

Sitting Ducks – Or Guinea Pigs?

The plan to eradicate “vampire” mice preying on Midway albatross has received near-universal praise. Yet all but ignored in the planning process is the impact that the poisoning of mice will have on the most endangered of all species on the atoll: the Laysan duck. Our cover article digs deep into the dilemmas raised in the scenarios anticipated in the draft environmental assessment for the project.

Among the several points raised in comments submitted on the draft EA is the notion that the step-wise release of captured ducks following application of the rodenticide risks using them as, well, guinea pigs to see if an “all-clear” can be issued for further releases.

Also in this issue: litigation centered on the long-stalled ‘Aina Le’a development in Kohala has resulted in some surprising outcomes; efforts to protect false killer whales run up against the longliners’ hardened stance against them; and Honolulu municipal agencies face daunting problems in confronting the challenges of climate change.

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Plan to Eradicate Mice on Midway May Come at a Cost to Imperiled Laysan Duck

The photos are hard to view. Adult albatrosses with bloodied heads. Gray, night-time shots of mice preying on birds that can’t or won’t leave their nests. Beautiful, dead birds, killed by the “vampire” mice of Midway National Wildlife Refuge.

The problem seems to have begun in late 2015. According to the U.S. Fish and Wildlife Service, “refuge scientists and volunteers found open wounds on the backs, necks, and heads of nesting albatrosses in a small area on Sand Island, Midway Atoll. Using automatic cameras, live traps, and laboratory examination of bite marks on mortally wounded birds, scientists rapidly identified the cause of the injuries as attacking non-native house mice.”

Since then, the FWS says “more than 300 nesting adult albatrosses are known to have

been attacked and the mouse aggression has spread to two additional areas... Forty-eight bitten birds are known to have died and at least 46 nests have been abandoned.”

To address this, the service has published an environmental assessment, with the proposed action being the aerial broadcast of a rodenticide, brodifacoum, in pellet form over all 1,128 acres of Sand Island, the largest of the small islets in the atoll. (The public comment period on the draft EA closed on April 20.) The expectation of the FWS is that within a year of implementation, non-native mice will be eradicated “for the benefit and protection of nesting albatross species (e.g., Laysan, short-tailed, and black-footed), other nesting seabirds (e.g., Bonin petrel), and their habitats.”

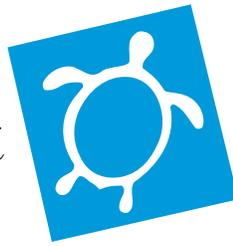
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A Laysan duck and a Laysan albatross.

PHOTO: JAMES BREEDEN / USGS

Environment



Hawai'i

Volume 28, No. II

May 2018

NEW AND NOTEWORTHY

Maunakea Silverswords: At some time in late March or early April, the gate leading into the silversword reserve near Hale Pohaku, on Maunakea, was not just damaged, but completely removed by vandals, as revealed on a visit in early April.

That same visit also revealed the presence of fresh fruits (including apples and oranges), muffins, and other perishable ho'okupu, or offerings, at a lele, a kind of altar, erected inside the reserve.

After inquiries were made to the Department of Land and Natural Resources, which set aside the reserve for the endangered plants, the gate was replaced. As to the perishable ho'okupu, a spokesperson for the DLNR stated that the agency had no knowledge who might have erected the lele.

The presence of fresh foods at the lele, 9,000 feet or so up the slopes of Maunakea, raises the prospect that ants, vermin, or diseases of plants could be introduced into an



An array of rotting fruit on the lele in silversword reserve.

area where none now exist.

Stephanie Nagata, director of the Office of Mauna Kea Management, said that even though the reserve "is not our property, our rangers will monitor and remove perishable items, such as food matters," adding: "We plan on meeting with DLNR to discuss this and other matters."

Scientists Walk: The group of scientific experts chosen to advise the National Marine Fisheries Service and the Fish and Wildlife Service on marine mammal issues in the Pacific region, which includes Hawai'i, has practically gutted itself. In a December 29, 2017, letter to the Southwest Fisheries Science Center's Karin Forney, Pacific Scientific Review Group chair Michael Scott announced his resignation, as well as those of group members Hannah Bernard (of the Hawai'i Wildlife Fund), Steve Jeffries of the Wash-

ington Department of Fish and Wildlife, Kathy Ralls of the Smithsonian Institution, and Terry Wright (retired). Their resignations follow those of original SRG member Doyle Hanan of Hanan & Associates, Inc., and Robin Brown of the Oregon Department of Fish and Wildlife.

That left Tim Ragen (formerly of the Marine Mammal Commission), John Clambokidis of Cascadia Research Collective, Hawai'i-based fisheries consultant David Itano, and Scott Baker of Oregon State University, who have since been joined by Simone Baumann-Pickering of Scripps Institute of Oceanography and Rebecca Lewison of San Diego State University.

The departures were largely the result of a change in policy by NMFS to rotate group membership. Rather than being allowed to stay on for decades, as some members had, NMFS's new Terms of Reference limit each member's term to three years. Members can serve three consecutive terms at a time and can be reappointed again afterward following a year-long break.

"We understand that NMFS plans to replace Doyle Hanan, an original member of the Pacific SRG. While we realize that the NMFS architects of the recent Terms of Reference view this differently, those of us who have voluntarily served on the Pacific SRG since its inception regard this as essentially being fired after 23 years of providing advice to NMFS. Doyle Hanan, like Robin Brown earlier this year, preferred to resign rather than be fired.... The Pacific SRG regards the NMFS decision as capricious. For the sake of turnover, NMFS is sacrificing long-time SRG experience, it is creating gaping holes in the group's expertise in pinnipeds and west coast fisheries, and it is ignoring the judgment of the SRG itself about the expertise it needs. ...

"The Pacific SRG has always argued that a 3-year term limit is too short to navigate the PBR process, to absorb all the issues before us, and to be able to knowledgeably review the Stock Assessment Reports for over 60 stocks that include pinnipeds, dolphins, and large whales," Scott wrote.

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Hilo, Hawai'i 96720

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Environment Hawai'i is published monthly by Environment Hawai'i, Inc., a 501(c)(3) non-profit corporation. Subscriptions are \$65 individual; \$100 non-profits, libraries; \$130 corporate. Send subscription inquiries, address changes, and all other correspondence to Environment Hawai'i

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Environment Hawai'i is available in microform through University Microfilms' Alternative Press collection (300 North Zeeb Road, Ann Arbor, Michigan 48106-1346).

Production: Frances Officer

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ISSN 1050-3285

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Quote of the Month

"Climate change adaptation involves erring on the side of caution and planning well in advance."

— **Barry Usagawa,**
Honolulu BWS

'Aina Le'a Controversies on Three Fronts: Federal Court, Bankruptcy Court, and County

In March, a jury in Honolulu federal court decided that Bridge 'Aina Le'a, LLC, had suffered damages when the Hawai'i Land Use Commission voted in 2011 to put land the company owned on the Big Island back into the Agricultural land use district. From the late 1980s until that point, the land – about 1,060 acres just mauka of the Mauna Lani resort, on the Kohala Coast of the Big Island – had been in the Urban district.

Unbeknownst to members of the jury, before their deliberations began, the maximum damage award had been capped at \$1 by the judge hearing the case, Susan Oki Mollway.

“Maybe the jury will just shrug their shoulders and say – ‘Why bother for a dollar? Let’s just find no taking and get done before lunch.’ Or maybe the jury will say or think: ‘Bridge is only getting a dollar so it won’t hurt anyone for us to find a taking.’”

