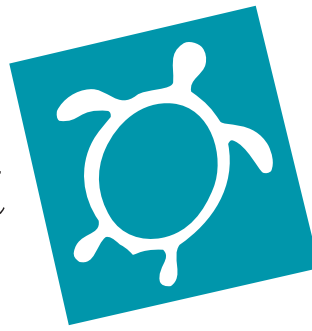


Environment



Hawai'i

a monthly newsletter

Back to the Well

Before the dispute over the century-long diversion of East Maui streams by Alexander & Baldwin can be resolved, a few things need to happen. Perhaps foremost among them is a Commission on Water Resource Management decision on a contested case over the interim instream flow standards (IIFS) of more than two dozen streams diverted into the East Maui irrigation system.

With the release of hearing officer Lawrence Miike's recommendations in January, a decision on the IIFS is expected in the foreseeable future. And if his meticulous calculations are correct, it's clear A&B has access to sufficient well water to supplement irrigation needs of its final sugarcane crop, even if nearly 20 million gallons a day are restored to streams. In this month's cover story, we detail the potential implications of Miike's recommendations. And in related articles, we continue our discussion of the challenges to A&B's authority to divert the water.

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Recommendation of Hearing Officer Favors Restoration of East Maui Streams

In the coming months, the state Commission on Water Resource Management is expected to hear oral arguments on contested case hearing officer Lawrence Miike's January 16 proposed Findings of Fact, Conclusions of Law, and Decision and Order regarding Na Moku Aupuni o Ko'olau Hui's 2001 petition to amend the interim instream flow standards (IIFS) of more than two dozen East Maui streams currently diverted by Alexander & Baldwin (A&B) and its subsidiary, East Maui Irrigation Co., Ltd.

water needs for a very thirsty crop that will soon no longer be grown.

"We question why this was not included in the contested case hearing. It was a material fact," Na Moku's Mahealani Wendt told the state Senate Committee on Water, Land and Agriculture last month during a hearing on Senate Bill 3001, which would have created a "holdover permit" to allow A&B to continue to divert the streams while waiting for a long-term water lease from the state Board of Land and Natural Resources.

Because the decision to close HC&S was made public after the hearing closed, "we were told it cannot be taken into consideration," she said. "It is very disheartening."

A&B's representatives, on the other hand, testified that although the company is ending its sugar operation this year, it still needs all of the water it's currently diverting — some 150 million gallons a day — to irrigate its final cane harvest and whatever diversified crops it might grow in the future.

"There are many times

when the ditch goes down to 10-20 million gallons a day," said A&B vice president Meredith Ching. Addressing arguments that the company could use brackish well water instead of East Maui surface water, she noted that sugar is a very hearty plant that can withstand some salt, but many of the crops her company is looking into may not be as tolerant, she said, adding that well water is expensive.

Commission staff has estimated that total

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PHOTO: LIBRARY OF CONGRESS

Control gates to East Maui Irrigation system in vicinity of Kopili'ulu Bridge

Although written exceptions to his recommendations were not available by press time, it was clear from recent testimony before the state Legislature that Na Moku, a group of East Maui taro farmers and native Hawaiian cultural practitioners, isn't thrilled with A&B's decision in January to announce the closure of its Hawaiian Commercial & Sugar Company (HC&S) after the contested case hearing ended months earlier. The move now forces the Water Commission to base its vote, in part, on

Environment



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NEW AND NOTEWORTHY

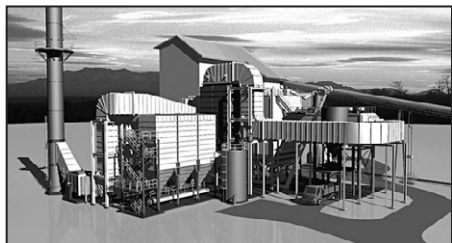


PHOTO: HU HONUA

Hu Honua Pau? The troubled Hu Honua power plant at Pepe'ekeo, Hawai'i, may finally be put out of its misery. On February 16, the Hawaiian Electric Light Company, with which Hu Honua had a power-purchase agreement (PPA), informed the state Public Utilities Commission that Hu Honua Bioenergy, LLC, the plant's owner, was in default and there was no prospect of it curing the default or achieving commercial operation "in the near future."

"Absent compelling changes in circumstances, [HELCO] intends to terminate the PPA effective March 1, 2016," the company stated.

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Hu Honua was attempting to renovate a power station that burned bagasse in the days of the sugar plantations and then burned exclusively coal for a decade after that. When completed, the plant was to have a capacity of around 30 megawatts.

As *Environment Hawai'i* has reported over the last several years, Hu Honua faced numerous financial difficulties, disputes with contractors, and zoning and permitting challenges.

In an effort to induce HELCO to forbear, in January, Hu Honua representatives informed HELCO that they could offer "a significant reduction" in the price of power. That, HELCO said, prompted the company to continue talks with Hu Honua for another month to see if agreement could be reached on amendments to the PPA "that would be advantageous to company's customers."

HELCO agreed to put off cancellation of the contract until March 1, but then, on February 3, Hu Honua stated it was not going to propose any pricing amendment to the PPA, HELCO stated in its filing with the PUC. "Rather," the company continued, "Hu Honua requested ... that the parties 'agree to agree' to negotiate potential future PPA pricing adjustments."

After that, talks apparently ended and HELCO filed its notice of impending cancellation of the PPA.

In a news release issued in late February, Hu Honua claimed that it had the necessary financing, expressed disappointment with HELCO's decision, and blamed several of the missed deadlines on disputes with a former contractor.

The state consumer advocate agreed with HELCO's termination of the agreement.

"The consumer advocate recommends that the commission support [HELCO's] determination

that HuHonua is in default of the PPA. To do otherwise would set a bad precedent that would allow material breaches of a developer's contractual obligations without repercussions," it said in a filing with the PUC late last month.

Solar Flares: In mid-February, Hawaiian Electric (HECO), the utility serving O'ahu, notified the Public Utilities Commission it was cancelling its power-purchase agreements with three solar farm developments, all subsidiaries of the giant but financially ailing SunEdison company.

SunEdison protested that the utility could not do this unilaterally and filed its objections.

In a February 23 letter to the PUC from Bryan Martin, managing director of the D.E. Shaw Co., which was in line to purchase the three solar farms being built on O'ahu by SunEdison, stated that as recently as early January, HECO seemed favor the sale of the projects to D.E. Shaw Renewable Investments, LLC (DESRI). The company had signed an agreement to purchase the projects in late December.

At HECO's request, Martin wrote, SunEdison made certain concessions to mitigate the effects of interim deadlines that had been missed.

"HECO seemed supportive of the concessions, although HECO did acknowledge that it needed approval from NextEra Energy, Inc., prior to making any final commitments to us because of the pending combination of the two companies," he wrote.

The Honolulu Star-Advertiser's Kathryn Mykleseth reported last month that a NextEra spokesman confirmed that, under a merger agreement, the company must consent to material contract changes, including the amendment or termination of PPAs.

"HECO made the decisions, we agreed they were the right decisions for customers, and we therefore granted our consent," he was quoted as saying.

For more details, see our EH-xtra item posted on our website, environment-hawaii.org.

A Correction: Our February 2016 cover story incorrectly stated that the hearing officer's recommendations in the East Maui interim instream flow standards (IIFS) contested case hearing was expected early this year, when, in fact, those recommendations had been issued on January 15. We sincerely regret the error.

