained in aquaculture feeds while maintaining the important human health benefits of farmed seafood. Ultimately, the initiative will lead to the commercialization of alternatives for some species which will result in reduced dependence on marine fish resources by feed manufacturers and seafood farmers worldwide. NOAA is partnering with the USDA's Agricultural Research Service and Cooperative State Research, Education, and Extension Service on the initiative, which will build on ongoing USDA and NOAA research to identify alternative protein and oil sources for aquaculture feeds.



The NOAA-USDA Alternative Feeds Initiative is seeking to identify alternative feed ingredients to replace fish meal and fish oil in aquaculture feeds [NOAA Aquaculture Program Photo].

The major components of the joint initiative are:

- Solicit ideas and suggestions on alternatives from the public (comment period now closed; comments received can be found [here](#));
- Convene a panel of U.S. and international researchers to gauge the current state of alternative feeds research and suggest priorities for future research (February 2008);
- Convene a stakeholder panel to discuss issues associated with feeds, including human health and nutrition factors; the environmental effects of feeds production, such as the pressure on reduction fisheries; ongoing research on alternative ingredients, such as plant proteins; the importance of viable alternatives from a manufacturer's perspective. This panel will also inform future research priorities (April 2008);
- Develop and distribute a white paper summarizing the results of the two panels and charting the course for the development of alternative aquaculture feeds in the United States.

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### Background Information on Aquaculture Feeds

Fish meal and fish oil are important components in the feeds for many farm-raised species, from pigs and poultry to farmed fish. As ingredients in aquaculture feed, fish meal and fish oil supply essential amino acids and fatty acids required for normal growth for cultured species,

including carp, salmon, tilapia, trout, catfish, shrimp and others. Fish meal and oil also help maintain the important human health benefits of seafood. However, the relatively high cost of fish meal and fish oil – and growing pressure on the wild fisheries that supply the fish meal and fish oil – are adding up to make alternative feeds one of the top issues facing the global aquaculture industry, fueling research on suitable alternative feed ingredients.

The protein and lipid-rich feed pellets used for farmed fish and shrimp have traditionally been made in part from small, bony fish species that are not generally used for human consumption, including herring, menhaden, capelin, anchovy, pilchard, sardines, and mackerel. These commercial fisheries are often referred to as 'reduction fisheries' based on the steps used to process – or reduce – the harvest into a final product. Harvested mainly off the coast of Peru and Chile, and in the North Atlantic, North Sea, and Baltic Sea, these species are increasingly in demand as a source of protein and oils for a variety of commercial agricultural feeds, including fish feed.

In the United States and elsewhere, studies are underway to better understand the nutritional requirements of fish and shrimp and to evaluate the use of alternative dietary ingredients in aquaculture feed. Potential alternatives already in use include soybeans, barley, rice, peas, and other crops along with canola, lupine, wheat gluten, corn gluten, various plant proteins, algae, and seafood processing co-products. To help maintain the human health benefits of eating seafood, suitable alternatives with marine nutrients such as long chain omega 3 fatty acids, are needed.

On a global scale, significant improvements have been made in reducing the reliance on fish meal and fish oil for feeds for many cultured species. NOAA and other federal agencies play a vital role in that research and the transfer of that technology to industry. The joint feeds initiative will highlight this type of ongoing research and identify new priority areas.

#### **For more information:**

##### **New Developments in Fish Feeds and Feeding Practices ([pdf](#), 424 KB)**

This presentation, by Dr. Ron Hardy, Director of the [Aquaculture Research Institute](#) at the University of Idaho, provides an overview of the issues associated with aquaculture feeds and highlights current research on suitable alternative ingredients. More information on Dr. Hardy is available [online](#).

##### **State of Information on Salmon Aquaculture Feed and the Environment ([pdf](#), 562 KB)**

This report by Dr. Albert Tacon was published in 2005 as part of the [World Wildlife Fund Salmon Aquaculture Dialogue](#). The report provides information on environmental and public health issues related to salmon feed, including the use of fish meal and fish oil. This report is also available [online](#).

##### **United Nations Food & Agriculture Organization (FAO) Publications**

The following publications include information on many aspects of aquaculture, including the availability and manufacture of feeds for aquaculture.

