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They Just Don't Get It

The members of the state Commission on Water Resource Management just don't seem to understand that their board exists to balance the interests of all parties with a legitimate claim to the islands' water, not just the corporate folks.

In yet another rebuff to the agency, the Hawai'i Supreme Court has thrown back into the commission's lap its decision involving stream flows to the four great waters of Maui, Na Wai 'Eha, making it five cases out of five that the court has decided against the commission.

Our cover article looks in detail at the court's most recent slam at CWRM, in which it strongly affirms the property-right interests in water of the claimants who asked the commission to restore the streams in the first place.

But the losing streak isn't the commission's alone. In its bone-headed decisions involving water rights, the panel has also caused real losses to all those who have suffered by being denied their legitimate share of stream water.

Supreme Court Orders Water Commission To Revisit Decision on West Maui Streams

The losing streak continues for the state Commission on Water Resource Management. And the environmentalists, farmers, and native Hawaiian cultural practitioners seeking to restore stream flow in West Maui couldn't be happier.

On August 15, the Hawai'i Supreme Court vacated the commission's June 2010 decision to amend the interim instream flow standards (IIFS) for only two of four streams in West Maui that native Hawaiian and environmental groups sought to restore.

The court issued its decision shortly after 9 a.m.

"I didn't have my cell phone on and the Earthjustice attorneys were calling me," says taro farmer John Duey, president of Hui o Na Wai 'Eha. "I got an email at 10 and started reading [the decision] right away. I started

pounding on the desk, 'Hooray! Hooray! Hooray!'"

In 2004, the Hui — which includes West Maui residents, many of them kuleana landowners — joined the Maui Tomorrow Foundation in petitioning the Water Commission to amend the IIFS for 'Iao, Waikapu and Wai'ehu streams and Waihe'e River, which are collectively known as Na Wai 'Eha (the four great waters).

At the time, the groups were concerned that the Wailuku Water Company (WWC) was selling, or possibly even wasting, unallocated diverted water rather than returning it to the streams. WWC is a remnant of the Wailuku sugar company and controls most of the plantation-era ditches that divert tens of millions of gallons of water a day from Na Wai 'Eha.

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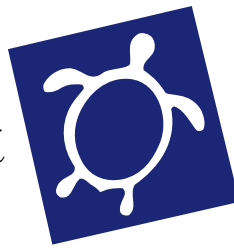
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Schoolchildren learning the significance of kalo in the Native Hawaiian culture at the Pellegrino family's Noho'ana Farm. The Pellegrinos can plant only two of the twelve ancient kalo patches on their land due to the diversions on Waikapu Stream.

PHOTO: EARTHJUSTICE

Environment



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NEW AND NOTEWORTHY

'Aina Le'a Appeal: The Hawai'i County Planning Department has approved the application for a planned unit development (PUD) consisting of 70 single-family residential lots on about 25 acres of land owned by 'Aina Le'a, Inc. But on July 25, a month to the day following the approval letter for what 'Aina Le'a is calling its Ho'olei development, the Mauna Lani Resort Association appealed to the county Board of Appeals.

Among other things, the appeal points out that the legal challenge that the MLRA brought against the environmental impact statement prepared for the Villages of 'Aina Le'a, of which the Ho'olei subdivision is one component, is still pending in state court. "The Planning Department should not have considered the PUD application until the challenge to the EIS was resolved," wrote MLRA attorney Roy A. Vitousek III.

Also, he continued, "The PUD application is not consistent with representations made by the

developer to the Land Use Commission, to the County Council when zoning was approved, and to numerous other agencies in public *forae*."

One of the most potentially damaging claims made by the MLRA is that the application was signed by just one of the 900 or so registered legal owners of the land, as listed in the county's real property tax records.

The Board of Appeals has scheduled a hearing on the matter for October 12.

Although Vitousek's appeal does not mention it, between the time the PUD was initially sought (in September 2011) and the time it was approved (June 25), 'Aina Le'a LLC, the applicant, was converted to a corporation and its home registration was shifted from Nevada to Delaware.

(For more on this shift in corporate status, visit the *Environment Hawai'i* home page, <http://www.environment-hawaii.org>, and scroll down the EH-Xtra column.)

And Waikaku'u, Too: The Hawai'i County Board of Appeals decision in the case of the PUD for Waikaku'u development in an old-growth 'ohi'a forest is being challenged in 3rd Circuit Court. Although the board decided the case in July, in favor of the developer, not until mid-August was the formal decision given to appellants Patricia and Richard Missler.

Among other things, they challenge the BOA's virtual dismissal of elements in the recently adopted Kona Community Development Plan. Rather than regard that plan as a hard-and-fast standard for future growth, the board viewed it more as advisory.



PHOTO: RICHARD AND PATRICIA MISSLER

Old-growth 'ohi'a forest at Waikaku'u, South Kona.

The Waikaku'u project would entail dividing a 52-acre parcel running from the Hawai'i Belt Road up the South Kona slopes of Mauna Kea into 13 two-acre lots in the heavily forested mauka area and one remainder lot of 41 acres in the makai portion. For more on this project, see the cover article in the June 2012 edition of *Environment Hawai'i*.

Conry to Depart DLNR: In December, Paul Conry is expected to retire from his position as administrator for the state Department of Land and Natural Resources Division of Forestry and Wildlife. His retirement will follow the recent departure of former DLNR land deputy Guy Kaulukukui, now a senior vice president for land investment company Bio-Logical Capital.

The DLNR has lost a couple of administrators in recent years who have yet to be replaced, including Dan Polhemus of the Division of Aquatic Resources and Gary Moniz from the Division of Conservation and Resources Enforcement.

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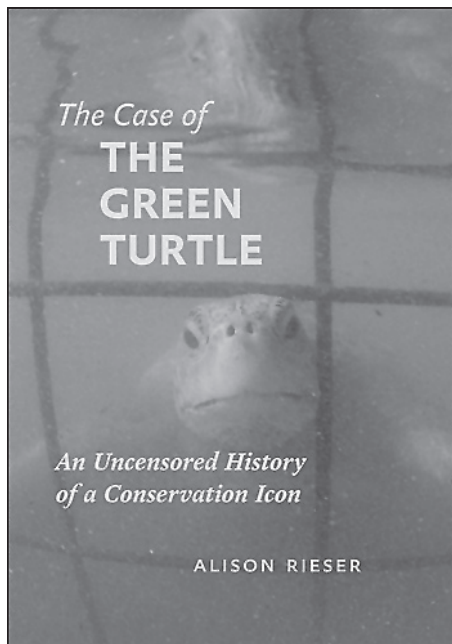
Quote of the Month

"In short, the IIFS [interim instream flow standards] matter. They have both immediate and lasting impacts on individual water users."

— *Hawai'i Supreme Court*

BOOK REVIEW

From Soup to Icon: Can the Green Turtle's Status Be Reversed?



Alison Rieser. *The Case of the Green Turtle: An Uncensored History of a Conservation Icon*.

Johns Hopkins University Press, 2012.
338 pages. \$45.00 hardbound.