Quote of the Month

"If we get to four feet [of sea level rise], which we eventually will, it's a catastrophic situation."

— **Chip Fletcher,**
University of Hawai'i

State Green Energy Loan Fund Yields Few Measurable Results in 2nd Year

Rep. Cynthia Thielen of Kailua was frank: “I think that GEMS has not been run well. A million dollars to place out three loans is pretty pathetic. I mean, that may rank at the top of the pathetic list of what the state has done.”

Thielen made her remarks at a hearing last month on a proposal to take money from an account held by the state’s Green Energy Market Securitization program – GEMS, for short – and use it to pay for programs to cool hot classrooms across the state. To achieve this, Gov. David Ige had proposed lending the Department of Education \$100 million, more than two thirds of the roughly \$145 million held by GEMS. To cover the interest on the loan, he was asking the Legislature to approve up to \$7 million in general funds.

While testimony on House Bill 2726, the vehicle intended to carry out Ige’s plan, was favorable when it came up for a hearing on February 4 before the House Energy and Environmental Protection Committee, Thielen used the hearing as an opportunity to voice her frustration with GEMS.

“We’re working hard to keep the schools cool and I totally support that,” Thielen said. “What I do have problems with is the actual GEMS program itself. My research has shown that there’ve evidently been a total of three loans during the time the program has been in operation. Three loans, that’s it. And yet during that same time, there’s been a million spent on administrative expenses. ... So, what assurance is there that if the [Department of Education] is going to be able to tap into this, to get the money to cool the schools, that we won’t run into this same inept bureaucracy that has prevented the money getting out to the consumers that needed to cool their properties?”

Despite Thielen’s misgivings, the Energy and Environmental Protection (EEP) Committee approved the intent of the bill, folding its provisions into yet another bill – House Bill 2569 – which, in addition to authorizing the \$100 million loan from the GEMS fund, called for the state to issue \$30 million in general obligation bonds to pay for heat-abatement, energy efficiency, and other measures intended to make for cooler classrooms.

The following week, the companion measure in the Senate was heard in a joint meeting of the committees on Transporta-

tion and Energy and on Education. Once again, those testifying were in strong support. (For latest developments on this bill, see the article on page five of this issue.)

High Hopes

The most recent quarterly report from the Hawai'i Green Infrastructure Authority (HGIA) to the Public Utilities Commission bears out Thielen’s criticisms. From the time GEMS opened for business, in late 2014, until the end of 2015, GEMS had authorized no loans at all from the \$145 million in bond funds it has sitting in the bank, according to the filing, made on January 30.

Only in January 2016 were funds for the first three GEMS loans disbursed, with a total face value of \$107,000, the report stated.

“What I do have problems with is the actual GEMS program itself.” — Rep. Cynthia Thielen

The administrative costs associated with GEMS, on the other hand, came to more than ten times the value of the loans: \$1,199,235.75 – not including any expenditures since the close of the reporting period (December 31, 2015). Meanwhile, payments to bondholders have siphoned off around \$7 million a year from electric ratepayers in three counties.

To explain the disappointing performance, the report notes that “the renewable energy landscape in Hawai'i is changing rapidly.” PUC actions including a cap on new rooftop solar capacity (35 megawatts), the end of net-metering (NEM), and inter-connection issues, the report states, “have affected not just the HGIA and the GEMS program but all of the private and public sector actors in the renewables marketplace.”

PUC ended net-energy metering on October 12 and, in so doing, threw a spanner into the GEMS loan process. Instead of homeowners with PV systems being credited for energy put into the grid on a one-to-one basis with what they draw from it, anyone applying for a new system after October 12 would see that credit more or less halved.

Tara Young, hired last November as executive director of HGIA, told *Environment Hawai'i*, “the effect of the end of the net

metering tariff was almost immediate – we received 101 applications in the period from June 30 to October 13 and only 29 applications from then until present.” Almost all those applications, she added, “have been for potential borrowers who had already obtained conditional NEM approval. While the GEMS consumer loan product is available to finance systems connecting via grid-supply or self-supply, there has been a dramatic slowdown in the sales of these systems.”

At an “informal technical conference” on the GEMS program held by the PUC on February 11, Young listed some other factors underlying the poor performance of the GEMS program over the last two years. In addition to the end of net-metering and other developments listed in the annual report to the Legislature, Young described how the GEMS program had not been nimble enough to compete for market share against private-sector solar installers. Thus, “competitive products in the commercial market” had undercut the anticipated demand for GEMS loans in both the private

and non-profit sectors. In addition, GEMS loan applications had a “longer sales cycle than consumer products.” For example, she said, for customers to get pre-approval for a GEMS loan, they had to mail or fax in their applications, while private lenders allow for online submissions.

She added that the program, which currently has only three employees, is going to need more people if it’s ever going to effectively deploy loans.

Although downplayed at the conference by Young, PUC staff noted that they had received feedback that the interest rates offered under the GEMS program were too high. What’s more, on-bill financing, which many considered to be a critical component of the GEMS program, has never received PUC approval.

Leveraged Debt

One of the key elements of the program that may have also contributed to GEMS’s lack of progress was the use of private capital to augment, or leverage, the total amount of funds that could be used for loans to the groups or individuals needing GEMS help. Or, as the PUC application stated, “The Program will invest debt capital in the market in partnership with private sector entities (‘Deployment Partners’) that

will use such capital to support directly or indirectly financing products serving ratepayers. ... [T]he Program will deploy funds through Deployment Partners utilizing two key methods: unleveraged debt and leveraged debt." The idea was that private investors wanting to take advantage of the investment tax credits available under state and federal laws would underwrite loans to

"We are not going to speculate about whether alternatives might have been more productive in retrospect."
— **Tara Young, HGIA**

customers in Hawai'i who might not qualify for those credits, either because they were in too low a tax bracket or because they were not subject to taxation (such as churches and non-profit organizations). This way, the investors could take the tax credits while at the same time lowering the overall cost of the loan to the ratepayer.

DBEDT went on to outline how this might work: "The GEMS Program will purchase a percentage, for example 80 percent, of a loan or lease. By leveraging GEMS funds, more capital is available to finance clean energy improvements. An additional benefit in Solar PV financing is private capital in the form of tax equity may be used to lower the system cost for end users that cannot monetize tax benefits."

The first "loan products" were unveiled on December 31, 2014: a "non-profit loan product" and a "consumer loan product." In the case of the non-profit loans, a minimum loan amount of \$150,000 was set. At that point, it became clear that the GEMS program was going after a slice of what turned out to be a hugely competitive market for financing from individuals and institutions that were seeking to take advantage of the investment tax credit – the so-called leveraged loans.

But even though the initial conditions of these two loan products had been determined, DBEDT was still struggling to work out just who would be selling the loans, who would be installing the systems, and who would be responsible for finding underwriters for the leveraged loans, among other things – the so-called deployment partners. In addition, the fact that the PUC had not approved an on-bill financing program meant that DBEDT also had to select an agency to process payments on the loans.

In April 2015, when it submitted its second quarterly report to the PUC, the HGIA stated that it was still "focused on securing partners for both the origination and servicing of the GEMS consumer loan product."

