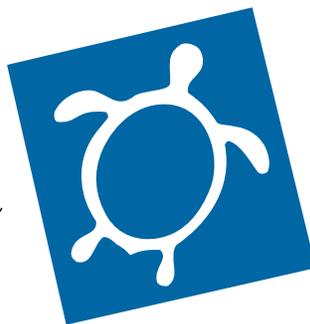


Environment



Hawai'i

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Burning Issues

If Andrew Pierce is right, Hawai'i is apt to experience hotter and faster-spreading wildfires with just a small rise in temperatures. When a warming climate forces the thermometer to climb even higher, the impact on Hawai'i's environment will be devastating.

Our cover story, based on presentations from the 2013 Hawai'i Conservation Conference, provides a sobering look at the new breed of fire the islands will be facing with increased hot and dry spells. Inside the issue is an invasive species wrap-up from the HCC as well as reports from Peter Vitousek's 25th — yes, 25th — conference on Hawai'i ecosystems held on the Big Island.

New Yorker Ava Prince, our summer intern, describes her experiences at two very different forest restoration projects. Rounding out the issue is our regular Board Talk column and a last, final report on legislative action in 2013.

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Fire Dangers Increase Exponentially With Just a Small Rise in Temperature

I don't mean to scare anybody," Andrew Pierce said after he had probably done exactly that.

Pierce's new research, which he shared at July's Hawai'i Conservation Conference in Waikiki, suggests that recent climate change has resulted in fires that can now spread 11 times faster and can be 30 times more intense than those in the 1950s. And that's just from a two-degree Celsius increase in temperature.

in their history. The fire trend is due, in large part, to climatic factors, something Pierce has studied extensively in California. More recently, he worked under Creighton Litton of UH's Department of Natural Resources and Environmental Management, and with Susan Cordell and Christian Giardina of the U.S. Forest Service's Institute of Pacific Islands Forestry, to determine the potential impact of climate change on fires in Hawai'i.



PHOTO: DLNR

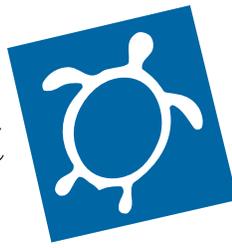
After decades without a single fire, three scorched some 3,000 acres on Kaua'i's west side last year, including state timber management areas (pictured here).

"Even if we think in our brains, 'It's two degrees warmer,' ... we're going to have exponential feedbacks into fire behavior," said Pierce, a post-doctoral researcher at the University of Hawai'i.

Over the past decade, states across the nation — Texas, New Mexico, Georgia, Arizona, Utah, Florida and California — have had some of the largest, if not *the* largest fires,

While waiting for a projection from the Pacific Islands Climate Change Cooperative (PICCC) on what the climate here will be like in 40 to 50 years, Pierce and his team looked to the past and found that climate change has already made the islands more vulnerable to wildfire.

Environment



Hawai'i

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NEW AND NOTEWORTHY

Monk Seals Are Not Pigs: Hawaiian monk seals are critically endangered, with only about 1,100 remaining in the wild, 140 of which live in the main Hawaiian islands. While federal resource managers are trying to grow those numbers, fishermen have begun complaining that the seals compete with them and steal their catch.

Stories of seals snagging bait, messing with gear or harassing spear fishers aren't uncommon, but new research by the National Oceanic and Atmospheric Administration suggests the animals aren't gobbling up all the fish in the main Hawaiian islands. Not even close.

The seals do eat a lot, but they're scattered across hundreds of miles of ocean and they're not the only consumers out there, NOAA's Rachel Sprague said at recent presentations on her research.



Hawaiian monk seal.

PHOTO: NOAA

To better determine the degree to which seals are affecting nearshore marine resources, Sprague compared what they eat with what commercial fishers catch and what apex predatory fish are estimated to consume.

"This is trying to put monk seal consumption in context," Sprague said at a recent meeting of the Western Pacific Fishery Management Council's Scientific and Statistical Committee.

She first estimated the seals' dietary needs by taking what captive seals eat and adding 20 percent. A seal eats an average of about 15 pounds of fish a day, depending on size, she said.

Then, looking only at fin fish that live in waters shallower than 30 meters, and assuming a MHI monk seal population of 200 (even though only 130-140 were counted last year), Sprague found that apex predatory fish consumed more than 50 times what monk seals do. Also, commercial fisheries take 25 times more fish than the seals do, she said.

Sprague calculated that monk seals eat less than one percent of the fish biomass within 30 meters. To put it another way, the seals consume 1 pound of fish per square mile, she said.

What's more, the seals only eat some of the species targeted by fishermen, namely surgeonfish, wrasses, and crustaceans, she said.

Petition Seeks to Remove Leithead-Todd:

Bobby Jean Leithead-Todd, the former planning director for Hawai'i County, was appointed to head the county's Department of Environmental Management in June. She had held the position once before, but in 2010, voters approved an amendment to the county charter that requires the DEM to be headed by someone with a degree in engineering or a related field.

When Leithead-Todd was up for confirmation by the County Council in July, six of the nine council members accepted the argument of Mayor Billy Kenoi that Leithead-Todd's law degree fulfilled the new charter requirement.



Bobby Jean Leithead-Todd

Councilmember Brenda Ford did not. Instead, on August 8, she petitioned the 3rd Circuit Court to order Leithead-Todd to explain "the authority under which [she] purports to hold the office" and to enter a judgment that Leithead-Todd "is not qualified to hold the office of Director of the Department of Environmental Management" and that she "be restrained from performing the duties of that office."

In support of the petition, Ford's attorney, Mike Matsukawa, quoted from the discussions that the county charter commission held in considering the charter amendment in 2010. One of the members specifically asked former Environmental Management director Lono Tyson what "a related field" might be.

A "related field could be anything ranging from environmental science to even geology to a certain extent, but a technical background that supports a lot of the very difficult decisions that the director has to make," Lono replied.

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◆
*"There are people out there
watching to make sure we staff
and the board look out for
the interest of the public,
especially in the shoreline area."*

— Russell Tsuji, DLNR



Conservation Scientists Gather in Hilo For 25th Annual Vitousek Meeting

There are no plenary sessions, registration fees, special badges or fancy luncheons. No logo-imprinted coffee mugs – not even a logo, for that matter. But for the last 25 years, the summer meetings organized by Stanford University professor Peter Vitousek have attracted scientists and graduate students from all over the world to the Big Island, where they discuss the work they're doing in the field of Hawaiian conservation biology and ecology.

This year was no exception. With each presenter given five to ten minutes (and with Vitousek himself enforcing the time limits), the two-day gathering this year at the University of Hawai'i-Hilo featured nearly 90 talks covering a wide range of topics – everything from the localized effects of global climate change to the genetic analysis of microscopic mycorrhizal fungi.

We present a write-up of just a few of these that seemed to have special bearing on recent events or which challenged received wisdom.



After Broomsedge Is Gone, Things Can Get Worse

Carla D'Antonio, a professor in the Department of Environmental Studies at the University of California, Santa Barbara, has been studying the invasion of Hawai'i Volcanoes National Park by perennial grasses. Do the invaders "represent an alternative stable state?" Or are they "part of a series of changes over time?" Or, as yet a third option, "do they precipitate a series of changes leading to meltdown" of the entire ecosystem?

