



UNIVERSITY OF HAWAII SYSTEM

Legislative Testimony

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By
Jo-Ann Leong, Director
Hawai'i Institute of Marine Biology
University of Hawai'i at Mānoa

HB 499 HD1 – RELATING TO THE UNIVERSITY OF HAWAII SYSTEM

Aloha Chair Luke, Vice Chairs Nishimoto and Johanson, and members of the Committee on Finance, the University thanks you for the opportunity to submit written testimony regarding the Hawai'i Institute of Marine Biology.

The Hawai'i Institute of Marine Biology (HIMB) strongly supports the intent of HB499, designed to provide funds for research in support of stewardship of aquaculture and marine protected areas in the State of Hawai'i. HIMB has a long history of working in these disciplines, and have numerous faculty who are eager to continue and expand these important efforts to improve that state of Hawai'i's unique and valuable marine natural resources. However, we would like to suggest the bill be amended to accommodate for an integrated research and education program that allows for training of Hawai'i's students in these critical disciplines. We would also like to expand the focus on the Northwestern Hawaiian Islands to an archipelago wide approach, which includes research in the main Hawaiian Islands. We would be pleased to work with the committee on suggesting amendments that would allow HIMB to take advantage of these potential research efforts to train the next generation of ocean scientists, managers and stewards for the State of Hawai'i. Please also note in this testimony that the University of Hawai'i at Mānoa supports the intent of the bill provided it does not adversely affect our UH priorities as set in our budget request.

Aquaculture Research and Outreach at HIMB

HIMB faculty and staff are collaborative partners with faculty from other institutions within the UH system (e.g., College of Tropical Agriculture and Human Resources, Windward Community College) and community groups (Pacific American Foundation, Paepae o He'eia) in the development of culture-based curriculum utilizing one of the oldest forms of aquaculture (i.e., loko i'a or Hawaiian Fishponds) as models of sustainability. While fishpond numbers have diminished across the island landscape, their ecological, socioeconomic and cultural significance have risen to new heights by serving as cultural icons instilling pride in being Hawaiian, and Hawaiian at heart, and raising awareness of the shared responsibility of caring for these islands through the practice of mālama i ka 'āina. This is particularly important because school achievement and resulting employment impacts show that Hawai'i high school graduates, especially those of Native Hawaiian ancestry, are significantly underrepresented in the sciences at UH Mānoa and in the subsequent work forces recruited from the University. There is a clear

need to develop opportunities to close the gap in competitive employment between Hawai‘i’s local students and their mainland or international peers.

For many years, HIMB has been involved in important research that addresses the current plight of Hawai‘i’s coastal and bottomfish fisheries. Past collaborative efforts between Hawai‘i’s Division of Aquatic Resources and the University of Hawai‘i at Mānoa have resulted in the unprecedented success at HIMB in the establishment of a brood stock of the most heavily fished bottomfish species, the ‘ōpakapaka *Pristipomoides filamentosus*. HIMB now has the ability to produce millions of fertilized eggs and larvae in captivity, but hatchery outputs remain low, underscoring the need for continued and expanded research efforts. HIMB affiliate researchers also work in the development and/or refinement of hatchery technologies focused on some of the most heavily targeted and increasingly threatened species in the marine aquarium fishery. A few examples include: 1) the establishment of the world’s second seahorse farm established in Kona, 2) successful production of the highly sought after pygmy angelfishes, and 3) artificial propagation of the feather duster worm, one of the most heavily collected invertebrates in Hawaiian waters. Through this work, we have found that the home grown individuals provide invaluable, and often the only, source of information on the reproduction and early life history of these popular species, providing a means to design science-based programs for their management. While technically demanding, the cultivation of marine ornamentals has great potential towards improving wild fisheries through understanding of basic biology of these organisms. This latter aspect will be a primary focus of the marine aquaculture research initiative at HIMB.