By last September, the program had made some progress in qualifying photo-

voltaic installers. According to the report to the PUC for the quarter ending September 30, the HGIA had "approved nine companies to be installers. ... Eleven companies are pending approval." More than 100 applications had been received for consumer loans, 35 of which had been denied and 47 "pre-approved." Twelve applications had been received for non-profit or small-

business loans, but, according to the next GEMS report, filed at the end of January 2016, none was a go. In addition, by the end of 2015, the fund administrator for non-profit loans dropped out.

Young was asked whether it would have been simpler and more productive to have placed GEMS' focus on direct loans rather than attempting to leverage loans by attracting investors wanting to take advantage of the investment tax credit. "We are not going to speculate about whether alternatives might have been more productive in retrospect," she replied.

Can They Do That?

Whatever the reasons for the GEMS program's slow start, plans to issue the DOE a loan for the majority of program funds were fast-tracked. The HGIA had been scheduled to vote to approve the loan on February 24. By that time, the legislators had started exploring whether using funds from a Medicaid reimbursement would be more appropriate; the HGIA met, but did not vote on the proposal to use of the GEMS funds for schools.

While the plan may eventually be consigned to the trash heap of history, it's clear that

"They're underserved because they're not able to get quick cash?" — **Shannon Mears, PUC counsel**

state officials were on board with the idea.

In her testimony to the EEP Committee and the Senate committees on Education and Transportation and Energy, Young said that the program "was originally founded with a broad mandate to accelerate adoption of renewable energy technology by deploying capital to consumers, for-profit, non-profit, and public sector entities." But actually, the legislation establishing the GEMS program (Act 211 of the 2013 session) limits loans "to private entities, whether corporations, partnerships, limited liability companies, or other persons." No mention of "public sector" entities appears in either

the law or the reports from legislative committees that heard the bill three years ago.

Act 211 also suggests that GEMS was created to assist underserved consumers, specifically those ratepayers unable to obtain green infrastructure equipment "on reasonable financing terms." At the February 11 PUC technical conference, commission counsel Shannon Mears asked Young how loaning the DOE two thirds of the funds available through the GEMS program is "reaching an underserved market."

Young replied, "The issue here is speed." She explained that schools need the funds quickly and GEMS funds are available.

"They're underserved because they're not able to get quick cash?" Mears asked.

"Yes," Young replied.

Whether or not the Legislature or PUC needs to amend the program to accommodate the DOE loan remains to be seen. In its September 2014 order approving the GEMS program, the PUC authorized two means of augmenting or amending it.

The first of these was through "program notifications," which would give the PUC additional details on program components; minimum lending, credit, or investing criteria; and repayment mechanisms and processes. These notifications would be submitted 15 business days prior to any program component being implemented.

"Program modification" requests, on the other hand, can be made whenever DBEDT wants to modify the program's structure beyond the scope of the PUC-approved program guidelines.

No "program modification requests" had been submitted as of mid-February. What's more, Young said she did not think any would be required to expand the GEMS program to allow for loans to the schools. On February 23, the HGIA submitted to the

PUC a program notification for a commercial energy efficiency loan product to address the DOE's heat-abatement program.

As to why schools would be considered commercial, Young stated: "The utility classifies customers as either residential or commercial. The DOE is a commercial customer of HECO and its affiliates and contributes to the ... Green Infrastructure Fee. As a ratepayer, the DOE is eligible to participate in the GEMS program. ..." Schools on Kaua'i, however, are out of luck. "GEMS funds are only to be used by borrowers served by HECO and its affiliates," she noted. — **Patricia Tummons**

DOE's Evolving Position on GEMS Bills

Kathryn Matayoshi, state superintendent of education, had little to say about the proposal to loan the Department of Education \$100 million from the Green Energy Market Securitization (GEMS) fund when the House Committee on Energy and Environmental Protection heard the bill in early February.

In a short statement, submitted as late testimony, she merely noted that “these funds will allow the Department [of Educa-

systems installed, and that these costs will need to be built into the DOE's operating budget.”

Matayoshi explained how recent actions of the Public Utilities Commission to end net-energy metering have hobbled schools.

“Current regulatory options of ‘grid-supplied’ and ‘self-supplied’ are problematic for the DOE for two reasons,” she stated, referring to the alternatives the PUC has

“Current regulatory options of ‘grid-supplied’ and ‘self-supplied’ are problematic ...”

— Kathryn Matayoshi, DOE

tion] to reach the goal of installing AC in 1,000 classrooms. Additionally, the GEMS financing will boost efforts in implementing heat abatement and energy efficient measures towards cooling additional classrooms, while offsetting anticipated energy uses.”

But a week later, when the revised proposal was heard before the House Committee on Education, Matayoshi's position was far more nuanced and seemed to put a damper on Governor David Ige's promise to use GEMS funds to air-condition 1,000 classrooms by the end of the year.

The House Committee on Energy and Environmental Protection had voted to combine the GEMS bill with another bill calling for the Department of Education to become net-zero with respect to energy use by 2035 and to “expedite the cooling of all public school classrooms to a temperature acceptable for student learning,” among other things.

This time, Matayoshi testified that the GEMS funds would be directed – not to air conditioning – but to “enable the DOE to install LED lighting and increase energy efficiency on a statewide basis. Energy efficiency is an important first step to reduce the energy usage at the schools.

“Step two is to size the renewable energy systems to meet this reduced load along with any increases from air conditioning. ... While the DOE agrees that thermal conditions in many classrooms need to be improved, this must be done with careful consideration of both the up-front initial costs and the costs that are to be carried into the future. Therefore, funding provisions for heat abatement must also include considerations for the ongoing electricity, maintenance, and replacement costs of any

approved for utility customers still wishing to install solar arrays to offset demands from the grid.

Those reasons are, first, “the size limit of 100 kilowatt photo-voltaic systems only cover a portion of a schools energy needs.” Second, “the credits earned for PV energy generation cannot be carried over month to month. Solar PV systems produce the most energy in the summer months, but this is the time of lowest usage for the schools. The changes to net energy metering no longer give the DOE the ability to carry over credits. As a result, the DOE does not have a cost-effective pathway to achieving 90 percent clean energy without policy changes.”

Matayoshi warned against burdening schools with the additional energy costs associated with air-conditioning. “While

“[W]e told them there was no way we could put out \$100 million worth of contracts in one year.”

— Gilbert Chun, DOE

the DOE agrees that thermal conditions in many classrooms need to be improved, this must be done with careful consideration of both the up-front initial costs and the costs that are to be carried into the future. Therefore, funding provisions for heat abatement must also include considerations for the ongoing electricity, maintenance, and replacement costs of any systems installed, and that these costs will need to be built into the DOE's operating budget.”

A Head Start

Since 2014, the DOE has contracted with OpTerra Energy Services to undertake a sort of energy audit of public schools in a project it calls Ka Hei, referring to the

snare used by the Hawaiian god Maui to catch the sun.

So how does the work of OpTerra mesh with the proposal for the DOE to spend up to \$100 million to cool Hawai'i schools with a loan from the state Green Energy Market Securitization fund?

According to the DOE's Gilbert Chun, who oversees the OpTerra contract, “the first thing OpTerra did was to assess O'ahu in terms of energy generation, see how many schools we could put photovoltaic systems on.”

As a result, the DOE has had about 80 net-energy metering applications approved by Hawaiian Electric, Chun said, and construction of the PV systems is “in various phases” for those schools.

Those PV systems have been funded with power-purchase agreements, he continued. “OpTerra also helped us get financiers who were interested in investing in PPAs. They also helped us bid out labor and equipment.”

