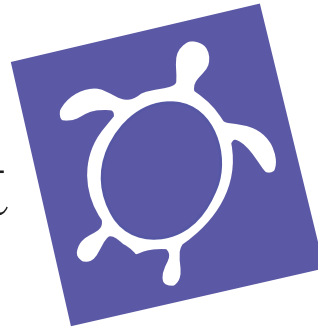


Environment



Hawai'i

a monthly newsletter

Will They Ever Get it Right?

Ever since the leases for stream water from East Maui expired decades ago, the state Board of Land and Natural Resources has been challenged in court too many times to count over its issuance of revocable permits allowing ongoing withdrawal of water to irrigate Central Maui crops, with a small fraction of the diversion feeding Maui County's Upcountry water system.

And its decision to approve another RP for 2026 has invited yet another appeal, with the board seeming to ignore instructions of the most recent court to weigh in on the subject

In other Land Board action, Lā'ie homeowners who for years failed to remove busted-up sandbags fronting their property faced nearly a quarter of a million dollar fine. That has been reduced significantly, with the board allowing them to offset the fine by the cost of removal.

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Groups Appeal Land Board Decisions To Deny Contested Case, Grant Water Permit

Here we go again. On October 29, Environmental Court Judge Lisa W. Cataldo's issued an opinion in the Sierra Club of Hawai'i's appeal of a 2022 Land Board decision to grant revocable permits to Alexander & Baldwin and East Maui Irrigation Company to divert up to 45 million gallons a day of water from East Maui streams.

Although the permits had expired years ago, Cataldo instructed the Land Board that when granting future permits, it ensure that the Commission on Water Resource Management's interim instream flow standards (IIFS) for East Maui streams "are in place and fully implemented before allowing more water to be taken."

According to EMI diversion data from January through October, last year the company took an average of 22.41 million gallons a day from East Maui streams. And by most accounts, the IIFS for many East Maui streams still have not been met. Yet at the December 12 meeting of the Board of Land

and Natural Resources, the Department of Land and Natural Resources' Land Division recommended granting a permit to EMI and its parent company, Mahi Pono, for the diversion of 41.72 mgd, 35.22 mgd of which would be used by Mahi Pono for agricultural uses in Central Maui with the remainder going to the county Department of Water Supply to meet its Upcountry needs.

At that meeting, the recommendation of the DLNR's Land Division stated that the 35.22 mgd for Mahi Pono "is based on the average amount of water used from January through October of 2025 for diversified agriculture, historical and industrial uses, and other uses including system losses, but excluding any water that is not used by the County of Maui, totaling (36.82 mgd), minus an additional 1.60 mgd. This amount is based on the current planted acreage of 12,734 acres. ... This recommendation is in response to concerns raised by Sierra Club that Mahi Pono is planting too many acres.

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Honopou Stream in East Maui. CREDIT: CWRM.

Environment

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January 2026

NEW AND NOTEWORTHY

Dolphin, Whale Strandings: A study of dolphin and whale strandings on Hawaiian and other Pacific Islands from 2006 to 2024 found that nearly two-thirds of the stranded animals died as a result of human-caused injury or infectious disease.

The research was conducted by the University of Hawai'i Health and Stranding Lab, formerly operating out of Hawai'i Pacific University, which investigated 272 stranded animals from 20 different species of whale and dolphin. Most strandings were linked to diseases, with about half of the animals in poor body condition, the effect of long-term illness.

Human-caused strandings accounted for 29 percent. "Vessel strikes were a significant risk, resulting in fatal vertebral and skull fractures for seven individuals, including two pygmy sperm whales, two humpback whale calves, a goose-beaked whale, a spinner dolphin, and a striped dolphin," the University of Hawai'i stated in

a press release reporting the findings of Kristi West, director of the Stranding Lab, and her associates.

Fishing gear and marine debris also caused several strandings, including a sperm whale that died from plastic and fishery debris blocking its stomach and a bottlenose dolphin that died after being hooked.

Diseases caused by infectious viruses and bacteria were also implicated in a number of strandings, affecting 11 different species including striped dolphins and Longman's beaked whales. "Two of the most concerning pathogens were morbillivirus and brucella, which can cause serious brain and lung problems in marine mammals," the press release noted.

Toxoplasmosis, caused by the parasite *Toxoplasma gondii*, led to the deaths of two spinner dolphins and one bottlenose dolphin, the researchers write, describing this as "of anthropogenic cause in Hawai'i." The parasite is spread by cat feces and, in Hawai'i, colonies of feral cats, living along the shore and often fed by cat fanciers, introduce the parasite into the nearshore waters.

Other parasites – nematodes, cestodes, and trematodes – were linked to deaths of pygmy and dwarf sperm whales, beaked whales, and pilot whales.

"Dolphins and whales are sentinels of ocean health," said West. "We need to understand why these animals die to help others live."

Most dolphins and whales die at sea, West notes, and recovery of carcasses is rare. Strandings that can be examined provide scientists with valuable information about what is happening to the animals and their ecosystem. Public reporting is critical to understanding threats to marine

mammal health.

Sightings of dead or distressed marine mammals can be reported to the NOAA Marine Wildlife Hotline, 888 256-9840.