In the park, broomsedge grass (*Andropogon virginicus*) has been found to slow the growth of native trees and shrubs and has been blamed for preventing their regrowth in disturbed areas.

So, after a fire took out the broomsedge, natural resource managers and others were hopeful that the natives would have a better chance of returning.

Instead, D'Antonio reported, although the dominant grass declined from 73 percent cover to 10 percent, two other invasives – possibly even nastier than broomsedge – moved in: molasses grass and faya tree.

Overall, said D'Antonio, there was a 50

percent decline in the 'ohi'a canopy and a 25 percent decline in pukiawe. "It would have been even greater," she said, "except that pukiawe loves being next to faya."

Driving all this are long-term changes in the climate, she said. Starting in the 1980s, the incidence of wet years has declined. "Break it down by season, and you see the dry season is really getting much drier. Since 1997, we have had a lot of very, very dry summers – we're hardly seeing any summer precipitation at all. We also are seeing a long-term increase in temperatures, so plants see less moisture as well as higher temperatures in the growing season."



A Hailstorm of Caterpillar Poop

In early January, staff from the Hilo office of the Natural Area Reserves System, part of the Department of Land and Natural Resources, noticed that koa trees along the Hamakua coast were losing their leaves (more properly, the phyllodes that replace true leaves as the trees mature).

What they saw, and which was later confirmed by overflights, was "a spectacular outbreak of koa looper moth, larger than ever before reported," said Robert Peck, an entomologist with the University of Hawai'i-Hilo. In areas where the infestation was high, the outbreak "may have long-term impacts," he added.

The moth (*Scotorythra paludicola*) is native to Hawai'i and found on Kaua'i, O'ahu, Maui, and the Big Island. Just 12 outbreaks have been recorded in the last 120 years, with the severity of outbreaks (and tree mortality) seeming to be a function of tree health. Mortality can range from 0 to 35 percent, Peck said – with the higher number being recorded after an outbreak at Makawao, Maui, in 1985.

A century ago, the naturalist R.C.L. Perkins wrote of one such outbreak, "Native birds, attracted in thousands by the abundance of this, one of their favorite foods, were gorged to repletion, and the starving caterpillars formed writhing masses on the ground... [T]he dropping of excrement from the trees on the dead leaves beneath made a rattling noise as of a hailstorm."

By mid-May, the outbreak had spread – south from Hamakua to Ka'u and the Hawai'i Volcanoes National Park, then up the Kona side of the Big Island: Kona Hema, Kona Mauka, and north as far as Pu'uwa'awa'a.

Whatever prompted the outbreak, the trees seem to bounce back fairly quickly. According to Peck, at Laupahoehoe, on the Hamakua coast, refoiliation began about six weeks after defoliation.

Stephanie Yelenik, a researcher with the U.S. Geological Survey's research station in Volcano, has been looking at the effects of the outbreak on soil nutrients and the forest understory.

"Each phyllode got pumped through a caterpillar gut and came out the other end," she said. "It was a hailstorm of frass. You could watch it collect on your lunch pail."

The pulse of nitrogen from the frass (the polite word for caterpillar excrement) could facilitate the decomposition of the thick layers of dead phyllodes on the forest floor, she speculated. To verify this, she and a colleague are continuing to study nitrogen in the soil under the affected trees. Also, they are looking at light levels: "When the phyllodes go away, light inputs increase."

Overall, while the pulse of nitrogen and added light could help native plants, "it might also foster more grass," Yelenik said.

According to J.B. Friday, the extension forester with the University of Hawai'i, almost every koa tree in the Hamakua area was defoliated by the koa looper. The outbreak is the largest ever recorded, exceeding 30,000 acres, he said.



Rethinking Prickles On Native Poppy

Kasey Barton, a botany professor at the University of Hawai'i at Manoa, is challenging the notion that a benign, predator-free ecosystem resulted in native Hawaiian plants letting down their defenses.

"We expect island plants to have lower levels of defenses than their continental relatives," she said. Because Hawai'i has no "herbivorous mammals, mollusks, or reptiles, it leads people to believe defense traits are not needed."

But this is based on the assumption that the pressure from herbivores is the only reason for the traits, "and generally," she said, "this is too simple."

For one thing, she noted, "we do have some native herbivores on the islands," including gall-forming psyllids and moths,

Hawai'i Is Becoming a Different Place 'Very Quickly,' Threatening Conservation Work

Jeff Burgett is the science coordinator of the Pacific Islands Climate Change Cooperative. At the Hilo meeting organized by Peter Vitousek of Stanford University to discuss research into Hawai'i ecosystems, Burgett spoke direly of changes to come.

"Conservation is founded on two concepts," Burgett said: "protection of current habitat and restoration of lost species, processes, and cultural traditions whenever possible."

"But," he went on to add, "this assumes a stationary climate. And that's no longer tenable."

Climate change is coming, and many species may not be able to survive in the new circumstances. The changes include higher temperatures, especially at night and at higher elevations. Leeward and high-elevation areas will be drier, while windward slopes may be drier in parts and wetter in

others. Contrasts in rainfall and temperatures will be accentuated, he said.

Shorelines will change as well. The lowest islands, in the northwestern part of the archipelago, "are going to be overwashed by storms long before they're submerged" by rising seas, he said. Meanwhile, coastal wetlands will become saline or disappear.

Reef-building corals "will be in serious trouble quite soon," he said. "Sea surface temperature increases will cause bleaching to be more frequent, and there's the added stress of ocean acidification."

Science and management need to be linked more strongly than ever to confront the changes, Burgett said. To encourage this, his agency is developing four new "products," he said.

First is an analysis of the vulnerability of plant and bird species to the changing climate, he said. "The plant version looks at

the climate vulnerability of the entire native flora ... and includes species distribution models for more than 1,000 species." That analysis, he added, should be available for use as early as this fall.

A similar analysis for all native forest birds is expected to be released in early 2014, Burgett said.

A tool to look at coral reef stresses, including bleaching and aragonite saturation projections, is to be released this fall, he said.

Finally, PICCC will look at coastal wetland transformations on three high-priority wetlands on O'ahu and Maui, including Maui's Kealia Pond.

"There's going to be a transformation of a lot of critical conservation properties and associated resources," Burgett said. He noted that among the several future climate scenarios, "we are currently on track with the high warming scenario. By the mid-century, there will be a decrease in winter rainfall of substantial magnitude – 50-plus percent."

"Hawai'i is becoming a different place than it's ever been — very quickly," he said.

— P.T.

among other arthropods, and also now-extinct flightless birds..

Barton compared the native Hawaiian poppy, pua kala (*Argemone glauca*), to its "continental sister species," the Mexican poppy. Both have prickles and latex, "but the island plant is better defended than the continental plant for both prickles and latex – the complete opposite of what you would predict."

"My two main hypotheses for why pua kala appears to be better defended than the Mexican poppy are that, first, herbivore pressure has been historically strong in Hawai'i on the poppy," Barton said in a follow-up email to *Environment Hawai'i*. "It may have had high levels of damage by native insects (especially beetles) and the extinct geese. And two, the prickles may also serve the function of photoprotection and water balance via light reflection and an increase in the boundary layer. I'm researching that aspect this summer to examine the physiological benefits of prickles." The first hypothesis "is, of course, impossible to test directly."

