

2009 ANNUAL REPORT



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2009 ANNUAL REPORT: OVERVIEW OF THE YEAR BY THE PRESIDENT OF THE BOARD



Roberta Fujimoto Chu, President of the Board of Directors, with Executive Director Matt Hamabata, a recipient of the 2009 Ho'okele Nonprofit Leadership Award. The award was presented by the Hawai'i Community Foundation and the Wallace Alexander Gerbode Foundation on August 5, 2009.

Look at our island and you will see new school gardens springing up everywhere. And where school gardens flourish, young minds flourish, and so do our communities.

The Hawai'i Island School Garden network is a thriving example of our community's ability to recognize assets that might have gone unnoticed—in this case, gardens that had begun to go fallow—and to build on those assets to meet community needs. School gardens provide interactive and meaningful educational experiences while engaging island youth in growing their own food. Beyond this, they stimulate interest in mathematics and science, encourage healthier diets, build interest and skill in the agricultural sciences, move our communities toward greater food self-reliance, connect food production with the larger concept of healthy ecosystems, and help us to develop a more diversified and sustainable economy.

School gardens are a simple and tangible way to bring communities together. The school garden movement is about education. It's about environmental stewardship. And it's about empowerment—our children become a catalyzing force for positive societal change.

I begin this year's overview with the school garden network because other members of the board and I, as well as members of the staff, continue to be astonished and impressed by the inventiveness and pragmatism of island communities. When our board approved the establishment of the Hawai'i Island School Garden Network (HISGN), ably organized by staff member Nancy Redfeather, we had no idea how meeting what seemed like a simple



Consider this:

In 2009, HISGN expanded to serve 47 schools on the island, and by year's end we expect to add two more schools to bring the total to 49 schools. In partnership with the Uluopono Initiative, The Kohala Center provided direct financial support to 14 school gardens in the Network. These 14 gardens alone served 1,591 students who are cultivating 180,000 square feet of land to produce over 14,000 pounds of food. In the district of North Kohala, more vegetables are produced by the Kohala Youth Agriculture Project, a member of HISGN, than by any other farm in that community.

request would lead to such enormous possibilities for bolstering K-12 education, for enhancing the health of island residents, and for creating a more sustainable future for our society and economy. The momentum and immense transformative potential of the school garden movement reminds me that we have an unusual staff. (Please see the staff profiles beginning on p. 43 of this report.) While they have long professional histories and strong professional ties upon which to draw, they are not so disciplined by their disciplines that they are unable to recognize novel solutions to challenges. These solutions usually arise from conversations with community partners who say, “Well, let’s just start small and begin with what we have at hand.” The school garden movement draws on the strength of our communities and on the creativity of island people—people who are driven by a sense of optimism.

Eight years ago, The Kohala Center was founded with a mandate to create greater employment and educational opportunities by caring for and celebrating Hawai‘i Island’s spectacular natural and cultural landscape. Our staff has had the courage and the wisdom to listen to island residents and to truly address their needs with creative solutions.

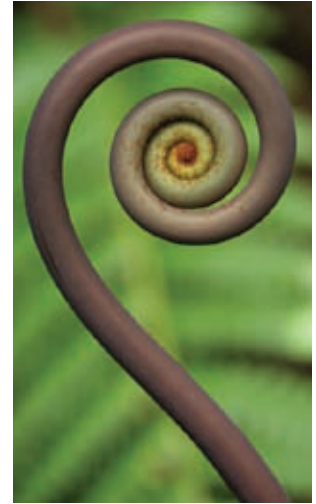
Our remarkable island. Our greatest asset has been, and continues to be, the island itself. The sheer diversity of Hawai‘i Island’s ecosystems and climate zones make it an ideal model of the planet. Whenever human and natural systems intersect, challenges arise. As we develop solutions to modern-day challenges of resource management, Hawai‘i Island becomes a model for the world. It is this modeling capacity that attracts global resources to the work of The Kohala Center.

Our areas of interest. By listening to the needs and ideas of island residents, by addressing the interests of our university and research agency partners, and by understanding that we work in a model environment, The Kohala Center is creating meaningful jobs and educational opportunities. Our work focuses on three core areas of interest: energy self-reliance, food self-reliance, and ecosystem health. Our programs include applied and basic research, conservation and restoration initiatives, public outreach, and education.

Job creation. In Fiscal Year 2000–2001, when The Kohala Center began its work, the operating budget for the organization was \$7,600. On July 1, 2009, the board approved an operating budget for FY 2009–2010 of \$4.1 million. At the time of this writing in October 2009, The Kohala Center employs 36 people on a full-time basis.

Our work has generated the need on this island for more ecologists, conservation biologists, economists, expert fence builders, archivists, agronomists, web designers, hydrologists, cultural historians, field managers, environmental educators, landscape architects, cultural practitioners, engineers, graphic artists, community organizers, writers, geographic information scientists, grant managers, ethnographers, media relations professionals, copy editors, curriculum specialists, field managers, and botanists, among others. To ensure that island youth can assume the knowledge-rich jobs that we are creating, we remain steadfast in our commitment to bolster K-12 education.

Education and empowerment. Just as gardens bring communities together, high quality science education brings community expertise into our schools. Our Hidden Jewels program at Kohala Elementary School celebrates the natural and cultural environment of North Kohala. This program has built meaningful connections between the school and the community—connections that



have resulted in a new science resource center on the school campus and a standards-based science curriculum for grades 1–5. An advisory board of prominent North Kohala community leaders has been formed to support the science program at the school, and a full array of science-informed after-school programs is now being launched with that board's assistance.

In the Hilo school complex, we are empowering the community to support excellence in K–12 education by identifying, training, and mentoring outstanding teacher leaders. Under the guidance of 2008 Hawai'i State Teacher of the Year Pascale Pinner, 35 teacher leaders in four Hilo elementary schools are spearheading an effort to improve science and mathematics education at their schools. By the spring of 2010, this effort will reach 750 students.

Island high school students are learning to care for their environment through the annual Student Sustainability Conference, organized by the Hawai'i Preparatory Academy and The Kohala Center. Each June, student environmental leaders from public, charter, and independent schools gather to share ideas and report on projects that they develop to address energy, food, waste management, and ecosystem health challenges in their home communities. Through the Earl E. Bakken Science and Engineering Scholarship Fund, established by the board of The Kohala Center, Hawai'i Island youth are provided with opportunities to join environmental leadership programs at Brown University and summer engineering programs at Cornell University. These programs educate and empower island youth to develop solutions to local environmental challenges.



Island-based university students developed new knowledge about Hawai'i Island's environment through the Cornell-Hawai'i Graduate Field Research Program, a partnership forged by The Kohala Center between the University of Hawai'i at Hilo (UH Hilo) and the Graduate School of Arts and Sciences at Cornell University. Cornell worked with the Kīpuka Native Hawaiian Student Center, the Tropical Conservation Biology and Environmental Sciences Program, and the NSF Center for Research Excellence in Science and Technology Program at UH Hilo to build research teams that involved doctoral students at Cornell and upper division undergraduate and master's level students from UH Hilo. After working in the field on Hawai'i Island for three weeks, the UH Hilo and Cornell students remained in contact via internet conferences. In the spring of 2009, the UH Hilo students joined their Cornell colleagues in Ithaca, New York, to prepare manuscripts and participate in scientific seminars. Publications stemming from the projects completed on Hawai'i Island are co-authored by UH and Cornell students.

Each spring, university students from around the country and abroad come to Hawai'i Island with Cornell University's semester-long Earth and Atmospheric Sciences Field Program. These students spend six weeks working as interns with island organizations, such as the Hawai'i County Council, Mauna Kea Soil and Water Conservation District, West Hawai'i Wildfire Organization, and ReefTeach. During their five months on the island, students also learn how to minimize their carbon footprint. Our Cornell student colleagues use solar water heating, monitor their electric and propane usage, and purchase locally grown fruits and vegetables and island beef as often as possible. They volunteer to help out in local school gardens, and in 2009 alone, the Cornell students planted over 300 trees, shrubs, and other native plants in the forests of Kohala and Kona. Now they are busy sharing their knowledge with others. Nine students attended the Geological Society of America Annual Meeting in October to discuss their paper, "What Does It Take to Be Carbon-Neutral?"

Consider this:

In the spring of 2009, the Cornell students planted 300 trees—which should more than compensate for their carbon footprint. To calculate their carbon footprint, the students counted their total number of air miles traveled, their vehicle miles driven, the electricity and gas they used at their residence, the food they ate, and the waste they generated. Their carbon footprint for all of those activities looks like this:

Air travel = 41 tons of carbon dioxide

Food = 13 tons of carbon dioxide

Vehicles = 11 tons of carbon dioxide

Electricity = 2 tons of carbon dioxide

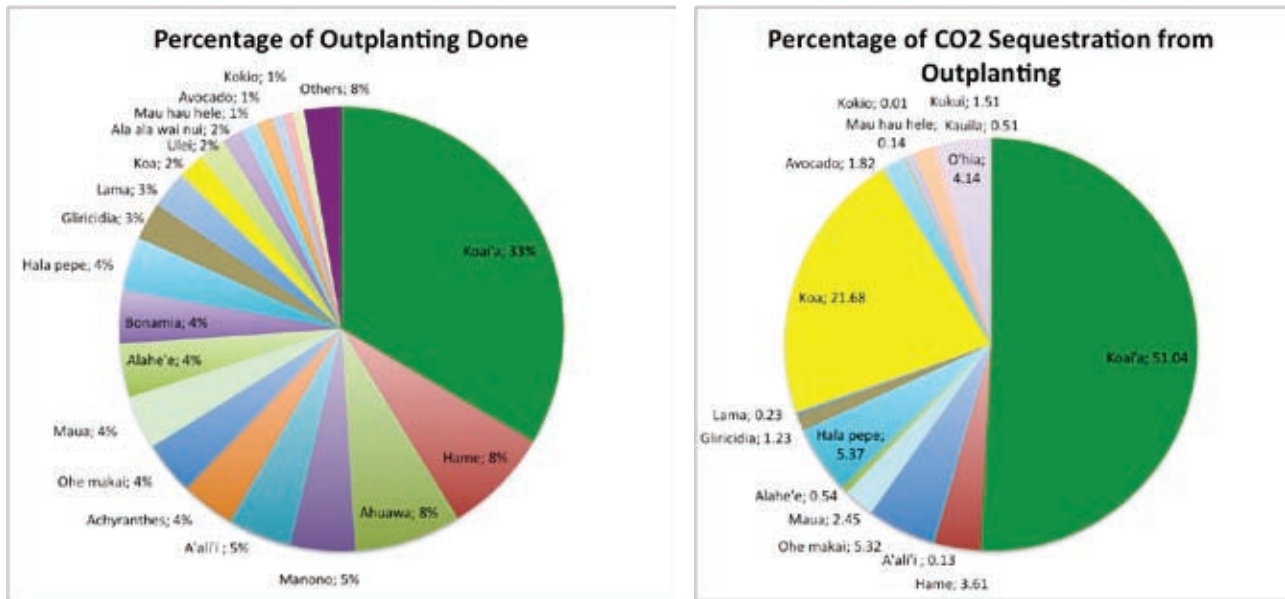
Waste = 1.4 tons of carbon dioxide

Propane = 0.5 tons of carbon dioxide

Total = 69 tons of carbon dioxide

The total amount of carbon dioxide that 300 trees will absorb is about 300 tons. This depends a lot on the type of tree planted and whether it grows to its full mature size (if it is not stunted by lack of water or does not die from fire or disease), but roughly one ton per tree is a good figure to use. As they mature, these plants will sequester roughly four times as much carbon as the students emitted in the course of their stay on the island.

Graphs: Species planted and the percentage of carbon dioxide sequestered by each species. Graphs courtesy of the 2009 Cornell students.



The Kohala Watershed Partnership (KWP) has planted approximately 10,000 native plants (including trees and shrubs) so far this year. This figure includes plantings by KWP partners, staff, and volunteers. Using the estimate of one ton of carbon dioxide per tree, KWP's plants will help to sequester roughly 10,000 tons of carbon dioxide over the course of their lifetimes.

Intellectual leadership. A knowledge-based economy and society needs leaders to steer its educational and research institutions. Over the past two years, The Kohala Center has worked with The Andrew W. Mellon Foundation and Kamehameha Schools to create and support the Mellon-Hawai'i Doctoral and Postdoctoral Fellowship Program. In 2009, we received inquiries about and applications for these fellowship positions from Native Hawaiian candidates in Europe, North America, and throughout the Pacific. This year's fellows are Dr. Ku'ualoha Ho'omanawanui (Comparative Literature), Dr. Karin Ingersoll (Political Science), and Ms. Kauanaoe Kamanā (Indigenous Language and Culture Revitalization). The work of this new generation of Hawaiian scholars promises to transform the ways in which Hawaiian culture and history is understood, both within the academy and in a broader societal context.

Saving Kahalu'u Bay. Like most of our work, the Kahalu'u Bay Project began with a simple request to reach out to the 400,000 users of this precious bay. Many of those who enter the bay, both island residents and visitors alike, were unaware that they could harm the fragile coral reef environment. They needed assistance to understand how to enjoy the bay and at the same time preserve its health. The ReefTeach effort has now burgeoned into a program that works with more than 360 volunteers a year and reaches 1,200 K-12 students through its coral reef health program.

This year, our efforts at Kahalu'u have evolved into a Citizen Science program, in which local residents learn about the science of monitoring the health of nearshore environments and collect and analyze water samples. The work of the Citizen Scientists has led to a multi-university effort, in which the entire Kahalu'u *ahupua'a* (loosely translated as "watershed") is considered a complete ridge-to-reef ecosystem health project. A recent National Science Foundation grant will help lay the groundwork for this research and education effort, which involves the Center for Conservation Research and Training at the University of Hawai'i at Mānoa, the Hawai'i Institute for Marine Biology, Redlands Institute, the University of Alaska, and Stanford University. The project begins with organizing existing information and data about the health of the Kahalu'u *ahupua'a*.