Court Rules Against Dunphy: At a hearing on October 30, 1st Circuit Judge Taryn R. Thomas granted the state's motion for judgment on the pleadings in its case against Todd Dunphy and his companies, Tropical Exotics II LLP and Tropical Exotics IV LLP, regarding unauthorized grading and construction of shoreline erosion control devices in the Conservation District on O'ahu's North Shore.

A January 2022 inspection by the Department of Land and Natural Resources' Office of Conservation and Coastal Lands of properties at Ke Nui Road owned by Dunphy and his companies found "broken sandbags, rocks, concrete rubble, and support beams from a failed erosion control structure," according to a staff report.

The OCCL brought a violation case to the Board of Land and Natural Resources, which decided on December 18, 2023 to levy a \$107,000 fine and gave Dunphy until February 16, 2024 to restore the shoreline to a more natural state.

Dunphy neither paid the fine nor restored the shoreline.

The board's decision assessed an additional \$1,000-per-day fine if restoration work failed to commence within sixty days, deputy attorney general Miranda Steed explained in a September 2025 memo supporting the state's motion for judgment on the pleadings.

After Dunphy failed to comply with the order, the state filed a complaint seeking to enforce payment, as well as a court order that Dunphy and his companies pay \$1,000 for every day after the February deadline they failed to restore the shoreline.

"In their answer, defendants failed to deny the material allegations contained in the complaint or assert any affirmative defenses," Steed wrote.

Judge Tamarosa issued her formal order granting the state's motion on the pleadings on December 30.

Given that the nearly two years that have passed since the deadline to restore the shoreline, Dunphy now faces nearly \$800,000 in fines.

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Quote of the Month

"We need to do some of that adaptive management, to adapt to the fact we have longer droughts."

— Lucienne de Naie

Recent Developments in Seabed Mining

The administration of President Donald Trump is going full steam ahead with plans to allow mining of metal-rich nodules on the seafloor in international waters. In April, he signed Executive Order 14285, “Unleashing America’s Offshore Critical Minerals and Resources,” which directs the Secretary of Commerce to, among other things, identify “private sector interest and opportunities for seabed mineral resource exploration, mining, and environmental monitoring in the United States Outer Continental Shelf; in areas beyond national jurisdiction; and in areas within the national jurisdictions of certain other nations that express interest in partnering with United States companies on seabed mineral development.”

To give legal cover to the order, the administration is relying on the Deep Seabed Hard Mineral Resources Act of 1980 (DSHMRA). This law was passed as a holding measure in anticipation of the U.S. ratification of the United Nations Convention on the Law of the Sea (UNCLOS). “[P]ending a Law of the Sea Treaty, the protection of the marine environment from damage caused by exploration or recovery of hard mineral resources of the deep seabed depends upon the enactment of suitable interim national legislation,” the act states. “[L]egislation is required to establish an interim legal regime under which technology can be developed and the exploration and recovery of the hard mineral resources of the deep seabed can take place until such time as a Law of the Sea Treaty enters into force with respect to the United States.”

The United Nations Convention on the Law of the Sea was adopted in 1982 and became effective in 1994, a year after Guyana became the 60th nation to ratify it. At present, 169 sovereign states and the European Union are signatories to the law, which, among other things, established the International Seabed Authority (ISA) to regulate deep-sea mining.

When Congress passed DSHMRA, few doubted that the United States would also eventually be signatory to the law of the sea, which was still being negotiated and would be adopted by the United Nations two years later. That did not happen. One result is that, while international law governing seabed mining is binding on all signatory nations that have the capacity to pursue it, the United States is not. Another is that American companies cannot obtain licenses for deep-sea mining from the ISA.

A recent analysis on the Bitget website describes the legal complexities that the ad-

ministration’s position presents. The executive order, issued “to speed up seabed mineral exploration, has been perceived as a direct challenge to the UNCLOS framework, potentially heightening competition in resource-rich areas like the Clarion-Clipperton Zone,” the unnamed author writes (see <https://www.bitget.com/news/detail/12560605107102>).

ment, we have extraordinarily limited knowledge of the animals that inhabit this zone,” Ellis said, as quoted in a press release from the University of Hawai’i. “We didn’t expect the results to be as stark as they were. These animals may be quite sensitive to changes in productivity in surface waters, which ultimately drive these patterns in the abyss.”



Some of the animals identified in the deep-sea that spend their life in the benthic boundary layer.

CREDIT: GABRIELLE ELLIS.

“By circumventing the ISA, the U.S. challenges the legitimacy of a multilateral system that is widely accepted by the international community,” the Bitget analysis continues. “This has led to warnings from the ISA and criticism from countries such as China, which sees U.S. unilateralism as destabilizing for global ocean governance.”

Meanwhile, the ISA is itself mired in difficulty in efforts to establish regulations for seabed mining. As time passes, more and more of the signatory nations are pushing for a ban on any permits.

Bolstering their position are increasing studies of the long-term impacts of seabed mining as well as the discovery of new organisms in the dark, cold environment.

A University of Hawai’i graduate, Gabrielle Ellis, was lead author of one of those studies that examined ocean life in the abyssal benthic boundary layer, a few meters above the seafloor. The study, published in *Limnology and Oceanography*, describes a dynamic community of snails, bivalves, and barnacles that changes in response to seasons and availability of food that drifts down from higher in the water column.