As for energy efficiency, OpTerra conducted audits at a number of schools. Financing for energy efficiency improvements “are not typically funded with PPAs,” Chun added, “so OpTerra was working with us to determine how we would finance that.”

“Right now, after conducting audits at several schools, they determined that replacing fluorescent lighting with LED probably would give us the biggest bang for the buck, in terms of efficiency and reducing utility costs. So under the GEMS financing, what we are going to look at first is replacing fluorescent lights with LED and using GEMS to pay for that.”

Part of the GEMS money might also be used for air conditioning, he added, but “there's no breakdown yet” of how the funds will be spent.

Chun was not supportive of the idea that the DOE get the full amount of GEMS funding proposed by the governor — \$100 million — all in one year. “In talking to them,” he said, referring to talks held with representatives of Governor David Ige's administration, “we told them there was no way we could put out \$100 million worth of contracts in one year. We would have to figure out the life span of that funding and figure out, based on that, how many projects we could put out in a given time.”

— P.T.

Legislature Looks Past GEMS for Cooling

Following Gov. David Ige's state of the state address, in which he proposed using nearly two-thirds of the Green Energy Market Securitization funds to air-condition 1,000 public-school classrooms, both chambers of the Legislature heard companion bills that would authorize the Department of Education to spend up to \$100 million in GEMS funds for various purposes, all intended to cool classrooms in one way or another.

When the bills were heard, testimony was overwhelmingly favorable to the idea.

But it would seem that over the last month, someone — whether at the Legislature or in the governor's office — began to have second thoughts about whether this would be the best way to reduce temperatures in overheated classrooms.

Evidence of this re-thinking surfaced in late February, when an entirely new means of financing for cooler classrooms was floated in the Senate version of the GEMS-for-schools bill (SB 3126). Here's the explanation in what was proposed as Senate Draft 2 of the measure:

"On January 7, 2016, the department of budget and finance reported to the council

on revenues that the State will receive approximately \$170,000,000 of increased reimbursements from the federal government, primarily for Medicaid. The \$170,000,000 increased reimbursement was not anticipated by the administration when it prepared the executive supplemental budget request for fiscal year 2016-2017. The reimbursement is the realization of the general fund.

"The legislature further finds that the use of general funds for providing air conditioning and heat abatement for public schools is preferable to using green infrastructure loan funds. First, the department of education will have more flexibility in using general funds for air conditioning and heat abatement measures. The types of projects that the department of education would have been able to fund with green infrastructure loan funds were unclear and apparently limited to energy efficiency and conservation projects. Second, using general funds instead of green infrastructure loan funds precludes the need for annual debt service payments."

The bill holds the appropriation amounts to the same levels in the original bill: \$100 million for improvements from the design-

nated fund (now Medicaid reimbursements instead of GEMS) and \$30 million more in general-obligation bonds.

As to what is to be done with the GEMS funds, the Legislature has an idea for that, too: "Using the green infrastructure loan funds for utility-scale projects, as recommended by the consumer advocate before the public utilities commission, may be a possibility in the future."

Whether GEMS funds may still be loaned out to the DOE is an open question. On February 23, the Hawai'i Green Infrastructure Authority filed with the Public Utilities Commission a program notification that would allow schools to be eligible for a new "loan product" — the "GEMS Commercial EE Loan Product" — for energy efficiency improvements undertaken by large electrical consumers.

At the February 24 HGIA meeting, where a vote had been scheduled to approve the \$100 million loan to the DOE, Luis Salaveria, director of the Department of Business, Economic Development, and Tourism, said, "We're having constructive discussions on possible financing of a project with the DOE. It's a complex deal, given the number of stakeholders." At his request, the vote on the DOE loan was deferred.

— P.T.

Solar Contractors Tell of GEMS Troubles

The roll-out of the Green Energy Market Securitization program (GEMS) has had results that can charitably be described as disappointing. Of the \$145 million available for loans intended to help Hawai'i homeowners and renters avail themselves of advances in energy-saving technologies, just three loans had been approved by the end of last January.

Officers with three solar installers who were willing to talk with *Environment Hawai'i* discussed some of the reasons they felt were behind the program's limited results. None was willing to be identified in print.

"There was a difficulty not only in getting customers approved, but in dealing with the program in general," one company officer told *Environment Hawai'i*. "It was time consuming. Weeks would go by with no response, customers would be calling, saying they'd never been contacted."

One thing in particular he found upsetting: "A lot of homeowners are putting their homes in trust to qualify for Medicaid. They're being turned down by the GEMS program, because the property is in a trust.

We had quite a few customers who had to put their homes under a trust for medical purposes. They wanted to apply for the program but got rejected." Even though the lack of fee ownership of property was cited in these cases, he went on to say, GEMS did entertain loan applications from Hawaiian Homes lessees.

Another executive with a solar company said the very process of getting authorization to work with GEMS was a hurdle. "It was a difficult process to become authorized," he said, blaming that in part on a "lack of leadership."

The program "got off to an extraordinarily slow start. ... We still think that conceptually it makes sense, as something that could benefit portions of the consumer market that might not otherwise have funding for solar energy. It's a good theory. It's just a matter of making it work in the real world."

When the Public Utilities Commission closed the door on net-energy metering last fall, "that had an enormous damper effect on the entire solar market." Both of the customers of this installer who had been approved

had applied before the PUC decision to end NEM. Since then, he has received no GEMS applications.

He mentioned yet another disadvantage for solar installers under GEMS: "we had to front all costs before we could get paid," he said. Not until a system was up and running are solar installers able to recover their costs under GEMS.

A representative of yet a third solar contractor who spoke with *Environment Hawai'i* said that he had been an enthusiastic proponent of the bill when it made its way through the Legislature in 2013. After passage, however, when the Department of Business, Economic Development, and Tourism was working out details of GEMS, "it felt, at times, like there were 100 cooks in the kitchen."

"The most frustrating thing," he said, "was that GEMS was supposed to help create on-bill financing. That hasn't happened."

His company "initially looked into working with GEMS," but decided against it in the end, judging the process to be "too complicated. ... If the solar energy industry has a certain process, you have to find out how it works and adjust to that. You can't just do it how you want things to happen."

— P.T.

Despite Invalid Permits, Lack of Stay A&B's East Maui Diversions Continue

On February 4, First Circuit Judge Rhonda Nishimura granted an interlocutory appeal of her January 8 ruling that four holdover revocable permits held by Alexander & Baldwin and the East Maui Irrigation Co., and renewed by the state Board of Land and Natural Resources in December 2014 and every year for the past decade or so, were invalid.

She also granted a stay of enforcement to the Maui Department of Water Supply, which relies on about 8 million gallons a day of the stream water diverted under those permits for 80 percent of its Upcountry domestic and agricultural needs.

Nishimura did not, however, grant the Land Board and the Department of Land and Natural Resources a stay, noting that the agencies failed to provide any evidence that they would be impacted by the enforcement of her ruling.

She also found that A&B/EMI, which diverts on average about 150 million gallons of water a day from East Maui streams, and Hawaiian Commercial & Sugar Co. (HC&S), which uses most of the water, did not ask for a stay. Therefore, she wrote, they are not entitled to any relief, but are not precluded from filing their own motion for a stay of enforcement.

