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Gene-Level Conservation

Genetic analysis may not be one of the first tools that come to mind when we think of conservation strategies, but it should be, as Ania Wieczorek and Carol Oshiro demonstrate with their recent study of the rare endemic plant Lobelia villosa. L. villosa only grows in wet forests and mountain bogs between around 4,000 and 5,000 feet in elevation in Mt. Waialeale and the Alaka'i Swamp on the island of Kaua'i. These plants with long, hairy, purple-tipped leaves and yellow or greenish flowers are listed as a species of concern by the U.S. Endangered Species Act of 2006, but the population size is unknown, and other information about them is limited.

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Carol Oshiro and Dr. Wieczorek also enjoy providing science education to students grades 1-9 through Dr. Wieczorek’s popular GENE-ius Day Program.

Aloha,
Rachel Novotny, Ph.D.
Interim Dean and Director for Research and Cooperative Extension
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Ania Wieczorek and Dr. Wieczorek also enjoy providing science education to students grades 4 through Dr. Wieczorek’s popular GENE-ius Day Program.
Home for the Bees

Dr. Graham's work not only raises awareness but also initiates action to protect these insects. By monitoring local populations and creating artificial nest boxes, he is providing habitat for bees that might otherwise be lost. This approach is crucial to preserving the biodiversity around which tropical forests are built, which in turn support the health of the wider ecosystem.

Partners in Conservation

Dr. Megan Barnes is a decision scientist who likes to “get her hands dirty” with data. She works in ecological economics, a field that combines natural sciences with economic theory to understand how ecosystems function and how human activities affect them.

To Conserve and Protect

Conservationists sometimes have to call in tree-huggers. But as Megan Barnes, a post-doctoral fellow in the Department of Natural Resources and Environmental Management, explains, you have to analyze the physical environment the tree grows in, assess the fauna and flora living in and around it, calculate the economic and environmental impacts on it, and tabulate countless other variables to figure out how best to save it. With a background in theoretical and applied conservation science, Dr. Barnes applies this rigorous approach to gathering and evaluating data to drive positive change.

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Dr. Megan Barnes on a decision scientist who likes to “get her hands dirty” with data.
Home for the Bees

There are no place like home,” declared Dorothy in the Wizard of Oz. But for Hawai‘i’s yellow-faced bees, artificial nest boxes—not necessarily home but a good facsimile—may be their best hope for survival. This is where Jason Graham comes in.

Dr. Graham, a post-doctoral researcher in the department of Plant and Environmental Protection Sciences, is researching the native bees, seven species of which have just been placed on the endangered species list, but as to how to save them from extinction. Although they were first identified in the Islands a century ago, little is known about them, he explains. But while people weren’t studying these bees, they were nevertheless directly and indirectly impacting their environment—so severely that when researchers started looking for them a few years ago, they were shocked at how few remained.

The bees, Hylaeus sp., live and nest in coastal areas, often in holes in pieces of coral that have washed ashore or in the hollow stems of coastal plants. This habitat makes them especially vulnerable to climate change, since an increase in storm surge can decimate their habitat makes them especially vulnerable to climate change, since an increase in storm surge can decimate their environment. One of Dr. Graham’s goals is to get them on the list, “he points out. “But now we’re working to increase their abundance as well.”

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Another important component of Dr. Graham’s work is raising awareness. His findings have already been presented at the Hawai‘i Conservation Congress, the Smithsonian Botanical Symposium, and international conferences. Dr. Graham is monitoring populations at Mokuleia, Kahuku, Sandy Beach, and along the Ka‘ena peninsula, another population at Ko Olina was wiped out by a rogue storm that washed them away. After analyzing their dwelling places, he’s created nest boxes that are inviting to the bees.

Several CTAHR faculty participated in the International Union for Conservation of Nature (IUCN) World Conservation Congress, held in September in Honolulu, where they shared research on everything from Rapid ‘Ohi‘a Death to agroecology to native bees. Before the Congress began, though, other members of the college helped to set the tone for the international event. Dr. Mahina Vaughan, assistant professor in the department of Natural Resources and Environmental Management (NREM), along with NREM students and alumni, participated in a pre-Congress gathering of indigenous leaders. E Ala Pā. This gathering brought together 150 participants from across Hawai‘i and over thirty countries, as far away as Madagascar, Canada, Vanuatu, and Peru, for a four-day cultural exchange.