“Given the remoteness of this environ-

ment, we have extraordinarily limited knowledge of the animals that inhabit this zone,” Ellis said, as quoted in a press release from the University of Hawai’i. “We didn’t expect the results to be as stark as they were. These animals may be quite sensitive to changes in productivity in surface waters, which ultimately drive these patterns in the abyss.”

Erica Goetze, study co-author and professor of oceanography at UH-Manoa, added, “In the event of deep-sea mining, the organisms in this region will be impacted via ambient water removal and the generation of sediment plumes that interfere with feeding, in addition to the removal of nodules, which will effectively remove the settling habitat for larvae, likely leading to further declines in local recruitment.” Also co-authoring the study were UH oceanography professor Jeffrey Drazen and Craig R. Smith, professor emeritus of oceanography and, with Goetze, graduate advisor of Ellis. (Ellis recently received the Mirikitani Outstanding Dissertation Award; she now teaches at Georgetown University.)

“Our results highlight how much we have to learn about the dynamics of these abyssal ecosystems in order to provide a vital baseline for assessing the impact of both human activity and climate change,” Smith said.

Yet another study published last March in *Nature*, “Long-term impact and biological recovery in a deep-sea mining track,” looks at the tracks left by an experimental mining vehicle more than 40 years ago on the floor of the Pacific Ocean. The researchers, from Britain’s National Oceanography Centre, found

that the mining activity in 1978 led to alterations in the seabed sediment and declines in larger marine organisms.

“Although some aspects of the modern collector design may cause reduced physical impact compared to this test mining experiment,” the authors write, “our results show that mining impacts in the abyssal ocean will be persistent over at least decadal timeframes and communities will remain altered in directly disturbed areas.”

Just last month, *Nature Ecology & Evolution* published yet another study of the ecological impacts of seabed mining, “Impacts of an industrial deep-sea mining trial on macrofaunal biodiversity.” This study, led by researchers at the Natural History Museum of London with contributions from scientists at other institutions, was funded by Canadian-based TMC, whose U.S.-based subsidiary is one of the companies that is seeking licenses from the United States to mine the sea floor, while its Nauru partner has applied for a license from the ISA. The TMC “had no influence on data analysis, interpretation, or presentation,” the authors stated.

The study looked at an area of the Clarion-Clipperton Zone that, in 2022, was the site of a large-scale test of a commercial deep-sea mining vehicle. For two years before the test and two years after, the scientists looked at the organisms living in the sediment. This allowed them to separate impacts from the mining activity from natural variation.

In the area mined, the density of macro-fauna decreased 37 percent within the mining tracks, while the number of species decreased 32 percent.

In June 2021, the president of Nauru informed the ISA that it was going to invoke the two-year rule, allowing it to commence seabed mining in 2023, through its partnership with TMC, Nauru Ocean Resources, Inc. (NORI). By 2023, the ISA, under its rules, would be required to give NORI provisional approval to mine nodules in an area of the Clarion-Clipperton Zone, even if it had not approved a Mining Code,

The ISA still has no Mining Code, governing the conditions under which mining may proceed, but members have pointed out that this two-year rule is not the only provision that stands in the way of moving forward with mining operations.

An analysis on the mining.com website analyzes other obstacles. Aline Jaeckel and Erik van Doorn write in the Blog of the European Journal of International Law, EJIL Talk!, that in addition to rules concerning mining exploitation, “the ISA is obligated to adopt another, entirely separate, set of regulations before any seabed mining can occur:

benefit sharing regulations,” negotiations for which are “at a very early stage.”

What has been lost in discussions, they write in a post of December 29, “is the legal obligation on all UNCLOS member states to ensure that benefits derived from mining ... are shared equitably. Indeed, the ISA is required to develop and adopt a separate set of regulations on benefit-sharing.”

Jaeckel is associate professor at the Australian National Center for Ocean Resources and Security (ANCORS) at the University of Wollongong and advisor to the government for ongoing negotiations at the ISA. Van Doorn is a lecturer at ANCORS whose research has focused on marine resources.

“The importance of these benefit-sharing obligations to the ISA regime cannot be overstated,” they write. “The *raison d'être* of the ISA regime is to avoid a repetition of historical inequities in extractive industries. ... The ISA represents a rejection of this colonial approach to resource management. Thus, ensuring that DSM [deep sea mining] ... benefits humankind is a core mandate of the ISA.”

While the ISA Council is charged with adopting rules for mining exploitation, the full ISA Assembly must approve benefit-sharing rules. “The Assembly must approve the regulations and decide how benefits are distributed,” they write, “a process separate from and slower than adoption of exploitation rules.”

Meanwhile, more and more companies are seeking licenses to mine the deep, either from the ISA or the United States, or both. As reported in mining.com, Lockheed Martin, which holds two licenses in the Clarion-Clipperton Zone (CCZ) granted by U.S. regulators in the early 1980s, is holding talks with

several mining companies about potential partnerships to exercise those licenses.

A California-based company, Impossible Metals, has applied for exploration rights under the U.S. law as well as the ISA, also in the CCZ. It is also the first company “to apply for a deep-sea critical mineral lease in U.S. federal waters, 130 miles off the coast of American Samoa,” the company’s website states.