The green turtle, *Chelonia mydas*, is much in the news in Hawai'i these days, what with the National Marine Fisheries Service seeming to look favorably on a petition to deprive the Hawai'i population of these turtles from any protections afforded by the Endangered Species Act. The comment period on the petition does not close until October 1, which should give anyone interested in the fate of this species plenty of time to brush up on its history. And there is no better place to start than with Alison Rieser's comprehensive review of the human exploitation of this species.

Rieser, the Dai Ho Chun distinguished professor of ocean policy in the University of Hawai'i's Department of Geography, worked on this volume for years and has the bibliography and citations to prove it. Hands down, it is the most exhaustive and global record yet of the devastating plunder of these animals over the last five hundred years.

While Rieser's prose is admirably clear, her facts well organized, and her narrative compelling, I found it was at times tough to keep reading. Anyone who has been stirred

by the quiet presence of a turtle while snorkeling or bathing in Hawai'i's nearshore waters will inevitably stumble on certain passages. Rieser does not shy away from providing grisly accounts and heart-rending photos of the many cruel ways in which turtles were captured, killed and butchered – not always in that order – so that the growing taste for turtle soup on European tables could be sated.

When Columbus reached America's shores, Rieser writes, the islands he called Las Tortugas ("the turtles") "were teeming with sea turtles that looked 'like little rocks'... The islands he described would later come to be known as the Cayman Islands, and their vast herds, or 'fleets,' of breeding green turtles would supply European voyagers, vessels, and colonies for the next 300 years."

One of the key figures in the history of turtle conservation is Archie Carr. At a talk he gave to members of the American Institute of Biological Sciences in 1954, Rieser writes, he noted how "[a]ll early activity in the New World tropics – exploration, colonization, buccaneering and the maneuvering of naval squadrons – was in some way dependent on the turtle." He went on to warn, however, that unless the turtle was protected, "it may soon be extirpated as a breeding resident of American waters."

While Carr was referring mainly to the Atlantic and Caribbean turtles, the prospects of green turtles elsewhere were hardly more sanguine. Rieser describes the depredations that occurred in the Pacific and Indian oceans as well, all leading up to the formation in 1958 of the Brotherhood of the Green Turtle, an association made up mostly of men in the publishing business intent on "restoring green turtles to their native waters, and insuring Winston Churchill his nightly cup of turtle soup."

Carr and many other members of the brotherhood (later to become the Caribbean Conservation Corporation) thought the way to have their turtles and eat them, too, lay in farming. From this came the first major commercial effort, launched by an English chicken farmer, to raise turtles in pens on Grand Cayman island from eggs taken from nests of turtles in the wild.

From its inception to its eventual demise, the operation, calling itself Maricul-

ture, Ltd., never got to the point where the turtles' reproductive cycle was completed, and it had to rely on eggs taken from nests of wild turtles. Meanwhile, to meet the demand for turtle products – calipee for soup, skins for shoes, flesh for steaks, shells for trinkets – turtle processing factories popped up all along the central American coast in Nicaragua and Costa Rica, devastating the turtle populations.

And more: the opportunity for natives to sell turtles they had traditionally consumed wrought havoc in their communities. As Rieser writes:

"Each turtle slaughterhouse had the capacity to process 10,000 turtles a year. To encourage the Miskito to catch that many turtles, the companies gave the villagers building materials to make houses on the offshore cays. This allowed them to stay out on the turtle banks during rough weather and get in more fishing time. The companies then sent boats up and down the coast on weekly runs, bringing the Miskito fishermen food and more fishing gear, and buying their turtles for cash."

In short order, the traditional practices of the Miskito were abandoned: "When the men did return home, they brought few if any turtles. The vast majority were sold to the company for cash... so there was not enough [turtle] now to fulfill kin and social obligations, nor to meet the village's nutritional needs... Social tension was growing in the village, and the villagers' diet suffered. The outside sources of their food were subject to world market fluctuations and inflation. A sense of being poor was beginning to overtake the community."

Rieser describes the ever-morphing alliances and estrangements that lay behind the first attempts in the 1960s to arrive at an international arrangement to protect green turtles throughout their global range, attempts that were handicapped by huge gaps in the knowledge of the animals' age at maturity and their obscure migrations. The more scientists learned, the more they favored restrictions on their trade. Even Carr, the early champion of turtle farming, came to regard the practice as detrimental to conservation efforts.

Rieser's discussion of the political intrigue behind the domestic regulation of turtles

through the Endangered Species Act is especially helpful in understanding the present regulatory regime. By July 1975, the Fish and Wildlife Service and National Marine Fisheries Service, Rieser writes, “could not agree whether the green turtle was endangered or threatened. Without this agreement, there could be no federal regulations and permits for mariculture.” NMFS wanted to list green, loggerhead, and Pacific ridleys as threatened: “This would give the service the flexibility to fashion regulations that allowed the species to be taken, imported, farmed, or otherwise affected by human activities – an approach more consistent with its managerial approach to living marine resources. The endangered species staff at FWS thought the data indicated that green and Pacific ridley turtles were endangered.” NMFS was apparently hoping to delay imposition of any regulation for years, giving the mariculture operation time to show it could close the reproductive cycle, and so it decided it should go through the process of preparing an environmental impact statement on the effect of the proposed threatened listing.

In February 1976, NMFS held a hearing on the matter. Lawyers representing Gulf shrimpers “believed they should have a complete exemption from any turtle protection regulations,” Rieser writes. “They insisted that shrimp trawls caught very few sea turtles; if sea turtles were threatened with extinction, it was more likely that coastal development and pollution were the culprits” – an argument still heard frequently in Hawai'i. Conservationists, led by Wayne King of the New York Zoological Society, argued that the matter should not be NMFS' to decide. “Given the inadequacies of the EIS, it was clearly appropriate for FWS to have sole jurisdiction over sea turtles,” Rieser paraphrases him as having testified. As for the mariculture operation that NMFS was trying to protect, “there was no hope that Cayman Turtle Farm [its new name, following bankruptcy] would attain self-sufficiency from wild-caught eggs. . . . By marketing sea turtle products around the world, the farm would encourage others to take turtles illegally in order to cash in on this demand. Poaching was very difficult to prevent, given the remote locations of sea turtle nesting beaches. As IUCN had found in 1975 . . . turtle farming was not in the conservation interests of the green turtle.”

Before the final decision on the green turtle's status under the ESA, the parties to the Convention on the International Trade in Endangered Species had already placed all species in the family *Cheloniidae* (loggerheads, greens, hawksbills, and both species of ridleys) in Appendix I, the list of

those species facing extinction, Rieser notes. Trade in products from these animals is generally outlawed among members of the convention – a circumstance that, for all practical purposes, ruled out any hope of commercial success for turtle farming operations. In response, the Fish and Wildlife Service had “promptly issued regulations to implement CITES,” notwithstanding NMFS' proposed listing of the green turtle as threatened.

Rieser describes the efforts to resolve the standoff between NMFS and FWS: “The agencies decided to list as endangered the sea turtle populations that were the most depleted or were suffering the highest rates of exploitation. These were the Florida and Mexican green turtle nesting populations and the Mexican populations of Pacific ridleys. All other species in the family *Cheloniidae* were listed as threatened. Once these classifications were agreed to, they could settle on which agency had jurisdiction for future policy decisions.”