"The County's motion for stay pending appeal is granted only as to the county and only as applied to the water presently delivered by defendant East Maui Irrigation to the county for the Department of Water Supply's continued provision of water to customers of its Upcountry service area," she wrote, adding, "The state defendants' joinder is denied other than to the extent necessary to accommodate the continued diversion of water delivered by East Maui Irrigation to the county."

Why A&B/EMI didn't explicitly seek a stay is unclear. But, by not seeking one, the companies and their supporters have been better able to argue to the state Legislature that House Bill 2501 is critical to HC&S's final sugarcane harvest and A&B's future use of its fields for diversified agriculture.

The bill, ostensibly designed to benefit A&B/EMI, proposed creating a "holdover period" during which an entity that had a previously authorized diversion of water would be able to continue diverting until its application for a long-term lease was decided on by the Land Board. A Senate

version, SB 3001, was killed last month. The House version was alive at press time but still had to clear the Finance Committee.

A&B/EMI, which had diverted the water for its sugarcane plantation for decades under month-to-month revocable permits (and before that under long-term water licenses and leases), sought a 30-year water lease in 2001. However, the matter has been tied up in litigation since then following a contested case hearing request and a petition to amend interim instream flow standards filed by East Maui residents represented by the Native Hawaiian Legal Corporation.

Some who support the continued diversion have argued to the Legislature that should the bill fail to pass, the diversions would have to cease and Central Maui would become a "dust bowl."

"Just as a matter of law, unless the court issues a stay, then the order becomes effective immediately," attorney Yvonne Izu, representing A&B, told the Senate Committee on Water, Land, and Agriculture at a hearing last month on SB 3001. (That being said, A&B/EMI are still diverting the streams.)

Native Hawaiian Legal Corporation attorney Camille Kalama, however, testified that A&B/EMI had other options that would have allowed them to continue to divert water and could have gone to the court, just like the county did, to stay the January 8 ruling. She urged the committee to ask A&B/EMI representatives why they didn't.

Addressing the stay issue, Izu said she didn't know what the rationale was for the position the company had taken. Although she was representing the companies at the Senate committee hearing on the bill, she said she is not representing them in the court case.

"My understanding was that they joined in the stay. There might have been some problem with how they phrased that joinder so the court said A&B did not actively ask for a stay themselves," she said.

In its filings with the court, A&B/EMI and HC&S did seek to join in the county's motion for an appeal, but did not file a similar joinder to the county's motion for a stay. However, in a memorandum supporting its position, the companies' attorneys did write that they "joined in the arguments"

the county and state made in their motions for an appeal and a stay.

Although committee chair Sen. Mike Gabbard indefinitely deferred SB 3001, he said he was willing to entertain the House version if and when it came before him. In the meantime, he recommended that A&B "avail itself of other non-legislative remedies, i.e., a stay of Nishimura's order."

As of press time, A&B/EMI still had not sought a stay of enforcement. Whether or not they need one, or even need HB 2501, to continue irrigating HC&S's final cane crop is debatable.

At the Senate hearing, an A&B representative testified that HC&S has 35,000 acres in sugar and that it needs all of the water its diverting now from East Maui, some 150 mgd, for its crop. But according to the companies' court filings, HC&S is cultivating a much smaller area.

The NHLC, the Office of Hawaiian Affairs, and others seeking restoration of stream flow have argued that the amount of water emanating from A&B's private lands in East Maui, in addition to the more than 80 million gallons a day available from brackish wells, are sufficient to meet the companies' immediate needs. NHLC attorneys, citing EMI's own experts, have argued that 30 percent of the diverted water, or roughly 40 million gallons a day, comes from A&B-owned lands.

But both the state and A&B/EMI/HC&S have argued before the court that although 30 percent of EMI ditch water originates from private land, the actual diversions are mostly on state land.

"If all of the diversions located on state lands are ordered to be shut down, there would be few places for the water to enter the EMI ditch, regardless of its source. The 40 million gallons of water on average that the plaintiffs say would remain in the EMI ditch system is available only on paper as it would have few ways to enter the ditch system," the state argued in its memo supporting the appeal and stay.

A&B/EMI/HC&S attorneys added, "Thirty percent of the available water would be insufficient to sustain and ripen the 16,000-17,000 acres of sugarcane planned to be harvested this year."

Based on an estimate that 4,844 gallons per acre per day of water are needed for HC&S's East Maui cane fields, HC&S's wells could service about 17,200 acres, according to Lawrence Muike, hearing officer in a contested case hearing on the interim instream flow standards of many of the streams A&B/EMI divert. (See our cover story for more on this.) — T.D.

Appeal of Nishimura Ruling Centers On Board's Earlier Holdover Decisions

According to court documents, the Appeal of Judge Nishimura's January 8 ruling is expected to cover the following issues, among others:

Whether she correctly ruled that the permits were invalid under Hawai'i Revised Statutes Chapter 171 (the state's law governing the disposition of public land) when the plaintiffs had only argued that the permits were invalid because they violated the state's environmental review law, Chapter 343. In her ruling, Judge Nishimura specifically found that the Land Board's December 2014 renewal of the permits did not violate Ch. 343.

Whether or not Ch. 171 and the public trust doctrine authorizes the Land Board to put revocable permits into holdover status to maintain the status quo for the public good. A&B attorneys have argued that if the Land Board has the duty to protect the public

trust, it must have the authority to do it, whether or not it's codified in statute. Ch. 171 only seems to allow for public lands and waters to be disposed of via a lease, issued directly or at public auction, or a month-to-month revocable permit that may be renewed annually.

In cases where a lease has expired, Ch. 171 gives the Land Board the authority to allow the lessee to continue to hold the land for up to one year or, in cases where crops had been planted before the lease's expiration, until those original crops have been harvested. If, after the holdover period expires, the Land Board hasn't decided to issue a new lease, the board is also authorized to issue a temporary permit to the lessee.

Whether any claims regarding the holdover status were time-barred.

A&B's attorneys have argued that the plaintiffs had the chance several years ago to litigate the issue of whether the Land Board can grant a holdover of the status quo, but chose not to. In 2007,

the Land Board issued an order in a contested case hearing basically dismissing the NHL's arguments that the board could not authorize a holdover beyond one year to continue the diversions.

"The validity of the revocable permits and the holdover decision under Chapter 343 are claims that were alleged in this action and plaintiffs have conceded that those claims are time-barred."

Whether collateral estoppel (a common law doctrine that prevents a person from re-litigating an issue) precluded any challenges to the holdover status of the revocable permits. A&B's attorneys argue that the Land Board's 2007 order affirmed its hearing officer's denial of Na Moku Aupuni o Ko'olau Hui's and Maui Tomorrow's motions challenging the validity of the board's 2002 decision to grant A&B/EMI a holdover and note that the order also stated that "the holdover decision was procedurally essential to the board's proper discharge of its public trust responsibilities."

"This order was never appealed and is entitled to preclusive effect on the legality of the holdover decision," A&B's attorneys states in a court filing. — *T.D.*

Water from page 1

diversions by EMI range from 134 mgd in the winter to 268 mgd in the summer, averaging about 167 mgd. Should the Water Commission choose to adopt Miike's recommendations unamended, several million gallons a day more water would be returned to streams than under IIFS adopted in 2008 and 2010, and A&B — and possibly the Maui County Department of Water Supply (MDWS) — may be forced to look for alternative water sources to meet their needs when what's left in EMI's ditches falls short.