Shoots vs. Roots.

One under-appreciated defense that Barton is studying is that of tolerance, the ability of plants to survive despite damage. "Seedlings of weedy plants are extremely plastic," she



Pua kala (*Argemone glauca*)

said. "They can minimize root growth to maximize their above-ground growth following damage, which allows them to recover quickly and have similar growth to undamaged plants." By "weedy," Barton later explained, "I do not necessarily mean invasive – just plants with weedy phenotypes (fast growth rates, usually annuals, often found in disturbed habitats)."

Barton's current research involves studying in her labs the tolerance to herbivory of thousands of seedlings of many native Hawaiian species (including 'ohi'a, mamaki, akolea, and haha). She expects their tolerance of herbivore pressure to be low, "since Hawai'i lacks the classic seedling herbivores (mammals, reptiles, herbivorous mollusks)."

In connection with the herbivore pressure, Barton is also studying the effects of drought. "Seedling tolerance to herbivory involves a reduction in root growth in order to maximize shoot growth," she said, "while drought tolerance involves the opposite pattern – an increase in root growth. Thus, drought may make Hawaiian plants especially intolerant of seedling herbivory." In other words, by investing in root growth in response to drought pressure, plants are constrained in their ability to reallocate growth aboveground to replace leaf tissue lost to herbivores.

"But these are just predictions at this point," Barton said. "I'm just starting trials right now with about 2,000 seedlings in pots and another 1,000 to 3,000 to go over the next couple of months."

"I do hope that this will inform us about restoration by highlighting the effect of climate change on seedling-herbivore interactions and the need to manage for multiple factors simultaneously because of their interactive effects," she said.

At the same time that she is studying native seedling tolerance, she will be conducting similar experiments on invasive plants to determine whether they are more tolerant of seedling damage and drought than native Hawaiian plants.

— Patricia Tummons

*Fire Dangers continued from page 1***Hot! Hot! Hot!**

Wind, temperature, and humidity all affect fire behavior. Using data collected at the Honolulu International Airport—one of the few locations in Hawai'i with reliable records going back several decades—Pierce noted all of the average daily and monthly high temperatures from 1950-1959 and compared them to records from 2000-2009. He also followed changes in relative humidity and wind speed.

"The 2000s look quite a bit different" from the 1950s, he said. He found that the average temperature in the 2000s was higher than the extreme high temperatures of the 1950s.

Humidity levels also varied. In the 2000s, the driest months were significantly drier than they were in the 1950s, but the average months are similar to what they were in the 1950s, he said. Wind speeds were higher in the 2000s, but only marginally so.

Pierce made what was perhaps his most dramatic finding when he compared the number of days where temperatures reached 88 degrees F or higher. In the 1950s, there were only 61 days where the daily high temperature was 88 degrees. In the 2000s, there were 752 days, an increase of more than 1,000 percent. When he included days where high temperatures exceeded 88 degrees, the difference was even greater: 69 days in the 1950s compared to 1,104 days in the 2000s.

Pierce, who has recently moved to Washington, D.C., said he wasn't surprised by the differences in temperature and humidity because "what I found is essentially the same as what [other researchers] found." But, he added, "I was surprised by how those seemingly small changes in weather variables produced large changes in fuel moisture levels and the exponentially larger changes in potential fire behavior."

Flammability

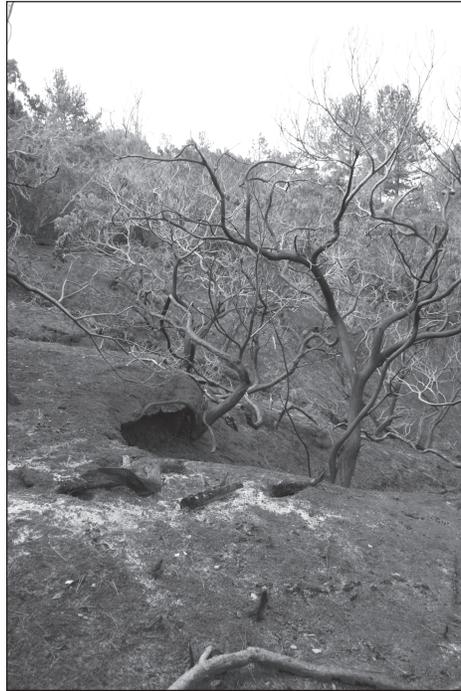
The drier and hotter weather has translated into drier landscapes, where "fuels ignite more quickly and release heat faster," Pierce said.

Without any data from actual fires in the 1950s and 2000s, Pierce used the Honolulu airport weather data and a fire behavior model to calculate potential fire characteristics from those periods for fires burning in the 10 percent most extreme conditions. Model results showed that fires in the 1950s would have spread at a rate of 0.1 meters/

second, while those in the 2000s spread at a rate of 1.1 meters/second. Fireline intensity, an index of the severity of a fire, went from 274 kW/meter to 8,674 kW/meter, and flame length increased fivefold between the two periods, he said.

Those results do not bode well for Hawai'i's wild landscapes, native or not.

"The general idea is that air temperatures will be higher with climate change," Pierce said. And if fires become more frequent and intense as a result, forest restoration will also become more difficult, according to experts. At the 2012



The Kaua'i fires left acres of bare earth.

conservation conference, Pierce reported on earlier research showing that repeated fire can drive out a lot of native species — shrubs, in particular. What's more, he found that dryland areas on Hawai'i island where ungulates had been fenced out to protect native species had higher fuel loads than unfenced areas. Research presented at this year's conference by the University of Maryland's Kealoha Kinney also suggests that recurrent fire may reduce the amount of soil phosphorus that is available to plants in dryland systems and thus could alter the pathway of primary succession.

A presentation by state Department of Land and Natural Resources' Division of Forestry and Wildlife (DLNR-DOFAW) forester Sheri Mann provided a glimpse of what fires in today's climate can do.

In the summer of 2012, three large-scale fires ravaged 3,000 acres on Kaua'i's west side. The DLNR spent nearly a million dollars controlling them, and even so, they burned more than a thousand acres in the Na Pali-Kona and Pu'u Ka Pele forest reserves and the Kuia Natural

Area Reserve, including 149 acres of critical habitat for federally listed species.

"Not only was this one of the largest fire seasons on Kaua'i since the 1960s, but the fire severity was characterized as severe for much of the burned area. These high-fire severities across numerous watersheds and steep gulches above pristine near-shore coral reefs have created a significant management challenge for [DOFAW]," Mann stated in her conference abstract.

The intense flames burned just about everything in their path, leaving vast areas of exposed earth. Although DOFAW started remediating the forested areas last year, Gov. Neil Abercrombie issued in February an emergency executive order allowing the DLNR to immediately expand remediation activities to include ground cover planting and dead tree removal, among other things.

"Immediate action is needed to stabilize and quickly revegetate denuded slopes and minimize the long-term ecological impacts to the mauka forests and marine ecosystems from heavy rains, downed woody debris and runoff," according to a press release describing the order.

Mann agrees with Pierce's assessment that fires today can be far more intense than they used to be.