Other proposals are moving forward to link indigenous knowledge systems through *ahupua'a* research at Kahalu'u. Partners in this effort are the Edith Kanaka'ole Foundation, Kamehameha Schools, Redlands Institute, and the Watershed Professionals Network.

Saving Pelekane Bay. The Kohala Watershed Partnership (KWP), successfully led by coordinator Melora Purell, has added the restoration of Pelekane Bay to its current mandate to care for the 65,000-acre forested watershed of Kohala Mountain. In July of this year, The Kohala Watershed Partnership, for which The Kohala Center serves as fiscal agent, was awarded \$2.69 million in federal funds to improve the condition of the Pelekane Bay watershed. Pelekane Bay once served as a nursery for young fish. Now, invasive alien plants, feral animals, and fire threaten this watershed. Federal funding will be used to help restore 400 acres of native vegetation, to protect 100 critically-eroding sites, to plant 100,000 native plants, and to construct 20 miles of goat-proof fencing around an 11,750-acre portion of the watershed.

The Kohala Watershed Partnership effort is also providing economic assistance to our local community through the creation of jobs. It includes the employment and training of 14 new field personnel, who are gaining skills in conservation work that can be applied to future restoration projects. The communities surrounding the watershed will ultimately benefit from improved coastal habitats, fisheries, cultural sites, and tourism. Work on the restoration project began on August 1, 2009, and will be completed by December 2010. This project is enabling us to significantly rehabilitate a damaged landscape within a relatively short time frame.

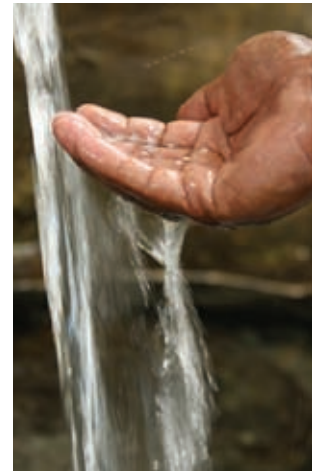
Saving our island planet. Over the last several years, The Kohala Center and its university and research agency partners have been working with the County of Hawai'i to address critical issues at the intersection of human and natural systems. A waste system study was completed in 2007. Also in 2007, a food systems study with the Rocky Mountain Institute was completed, and the Hawai'i County Sustainable Energy Plan was developed in collaboration with the Yale School of Forestry and Environmental Studies. The energy plan, in particular, has led to the passage of research-based legislation at the County level to increase efficiency and expand renewable generation. In Fiscal Year 2008–2009, The Kohala Center began working with the County and Agricon Hawaii LLC, to develop a new agricultural plan and to launch a water systems study.

This kind of systemic analysis is anchored in the field of study known in the U.S. as “industrial ecology,” or in Europe and Asia as “social ecology.” This new field evaluates ecological approaches to achieve economic and societal health. A multinational team has been formed to continue this whole systems approach to our island’s economic and societal well-being through what is called the Long-Term Industrial Ecology Model (LIEM) – Hawai'i Project. Among other things, the project will generate comparative scenarios—for example, intensive biofuel development versus local food production—which will help stakeholders visualize which elements they want, and which elements they don't want in our island's future. These analyses will be of immediate use to the County as it seeks to address island challenges, and the project will have global benefits as well. The ongoing gathering and analysis of data will, over the years, lead to a significantly enhanced understanding of the complex interaction between human and natural systems. This work is of enormous value as communities around the world seek to mitigate the potentially devastating effects of global climate change.

The multinational team includes scientists and scholars from the Redlands Institute; Yale; the Institute for Advanced Studies at Waseda University in Tokyo, Japan; the University of Hawai'i at Hilo; the U.S. Forest Service at Hilo; and the Institute for Social Ecology in Vienna, Austria. The National Science Foundation is supporting a two-year start-up of this effort, which will analyze the resource consumption patterns of the island's two major urban centers: Hilo and Kona.

Organizational development. As The Kohala Center grows, we want to maintain an organizational culture in which employees understand the mission of the organization, as well as the purpose of the particular project for which they are responsible. We are very pleased to be working with Dr. Joann Hoffman of Hoffman and Clark Associates, and Dr. Michael Minh of Citiscapes to install an organization-wide evaluation program and system. Drs. Clark and Minh have worked with staff to learn about our current programs, the fit of those programs with The Kohala Center's mission, and the need for evaluation. Drs. Clark and Minh are now working to install a Web-based system that will allow staff to input information which they gather on a daily basis as a part of their regular work, and organize that information for the purposes of evaluation.

The Web-based system will not only collect information, but it will also push information out, so that leaders of programs will know what outcomes are expected, what deliverables need to be produced, and what progress programs are making towards their goals on a constantly updated basis. The implementation of this system is a milestone in our efforts to create a truly information-rich organization, in which members of the staff have all the information they



need to align their work with the organization's mission. This system will ensure that we at The Kohala Center remain accountable to our funders, to our contractors, and, especially, to the communities we serve.

Financial matters. Income for Fiscal Year 2008–2009 was budgeted at \$2,278,824. Total income at the end of the year was \$2,707,969.89, which is \$429,145.89 over, or 118.1% of the income expected. Annual expenses of \$2,278,837 were budgeted, and actual expenses in all categories at the end of the year were \$2,698,900.53, which amounts to 118.3% of the approved budget. Over-expenditure of \$415,629.96 reflects expenses required to meet grant and contract requirements resulting from the increase of \$429,145.89 in revenue streams. Collectively, this results in a positive net income of \$13,069.54 for the year, approximately \$18,000 ahead of projection for the last quarter of the fiscal year.

Total equity amounted to \$29,600.18. Total liabilities were \$323,820 (including \$243,775 in deferred revenue for payments received in advance of planned future programmatic expenses). Total liabilities and equity were \$353,420.63.

In Fiscal Year 2008–2009, 17.5% of The Kohala Center's funding came from federal contracts, 10% from State contracts, 7.8% from local government contracts, 8.4% from private contracts, 8.7% from program fees, 31.3 % from private foundations, and 16.3% from individual gifts.

The next challenge. The Kohala Center has demonstrated its ability to create jobs and educational opportunities through work about and for the natural environment. Our next big challenge is to support the development of new businesses on this island. New organizations are forming in the state and across the nation—organizations which combine philanthropy with venture capital. Philanthropy supports the applied research, the policy research, and the public outreach work that lay the groundwork for private investment in businesses which will move Hawai'i toward a more sustainable future. Hawai'i Island faces extreme challenges as we seek to make this transition, given our current dependence on fossil fuels and imported food. Yet we see great potential for success, given the island's remarkable natural resources and the creative spirit of island residents.



Consider this:

Hawai'i's unique climatic and geologic landscape could potentially support a yearlong growing season capable of producing a wide array of crops. The current market share of 15% for local produce indicates that there is substantial room for improvement. It has been estimated that the irrigation of a relatively small amount of land, approximately 1,300 to 2,600 acres, would enable us to satisfy 70% to 100% of the island's demand for fresh produce. These numbers pale in comparison to the amount of irrigated land during the sugarcane industry's heyday, which was between 36,500 and 45,300 acres.

–Island of Hawai'i Food System Project (2007), Table 4 - Physical Water Capacity Calculation Results. Completed by the Rocky Mountain Institute and available at http://www.kohalacenter.org/pdf/hi_wsp_2.pdf.

Working across the independent, public, and private sectors, we can support the development of entrepreneurial ventures that will address our challenges. We see tremendous business development opportunities. We look forward to working with others to help identify and foster promising new ventures.

We have had an extremely productive year. We appreciate your support as we continue to serve our island communities and care for our island environments. *Mahalo nui loa.*

Sincerely yours,



Roberta Fujimoto Chu

President of the Board of Directors

Dr. Earl E. Bakken, founding benefactor of The Kohala Center

I am committed to enhancing the health of the people of Hawai'i, and in Hawai'i; we know that the health of the *āina* [land] means the health of its people. I am very happy to see the development and the success of The Kohala Center's work, and I am proud to support this wonderful work.

FROM THE PERSPECTIVE OF THE EXECUTIVE DIRECTOR

Ominous news streams steadily into the world's collective consciousness. Polar ice caps are melting at an unprecedented rate. Rising ocean temperatures threaten life as we know it—from our coral reefs to our human communities. The end of the era of cheap oil has disrupted our current systems of energy and food production, global politics, and the global marketplace. We are uneasy, knowing that we must find new ways of living and being.



For many of us, this sense of unease motivates creative and generative work. Indeed, the crises we face present enormous opportunities to rebuild our economy and society, to rethink our life strategies, and to recommit ourselves to a future of sustained abundance. At no time has it been clearer that we must move toward energy and food self-reliance and that we must build an economy that enhances ecosystem health. All of this requires great agility, great inventiveness, and rigorous thinking. It means that we have no choice but to move forward with building a knowledge-based society, in which all occupations require us to tap into the potential for learning and human development ... at all times.

As an island people, we understand that we have limited resources. By embracing the challenges we face and by seeking effective solutions, we can generate knowledge that will help communities in Hawai'i, in the Pacific, and around the world thrive—economically, ecologically, socially, and culturally. Take, for example, the Long-Term Industrial Ecosystem Model of Hawai'i Island (LIEM-Hawai'i) Project, which involves some of the finest minds in Hawai'i, the U.S. Mainland, Europe, and Japan, and which positions the Island of Hawai'i as a global knowledge resource for ecological approaches to economic and societal health (see pp. 40-42 of this report). This solution-oriented work also creates new jobs on Hawai'i Island, perhaps best exemplified by The Kohala Center's own rapid growth from an organization with no employees in Fiscal Year 2000–2001 to an organization of 36 employees in October 2009.

We are pleased to report that everywhere we look, we are seeing signs of positive change. We are happy to share some of these indicators with you here. Some track changes that are already in progress, such as the growing school garden movement. Others point out areas that are ripe with potential, such as the opportunity for our island to supply island residents with ample fresh produce. Look for these positive indicators under the heading “*Consider this*” sprinkled throughout this report.

The Kohala Center remains blessed by your support, your creative spirit, your optimism, and your native intelligence. Together, we are making a difference. *Mahalo nui loa.*

Imua! Onward!

Matthews M. Hamabata

Matthews M. Hamabata, Ph.D.
Executive Director

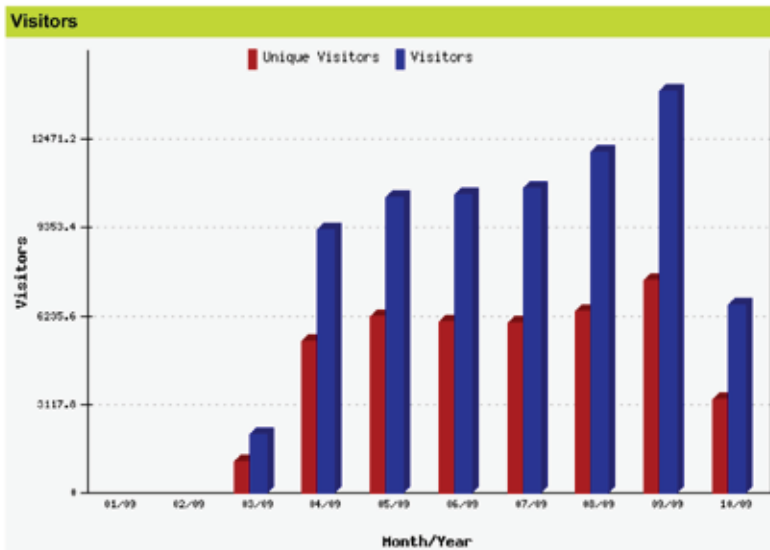


Consider this:

As of October 2009, The Kohala Center has **360** volunteers and **254** members in our Circle of Friends. Individual donors, all members of our Circle of Friends, contributed **\$441,399** (16.3% of our total revenues) towards our collaborative efforts in 2008-2009. And since March 2009, The Kohala Center has welcomed **75,888** visitors (and counting...) to our Web site. Wow!

Report created by Site Analytics for <http://www.kohalacenter.org> on 10-12-09

The Visitor Report shows the numbers of unique and total visitors to the site, thus providing an overview of site traffic for the selected period of time.



Date	Unique Visitors	Visitors
January, 2009	0	0
February, 2009	0	0
March, 2009	1,082	2,060
April, 2009	5,350	9,299
May, 2009	6,220	10,407
June, 2009	6,051	10,517
July, 2009	5,969	10,749
August, 2009	6,397	12,043
September, 2009	7,509	14,171
October, 2009	3,290	6,642
Total	41,868	75,888

A VIBRANT AND EXTRAORDINARY LEARNING LABORATORY

Scientists study model systems as a means of understanding broader truths. In selecting model systems, they look for a compromise between complexity and tractability. Islands are often examined as model systems with their well-defined boundaries, limited natural resources, and geographic isolation. Island populations confront unique challenges as they seek to provide adequate energy, food, and water to sustain themselves, and as they respond to natural events, such as rising sea levels due to global warming, droughts, hurricanes, earthquakes, and volcanic activity. Hawai'i Island is an ideal choice to serve as a model system because it is complex, but small enough that the whole system can still be monitored.

The scientists who work here tell us that there is no better place on the planet to study how climate affects species and ecosystems than on Hawai'i Island. The following are some of the remarkable features of our island that Professor Peter Vitousek, Population and Resource Studies at Stanford University; Professor Marian Chertow, Industrial Environmental Management Program at Yale University; and Dr. Gregory Chun, Bishop Holdings Corporation, noted in their talks at the Hawai'i Island Summit on May 21–22, 2009. Read the full summaries of the speakers' presentations at <http://www.kohalacenter.org/hawaiiislandsummit/about.html>.



What makes Hawai'i Island a model system? It has a consistent volcanic bedrock and topography, and it is situated in the most isolated archipelago on Earth. It has 11 of the 13 climatic regions of the world, the world's largest mountain (Mauna Kea) as measured from the sea floor, and it is considered by many to be the endangered species capital of the world. Relatively few species adapted to inhabit the different climate zones which occur here along a continuous rainfall gradient, ranging from Hāpuna Beach, which receives just 7 inches of rainfall annually, to the summit of Kohala Mountain, which receives 180 inches of rainfall annually. The underlying rock is the same, yet there is tremendous variation among the species which evolved here. For example, Hawaiian honeycreepers evolved from a single common ancestor into a spectacular honeycreepers variety of species, as they adapted to inhabit a great range of habitats.