And TMC filed for a commercial permit from the U.S. in April, soon after Trump signed Executive Order 14285.

Impossible Metals has said it plans to share with American Samoa 1 percent of the company’s profits from mining in federal waters near Rose Atoll, potentially providing the territory with \$10 million a year.

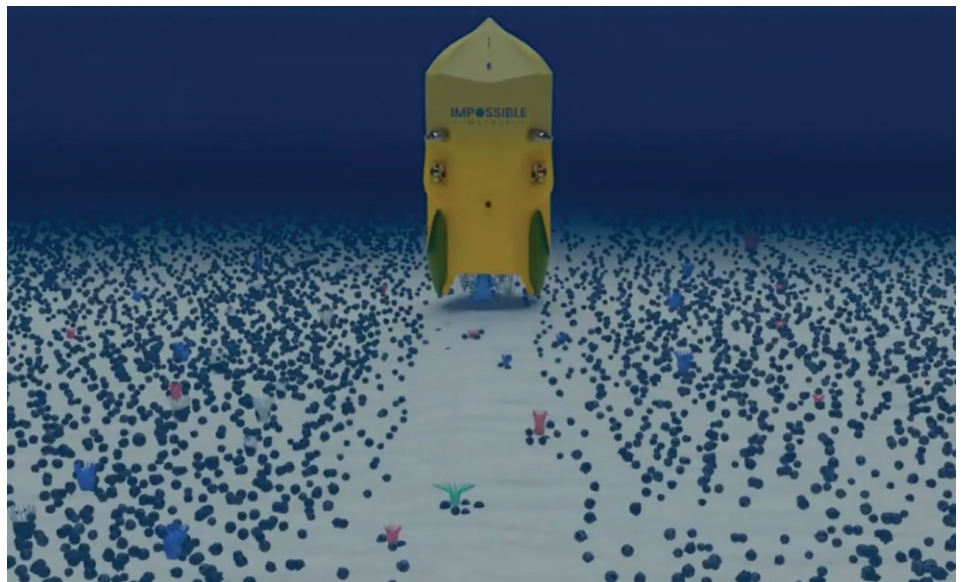
Rather than dredging the seabed with large tractor-like behemoths, the company plans to selectively pluck metallic nodules from the ocean floor using robots that hover just above it. The company claims its technology will allow the robots to avoid sensitive habitats, and won’t generate much noise, create sediment plumes, or require the dumping of effluent.

Drazen reported to the Western Pacific Fishery Management Council last September that the company hopes to test its mining technology in 2027.

“Their technology is experimental. It could be disruptive,” he said.

In any case, he said the United States should be wary of giving blanket permits to a given company. Instead, he argued that permits should be issued for specific mining technologies, since a company issued a permit could later decide to change the mining technology it uses.

— Patricia Tummons



An artist's rendering of the hovering robot Impossible Metals plans to use if it is allowed to mine the seabed. CREDIT: IMPOSSIBLE METALS.

Groups Appeal *continued from page 1*

We note that this recommendation is to maintain the status quo during this 2026 RP.”

It adds in a footnote, “Previously, the revocable permit allowed for a diversion of 3,263 gallons per acre per day (gad) multiplied by actual acreage planted. This new calculation is based on 2,765.82 gad multiplied by current planted acreage of 12,734.”

As for Judge Cataldo’s instructions regarding the IIFS, the Land Division stated, its staff “consulted with CWRM staff and was informed that the applicant’s diversion of water was compliant with the IIFS. CWRM staff also noted that the applicant was working in good faith to obtain numerous regulatory approvals to remove outstanding diversions in the Huelo region to comply with the 2022 IIFS decision.”

The Land Division also recommended that EMI and Mahi Pono should be required “to provide an improvement plan in order to implement practical mitigation measures to reduce system losses. Regarding the ditch system, staff recommends that the board require the applicant to start construction no later than November 1, 2026, on all diversion removals required under the 2018 and 2022 CWRM orders that receive all required State, Federal and County permits by June 30, 2026. Staff believes that requiring this work would also meet the requirement that CWRMs IIFS are implemented.”

The division also recommended that the companies provide by March 31 a plan for lining all reservoirs that store water diverted under the permit.

“Staff believes that these recommendations sufficiently comply with the 2025 court opinion requirements. Staff does not believe that the applicant must complete certain construction activities on either the diversion removals or lining reservoirs as a pre-requisite for the board to approve the issuance of the 2026 revocable permit, especially if completion of permitting requirements remains outstanding,” it stated.

In written testimony to the board, both the Sierra Club and Nā Moku ‘Aupuni ‘o Ko‘olau Hui took issue with many of the Land Division’s recommendations and requested a contested case hearing.

Native Hawaiian Legal Corporation attorney Ashley Obrey, who represents Nā Moku, wrote, “First, authorizing 35.22 mgd as the supposed ‘status quo’ does not maintain anything; instead, it represents a **57 percent increase** over the actual average diversion of 22.41 mgd as reported by Mahi Pono and EMI to the board. This is unacceptable.



In addition to delivering water for Mahi Pono’s fields in Central Maui, the East Maui Irrigation system provides water for Maui County’s Kula Ag Park, pictured here. CREDIT: CWRM.