"I would say that the fire intensity is much higher, as well as the fire frequency. In that area there hadn't been a fire in 60 years," she told *Environment Hawai'i*. "There's no doubt it's connected to climate change," she continued, adding that species composition also affects fire intensity.

"A lot of the invasives are a lot more flammable," she said.

Initially, the DLNR estimated it would cost \$8 million to restore and remediate the burned timber management areas alone. Those areas consisted mainly of eucalyptus and pine, with some scattered native species, Mann said.

"We were asked to cut that in half," Mann said, so it "will be in the neighborhood of \$4 million to do what needs to be done. So far, we've received less than \$1 million. We've been promised a million."

Even so, her agency was able to remove hazardous trees, plant some ground cover, and create fire breaks early on.

"We got lucky because the big rains came really late so we were able to get some vegetation on the ground. The erosion potential was extremely high," she said.

Future Work

At the time Pierce gave his presentation, Giardina said that they had hoped to be able to show the results of similar modeling, using

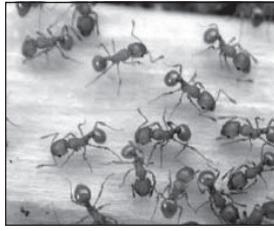
PHOTO: DLNR

Annual Damages from Little Fire Ant Could Be \$170 Million on Big Island Alone

If efforts to control the little fire ant (LFA) on Hawai'i stay as they are, the island could see damages of nearly \$170 million a year, as well as 33 million sting incidents a year. That's according to University of Hawai'i planning student Mike Motoki, a presenter at the 21st annual Hawai'i Conservation Conference held recently in Waikiki.

The bright orange-red ants — *Wasmannia auropunctata* — are native to Central and South America and form large colonies on the ground and in trees. In addition to Hawai'i, they have also invaded Tahiti, the Galapagos Islands, and other parts of the Pacific. Their burning stings can send you running to the drugstore for a pack of Benadryl.

Using a model developed by scientists at UH, Motoki has been able to estimate the potential economic harm and number of sting incidents that are likely to occur with varying levels of ant management. He looked only at impacts to six sectors (nurseries,



Little fire ants
(*Wasmannia auropunctata*)

agriculture, residential, lodging, parks, schools, and other). He did not assess the potential threats to native species or the costs associated with pets blinded by ant stings.

Eradication, he found, wasn't really worth the cost. His model showed that it would cost about a billion dollars to eradicate the ants from Hawai'i island, where they have steadily spread since a state entomologist discovered them there in 1999.

And even if you spent all that money, says Hawai'i Ant Lab manager Casper Vanderwoude, "you may or may not succeed."

The ants, as tiny as crumbs, are notoriously persistent. Eradication is "probably

not an economic thing to do" given the cost, Vanderwoude told *Environment Hawai'i*. Motoki recommended something in between the status quo and total eradication. Spending about \$70 million on mitigation and the prevention of an expanded ant range over the next ten years could result in a significant decrease in damages and ant sting incidents, he found.

Currently, the Hawai'i Ant Lab, based in Hilo and funded by the U.S. Forest Service, the Department of Land and Natural Resources, and the Department of Agriculture, has an annual budget of only \$200,000 to \$250,000, Vanderwoude says, and with that he and his staff are supposed to address all invasive ant problems throughout the state. His staff — just 3.6 people — conducts research on better ways to control the LFA and coordinates with the Hawai'i Department of Agriculture and island invasive species committees to control incipient infestations and educate the public.

A couple of recent community workshops on the LFA were "frighteningly well-attended," he says, adding, "The demand for residential workshops has been really, really high."

The ants have already spread to an esti-

PICCC's climate change projections, for the Army's 80,000 hectare Pohakuloa Training Area (PTA) on Hawai'i island, which has a history of burning. With an estimate of what the climate at PTA will be like during the decade 2050-2060, they planned to "illustrate how incremental increases in basic meteorological variables can have non-linear effects on the frequency of hot and dry days, as well as potential intensity of and size of wildfires," Pierce's abstract states. It notes that PTA, where the U.S. military conducts live-fire training, is also "where 15 native threatened and endangered species stand to be severely and negatively impacted by warming and drying trends and resulting fires forecasted for the region."

However, Giardina says his team is just now receiving the data needed for the PTA work.

"We originally wanted to do current vs. future, but it turned out to be really interesting to go back and see how fire behavior may have already changed dramatically," he says of Pierce's research, which was funded by the U.S. Army Garrison-Hawai'i and the Forest Service's Pacific Southwest Research Station.

According to University of Hawai'i climatologist Thomas Giambelluca, who also spoke at the conference, the leeward side of

the island of Hawai'i may feel climate change impacts sooner than some of the northern islands, such as Kaua'i and O'ahu.

"I've noticed it's been very dry in the southern islands. That means that our wintertime systems are not migrating as far south as they were in the past," and, in fact, they appear to be moving north, he said. "Whether that is connected with climate change, I'm not sure, but it makes sense that it is."

Because the windward sides of the islands don't rely as heavily on those winter storm systems for moisture, they aren't likely to suffer as much as the leeward sides, Giambelluca said. PTA is located in the saddle of Hawai'i island, between Mauna Loa and Mauna Kea.

Management Tools

While reversing the current climate trends appears to be near impossible, government agencies, scientific institutions, and non-profit organizations have been working together to provide Hawai'i island, at least, with tools to help identify — in real time — areas most vulnerable to burning and to collate fire history data collected by various agencies.

In his 2012 presentation, Pierce said there's usually a two-week lag between a hot spell and vegetation die-off. Dead vegeta-

tion is "correlated with [low] fuel moisture, which is key to the start and spread of fires," he said.

Several years ago, Greg Asner of the Carnegie Institution for Science developed a web tool that allows visitors to view satellite images showing areas of live vegetation, dead vegetation, and bare ground.

In addition, the Hawai'i Wildfire Management Organization (HWMO), a non-profit organization, has helped develop a map identifying the fuel loads across the island. It has also spearheaded the creation of a wildfire history map. Among other things, the map, which is the first of its kind in Hawai'i, will help agencies secure resources for mitigation and post-fire restoration, according to HWMO executive director Elizabeth Pickett, a conference presenter.

According to Mann, HWMO is working toward developing a statewide map.

Coupled with climate change information expected from the PICCC, the map will be a useful tool for fire pre-emption, management, and post-fire remediation, Mann said.

Having data on historic fires, as well as current day information on changes in precipitation, should give managers the ability to predict fire hazards and do pre-fire planning, she said.

— Teresa Dawson

mated 6,000 sites from lower Puna to Laupahoehoe on the east side, and to the Kona airport and Ka'u on the west. Some 4,000 homes, 186 farms, six parks, a school, a hotel, and 568 other sites on the island have been infested, Motoki said. Fellow presenter Lissa Strohecker, an outreach specialist with the Maui Invasive Species Committee, added that the Hawai'i island office of the state Department of Agriculture now gets 25 to 30 calls a week from people seeking advice on how to get rid of the pests.

And the ants aren't just biting people, they're hampering inter-island trade and tourism.

Motoki reports that the model predicts 23 percent of plant nurseries on Hawai'i island are infested with the ant. As a result, a number of landscapers on Maui have stopped importing plants from Hawai'i and have started sourcing locally, according to biologist and environmental consultant Forest Starr.

