

**Committee on Natural Resources Subcommittee for Indigenous Peoples of the  
United States Remote Oversight Hearing - Cisco WebEx  
May 13, 2021 10:00 a.m.**

**Oversight Hearing on “*Environmental Justice in Indigenous Communities*”**

**Questions from Rep. Grijalva** for Mr. Herb Lee, Jr., President and CEO, Pacific American Foundation

1. *Your testimony highlights a critical component of Indigenous environmental justice—the utilization of traditional knowledge. Can you further elaborate on how the preservation of Waikalua fishpond has bridged Indigenous knowledge with environmental science?*

**Answer:** Research and Hawaiian history show that over the course of 800 years, 488 fishponds were built throughout the major Hawaiian Islands. Approximately 10-15% remain and are on the verge of vanishing in the 21<sup>st</sup> century. The restoration of Waikalua Loko I’a was begun in 1995 and every effort was made to recapture this knowledge across the Hawaiian archipelago through literature research, oral histories, chants and scientific investigation of the ponds that have remained. Waikalua represents a unique type of Hawaiian engineering known as a Loko Kuapa that typically were built near the shoreline to create a brackish water (waikai/combined fresh and salt water) environment for raising food.

The true “bridging” occurred after a pilot curriculum was developed to teach high school students science in the context of the fishpond. A U.S. Department of Education grant was secured under the Native Hawaiian Education Act (NHEA) to assemble a team of scientist, Hawaiian language, artists, practitioners, master teachers, Hawaiian curricula specialist, that over the course of 20 years developed some of the most innovative, culturally relevant and rigorous curricula in the State of Hawaii. We adapted the Waikalua Fishpond curricula to other ponds on every island and amassed even more information on engineering, aquaculture development and over a generation of collecting data in water quality, sedimentation, sea level rise, invasive species and microorganisms.

In 2014, we were invited to join the Smithsonian Institutes’ Marine Global Earth Observatory (GEO) to work alongside global scientist with our student and citizen scientist and University of Hawaii partners to assist in collecting data from our pond and the Kāne’ohe Bay site, over the course of the next 30 years. Today, the Pacific American Foundation uses all types of technology to remotely gather data from the pond and surrounding area including underwater and flying drones to constantly assess changes to the environment. Waikalua fishpond continues to be one of the largest “community classroom” sites in which this “bridge” of sharing knowledge through ongoing stewardship and practice continues to evolve at an unprecedented rate. In 2014, I received the Cezar Chavez “Champion of Change” award from President Barack Obama.

In conclusion, the focus on education allowed us to build new bridges of indigenous wisdom with contemporary science and technology to create a more “holistic” methodology applied to modern day problem solving, collaboration and critical thinking.

*2. In what ways has climate change impacted the Pacific American Foundation's restoration and preservation of the Waikalua fishpond?*

**Answer:** In 1995, climate conditions were indeed different than what we have experienced in the last 5 years of the restoration and preservation process. Ocean acidification has greatly affected coral growth in Kaneohe Bay and our pond. Coral bleaching has had a pyramid type effect on marine biology overall. In 2016, we experienced our first dramatic sea level rise in July, August and November of that year. Ocean temperatures significantly increased to one of the highest in decades and we witnessed a "mini" extinction event in our pond in which invasive seaweed (*Gracilaria salicornia*) almost disappeared over the course of a few short months. Previously we would typically remove up to 100 tons/year from our 11-acre pond. "King tides" over topped our pond wall every year since 2016 at least once a year. Increasing the height (3 additional feet) of the wall began in 2017 and is 50% complete. More importantly, water chemistry has changed bringing new types of invasives and microorganisms that we are only beginning to understand and assess its impacts.