Reasonable, Beneficial Uses

Because stream flow naturally varies and may dip below the IIFS in dry periods, "guaranteeing that a specific flow is always in the stream and still meet the objective of the IIFS is not possible," Miike wrote in his recommendations. Even so, after weighing the water needs of HC&S, the Maui DWS, and water rights holders and native ecosystems in East Maui, Miike recommended new IIFS for about a dozen of the streams cited in the petition that

would result in the restoration of between 18 and 19 mgd.

Miike found that when the Water Commission first attempted to deal with part of Na Moku's petition in 2008, it restored only enough water to some streams to allow for continuity of flow, but not growth, reproduction and recruitment of native stream animals. He noted it wasn't until 2009 that the Water Commission staff even had access to a habitat availability study indicating the minimum flow level necessary for the stream animals to thrive.

Miike also found that commission staff probably had, in many cases, overestimated what natural stream flows would be, which led the Water Commission to set IIFS that could simply not be met even if EMI opened its sluice gates.

Whatever the reasons, recent monitoring showed that in the streams where there had been an attempt to implement the amended IIFS, the biota didn't exactly bounce back.

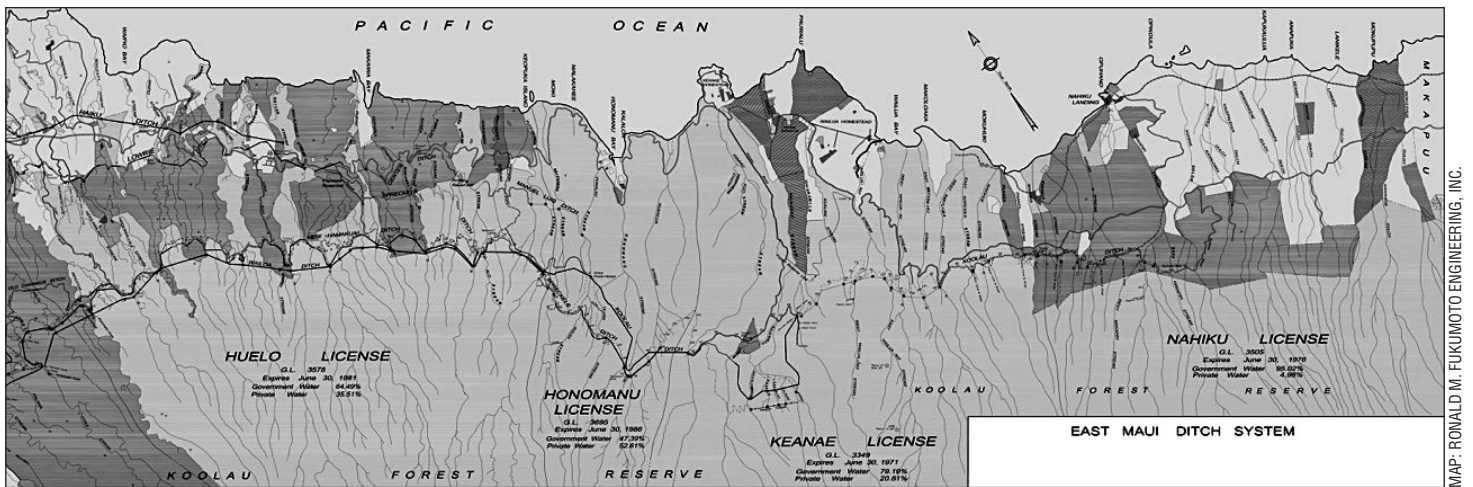
"The correlation between return flows, habitat and biota was weak," he wrote. "This may have been due to a number of factors including: changing environmental condi-

tions (e.g. rainfall, drought, flash flooding), short monitoring period (< 4 years), and/or that summer flows were detrimental to gains in habitat and biota from the winter flows."

As for the needs of East Maui taro farmers and others with appurtenant rights, Miike found that the initial acreage claimed by Na Moku as being either in taro or cultivable agriculture and fed by Honopou, Palahulu, Waiokamilo, and Wailuanui streams (136.18 acres) was likely an overestimate.

"Na Moku's own expert witness conceded that these acreages are overstated by an unknown amount," he wrote. However, he eventually concluded that approximately 94.721 acres in East Maui do have appurtenant rights — 49.805 acres for taro and 44.916 acres for other types of agricultural uses — and that "appurtenant and riparian rights-holders have demonstrated actual harm to their reasonable use of the waters of Palahulu, Waiokamilo, Wailuanui, Honopou, Hanehoi, and Makapipi streams."

Although an agreement with EMI provides the DWS with a little more than 8 mgd of diverted water for domestic and agricul-



tural needs in the Upcountry area of Maui, Miike determined that the department has been using only about 7.1 mgd.

Finally, with regard to HC&S's water needs, Miike wrote that the company's calculated usage of 5,064 gallons per acre per day (gad) in the winter and 10,128 gad in the summer was too high according to commission staff, which found instead that the average irrigation needs for sugarcane ranged from 1,400 to 6,000 gad.

Basing his decision, in part, on the amount of water HC&S uses on its West Maui fields, Miike determined that a reasonable amount of water needed for the company's East Maui sugarcane fields was 4,844 gad.

Total reasonable, beneficial offstream uses, according to Miike: 140.19 mgd for sugarcane, 7.1 mgd for the Maui DWS's Kamole Water Treatment Plant and Kula Ag Park, 6.66 mgd for HC&S industrial uses, and 34.95 mgd in irrigation system losses due to seepage or evaporation. The grand total: 188.9 mgd.

If brackish water supplied 83.32 mgd, HC&S would only need 105.58 mgd of EMI ditch water, he noted. (Although HC&S has wells that can provide 115 to 120 mgd, Miike found that to avoid increasing aquifer salinity, only 83.32 mgd of brackish water could be safely pumped. Based on the 4,844 gad needed for HC&S's East Maui cane fields, the wells could service about 17,200 acres of the 28,941 acres serviced by the EMI ditch system, he wrote.)

"On average, the total amount of stream flows diverted by EMI's ditch system has been 114 to 167 mgd, and the proposed [IIFS] amendments would reduce that amount to 96 to 149 mgd, compared to a need of 105.58 mgd of stream waters. ... Therefore, there would be no more than a 10 mgd or 9 percent shortfall some of the time, and still more surface water

than needed most of the time," Miike concluded.

He added that the Maui DWS's use of 7.1 mgd would seldom compete with the increased IIFS he proposed, "and if such competition occurs, it would be for only a few days a year."

Should competition over the water escalate to more serious levels, Miike pointed out that resource protection doesn't necessarily trump other public trust purposes, particularly the provision of drinking water for the general public.

"Reason and necessity dictate that the public trust may have to accommodate offstream diversions inconsistent with the mandate of protection, to the unavoidable impairment of public instream uses and values," he wrote. "For MDWS's use of East Maui stream waters, there is a potential conflict between the public trust doctrine and the common law. Under the public trust doctrine, there is a presumptive favor of trust purposes, and competing water uses must be weighed on a case-by-case basis. Under the common law, MDWS's use must not actually harm the established right of appurtenant and riparian landowners. While some appurtenant rights-holders are also likely to have traditional and customary Hawaiian rights in their exercise of appurtenant rights, and also have a presumption in their favor, they do not have priority over MDWS as a purveyor of domestic water uses of the general public, and competing uses must still be weighed on a case-by-case basis according to any appropriate standards provided by law."