Hawai'i Island is a tremendously important resource in terms of global climate research. C. D. Keeling used measurements made right here on Mauna Loa Volcano to demonstrate an increase in atmospheric carbon dioxide over time. Keeling's study provided empirical evidence of the human-induced increase in greenhouse gas emissions over the past 50 years.

These measurements provide one of the clearest indications that humans aren't living sustainably on the planet, and Keeling's findings have had profound ramifications—transforming public policy and reshaping our worldviews.

Hawai'i Island is also a model for understanding cultural evolution. Many of the diverse societies that inhabit the Pacific have common Polynesian origins. Polynesian voyagers settled on islands that were very different, and over time their societies adapted to the unique conditions of each island—to enable the people to live more efficiently in each place. As they developed cultural traditions that were unique to this island, the Polynesians became Hawaiians.

The Hawaiian people were prodigious farmers who learned how to cultivate lands that most people could not have survived on. They developed irrigated wetland systems on the windward side of the island, as well as rain-fed dryland systems on the leeward side of the island. The Hawaiian people intensified agricultural production on this island through multiple strategies, and they sustained their productivity for centuries on very rugged lands. Though scientists cannot be sure exactly how large the pre-contact population of this island was, they do know that there were many more people living on this island 250 years ago than there are today and that this large population sustained itself here for generations.



Consider this:

"Hilo Bay from the Wailuku River to Leleiwi Point is one giant underground spring, feeding up to a billion gallons of fresh water into the ocean every day. Hilo only uses perhaps 2% of the available water, making the watershed one of the most productive in the world."

—Professor James Juvik, Geography, UH Hilo

The Hawaiian people had, and continue to have, deep and intimate relationships with, and understandings of, the natural world. They understand the cycles of the environment which are important to their survival, and they understand what it means to live in unity with these cycles. As we seek to develop solutions for the future of Hawai'i Island, there are many lessons we can draw from the *ahupua'a* (traditional Hawaiian land division) system. This system was based on a profound interconnectedness with the land and on the understanding that whatever people did on the land affected what happened in the ocean.

Professor Peter Vitousek, Population and Resource Studies, Stanford University

These islands were their world: the Hawaiians weren't importing anything and their energy source was their muscles. The Hawaiians should serve as a model for us as we look for ways to live sustainably on this land. We are still working to discover what they knew about agricultural cultivation that we don't know today. The greatness of the land, the greatness of the life on the land, and the greatness of the culture that developed here are the kind of greatness that appeals to scientists. The measurable results that were achieved here on Hawai'i Island are greater than what we are achieving today.

The legacy of groundbreaking environmental research on Hawai'i Island is ongoing. By studying the lava flows on this island, scientists are beginning to understand how climate shapes ecosystems. By analyzing different lava flows on the island which are exposed to different temperatures, they are studying the consequences of higher temperatures. What they are seeing is that as it gets warmer, the rate of decomposition of plant and animal life outpaces the rate of production of new life. As global temperatures rise, it's possible that ecosystems will feed back to reinforce that change. If rising temperatures intensify the rate of decomposition which occurs naturally in the soil, this could cause an increase in the greenhouse gases that are being released from the soil. Here on Hawai'i Island scientists are working to understand how these complex feedback loops operate and how they will impact our island and our planet.

Professor Louis Derry, Earth and Atmospheric Sciences at Cornell University, is a biogeochemist who specializes in studying the evolution of soil in various locations. In Hawai'i, one would expect the soil to lose its fertility over time, as the rocks weather and essential minerals such as potassium and calcium are leached from the soil. Yet, in fact, many of Hawai'i's older soils defy this prediction. Further research has confirmed that mineral-rich dust has deposited over about 3.5 million years across Hawai'i, and that this dust has its origin in central Asia, a fact that has been proven by the distinct chemical composition of the soils here. This interdependence between the geographically distant Hawaiian and central Asian ecosystems has set a new record for proven, long-distance interaction among global environments.

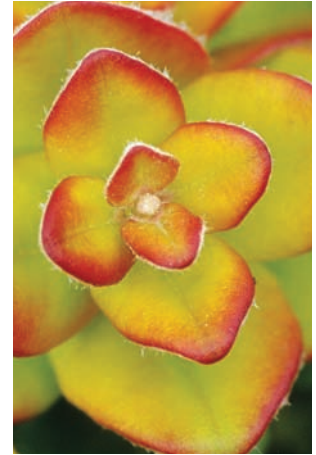


Professor Louis Derry, Earth and Atmospheric Sciences, Cornell University

This is how scientists like me actually work. Hollywood would have us all staring into space until a Great Thought pops into our heads. But that's usually not it at all—it's much more like working out puzzles, one piece at a time, and from time to time you get enough pieces that a whole section comes together and you say 'aha.' In fact, the puzzle analogy is pretty good, because this kind of work is slow and methodical—we work on the edge pieces first, and look for patterns and so forth.

THE HEART OF THE MATTER

When we started our work eight years ago, we could not have imagined the path that has unfolded before us. By fully acknowledging the Island of Hawai'i as a remarkable source of knowledge for the world, we have successfully expanded our network of partners to include an impressive array of public, private, and independent sector institutions from Hawai'i and abroad. By introducing each and every off-island partner to the richness of the Hawaiian cultural and natural landscape, we have broadened their worldviews and enriched the global knowledge economy with indigenous ideas, perspectives, and approaches. In return, our colleagues from abroad have intensified their commitments to serve island communities, to protect endangered island landscapes, and to work together with us to enhance the health of our land and of our people.



Consider this:

Included in The Kohala Center's network of project and program partners are, among others:

Hawai'i Community College

Massachusetts Institute of Technology

Edith Kanaka'ole Foundation

School of Forestry and Environmental Studies at Yale University

University of Hawai'i at Hilo and Mānoa

Cornell University

County of Hawai'i

Brown University

Hawai'i Institute for Marine Biology

The Andrew W. Mellon Foundation

U.S. Forest Service at Hilo

Kohala Watershed Partnership

Ulupono Initiative

Redlands Institute

Ka 'Ahahui o ka Nahelehele

Montana State University

Institute for Advanced Studies, Waseda University, Tokyo, Japan

University of California at Santa Barbara

State of Hawai'i Department of Education

Hau'oli Mau Loa Foundation

Institute for Social Ecology, Vienna, Austria

Center for Conservation Research and Training at UH

Kamehameha Schools

National Oceanic and Atmospheric Administration

Hawai'i Preparatory Academy

Stanford University

Rocky Mountain Institute

We began our work by identifying scientists and institutions that were already working on the island—hoping to facilitate their work and to engage them as partners. We met with scientists like Professors Louis Derry of Cornell University and Oliver Chadwick at the University of California at Santa Barbara to see how we could be of assistance to them, and conversely, how they could be of assistance to us as we sought to strengthen the education and research sectors on the island. Programs like the Cornell University Field Program in Earth and Environmental Systems developed out of these initial conversations. The Cornell Field Program is a semester-long introduction to the geology, marine biology, terrestrial environments, biogeochemistry, and cultural landscapes of Hawai'i Island.

Year by year, new offshoot programs have sprung up, such as the Cornell-Hawai'i Graduate Field Research Laboratory, which brings a dozen or more doctoral-level students to the island every other January. The Cornell students work with UH Hilo students to conduct intensive research in our forests, our coastal ponds, and our nearshore waters. The 2009 team of Cornell graduate students and UH Hilo undergraduates have co-authored three scientific papers: one on the adaptive behavior of native shrimp in response to the introduced fish which have invaded their anchialine pond habitats, one on the distribution patterns and effects of gall wasp infestations on native *wiliwili* trees around Waikoloa, and one on the relationship between man-made terrestrial disturbances and coral reef disease along the west coast of Hawai'i Island.



One Cornell graduate student, Courtney Couch, is now engaged in a multi-year study of the prevalence and potential contributing factors to coral reef disease at eleven sites along the coast of West Hawai'i. And, while she is here, Courtney is working with Kohala Center staff and our university and research agency partners to develop a “ridge-to-reef” research program at Kahalu'u. She is also working with elementary students to teach them about marine biology, the scientific method, and how to design and implement their own independent research projects through our HI-MOES (Hawai'i Island Meaningful Outdoor Experiences for Students) Program.

**Professor Charles Greene,
Director of the Ocean Resources and Ecosystems Program, Cornell University**

The Kohala Center and its staff have inspired me to rethink the way I do my science. By opening up many doors, they have shown me what a remarkable place Hawai'i Island is for studying the interactions among the ocean, atmosphere, and solid earth. At the same time, they have taught me to appreciate the culture and environmental ethics of the Native Hawaiian people. During the past five years, Matt Hamabata has encouraged me to think big and envision scientific projects that can utilize Hawai'i Island's natural and human resources while simultaneously giving back to the local community. I am committed to learning as much as I can about this very special place and sharing my knowledge with students of all ages. At Cornell, I am thought of as a teacher first; here, I am a student first and then a teacher.



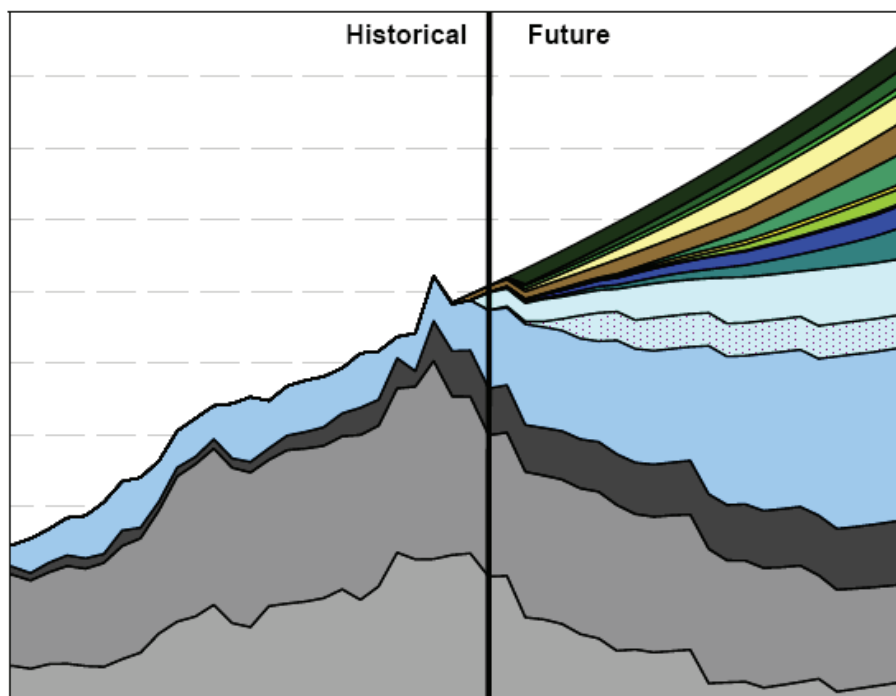
Our partnership with Cornell has also led to the creation of our annual scholarship opportunity for island high school students to attend the CATALYST Engineering Academy at Cornell's campus in Ithaca, New York. Cornell helps to sponsor these scholarships, which include full tuition for two island students, as well as reimbursement of their travel expenses. These scholarships, along with scholarships for island youth to attend Brown University's Environmental Leadership Lab held on Hawai'i Island and in Rhode Island, are co-sponsored by the Earl Bakken Science and Engineering Scholarship Fund. Our partnerships with Cornell and Brown are just two examples of how our work has led us, step-by-step, toward an important goal: to build bridges to the very best universities for island youth by creating meaningful educational opportunities right here on Hawai'i Island. Supporting these partnerships also creates meaningful work for island residents—involving professionals who range from curriculum specialists, geographers, and biologists to Hawaiian cultural experts and indigenous scientists.

Over the years, we have found ourselves more and more often in the position of crossing the boundaries between discrete disciplines—scientific, social scientific, humanistic, and cultural—in our efforts to generate solutions to island challenges. Early on, Western and Hawaiian scientists and scholars crossed those boundaries with island residents and leaders. They recognized that human and natural systems on the island are inextricably intertwined, and in order to promote the health of the land and of our people, our work must consider both systems as one—a deeply Hawaiian perspective.

For example, erosion and unsustainable land management practices on the slopes of our mountains contribute to eutrophication and loss of our coral reef habitats. Research produced by our partners who operate locally and who come from abroad made it clear that our ability to sustain coral reef resources for the benefit of future generations was dependent upon our ability to understand how human actions upslope influence the health of our reefs. In short, we needed to bring our discrete worldviews of these overlapping systems together—to create an integrated understanding of the way the natural and human systems on Hawai'i Island interact. We knew that indigenous knowledge had much to offer and that we needed to bring such knowledge together with Western sources of knowledge. And we needed to do this now, to balance our demands on the environment with the ability of the environment to regenerate.

Our efforts at formal, systemic analyses began in earnest with Professor Marian Chertow of the Industrial Environmental Management Program at Yale University. Chertow is one of the nation's leading experts in the subject of trash. With the impending closure of the Hilo landfill, the need for a high-quality analysis of the waste management systems on the island seemed to make good sense. Chertow's students prepared just such an analysis, as well as recommendations for areas in the current system which could be improved upon. What we saw was the need to more effectively deal with our green waste. By viewing green waste as agricultural inputs, we could significantly reduce the volume of waste ending up in our landfills and provide a local source of mulch. We began to provide information to the County of Hawai'i about solutions that are low-cost and low-tech. Read the full waste study at http://www.kohalacenter.org/pdf/waste_mgmt.pdf.