The eventual agreement called for NMFS to “make the call on how to restrict fishing activities that involved encounters with sea turtles; FWS would have sole jurisdiction ‘over sea turtles, including parts and products, when on land,’” Rieser writes. “Because sea turtles spend so little of their very long lives on land, this arrangement left some people scratching their heads, everyone except those who knew about the controversial turtle farm.” At a Senate committee hearing on the ESA, she continues, “Senator John Culver asked NMFS deputy director Jack Gehringer what would happen if they found a turtle that could fly. Culver proposed that jurisdiction should go to NASA.”

Finally, by July 1978, the turtle rules were published by NMFS and FWS. With products from turtle farms now being banned from entering the United States, it became illegal for the Grand Cayman operation even to transship their product to Europe by way of Miami. Its owners appealed the rules in federal court, but to no avail. In a joint brief filed with the court by the directors of NMFS and FWS, Rieser writes, “They stood behind the regulations they had issued in July: there would be no exception made for trade in green turtle products derived from mariculture,” since in their opinion, “such trade was likely to stimulate demand for turtle products at a level that no single farm could satisfy. This renewed demand would inspire any number of new farms to get into the business by taking wild turtles and wild-laid eggs for their stock.” The district court upheld the regulations, as

did the appeals court in 1980, in a decision that seems to have turned on a flaw in the turtle farm's appeal. “The transformation of the green turtle from food to icon was thus affirmed by the narrowest of margins,” Rieser writes. “There would be other acts and players drawn into the drama. But for the connoisseurs of green turtle soup, and the proponents of conservation through commerce, the play was over.”

Although Rieser's narrative concludes here, in the “Introduction,” she takes note of the current debate over whether to relax legal protections for the green turtle. “Currently, several conservation scientists are marshaling evidence that the green turtle is no longer endangered,” Rieser writes. “Aware that this classification is both a scientifically derived status and a social construction, these scientists have a variety of motives and tactics. Some seek to demonstrate that conservation interventions can work and that species can be returned to a nonimpaired state. Others believe that the total preservation strategy adopted in the late 1960s worked an injustice in some human societies; they seek to restore the green turtle to the status of an exploitable resource.”

She continues: “The International Union for Conservation of Nature (IUCN) Red List is the international classification scheme for species, and it has classified the green turtle as globally endangered since 1968. The specialists responsible for this classification argue within their ranks (and in their publications) whether the green turtle is really endangered globally. But under the cover of this debate, they are actually reprising another debate that raged among turtle scientists during the 1970s: should the green turtle be commercially exploited or protected from all human consumptive uses until its role in tropical marine ecosystems is restored?”

For more than four decades, the American public has got on just fine without turtle soup. What demand there was for tortoise-shell trinkets has been filled by plastics. The shifting public image of the turtle – from the exploitable “buffalo of the sea” to a charismatic icon of nature – is not going to be easy to reverse, no matter how well populations recover. Rieser's book is a timely reminder that the debate over regulations that are to be informed by the “best science available” is ultimately and, even more importantly, one that will be informed by our values. As NMFS weighs the petition to delist the Hawaiian green turtles, it will be interesting to see how this plays out.

— *Patricia Tummons*

Green Sea Turtles May Lose Protection In Hawai'i if Pending Petition is Granted



NOAA TURTLE PHOTO
BY JEFF SEMINOFF

The National Marine Fisheries Service says that a petition to delist the Hawai'i population of green sea turtles – removing its status as threatened under the Endangered Species Act – “may be warranted.”

“We find that the petition viewed in the context of information readily available in our files presents substantial scientific and commercial information indicating that the petitioned action may be warranted,” the service stated in a notice published in the *Federal Register* of August 1. The public now has until October 1 to submit comments on the proposed delisting.

The petition was submitted to NMFS and

the U.S. Fish and Wildlife Service last February by the Association of Hawaiian Civic Clubs, which had been spurred to act by Kitty Simonds, executive director of the Western Pacific Fishery Management Council (Wespac). Simonds and several council members – notably those from Guam and the Commonwealth of the Northern Mariana Islands – had been griping for years about the restrictions on the take of turtles, whose killing and eating, they say, represents an important cultural tradition.

In June 2011, Wespac voted to support efforts to remove the Hawai'i turtles from the International Union for Conservation of Nature (IUCN) Red List of Threatened Species. This year, the IUCN accepted an assessment of its Marine Turtles Specialist Group, which concluded that the Hawaiian sub-population of green sea turtles should be considered a species of least concern. The Red List identifies the global green sea turtle population as endangered.

More than 90 percent of green sea turtle nesting occurs at French Frigate Shoals in the

Northwestern Hawaiian Islands, mostly at East Island. Although recent modeling by local scientists suggest that Disappearing, Shark, East and Gin islets, which are roughly two meters high, would all but disappear if sea level rises two meters by 2100, the IUCN projected that East Island would lose only 15 percent of its area with “an Intergovernmental Panel on Climate Change (IPCC)-projected 48 cm increase in sea level, and up to 26 percent of its area under the extreme predictions of 88 cm rise in sea level. These predictions are based on IPCC suggested rises up to 2100 (Church *et al.* 2001),” according to the organization’s website.

The NMFS is seeking information on “whether green turtles should be listed as DPSs [distinct population species], including the identification of the Hawaiian population of the green turtle as a DPS, and, if so, whether they should be classified as endangered or threatened, or delisted.”

Comments on the petition may be submitted electronically to <http://www.regulations.gov>. The docket number for the petition is NOAA-NMFS-2012-0154. They can also be mailed or hand-delivered to: Office of Protected Resources, NMFS, 1315 East-West Highway, Silver Spring, MD 20910. — P.T./T.D.

Corrections and Clarifications on Article About False Killer Whale Takes by Longliners

Our August story, “New Stock Assessment of Pelagic Population of False Killer Whales,” regrettably included several errors and failed to note several important points. The following is intended to correct and/or clarify misstatements and omissions in our piece.

- Our statement that the take reduction plan was based on an old population estimate was incorrect. The take reduction plan’s trigger for closing the Southern Exclusion Zone (SEZ) is not tied to any particular stock assessment. Rather, it was designed so that it can be adjusted to reflect current potential biological removal (PBR) and observer coverage levels.
- The PBR level is based, in part, on a minimum population size estimate. In the case of pelagic Hawaiian false killer whales, the previous PBR level of 2.4 was based on a minimum population size estimate of 249 whales, which was determined using a best abundance estimate of 484 whales.
- The closure of deep-set longline fishing in Hawai'i as a result of fishers killing/seriously injuring whales at a level that exceeds the PBR

level would apply only to the SEZ, which includes federal waters south of the Main Hawaiian Islands and stretches past some of the Northwestern Hawaiian Islands.

- Reducing fishery-related take to below PBR is the short-term (six-month) goal of the take reduction plan. The long-term goal is to reduce fishery-related take to less than 10 percent of the PBR within five years. These take reduction goals are specified in the Marine Mammal Protection Act.
- The new abundance estimate for pelagic Hawaiian false killer whales — 1,503 — is approximately three times higher than the previous best estimate. A new PBR of 9.1, based on a revised minimum population estimate of 906, has been proposed in a new draft Stock Assessment Report. About one in five vessels in the deep-set longline fishery carry observers, so to arrive at an estimate of total takes (serious injury or death) of false killer whales, the number of observed takes is multiplied by five. As a result, even low levels of observed takes may still exceed the new PBR and may vastly exceed the MMPA goal of reducing take in

commercial fisheries to no more than 10 percent of PBR.