While the verdict, coming at the conclusion of an eight-day trial, favors the plaintiff, an appeal seems likely. For its part, the state, which lost the case, has no interest in appealing, said William Wynhoff, the deputy attorney general who headed up the litigation team. But if Bridge appeals, the state will have little recourse but to file a counter-appeal, he said.

And so the long history of litigating the LUC decision to revert the 'Aina Le'a land, moves into its next phase.

The Federal Case

For about four years, the federal case was on ice. The state had sought removal to federal court of a case Bridge filed in state court just after the LUC decision, but that federal action was put on hold pending a decision by the Hawai'i Supreme Court on claims Bridge had made of due-process violations and takings. After that ruling was issued in late 2014, the action moved once again to the federal courtroom of Judge Susan Oki Mollway.

In preparation for trial, Bridge retained consultants to justify to the court its claims of monetary damage the company suffered as a result of the LUC's reversion of the 'Aina Le'a land: David Burger, an accountant based in Saipan, Commonwealth of the Northern Mariana Islands, and Stephen

Chee, a Honolulu appraiser.

Burger provided estimates of the rate of return on investment that Bridge could have expected to receive, absent the LUC action, arriving at a figure of 10.12 percent. Chee then estimated the difference in value of the property before and after the reversion. According to Chee, the value of the property dropped from \$40 million to \$6.63 million immediately after the LUC reversion. (Ted Yamamura, an appraiser retained by the state, found the pre-reversion value of \$40 million “not supported.”) Altogether, by multiplying the difference in value by the rate of return over the time the loss was in

effect (a period that, according to Bridge ran from April 30, 2009, to November 25, 2014, when the state Supreme Court issued its ruling), Bridge came up with a figure close to \$40 million.

The state objected to the conclusions of Burger and Chee, but before Judge Mollway could rule on the matter in July 2016, on the eve of the start of the scheduled jury trial, the state and Bridge arrived at a mediated settlement. The state would pay \$1 million to Bridge and Bridge would drop the case, with both sides bearing their own attorney fees and costs.

That, of course, was contingent on the state Legislature making an appropriation for the settlement in its 2017 session.

Legislators, however, apparently felt that the state could get a better deal if the case went to trial. Funds for the settlement were not approved. In late 2017, the case was back on track, moving toward a jury trial in early 2018.

Disputed Experts

Once again, the court had to take up the state's motion to dismiss the expert opinions offered by Bridge that formed the basis for their claim of damages.

Back in May 2016, before the settlement had been reached, Mollway stated her inclination to exclude the reports of Burger

and Chee. Burger, she wrote, “states that he ‘relied on audited financial statements [of Bridge Capital and its subsidiaries] for the years ended December 31, 2009 through 2014’ to render his opinion,” yet his report provided none of those documents, “nor any of the underlying calculations that were the basis for his conclusion that the rate should be 10.12 percent.” This violated the Federal Rules of Civil Procedure, she wrote.

“With regard to the Chee report,” she continued, “the court notes that for expert testimony to be admissible it must assist the trier of fact to understand the evidence or to determine a fact in issue. . . . Given that Bridge Aina is alleging a temporary taking rather than a permanent taking, Bridge Aina is not seeking damages equivalent to the full value of the property. Instead, the purpose of the Chee report is to provide a valuation of the property before and after the Land Use Commission's April 30 2009, vote to reclassify the property, which can then be applied to the rate of return in Burger's opinion. . . . The court is inclined to reason that the Chee report is only helpful to the jury to the extent it can be used in conjunction with the Burger report.”

In the end, the jury did not hear the testimony of Bridge's experts. Instead, six days after the jury trial began on March 13, the state filed a motion asking Mollway to issue a judgment in the state's favor “as a matter of law.” And, failing that, it asked that the court not allow the issue of compensation to go to the jury. In the event that the jury determined a taking had been made, it asked the judge to rule that Bridge was entitled to “nominal just compensation of \$1.”

Mollway let the trial proceed, but she did agree with the state on the nominal damages. She then polled attorneys on both sides as to whether the jury should be informed of the cap. Bridge was adamant that it not be. Wrote John Ferry, one of the attorneys on Bridge's team: **“Essentially, the jury cannot know that just compensation has been capped at nominal damages”** (boldface and underline emphasis is in the original).

The state agreed: “The effect on decision-making is unpredictable. Maybe the jury will just shrug their shoulders and say – ‘Why bother for a dollar? Let’s just find no taking and get done before lunch.’ Or maybe the jury will say or think: ‘Bridge is only getting a dollar so it won’t hurt anyone for us to find a taking.’ Either way, the \$1 introduces a wild card into the process and diminishes the chance of getting a true verdict.”

The trial ended the eighth day. The seven jurors were dismissed for lunch at 12:25 p.m. before beginning their deliberations. By

2:30, they had returned their verdict, agreeing with Bridge that it had suffered damages under two different standards: *Lucas* (Bridge was deprived of all economically beneficial uses of its land by the LUC action) and *Penn Central* (the regulation interfered with investment-backed expectations).

What's Next?

Although Bridge was awarded just \$1, Bruce Voss, attorney for Bridge, was pleased with the outcome. "The jury's prompt verdict shows how strong the evidence was that the Land Use Commission committed a taking," he told *Environment Hawai'i* in an email. "This is one of the first verdicts in the country where a jury has found a taking under both takings analyses approved by the U.S. Supreme Court."

It was, however, "clear error" for the court to bar Bridge's expert witnesses, he said, adding that his client "will appeal to the 9th Circuit on that issue." "If the appeals court agrees with us, the case likely will be sent back for a new jury to determine how much the state Land Use Commission has to pay. We contend the just compensation owing is approximately \$20 million."

The state, of course, disagrees, noting, among other things, that Bridge purchased the property and an additional 2,000 surrounding acres for just \$5 million and sold it for around \$30 million to DW 'Aina Le'a, the company now trying to develop it.

As the prevailing party, on April 13, less than two weeks after the judgment was filed, Bridge submitted a motion requesting attorneys' fees and costs, totaling about \$725,000. Voss said his client is still open to discussions of a settlement with the state.

A week later, the state filed a motion with the court, renewing its request for a judgment in its favor as a matter of law, or, failing that, for a new trial. In support of its request, it argues, among other things, that Bridge "did not possess a valid interest in the 1,060-acre property at the time of the taking" and that if the LUC did make an "erroneous finding of fact" in its quasi-judicial proceeding, that does not support any claim of a take by Bridge.

Any appeal is on hold until the two motions are resolved.



Another Go at an EIS

Since 2013, development of the 'Aina Le'a site has been stalled. As a result of a court challenge to a previous environmental impact statement, the Hawai'i County

APPENDIX: CONCURRENCE OF 'AINA LE'A, INC.
REPLACE WITH ONE FOR EISPN, NOT SEISPN

Planning Department determined that a supplemental environmental impact statement needed to be prepared – not just for the 1,060 acres in the Urban district, but also the 2,000 or so acres in the Agricultural district that surround it on three sides, since so much of the work proposed for the Urban land in previous environmental documents relates to the Agricultural lands as well. In February, it informed the landowners that a supplemental EIS would not do – they would need to prepare an altogether new EIS.

Even before that notice was in the mail, Bridge had retained the engineering firm Belt Collins to develop a document to satisfy environmental disclosure requirements – this despite the fact that nearly all of the Urban land is owned by 'Aina Le'a, Inc.