Participants took part in a traditional Hawaiian ‘aha ‘awa ceremony and in discussions focused on preserving indigenous culture and fostering community stewardship of local lands and waters. They shared struggles with the loss of native lands, over-regulated harvesting rights, and pressure to westernize the management of local resources, as well as success stories of reclaiming access to resources, building local trade economies, creating strong partnerships, and empowering youth. Monna Montgomery, Kanoe Morishige, Jordan Muratsachi, Aissa Yazzie, and Kawela Farrant joined by fellow NREM alum Pua‘ala Pascua and NREM project manager at Pono Pacific Land Management. She was also a member of the senior leadership of the college.

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**Home for the Bees**

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Dr. Graham, a post-doctoral researcher in the Department of Plant and Environmental Protection Sciences, is researching the native bees, seven species of which have just been placed on the endangered species list, for clues as to how to save them from extinction. Although they were first identified in the Islands a century ago, little is known about them, he explains. But while people weren’t studying the bees, they were nevertheless directly and indirectly impacting their environment—so severely that when researchers started looking for them a few years ago, they were shocked at how few remained.

The bees, Hylaeus sp., live and nest in coastal areas, often in holes in pieces of coral that have washed ashore in the hollow stems of coastal plants. This habitat makes them especially vulnerable to climate change, since any increase in storm surge can destroy a population. They’re also outcompeted by introduced bee species and preyed upon by invasive ants, which eat their larvae—and because the bees are solitary, rather than hive dwelling, like honeybees, they hatch and rear many fewer offspring.

The Hawai‘i Conservation Congress held in Honolulu in 2016. He was instrumental in getting Hylaeus classified as endangered, the first bees to gain this protection. “It was crucial to get them on the list,” he points out. “But now we’re working to increase their abundance so they don’t have to be on it.”

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Dr. Monica Montgomery, Kanoe Morishige, Jordan Muratsachi, Aissa Yazzie, and Kawela Farrant. The project she’s now working on, assessing the health of and threats to reef systems in West Maui that are impacted by coastal landfill and other types of pollution. Also an expert in global vertebrate fauna, Dr. Barnes is the lead author on an international study of wildlife trends in protected areas, the largest investigation to date, recently published in the journal Nature Communications.

The good news is that, for the most part, protected areas are successfully safeguarding wildlife populations within their boundaries. The various news is that the socio-economic conditions of the countries in which the protected areas are located turn out to be far more critical to the success of parks than factors previously thought to be influential, such as size, design, or type of protected area. Both of these findings suggest the continued need for adequate support of these parks. “National parks are the cornerstone of most country’s conservation plans, so it’s essential they work as well as possible,” Dr. Barnes explains. There are still a number of protected areas where wildlife populations are declining, especially in developing nations, and these urgently need support so they can successfully preserve the biodiversity that is so crucially necessary to the future of the planet.

All of Dr. Barnes’s work underscores an important point: conservation requires careful study and a strong commitment to making a difference. She provides both.
CTAHR has long been a supporter of mālama 'āina. The World Conservation Congress held in Hawai‘i this fall, to which so many college members contributed, provided a vivid reminder of the need to protect and sustain our natural resources.

This quarter’s Impact Report focuses on what CTAHR students, alumni, and faculty are doing to further this important mandate: Jason Graham is not only working to save yellow-faced bees in the Islands; he’s also bringing nationwide attention to their threatened status. Mehana Vaughn and NREM students and graduates participated in discussions at the Congress that emphasized the need for community members to participate in the conservation of local resources. Ania Wieczorek and Carol Oshiro are using genetic testing in the lab to track threats to rare plants from high mountain swamps, while Megan Barnes assessed the effectiveness of protected areas across the globe in keeping wildlife safe and fostering biodiversity.

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Interim Dean and Director for Research and Cooperative Extension

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