- [State of World Aquaculture \(2006\)](#)
- [Global Trade Conference on Aquaculture \(2007\)](#)
- [Overview of Aquaculture Feed Manufacturing \(2001\)](#)
- [Feeds Technology in Aquaculture](#)

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##### **Results of the National Stakeholder Meeting**

On April 30, 2008, NOAA's Aquaculture Program hosted the NOAA-USDA National Stakeholder Meeting on Alternative Feeds for Aquaculture in Silver Spring, Maryland. Over 60 participants representing aquaculture producers, the aquaculture feeds industry, private research consortiums, other federal agencies, academia, and non-government organizations focused on

research priorities for promising alternatives to fish meal and oil in aquaculture diets. The meeting was moderated by Dr. Paul Sandifer, Senior Scientist for Coastal Ecology for NOAA's Ocean Service. Speakers included Dr. Charles Santerre of Purdue University, Dr. Jane Lubchenco of Oregon State University, Dr. Diane Bellis of Ag Source, Inc. and Richard Nelson of Silver Cup Feeds.

The purpose of the stakeholder meeting was to provide a forum for open communication among stakeholders including scientists, representatives from government and non-governmental organizations, academia, private industry, and others. The meeting featured invited presentations and interactive dialogue focused on current and best-available knowledge of alternative feed ingredients for aquaculture to inform U.S. research priority setting.

Topics addressed at the meeting included the following scientific and practical considerations of alternatives to fish meal and oil in aquaculture diets:

- [Human Health & Product Quality Impacts](#)
- [Environmental Implications](#)
- [Alternative Feedstuff Options](#)
- Future Directions for Feeds Manufacturing

**Agenda** (posted March 31, 2008)

WEDNESDAY, APRIL 30, 2008

**Welcome, Introductions, and Brief Remarks 11:00 - 11:20 a.m.**

- Dr. Michael Rubino, NOAA Aquaculture Program
- Dr. Caird Rexroad, Associate Administrator, USDA-ARS
- Dr. Ralph Otto, Associate Administrator, USDA-CSREES

**Moderator Remarks 11:20 - 11:45 a.m.**

- [Dr. Paul Sandifer](#), Senior Scientist, Coastal Ecology, NOAA Ocean Service

**Presentations & Discussion 11:45 a.m. – 12:30 p.m.**

Human Health & Product Quality Impacts ([pdf](#), 655 KB)

- [Dr. Charles Santerre](#), Purdue University

Environmental Implications ([pdf](#), 2 MB)

- [Dr. Jane Lubchenco](#), Oregon State University

**Presentations & Discussion (continued) 1:30 – 2:15 p.m.**

Alternative Feedstuff Options ([pdf](#), 612 KB)

- [Dr. Diane Bellis](#), Plant Products in Aquaculture Working Group

Future Direction for Feeds Manufacturing

- Richard Nelson, [Silver Cup Feeds](#)

**Breakout Groups 2:15 – 4:30 p.m.**

**Reports from Breakout Groups 4:30 – 5:15 p.m.**

**Closing Remarks 5:15 – 5:30 p.m.**



On April 30, 2008, NOAA hosted the NOAA-USDA National Stakeholder Meeting on Alternative Feeds for Aquaculture. Pictured (l-r) are Dr. Charles Santerre of Purdue University, Dr. Jane Lubchenco of Oregon State University, and Dr. Paul Sandifer, Senior Scientist for Coastal Ecology for NOAA's Ocean Service.

## Adjourn

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## Public Comment

NOAA launched the joint initiative by [calling for public](#) input on the development of alternative aquaculture feed. The deadline for comments was February 29, 2008. The public comments will be shared with the research panel developed for the initiative. The comments received by NOAA can be found [here](#).

NOAA was seeking responses in four specific areas:

(1) Groundbreaking research on alternative dietary ingredients (feedstuffs) for aquaculture, including plant based proteins, is expanding the United States and worldwide. Where should the federal government focus its research efforts in the area of alternative feeds for aquaculture? Are there specific areas that the federal government should not address?

(2) What are potential alternative sources of protein and oil for aquaculture feeds? For example, are there specific opportunities for greater use of seafood processing waste and other agricultural by-products in aquaculture feeds? Are there specific obstacles to using these alternatives as alternative dietary ingredients in aquaculture feed?

(3) What type of treatments or processes show promise for improvement of existing aquaculture feedstuffs and for developing new feedstuffs? How soon could these technologies be commercialized?

(4) Fish meal and fish oil contribute important human nutritional components to aquaculture feeds such as omega 3 fatty acids. As the aquaculture feeds industry seeks to replace fish meal and fish oil with alternatives, how can the nutritional benefits of farmed seafood be maintained or enhanced? For example, what technologies exist for producing omega 3 fatty acids?

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