In One Year ...

Should the Water Commission approve Miike's recommendations, commission and Division of Aquatic Resources (DAR) staff, as well as the parties to the contested case hearing, would be required to provide

the following status updates one year from the date of the decision:

- Commission staff must report on whether or not continuous flow could be established in Makapipi stream and all other aspects of the implementation of the amended IIFS.

- DAR shall basically report on whether or not the IIFS implemented for East and West Wailuaiki, Waikamoi, and Waiohue that were intended to improve habitat for native biota did, in fact do that. It must also report on reconnaissance of Kualani (Hamau) and Ohia (Waianu) streams, which have never been diverted, for a qualitative assessment of the abundance of native stream animals.

- Na Moku shall report on the adequacy of water deliveries to Pauluhu, Waiokamilo, Wailuanui, Honopou and Hanehoi/Puolua streams; taro loi from which outflows continue to lower loi or return to the stream and loi from which outflows are not reused or returned; maintenance, irrigation and farming practices for more efficient use of stream waters; Na Moku members' activities as konohiki for the streams they use for irrigation and/or domestic uses, including managing their uses so that the downstream IIFS for habitat restoration are met.

- EMI shall report on modifications to diversions to meet the amended IIFS and water deliveries at Honopou and Maliko Gulch, and any changes EMI ascribes to the amended IIFS

- HC&S shall report on surface, pumped, and total water usage.

- Maui DWS shall report on water deliveries at the upper Waikamoi flume including any amounts ascribed to reduced losses from replacing the flume and the status of plans for a 100-million or 200-million gallon reservoir at the Kamole water treatment plant.

— **Teresa Dawson**

BOARD TALK

Sparks Fly Over Fireworks Permit, \$2,500 Deposit to Clean Up Debris

For years, right-of-entry permits brought by the Department of Land and Natural Resources' Land Division for fireworks displays at the state beaches have garnered little, if any, opposition. Last year, a small group of Hawai'i Pacific University students opposed one permit for a fireworks display at the Kahala Hotel & Resort because of the potential adverse effects to the marine environment and the captive dolphins at the hotel. But for the most part, the permits are approved without public comment and little discussion by the board.

post a \$2,500 deposit to cover the cost of any cleanup following fireworks events, a condition Albrecht has resisted. And at the meeting last month, Downing continued to push for that condition to be part of all fireworks right-of-entry permits.

Albrecht, however, questioned how the board came up with the \$2,500 amount and complained that if he applies for multiple permits, he could be forced to shell out tens of thousands of dollars without any idea of if or when he would get it back.

"We have no issue being accountable. It



Land Board member Keone Downing confronts Hawaii Explosives & Pyrotechnics, LLC manager Bruce Albrecht with litter collected from the ocean after a fireworks show

More recently, however, with the addition of avid waterman Keone Downing to the Land Board, the permits have received greater scrutiny. And at the board's February 12 meeting, Downing confronted Hawai'i Explosives & Pyrotechnics, Inc., manager Bruce Albrecht with a garbage bag full of litter Downing had apparently collected from a 50'X50' section of reef following a fireworks show the company did last year.

Downing had asked Albrecht what he does with the fireworks debris once an event is done. When Albrecht said he cleans it up, Downing rose, retreated to an office adjacent to the board room, and re-emerged with his garbage bag, dumping its contents onto the table until the rubbish spilled onto the floor.

Downing has in the past pushed for the division to require permit recipients to

is going to come at an economic cost. ...I want it to be fair," he said.

Land Board member Ulalia Woodside noted that there has already been an environmental cost that has gone unpaid for many years.

The board ultimately decided to keep the \$2,500 deposit a condition of the permit, with the understanding that the Land Division would work on the terms under which the deposit would be used or returned.

Downing further suggested that pyrotechnic companies look for alternatives to launching into the ocean.

"I think people can be conditioned to do the right thing," he said. "There are lots of places in this country where they don't have an ocean to fire fireworks into and they they fire fireworks. ... The water means a lot to me and I want it to be clean."



State Parks Cesspool Settlement

In a proposed settlement with the U.S. Environmental Protection Agency, the DLNR's Division of State Parks has managed to reduce a proposed fine of \$187,500 for failing to close large capacity cesspools (LCC) at Wainapanapa State Park on Maui down to \$50,000. In exchange for the reduced fine, the division will close several other cesspools at park facilities throughout the state.

More than a decade ago, the division entered into a consent agreement with the EPA to decommission all large capacity cesspools, which are those that serve 20 people or more a day or serve multiple dwellings. State Parks had dozens of LCCs throughout the state.

Although one LCC at Wainapanapa State Park had been included in the consent agreement, those that served the park's rental cabins were not. Each of those cesspools served two cabins, but because each cabin only holds six people, the division had not moved to close the cesspools, apparently believing they didn't qualify as LCCs. Once the division realized it did, indeed, need to close the six cesspools there, it planned to coordinate the work with cabin renovations.

"The cabins were booked. We tried to schedule [the work] when we were going to decommission the use of the cabins and the cesspools all at one time but the EPA got a little more aggressive than we were used to," division administrator Curt Cottrell told the Land Board at its December meeting. Rather than waiting for the division to get its funds and plans in order, the EPA chose to impose a fine of \$187,500.

Rather than paying the whole fine, the division is being allowed to pay \$50,000 if it also decommissions cesspools at caretaker residences and concession buildings that had been grandfathered in by the EPA. Although the Land Board approved in December the settlement terms and authorized its chair to sign the final agreement, the Legislature must still appropriate the funds.

The cesspools at Wainapanapa were closed in July 2015.



Sea Cucumber Rules Pass Despite Worry Over Aquarium Take

To protect Hawai'i's populations of sea cucumbers from the kind of over-

harvesting that has devastated other areas where commercial operations have taken root, Gov. David Ige last December signed rules banning the commercial take of sea cucumbers, except by aquarium collectors on O'ahu, who are allowed to take up to 20 sea cucumbers a day. In total, they may harvest up to 3,600 a year.

In a press release, the Department of Land and Natural Resources' Division of Aquatic Resources administrator Bruce Anderson commended his staff and that of the department's enforcement division for quickly responding to a mass-harvesting of sea cucumbers last summer on Maui — the first event of its kind in Hawai'i. The DLNR immediately requested and received Land Board approval to temporarily ban commercial harvesting of sea cucumbers. Rules imposing a permanent ban were approved last December 11 by the Land Board.

"Without this prompt action the short-lived, mass harvest of sea cucumbers could have been an ecological disaster for the sea cucumber and its role in the health of Hawai'i's coral reefs," Anderson said.

But at the Land Board's December meeting, critics of the state's aquarium trade lamented the exemption.

Inga Gibson, Hawai'i director of the Humane Society of the United States, argued that the exemption was not based on any science proving that level is sustainable. She noted that the industry reported harvesting 14,000 sea cucumbers in 2004 and by 2014, the take had dropped to 2,260.

"While take has decreased in the last ten years, right now the submittal proposes to allow 3,600 cucumbers to be taken and again, primarily by the aquarium trade," she said. "We need to know more about what the sustainability levels are."

Marjorie Ziegler, director of the Conservation Council for Hawai'i, added that while it was not objecting to the take of sea cucumbers for home consumption, which the new rules allow, "without numbers, it's hard to support even that."