- While the five-year average take by the longline fleet (deep-set and shallow-set longline fisheries) between 2004 and 2008 was 7.3 FKWs/year, the latest estimate of annual take in the longline fisheries — within the Exclusive Economic Zone — is 13.8 whales (based on a five-year average from 2006-2010). The fisheries were estimated to have killed an additional 11.3 animals on the high seas over the same time period. Due to the high level of fishery take in 2009, the official five-year take average will remain high until the 2015 stock assessment report.
- The estimate we gave in our August article of potential economic losses by the fishery needs clarification. A closure of the SEZ would mean a reduction of approximately 17 percent of the deep-set longline fishing area. Although the fishery generates an average of \$38.9 million a year in bigeye tuna catches, it is unknown how or whether an SEZ closure would affect revenue. Any financial impacts would depend on when in the fishing year the SEZ closed and any subsequent adjustments in effort, among other things. In any case, the trigger for closing the SEZ, as previously mentioned above, is not tied to any particular stock assessment.

West Maui Streams from page 1

After the ensuing contested case hearing concluded in 2009, the majority of the commission decided to restore about 13 million gallons of water a day (mgd) to Wai'ehu Stream and Waihe'e River and none to 'Iao and Waikapu streams. That left WWC and Hawaiian Commercial & Sugar (HC&S) free to divert more than 54 mgd via their ditch systems.

Contested case hearing officer and then-commissioner Lawrence Miike vigorously dissented, and Hui o Na Wai 'Eha and the Maui Tomorrow Foundation (Hui/MTF), quickly appealed. The groups were later joined by the Office of Hawaiian Affairs (OHA).

In its decision last month, the Supreme Court found that the commission had failed to properly address the effect the amended IIFS would have on traditional and customary native Hawaiian practices and the feasibility of protecting any affected practices. The commission had also "violated the public trust" when it failed to fully consider all instream uses to which witnesses testified during the hearings and erred in its evaluation of alternative water sources, HC&S's acreage, and system losses.

The court directed the commission to do the following:

- Reconsider the effect the IIFS amendments have on native Hawaiian practices and the feasibility of protecting affected practices.
- Consider evidence that 'Iao and Waikapu streams can support various instream uses.
- Reevaluate the determination that HC&S may use Na Wai 'Eha water to irrigate two sandy, porous fields (921 and 922).
- Reasonably estimate system losses, keeping in mind the commission's duty to protect instream uses to the extent practicable.
- Revisit the analysis of a once heavily used well (Well No. 7) and recycled water as alternative water sources.

"When I look at 'Iao and Waikapu streams, they're bone-dry, nothing but skeletal remains. The Supreme Court's decision restores my hope that the law stands for something, and that each of Na Wai 'Eha's four streams will flow like justice from mauka (mountain) to makai (ocean)," said John's wife, Rose Marie Ho'ouluhahui Lindsey Duey, in a press release issued by Earthjustice, the law firm that has represented the Hui/MTF throughout the proceedings.

Maui Tomorrow Foundation executive director Irene Bowie called the decision an "historic victory upholding Hawai'i's public trust doctrine."

The decision marks the fourth time the Supreme Court has rejected a Water Commission decision (or the fifth, if one counts the court's two decisions regarding the Waiahole Irrigation System — a.k.a. *Waiahole I* and *Waiahole II* — separately).

"They've been reversed every time," says Alan Murakami, a Native Hawaiian Legal Corporation attorney who represents parties appealing a similar case in East Maui.

The Water Commission had no comment on the court ruling as of press time.

"This is a very complex issue and commission members have not yet had time to review it in detail," wrote Deborah Ward, informa-

tion specialist with the state Department of Land and Natural Resources, in an email to *Environment Hawai'i*.

from Windward to Central O'ahu (*Waiahole I*), which states that while statutes and rules don't require a contested case hearing on petitions to amend IIFS or on water use permit applications [WUPA] for new uses, constitutional due process mandates one because of the individual instream and offstream rights, duties, and privileges at stake. If a contested case hearing is required by law, it can be appealed in court.

The court found that the jurisdictional language from *Waiahole I* was "susceptible to both interpretations." However, in reviewing its other cases regarding due process, the court concluded that it had jurisdiction to hear Hui/MTF's appeal because "the IIFS, independent of any WUPA, affects property interests of Hui/MTF's members."

The court cited testimony from Hui and Maui Tomorrow members whose property rights appeared to be affected by the lack of water in Na Wai 'Eha.

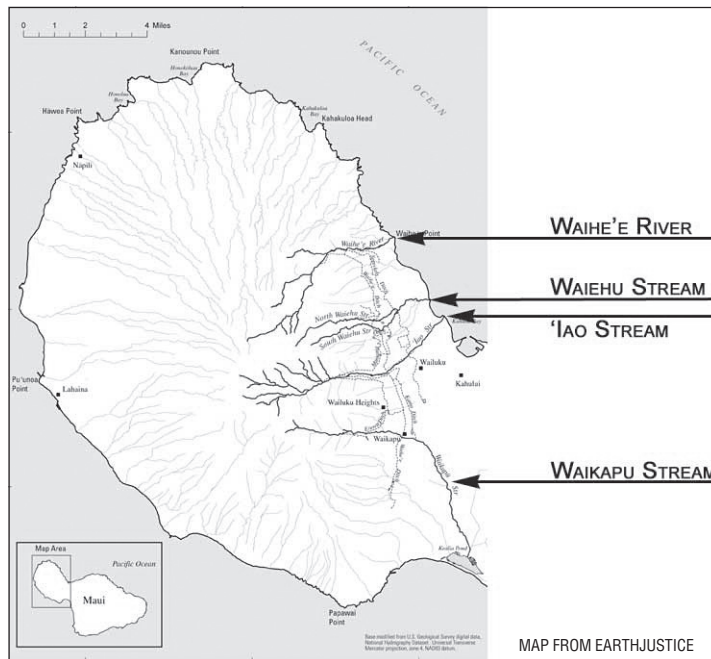
For example, 'Iao Stream runs through property owned by the Dueys. John testified that he wants to restore the 17 or so lo'i on their land that require water from the stream, but are limited to farming two of them because there isn't enough water. Taro farmer Hokuao Pellegrino also has the same problem with his efforts to

restore ancient lo'i using water from Waikapu Stream.

The court also noted that Maui Tomorrow supporter and kumu hula Roselle Keli'ihonipua Bailey submitted testimony stating that the lack of flowing water makes her gathering practices impossible.

"[D]ozens of others testified about their similar interests," the court wrote. "The question before the court today, a question we answer in the affirmative, is whether these interests constitute 'property interests' for the purpose of due process analysis."

In response to the state's and HC&S's arguments that traditional and customary rights and appurtenant rights do not rise to the level of property interests, the court pointed out that in this case, "affected parties own or live on land in the area and rely on the water to exercise traditional and customary



restoration specialist with the state Department of Land and Natural Resources, in an email to *Environment Hawai'i*.