In late March, Belt Collins delivered a draft Environmental Impact Statement Preparation Notice (EISPN) to the county. Running to more than 50 pages, it anticipates petitioning the LUC to redistrict the Agricultural land into the Rural district, where it would then develop 2,265 "half-acre single-family residential home sites," arranged in 18 different villages. In the Urban district, there would be 790 single-family units and 1,290 multi-family units, 179 apartment units in the 27-acre parcel (owned still by Bridge) that has been zoned for commercial development, and a 40-unit lodge. Altogether, there would be 4,514 housing units of one or another type. That's more than 1,300 units over what was proposed in 1989, at the time of the original redistricting petition.

The cost of developing the properties in the manner outlined in the EISPN is estimated at \$3 billion to \$3.5 billion (in 2016 dollars, the document states).



**Meanwhile,
in Bankruptcy Court...**

As owner of most of the Urban land slated for the densest development, 'Aina Le'a had to signal its consent to the plan outlined in the EISPN. A short letter appearing on the very last page of the document from Richard P. Bernstein, the "corp. secretary" of 'Aina Le'a, Inc., is apparently

intended to satisfy that requirement. (There is no evidence that similar consent has been given for two of the lots included in the project area; these are the lots, with a total area of 61 acres, that are owned by more than a thousand individual Asian investors who purchased so-called "undivided land fractions," or ULFs, from 'Aina Le'a's predecessor company in 2009 and 2010.)

The letter, dated September 13, 2017, is addressed to Michael Yee, the county planning director, and states that 'Aina Le'a "consents to the submission of the Supplemental Environmental Impact Statement ('SEIS') Preparation Notice ... prepared by Belt Collins." In yellow highlighter at the top of the page, however, there's the notation: "REPLACE WITH ONE FOR EISPN, NOT SEISPN."

That replacement has not been made. And the reason for that may be found in filings made in a separate arena: bankruptcy court.

'Aina Le'a filed for bankruptcy nearly a year ago, as several creditors were threatening to foreclose on 'Aina Le'a land that had been put up as security for mortgages. Bridge, which is one of the company's chief creditors, having self-financed 'Aina Le'a's purchase of most of the Urban land, was not among the parties pursuing 'Aina Le'a in court. But after the bankruptcy filing, it has vigorously represented its own interests, often objecting to the proposals 'Aina Le'a has made for spending the relatively small amount of funds it has raised while in bankruptcy.

Early on in the proceedings, 'Aina Le'a made a proposal to borrow up to \$5 million from existing shareholders. Funds raised in this fashion would be used to pay for "maintenance and preservation of the property of the Debtor's estate, salaries, rent, insurance, utility services, operating expenses," and other charges that the bankruptcy court might approve.

On September 1, the court approved a modified proposal allowing 'Aina Le'a to borrow up to \$500,000 – but also requiring that it raise at least \$250,000 by November 29. On that date, the company had raised just half that amount, with the largest single investor identified as Ng Chuntian of Singapore (\$50,000).

In March, 'Aina Le'a sought approval

For Further Reading

Here's a list of some of the articles *Environment Hawai'i* has published on the subject of 'Aina Le'a. All are available at www.environment-hawaii.org. Earlier articles are available to view for free; those published within the last five years are free to subscribers while others must pay \$10 for a two-day archive pass.

"Two Decades and Counting: Golf 'Villages' at Puako Are Still a Work in Progress," March 2008;

"After Years of Delay, LUC Revokes Entitlements for Bridge 'Aina Le'a," June 2009;

"Bridge 'Aina Le'a Gets Drubbing from Land Use Commission," March 2009;

"Under New Management, 'Aina Le'a Is Given Yet Another Chance by LUC," October 2009;

"'Aina Le'a Seeks Two-Year Extension of Deadline for Affordable Housing," October 2010;

"More Promises from Developer as 'Aina Le'a Fails to Meet Deadline," December 2010;

"A Frustrated LUC Orders Reversion to Agriculture of 'Aina Le'a Land," February 2011;

"LUC Takes Another Step Forward in Reversion to Ag of 'Aina Le'a Land," April 2011;

"Judge Halts Work at 'Aina Le'a and Orders Supplemental EIS," March 2013;

"Supreme Court Rejects Most Findings of Lower Court in 'Aina Le'a Appeal," January 2015;

"Whatever Happened to the Villages of 'Aina Le'a?" January 2016;

"'Aina Le'a Update: A Settlement, A Note, and a Possible Suitor," March 2017;

"Hawai'i County Lists Violations at 'Aina Le'a Site, Proposes Rezoning," June 2017;

"As its Creditors Close In, 'Aina Le'a Files for Bankruptcy Court Protection," July 2017.

A 30-Year History of Failure and Litigation

The land at issue in the Bridge 'Aina Le'a litigation was placed into the Urban district in 1989. A succession of owners failed to develop it, and in 1999, a subsidiary of Bridge Capital, a company now headquartered in the Commonwealth of the Northern Mariana Islands, purchased the Urban land as well as another 1,940 or so acres surrounding it on three sides—all of which had been proposed for development into six "golf course villages" at the time the original redistricting occurred.

Bridge teamed up with DW 'Aina Le'a, LLC, to move forward with development, including construction of the 385 affordable housing units required to satisfy a condition imposed by the LUC in 2005. The condition had been sought by Bridge, which wanted to be relieved of the far more onerous affordable housing conditions that were approved as part of the original redistricting order. The deadline for completing the affordable units was set at November 2010.

By 2009, it was evident that the affordable-housing condition was not going to be met. In August of that year, the LUC told Bridge and DW 'Aina Le'a that at least 16 affordable units would need to be completed by March 31, 2010, in order to avoid having the land be reverted to the Agricultural district.

Soon after that deadline passed, the LUC conducted a site visit and found just one eight-unit building was mostly complete. Four more buildings had been put up, but were still unfinished. There were no paved roads to the building site; the required intersection improvements with Queen Ka'ahumanu Highway were not begun; electricity to the building was supplied by a generator, water came from a tank, and wastewater flowed into an unpermitted septic tank.

from the court to spend part of the funds raised "to retain a land use lawyer to advise the Debtor of its options in addressing the county's change of position," referring to the planning director's notice in February that 'Aina Le'a and Bridge would need to prepare de novo an environmental impact statement for all 3,000 acres of their combined lands.

In support of the request, 'Aina Le'a stated: "Particularly crucial for the Debtor at this juncture of the case is the advice of land use counsel. Bridge has prepared an EIS-PN and urged the Debtor to sign onto it. However, the Debtor believes it would be

In January 2011, two months after the deadline passed for completion of all 385 affordable units, the LUC voted to revert the Urban land to Agricultural. In April, it formally adopted the decision and order effectuating the reversion.

Immediately, both DW 'Aina Le'a and Bridge appealed in state Circuit Court, naming the LUC and all individual commissioners as defendants. They won a judgment in June 2012 that the LUC had, indeed, acted improperly when it reverted the land without going through all the hoops required in the usual redistricting process.

When the Hawai'i Supreme Court ruled on the matter, in November 2014, it agreed that the LUC had not followed the correct process for reversion in this case, since Bridge and DW 'Aina Le'a had "substantially commenced use of the property." It disagreed with the lower court, however, on the matter of what was required for the LUC to revert land: "The express language of HRS § 205-4(g) and its legislative history establish that the LUC may revert property without following those [redistricting] procedures, provided that the petitioner has not substantially commenced use of the property in accordance with its representations. In such a situation, the original reclassification is simply voided."