The Circuit Court expressly barred BLNR from ‘allowing more water to be taken’ before CWRM’s orders are fully implemented. It is undisputed that the diverters have not completed the modifications previously ordered by CWRM, which are essential for riparian, recreation, and cultural uses of the streams as well as biological values. Staff’s proposal does exactly what the court prohibited.

“Second, the staff submittal proposes increasing not only the total the amount of water diverted from East Maui but the allocation of water to the county as well. The county does not require up to 6.25 mgd for its total domestic and Kula ag park uses. Its monthly average is 4 mgd.”

The Sierra Club’s testimony argued that the Land Division had misinterpreted EMI’s data for 2025. “The staff used data from the diversified agricultural column, but that column includes water taken from the revocable permit area as well as water from outside the revocable permit area and lots of groundwater. It calculated that the average amount of water **used** this year was 35.22 million gallons per day. But the court’s order does not refer to the amount of water **used**; it refers to the amount **taken**,” it stated.

“This board has already gotten in trouble with the court for making frivolous representations that were manifestly and palpably without merit. ... Does it wish to increase the court’s ire by defying the court’s instructions?” the Sierra Club continued.

It pointed out that the Water Commission’s IIFS decisions in 2018 and 2022 ordered modifications to stream diversions,

and called for ensuring downstream flows in Ho‘olawa, Waipi‘o, Hānawana, Naili‘ilihaele, ‘O‘opuola, and Kailua streams.

“Yet, none of the diversion structures have been modified for these six streams! CWRM has already concluded that diversions on six streams are harming others. Until that harm is stopped, BLNR cannot allow EMI or Mahi Pono to take more water,” the group stated.

At the board’s meeting, chair Dawn Chang stated that it needed to deal with the Sierra Club’s and Nā Moku’s requests in their written testimony for a contested case hearing before taking up any substantive discussion of the proposed revocable permit to EMI and Mahi Pono for 2026.

Attorney David Kimo Frankel, who represents the Sierra Club, pointed out that the group had not yet filed the required written petition or made an oral request for a contested case hearing.

“Other people want to testify. We want to make sure we don’t cut them off. We will likely make that formal request at the end,” he said.

Chang argued that if the Land Board granted the requests for a contested case hearing, “the rest of it is moot. We can’t proceed forward on the RP.”

(In May 2024, *Environment Hawai‘i* challenged the Land Board’s practice of stopping public testimony once a contested case hearing is requested. The Office of Information Practices asked the BLNR to defend this practice in June 2024; it has yet to do so. For more, see “Environment Hawai‘i Appeals Refusal of BLNR to Hear Marconi

Point Testimony,” Board Talk column, August 2024.)

Chang then asked Frankel and Obrey to explain to the board how the proposed permit would harm their clients.

Frankel pointed to the Water Commission’s 2022 finding that six East Maui streams needed more water, that the diversions were causing harm, and that the commission’s order that diversions be modified was still unmet.

“If you grant us a contested case hearing and actually act diligently, which you haven’t been doing, to commence the contested case hearing before the end of January, we will not go to court to challenge the RP during the pendency of the [hearing] as long as you do not authorize more than 23 mgd,” Frankel said.

Frankel explained that this amount would comply with the court’s order that the Land Board may not increase the amount of water taken until the modifications are made.

“So, 23 mgd approximately is what they were taking in 2025. You would be preserving the status quo. ... We could take a very harsh position and say, ‘not a drop of water at all.’ We are attempting to provide you with a reasonable proposal, as we have in the past,” he said, noting that the Sierra Club’s proposed cap is similar to one the court ordered a couple of years ago.

“We’re not here to bankrupt Mahi Pono. We’re not here to have all their crops die. We are asking for a *balanced* solution. A balanced solution. And I don’t think you recognize what we’re proposing is a balanced proposal. What the staff is proposing is not. What Mahi Pono is asking for is not,” he said. (Mahi Pono had asked for even more water for 2026 than what the Land Division proposed.)

Chang countered that the Land Board must balance all of the interests involved, including sustainable agriculture. “How do we balance that?”

“You’re giving them 23 million gallons of water a day, which is what they used in 2025. So you’re not cutting off ag at the knees. What you’re stopping is expansion until these complicated issues are resolved,” he replied.

He later clarified that not all of that 23 mgd would go to Mahi Pono, as that amount includes the water used by the county. Subtracting the water to the county, “Mahi Pono would have available to it 19 mgd, which can be supplemented — as it has been — with water from streams that are west of the RP areas, as well as groundwater, which it has been using of the past

several years,” he said.

To this, Chang said, “CWRM has taken the position that they would prefer that surface water be used” instead of groundwater, possibly referring to a recent presentation by CWRM deputy director Ciara Kahahane and staff hydrologist Ayron Strauch to the Water Commission on the difficulties of meeting all off-stream uses of East Maui water during the severe drought this past year.

Frankel countered, “The Water Commission has not taken that position. A staff member of the Water Commission took that position. The Water Commission, as you know, has never had a meeting to discuss this. We’ve never had an opportunity to cross examine anyone on this. That is not the commission’s recommendation. That is a staff member statement taken, I believe, out of context.”