Jurisdiction

"In this appeal, the state and companies [WWC and HC&S] not only defended the restoration of minimal or no flows, but even argued that the court had no jurisdiction, and the public had no right, to enforce the public trust. The court flatly rejected that argument," Earthjustice stated in its press release.

Indeed, the issue of whether or not courts have jurisdiction to hear appeals regarding IIFS took up a significant portion of the court's 88-page decision.

In its filings in the case, Earthjustice cited a footnote in the court's 2000 decision regarding waters diverted by the Waiahole Ditch

rights, including kalo farming. What's more, the water code supports their entitlement to water for kalo farming. ...

"When the Commission issued a [decision and order] retaining the existing IIFS for 'Iao and Waikapu streams, it necessarily affected the Dueys' and Pellegrino's access to water because it endorsed the upstream diversions that remove water from 'Iao and Waikapu streams, apparently finding that the 'importance' of those diversions outweighed the importance of downstream uses."

In addition to affecting property rights, the setting of IIFS is in general a complex process requiring significant analysis and fact-finding, the court found.

"Unlike establishing a WMA [water management area], the analysis supporting a determination of an IIFS requires more than a yes/no decision, but rather requires the commission to weigh serious and significant concerns, including: 'the need to protect and conserve beneficial instream uses of water,' 'the importance of the present or potential instream values,' 'the importance of the present or potential uses for noninstream purposes,' and 'the economic impact of restricting such uses.' Indeed, in *Waiahole I*, the Commission itself advocated for due process rights in proceedings to determine IIFS," the court wrote.

A kuleana landowner cannot, in the middle of the permitting process, ask the commission to raise the IIFS to accommodate his or her needs, the court pointed out.

"[T]he ramifications of an erroneous IIFS could offend the public trust, and is simply too important to deprive parties of due process and judicial review," it stated.

"In short, the IIFS matter. They have both immediate and lasting impacts on individual water users," the court wrote.

Native Rights

The commission's decisions regarding the Na Wai 'Eha IIFS were based largely on the needs of amphidromous species, which require mauka to makai stream flow to complete their life cycles. They include hihiwai (snails), 'opae (shrimp), and several fish species known as 'o'opu.

Because 'Iao Stream has a large channelized section in its lower reaches that includes a 20-foot drop, and because it was debatable whether Waikapu Stream ever reached the sea, the commission found they had little potential to support amphidromous species. Thus, it chose not to require any restoration of flow to those streams.

The Hui/MTF and OHA argued that the commission's decision failed to protect native Hawaiian traditional and customary rights.

And the court agreed.

Although the commission's decision documents various native Hawaiian practices in the area, including taro farming, "nothing in the decision indicates that the majority even considered the feasibility of protecting those traditional and customary rights," it wrote.

First, the decision not to restore 'Iao and Waikapu effectively denies kuleana landowners who take water directly from those streams what they need to grow taro, the court found. The decision doesn't even mention the kuleana diversion systems off 'Iao and Waikapu streams, the court noted.

With regard to gathering rights, the court found that the commission provided no analysis of its decision's effect on them.

The state, in its oral arguments, suggested that providing flows sufficient to support amphidromous species (which are collected by native Hawaiians) in Waihe'e River and Wai'ehu adequately protected traditional and customary practices. The court, however, noted that the commission's own decision stated that gathering rights encompass several species other than amphidromous ones.

"[T]he commission does not explain its focus on amphidromous species above the evidence of other instream uses. Even if the 'Iao and Waikapu streams may not support amphidromous species, evidence that they can support other instream uses must be weighed against non-instream uses," the court wrote.

Public Trust Violations

"The commission violated the public trust in its treatment of diversions," wrote the court, which found several errors in the commission's decision that seemed to allow millions of gallons a day of Na Wai 'Eha water to be wasted on porous fields and lost in WWC's and HC&S's vast, unlined irrigation systems while alternative water sources went underused.

Acreage: First, the commission erred when it included HC&S fields 921 and 922 in the acreage that relies on Na Wai 'Eha water. That decision, the court found, was based on speculation that HC&S was soon going to lose wastewater provided by Maui Land and Pineapple (MLP) that it used to irrigate fields 921 and 922. Those two fields are "scrub land" that HC&S began cultivating only after reaching an agreement with MLP in the mid-1990s, under which MLP delivered wastewater from its cannery to them.

After the close of the evidentiary portion of the contested case hearing, newspaper articles reported that MLP was going to cease its pineapple operations and its successor planned to farm truck crops. Although Hawai'i Rules of Evidence allow the commission to take note of facts reported in newspapers, the commis-

sion did much more than that, the court found.

"[I]t predicted the impact of those facts on HC&S's water supply," the court wrote, adding that evidence rules don't allow the commission to "take judicial notice of a possible effect of a change in ownership in the pineapple cannery. ... [T]he prediction that wastewater will no longer be available is purely speculative. In fact, one of the commission's [findings of fact] contradicts this speculation, stating that 'due to the shutdown of MLP's cannery operation, MLP wastewater will only be able to supply approximately half of the irrigation requirements of Fields 921 and 922 in the future.'"

What's more, the commission failed to explain why it included fields 921 and 922 in HC&S's acreage, while it excluded a similarly porous field, 920, because it consumed too much water.

"The record does not contain sufficient analysis to support the conclusion that fields 921 and 922 should be treated differently from field 920," the court wrote.

System Losses: The commission estimated that between 13 and 16 mgd are lost from irrigation systems in the Na Wai 'Eha area. "Briefly stated, losses in the water system of Na Wai 'Eha are massive," the court wrote.

The commission concluded that WWC and HC&S could halve their system losses, but the court found that the commission provided no explanation of how it arrived at that estimate.

"In choosing a number that appears to be arbitrary, the commission could have significantly over- or under-estimated the potential for mitigation of losses in HC&S's and WWC's water systems," the court wrote.

Well No. 7: One of the biggest points of contention has been the commission's finding that only 9.5 mgd from HC&S's Well No. 7 could be considered a practicable alternative to diverted water. Historically, HC&S pumped an average of more than 20 mgd from Well No. 7, but the company has minimized its use over the past 25 years.

During the contested case hearing, HC&S claimed it would cost millions of dollars to pump more water from the well and that increased pumping would exacerbate the strain on the underlying aquifer. The commission adopted this testimony as fact and decided that aquifer effects, as well as the financial burden HC&S will have to bear to reduce system losses, limit the practical use of Well No. 7 to 9.5 mgd.

The court found that the commission did this without assessing evidence on record contradicting HC&S's arguments, including a letter to the commission from



For Further Reading

Environment Hawai'i has published several articles that will provide additional background to the dispute over West Maui surface water:

- “Commission Struggles with Conflicting Claims Surrounding West Maui Stream Diversions,” February 2006;
- “Commission Orders Contested Case Mediation for Maui Water Disputes,” March 2006;
- “Finally, a Schedule for Contested Case Over Charge of Wasting Maui Stream Water,” January 2007;
- “Hearings Begin in Contested Case over Diversion of West Maui Streams,” “USGS Seeks Temporary Releases For Study of Instream Values,” and “Wailuku Water Co. Sells Ditch Water Without Consent of Utilities Commission,” December 2007;
- “Commission Tightens Grip on Waters of Central Maui,” May 2008;
- “Wailuku Companies Seek PUC Approval to Serve Existing, Future Water Users,” November 2008;
- “Hearing Officer Issues Recommendations for Na Wai ‘Eha Contested Case Hearing,” June 2009;
- “Parties Conclude Debate over Impacts of Stream Restoration in Central Maui,” November 2009;
- “Commission’s Order on Na Wai ‘Eha Baffles Its Most Experienced Member,” “The Water Commission: An Idea Whose Time Has Passed (Editorial),” “Maui Agency Is Sued Over Plan to Have A&B Put Stream Water in Municipal System,” “*Environment Hawai'i* Questions Miike On Dissent in Na Wai ‘Eha Decision,” July 2010;
- “Supreme Court Weighs Jurisdiction In Appeal of Decision on Maui Water,” and “Supreme Court Dissects Arguments In Appeal of Maui Stream Standards,” July 2012.