**“If we find nothing, we declare freedom.”
— Gary Morton**

Visitors to a few badly infested beach parks and the Panaewa Zoo are “constantly being stung by ants falling from trees,” according to the ant lab’s website.

Despite the ant’s obvious impacts, Strohecker said, there still seems to be a lack of awareness on Hawai'i of how bad the pest can be once it’s established.

“[E]ven though properties have ants, residents are often not treating, or treating too inconsistently to be effective, citing treatment cost and neighboring lot access as limitations,” her abstract states.

Government agencies have been encouraging the landscape industry to treat plants, working with farmers markets to encourage testing, and trying to spread the word at community events with the Big Island Invasive Species Committee, among other things, Strohecker said.

Should resource managers ever get an influx of funds to control the ant, Motoki’s model suggests that focusing on suppression in the agricultural, nursery, and lodging sectors would likely yield more economic benefits than focusing on residential, school, and park sectors. However, that strategy would protect far fewer people from getting stung.

Incipient Infestations

So far, the ants haven’t been detected on O’ahu. On a farm in west Maui, a small infestation found in 2009 was thought to be nearly eradicated a couple of years ago, but scientists discovered a nest on the property

this year. On a 12-acre site on the North Shore of Kaua’i, after repeated treatment with pesticides, resource managers are now close to stamping out a decade-old infestation there.

To prevent plants shipped from Hawai'i island from causing further infestations, the HDOA requires all potted plants from there to be inspected. If any ants are found, the plants must be treated with pesticide before being shipped. Nurseries inspected twice a year by the HDOA and certified to be ant-free, however, may ship plants freely.

Some scientists and resource managers have recommended tightening the state’s regulations to prevent the transport of any plants from known high-risk areas, but so far, no rule amendments have been proposed.

Presenter Gary Morton of the Department of Agriculture, Fisheries and For-

estry in Queensland, Australia, described the protocols and methods his agency has implemented to prevent the spread of the LFA, which was first detected there in 2006.

In Queensland, where eradication is still possible, 50-meter buffers are imposed around infested areas and landowners are prohibited from moving materials or ants out of the quarantine area without the approval of an inspector, Morton said.

With two trained ant-sniffing dogs (plus their handler), a field staff of five, and strict protocols on moving vegetation, Morton has managed to inspect and treat some 260 hectares.

When inspecting green waste, “that’s where the dogs come in really handy,” Morton said. “They can check some soil and run across some plants very quickly, in a five or ten minute period.”

Morton also advocates for proactively searching for the ants.

“Catching that cycle early, that’s how we’re going to eradicate. There’s less plants that are being moved. Hopefully [we’re] reducing the chance of spreading. ... We’re on target for eradication,” he said.

Although penalties for violating the quarantine are high, “we’ve issued warnings but never prosecuted anybody,” he continued, adding that it’s difficult to prove a person knowingly moved infested materials.

Once an infestation is treated with

pesticide, his team resurveys the area nine months later with the dogs, then again nine months after that.

“If we find nothing, we declare freedom,” he said.

So how important are the dogs?

For Morton, it means doing only two follow-up surveys rather than three. “They’re also an enormous engagement tool. We’ll do demonstrations at events. They’re such a visible part of our program,” he said.

They are, however, very expensive. His dogs are trained to detect little fire ants – or as they call them in Queensland, “electric ants” – as well as red imported fire ants. The cost of that training: \$60,000.

Vanderwoude, who mediated the conference panel on LFA, says the dogs are really handy when eradication is the goal and “where you have to find every last ant.” And they’re also good in a quarantine context. “If you had a trailer load of potted plants ... if there was one fire ant in there, they would find it,” he says.

But because they’re so expensive to train and maintain, dogs are not ideal for controlling ants on Hawai'i island, “where we have ants everywhere. ... You’re not looking to find *an* ant,” he says. “There is a use for detector dogs, but it’s important to do the math first.”

More information on this problem as well as how to manage little fire ants can be found on the Hawai'i Ant Lab website www.littlefireants.com.

Can the Mongoose Be Eradicated from Kaua’i?

Thank you, Theresa. That was very depressing,” said Advancing Biodiversity session moderator Josh Atwood of Theresa Menard’s presentation on how difficult it will likely be to eradicate mongoose from Kaua’i, especially with only a year’s worth of funding in place for a single dedicated technician.

If they can’t be eradicated, the “eggs and hatchlings of ground nesting birds like our state bird, the nene, and endangered sea turtles like the hawksbill sea turtle are especially at risk,” states the website for the Kaua’i Invasive Species Committee (KISC).

No one knows whether mongooses have established a breeding population on the island or if there’s only an incipient one. One mongoose was found in 1968. Another, a lactating female, in 1976, Menard

PHOTO: KEREN GUNDERSEN



Kaua'i Invasive Species Committee employee Pat Gmelin with a live mongoose captured on Kaua'i, in May of 2012.

said. They had been sighted sporadically throughout the decades, then in 2012, they seemed to be everywhere. A male was captured near the airport, then a female near Nawiliwili harbor. And there were dozens of sightings.

Menard, a map maker and data analyst for The Nature Conservancy of Hawai'i, KISC's Keren Gundersen, and John Chapman of the National Tropical Botanical Garden ran various scenarios on a population model to determine what, if anything, could be done to rid the island of the pest that has already established itself on O'ahu, Moloka'i, Maui, and Hawai'i island.

Based on the number of credible, non-overlapping sightings in 2012, the team estimated that there are about 54 mongooses on Kaua'i. Because of the model's limitations, they set a carrying capacity of 5,000 animals, but the actual capacity could be much higher, Menard said.

Simply put, without consistently high levels of harvest, there's no chance of eradication. Menard reported that if no more mongooses make their way to the island, and if managers are able to cull 29 of them a year, there is a 50 percent chance that Kaua'i would be mongoose-free after 15 years.

Under a scenario in which only half of the adult females breed, a harvest of 29 a year would eliminate the population in three years. If only eight a year were caught, it's likely they could be eradicated after 27 years, the model showed.

However, if only two mongooses a year somehow make it to Kaua'i and no more than 29 a year are caught, eradication be-

comes impossible, the model showed.

To prevent newcomers from supplementing the current mongoose population on the island, Menard recommended signage and inspections.

Trapping the animals has proven difficult. After two were captured in the summer of 2012, staff with KISC, the Department of Land and Natural Resources' Division of Forestry and Wildlife, the U.S. Fish and Wildlife Service, and Young Brothers spent more than 2,500 hours over the rest of the year setting and checking more than 300 traps. By the end of the year, they had caught mice,

chickens, cats, and toads, but no mongooses. No mongooses have been caught so far this year.



Two Candidates for Miconia Biocontrol

Enemies of one of the worst invasive plants in the Pacific are a step closer to being deployed in Hawai'i. At the conservation conference, U.S. Forest Service entomologist Kenneth Puliafico reported on his progress with determining if two insects from the home range of *Miconia calvescens* will leave important Hawai'i flora alone.

So far, the news is good.

"In Costa Rica, miconia is a happy little plant," Puliafico said as he showed a picture of a shoulder-high, lone miconia plant growing alongside a stream there. Outside of its range—in Tahiti, in particular—the plant bosses nearly every other plant out of the forest. In infested areas in Hawai'i, miconia is often the tallest tree around and forms dense stands. Its massive leaves, which



Miconia calvescens

can easily grow to be several feet in length, shade out native understory.