In 2011, almost as soon as Bridge and DW 'Aina Le'a had brought suit in circuit court, the state sought to remove the case to federal court. But that litigation was put on hold pending the outcome of state litigation.

After the state Supreme Court decision favorable to Bridge's claim of a taking was issued in November 2014, the stalled litigation in federal court resumed. — *P.T.*

prudent to obtain separate land use counsel's advice and has made the funding of land use counsel's ... retainer (subject to court approval) a priority."

A budget that proposes spending all \$125,000 raised by 'Aina Le'a last fall shows \$25,000 would be spent on a retainer for "land use counsel."

Bridge and other secured creditors objected to the plan. In their filed objections, they noted that 'Aina Le'a is in arrears, to the tune of more than \$200,000, on tax bills for property that secures their interests.

As Romspen, one of the secured credi-

False Killer Whale Team Fails to Reach Consensus on Protection New Measures

It's been five years since the National Marine Fisheries Service adopted a take reduction plan (TRP) to address the Hawai'i longline fleet's interactions with false killer whales (FKW). The plan required vessels to use stronger branch lines and weaker hooks so hooked whales could free themselves without much harm or trailing fishing gear. But that plan has failed to reduce the number of FKW killed or seriously injured by the fleet. In fact, that number has only increased.

The federal FKW take reduction team, which advises the National Marine Fisheries Service on protection measures, met in Wai-kiki for nearly a week last month to try to work out an approach to change that trend. But as the week drew to a close, fishing industry representatives demanded that gear changes be contingent on reducing the size of a large area that under current regulations must close to fishing in the event of excessive FKW takes. As a result, the team failed to reach consensus before the meeting's end. This, despite a strong admonition from NMFS Pacific Islands Regional Office Protected Species Division supervisor Ann Garrett.

"I asked you this week to walk slowly and not walk backwards. We've walked very, very slowly and our time is almost up today," she said, then warned: "I don't need a consensus recommendation to act."

She noted that 34 percent of the time FKW have been hooked by the Hawai'i

longline fishery since the plan was adopted, the branch lines, which are strung between the main line and the bait, broke. And given that, she said she could immediately start the process to require branch line strength to be increased.

"That's not what I want to do. I want it to come from this team," she said.

She did not get what she wanted. With time running out, and team members from the fishing industry and conservation and scientific communities unable to agree on quid pro quo arrangement, the team agreed to simply continue discussions remotely.

Missing Goals

The 2013 take reduction plan set two goals, one short-term and one long-term. The short-term goal was to reduce, within six months of implementation, mortalities or serious injuries (M&SI) of the pelagic and endangered insular FKW stocks caused by the Hawai'i longline fisheries within the 200 nautical mile exclusive economic zone around the islands to less than the stocks' potential biological removal (PBR) levels, which is the number of animals that can be removed from a population without risking its chance of survival. In the case of pelagic stocks, the annual number was 9.1; for insular stocks, 0.3. That goal has been met.

The number of whale M&SI interactions within the EEZ has never reached levels that

exceeded the stock's PBR levels in a given year, which, at the current 20 percent level of observer coverage would be two. (Because vessels on trips without an observer almost never report interactions with endangered species, the number of observed takes is assumed to equal just 20 percent of total takes.) Had there been two reported takes, it would have triggered the closure of an area south of the Main Hawaiian Islands known as the southern exclusion zone (SEZ).

The long-term goal of the take reduction plan, however, has not been met. The gear and area closure measures in the plan were supposed to reduce, within five years, the incidental M&SI of the FKW stocks "to insignificant levels approaching a zero mortality and serious injury rate (i.e., less than 10 percent of their respective PBR levels)." The M&SI take has actually increased, from 26 in the five years preceding the TRP, to 27 for the five-year period following the plan's implementation.

In fact, the Hawai'i longline fleet (mainly the deep-set fishery, which targets tuna) doubled the number of FKW it killed or seriously injured on the high seas in the post-TRP period. Between 2013 and April 10 of this year, there have been 39 observed false killer whale interactions with the fleet, only eight of which were within the EEZ, according to Kevin Brindock of NMFS's Protected Resources Division. Of those 39 observed interactions, three resulted in death and 24 resulted in a serious injury.

One of those serious injuries occurred within the EEZ this year. Should another occur before December 31, the SEZ would be closed to longlining.

tors, explained: "First, if new funds are made available to 'Aina Le'a, it should be made a priority that all, if not a substantial portion, of such funds should be budgeted and allocated towards the payment of the outstanding and delinquent real property taxes owed to the county of Hawai'i, as these real property taxes are a paramount lien on the real property, the bankruptcy estate's sole asset."

Bankruptcy Judge Robert Faris held a hearing on the matter April 9. He consented to 'Aina Le'a's request to retain the land use lawyer at \$25,000 and also approved a payment of \$6,000 to Architects Hawai'i.

A Plea from China

The difference between equity investors and lenders is fundamental in bankruptcy proceedings as well as other fields of financial play. Investors have no claim on any

of the debtor's holdings and stand to lose everything, while lenders can expect some settlement, however small. Investors get their payout, if at all, when the company successfully emerges from bankruptcy proceedings and turns a profit, which is distributed to investors as dividends.

In short, in bankruptcy court, investors have no standing.

Yet that didn't stop one Chinese investor from writing a pleading letter on February 12 to Judge Faris, seeking Faris's "understanding and supporting" [sic].

"My company, Zhongyou [Real Estate Group Ltd.], is one of the important shareholders and I feel really sorry for the difficulties which 'Aina Le'a, Inc., is having."

In December 2014, he notes, "Zhongyou invested \$16 million into 'Aina Le'a, Inc.," acquiring 1.28 million shares of common stock.

"As the president of Zhongyou, I also need to be responsible for Zhongyou's shareholders. Zhongyou's shareholders have invested a lot, and now their investment is facing huge risks that probably will be unrecoverable. If 'Aina Le'a Inc. does not succeed the re-organization, not only Zhongyou's shareholders will have a major loss in investment, but also there may be negative effects on the enthusiasm of Chinese entrepreneurs investing in the United States. ...

"Therefore, I request that my dear Judge Faris could allow 'Aina Le'a Inc., and Mr. Robert Wessels [its CEO] a little more time and provide more opportunities within the scope of the law to help 'Aina Le'a Inc. to succeed into reorganization."

— Patricia Tummons

In only four cases did the whales straighten the hooks and swim free. In the remainder of the cases, the lines either broke or were cut by the crew.

However high the number of FKW interactions on the high seas goes, unless a change is made to the TRP, it's unlikely to trigger any type of closure. And any effort to set a closure trigger based on takes of that part of the pelagic FKW stock that spans the high seas would be difficult, if not impossible. The pelagic stock abundance estimate and PBR are based on information only from within the EEZ around Hawai'i "because that is where the stock's abundance has been assessed, even though the stock's range (and fishery bycatch) extends into the adjacent high seas. Mortality and serious injury of this stock outside the EEZ (where there is no PBR) is not factored into the evaluation of stock status," the most recent stock assessment for FKW states. A new stock assessment is expected to be complete sometime next year.

The geographic range of the pelagic FKW stock beyond the Hawaiian Islands EEZ is poorly known, a NMFS 2015 report on the whales states.

Fixing the Problem

In characterizing the FKW takes over the past five years, Brindock noted that there has been no clear trend of where or what time of year interactions occurred within the EEZ. What was clear was that the weak hooks were not performing as intended. Given that, the discussion among team members focused on how to tweak the gear requirements to meet the long-term goal of reducing M&SI to zero.