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HC&S itself, which stated that its wells have pumped the Paia and Kahului aquifers for more than 100 years “without any longer term deterioration in water quality.” The commission also set 9.5 mgd as the practicable alternative amount, knowing that it lacked any economic analysis of the impact that pumping more water from Well No. 7 would actually have on HC&S, the court found.

“The commission erred when it made its decision regarding Well No. 7 based on cost while explicitly acknowledging that it did not have the data it needed to truly analyze cost. ... When such critical information is missing, the commission must ‘take the initiative’ to obtain the information it needs” the court wrote, adding, “Where the commission’s decision making does not display ‘a level of openness, diligence, and foresight commensurate with the high priority these rights command under the laws of our state,’ the decision cannot stand.”

Recycled wastewater: Finally, the court found that the commission erred when it dismissed 5 mgd of wastewater from the Wailuku/Kahului wastewater treatment plant as an alternative water source for HC&S. The wastewater is currently injected into the ground and because no infrastructure exists to deliver it to HC&S’s fields, the commission chose not consider it as an alternative. This decision also did not display the “level of openness, diligence, and foresight commensurate with the high priority these rights command under the laws of our state,” the court found. It also pointed out that 5 mgd could nearly satisfy all kuleana users in Na Wai ‘Eha and “would be a significant contribution to HC&S’s water needs.”

The court ordered the commission to revisit these errors and amend the IIFS accordingly.

MTF’s Bowie says she was heartened by the court’s findings regarding the public trust violations.

“The court called the system losses massive. It was very heartening to hear that. What we’ve said all along is that if HC&S spent any money fixing the irrigation systems over the years, there would be much more water to share,” she says.

When it comes to resetting the IIFS, “I hope we don’t go back to square one,” says John Duey, noting that the Hui has been fighting to restore flows for eight years. “The thing we don’t know is when water will be returned and how much. ... It depends on the commissioners and if they go with Miike’s recommendations. They didn’t last time and got slapped around a bit.”

East Maui

The Supreme Court’s decision is a boon for the Native Hawaiian Legal Corporation and its East Maui clients, which include the group Na Moku ‘Aupuni o Ko‘olau Hui, as well as a few individual native Hawaiian taro farmers. They raised nearly the same issues that the Na Wai ‘Eha parties did in their appeal of the Water Commission’s 2010 decision regarding several East Maui streams diverted by Alexander & Baldwin, Inc. and its subsidiary, East Maui Irrigation Co. (HC&S is also a subsidiary of A&B.)

Na Moku has been trying for more than a decade to restore water to streams in East Maui and petitioned the Water Commission in 2001 to amend the IIFS of about two dozen streams. Not until 2008 did the commission hold public hearings on the petitions. Unlike the Na Wai ‘Eha case, the commission chose not to amend the IIFS via the contested case hearing process.

In 2008, the commission voted to significantly restore water to six of the streams and none to two others, an action Na Moku did not protest. Na Moku did, however, request a contested case hearing after the commission voted in May 2010 to provide minimal flow during dry times to four others, and maintain the status quo for the rest. The NHLC argued that the commission failed to restore enough water to “adequately protect and promote instream public trust uses of the streams, including Native Hawaiian traditional and customary practices.”

In October 2010, the Water Commission denied Na Moku’s petition for a contested case hearing. The NHLC appealed to the Intermediate Court of Appeals, which ruled last fall that the commission’s action was not appealable because it was not a final decision. The Supreme Court, however, disagreed and remanded the decision back to the ICA.

In its filings, the NHLC also cited the footnote in the Waiahole case that states that constitutional due process mandates a contested case hearing for IIFS.

“We raised nearly identical issues” as Earthjustice, NHLC’s Murakami says, adding that the recent Supreme Court decision will certainly help his case.

The court clarified things — “big things” — that had only been implied in other cases, he says, adding that the import of the *Waiahole* footnote was the subject of debate up until now.

As it did in the Na Wai ‘Eha case, the state argued in the proceedings regarding Na Moku’s petition that a contested case hearing was not required because only IIFS were at

BOARD TALK

Land Board to Decide Future Of Proposed O'ahu Energy Park

Later this month, the state Board of Land and Natural Resources is expected to either terminate or amend a development agreement for a 20 megawatt (MW) renewable energy park in 'Ewa, O'ahu.

The park, as proposed by West Wind Works, LLC (3W), would generate electricity using a combination of solar, wind, and biomass energy technologies. 3W was selected by former Land Board chair Laura Thielen following a failed November 2009 request for proposals and qualifications for the development of a 110-acre former feedlot at Campbell Industrial Park.

Thielen and 3W president Keith Avery signed a development agreement that would give the company a 65-year lease (effective November 24, 2011) for the property, provided it met several benchmarks and paid development fees of \$345,000 a year, payable in quarterly installments. The deputy attorney general's office approved the form of the agreement in November 2010.

In the development agreement, 3W promised to complete an environmental assessment for the project and obtain a non-utility generator (NUG) determination and power

purchase agreements (PPA) from the Hawaiian Electric Company (HECO), as well as various county, state, and federal approvals.

January 13, 2013, is the deadline for 3W to receive approval from the state Public Utilities Commission, as well to obtain 5 MW power-purchase agreements for the proposed wind-to-hydrogen energy component, the bioenergy component, the concentrated solar farm, and the solar panel farm.

Almost immediately, 3W fell behind on its quarterly payments due under the develop-

mental Notice by October 31, 2011, obtaining a NUG determination by June 30, 2011, having a Special Management Area permit accepted by the City and County of Honolulu by December 31, 2011, and having a conditional use permit application accepted by the city by January 5, 2012.

In January, Avery proposed that the DLNR convert the development agreement into a "conditional lease" and promised to pay all rents past due, as well as future rent through November 2013. But in the months that followed, Avery failed to satisfy the Land Division's repeated requests for information on proposed terms of the conditional lease and how such a lease would help 3W attract renewable technologies and more financing, among other things. So on May 25, Land Division staff recommended that the Land Board terminate the agreement.

"I think we have a ways to go."

— **Keith Avery, West Wind Works**

ment agreement and received notices of default from the Department of Land and Natural Resources Land Division in March and October of 2011 and in March of this year. As of May, 3W had paid \$260,360.25 in fees and was \$385,000 in arrears.