The 2018 Water Commission IIFS decision approved the use of groundwater to irrigate the crops in Central Maui, and to change that position so radically could require a public hearing at least, and possibly a contested case hearing, he said.

Chang then suggested that the commission’s position is that so long as the IIFS are met, any amount of water above that could be taken to meet off-stream uses.

Frankel explained that the 2022 Water Commission finding that more water needed to flow downstream in six East Maui streams “has not been met. Currently there is a violation of the [IIFS]. You need to recognize that.”

“If the Water Commission staff, who are qualified staff, are saying that the IIFS is met ...” Chang stated.

Frankel interjected, “We’re going to cross examine them on that. It’s black and white.”

NHLC’s Obrey added that she joined in everything Frankel had said. She also took issue with how the Land Division submittal attempted to address the proposed permit’s possible impacts to traditional and customary practices in East Maui.

The Land Division’s submittal cites language in the Water Commission’s 2018 IIFS decision that suggests that the record is not clear and no evidence was presented that native gathering rights were traceable to at least November 25, 1892. Yet, the commission’s decision “assumed that there are persons who can show that they possess native Hawaiian customary and traditional gathering rights.”

That limited analysis, Obrey argued, was “appalling.”

“The way that it focuses on the Water

Commission decision, it brings to mind maybe, people are doubting there are traditional and customary practices in East Maui,” she said, adding that the courts and the environmental impact statement prepared for a proposed long-term disposition of East Maui water both recognize the traditional and customary practices exercised in East Maui.

She also raised the fact that the staff submittal contained no *Ka Pa‘akai* analysis addressing possible impacts to those practices or possible mitigation.

Whatever the Water Commission’s 2018 IIFS decision says about traditional and customary practices, Obrey argued that more needed to be done to assess current effects the diversions from East Maui are having.

“Any time there are changes to a stream, that impacts stream life. It’s gonna impact farming. It’s gonna impact gathering. ... We’re coming out of drought conditions,” she said, noting that Makapipi Stream isn’t flowing and that she’s heard from the community that Honomanu has had low flows. “To take more water out is a problem,” she said.

“Is it your position that CWRM’s conclusion that the IIFS has been satisfied is not correct?” Chang asked.

“I’m not comfortable with that. Especially, with this recent court order,” Obrey replied.

Chang then asked both Obrey and Frankel whether they thought it was the Land Board’s role to weigh the various uses of water to determine what’s appropriate,

“So there are traditional and customary practices; there’s ecosystem. But there’s also other reasonable beneficial uses, municipal water, sustainable ag,” she said.

“You have discretion, but it’s very limited discretion,” Frankel replied. “There’s minimum standards that need to be met and have not been met. So, for example, you cannot authorize all the water to be taken from a stream. That is not balanced. Even if it provides the water to agriculture,” he said.

“Do you believe that that’s what the board has done? Authorized all water [to be taken from the streams]?” Chang asked.

“Yes. From six streams, yes,” he replied.

Chang later asked them if they disputed the Water Commission’s IIFS finding that approximately 56 mgd is estimated to be available for off-stream use at median flows.

Frankel said the board needed to recognize the larger issue, which is that 30 percent of the time, there is far less water than that. “I think it’s down to like 26 [mgd]. I

don't think Mahi Pono's accepted that fact, which is why it's so important they not be planting more crops now, because in the long-term, there's not going to be enough water for their crops," he said.

After hearing from Frankel and Obrey, the board met in executive session to discuss with its deputy attorney general their contested case hearing requests. Upon returning, Chang made a motion to deny them.

"In weighing the different government interests, including uninterrupted service to [the Maui DWS], as well as supporting ag, balanced against the interest asserted [by the Sierra Club and Nā Moku], I am making a motion to deny," she said.

Her motion, seconded by Hawai'i island board member Riley Smith, passed unanimously.

'Ketchup and M&Ms'

When it came time for the public to testify on the proposed permit, Sharon Hurd, director of the state Department of Agriculture and Biosecurity, went first.

She supported the permit and stressed the need for more locally produced food, noting that only 1.1 percent of the state's

farms have the ability to provide food for the state. "Mahi Pono would like to do their bit," she said.

She suggested that if the world goes through another pandemic, without local farms that can produce the volume of food necessary to sustain the state, "we're going to be eating ketchup and M&Ms, folks."

She argued for allowing more water to be diverted than is needed, given strict crop-specific requirements. "Farming is not surgical like that [when it comes to water needs]. I'm not going to say arbitrary, it's not surgical," she said.

In any case, she said, "Expansion is key."

Attorney Cal Chipchase, who represents Mahi Pono and EMI, pointed out that the county of Maui and its mayor also supported the permit with some modifications. The permit would allow the county another year to work out how its East Maui Regional Community Board might take over the job of allocating water from the diversion system.

"Alignment is nice to see," Chipchase said.

He also supported a request by the

county to increase its allocation from the 6.25 mgd the Land Division proposed to 6.5 mgd.

He then argued for raising the cap on the water Mahi Pono would receive to what the Land Board had authorized in the past, "to truly maintain the status quo."

"We would look at what was done last year: 3,263 [gallons per acre per day] against 12,734 acres," he said. That total of 41.55 mgd "would be perfectly consistent with the court's order," Chipchase said.