Next, we brought partners at Yale together with energy experts at the County of Hawai'i's Department of Research and Development to study energy systems on the island. The resulting energy plan recommendations have generated measurable results, through legislation enacted by the Hawai'i County Council that was based specifically on these recommendations, and through lively discussions with policy leaders at the State and U.S. federal levels—discussions which are now resulting in fundamental changes in the regulatory landscape for the entire State of Hawai'i. The image of the number of oil barges it would take to feed our oil addiction through the year 2030, an image that was produced as part of the study that led to the development of the County of Hawai'i Sustainable Energy Plan, made us all stop and rethink our current path. This energy plan and the discussions which it sparked have helped to lead the way toward greater energy independence for our island and for our state. Read the full energy study at http://www.kohalacenter.org/pdf/analysis_and_recommendations.pdf.



Then we looked at food systems on the island with our partners at the Rocky Mountain Institute. What we saw made us very insecure: less than a ten-day emergency food supply and an unhealthy reliance on imported foods. Again, we were forced to stop and rethink our reliance on barges to bring us the most basic necessities of life. Read the full food study at http://www.kohalacenter.org/pdf/hi_wsp_2.pdf.



Ezekial Fugate, doctoral student at Yale University, currently working on the LIEM-Hawai'i study

I think it is safe to say that education holds a ton of potential for changing folks for the better. I'm not talking classroom education, I'm talking awareness, I'm talking understanding what you're doing both when you're doing it and afterwards. For example, there are tons of substances entering and leaving our bodies every day, but we have a very limited idea of what they are and where they came from. Nutritional and ingredient labels were established to inform people about this very thing, but how many people do you know who not only read the list of ingredients, but monitor their consumption patterns and track these "foods" back to their source? We are deeply entrenched in a food system that we as individual agents know very little about. So why don't we change this? Why don't we show the system to itself and turn on our reflexive powers? By mapping out the whole system, we could really catalyze action by exposing and closing some of the myriad loops that we are enmeshed in. The fact of the matter is that we can and do change.

Systemic linkages also became apparent when we looked at water usage. We saw that the Department of Water Supply is the biggest energy consumer on the island, due to the energy required to pump ground water from its source to customers around the island. By transitioning from ground water to surface water where appropriate, we could recognize significant energy savings. We saw that we could reduce the demand for potable water used in agriculture if we were to utilize grey water for irrigation. And finally, we saw that by irrigating a relatively small percentage of our available agricultural land, we could substantially increase our local supply of fresh produce.

Consider this:

A 2008 study conducted by the University of Hawai'i College of Tropical Agriculture and Human Resources concluded that, "If we could replace just 10% of imported foods, assuming we have the available and appropriate resources and infrastructures for such an expansion, it would amount to some \$313 million, or \$94 million at the farm-gate, assuming a 30% farm share. Taking into account the multiplier effects, this \$94 million would generate an estimated economy-wide impact of \$188 million in sales, \$47 million in earnings, \$6 million in State tax revenues, and more than 2,300 jobs. This is not a trivial amount." Hawai'i County, with 64% of the agricultural land in the state, has the potential to capture between 40% and 50% of the increased sales, earnings, and jobs which would be generated. Simply put, by growing more of the food we eat, we can significantly contribute to overall economic growth for the island. Read the full study at <http://www.kohalacenter.org/pdf/FoodSelfSufficiency%20Report12-08.pdf>.

Our food, energy, water, and waste management systems are inextricably linked, and in order to sustain ourselves into the future, we need to understand the whole picture—how these systems interact and how we can effectively and intelligently manage them to support the health of the land and of our people.

Richard Ha, Kohala Center board member

When oil prices hit \$147 per barrel last summer, it became apparent that the world had changed. The Kohala Center is in the forefront of doing the things that will help us who are living on an island, in the middle of the Pacific Ocean, adapt to a changing world.

By puzzling our way forward, piece by piece, we have come to the heart of the matter—the need to generate the best possible data and analyses to help guide our decision makers as they chart our future. By including everything: public policy, ethics, agronomy, hydrology, forestry, soil science, ecosystem science, landscape architecture, transportation science, transportation oriented planning, cultural and political history, and so on—we are hoping to better understand our history of land and people and identify practices that will lead us into an immediate future of sustained abundance.



A GOOD BUSINESS

While many island businesses are downsizing and reducing their work force in response to the lagging economy, The Kohala Center is growing. In the past year, we have doubled our staff and our payroll, and we've expanded the pool of independent contractors who work with us. In the past four years, The Kohala Center has grown from a staff of four to a staff of 36, and our payroll in this community now is about \$1.2 million annually in "new to the community" income, not just community income redistributed. Our contract costs for independent contractors are about equal to our payroll.

We had an operating budget of about \$1 million in 2006–2007, \$2 million in 2007–2008, \$2.6 million in 2008–2009, and expect \$4.2 million in the current fiscal year (FY 2009–2010). More than 80% of this income is spent on-island through our employees and our use of independent contractors and local vendors.



James Takamine, Kohala Center board member

It's great to see a nonprofit run like a good business. The staff has kept its eye on the "market," i.e., the needs and wishes of island residents, and has figured out a way to meet those needs. The staff also understands that as needs are addressed, they develop and change, thus opening up further opportunities to serve. Through this process, The Kohala Center as a nonprofit business has grown in a few short years from no employees to a thriving organization that employs 36. The Center is now an important business in our island economy.

BUILDING FRAMEWORKS FOR SUCCESS

When we look at our public education system on Hawai'i Island, there is consensus from the top down that the system needs to change. Federal evaluators tell us that too many of our public schools are not meeting annual yearly progress standards set forth in the *No Child Left Behind Act*. State-level administrators and legislators are struggling to maintain adequate funding for our schools in light of greatly diminished revenues. The recent imposition of “Furlough Fridays,” which attempts to cut costs by eliminating 17 instructional days at public schools statewide, has resulted in a 163-day school year—the fewest number of instructional days in the nation. Hawai'i students now spend only about 45% of the year in school. Teachers are expected to cover the subject matter curriculum in fewer days; students are expected to master the curriculum with 10% less time in school; and parents are faced with finding safe, affordable, and meaningful activities for their children every other Friday. Everyone agrees that we can—and should—do better for our children.



When we take a systemic look at our education system, we can begin to identify areas of need and strategies that seem to be working to address these needs. We can identify best practices at model schools, which we can then replicate at neighboring schools to build networks for sharing effective curricula and teaching styles. By systematically identifying, studying, and sharing best practices amongst schools, we can build frameworks within the education system that will help to ensure student success. Like all of our work, this is a long-term effort—and one which we are deeply committed to—school by school, classroom by classroom, teacher by teacher, and student by student.

Marni Herkes, Kohala Center board member

Through our work, The Kohala Center strives to empower the people of Hawai'i Island to make decisions that are *pono* (right) for them. To arrive at this result, the Center conducts research, documents findings, promotes education, and engages the broader community in discussions that lead to *pono* decisions—which, in turn, lead to an improved quality of life.

Just six years ago, when we launched the Hidden Jewels Program at Kohala Elementary School, the State of Hawai'i had not yet adopted science standards at the elementary school level. The situation at Kohala Elementary School was typical of most elementary schools on the island: there was no formal science education in the community's sole public elementary school, no formal science curriculum or training for teachers, no special science materials or facilities, no linkages between science and math or science and literacy, and no after-school educational enrichment programs for elementary-age children in the community. When we conceived of the Hidden Jewels (HJ) Program, our goal was simple—to instill curiosity and a love of learning in as many students as possible, with an emphasis on science.

We started with a master science teacher, Susan Lehner; a master artist, Peter Kowalke; a receptive second grade teacher, Calin Duke; and a small start-up grant from supportive members of the North Kohala community. Once again, we could not have imagined how this program would blossom over the course of the last six years to incorporate all students in grades 1–5. The HJ Program has transformed Kohala Elementary School and the role of science within this school. HJ has developed a place-based, relevant, and integrated elementary science curriculum for grades 1–5, a curriculum which we have now published and are sharing with other schools on the island. HJ lessons reinforce scientific thinking by consciously linking scientific concepts to literacy and math concepts. Science learning is further enriched through project-based art lessons. In spring 2009, the school’s new Science Center was formally dedicated and opened its doors to students, where it serves as the focal point for science learning and for a variety of HJ-sponsored after-school enrichment activities for students. Our long-term goals are to integrate the HJ curriculum into all the disciplines—language arts, math, social studies, and art—and to develop the capacity for classroom teachers to implement the program by themselves, under the mentorship of the master science teacher.



HJ is a model program with elements that we can replicate as we work to transform science education in schools around the island. The Hidden Jewels curriculum focuses on concepts students can observe or study here in Hawai‘i, how they relate to their lives on the island, and how they relate to the larger world in general. All HJ subjects are things that the children either see or hear of on a daily basis, and the HJ units focus on the forest, the ocean, the Earth, and the sky. This place-based curriculum can be implemented at any school in Hawai‘i, and The Kohala Center is working to create linkages with other island schools.

Kohala Elementary School Principal Elanor Laszlo, interviewed by Joann Hoffman, Ph.D., independent evaluator for The Kohala Center, on June 22, 2009

I think the thing that really helped the teachers was when Susan Lehner formalized the HJ curriculum. She was able to align her lessons with the Hawai‘i based standards and give that hand drawn document to the teachers. With Susan’s concrete guide in their hands, the teachers can take off. Teachers are learners too, so if you can give them examples and show them what to do, they take off. They are all pretty smart people, they just need to develop their confidence in teaching science. Ultimately, we might see an improvement in the students’ science test scores because teachers are doing authentic assessment of science now.

Elementary schools in the Hilo Intermediate Complex are currently replicating some elements of the Hidden Jewels curriculum in their classrooms, as part of the *Frameworks for Science Success (Frameworks)* Project. The Kohala Center was approached to partner with these Hilo elementary schools in an innovative Math Science Partnership program which started in March 2009. The *Frameworks* Project will receive nearly \$500,000 in grant funds over the next three years to bolster science education at the six elementary schools within the Hilo School Complex.

A new science test was part of the battery of tests administered to public school students across the state for the first time in 2008. Many Hawai'i Island schools did not meet state standards in science testing last year, and administrators and teachers at these schools are now focused on improving test scores. Hilo Complex Hawai'i Statewide Assessment (HSA) science test scores demonstrated deficiencies at both the 5th and 7th grade levels. The *Frameworks* Project will engage K–6th grade teachers from within the targeted elementary schools to develop a common and viable science curriculum for the Hilo Complex schools.

The elementary science curriculum will be designed by a professional learning community of teachers from within the complex, in consultation with master science educators and with university and nonprofit partners. This collaborative effort is being spearheaded by Pascale Creek Pinner, a recognized leader in science education and a faculty member at Hilo Intermediate School. The *Frameworks* Project will bring resources and faculty from The Kohala Center, UH Hilo, the Project Aims Education Foundation, as well as DOE curriculum specialists, together to work with the Hilo Complex elementary teachers on improving science education in their classrooms. MSP funding will provide professional development sessions for teachers in grades K–6 to encourage these teachers to utilize resources beyond the textbook to provide students with engaging, interdisciplinary learning experiences.

The expected outcomes of the *Frameworks* Project are to increase both the quality and quantity of science instruction in the elementary grades, to improve student achievement in science, to promote the integration of science across content areas, and to create a framework that will sustain ongoing improvement of teachers' professional practices in science. *Frameworks* partners share a common vision of bolstering science education for island youth—since they are our future leaders.

Pascale Creek Pinner, 2008 Hawai'i State Teacher of the Year

It has been my long-term dream to help my colleagues at the elementary level integrate science into their curriculum. Creating an opportunity for elementary teachers to become immersed in not only the content, but also the inquiry skills used by scientists, is so important. If students have positive experiences doing science throughout their elementary years, the more abstract and difficult concepts of science will not intimidate them, and they will soar forward in math and science well into high school and college.

To engage our future scientists and environmental leaders, The Kohala Center partnered with Hawai'i Preparatory Academy (HPA) to co-host the second annual Student Congress on Sustainability in June 2009. Seventy-five high school students from Hawai'i Island, Maui, and O'ahu congregated at HPA for four days, to learn about initiatives to help green the planet,



their communities, and their lifestyles. Students lived on the HPA campus and attended workshops on sustainable agriculture, electric cars, biofuels, home energy audits, protecting coral reefs, hydrogen fuel cells, and other topics. Students also had the opportunity to visit sites around the island to learn about local food production and hydroponics, vanilla and chocolate production, and goat cheese operations. Students departed with renewed energy and ideas for how to implement change back at their home schools and in their own lives. At least two students who attended The Kohala Center’s “What is your Ecological Finprint and Coral Reef Management” workshop and the excursion to Kahalu’u Bay have now volunteered as ReefTeachers.

This month, October 2009, The Kohala Center kicked off its HI-MOES (Hawai’i Island Meaningful Outdoor Experiences for Students) program. Over the next few months, expert scientists will be visiting school groups and educating them about human impacts on the marine and terrestrial environment and about the importance of science and the scientific method in general. In January, the scientists will assist students with development of independent research projects and methodology.