After conferring in small work groups, the team seemed willing to agree that another study would be done on an even weaker hook type than the one being used by the fleet. Before the current TRP was adopted, a study was done to test the efficacy of a range of weaker hooks in retaining large tuna. While the TRT had recommended the fleet switch to a 4.0 mm wire diameter circle hook, NMFS adopted rules calling for a slightly stronger 4.5 mm hook, instead, to allay concerns that a 4.0 hook would let too many prized large tuna go free.

This time around, the study would evaluate the efficacy of 4.2 mm hooks.

On the eve of the last day of the TRT meeting, however, representatives from the Hawai'i longline industry and the Western Pacific Fishery Management Council announced that they would not agree to any set of measures that did not address the SEZ, which they have argued would provide no additional protection to the whales since the fleet has interacted with so few there.

(In March, the council, which has a representative on the TRT, had voted to not support any new gear or closure measures under the TRP until new abundance estimates resulting from NOAA's 2017 cetacean survey are available for review by the council's Scientific and Statistical Committee. It also found that the removal of the SEZ should be considered by the TRT. It's unclear how many team members were aware of the council's position at the start of the meeting, but a March 22 letter from council executive director Kitty Simonds to NMFS PIRO administrator Michael Tosatto detailing the council's position was eventually provided to team members before the last day of its meeting.)

With only a day to draft a measure regarding the SEZ, team member Brendan Cummings, of the non-profit Center for Biological

"The SEZ, no matter what formulation, it's a penalty to the fishermen. Whether half size or full size. We're not suggesting the SEZ go away entirely. . . . The SEZ has always been a point of contention because it's a closed ground," he said, noting that the expansion of marine national monuments since the current plan was adopted has left Hawai'i longliners with a much smaller portion of the EEZ to fish in.

"The problem I see with Brendan's idea, it has some merit, but if for any reason the 4.2 hook ends up not being adopted, [and] the branch line [is] effective all by itself . . . we get nothing for it," added team member and longline vessel owner John LaGrange.

For team member Andy Read, of the Duke University Marine Lab, reducing the SEZ by half was not going to happen. "We

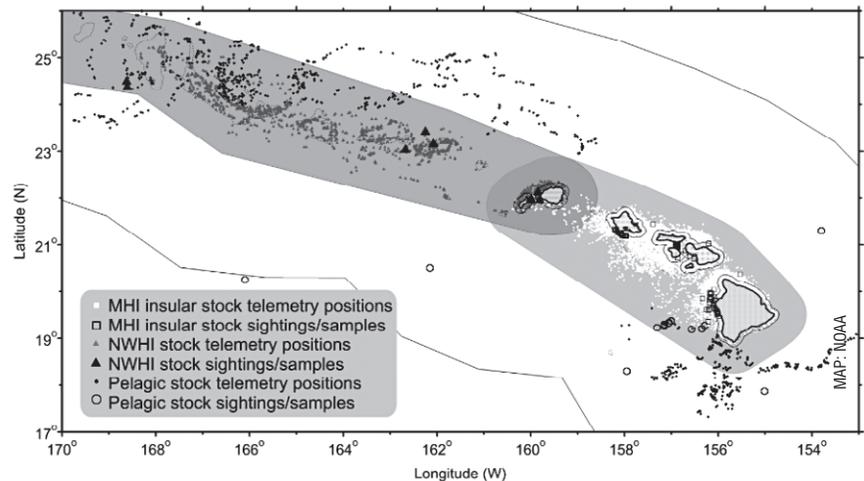


Figure 2. Sighting, biopsy sample, and telemetry record locations of false killer whale identified as being part of the MHI insular (square symbols), NWHI (triangle symbols), or pelagic (circle symbols) stocks. The MHI stock area is shown in light gray; the NWHI stock area is shown in dark gray; the pelagic stock area includes the entire EEZ excluding the region delineated by the black line around each of the MHI (reproduced from Bradford et al 2015). The MHI insular, pelagic, and NWHI stocks overlap around Kauai and Niihau.

Diversity, proposed eliminating the SEZ if and when a weak hook requirement was adopted following experimentation. While the hook was being studied, the longliners would switch to stronger branch lines. In return, the SEZ closure regulations would be suspended for two years, until the end of 2020.

"That's our proposal for this. The SEZ remains on the books, but the actual on-the-water threat to the fishermen is suspended," he said. If the weak hook turned out not to be feasible, the team would reconvene to discuss options after the two-year SEZ suspension.

That was not good enough for team member Ryan Steen, an attorney with the law firm Stoel Reeves, which represents the Hawai'i Longline Association. He had proposed that the longline fleet would immediately start implementing stronger branch lines in exchange for a commitment to reduce the SEZ by half.

heard yesterday Ryan was not willing to go to a weak hook now. . . . We wanted an experiment for a 4.0 [hook]. We're not getting that. We're getting 4.2. . . . I personally feel I've come a long way. I've given a lot up and you're asking me to take another step back I'm not willing to take. I want a 4.0 hook. . . . A stronger branch line is not the same thing," he told Garret.

Everyone seemed to agree that more crew training on how to best handle the longline to free the whales would probably save a few of them. But team members continued to debate the SEZ issue until the end.

With about ten minutes left, Steen recommended ending the discussion. "I think we're all running out of steam. We're not going to find the missing piece," he said.

The group then committed to trying to hammer out an agreeable set of measures sometime this summer, whether via email, phone or webinar. — *Teresa Dawson*

Midway from page 1

But will their benefit come at the expense of an even more threatened species, the Laysan duck? The agencies involved – including the Hawai'i Department of Land and Natural Resources, the Fish and Wildlife Service, and the Papahānaumokuākea Marine National Monument – have enthusiastically supported the plan, including with their publicity the gruesome photos of the handsome albatross with mouse-inflicted injuries.

Yet Michelle Reynolds, who has studied Laysan ducks and worked extensively with them, has serious concerns about the mitigation measures proposed to protect that much smaller, and far more endangered, population. “[T]he mitigation plan as described in the DEA will not eliminate risks and poses additional and significant threats to a critically endangered species,” she says.

Loyal Mehrhoff, now retired but formerly field supervisor of the Fish and Wildlife Service’s Pacific Islands Office and director of the U.S. Geological Survey’s Pacific Island Ecosystems Research Center, also has weighed in with critical comments. While he supports the goal of eradicating the mice, the “project will undoubtedly impact endangered Laysan ducks to at least some extent and those impacts could potentially rise to be very significant,” Mehrhoff says, submitting comments on his own behalf.

Unintended Consequences

Few would disagree with the goal of eradicating mice. Rats were eradicated from the atoll more than 20 years ago using a combination of snap traps and brodifacoum in bait stations. Since then, the mouse population appears to have begun occupying ecological niches formerly occupied by the rats.

Another factor that might help explain



A mouse preying on a nesting Laysan albatross at Midway.

PHOTO: USFWS

the aggressive behavior of the mice has been the virtual eradication of an invasive weed, *Verbesina encelioides*, also known as golden crownbeard. For years, volunteers at Midway had spent their days pulling the weed. But, starting around 2012, a grant from the National Fish and Wildlife Foundation allowed the refuge to treat the weed with a mixture of glyphosate and another herbicide, Milestone.

According to the draft environmental assessment (DEA), from 2012 to 2017, the area of ground covered by this member of the aster family went from 50 percent to less than one percent.