With seeds like grains of sand packed into tiny berries, a single tree can produce millions of seeds a year. Because the seeds are widely dispersed by birds and stay viable in the soil for up to eight years, detecting and eradicating incipient populations is labor intensive and costly.

On all of the large main Hawaiian islands—Kaua'i, O'ahu, Maui, and Hawai'i— island invasive species committees have been fighting for years to limit the plants' spread. Some islands have fared better than others. O'ahu, for example, has all but eradicated the plant. On Hawai'i island, however, the plants have established a stronghold in the Hilo area and are creeping their way along the Hamakua coast. A couple of isolated populations have also been found on the island's west side.

With limited funds and staff to control the plants, many see biocontrol as the best long-term management option.

At a lab in Costa Rica, Puliafico has been feeding a variety of plants to two insects known to hamper miconia's reproductivity and ability to shade out other plants. He wants to see what they will eat, what they like the best, and what they'd rather die than eat.

First, there's the seed-feeding weevil, *Anthonomus monostigma*, collected from four different miconia species. Adult weevils feed on the fruit; the larvae eat the seeds, he said.

His tests so far suggest that the weevils have very strong preferences for their host plants. However, Puliafico said, he is still working on a list of native Hawaiian plants to test the weevil on.

"The good news is that the *Miconia nervosa*, invasive in Australia and potentially coming here, has a weevil that loves its host plant. We've got an ace in the hole," he said.

The second insect he's testing is *Euselasia chrysippe*, a defoliating caterpillar, which he said have "fun, little larvae that eat all together," forming great chains along the edges of leaves.

The caterpillars are found only on miconia species and were identified a decade ago as a potential biocontrol agent. Puliafico said he had tested them on 34 species of plants in petri dishes. Fortunately, he said, none of them damaged any native Hawaiian species.

He said he plans to test the caterpillars on even more local plants "to make sure our native species are well protected, and important crop trees." — T.D.

PHOTO: MAUI INVASIVE SPECIES COMMITTEE

How I Learned to Love to Weed: My Month on the Big Island

I'm a New Yorker, born and raised in a city where trees are planted in five-by-three foot squares every few blocks and gardens are squeezed onto rooftops, cajoled out of postage-stamp yards, and nurtured on terraces. Green is hard to come by in New York, but growing up as the daughter of a professional gardener, I interacted with nature more than most of my peers. That's not to say that I was an expert on the subject or enjoyed the back-breaking, sweat-inducing labor involved in gardening. When I was around twelve my mom hired me to help at one of her jobs (a charming garden with a patio in Park Slope). I might have pulled up two or three weeds before she handed me a twenty (my day's salary), told me to stop whining, and sent me off to buy myself the slice of pizza that I seemed so desperately to want.

It's been four years since I was twelve (thank god) and in the meantime my appreciation of hard work and the environment has increased tenfold. Having always had an interest in journalism and a secret (though overly romanticized) yearning to save the world through environmental activism, I came to Hilo to intern for a month at *Environment Hawai'i*. I had no idea what to expect. The images I conjured up before landing in Hilo were spotty and slightly resembled a desktop screensaver: swaying palm trees, a postcard marked "Aloha From Hawai'i," scantily clad hula dancers, and waves crashing on white sand beaches. As I've come to realize since, such images reflect little of what the islands have to offer.

In my short time here I've had the good fortune to explore a range of Hawai'i's ecosystems: from the lush rainforest in Hawai'i Volcanoes National Park to the dry alpine desert on Mauna Kea. Volunteering at two forest restoration projects, one in a dry forest and another in a lowland rainforest, I was able to get up close and personal with two of the Big Island's ecosystems and help, albeit in a small way, in the effort to protect them. What's more, I wound up doing exactly what my mom had paid me not to do four years ago and found myself enjoying it.

Pu'uwa'awa'a

Within three days of my arrival I was headed to Pu'uwa'awa'a, an area that's been chewed nearly to death by cattle, sheep, and goats for the better part of two centuries. Since 2001, stewardship of the area has been given over to



Ava Prince weeding at Liko Na Pilina.

the Department of Land and Natural Resources' Division of Forestry and Wildlife, which is now working to restore the land and its natural inhabitants. We — Pu'uwa'awa'a manager Elliott Parsons, *Environment Hawai'i* editor Pat Tummons, two students and myself — were the first group to outplant threatened and endangered trees in Waihou, a 204-acre fenced conservation unit high in the ahupua'a. Armed with planting tools, watering buckets, and healthy aiea, halapepe, and kauila seedlings, we bounded over weeds and weathered lava in one of the roughest truck rides I've ever been on. I clutched my seat as the pickup bounced mercilessly onward, keeping my eyes focused on what was outside the window. I'm not exactly an expert, but even so, what I saw didn't seem to represent "...the richest floral section in the whole territory," which is how famed botanist Joseph Rock described the area he saw in a visit in 1913. The landscape that was once dense with "luxurious vegetation" is now mostly covered in a carpet of invasive kikuyu grass, with the occasional 'ohi'a or mamane tree peeking out tentatively alongside the scraggly remains of their predecessors. Along the way, a few herds of wild goats or sheep would quickly leap across our path, and at one point we were chasing a directionally likeminded turkey as he scuttled down the road ahead of us. Parsons would stop the truck at times to point out recent accomplishments — school-kid projects and successes in other management units — before navigating us, safe yet shaken, to Waihou.

Well before our arrival, other work crews had cleared plots in our worksite using pesticides. The grey circles of the dead kikuyu polka-dotted the landscape, with colorful flags popping up to show where previous groups

had planted koa and other natives. Our small crew added just 24 more trees and spent the rest of the day weeding. This foe from long ago was soon to become a friend, however, as I pulled at these weeds with a ferocity and the same feeling of triumph Superman must feel as he lifts cars and rescues small children.

"The personal fulfillment one gets out of doing projects here is enormous," Parsons wrote in an email to me, and I can understand.

Uprooting weeds and digging through the 'a lava, you can easily become consumed with the small details: the ache in your lower back, the blisters on your hands, the stone you want to wrench out of the ground that turns out to be a boulder. It's easy to forget how much larger the project is and how much work you have left to do.

Liko Na Pilina

"There were various times when I definitely felt overwhelmed. But then we hired an amazing team of people, and having them on board, and all the teamwork involved gave me a lot of confidence that we could do this," says Rebecca Ostertag, one of the main researchers at Liko Na Pilina (otherwise known as the Hybrid Ecosystems Project). This project is located alongside the Hilo airport at the Kilauea Military Reservation (KMR), where Ostertag and her team are experimenting using a blend of native and introduced, non-invasive trees to restore the lowland wet forest.

As at Pu'uwa'awa'a, Ostertag's team needed to set up and clear plots to carry out their research. Unlike Pu'uwa'awa'a, however, where the largest weed I encountered was a two-foot-high thistle, the crews at Liko na Pilina faced 30-foot-tall trees that had intertwined with one another over time. All the trees that were not native or part of the hybrid collection were cut down. Think of it as extreme weeding. As I viewed the control areas, I couldn't imagine trying to cross them on foot, let alone march through them with a chainsaw. I feared I would trip when I'd walked just a few feet out of the plot to use the facilities supplied by the overgrowth. Covered completely by the rows and rows of tangled forest, the alterations Ostertag and her team are making in the plots are invisible unless one, for some inexplicable reason, were to leave the road and plow through the dense weeds for a good five minutes.