Laura Jim, HPA Middle School Science Educator

I wanted to share a few thoughts from our field trip to Pu’u o ‘Umi. This field trip was an introduction to our HI-MOES project with The Kohala Center and Kohala Watershed Partnership. Upon entering the rainforest, students sang a Hawaiian chant—setting the stage for our entrance into this very important place. Students were told to imagine themselves as members of a National Geographic expedition whose mission was to make observations about the environment around them. After a short hike, the students spent about ten minutes of quiet time to use all five senses and recognize the world around them. We were visited by native birds, heard the flow of a nearby stream, smelled the earth, etc. Then, Melora Purell, Director of the Kohala Watershed Partnership, shared some information about how field ecologists seek to find answers and ask questions based on their observations. Homework was to create a poem of their sensory experiences. This is one 7th grader’s poem:



*I heard the birds weave patterns into their song.
I touched the fern curl about to open.
I tasted the moist air on my tongue.
I smelled the newness of it all.
I saw life spring up around me.
I wondered if this was the way it was meant to be.*

Consider this:

In 2008–2009, The Kohala Center's education programs served several thousand learners, from children to adults, at sites around the island. Here are some of our participant counts so far this year:

- *Hawai'i Island School Garden Network: 47 schools island-wide*
- *ReefTeach Program at Kahalu'u Bay: 1,200 K–12 students through its coral reef health program plus 360 volunteers*
- *Hidden Jewels at Kohala Elementary School: 320 K–5 students plus 100 after school students*
- *Frameworks Project at Hilo Complex Schools: 540 K–6 students*
- *HI-MOES Program: 560 students in grades 5–12 & 14 teachers*
- *Student Congress on Sustainability: 75 high school students*
- *Waimea Nature Camp: 146 children*
- *Brown University Environmental Leadership Lab: 32 high school students*
- *CATALYST Engineering Academy: 2 high school students*
- *Cornell Field Program in Earth and Environmental Systems: 14 undergraduate students*
- *Cornell-Hawai'i Graduate Field Research Laboratory: 14 graduate students from Cornell plus 2 undergraduate students from the University of Hawai'i at Hilo*
- *Montana State University Preliminary Design Plan for Kukai'au Ranch: 6 graduate students*
- *Colorado College Program in Environmental Sociology: 12 undergraduate students*
- *Yale University's Center for Industrial Ecology LIEM-Hawai'i Project: 15 graduate students*
- *Puana Ka 'Ike Lecture Series: 1,100 learners*
- *County of Hawai'i Agriculture Development Plan Public Listening Sessions: 135 island residents*
- *The Kohala Center's Member Events: 54 learners*



THE DEVELOPMENT OF NEW KNOWLEDGE

In 2008, through the generosity of The Andrew W. Mellon Foundation and Kamehameha Schools, the Mellon-Hawai'i Doctoral and Postdoctoral Fellowship Program was established at The Kohala Center. This program provides fellowships to Native Hawaiian scholars whose research is about Hawai'i's natural and cultural landscapes or about Hawai'i's history, politics, or society. The Mellon-Hawai'i Fellowship recognizes Hawai'i's leading thinkers and writers, many of whom are at the start of their careers. We have great expectations for these Fellows, as they work to develop new knowledge about the Hawaiian Islands.

Before we introduce this year's Fellows, we'd like to provide some historical context to illustrate the significance of the Fellowship Program itself.

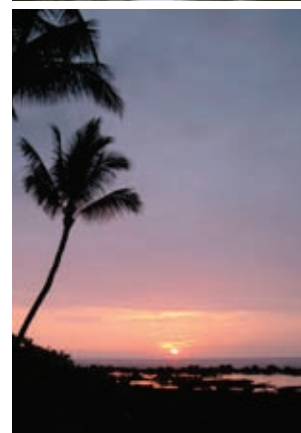
Consider this:

Twenty years ago, there were fewer than forty children speakers of the Hawaiian language. The 'Aha Pūnana Leo program, through its Language Nest Preschools, has helped to save the Hawaiian language from extinction. Today, there are over 2,000 children speakers. Visit <http://www.ahapunanaleo.org/eng/index.html> for more details.

The Hawaiian Studies program at the University of Hawai'i at Mānoa was formed in 1970 under the College of Arts and Sciences in the Liberal Studies interdisciplinary program. By the summer session of 1974, twenty-seven students had graduated from this program. In July of 1987, the Board of Regents of UH approved the establishment of the School of Hawaiian, Asian, and Pacific Studies. This action also established the Kamakākūokalani Center for Hawaiian Studies. Between the years of 1980 to 1993, 146 majors graduated. Since 2000, the number of graduates has fluctuated from year to year with approximately 25 per year. The Master's Degree Program was established just five years ago, in 2004. In 2007, one M.A. degree was awarded; in 2008, one M.A. degree was awarded; and in 2009, two M.A. degrees were awarded.

Ka Haka 'Ula O Ke'elikōlani College of Hawaiian Language at the University of Hawai'i at Hilo conferred its first undergraduate degree in 1982. In 1982, there were about a dozen Hawaiian Studies majors. In 2009, Ke'elikōlani College has 150 majors in undergraduate and graduate programs. This semester (fall 2009), 937 students—many from other Colleges and fulfilling University General Education requirements—are enrolled in Ke'elikōlani College's Hawaiian Studies and Linguistics courses.

Ke'elikōlani College has four graduate programs: Kahuawaiola Indigenous Teacher Education Program, M.A. in Hawaiian Language and Literature, M.A. in Indigenous Language and Culture Education, and the Ph.D. in Hawaiian and Indigenous Language and Culture Revitalization. Started in 1998, the M.A. in Hawaiian Language and Literature is UH Hilo's first graduate program and graduated its first student in 2002. Started in 1998 as a post-baccalaureate program, Kahuawaiola has only recently been reclassified as a graduate program. The Ke'elikōlani Ph.D. program is the only one like it in the world—UH Mānoa has an M.A. in Hawaiian Language and one in Hawaiian Studies but no Ph.D. program yet.



The Mellon-Hawai'i Fellowship Program is helping to foster a new generation of credentialed Hawaiian academics/intellectuals.

The Mellon-Hawai'i Fellows are bilingual scholars who are immersed in Hawaiian intellectual traditions. These individuals are able to refer to original sources—Hawaiian literature, historical documents, newspapers, and chants—and interpret them in a whole new light, through the lens of Hawaiian interpretive traditions. In so doing, these scholars are transforming our understanding of Hawaiian literature, Hawaiian history, the ahupua'a system, and contemporary society. The implications of their work in the fields of archaeology, education, political history, comparative literature, and land management, among others, are profound. The Mellon-Hawai'i Fellows are helping to ensure that Hawaiian knowledge—local knowledge—is preserved and shared with learners here on the island and around the globe.

Robert Lindsey, Jr., Kohala Center board member

I want to thank my colleagues Drs. Shawn Kana'iaupuni, Pua Kanahele, Jim Kauahikaua, and Dennis Gonsalves, as well as Matt Hamabata and his staff at The Kohala Center for the time, energy, and commitment they have made to our Mellon-Hawai'i Fellowship Program. We have the tough task of deciding who gets to receive a Mellon-Hawai'i Fellowship. I know I speak for the Committee in saying we wish we could give everyone who applies an award, but that is just not possible based on present funding levels. We are very grateful to our donors, The Mellon Foundation and Kamehameha Schools, for making it possible for some of our best and brightest Hawaiian Scholars to take their scholarship to the highest level possible.

The Kohala Center congratulates our second cohort of Mellon-Hawai'i Fellows for 2009–2010: (pictured left to right) Dr. Karin Ingersoll, Dr. Ku'ualoha Ho'omanawanui, and Ms. Kauanoe Kamanā.





Ku'ualoha Ho'omanawanui

Postdoctoral Fellow, Ph.D. in English (2007), Department of English, University of Hawai'i at Mānoa.

Book title:

"Dancing on the Page: the Pele and Hi'iaka Literature (1860–1930)"

Because there are so few people working on Hawaiian literature in a serious research capacity, my work is definitely contributing to how Hawaiian literature is understood and to why it is important to understand. Here is one example of what I mean: I've talked to Hawaiian women in domestic violence programs, teen drug rehabilitation programs, foster care programs, and those who have attempted suicide and been locked up in the mental hospital about the lessons we can learn about *mana wahine* ("female power") and Hawaiian literature. The character Hi'iaka overcame all obstacles with her *ike* (intelligence) and *leo* (voice)—not with guns nor any other means of protection. Our stories demonstrate that we are beautiful, intelligent, life-loving people, and we need only be reminded of that to begin to set ourselves on a better path. I know these talks I have given have changed lives.



Karin Na'auli'i Amimoto Ingersoll

Postdoctoral Fellow, Ph.D. in Political Science, Department of Political Science, University of Hawai'i

Dissertation title:

"Seascape Epistemology: Decolonization within Hawai'i's Neocolonial Surf Tourism Industry"

My concept of seascape epistemology is an approach to knowing presumed on a knowledge of the sea, which tells one how to move through the sea, how to approach life and knowing through the movements of the world. I believe seascape epistemology offers a way of thinking for contemporary Native Hawaiians that is rooted in our genealogy and culture. It is an alternative literacy that is relevant to our region, and it is a literacy that has been marginalized by colonial notions of literacy. I hope that my concept helps to encourage a multi-sited understanding of literacy as a complex and constantly evolving skill embedded in interwoven sets of knowledges.



Kauanoe Kamanā

Doctoral Fellow, earning a Ph.D. in Hawaiian Language and Indigenous Language and Culture Revitalization at the College of Hawaiian Language, the University of Hawai'i at Hilo

Dissertation title:

“Ke Ō O Ka ‘Ike Ku‘una Ma O Ka Mo‘oki‘ina Ho‘oponopono Ma Ke Kula ‘O Nāwahāokalani‘ōpu‘u: Living Traditional Culture through the Contemporary Application of the Conflict Resolution System, Mo‘oki‘ina Ho‘oponopono, at Ke Kula ‘O Nāwahāokalani‘ōpu‘u School”

The mo‘oki‘ina ho‘oponopono is a Hawaiian system that is in place at Nāwahāokalani‘ōpu‘u School and which can be relevant in other places as well. The context that enables it to be successful is the overall culture of the school. The mo‘oki‘ina ho‘oponopono functions as part of that culture and facilitates the improved interpersonal productivity of its participants. As a Hawaiian process, it is part of a network of systems that reflect a Hawaiian worldview. It cannot function alone. Teachers, staff, and families take on responsibilities in ways that reflect a Hawaiian worldview. Some examples include attaining a level of quality in terms of leadership and trusting a leader, giving one’s best effort in beginning and completing an activity, and respecting genealogical order and responsibility. Students who are surrounded with adults who behave and respond in these ways will grow up and emulate these understandings.

NEW LIFE AT KAHALU'U BAY

In November 2009, The Kohala Center hosts its third annual Bay Concert: A Celebration of Life at Kahalu'u Bay. At last year's concert, more than 900 community members came together to celebrate the rebirth of Kahalu'u Bay—a beautiful jewel on the West Coast of Hawai'i Island. Over 360 community and visiting volunteer ReefTeachers and nearly three dozen island businesses offer their resources to educate visitors in how to enjoy the coral reef ecosystem in the bay without damaging it. Many of the ReefTeachers will join in the festivities at the upcoming Bay Concert, clad in their blue ReefTeach T-shirts. The positive energy for this project in the community is palpable, and an outpouring of support from island residents and from visitors is transforming Kahalu'u Bay into a focal point of hope for the future. Funds raised by the Bay Concert support the Kahalu'u Restoration Project, an ecosystem health project to restore the natural, cultural, and historic resources of this sacred ahupua'a.

Cindi Punihaole, Kohala Center Volunteer and Outreach Coordinator

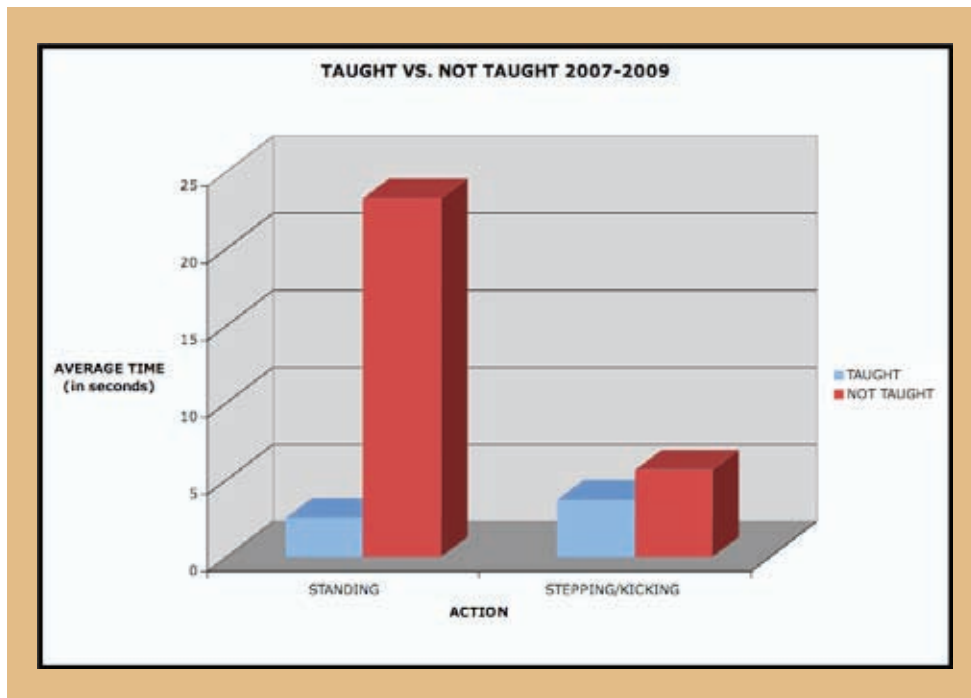
In the past year, we have trained over 400 volunteer ReefTeachers to educate our visitors on proper reef etiquette. Because of their dedication to our bay, baby coral polyps are beginning to grow. Now we are seeing so many babies: baby Moorish idols, baby yellow tangs, convict tangs, *humuhumu*, and coral polyps. *Kūpuna* (Hawaiian elders) are so happy that the cultural sites are being restored. We see healing happening at the bay, and we know that if it weren't for our volunteers and supporters this would not have happened.

Last year, 1.3 million people visited the Island of Hawai'i, and over 348,000 of these visitors stopped at Kahalu'u Bay. Kahalu'u Bay County Park is the premier snorkeling site for both visitors and residents on the Island of Hawai'i, receiving over 400,000 visitors each year. Its shallow protected waters make it an ideal place for beginning snorkelers to experience the vast diversity of life on a coral reef. The concern is that if we do not carefully manage this area, there is a very real danger that we will "love our bay to death." In 2008, a conceptual Master Plan (<http://www.kohalacenter.org/kahaluubay/restoration.html>) for Kahalu'u Beach Park was created, inspired by the vision of local *kūpuna* and embracing the wishes of park users and the community. "Though we have accomplished a lot at the bay, we still have a long way to go to fully implement this plan," explains Punihaole.

Five years ago, the University of Hawai'i Sea Grant extension agent in Kona, Sara Peck, initiated a program of educational presentations at Kahalu'u Bay by volunteer ReefTeachers. The Kohala Center stepped forward to facilitate the continuing community-driven efforts at protecting Kahalu'u Bay. From its inception, the ReefTeach Program has been wildly successful: data collected during and immediately after each teaching session has revealed that trampling damage caused by bay users standing on living coral was reduced by 93%. Community members have embraced the program, and local schools have adopted the ReefTeach program as classroom projects. The West Hawai'i Girl Scouts have even developed a merit badge around this effort.