The albatrosses moved in quickly to occupy the denuded land, as evidenced in a 2017 photo on the website of Island Conservation, the New Zealand-based organization that has helped the Fish and Wildlife Service with a number of projects intended to restore the natural balance in island ecosystems. These include the recent efforts to eradicate rats on Lehua island and Palmyra atoll.

The removal of *Verbesina* may have had an unintended consequence, however. Almost certainly, invertebrates and

seeds from the *Verbesina* were important sources of food for the mice. With very little other vegetation planted in its place and a drought in 2015, the scene was set for the sudden appearance on the scene of the “vampire mice.”

Regardless of the factor or factors that may have prompted the devastating change in mouse behavior, one thing was clear by 2017: the mice had to go.



Enter the Laysan Duck

After removal of the rats, Midway was viewed increasingly as a suitable site for a second population of Laysan ducks. Before the arrival of humans, the ducks were widespread on all the Hawaiian islands. At the turn of the last century, in the early 1900s, only a dozen or so of them were counted on the 1,016-acre Laysan Island.

Despite years of protective efforts, by the turn of this century, the duck population on Laysan was still extremely vulnerable. Ecologists began to express concerns that all the Laysan ducks’ eggs were in one basket – i.e., Laysan island. Should a catastrophic storm, disease, or tsunami strike, the species could be wiped out. In 2004 and 2005, 42 of the birds were translocated to Midway’s Sand Island, to restore a second population, as a form of insurance for the species.

The reintroduction succeeded. By 2010, the population at Midway was thought to



CREDIT: DANIEL CLARK, USFWS

Photos show the dramatic change at Midway atoll following the removal of *verbesina*.

exceed that at Laysan. Best estimates now of the duck population at Midway put it at around 500 individuals, according to the draft EA, representing around half of the known global population. (Another small group of ducks was translocated to Kure; this population, however, has not grown.)

But, the draft EA acknowledges, the ducks are extremely vulnerable to the toxicant. “Initial tests at sites ... where non-toxic bait piles were put out and monitored indicated that Laysan ducks would readily consume bait pellets,” the draft EA states. “Thus, there is a clear primary route of exposure to the rodenticide as it is assumed they would consume bait. Since the ducks also consume invertebrates, there is a likely secondary exposure. The consequence of that exposure is presumed to be substantial, and without mitigation, a large number of individual ducks present on the island during the eradication would very likely succumb to the toxic effects of the rodenticide.”

The draft EA goes on to state, “an individual duck would need to ingest only 5 bait pellets to receive a potential lethal dose of brodifacoum. For secondary exposure, an individual duck would need to ingest 1.5 oz. (42.6 g) of contaminated invertebrate prey, which would be 57.5 percent of a bird’s daily food intake.... Without mitigation measures, the worst-case scenario is that the entire population on Sand Island could be at risk of mortality.”

“[T]he only effective mitigation and minimization strategy is to prevent the exposure of the ducks to rodenticide either through live-capture and holding ducks on Sand Island or to capture and temporarily translocate the birds to another island such as Eastern Island [another small islet within Midway Atoll] until the risk period passes,” the DEA states. In light of the fact that the duck population on Midway “is globally significant for this species,” it goes on to say, “a robust minimization strategy would need to be in place prior to implementation” of the project, with the goal being “to ensure that Laysan ducks persist on [the atoll] after the mouse eradication.”

A ‘Step-Wise’ Release

That “robust” strategy outlined in the DEA involves capturing ducks and holding them for a month or so, by which time the bait pellets would have degraded. After that, the ducks would be released “in a step-wise progression,” that is, a few at a time, with the released animals being monitored to see if they suffer any ill effects as a result of either direct exposure to the rodenticide or indi-

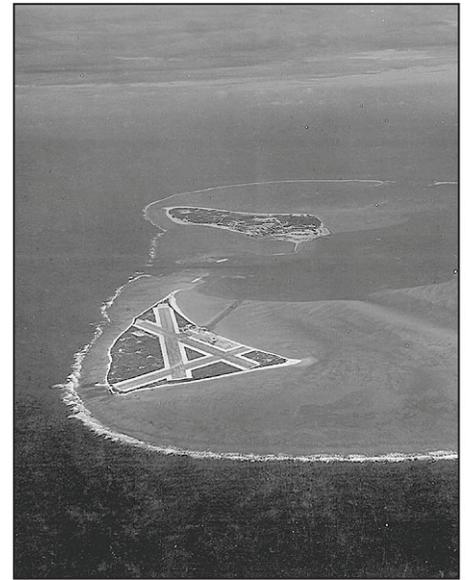
rect exposure, since the brodifacoum residues will likely persist “and will likely enter the Laysan duck food web (invertebrates), leading to multiple and repeated exposures over time.” In this way, “any uncertain or unexpected loss of ducks can be detected early and before a significant portion of the population would be put at risk.”

Just how long the “step-wise” release of ducks would last is not even hinted at in the environmental assessment. “The temporal exposure risk and consequence of exposure is difficult to quantify a priori but is likely to have high consequence to some individuals for a few to many months post-bait application. ... Effectively, each release group is a sentinel for the next group of released animals, and through monitoring for survivorship and other indicators, the mitigation team can either continue with the release of ducks or halt the release and re-capture some individuals.”

To ensure that a “local population” of Laysan ducks survives the eradication project, starting in the spring of 2019, in advance of the planned broadcast of brodifacoum, 50 male and 50 female ducks are to be captured, transferred to Eastern Island, and held there in aviaries for eventual release. Other ducks are then to be captured, banded, have their flight feathers clipped, and removed to Eastern Island. “Capture efforts will continue on Sand Island throughout the bait application period and any ducks not captured for hold-release, subsequently exposed to the rodenticide, and demonstrating signs of toxicosis, would be captured and treated ... by a veterinary professional to offset the negative effects of the rodenticide.”

Under the Endangered Species Act, the Fish and Wildlife Service has to determine that the proposal will have no “net negative impact” to the species. Over the long term, the removal of mice will likely benefit the ecosystem. “However, short-term adverse impacts are likely even with minimization and mitigation measures in place,” it states.

The DEA goes on to note that the founding population of Laysan ducks on Midway was small “and this species can reproduce quickly. ... [I]n six years this population grew more than 15-fold to 661 birds.... [T]here is likely to be short-term adverse impacts to the population of ducks on Sand Island, but the population should recover quickly, and thus the action is not expected to have long-term adverse effects to the Pacific population.” In other words, the Fish and Wildlife Service assumes that however many ducks are killed in the process, the remaining ducks will breed at



Eastern Island (foreground) and Sand Island (background) at Midway.

PHOTO: NATIONAL ARCHIVES AND RECORDS ADMINISTRATION

these same high levels. But in the years since the Midway population was established, conditions have changed in a way that does not favor the ducks. As Reynolds notes in her comments on the DEA, at the time of the release, 2004-2005, “Midway atoll was densely covered in *Verbesina* weeds with more numerous fresh water seeps. ... The population has not increased at the rate it did after the translocation since 2008.”

Sheila Conant, one of the most respected authorities on Hawaiian birds, told *Environment Hawai'i* that to her, “the ‘step-wise release’ protocol sounds like an experiment. ‘Hmmm, let’s release a few ducks and see what happens. If they don’t die from poisoning, let’s release some more!’ I would think that doing this kind of an experiment with the most robust population of a highly endangered species would be against the law.”

Insufficient Mitigation?

Reynolds wrote her dissertation on the foraging ecology, population dynamics, and habitat use of Laysan ducks, and assistance with the expansion of their range. She was also heavily involved in both the planning and execution of translocation efforts.