I spent my days at Liko Na Pilina weeding, yet again. While doing so I found myself enjoying not only what had become my new favorite hobby but also the communal atmosphere brought by the members of the team. The physical wear and tear of the day's work was balanced by cheerful gossip, the easy banter and conversation making the day seem

BOARD TALK

Land Board Finds Three Kayak Vendors Guilty of Illegal Use of Maui Beaches

After years of lax enforcement, the state Department of Land and Natural Resources' Land Division has begun cracking down on commercial tour companies on Maui that use state land to stage gear and orient guests.

"The Maui District Land Office has received numerous complaints from the public regarding the overcrowding of shoreline areas due to vendors laying out kayaks or surfboards along the beach while awaiting the arrival of clients or during lessons and safety briefings being conducted prior to moving out into the water for tour or surf lessons," states a June 28 DLNR Land Division report. It adds that the public is "now being forced

Division administrator Russell Tsuji asked the board to assess a \$1,000 fine and \$420 in administrative costs against Island Adventure Tours LLC (doing business as Keli'i's Kayak Tours), which he said had been illegally operating at Olowalu State Beach Reserve.

Company owner Brian Yesland readily admitted that he been using the beach for the past 20 years, but denied that he was conducting any commercial activity.

"We use the area strictly for ingress and egress to the ocean," he told the board.

Yesland has a permit to conduct his tours at the county's park at nearby Ukumehame. But the park, popular with surfers, is too crowded, he said.

"[G]o back to the county park, utilize your permit, and that way everybody is happy."

— Jerry Edlao, Land Board

out of these locations because of the impacts brought by the presence of unauthorized commercial operators."

This summer, the division brought three violation cases to the Board of Land and Natural Resources. All three companies were found to have broken department rules prohibiting commercial use on state land without a permit. But in two of the cases, the board eliminated the recommended fines. Two of those companies requested and recently received approval for a contested case hearing.

At the board's June 28 meeting, Land

"Years ago, we started to move to Olowalu because it's sparsely used. We are not running financial transactions there. We give a safety briefing and launch the boats. It's no different from what we do at the beach park. We're still crossing unencumbered [state] land. I don't know why you want to create user conflict by moving us back [to the park]," he said.

He added that DLNR enforcement officers have only told him to keep his gear off the beach.

To then-Maui board member Jerry Edlao, it didn't matter that Olowalu is less crowded.

"Over the years, maybe nobody really said anything, but it's getting to the point DLNR is catching up to the issues going on. Now they're looking at you. ... I would suggest you go back to the county park, utilize your permit, and that way everybody is happy," he said.

Rob Pacheco and John Morgan, the Hawai'i and O'ahu representatives on the board, seemed concerned that the case was only now coming to the board, five years after the initial incident. (Pacheco runs Hawai'i Forest and Trail; Morgan, Kualoa Ranch, both of which operate commercial tours.)

Pacheco also lamented the fact that the department's rules allow for commercial activity with a permit, but there is no process that would allow a tour company to get a commercial permit, for unencumbered lands. The DLNR quickly established a permitting system for beach weddings, he pointed out.

Tsuji countered that for commercial tour permits, his staff would have to evaluate the location and may have to conduct an environmental review. He also clarified that it is fine for tour groups to traverse the beach, but conducting operations there is not.

After discussing legal issues in executive session, Edlao moved to find that the company committed a violation, but forgo the fine and administrative costs. He added that he wanted the Land Division and the Division of Conservation and Resources Enforcement "to continue vigilance of commercial use of unencumbered lands."

Edlao's motion passed, but board members Pacheco and Morgan voted against it.

Pacheco said bringing a violation case five years late wasn't reasonable. "This doesn't work for me," he said.

Morgan added that he hoped the department continued to try to find a solution. The commercial tour companies are providing a

shorter and the workload lighter. Again, as at Pu'uwa'awa'a, the visible results have been slow, but mostly positive. The mortality rate of the trees planted has been much lower than Ostertag said she had expected (with only 10 out of 1,700 trees having died) and now that the canopy's been opened, tiny 'ohi'a and mamaki seedlings have been popping out all over the place on their own. In prior projects it took about a year to see seedlings, but these new natives have been spotted within a couple months of clearing.

Volunteering at these restoration projects has shown me the importance of perseverance. Instead of giving up and becoming overwhelmed by the size of a project, these

teams tackle it step by step, grab one weed at a time and work their way up to solving the larger issues. At the end of my days at Liko Na Pilina, we would sip on our water and look over our work space, now mostly free of weeds, with our little seedlings soaking up sunlight as we soaked in the fruits of our labor. I didn't get a twenty or a slice of pizza, but my reward was so much greater.

My month at *Environment Hawai'i* was an all-inclusive backstage pass to the world of forest restoration, and came with a complimentary pair of "ecologist glasses." This new prescription shaped every aspect of what I encountered on the Big Island, showing me a truth behind what most tourists see.

"Is that plant native or invasive?" is a question I've learned to ask of every plant I see. Sadly, the answer is almost always "invasive," with strawberry guava, albizia, banyan, and miconia consuming acre upon acre of the island's landscape. It is this new knowledge I've gained in my short time here that has changed my perception of Hawai'i, sticking with me so much more than a row of palm trees and crashing ocean waves.

Ava Rose Prince will enter her senior year at Fiorella H. LaGuardia High School of Music & Art and Performing Arts in Manhattan. She lives in Brooklyn.

service, he said, "and it's a worthwhile service. ... I think it's worthwhile to try to minimize conflict."

Yesland requested a contested case hearing, which the Land Board granted at its August 9 meeting.

Olowalu Offender II

In 2011, DOCARE officials photographed South Pacific Kayaks & Outfitters and Tiki Team Adventures doing much the same thing as Keli's Kayak Tours — setting kayaks along the sand and briefing customers. At the board's June 28 meeting, Land Division staff recommended the same penalties: \$1,000 fine, \$420 in administrative costs.

Roger Simonot, owner of parent company KRS Investments, LLC, did not attend the meeting, but in a letter requested a contested case hearing.

Continuing the discussion from the previous case, Tsuji told the board that the DLNR's top priority is preserving natural resources, and by law, it must also protect traditional and customary practices.

The shoreline and everything seaward "is held in trust by the state," he said. "The Land Division is not out looking to commercialize the shorelines at all. Uses get scrutinized very carefully before being brought to board."

He pointed out that the board had recently caused a stir when earlier this year it voted to allow the Four Seasons resort on Maui to preset chairs on the beach. Outraged community members quickly filed a lawsuit noting, among other things, that no environmental review of this use of state land had been done. The resort has since chosen not to use the easement provided by the board.

"There are people out there watching to make sure we staff and the board look out for the interest of the public, especially in the shoreline area," he said.

Should the board ever entertain the matter again, Tsuji said an environmental assessment would need to be done and, at least, a determination as to whether a Conservation District Use Permit would be required.

Looking at Olowalu beach, "it doesn't look like there's a lot of room for a commercial operation," he said.