In-water data collected continues to show the effectiveness of ReefTeach education. The statistics below record trampling behavior.



The ReefTeach Program provides brief but information-rich educational sessions informing visitors to the bay what they will see in the water, how the various ecological components of the reef ecosystem interact, and how to appreciate the bay's resources without harming themselves or the environment. By teaching visitors proper techniques for observing the reef through daily education sessions, the ReefTeach Program is helping to protect and preserve the environment at Kahalu'u Bay.

Carol Hermann, visitor from Madison, Wisconsin

What a wonderful day, it's like swimming in a fish tank! Thank you, ReefTeach, for sharing your knowledge. You're an absolute treasure!

All around us we see signs of positive change, signs that our bay and our community are becoming healthier. Snorkelers report that there are more baby coral polyps and fish in the bay now than there were just a few years ago. Over 100 community volunteers, including several visitors and several homeless people who frequent the park, joined together to renovate the facilities at Kahalu'u Beach Park, helping to repair and repaint the main park pavilion. Kahalu'u has become a hub for community activities and educational events, including the Coral Reef Awareness and Earth Day Festival, Hawai'i Preparatory Academy's Student Congress on Sustainability, the LavaKids Aquathon, and Snapshot Water Quality Monitoring Day. We are making a concerted effort to reach out to local businesses to participate as ReefTeach volunteers.

In 2009, twenty-one local businesses “adopted a day” at the park, with their employees volunteering for regular shifts as ReefTeachers. So far this year, sixteen schools have participated in the ReefTeach training. We have also worked with students participating in programs offered by the National Park Service, GEMS, Family Support Services West Hawai‘i, Jack’s Diving Locker Sea Camp, and the County Junior Lifeguard Program.

Hunter, ReefTeacher from Innovations Public Charter School, grade 6

I love ReefTeach! It’s so much fun teaching the people on the beach! My favorite part was when the people told our teacher how much we knew!



The majority of our new volunteers are students and young community members. Many of these volunteers are interested in helping to preserve the knowledge of their kūpuna and in protecting the natural resources of the bay. Recently, the Kona-Kohala Chamber of Commerce Environmental Committee also pledged their support for the Kahalu‘u Bay Project. Kamehameha Investment Corporation/Bishop Holdings, a major landowner of the Kahalu‘u Bay area, has provided financial support for educational activities at the park for the past three years, and the corporate leadership team has made a long-term commitment to the improvement and protection of Kahalu‘u Bay, a site which is central to their land holdings in the area.

Dr. Gregory Chun, Kamehameha Schools Kahalu‘u Keauhou Educational Group (Read Dr. Chun’s complete remarks at <http://www.kohalacenter.org/hawaiiislandsummit/chun.html>).

For the past six years we have been working on a model for development in Keauhou where culture and education are our value proposition and where we are exploring how to integrate indigenous perspectives into our development planning decisions. At Keauhou our ancient *heiau* (temples) are rising out of the sea. The restoration of our *wahi pana* (sacred places) provides a platform for regaining the wisdom of the land. Our Hawaiian kūpuna have become engaged in this process and they have become our teachers. Through them we are rebuilding our families.



Consider this:

On average, 250 people frequent Kahalu'u Bay at midday. All users of the bay are exposed to and have easy access to the natural resource information provided by ReefTeach. We estimate that about 80,000 people are exposed to ReefTeach educational materials annually. ReefTeachers directly interact with and educate an average of 86 people per day. From January through October 2009, ReefTeachers have educated 15,600 individuals at Kahalu'u Bay. Approximately 98% of these participants were visitors to the island, meaning that roughly 27,000 visitors participate in the ReefTeach Program annually.

Kahalu'u is a popular weekend destination for Hawai'i residents. The Kahalu'u Beach Park pavilion is rented for parties by residents almost every Saturday and Sunday throughout the year. With attendance at these gatherings averaging about 50 people per weekend day, an estimated 5,000 residents directly benefit from the ReefTeach Program and from our volunteer efforts to improve the quality of park amenities.

Earlier this year we launched the Citizen Science Program at Kahalu'u Bay, to complement the already thriving ReefTeach efforts. Citizen Science is both an ecosystem health monitoring program and a community education and training program. Citizen Scientists monitor temperature, pH, salinity, conductivity, turbidity, and dissolved oxygen in water samples collected twice weekly from five sites in the bay. Participants are responsible for collecting water samples using proper sampling protocols learned during their initial training. Samples undergo analysis for dissolved nutrient inputs on a quarterly basis at NELHA. Citizen Scientists also record observations about water clarity, tide level, and weather conditions, for further analysis in conjunction with the quarterly nutrient analyses. The Citizen Science Program is supervised by Michael Navatta, a chemist at NELHA, and by Cornell doctoral student, Courtney Couch, working under the supervision of Professor Drew Harvell, an internationally recognized coral reef researcher and head of the World Bank's Worldwide Coral Reef Project Coral Disease Team. The Citizen Science Program engages community members, including local students, in monitoring the health of the Kahalu'u-Keauhou Bay area and in collecting data and sharing information about water conservation. Over time, we are hopeful that this data can help to elucidate the relationship between development on land within the Kahalu'u ahupua'a and the nearshore environment.

Caroline Neary, Kohala Center Assistant Outreach and Volunteer Coordinator

Kahalu'u has been the center of a human community for at least 800 years. Residences, businesses, transportation networks, golf courses, and new construction all impact water quality. Working closely with the Hawai'i Department of Health and our partners at NELHA, we have identified a few, relatively basic characteristics of the water that we can measure to inform the community and decision makers on the health and resiliency of our ecosystem.

In just three years, The Kohala Center’s work at Kahalu’u Bay has evolved from a public outreach effort in the form of ReefTeach to a community driven water quality monitoring project with Citizen Scientists of all ages participating. Given our collective desire to understand more about the bay environment, we are delighted to be working with the Center for Conservation Research and Training at UH Mānoa, Edith Kanaka’ole Foundation, the Hawai’i Institute for Marine Biology, Kamehameha Schools, and Stanford University in thinking through a complete “ridge-to-reef” research and education program. In everything we do, we have a vision. In this case, we envision Kahalu’u ahupua’a as a wonderful place in which to live and learn about ways to enhance ecosystem health—from both Western and Hawaiian perspectives. Like everything we do, we are starting small. Our first step is to organize existing data and analyses and build the foundation for a data management system that could support research, educational, and outreach efforts about and for the health of Kahalu’u. As opportunities to expand this effort arise, we will work to build an ecosystem health program with a whole systems approach that operates across Western and indigenous worldviews.



The Kohala Center extends a heartfelt mahalo to each and every one of our students, community members, kūpuna, and visitors who have lent their hands and their hearts to bring new life to Kahalu’u Bay.

RESTORING PELEKANE BAY

“If you don’t fix the whole watershed, you lose the bay,” U.S. Senator Daniel K. Inouye said at the ceremony which officially launched the Pelekane Bay Restoration Project in August 2009. “We will provide jobs and in the process save the bay,” Senator Inouye said. “It’s a win-win.”

The Kohala Watershed Partnership was awarded \$2.69 million in federal funds to improve the condition of the Pelekane Bay watershed on the leeward coast of Kohala Mountain. The Pelekane Bay Watershed Restoration Project is one of two Hawai‘i habitat restoration projects selected for funding through a National Oceanic and Atmospheric Administration (NOAA) coastal restoration grant. NOAA received a total of \$167 million in federal stimulus funds, which it divvied up amongst 50 high priority projects designed to restore coastal areas around the country. The Pelekane Bay project was chosen from a pool of 814 proposals.

The goal of the project is to restore the coral reef habitat of Pelekane Bay by reducing land-based sediment inputs into the nearshore environment. Pelekane Bay was traditionally a sheltered place for young fish to grow and mature. The Pelekane watershed served as productive farmlands for Hawaiians and before that, forests covered the slopes of Kohala Mountain. Abundant sea life in the bay provided food for the people who inhabited the village of Kawaihae. With the introduction of exotic plants and animals, the *mauka* (upslope) watershed deteriorated. Now, with every heavy rainfall, sediments are dumped into the bay. This project will rehabilitate the mauka watershed through erosion control and by planting native vegetation to reduce the amount of sediment being carried into the bay—which should help to restore the coral reef habitat of Pelekane Bay.



The spirit of the Pelekane Bay project is massive. The groundwork for this effort has been ten years in the making, as many individuals and organizations have worked to collect data and create a viable watershed management plan. Fourteen new employees have been hired to serve as field crew and technicians to implement the 18-month ecosystem restoration project.

Melora Purell, Coordinator, Kohala Watershed Partnership

We know what needs to be done, and this funding is making it possible for us to accomplish our goal of restoring the watershed and the bay—all within a relatively short amount of time! We feel confident in the capacity of our new crew—they are strong, willing to learn, and eager to do good work for the 'āina.



The Kohala Watershed Partnership was also awarded two Americorps/Recovery Conservation Corps positions for September 2009 through August 2010. These positions are funded by the U.S. federal government as internships. At the end of their term of service, interns receive an educational award of \$4,700 which can be used for post-secondary education expenses. The two interns are working with KWP staff on protecting and managing the forested watershed of Kohala Mountain through weed control, fence building, feral animal control, surveys, growing and outplanting native plants, and trail/fence maintenance projects.

Consider this:

The Kohala Center is a partner in the following ecosystem health projects:

Kohala Watershed Partnership – Management of the 65,000-acre forested watershed of Kohala Mountain, including Pelekane Bay.

Kahalu'u Bay Project – Restoration of the natural, cultural, and historic resources of the Kahalu'u ahupua'a, including Kahalu'u Bay (which encompasses approximately 65,000 square meters of land).

Coral Health Surveys – Monitoring of 11 sites along the coast from Waiaka'ilio Bay to Hōnaunau (an area spanning 82 kilometers of coastline). In the course of this research, the health of 2,300 square miles of coral reef will be surveyed and assessed.

Cornell-Hawai'i Graduate Field Research Laboratory – Terrestrial (invasive species effects on dryland forests); freshwater (control of invasive species and preservation of traditional opae'ula anchialine ponds); and marine (coral community structure and disease prevalence) projects island-wide.

Long-Term Industrial Ecosystem Model - Hawai'i Island (LIEM-Hawai'i) Project – Hilo (encompassing 58.4 square miles) and Kailua-Kona (encompassing 39.8 square miles) are being studied in the first phase of this long-term project. The initial studies will monitor material and energy flows, as well as spatial patterns that have emerged as a result of urban growth in these two cities. These studies are being completed as components of a larger scale study, LIEM-Hawai'i, that will monitor the stocks, flows, use, loss, and driving forces of resource use for the entire island of Hawai'i.

THE FUTURE

Resource management issues are of critical concern for Hawai'i Island, which imports approximately 85% of its food supply and approximately 90% of the fuel used for electricity generation and transportation. The island has less than a ten-day supply of food in reserve and the highest electricity rates in the country. The Hilo landfill that services the entire east side of the island has exceeded its capacity, and there is some resistance to trucking waste cross-island to the landfill in West Hawai'i.

The current economic recession has brought us face-to-face with the challenges of sustaining a "modern" lifestyle on Hawai'i Island, a lifestyle which is heavily reliant on imported food and energy. We are also grappling with the limits of the island environment to absorb the impacts of this lifestyle of dependence. How can we create a viable local food system? How can we generate energy to power businesses, our homes, and our vehicles? How should we deal with our garbage?

These are the sorts of challenges that the Long-Term Industrial Ecosystem Model - Hawai'i Island (LIEM-Hawai'i) Project will seek to address. LIEM-Hawai'i is a long-term research project based on Hawai'i Island and designed to study how human actions influence resource development and consumption over time. We will look at issues such as: where resources come from and where they go on the island; how long they stay tied up in buildings; when they cycle out again; and how we can use fewer resources, be more efficient, and create a vibrant local economy.



LIEM-Hawai'i is a model study for Hawai'i Island and for the world because, in addition to looking at natural systems, this study will also consider socioeconomic factors. We will be taking a focused look at land cover changes on the island over time, at land-use decisions, at production systems, at consumption patterns, at infrastructure, and at waste disposal networks. Our partners tell us that it is extremely challenging to add in these societal factors, yet it is critical to include them if we want to observe and understand how these factors influence natural systems, and vice versa. If we carefully identify best practices for the island, these practices can inform public policy and private sector investment decisions. And as we do this over the long-term, i.e., over 20 to 30 years, we will develop truly valuable information for the planet as a whole.

Professor Marian Chertow, Industrial Environmental Management Program, Yale University

As scientists we want to measure everything. Just as Keeling didn't know that measuring carbon dioxide levels would be so profoundly consequential, it is very difficult to determine today what might be the most significant factors to examine for the future. So we will study everything from injection wells to coastal degradation. We will gather information on environmental and cultural resources from the local community, as well as from our partners around the globe. We will be creating exhaustive data sets about this island to be housed in a centralized data bank. When policy makers want to make decisions about particular issues, they will be able to consult our data bank for information.



So far we've studied water, waste, food, and energy on Hawai'i Island with our partners at the School of Forestry and Environmental Studies at Yale University. Our local, national, and international partners will help us to bring our discrete views of these overlapping systems together—to create an integrated understanding of the way the natural and human systems on Hawai'i Island interact. Joining in the LIEM-Hawai'i Project are the University of Hawai'i at Hilo; the U.S. Forest Service in Hilo; the Redlands Institute in Redlands, California; the Institute for Advanced Studies at Waseda University in Tokyo, Japan; and the Institute for Social Ecology in Vienna, Austria.