The order's key word was "allow," not what happened to be used in a year when Mahi Pono was pumping significant groundwater, he argued.

Chair Chang asked whether it was Mahi Pono's position that it would not be expanding any crops.

"We would not exceed the allocation per acre against the number of planted acres," Chipchase replied.

He also argued against the proposed permit condition to require a plan to line reservoirs, calling it "not the right approach." Deciding which reservoirs to line is "a more complicated decision than saying 'any one that takes water,'" he said.



According to the Sierra Club and Na Moku Aupuni O Ko'olau Hui, Mahi Pono's diversions from the East Makapipi and Porgue tunnels take water that would otherwise flow into Makapipi Steam, which is currently dry (pictured here). CREDIT: CWRM.

"What is the effect and capacity of that lining?" he asked, "All of those questions are appropriate for the long-term disposition."

He later added that with regard to mitigating system losses, Mahi Pono has already spent more than \$50 million to increase efficiency, resulting in a system loss somewhere around just 5.4 percent of the amount diverted.

"I think it's difficult to say it's not an efficient system," he said.

Board member Kaiwi Yoon questioned Frankel about Chipchase's argument for using the 41.55 mgd allocation the Land Board had set in the past.

Frankel noted that Chipchase was referring to how much water the Land Board had *allocated*. "We're talking about how much water was taken ... which is the word that the court used," Frankel said, before also pointing out that the board's decision to allocate that higher amount was reversed by the Circuit Court.

"You're instructed to not allow to them to take more than what was taken in the past. ... The status quo means on the ground, not status quo that the court has thrown out," he added.

Maui DWS deputy Kimo Landgraf testified in support of the permit as the Land Division had proposed, with the amendment to slightly increase the allocation to the county.

Maui ranchers and farmers, as well as representatives from the local food industry association and Chamber of Commerce also testified in support of the permit.

Members of Nā Moku and the Sierra Club, and others, testified in opposition.

Marti Townsend, a specialist at Earthjustice, argued that the Land Board lacked a required member who has a background in natural resource protection. "That puts a cloud over every decision you make. I want you to keep that in mind," she said.

She also took issue with a scolding Chang gave after a chuckle erupted from the audience during Chipchase's testimony.

"I find it really rich," she said of the Land Board's joking and jovial tone (a complaint other testifiers raised) "We're not allowed to laugh or chuckle ... when we're denied an opportunity to cross-examine," she said.

Lucienne de Naie, chairperson of the Sierra Club on Maui, invited the Land Board to come see the streams in East Maui "that supposedly meet the IIFS."

"Come see the streams that are still waiting the mandated restoration. ... We're still waiting because of the [diversion modification] permits. They're nobody's priori-

ty," she said.

To a previous testifier's praise of Mahi Pono's provision of cheap alfalfa bales to the island's ranchers suffering from the drought, de Naie said, "Everybody wants the ranchers to have enough feed, to not have Mahi Pono's trees drying. ... But we need facts."

She continued, "It sounds like you don't want those facts. That is just really, really sad."

She also argued that the IIFS set for East Maui may be outdated.

"We need do some of that adaptive management, to adapt to the fact we have longer droughts," she said.

After public testimony ended, Maui Land Board member Doreen Canto said she supported the staff's recommendation.

"It's not an easy decision. I have 'ohana in East Maui," she said before making a motion to approve the recommendation. Board member Smith seconded her motion, which they later amended to accommodate Maui County's request for a little more water than the Land Division had recommended.

Canto urged the county, in working toward a solution over the next year, to work with the various parties to reach some kind of an agreement.

"Please ... make sure community members are included," she said.

With that, the remaining members of the board unanimously approved her motion. Board members Yoon and Denise Iseri-Matsubara had left the meeting by then.

Appeals

About two and a half weeks after the board meeting, the Sierra Club filed a notice of appeal with the 1st Circuit Court. And on January 5, Nā Moku filed one, as well.

In granting Mahi Pono and EMI the permit, the Land Board "violated the Environmental Court's instructions that BLNR ensure that '[the Commission on Water Resource Management's] interim instream flow standards are in place and fully implemented before allowing more water to be taken from east Maui streams,'" the Sierra Club stated in its December 30 notice of appeal.

According to the notice, the Sierra Club wants the Land Board's December 12 decision on the contested case hearing request and permit decisions reversed. It also wants the court to modify the permit to cap diversions by EMI and Mahi Pono at 24 mgd until a contested case is completed, and to order the board to follow the instructions the court gave in its October 29 decision in

the case regarding water diversion permits granted to EMI in 2022.

What's more, the Sierra Club wants the court to sanction the Land Board for failure to comply, and to appoint a master or monitor to ensure compliance with the court's orders.



Board Issues Fine, Orders Removal Of Erosion Control Material in Lā'ie

On December 12, the Land Board hit James and Rhodette Greig with a \$234,000 fine for violations stemming from non-compliance with a September 2017 Emergency Conservation District Use Permit for a temporary erosion control structure fronting their Lā'ie property. But they may end up paying as little as \$25,000 in the end, depending on how much it costs to remove what remains.