The company also failed to meet development benchmarks, including having a notice of a draft EA published in the Office of Environmental Quality Control's *Environ-*

In letters to Avery, Land Division administrator Russell Tsuji warned that should the Land Board terminate the development agreement, it would jeopardize 3W's ability to secure a lease for a wind energy project it had proposed for the North Shore of O'ahu.

In August 2008, the Land Board approved, in principle, a 20-year lease to 3W for 232 acres in Kahuku, with an option to extend for another 20 years. 3W had proposed erecting

stake, whereas in the Waiahole case, both water use permits and IIFS amendments were pending.

"We argued, as did [Earthjustice attorney] Isaac Moriwake, there was this independent right [to a contested case hearing to amend an IIFS]. ... It was the state's hope the court would have retreated from declaring an independent right to a contested case hearing," he told *Environment Hawai'i*.

In the Na Wai 'Eha decision, he says, the court states things that it "may have said for the first time, but implied in other cases," referring to the finding that traditional and customary rights are, in fact, property rights, he noted.

"That's an important holding because if you have a property right, then you have rights to all kinds of things," including hearings, he says.

Murakami added that his office is working on sending a letter to the ICA calling attention to the Na Wai 'Eha decision and how it applies to his case. It's been several

months since the Supreme Court remanded the Na Moku case back to the ICA and no hearings had been scheduled as of press time. Now that the Na Wai 'Eha decision has come out, he said, he was hopeful that there would be some action on his case.

"I don't know how they [the ICA] can avoid it," he says.

Commission Prepares for Disputes Over Na Wai 'Eha Appurtenant Rights

The same day the Supreme Court issued its ruling in the Na Wai 'Eha case, the Water Commission voted to allow its chair to appoint a hearing officer in case a dispute arises over claims to appurtenant rights in the area.

A year ago, the commission decided that for parcels of land where Na Wai 'Eha

water is being used or proposed to be used, it would first determine whether they have appurtenant rights. Once parcels with appurtenant rights are identified, the commission will then determine the amount of water they are entitled to.

The deadline to submit applications for appurtenant rights was February 6. The commission's Dean Uyeno says his agency will publish a public notice of the complete applications soon.

"Upon the timely receipt of written objections and rebuttals, or if the staff has knowledge of issues which require further investigation or deliberation, a hearing's officer will hear all legal and material evidence ... and make appropriate recommendations to the commission," an August 15 staff report states.

If no one objects to an application, the commission can act on it within 120 days of it being deemed complete.

Uyeno says a hearing officer has not yet been selected. —**Teresa Dawson**

up to 10 wind turbines, which could generate up to 25 MW of electricity. The board also approved a right-of-entry permit to allow 3W to conduct due diligence activities on the property, which was once part of the state Department of Agriculture's Kahuku Agricultural Park.

At the time of the Land Board's approval, 3W had not had a lease, permit, or other state land disposition terminated within the last five years as a result of non-compliance. If it had, it would not be eligible for a lease.

"As a result of the termination of this Development Agreement, the Land Board may subsequently be requested to rescind its prior approval in principle to issue 3W a direct lease," a May 25 Land Division report stated.

Deferrals

At the Land Board's May 25 meeting, Avery and Enzo Zoratto of International Electric Power, which plans to help fund the project, asked the board not to terminate the agreement.

Avery said that after the DLNR's RFP for the feedlot had yielded no qualified applicants, 3W approached Thielen and convinced her that its project was a benefit to the state and could pay a high rent.

"Ms. Thielen said, 'Okay, I'll give you the opportunity. You have three years to complete the Development Agreement and three years to complete the project,'" he said. But because the energy farm proposes to combine photovoltaics, concentrated solar power, wind and biomass, "it became very apparent ... this was a very difficult product to produce," he said.

HECO's recent efforts to solicit proposals for at least 200 MW of renewable energy for O'ahu's electricity grid complicates things, according to Avery. HECO doesn't expect to even have a short list of projects selected until October. Final selection would occur next year, "leading to power purchase and transmission agreements," an October 2011 HECO press release states.

"We are guided by who we can sell this power to," Avery told the Land Board. If it's 5 MW or less, selling to HECO is not much of a problem. If it's more than that, it has to go out to bid, he said. As a result, the energy farm is largely tied to HECO's RFP time frame, which doesn't coincide with benchmarks in the development agreement.

"If the state comes in and says we will buy that power ... then we could complete the project in two years easily," Avery said.

Zoratto promised to start paying down the back rent if the board gave him and Avery time to renegotiate terms of the development agreement. Zoratto said the agreement had

become an obstacle to financial institutions and HECO.

"Although Keith, with really good intent, negotiated a timeline, I don't think he appreciated ... [the details in the agreement needed] to get the financing," he said.

(Avery has been involved in several wind energy projects in Hawai'i over the years, including the one at Kaheawa pastures on Maui.)

Tsuji told the board he did not want to do any negotiating until 3W cured its defaults. "I'm concerned about taking a partial payment under the guise that something's going to be worked out," he said.

In the end, the Land Board chose to defer the matter for two months to allow all of the parties to continue negotiations.

In the meantime, on July 13, the Land Board amended its August 2008 decision so that any termination of 3W's development agreement would not kill the Kahuku wind project. The board changed the assignee of the direct lease in principle from 3W to Na Pua Makani Power Partners, Ltd.

3W had recently entered into an agreement with Na Pua Makani's parent company, Delaware wind power developer Champlin Hawai'i Wind Holdings, LLC. Under that agreement, the Kahuku facility would be the first phase of a three-phase wind farm that would ultimately generate up to 90 MW. 3W holds a minority interest in Champlain Hawai'i.

On August 10, Tsuji provided the board with an update on negotiations regarding the development agreement for the energy farm in 'Ewa. In short, 3W and IEP needed more time. The companies had proposed new rental terms, including paying half of the delinquent amount upon execution of a PPA,

which is scheduled to be signed in 2014. The other half would be paid upon execution of a financing agreement to be signed some time afterward. They would not pay anything until then and if a PPA is not approved, the state would get nothing, Tsuji said.

"This is all subject to further negotiation," he added.

"I think we have a ways to go," Avery said. "Any deferred payments, we plan on paying interest on them and paying them whole." The company has also proposed to pay an additional million dollars.

The board unanimously voted to defer termination for another 60 days.



Board Grants Permit For Shark Movement Study

A handful of ulua and sharks in the Northwestern Hawaiian Islands may soon be fitted with go-pro-like little cameras, the size of a D-cell battery, so that Hawai'i Institute of Marine Biology scientist Carl Meyer can better understand their movements.

On August 10, the Land Board approved a Papahānaumokuākea Marine National Monument research permit to Meyer, who has been studying movement patterns of top marine predators in Hawai'i for years.

The cameras, which he will have to physically retrieve, will allow him to get a direct view of feeding activity. In addition to deploying cameras and/or acoustic transmitters to top predators, Meyer also plans to collect tissue samples from them, as well as reef fish species, algae, and phytoplankton, to determine feeding habits.

"You are what you eat," he said. Unique



Galapagos shark school at Midway Atoll.

Invasive Species, Rising Seas Threaten Seabirds in the Northwestern Islands

At this year's Hawai'i Conservation Conference, held once again at the Hawai'i Convention Center in Honolulu, scientists and natural resource managers recounted their successes in improving native ecosystems and protecting native species. They also expanded on their assessment of the potential effects climate change may have on Hawai'i's terrestrial and marine environments.