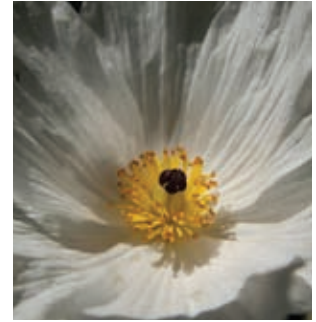
When we look at agriculture on the island, we see that there are very promising opportunities for diversified agriculture. And when we look at the tourism industry, we see that visitors to the island use significantly more resources than island residents do. Tourists use more water, sewers, electricity, utility gas, and highway gas, and they generate more solid waste. An integrated, systems approach can help to identify how to better absorb tourism into the economy. The LIEM-Hawai'i study will help us think about these issues for the future and show us how we can adjust the current situation to align with our future goals.

The Institute for Social Ecology in Vienna, Austria, has developed an analytic framework that actually involves community members and that helps communities such as ours model different scenarios for the future. Community members are involved in the planning process by helping to decide what the various scenarios that are modeled should be. Computer modeling can help us to understand, by varying factors like the number of residents on the island, the number of commuters on our roads, the acreage devoted to agriculture, or even the volume of greenhouse gases that we emit, how we ultimately affect the overall system.

Professor Helmut Haberl, Institute for Social Ecology, Vienna, Austria

Our model allows all sectors of the community to become involved in the planning process. This participatory approach is really engaging as it allows us to examine many variables. By including factors like increasing farm income, for example, we found more people will stay home and work part-time to support their farms rather than commuting to employment in urban centers. This kind of modeling empowers people to understand the impacts of their decisions on the human community and also to speak up enthusiastically as a community for what they want to see happen in the future.

The LIEM-Hawai'i Project will begin with a two-year comparative study of the island's two major urban centers, Hilo and Kailua-Kona, supported by a grant from the National Science Foundation. According to the study proposal, Hilo and Kailua-Kona both struggle with limited resources, import dependence, and limited economic diversity. The vastly different natural characteristics of Hilo on the "wet" side of the island versus Kona on the "dry" side, as well as the distinct economic issues facing these two urban areas make them ideal components for a comparative study. Additionally, the unprecedented growth in Kailua-Kona since the 1950s, compared to relatively stable growth in Hilo, has resulted in significantly different urban landscapes in the two cities.



"By focusing on the major urban areas of Hilo and Kailua-Kona, this project will provide a comparative analysis of the structure and function of two socio-ecological systems related through resource exchanges, geographic proximity, and historical and contemporary cultural configurations. Although similar in population and area, these cities have markedly different socioeconomic and biophysical characteristics," explains Professor Chertow. "These areas could benefit tremendously from a close analysis of resource allocation and use and how their patterns of consumption affect the island's human and natural communities."

Consider this:

"The systems analysis and policy recommendations developed with our academic partners are now resulting in positive community and Council action," reports Elizabeth Cole, Kohala Center Deputy Director. Key energy-related legislation passed in the last two years includes legislation which:

- *Adopts the 2006 International Energy Conservation Code (March 2007 Edition as amended). This legislation enables the County to meet national and international energy standards, ensure that our residential and commercial buildings are not only safe but also energy efficient, and move the County towards the energy efficiency goals established by the Hawai'i State Sustainability 2050 Task Force. (Bill 385);*
- *Recommends that the County purchase fuel-efficient (average 35 MPH) vehicles for its fleet (Resolution 546-08);*
- *Recommends that the County install solar water heating systems and photovoltaic systems on new County buildings (Resolution 550-08);*
- *Recommends that new County facilities comply with the energy-efficient building practices contained in the current International Energy Conservation Code (Resolution 578-08);*
- *Recommends that the Department of Water Supply seek out ways to increase energy efficiency in its water pumping and delivery systems; seek out ways to use distributed and renewable energy generation to pump and transmit water within its system; and draft a comprehensive water conservation policy which identifies ongoing practices to reduce water and energy demand within the County on a day-to-day basis (Resolution 593-08);*
- *Recommends that the Hawai'i County Transit Agency and the County administration draft a strategic plan designed to increase ridership 20% per year through 2015 in order to meet the target established by the Hawai'i County Energy Sustainability Plan; the strategic plan will include short- and long-term measures to expand the County's public bus service (Resolution 623-08); and*
- *Recommends that the Department of Environmental Management investigate the feasibility of installing a solar system designed to handle the energy demands for one or more of its wastewater treatment facilities; such analysis should determine the size and type of solar system to be installed, recommended locations for such installation, and a financial analysis for determining the value of the County's investment in said system (Resolution 758-08).*

STAFF PROFILES

Our employees hail from Hawai'i, the U.S. Mainland, and locales around the globe. Some of them grew up on Hawai'i Island: Cindi Punihaole, Community Outreach and Volunteer Coordinator; and Brad Lau, Field Operations Leader for the Kohala Watershed Partnership. These folks are thrilled to be able to return home from universities and careers on the U.S. Mainland to work for the benefit of the 'āina and island communities. Others, like Samantha Birch, Field Educator and Program Leader; and C.J. Davis, Grant Coordinator, Archivist, & Administrator, were drawn here from vastly different places: Samantha is originally from Portugal, and C.J. is from New York City. Some staff members, like Associate Director & Chief Financial Officer Greg Smitman, came to the island after establishing successful careers in other places, where their work helped to empower communities and promote healthy ecosystems. Collectively, these individuals bring a vast repository of skills, life experiences, knowledge, and pragmatism to our work here, helping us to serve Hawai'i Island communities with expertise and excellence.

We invite you to learn more about eight of our talented staff members by reading the profiles which follow.

Samantha "Sam" Birch

Field Educator and Program Leader

Photo by Andrew Walsh



I grew up on the south coast of Portugal by the ocean. The Portuguese are known as seafarers and traveling people, and this must run in my blood. After finishing my undergraduate degree in geology in England, I traveled to South America and was hooked. My travels led me to a coral reef research vessel, which I boarded in Australia. I remained onboard for the next three

years, sailing through Asia and the Pacific, studying coral reefs, learning about different cultures, and organizing expeditions. I returned to University in Australia, where I studied protected area management and marine science and explored the Great Barrier Reef.

Education has always been my passion. In addition to working as a trainer onboard the research vessel and for ReefCheck Australia, I co-founded a nonprofit organization focused on education about sustainability in 2004. The mission of the nonprofit was to link school communities around the world with one another and with scientists working on issues of sustainability. I worked closely with a school community in Vanuatu on science and sustainability. This work helped me to learn invaluable skills that I use with The Kohala Center today, such as curriculum design, using technology in education, and program organization.

I moved to Hawai'i hoping to find marine education related work on the island. A few weeks later, I met Cindi Punihaole, who offered me a position training and coordinating ReefTeach volunteers. From that point on, everything seemed to just slip into place. Teaching about

Samantha “Sam” Birch continued

Hawaiian coral reefs and spending time at Kahalu‘u Bay with dedicated volunteers was fun and inspiring, and six months later, in July 2007, The Kohala Center offered me a position as their Field Educator and Program Leader.

This is the perfect job for me, involving a combination of administration, organization, teaching, educational curriculum design, and science. I work with many different partners, both locally and nationally based, managing educational programs and developing curriculum. My role is to manage and support programs on-island. Kohala Center programs serve a broad spectrum of students, from elementary students at our school gardens, to high school students learning about environmental leadership, to graduate students participating in meaningful research.

The island community benefits from The Kohala Center’s work in many ways. We provide scholarships for island students to attend educational programs both here and on the Mainland. The students in our programs participate in environmental service work to benefit island environments and communities. And we are committed to ensuring that the data and research produced by our educational groups is shared with the broader community.

Hawai‘i Island is an ideal living classroom. I feel blessed to be able to participate in field work and explorations with the groups I work with, exploring the island’s many incredible ecosystems, participating in conservation projects, and getting to know some of the inspirational people who work here.

Debera Crosson

Events Planner

Photo by Michael Crosson



In 1955 my family moved to O‘ahu from California when I was very young—just two years old. My four sisters and I had a wonderful childhood living a rural plantation lifestyle on O‘ahu’s North Shore at the Meadow Gold Dairy where my dad worked. He started out as a herdsman and worked his way up to the job of manager during his 15 years with the dairy. We were required to

help (on foot, not on horseback) move cows from pasture to pasture when my dad asked us to. We also had a family enterprise of raising tuberflex worms, which we sold to pet stores for use as a high quality fish food. The dairy washed the milking barns down daily and the wastewater was diverted into a ditch that ran through a field and into a swampy area. We would put on protective clothing and wade into the manure ditch to harvest the worms.

We attended Kawailoa School, along with all the other children whose parents worked at the dairy or at the sugar plantation camp in Kawailoa. Kawailoa School was probably the last one-room school on O‘ahu. Our parents wanted us to experience a more diverse culture, so they applied for a district exemption so that we could attend high school out of our district. We attended Leilehua High School in Wahiawa, a very large public school serving families in this

Debera Crosson continued

sugar and pineapple plantation community, as well as families living at Schofield Army Base and Wheeler Air Force Base. After high school I worked at various administrative jobs in Honolulu for about four years, commuting from the country.

When my dad retired, he moved to Hawai'i Island to manage his 7,000-acre Pu'u O'o Ranch (leased land) on the slopes of Mauna Kea. One of my sisters lived and worked on the ranch with him, along with my step-mother and two step-sisters. The family, including my sisters and their husbands who lived on O'ahu and on Hawai'i Island, came to the ranch to help with round-ups and branding.

With the intent of raising our children in a similar plantation style setting, my husband and I moved to the Hāmākua Coast on Hawai'i Island in 1975. I enjoyed a rural homesteading existence—farming, raising three children, and assisting my husband with his business as a building contractor. We grew macadamia nuts which were sold to various processors. We also grew vegetables for home use and to share with neighbors. During our rural homesteading years, we lived “off the electric grid” for eleven years.

When my youngest child was well established in school, I reentered the work force, taking jobs at various enterprises in the Waimea community such as Parker Ranch and W.M. Keck Observatory. Working at Keck for six years in their administrative offices was especially exciting. I enjoyed working with the science community and the empowering feeling of working for an organization at the cutting edge of astronomy.

I left W.M. Keck Observatory in 2006 because my duties were slated to be taken over by a machine. At the time I never thought I would be able to find a comparable, fulfilling job. In April 2007, I found a position at The Kohala Center as an administrative assistant. The Kohala Center was also participating in cutting-edge scientific research and education. But, beyond this, the center was addressing community needs for education and meaningful employment to enhance the kinds of jobs available in the plantation communities of the past and in the present visitor industry. And The Kohala Center was growing rapidly. That same year I found myself filling The Center's need for a full-time Events Planner.

I have found my niche here, and I greatly enjoy my work. I organize various types of events, ranging from conferences to retreats, working on logistics for air and ground travel, accommodations, meeting space, audio visual support, meals, and endless other details. Some of the events I have helped to organize this year are the LIEM-Hawai'i conference, the TKC Mahalo Party, the Mellon-Hawai'i Fellowship Program's retreats, the County of Hawai'i Agriculture Plan Public Meetings, and the Seeds of Hope luncheon. I am so grateful for the opportunity to meet and work with such interesting people, from local vendors to students, scientists, and professionals from around the world.

I love how the staff here all work together to make our events run smoothly and flawlessly. Other staff members handle travel arrangements, our Web presence, invitations, ads, registration, program design and such, while I work on my share of the logistics. It takes all of our efforts to make each event flow successfully.

I find satisfaction in my work, assisting The Kohala Center as we help to sustain, educate, empower, and strengthen the communities and the 'āina that we serve.

C.J. Davis

Grant Coordinator, Archivist, & Administrator

Photo by Norma T. Davis



I hail from The Big Apple but I now consider the Big Island my home.

After high school I started on my adventures westward. I attended the University of New Mexico in Albuquerque on a partial swim scholarship and majored in health education with minors in psychology and dance.

My wife and I moved to Hawai'i in June 2008, after having spent the previous eleven years in the San Francisco Bay area. While living in California, we vacationed regularly to the islands and tried to figure out how we could eventually put down roots here. After a trip to Hawai'i Island in 2006, we both knew we had found our next home.

In my “past life” back on the Mainland, I worked for eight years in financial markets for the Royal Bank of Canada as a sales assistant for their institutional brokerage unit. I managed a sales team of up to six brokers, helping with every aspect of selling equity research to fund managers along the U.S. West Coast and Canada. I coordinated road shows, research distribution, client data bases, conferences, travel, expenses—you name it. I was the equivalent of Scotty on Star Trek—just balder and with a horrible Scottish accent. As much as I enjoyed my team, my work, and the company, I felt it was time to shift industries and to focus on enjoying a better quality of life.

As fate would have it, I have found myself with yet another great organization, working with really great people as the administrative assistant and grant coordinator for The Kohala Center. My primary role here as the grant coordinator is to keep the flow of information for proposals that go out, and awards that come in, handy to anyone within the organization who needs it. I also back up and assist with administrative duties. I still feel Scotty's accent welling up from time to time when I sense that the ship's engines need a boost.

Though I'm many thousands of miles away from family and friends, I know I've found a new *'ohana* (family) here on the island, in Waimea and with The Kohala Center. I feel right at home. My quality of life has never been better.

I sleep really well knowing that all the work we do here at The Kohala Center truly makes a difference to the people of this island and throughout all of Hawai'i.

Guy Kaulukukui

Hawai'i Island Food Self-Reliance Program Director

Photo by Alapaki Nahale-a



I was born and raised on O'ahu. My father was born and raised in Hilo, and his parents were from Kāhehi in North Kohala. My family history on this island goes back for generations. The opportunity to live here and work at The Kohala Center allows me to reconnect with the place where my 'ohana's 'iēwe are buried.

After graduating from Kamehameha Schools, I attended the University of Hawai'i (B.A., Economics), Hawai'i Pacific University (M.B.A.), and University of Kansas (Ph.D., Economics Education). During the early part of my career I was a high school economics teacher. After that, I worked at Bishop Museum in Honolulu for

seven years, where I eventually became its vice president for cultural studies. I also served as the senior advisor to Honolulu City Councilman Todd Apo for nearly three years before joining the UH Hilo faculty as a visiting professor of economics.