Collaborations with Hawaiian Communities and Education

Consulting with cultural practitioners aids to focus research on areas that are ecologically and culturally relevant, as well as mutually beneficial. For example, kūpuna are currently helping with efforts at HIMB to establish aquaculture techniques for limu kohu (*Asparagopsis taxiformis*). By continuing research needed and requested by resource managers, consulting on native Hawaiian aquaculture and traditional practices, and cataloging scientific data on the Northwestern Hawaiian Islands to inform ecosystem status in the main Hawaiian Islands, we will work to provide a better future for the people of Hawai‘i.

In addition, HIMB’s affiliate faculty work with students and faculty from Hawai‘i inuiākea School of Hawaiian Knowledge in utilizing emerging aquaponics technologies in the production of lā‘au lapa‘au (Hawaiian Herbal Medicine) for both traditional as well as novel uses. Highlights from this work include the first Hawaiian Studies undergraduate to participate in CTAHR’s Annual Student Symposium with two presentations in April 2012.

Ancient loko i‘a, stand as testament to native technical achievement and innovation, providing a model that is very relevant to Native Hawaiians and a suitable framework for the development of marine research training programs that include both basic biology and aquaculture research techniques. Using the fishpond as a training ground and outdoor “laboratory” facility, the HIMB program seeks to infuse cultural significance and place-based relevance to educational processes

that support high school students and recent graduates, providing internship support and a seamless transition to undergraduate and graduate programs within the UH system. The creation of such a research-training program at HIMB is a critical component to address these challenges and opportunities. Towards this end, HIMB is a partner on a current Housing and Urban Development grant (HUD Project Award No. AH1AC-09-HI-01) to purchase the Waikalua Loko Fishpond.

Ecosystem Based Research in the Hawaiian Archipelago

The total economic value of the coral reefs of the main Hawaiian Islands is estimated as \$33.57 billion. The valuation of these reefs comes not only from direct input to the economy of the State of Hawai'i, but also from a wide array of ecosystem services that these reefs supply, including: subsistence and commercial fisheries attained from healthy reefs; nursery habitats to support the next generation of plants and animals inhabiting these reefs; protection of beaches and coastlines from storm surges and waves; as well as cultural value, tourism and recreation. The University of Hawai'i has a long history of working in collaboration with State and Federal agencies to enhance stewardship of these critically important natural resources, and this effort to provide the best available science to manage the natural resources was formalized into a signed MOA partnership with the Office of National Marine Sanctuaries beginning March 28, 2005, focusing on ecosystem-based research in the Northwestern Hawaiian Islands. This work has since been expanded to an archipelago wide approach, and has had major impacts on management practices throughout the State of Hawai'i. For example, genetic connectivity work has shown that recruitment is primarily local with each of the main Hawaiian Islands standing alone for reef replenishment. These studies have changed the viewpoint for management from an Archipelagic scale to highlight a need for more local management of marine resources within the State of Hawai'i.

The unique combination of cutting-edge microscopic and genomic capacity, field and natural seawater access, with proximity to living coral reefs make HIMB unmatched in the world for these sorts of studies. Researchers at HIMB continually seek federal funds and grants to assist in efforts to provide the best available research to inform resource management, restoration and aquaculture efforts within the main Hawaiian Islands. H.B. No. 499 makes possible State matching for those efforts to maximize the return on Federal investment, and ensures a culturally relevant context for research being conducted in the State.

Proposed Integration of Research and Education

HIMB is committed to educating and training all students but with a focus on local students, with emphases on reaching youngsters underrepresented in the marine sciences and that are enrolled at Hawai'i's public schools. The goal is create pathways to education at the university level and ultimately professional careers in the marine sciences to fulfill labor needs in Hawai'i's marine biology and marine resource management workforce. We propose to engage a broad representation of underrepresented students, including incorporating students from Title I areas and with high proportions of native Hawaiian and other Pacific Islander ethnicities. We would

like to incorporate a research and education integrated program that supports the training of Hawai'i's diverse students that capitalizes on the cutting edge science at HIMB, utilizing graduate student researchers as teachers, and faculty support for content expertise and program coordination. Content area specialties would include topics in sustainable marine aquaculture and aquaponics, coral reef ecosystems, and genetic connectivity and applications to management of marine protected areas, among others.