**Questions from Rep. Leger Fernández** for Mr. Herb Lee, Jr., President and CEO, Pacific American Foundation

*1. In your experience, how is culturally competent education directly related to responsible stewardship over the land and its resources?*

**Answer:** Content and context in a rigorous education pedagogy are inextricably intertwined. A culturally competent framework and practice speaks to the relevance of why we learn about content and context. A culturally significant place like Waikalua Loko Fishpond, has allowed students, teachers and families with an opportunity to not only learn about these culturally significant sites but to also make a meaningful difference in the restoration, protection and active stewardship of these sites. In other words, it has provided unprecedented opportunities to inspire learners to have more ownership in what they are learning and want to learn. It has allowed students to develop a sense of pride in being "connected" both to place and to ancestors. Responsible stewardship involves a "we" (kākou) versus "I" (au) mindset. Waikalua Fishpond also represents a feat of Hawaiian engineering that was historically pivotal in the transition from being a hunter-gatherer to a farmer of aquatic resources which in turn was important to basic survival. In Hawaiian, the word 'āina is a powerful word that refers to "that which feeds." Aloha 'āina (to love the Land) and Malama 'āina (to nurture and care for the land) has become increasingly important to sound education practices as well as taking better care of the land, sea and resources that feed us. Since 2000, PAF has developed culture-based curricula aligned to standards that is equally rigorous to western curricula. (see project Kāhea Loko, Aloha 'Āina, Mālama Kaho'olawe -[www.thepaf.org](http://www.thepaf.org))

*2. Your testimony also highlights the Pacific American Foundation's newly developed 25-year plan, which will focus on expanding aquacultural resources to promote food sustainability for the local community. Can you speak more on this plan? a. What federal resources does PAF need to accomplish these goals?*

**Answer:** Aquaculture in Hawaii is a proven economic model seen on Oahu and the neighbor islands that contributes to the long-term economic diversity to our state's industrial base. PAF intends to combine its experience as the steward of the neighboring Waikalua Loko Fish Pond with the social and economic benefit of a modern aquaculture facility. The enterprise portion of the Aquaculture facility is economically self-sustaining, and will produce commercial quantities of fish, limu and other products for the greater community. Feed production ties in with local farm waste; farms that in turn utilize aquaculture waste as fertilizer to mitigate the operational costs of both facilities.

As of this writing over 25 years have passed and a new course for the next 25 years has already been in the making to leverage the knowledge and experience of Hawaiian indigenous ways with contemporary science and technology to forge a new effort toward food production and sustainability. We will focus on a “multi-species approach” that will maximize the growing and harvest cycles of each species annually.

Partnerships with Windward Community College, the University of Hawaii Sea Grant and the Hawaii Institute of Marine Biology and the Smithsonian Institute will create specialized degree programs that focuses on “learning by doing” (Ma ka hana ka ‘ike) and where undergraduates gain real world experience as an alternative to a theory-based curriculum. Returning full circle, tie-ins between research, development and education encourage innovation and enterprise further reinforcing the commercial sustainability of the project. The project will also serve to support work-force development opportunities that align with Career and Technical Education (CTE), internships, externships and more.

Federal resources that could be helpful are USDA programs that focus on development of aquaculture and NOAA programs that can also help to assist in continuing research and development that can assess and mitigate more localized environmental justice issues affecting the streams and near shore environment. The development of U.S. Aquaculture is increasingly important for both Hawaii and the continent to reduce its dependency on imported seafood. Hawaii already imports nearly 90% of its food from outside sources which needs to be reduced.

*3. It is fantastic to hear about you and your community’s success restoring the Waikalua Loko I’a fish pond and making it, as you say, your Piko. a. Could you speak to the relationship between the fish pond’s restoration and improving local people’s diet and health?*

**Answer:** Ancient Hawaiian fishponds were designed to provide a ready source of protein combined with carbohydrates (taro) that were grown in the uplands along with other fruits and vegetables that comprised a very healthy diet. In our lifetime, these ponds have not produced food for at least 3 generations due to lack of maintenance, urbanization and a general disconnect in caring for the land that provides sustenance. The restoration process since 1995 has taught us many things about the need to transform how we educate our children in Hawaii especially as it relates to good nutrition and the growing of food. Specifically, how we can instill a greater sense of relevance and caring for learning and creating a sense of belonging and responsibility to “give back” to the community in which they are raised.

Social emotional connections in the education process are more important than ever when we take into consideration the needs of the whole child. Healthy eating and understanding of nutrition make for a healthy body, mind and heart. This has been further underscored in this pandemic time.

The revitalization of the fishpond has become a symbol for our community that through education and stewardship we can provide opportunities that reinforce a sense place, a sense of belonging, responsibility and a higher sense of Aloha for each other and the world around us. The profound Waikalua fishpond experience has indeed become our starting center point (piko) for healthy living through the nurturing of relationships to place and to each other long-term.