Since June 2009, I have been the director of the Hawai'i Island Food Self Reliance Project at The Kohala Center. The project drew my interest because it provides an opportunity to apply economic reasoning to a real world problem. Though 64% of all cultivated lands in the state of Hawai'i are situated on Hawai'i Island, we still import 85% of our food. To create a more sustainable and secure local food production and distribution system, the County of Hawai'i is in the process of updating its Agriculture Development Plan. I am currently working on finalizing this plan, which will guide the allocation of County resources to promote the expansion of the island's agriculture industry.

To increase the market share for locally produced food, we must first change consumers' current preference for imported food items. As consumers, we should purchase locally produced food and milk whenever the quality and price of the item is comparable to the imported alternative. Every dollar we spend on imported food subsidizes a business somewhere else in the world and unknown to us. Our dollars are better spent subsidizing Hawai'i farmers, many of whom are our families, friends, and neighbors. Another big part of my work is coordinating the efforts of island farmers, who traditionally make their business decisions independently from each other.

The Kohala Center is smart, creative, dynamic, and responsible. I like that. I also like the opportunity to work closely with the people who feed us. They are grounded, real, and no nonsense.

Brad Lau

Field Operations Leader, Kohala Watershed Partnership

Photo by Naul Lau



Once we complete a fence and remove all the feral animals from the enclosure, I feel successful knowing that the forest and ecosystem are recovering and will be around to share their beauty with future generations.

I was born in Hilo and raised in Waimea, living the country lifestyle. Growing up on our family ranch, I just wanted to be an ordinary kid who got “normal” presents for holidays, not horses and saddles like I usually received. The horses were for working on the ranch, not for fun.

I thought I was worse off than other kids my age, and not until high school did I realize how unique and special my life was. All the work I

did on the ranch as a child made me appreciate working hard and getting a job done. From my country lifestyle I developed a love for the outdoors. Hunting, fishing, diving, and roping are what I usually find myself doing with my free time.

After graduating from Hawai'i Preparatory Academy in 2003, I had many college opportunities. I chose Linfield College, a small liberal arts school in McMinnville, Oregon, because I had the opportunity to play football there and it had a familiar small town feel. I graduated in 2007 with a B.S. in physical and health education. Once I completed college I knew I had to move back home because I missed the people, the places, and the lifestyle.

I was working leading the trail rides at Parker Ranch and catching wild cattle in North Kohala when I learned about the job opportunity with the Kohala Watershed Partnership (KWP). I thought this was my chance to do what I love and to give back to the place that made me who I am. We are currently working on five major projects and maintaining a number of others. The largest is the Pelekane Bay Restoration Project, which involves 6,500 acres. The second largest is the high yield watershed in the Natural Area Reserve, which involves constructing a contour fence at the 3,000-foot elevation. We also have Kania'a, a 400-acre unit where you can find a rare native snail. Our newest project is Pu'u Pili at the top of Kahua Ranch, where some of the last known populations of native plants in Kohala can be found. Last but not least is the Koaia Corridor restoration site, where we have outplanted more than 8,000 plants.

Working for KWP, there are no typical weeks of work. Our work includes building fences, killing weeds, cleaning trails, collecting seeds, growing plants, trapping animals, and anything else that needs doing to manage our forests. To get all the work done, we have fourteen crew members and two interns. In coordinating the work, I always try to find the most efficient and productive use of each team member. Though the work I do is sometimes challenging, both physically and mentally, I know that my efforts are helping to enhance the place I call home.

Cindi Punahaole

Community Outreach and Volunteer Coordinator

Photo by Maleko Swanson



I was born and raised on the island of Hawai'i in the ahupua'a of Kalaoa, Makalawena, Kūki'o in North Kona. Back then Kona was "country" like most all of Hawai'i Island. I was a country girl, a tomboy with two elder brothers, who tagged along with my dad and brothers wherever they went. My dad is three-quarters Hawaiian and one-quarter Okinawan. My mom, of Japanese descent, was a city girl from Honolulu who was most comfortable taking care of the home. Like my dad, she had a "green thumb" and was an excellent gardener. Mom was my best friend, the kind of mom anyone would be proud of.

From my dad, grandfather, and brothers I learned how to hunt, farm, and fish by watching and doing. This is how we fed ourselves. I learned the art of "throw net" and how to slaughter and dress pigs and *pipi* (cattle). I also learned how to fish, make an *imu* (earthen oven), gather *limu* (seaweed), pick *'opihi* (limpets), grow vegetables, cook, and other basic subsistence skills.

Everything grew in abundance—strong and healthy mangoes, guavas, poha berries, papayas, bananas, vegetables, orchids, anthuriums, even the weeds! We raised pigs, chickens, ducks, and *pipi* and worked on our coffee farm, living off the land. The soil was healthy, the air was fresh, and the rain was heavenly! At the *kahakai* (seashore) fish were abundant.

We read by the light of the kerosene lamp and drank water from a rainwater catchment tank. I remember visits to a small country store called Matsumoto's and treats like dried abalone. Doing the laundry meant scrubbing our clothes on a washing board, hanging them out to dry on a line, and bleaching them by placing them on tall grass in our yard. Mom and Dad managed to take care of us even though jobs were scarce and money was tight.

Woven into my childhood were lessons in how to take care of the land and the *kahakai* which amply provided for our family and our neighbors. This was my dad's way of making sure that my brothers and I could take care of ourselves and my mom if anything happened to him.

We were always aware of the importance of taking care of our community and our extended 'ohana. Our survival hinged on working together, and we had an unspoken bond of interdependence.

My mom and dad shared and lived the true meaning of *aloha* with and for all of us children. I remember how Dad's handshake and his word meant something really special. I learned that when you said "I will *kōkua* you," it meant helping without expecting anything in return. Some people called this the "Kona way of life." I was fortunate to have lived this way, though at the time I thought it was a difficult life with very few opportunities for me.

After graduating from Konawaena High School, I left for college on the Mainland. I lived and worked in Washington State, New Jersey, Chicago, and California for some 30 years before returning home in 1998. Most of that time involved working in the communications sector in corporate business. My most recent position before returning home was as operations manager for Southwest Bell, overseeing a territory of the Chicago area, as well as Texas and California.

Cindi Punihale continued

I was introduced to The Kohala Center when I met Matt Hamabata through a wonderful friend, Sue Aronson. I felt really comfortable with his local style, his attitude, and respectfulness. As I got to know Matt and Betsy Cole, I realized what a wonderful organization they had created. In fact, The Kohala Center is the kind of organization that I had dreamed of working for.

In 2007, I was blessed with the opportunity to join The Kohala Center and manage the Kahalu'u Bay Project. Over the years, I have seen Kahalu'u Bay suffer under the impact of encroaching development and heavy usage: according to a County Lifeguard and UH Sea Grant Program count, the bay hosts over 400,000 users a year. The coral reef is threatened and the beach and park has deteriorated and fallen into disrepair.

From my childhood I fondly remember Kahalu'u Beach and Bay as a special place of beauty and bounty. The beach and reef thrived and were teeming with fish, as were most of the bays along the Kona Coast. I have a deep, heartfelt connection to Kahalu'u Bay, born from my childhood intimacy with the 'āina. I am truly grateful for the opportunity to give back to my beloved home, through my work with The Kohala Center to restore Kahalu'u Bay. Our programs are nurturing a deeper awareness and appreciation for our connection with the 'āina, and they are providing opportunities for our *keiki* (children) to find meaningful work here in Hawai'i as we celebrate the cultural, environmental, and social significance of Kahalu'u, its beauty and its ability to sustain life.

Melora Purell

Coordinator, Kohala Watershed Partnership

Photo by Jennifer Johansen



I am from everywhere and nowhere, having grown up as a military kid. Prior to working for the Kohala Watershed Partnership, I was a secondary science educator for 16 years, teaching at public, private, and international schools in Washington, Wisconsin, Japan, and Hawai'i.

I first came to Hawai'i in 2000, after living in Japan for 9 years. I chose to make this island my home because it felt more like home than any place I have ever lived. As a military kid, I never had a hometown growing up. When I arrived in Waimea and felt the cool misty wind on my face and wandered through the mossy native forest, I knew I had found my place in the world.

In 2004, I went back to school, and in 2006, I received an M.S. in Tropical Conservation Biology and Environmental Science (TCBES). I chose UH Hilo for school because the new master's program in TCBES had just started up, and it sounded like exactly what I wanted to study... AND I didn't have to leave my mountain to do my field research.

My connection to the Kohala Watershed Partnership started when I was living in Waimea and going to school in Hilo. I attended a public meeting about the Kohala Mountain Watershed Management Plan and was impressed with the proactive management that was being proposed. I learned that the Partnership was going to be hiring a few staff people in the next couple years.

Melora Purell continued

I guess it was serendipity that they were hiring for the coordinator position just as I was finishing my degree. I didn't apply for any other job.

Getting this job was definitely the strongest “meant to be” experience I have ever had. I feel as though I have been preparing for this work my whole life.

I have been the coordinator for the Kohala Watershed Partnership since 2007. In my role as coordinator, I am fulfilling a life-long dream to make a difference in the conservation of our precious natural resources. I am blessed to be able to go to work each day knowing that I am helping to protect and manage some of the most amazing and endangered native ecosystems in the world.

Greg Smitman

Chief Financial Officer

Photo by Samantha Birch



I was a Navy brat, raised at numerous locations around the Pacific Ocean. My family first moved to Hawai'i in the 1950s when it was still a territory, and we lived at 'Ewa Beach when it was still a sugar plantation. Some of my fondest childhood memories of Hawai'i include the smells and tastes of sugar cane right after the fields were burned.

My education includes B.S. and M.S. degrees from Washington State University in forest and range management. After graduation I worked with Native Americans in Montana, eventually visiting most reservations throughout the contiguous

United States and Alaska. My first jobs were as a biologist and natural resources manager, but I was moved “up” into positions of land manager and administrator which were not as much fun.

In 1987, in response to powerful frustration with the social and governmental structures on reservations, a group of us started the national **Intertribal Agriculture Council** (<http://www.indianaglink.com>). The IAC is a nonprofit organization of member Tribal Governments formed specifically to improve Indian use of Indian resources. The Council has been very successful, maturing to become an organization with twenty-six employees and five offices throughout the United States.

In addition to working with reservations, we spent a great deal of time and effort on changing policies or existing federal laws that seemed to be at the root of reservation problems. This work required frequent travel to Washington, D.C., to work with Congressional committees, to attend hearings, and to meet with those in Cabinet positions which most directly impact Indian reservations. I also served on various national committees and boards related to agriculture, including: President's Commission on Small Farms; Advisory Group for Beginning Farmers; Rural Coalition Board of Directors; USDA Civil Rights Action Team; Anti-Hunger Campaign (Phillip Morris Company); R-CALF; and various other agriculture and food-related national

Greg Smitman continued

policy panels. Testifying was a normal part of my routine. This work required very long days and weeks of intense activity.

When I wrote the last tuition check for my youngest child's college education, I decided I had worked 80-hour weeks long enough. My wife and I moved to Kona to enjoy ocean activities, including SCUBA and free diving, snorkeling, and kayak fishing—although lately I don't seem to be getting wet much!

As a founder and the first executive director of the Intertribal Agriculture Council, the set-up, funding, and administration of an organization dependent on federal contracts and grants taught me a great deal about the federal system—largely by making mistakes and struggling to resolve them. Applying these experiences at The Kohala Center to smooth the road gives me a great sense of personal contribution.

The Kohala Center function which is most rewarding to me, personally, is the overriding effort to create a knowledge-based economy here on the island. Such an economy will generate jobs for our children and grandchildren which reward personal achievement and foster excellence. With the right opportunities, we can keep our brightest citizens working in our own community and enable our grandchildren to grow up and prosper, right here. I am grateful to be a part of that effort.

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Hawai'i Community Foundation:

Page 3, Matt Hamabata and Roberta Chu

Jordan Hill:

Page 4, Fern frond; Page 9, Hand in water

Jack Jeffrey Photography:

Page 17, Lehua Liko; Page 23, left image, Hawaiian Stilts

Kohala Elementary School:

Page 25, Students; Page 26, Students

Kohala Watershed Partnership:

Page 14, middle image, Wiliwili; Page 23, right image, Forest; Page 27, lower right image, Students in the field; Page 29, top right image, Stream; Page 38, left and right image; Page 39, right image

Brad Lewis (volcanoman.com):

Page 16, Lava

Randy Magnus:

Page 8, Aerial picture of Kahalu'u Bay

Mala'ai The Culinary Gardens of Waimea Middle School:

Page 15, Placing seeds

Petch Manopawitr:

Page 18, right image, Scientific diver

Kamuela Naihe:

Front Cover, right image, Ke Kula 'o 'Ehunuikaimalino students in their school garden

Doug Perrine/SeaPics.com:

Page 14, right image, Fish

Doug Sell:

Page 33, lower right image, Fish

Jed Sparks:

Page 18, left and middle images, Cornell students

Noelani Spencer, Kaumana Elementary School:

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Keoki Stender, Marine Life Photography.com:

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Waimea Country School:

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Andrew Walsh:

Page 14, left image, Lava; Page 23, middle image, Lehua blossom; Page 33, top right image, Turtle; Page 36, Urchin; Page 37, Yellow Tang; Page 40, Taro field and sunset; Page 42, Flower

James D. Watt, Seapics.com:

Page 12, Wave image

Other photos courtesy of The Kohala Center staff

The Kohala Center
2008-2009 Financial Statements
Addendum

	Administration/Org. Development	Fundraising	Program Services
Payroll	195,171.84	0.00	784,217.89
Fringe 23%	45,118.10	0.00	169,729.98
Travel Detail	47,862.62	0.00	232,235.71
Equipment	0.00	0.00	0.00
Supplies	28,934.94	0.00	104,320.70
Solicitation Mailing Design/Printing	0.00	3,500.00	0.00
Solicitation Postage	0.00	1,029.80	0.00
Construction	0.00	0.00	0.00
Contracts & Grants	46,420.60	0.00	754,449.71
Other Expenses	122,568.90	0.00	122,339.56
Special Events and Related Costs	0.00	37,000.00	0.00
TOTAL	486,077.00	41,529.80	2,167,293.55
Percentage of total expenses:	21%	2%	77%