This year's theme was, "What Difference Does 20 Years Make? Reflections on Change, Innovation, and the Work that Remains." The following provides a glimpse of some of the success that's been achieved, as well as the

isotopes in organisms get passed up through the food chain, he said, adding that he will "look at carbon and nitrate ratios and see where they were sequestered."

Meyer has been putting transmitters in sharks since 2005 and they have provided "a very valuable insight into the ecology of the [various] species," he told the Land Board.

He's found that ulua "are like Swiss bankers—very predictable in their movements for the most part."

Tiger shark movements are much harder to characterize, he said, because they're more variable in their behavior. After six years of work, a recent transmitter download revealed that adult female tiger sharks in the Papahānaumokuākea monument travel to the Main Hawaiian Islands to pup in late fall.

"It's something we've been trying to figure out for years. We just cracked it," he said.

Galapagos sharks, on the other hand, don't travel nearly as far, at least not regularly.

Although one Galapagos shark tagged in the NWHI went to Palmyra atoll, "it surprised us how resident many of the sharks are, aside from tigers. Before we did this work, we thought we'd see Galapagos sharks going to Hawai'i and beyond," he said.

In this year's tagging effort, "[p]articulate emphasis will be placed on determining the frequency and timing of visits by Galapagos and tiger sharks to monk seal pupping sites at FFS [French Frigate Shoals]," a report by the DLNR's Division of Aquatic Resources states.

"This information is vital for a better understanding of shark predation on Hawaiian monk seals and for selecting appropriate management strategies for mitigating predation impacts," Meyer's permit application states.

— T.D.

work to be done with regard to seabirds, which are threatened both by climate change and invasive species.



Strike Team Vanquishes Crazy Ants at Johnston

Cool. Ants usually seem so freaking indestructible," one audience member told another after Stefan Kropidowski finished his talk at the conference.

Last year, armed with squirt guns filled with a mixture of canned cat food, Karo syrup, and pesticide, a trio of young men all but rid Johnston Island of yellow crazy ants, saving birds there from having their eyes swollen shut by stings and feet webbing laced with sores. In short, the men gave the birds their home back.



A red-tailed tropicbird and chick on Midway Atoll

PHOTO: FOREST AND KIM STARR

Kropidowski, a University of Hawai'i-Hilo student and U.S. Fish and Wildlife Service crazy ant strike team leader, presented the results of his efforts to control the ants, which had formed a super-colony spanning nearly a quarter of the remote island. Johnston Island is one of four small islands that make up the Johnston Atoll National Wildlife Refuge, which is located some 750 nautical miles southwest of Honolulu.

Johnston is "the only available sea bird nesting habitat in over 750,000 square miles of ocean and hosts 15 breeding species, including what may be the world's largest population of Red-tailed Tropicbirds (*Phaethon rubricauda*)," the abstract for his talk states.

In January 2010, an infestation of yellow crazy ants (*Anoplolepis gracilipes*) was discovered throughout 54.7 hectares of the 241-hectare island.

Yellow crazy ants, one of about 50 ant species introduced to Hawai'i, subdue their prey with formic acid, which can irritate the eyes and feet of birds, according to Sheldon Plentovich of the FWS. During her talk, which preceded Kropidowski's, Plentovich showed video from Johnston Island of a tern frantically tapping its feet on a branch to shake off the ants and a red-tailed tropicbird sitting in an infested area that "looked like a zombie bird."

Kropidowski said he saw birds, blinded by ant bites, hit trees on takeoff. Most ground nesting seabirds within the infested area fled.

By August, the FWS's strike team was on the ground. They first attempted to treat infested areas with a pesticide that had suc-

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cessfully controlled yellow crazy ants found in Mokapu, O'ahu. It didn't work and the infestation spread.

During one survey, the team found 800 to 1,000 queens in one 4-by-6 meter plot.

After more than a year of unsuccessful control treatments, the team switched pesticides last November and started using baits of cat food (for the queens) and Karo syrup (for the workers) delivered about a liter at a time via squirt gun. The team spent 24 days spread out over 13 weeks treating a total of 52.16 hectares.

By mid-June, it had reduced the ant population to below detectable levels. And the birds responded almost immediately. Before treatment, fewer than 24 red-tailed tropicbird nests remained in the infested area. In the weeks following the ant population decline, the number of nests grew to 524. At last count, 5,212 breeding pairs inhabited the island, which accounts for 32 percent of the global population estimate, he said.

Scientist Refine Assessment Of Sea Level Rise Effects on Birds

At last year's Hawai'i Conservation Conference, one poster suggested that a few low-lying islands at French Frigate Shoals in the Northwestern Hawaiian Islands would all but disappear with a two-meter rise in sea level. Another poster discussed how inundation zones can increase exponentially if wave action is included in combination with sea-level rise scenarios.

This year, presentations on the possible impacts of climate change on seabird nesting habitat in the NWHI continued. Since last

year, researchers using GIS models have revised their estimates of impacts to FFS and now believe four low-lying islands there will be completely submerged if sea level rises two meters by 2100.

For Midway Atoll, scientists with the U.S. Geological Survey, the University of Hawai'i, and the U.S. Fish and Wildlife Service attempted to assess which bird species are most vulnerable to sea-level rise. In their modeling, the results of which were presented in a poster, Karen Courtot, Michelle Reynolds, and Crystal Krause of the USGS, the university's Paul Berkowitz, and Elizabeth Flint of the FWS, chose not to incorporate wave action into their models, but did consider possible effects of groundwater rise.

To assess the vulnerability of each species, the researchers considered whether the birds breed during storm seasons, how well they can adapt to changes, and their population status. Of the 20 or so bird species that nest at Midway's Sand, Spit, and Eastern islands, they found that black-footed albatross were the most vulnerable, followed by Laysan albatross, Tristram's petrel, Bonin petrel, and grey-footed terns. Terns and boobies were found to be the least vulnerable to sea-level rise.

"Unique among terns, gray-backed ranked amongst the most vulnerable species," they wrote.

Sand, Spit, and Eastern islands total 604.2 hectares. Modeling indicated that a rise in sea-level of two feet would reduce the total nesting area of those islands by 12.5 to 18.9 percent, depending on whether a concurrent rise in groundwater levels was considered. Species nesting in southeastern Sand Island and western Eastern Island are the most vulnerable to inundation, they found.



PHOTO: ROBERT SHALLENGER

Scientists have determined that of all of the seabird species that nest on Midway Atoll, black-footed albatross are the most vulnerable to sea-level rise impacts.

Based on a two-meter sea level rise scenario and 2011-2012 nesting abundance data, Laysan albatross stood to lose 28,445 nests without a rise in groundwater levels. Using 2008 breeding season data, they found that Bonin petrels stood to lose more than 7,000 nests. If groundwater rises, nest loss is expected to be more than double those numbers for both species, their poster stated.

"Limited resources to monitor climate change impacts to seabirds at the nesting colony could be best allocated to the most vulnerable species," they wrote.

They noted that models that don't consider wave run-up underestimate inundation during storm events.

"Wave-driven inundation models will further improve our understanding of the areas most vulnerable to climate change impacts," they wrote.

— T.D.