She supports the proposed action but is critical of the mitigation plan for the Laysan ducks. The “substantial risks to the critically endangered Laysan duck appear to be underestimated, and the proposed mitigation has important inadequacies, uncertainties, and feasibility concerns,” she writes in her comments on the DEA. “Broader and more effective mitigation actions are urgently needed to protect the Laysan duck, as the current plan substantially increases the spe-

cies' high risk of extinction and may reverse the recovery efforts of the last decade."

The Fish and Wildlife Service has a recovery plan for the Laysan duck, which identifies the Midway population as crucial to the species recovery. The DEA does not consider any recovery actions in this plan, including "translocating a quantity of candidate at-risk birds off of Midway Atoll to Lisianski Island, Kure Atoll, and/or establishing a genetically managed captive breeding population" – all of which "would benefit the species," Reynolds writes.

Mehrhoff raises a similar point: "There are numerous options for minimizing impacts and mitigating/offsetting impacts. For example, the project could improve habitat for ducks, implement better anti-botulism efforts in the future, or bolster duck populations on other islands."

These broader mitigation actions "would help preserve species genetics, reduce the probability of extinction due to random event and disasters, and is an opportunity to reduce the risks associated with toxicant and avian botulism exposure during and after the proposed toxicant application."

While the "details, logistics, and justification of the broadcast operation are well described," Reynolds says, "the period of secondary lethal and sub-lethal exposure is much less certain and could vary between 30 days and two years after the application. This secondary exposure risk to the ducks is apparently very high but not clearly mitigated. The plan to release endangered ducks and monitor them for toxicosis is incredibly risky. The mitigation actions, effectiveness monitoring, post-application actions, and contingency planning (should the effort fail) become less well considered and less complete."

Reynolds also has concerns as to the timing of the application (in July 2019). "This is during the peak of [Laysan duck] breeding and molt, peak of seasonal avian botulism epizootics, and reduced food availability," she notes. And the prospect of using the ducks as sentinels – releasing them a few at a time and observing whether they suffer as a result of exposure to the toxicant – is a huge risk, she adds. "The endangered birds should not be used as indicators of environmental toxin," she writes, suggesting instead that carcass searches and non-endangered birds, such as mynahs, should be used as indicators of toxin in the food web.

The DEA glosses over the difficulties of holding Laysan ducks in captivity and is also inconsistent in describing the number of ducks proposed to be held during the bait drop, she notes.

Mehrhoff comments on the DEA's lack of "key management triggers" that would protect the Laysan ducks and other species from unanticipated impacts. "For example, if Laysan ducks turn out to be very difficult to catch, what is the minimum number that must be captured for the project to proceed? ... If ducks do poorly in captivity, what do you do? If hundreds of albatross chicks die after first application, what do you do? How many deaths does it take to stop or alter plans?"

An Alternative Toxicant?

The draft EA notes that a different type of rodenticide, AGRID (with the active ingredient of cholecalciferol) has been used in limited areas to control mice on Midway since 2016. The AGRID pellets are hand-broadcast under a supplemental label allowing its use for mouse control. Unlike brodifacoum, which is an anticoagulant, cholecalciferol interferes with the target animal's calcium levels by increasing calcium absorption and reducing calcium excretion. The DEA states that AGRID's effectiveness "has been proven in limited hand-broadcast situations, and it is relatively safe to non-target species if used according to label directions."

"It should be noted that there were no observations of any non-target organisms such as shorebirds or Laysan ducks interacting with AGRID bait pellets in the field or being found sick or dead ... as a result of the baiting process in 2016/2017," according to the DEA. While there is a potential for the ducks to consume some bait, "to reach a lethal dose, a Laysan duck would need to ingest three times its body weight in pellets, which is unlikely to occur."

Although AGRID is admittedly effective, the DEA does not seriously consider its use instead of brodifacoum. AGRID and other rodenticides that are not anticoagulants "are untested on islands larger than 22 hectares (54 acres). Furthermore, there is no cholecalciferol product registered by the EPA for aerial broadcast and the purpose of island-wide eradications for mice. Using [Midway] as a test island, without a high probability of success, would be inappropriate due to the high financial cost of the operation."

The DEA sums up why the use of AGRID or other types of non-anticoagulant rodenticides were not further considered. There's the high financial risk of using a bait that's not "tested on islands comparable to Midway, potential bait avoidance, and greater human safety risk" – all of which "disqualifies them from detailed consider-

ation for use" on Midway.

In addition, the DEA dismisses the notion that hand-broadcast of brodifacoum or the use of strategically placed bait stations could achieve the desired result.

Bait stations would need to be deployed in a much denser concentration for mice than for rats, given the smaller home range of mice. "Island Conservation estimates that a minimum of 45,200 bait stations would be needed to cover the total area of Sand Island," the DEA states. "[M]ore than approximately 280 miles of trails would need to be opened, flagged, and maintained to support crews walking to install, service, monitor, and decommission these stations. These trails would need to be opened in key habitat such as the coastal fringe in high density [naupaka] and through habitat with Bonin petrel burrows, which are found wherever the substrate allows for excavation by the birds... It is likely some burrows would be stepped on and collapse suffocating adults or young. Island Conservation estimates that, assuming a manageable crew size of 40 workers, this would require 200+ days, and an individual station would need to be visited at a minimum of five-day intervals."

Mehrhoff takes exception to the discussion of alternatives, noting that the environmental impact statement prepared in advance of the rat eradication project at Palmyra "did a better job of explaining the rodenticide selection process." The explanation of why diphacinone, a first-generation anti-coagulant rodenticide, was not selected for use "is weak and needs to be expanded. ... This is even more important at Midway, given the much higher potential for significant non-target mortality from brodifacoum compared to diphacinone to Laysan ducks and other species."

— *Patricia Tummons*



Adult female looking at camera.

City Agencies Face Phantasmagoria Of Climate Change-Induced Obstacles

In its first few meetings, Honolulu's new Climate Change Commission has heard from a slew of city agency heads about the status of their respective agencies' efforts to plan for climate change effects. Some agencies have gone further than others. At the commission's meeting last month, the Honolulu Board of Water Supply proved that it's gone the furthest, by far.

"It's only going to get worse," said Board of Water Supply program administrator Barry Usagawa of street flooding in various parts of O'ahu during high tide (especially Waikiki and Mapunapuna), which modeling predicts will get deeper and spread further with climate change-induced sea level rise. Already, he told the commission, his agency has had to wait until low tide to pump floodwaters exacerbated by three recent water-main breaks in urban Honolulu. Until the tide receded, there was nowhere to pump the water, he said.

In addition to more flooding, the BWS also expects sea level rise to threaten its transmission infrastructure. The increased groundwater and salinity levels near the coast will likely worsen corrosion of the BWS's pipelines, the agency's newly adopted long-range financial plan states.

Usagawa noted that the BWS's network of 2,100 miles of pipelines supplies 145 million gallons of water a day to about a million people on the island. A lot of those pipes are metallic and will corrode in salt water, he said, adding that even the plastic pipes are connected with metallic fittings, which are also vulnerable to corrosion.

What's more, the transmission system includes about two dozen low-elevation coastal pipe bridge crossings that may be subject to coastal erosion effects, he said.

Perhaps most concerning are the potential effects on water supplies. Currently, two types of modeling – statistical and dynamical – have been done to predict how climate change will affect weather and precipitation in Hawai'i with one painting a much rosier picture than the other. In the worst-case scenario, Usagawa said, the sustainable yield (SY) of groundwater aquifers on the island could decrease by 34 percent, from a historical average of 407 mgd to 267 mgd.