Maui land agent and former DOCARE officer Larry Pacheco added that several vendors with county permits to operate at Ukumehame use Olowalu instead because it's not only less crowded, but is less windy and has more reef.

"Residents across the street complain tourists are there at 7 a.m.," he said. "The general public goes there. If [tour operators] have 10 kayaks lined up, there's no place for families to go."

And the tour companies know they're not supposed to be there, he said. His office partnered with the county to conduct a presentation for operators explaining the shoreline boundaries of county land, private property, and unencumbered lands.

"In class, we tell them, if they do everything on private property, but traverse the shoreline, that's okay. Once they use the shore for their commercial operation, that's a problem," he said.

Board member Rob Pacheco asked whether the guests were showing up in their own cars.

"Their own cars and even buses are showing up. It varies. It depends on the company. Some of them have tour vans," Larry Pacheco said.

Again, the time lag between the violation and the recommendation to the Land Board bothered the Hawai'i board member. "Why now is this coming to us?" he asked.

The Maui land agent blamed a lack of staffing, noting that there are only two land agents for all of Maui County. He added that DOCARE held back on enforcing because there is no process in place to get a commercial tour permit for the beach.

Rob Pacheco asked whether it would be beneficial to try to work with the county on a joint permit for these operators.

Board chair William Aila said that option already exists. "We could issue a permit, but we choose not to," he said.

Jimmy Gomes, who has since replaced Edlao on the board, testified that Olowalu may not be the best place to direct tours.

"From road to ocean, I don't think you have 60 yards. When it's high tide, [even less]," he said.

According to Tsuji, controlling illegal kayak vendors is difficult with so little staff.

In the end, the board voted to approve staff's recommendation. At a subsequent meeting, the board granted the company a contested case hearing.

Third Time's a Charmer

At its July 26 meeting, the Land Division brought its third illegal kayak vendor case to the board. But this time, because the owner was contrite and promised to stop operating on Wailea beach, Tsuji recommended forgoing the proposed \$1,000 fine, but not the administrative costs of \$420. Should the company, Maui Ocean Activities, commit another violation, however, Tsuji recommended that the fine be reinstated.

The company had been operating adjacent to the area where the Land Board had agreed to allow the Four Seasons to preset chairs. Apparently, company manager Dan Cardoza said he wasn't aware he could not stage his kayaks on the beach.

"We just didn't know," said Cardoza. "We were under the the impression it was business as usual."

"Are you okay with administrative costs?" asked at-large member David Goode.

"What are you gonna do? ... It's the cost of ignorance," Cardoza replied.

The board then approved a motion finding that the company had committed a violation. The board waived the \$1,000 fine with the understanding that should the company commit another violation, the recommended fine would be higher.

— T.D.



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Kaua'i Drag Strip, Invasive Species Council Are Matched in Legislative Appropriations

The Hawai'i Invasive Species Council recently announced that it would be awarding \$2.5 million in grants to address problems associated with plants and animals that pose serious threats to the state's economic and environmental health. That is a far cry from the more generous sums the Legislature appropriated in previous years, even though with every month that passes, the threats only increase.

On the other hand, the Garden Island Racing Association, which operates a drag strip on state land in west Kaua'i, has been blessed with legislative appropriations equal to what HISC has to work with this year. Since 2011, a total of \$2.5 million has been allocated in capital improvement funds so that GIRA members can race their dragsters and bikes on a smooth track in Kekaha, Kaua'i — and also make other, as-yet-unspecified improvements. What's more, all the work associated with making the improvements — finding a contractor, overseeing the work, keeping the project moving forward — falls not to GIRA, but to the Department of Land and Natural Resources, to whom GIRA pays \$1 a year rent for use of the site.

The first funds to aid GIRA were appropriated in 2011, when the Legislature approved spending \$500,000 in FY 2012 on "plans, design and construction to upgrade and resurface Mana drag racing strip, ground and site improvements; equipment and appurtenances." In 2012, the Legislature increased the amount by an additional \$1 million. Earlier this year, the DLNR's Engineering Division awarded a contract to Jennings Pacific in the amount of \$846,550 to repave a quarter-mile of the track. With the bid having come in lower than anticipated, in July, the DLNR sought to encumber an additional \$260,000 to allow Jennings Pacific to repave another

quarter-mile section; the state's chief procurement officer gave his approval to the contract amendment early last month.

This year, the Legislature inserted CIP funds of \$500,000 for FY 2014 and \$500,000 for FY 2015 as well. The purpose of the appropriation was described in wording identical to that in previous budget bills. No one at the DLNR is clear on what this appropriation is for. Dickey Lee of the Engineering Division told *Environment Hawai'i*, "We are working with GIRA to determine other improvement projects to the race track to utilize the new funding."

The appropriation was inserted into the FY 2014-2015 budget after it had crossed over from the House to the Senate. In the report from the Ways and Means Committee, senators noted that they had increased the governor's capital improvement project (CIP) budget to add "hundreds of other projects for the Department of Education the University of Hawai'i, Department of Land and Natural Resources, and the Department of Accounting and General Services."

Senate vice president Ron Kouchi, a member of the Ways and Means Committee whose district includes West Kaua'i and Ni'ihau, defended the project. In a phone interview with *Environment Hawai'i*, Kouchi said that GIRA had submitted a request for funds, noting "the track was in disrepair and unsafe."

When asked if a sport that involves the lavish consumption of fossil fuels is one that the state should be encouraging, Kouchi pointed to his record of support for legislation that encourages use of renewable fuels and other environmental bills, including one that would have tacked on a plastic-bag fee to help fund watershed protection.

Kouchi also defended the drag strip as an

important economic driver for west Kaua'i. On holiday weekends — Memorial Day, Fourth of July, Labor Day — "four to five thousand people participate in racing events," he said.

Kouchi is not alone in his enthusiastic support for the track. When ground was broken on the track resurfacing project in June, Lieutenant Governor Shan Tsutsui read a statement from Governor Neil Abercrombie that praised GIRA for promoting "safe motorsports" and for encouraging "safe driving on public roads." State Rep. Dee Morikawa said the drag strip was "a great economic driver for the west side," according to a report in the Garden Island newspaper.

William Aila, DLNR director, was reported as saying the project provided "a place to gather to share stories of the past, make stories for the present, and to teach children about how they will create stories for the future."

Tony Ricci, president of GIRA, then told the crowd that safety in motor sports is one of the highest priority items in the group's mission, the paper reported.

Ricci, by the way, is the plaintiff in a lawsuit against Kaua'i County and the state, alleging that either one of them, or both, were at fault when he sustained serious and permanent injuries in a motorcycle accident on Koke'e Road last January. According to the complaint filed in 5th Circuit Court, "the condition of Koke'e Road constituted an unreasonable risk of harm and was unreasonably dangerous to motorists... The dangerous condition of the roadway caused plaintiff to lose control of his vehicle and collide and crash with a guardrail." As a consequence of the accident, Ricci claims, he "has suffered, and will continue to suffer, severe and permanent physical injury and suffering, mental distress, loss of wage and/or impairment of earning capacity, diminution of enjoyment of life's activities, expenses incurred for treatment of his injuries, together with other damages as shall be proved at time of trial."

— P.T.