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Offshore Aquaculture Project Yields a Traditional Hawaiian Delicacy

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In Hawaii, the largest consumer of seafood in the nation, the ocean's dwindling supply of fish has become a growing concern. The seafood consumption rate in the islands is three times that of the U.S. mainland. Yet, despite its mid-Pacific location, Hawaii imports 75 percent of all fish it consumes.

Over the last 20 years, the trend of increasing demand for seafood products has collided with a decreasing supply from depleted fishing grounds worldwide. So, with an eye on the ocean's dwindling supply of fish, scientists at the University of Hawaii's Sea Grant College Program and the Oceanic Institute have teamed up for a research project in marine aquaculture that offers the opportunity to expand these resources.

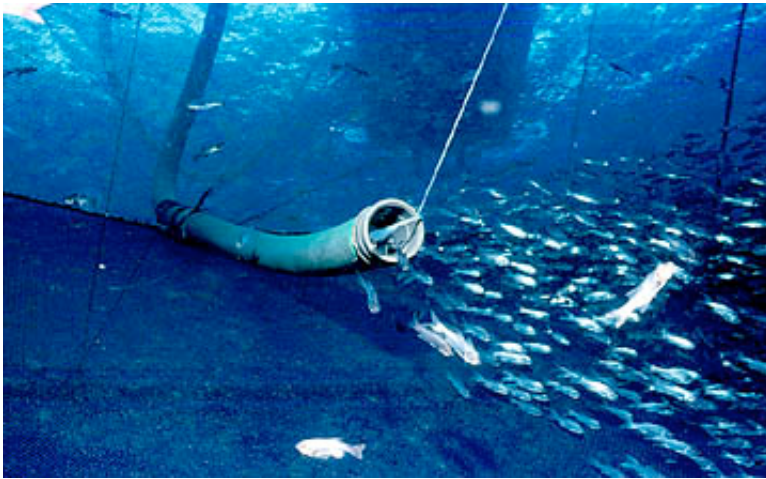
"The potential of aquaculture in open-ocean environments has attracted considerable interest throughout the world, and raises the intriguing possibility of fully utilizing the ocean's resources..."



The Hawaii Offshore Aquaculture Research Project is expected to become a national model for offshore cage culture. It will also transfer technology directly to Hawaii's aquaculture industry, targeted as an important element of the state's economic initiative in diversified agriculture. -*Oceanic Institute photo*

The Pacific Marine Aquaculture Center (PMAC) has been formed to conduct research and a demonstration project on offshore aquaculture. PMAC has implemented one of the first offshore mariculture research projects in the U.S., the Hawaii Offshore Aquaculture Research Project (HOARP).

HOARP is using state-of-the-art marine finfish aquaculture technologies to test a commercial offshore sea cage stocked in April with 70,000 Pacific threadfin (*Polydactylus sexfilis*), or moi, in Hawaii's first integrated experiment in open-ocean mariculture. The moi is indigenous to Hawaii and was once reserved solely for its royalty, with fishponds built along Hawaii's coastline for moi culture. Genetic mapping shows the species found in Hawaiian waters is of a single genetic stock. Therefore, any escapes into the wild would not adversely impact wild populations.

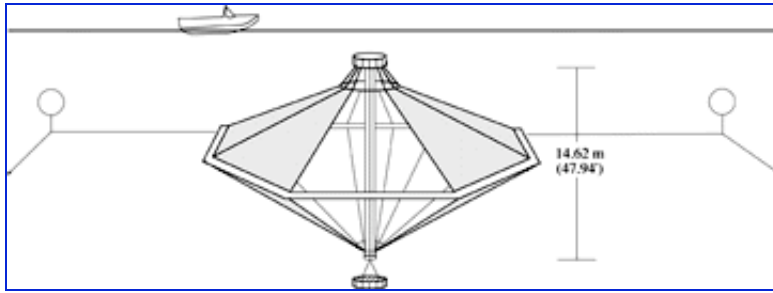


Using the pipe pictured here, more than 70,000 Pacific threadfin (*Polydactylus sexfilis*) fingerlings were introduced into the offshore sea cage. Using a similar pipe, the fish are fed commercial fish pellets twice daily into the cage by an operator on a boat at the surface. The fish are harvested after four months in the sea cage. The fish weigh in at 3/4 pound to 1-1/2 pounds when they are market size.

-Oceanic Institute photo

According to Hawaii's fishing industry, annual moi catches from the wild average about 2,000 pounds per year. The Oceanic Institute currently cultures moi for stock enhancement and in numbers large enough for this demonstration project.

SeaStation 3000, a 50-by-80 foot bi-conical sea cage developed by Ocean Spar Technologies of Bainbridge Island, Washington, is moored in waters approximately two miles off Ewa Beach at a depth of 100 feet. It is a fully submerged cage located approximately 40 feet below the surface.



[top] The Hawaii Offshore Aquaculture Research Project uses a 50 by 80-foot biconical sea cage made of steel and NASA-developed mesh and designed to withstand 25-foot waves. The sea cage can be submerged and raised in 15 minutes and can be easily towed to a new location. -*Illustration by Aaron Lee*



[right] The sea cage is submerged 40 feet below the surface, out of the high surf zone, to reduce the risk of harm to the cage or the fish in the event of very large ocean swells. The cage acts as a FAD (fish aggregating device) and the presence of fish and other marine animals near the cage will be closely surveyed as part of the research project. -*Oceanic Institute photo*

Divers from the Oceanic Institute feed the fish daily with prepared feed which contains no antibiotics or growth-stimulating hormones. Harvesting began in August and will continue throughout October until all the fish are harvested. To avoid impacting local moi farmers, researchers are consigning most of the harvested fish to U.S. Mainland and Asian wholesalers.

"The potential of aquaculture in open-ocean environments has attracted considerable interest throughout the world, and raises the intriguing possibility of fully utilizing the ocean's resources," said Dr. Charles Helsley, Hawaii Sea Grant Director. *"Our research project will identify issues related to open-ocean aquaculture in island regions of the tropical Pacific. Hawaii is an ideal place for this research because of the presence of several desirable fish species, clean seawater, warm temperatures and good scientific infrastructure."*

According to Dr. Anthony Ostrowski, head of Oceanic Institute's finfish program, *"This research positions Hawaii as a regional model for cutting-edge ocean mariculture technology."*

Federally funded by the National Sea Grant College Program and the National Oceanic and Atmospheric Administration, the model will help develop offshore aquaculture technologies in the U.S. and the Pacific. The project recognizes the commercial opportunities and the need to conserve depleted marine resources by pursuing technological advances in this industry-valued at \$4 billion worldwide.

For the past three decades, the [Sea Grant College Program at the University](#)

of Hawaii has focused on ocean-related research that responds to state and local needs. Under the direction of Dr. Charles Helsley, Hawaii Sea Grant is committed to the improved understanding, management and wise use of marine resources of the state. The current program supports research into sustainable aquaculture development, commercial biotechnology, coral reefs and coastal erosion.

For more information about this and other Hawaii Sea Grant programs, contact **Priscilla Billig**, Communications Director.

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