"Altogether, assets that could be impacted from climate change include some water resources, some pump stations, and coastal pipes. All this might drive the need

for mandatory conservation," the financial plan states. It's also likely to require the BWS, which is self-supported, to raise its rates to increase revenue. "[I]n the near term, no appreciable difference in revenue requirements is seen. However, over the long term, revenue requirements would begin to increase as assets had to be replaced sooner than originally planned, possibly by six percent over the base case by the 30th year," the plan states.

In addition to including a climate change scenario in its financial plan, the BWS is in the midst of preparing an adaptation plan with the help of the Water Research Foundation and the engineering firm of Brown and Caldwell. Brown and Caldwell has an \$838,771 contract to further evaluate climate change effects on the BWS and its assets and to develop the agency's response plan, a preliminary draft of which has already been prepared.

"Climate change adaptation involves erring on the side of caution and planning well in advance," Usagawa said. Right now, however, his agency still has a lot of questions that will hopefully be answered in the final plan. "Where do we start? ... Lewers (in Waikiki)? Mapunapuna? What are the triggers for CIP [capital improvement projects]? Nuisance flooding?" he asked.

The agency is already looking into increasing the use of recycled water from

the Honouliuli, Mililani, Wahiawa, and Schofield wastewater treatment plants. Desalination is also, and has long been, another consideration.

"This is a huge impact," Usagawa said of the projected loss in sustainable yield. He said the BWS would continue to monitor water levels and try to detect any downward trends as soon as they start, since "it takes ten years to get these [mitigation projects] moving."

Development Plans

At the commission's first meeting, Department of Planning and Permitting (DPP) acting administrator Kathy Sokugawa noted that the proposed revision of the O'ahu General Plan, approved by the Planning Commission earlier this year, incorporates climate change and sea level rise considerations.

"[A]ll public and private organizations [are called on] to prepare for the future problems caused by rises in sea level, rises in groundwater levels, and more frequent and severe storms, shifts in local rainfall patterns, and higher urban temperatures," the proposed revision states.

In contrast, the city's regional community development plans have not taken those concerns into account and at the rate they're being updated, they won't anytime soon. At the commission's meeting, however, Brad Romine, who works both with the University of Hawai'i Sea Grant program and the state Department of Land and Natural Resources' Office of Conservation and Coastal Lands (OCCL), announced that he is preparing a white paper for the



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DPP on how to incorporate sea level rise predictions into the Primary Urban Center Community Development Plan, which has not been updated since 2004. The plan covers the region extending from Pearl City to Kahala and across the south shore, where most of the island's population resides.

Romine, who is working on the white paper with Tetra Tech, Inc., said it would take both the National Oceanic and Atmospheric Administration's recent guidance on climate change resilience and downscaled sea level rise predictions for the area into account.

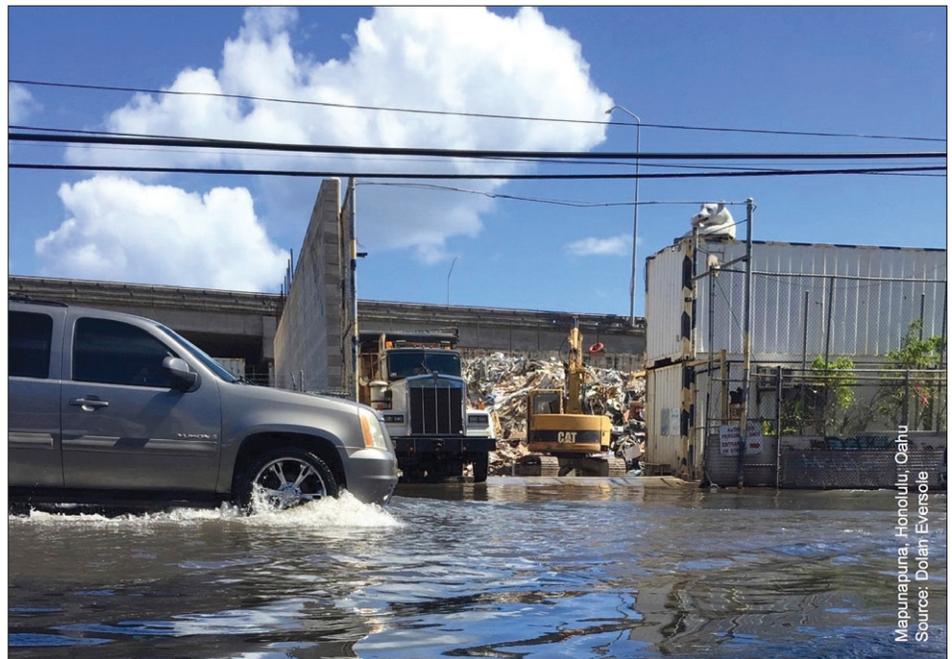
Wastewater Treatment

"State and county agencies should consider potential long-term cost savings from implementing sea level rise adaption measures as early as possible (e.g., relocating infrastructure sooner than later) compared to the cost of maintaining and repairing chronically threatened public infrastructure in place over the next 30 to 70 years," states the December 2017 Sea Level Rise Vulnerability and Adaptation Report (SLR report) prepared by Tetra Tech and the OCCL.

According to Department of Environmental Services director Laurie Kahikina, whose agency manages the island's wastewater treatment system, hundreds of agency projects are already in the planning, design, and construction phases, so her agency just "can't go back" and reconfigure them to address climate change concerns.

The SLR report identified those areas throughout the state (SLR-XA) that are vulnerable to sea level rise effects under various scenarios. "While no wastewater treatment facilities on O'ahu are located within the SLR-XA with 3.2 feet of sea level rise, sea level rise may impact wastewater stabilization ponds immediately surrounding the Sand Island and Kahuku Wastewater Treatment Plants. Flooding of these ponds would have the potential of releasing wastewater into nearshore waters," it states.

At the same time the city is undertaking an \$800 million upgrade to the Sand Island



Tidal flooding in low-lying Mapunapuna.

plant as a result of a consent decree over water pollution, the facility's pipes are vulnerable to sea water infiltration, said deputy director Timothy Houghton. He added that the wastewater system also includes 70 pump stations, a large number of which are located close to shore.

"We can't just pick them up and move them," he said, adding later, "If we get an opportunity to re-route lines ... how do we do that? Pieces are tied together. Once you start moving, you've got to move lots."

While the department is not yet prepared to relocate its entire wastewater system to avoid the effects of sea level rise, Houghton said it instructs its contractors whenever it can to consider sea level rise in ongoing projects.

"We do lots of borrowing and bond raters have asked us, 'How are you looking at climate change?' It's important to the bond raters. They're happy we're looking at it and talking about it. If we didn't, we would take a hit," he said.

Stormwater Management

Ross Sasamura, head of the city's Department of Facility Maintenance, told the commission that his agency may have the same problem the BWS has had with pumping areas flooded by water main breaks that are already flooded by high tides. As rising seas infiltrate more and more of the city's stormwater management system, runoff could have nowhere but the streets to go at some point.

"Pumps and pump systems can be problematic," Sasamura said. As an alternative to simply pumping floodwaters, he suggested what he admitted might be viewed as a hare-brained idea: capping outfalls, connecting regional systems using old abandoned pipes, and potentially using that trapped water as a non-potable resource, if necessary.

"I don't ever see us reconfiguring the storm drain systems, which are mostly developer-constructed," he said. — **T.D.**