To rebutting Gibson's arguments that the take level wasn't based on science, DAR's Alton Miyasaka explained that it actually was. In fact, it was based on the same harvest data Gibson had referred to. DAR reviewed harvest levels for the most recent eight years that it has data. In that period, the take was never greater than 3,300. The division rounded that up to 3,600.

He added that although he doesn't expect collectors to reach the annual limit, DAR will track catch via monthly catch reports submitted by permittees and will be able

to predict accurately if and when the limit will be reached.

Maui Land Board member Jimmy Gomes seemed unconvinced the 3,600 level was sustainable and asked Miyasaka if he knew what the reproductive capacity of the current sea cucumber population was.

"I'm just afraid the aquarium people would wipe it out and it starts hurting our [reef] ecosystem," Gomes said.

Miyasaka did not directly answer Gomes's questions, but explained that DAR has more than 40 years of data on the sea cucumber fishery and that the pre-2008 take by aquarium fishers was much higher than the new take limit.

"2008 is when the economic crisis hit the U.S. and demand for aquarium products plunged," Miyasaka said, adding that DAR felt basing a harvest cap on post-2008 take levels was a conservative approach.

"We feel at that level, 3600 animals, the long-term catch doesn't show it's excessive. ... We wanted to cap it where it is so it didn't expand," he said.



Koloa Duck Hybridization Study

The koloa is the only native Hawaiian bird facing extinction from hybridization with an invasive species, the mallard duck, according to a report by the DLNR's Division of Forestry and Wildlife. With an estimated population of 2,200, koloa are

among the world's most threatened waterfowl, it states.

So on December 11, the Land Board authorized its chair to enter into an agreement with the University of California Davis, which will analyze genes in more than 200 koloa blood samples to determine the extent of hybridization. Using physical measurements taken from museum specimens and birds sampled on Kaua'i, the university will also "investigate links between morphological characteristics and hybrid status, ideally to identify characteristics that managers can use to discriminate mallards from Hawaiian ducks and hybrids," the report states.

The agreement, effective through June 30, will provide \$12,200 in U.S. Fish and Wildlife Service grant funds to UC-Davis.

The genetic analysis will start with samples taken from ducks around O'ahu, DOFAW wildlife program manager James Cogswell told the Land Board.

The results will "help us to determine how to proceed with how to manage the hybridization," he said.

"After you do the research, what would be the remedy? Shoot the [hybrid] ducks? ... That would be a real difficult solution," Kaua'i Land Board member Tommy Oi said.

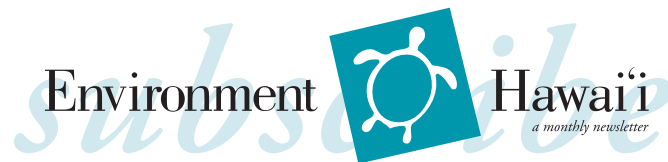
"That is an option on the table," Cogswell replied.

— Teresa Dawson



PHOTO: DOFAW

Koloa Duck



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Flooding From Rising Seas Could Displace More Than 5,000 'Ewa Beach Residents

Two years ago, research by the University of Hawai'i's School of Ocean and Earth Science and Technology (SOEST) revealed that flooding from the combination of a one-meter rise in sea level and a hurricane or a tsunami could affect 80 percent of the economy located between Pearl Harbor and Waikiki, with the total cost of those impacts reaching into the tens of billions of dollars. Now, as part of the statewide effort to prepare a Sea Level Rise Vulnerability Assessment and Adaptation Report (SLR report) by the end of next year, as required under 2014's Act 83, SOEST researchers have been focusing their sea-level-rise modeling efforts on areas outside Honolulu's urban core, looking not at tsunami or storm surge-related flooding, but that associated with groundwater inundation, coastal erosion, seasonal (non-storm) wave inundation, and a 100-year coastal flooding event. Using their modeling results, consulting and engineering firm Tetra Tech has been analyzing the potential social and economic impacts, census block by census block.

Last month at a sea level rise vulnerability and adaptation workshop sponsored by the state Department of Land and Natural Resources, the state Office of Planning, SOEST and UH Sea Grant, Tetra Tech's Catherine "Kitty" Courtney and SOEST associate dean Chip Fletcher provided a sobering glimpse of what could be in store for O'ahu's 'Ewa Beach, which already has a narrow, chronically eroding shoreline.

Over the last decade or so, the 'Ewa Beach population has grown by 50 percent to about 64,000 residents and most homes there have been built at ground level, Fletcher said. With an anticipated 1.06-foot rise in sea level by 2050, the area will lose \$29.63 million worth of land and buildings to coastal erosion, according to Courtney's presentation.

By 2100, when sea level is expected to have risen by 3.2 feet, which is roughly one meter, the land and building losses due to coastal erosion will total \$54.88 million.

As for temporary losses due to seasonal wave run-up and a 100-year flood, Courtney reported that the costs would be \$10.2 million (347 structures) and \$56.7 million (1,308 structures), respectively.

In total, 1,295 households in 'Ewa Beach will be lost due to coastal flooding by 2100, displacing more than 5,000 people, she found.

Costly as it seems, it's likely the true impacts would be worse, according to Fletcher's statements. He explained that the modeling done for 'Ewa Beach does not reflect real-life conditions. Because of time constraints, he said, his team has been forced to model waves as if they are running up onto the shore in a flume, every 20 meters, rather than refracting off of each other and the environment. Fletcher said this approach has likely led to an underestimate of the threat of wave inundation.

He also explained that the model being used incorporates sea level rise projections from the worst-case scenario in the Intergovernmental Panel on Climate Change's most recent report, which is far more conservative than projections by many other researchers.

"We might be shooting too low. Sea level may certainly be much higher," he said. "Looking at the geological evidence, we know sea level is not going to stop at 2100."

Given current temperatures, which are one degree Celsius higher than those in the pre-industrial era, sea level will not stop rising until it's 10 feet above pre-industrial levels, he said, adding that if they rise — in accordance with the cap agreed to at the

recent United Nations climate change conference in Paris — to two degrees above pre-industrial levels, sea level will rise for many meters above that.

A recent study by SOEST researchers found that once sea level rises to certain critical elevations, flooding increases dramatically. For 'Ewa Beach, the model shows that a four-foot rise in sea level — only 25 percent more than what's projected for 2100 — will lead to "enormous flooding" by groundwater and the ocean.

"If we get to four feet, which we eventually will, it's a catastrophic situation," he said.

SOEST has done the same kind of modeling for several other communities on O'ahu. Over the next year or so, Courtney said, Tetra Tech will eventually be doing similar analyses for every island to "provide benchmark information to start thinking about these challenges ahead."

"We're an island state. We may not be able to move our airport. We may have to find ways to protect critical infrastructure with hardening structures even though we know that has some adverse effects," she said.

With regard to structures not yet built, "we need to think about how to discourage development in high risk areas," she said, posing the question: "Do we need property disclosures to help us say, 'There are certain hazards on this property'?" And when it comes to expensive public projects, "how do we ensure these projects are considering sea level rise?" she asked.

Ensuring government planning documents include the latest climate science is a start. Last year, the former head of Honolulu's Department of Environmental Services lamented at an engineering workshop that the county's planning documents so far have not taken climate change or sea level rise into account. Courtney noted that Kaua'i county, at least, has finally decided to incorporate sea level rise and climate change into its general plan update. — T.D.