The wall of sand-filled burritos that was installed to stabilize about 250 feet fronting the Greigs' and their neighbor's properties was to have been removed by September 14, 2020. An inspection by the DLNR's Office of Conservation and Coastal Lands the next day found the structure "was dilapidated and unmaintained with liberated materials posing a nuisance and hazard to the nearshore environment," an OCCL report states.

What's more, the landowners also failed to meet the requirement of the emergency permit to provide the OCCL with a plan for long-term erosion management.

The OCCL followed up with a notice of alleged noncompliance on October 11, 2021, but the Greigs did not respond, the report states.

More than three years later, on April 7, 2025, the governor's office forwarded a complaint to the DLNR about the derelict erosion control structure. Following another site inspection, the OCCL issued a notice of alleged violation.

Finally, in May, the Greigs met with OCCL to discuss a removal plan, but none was forthcoming. And despite assurances from the Greigs that they were removing surface materials from the beach, subsequent site inspections by OCCL found no active work being done to remove the nuisance structures. (The Greigs' neighbor, however, did remove the offending materials fronting their land.)

The OCCL then issued a second notice of violation on August 11. OCCL administrator Michael Cain later notified the Greigs that his office intended to present the mat-



A photo taken by Office of Conservation and Coastal Lands last year of debris from the Greigs' emergency erosion control structure in Lā'ie installed in 2017. CREDIT: OCCL.

ter to the Land Board.

The OCCL brought the case to the Land Board on October 24, with recommended fines totaling \$213,000: \$183,000 (based on the maximum fine of \$1,000 a day) for their failure to remove the encroachments after receiving the April 24, 2024, notice of violation, \$15,000 for installing the burritos in the Conservation District, and another \$15,000 for violating the terms of the emergency CDUP.

But at the request of the Greigs' newly hired counsel, Tim Irons, the matter was deferred until the December board meeting to give him more time to "get up to speed." In granting the deferral, the board instructed Irons to work with deputy attorney general Danica Patel and the OCCL on a solution in the meantime.

Again, no removal plan or long-term solution was forthcoming.

The OCCL's December 12 report to the board noted, "[D]uring the Greigs' requested May 5, 2025, meeting, Mr. Joshua Greig (son of James and Rhodette) stated that he 'managed a landscaping company,' had access to machinery, and could remove of the expired and unauthorized erosion control devices in a timely manner. The meeting concluded with OCCL understanding and expecting that the Greigs would be submitting their removal plan in the next week or so.

"At the time of writing this submission, the Greigs have not submitted their removal plan and more importantly have not resolved matters by removing the expired and unauthorized erosion control structure and devices."

Given that, the OCCL recommended total fines of \$243,000 at the board's December meeting.

That day, Irons explained that the Greigs had misunderstood what was required of

them after the May meeting and believed that they could not proceed with removal work without a right-of-entry permit from the Land Board. He said they also thought that the OCCL had agreed with their long-term solution, which was to push sand from other parts of the beach to restore the dunes fronting their property.

"My clients want the same thing. They want to remove the sandbags ... but not threaten their property or the neighboring property in the process," he said.

With regard to the proposed fines, he asked that they be reduced. "We'd much rather have the money spent on the long-term solution [that's] gonna eventually protect Pounder's beach," he said.

He asked that the Greigs be allowed to do the sandbag removal and the sand push concurrently, since they would occur at two different areas of the beach. However, in a meeting with the Greigs before the Land Board meeting, the OCCL informed them that it cannot legally process an application for a use in the Conservation District when there is a violation pending. Removal would need to happen first and the OCCL would need to confirm with site inspections that everything had been removed.

Hawai'i island board member Riley Smith asked OCCL staff about the likelihood that it would approve the Greigs' proposal to have the sandbag removal and sand push occur at the same time.

Cain showed photos that staff planner Trevor Fitzpatrick had taken just a month earlier showing materials, including torn bags and rope, littering the beach.

"This is a derelict structure. This is, in our minds, debris on the beach. ... I don't see any value in delaying cleaning this up. It's not protecting the property," he said.

Regarding the feasibility of beach nourishment, he said he would rely on expert

engineers to determine that. "I don't have enough information [on] what is practical here or not," he said, before reiterating, "We are not allowed to process applications for parcels with open enforcement."

Fitzpatrick added that the Greigs would have to identify a source of sand.

"The beach is deflated here. There's not enough sand to push," he said. He added that he did not know if by March, when removal would be expected to be complete, whether enough sand would return to the degree that they want.

He noted that there are few available sand sources. There's a moratorium on sand sources from the land and going offshore to get it would probably be "very costly and would have to go through a permitting process," he said.

Board chair Dawn Chang also wanted removal to happen as soon as possible. Referring to the recent photos Cain and Fitzpatrick showed, she said, "This is dangerous ... to marine life, to people walking on the beach. ... If it looks anything like this, this is an extreme liability for the state."

After the board met in executive session, Chang informed the Greigs that she would recommend approving the OCCL's recommendations, but would allow up to \$218,000 of the \$243,000 fine to be offset by removal costs that are verified by a third party, such as a contractor.

The deadline for removal would be March 12.

"All we want is some independent assessment of your sweat equity," she said.

The OCCL would do an initial inspection in March and another in November to confirm that all of the bags were removed.

To this, Joshua Greig argued that the derelict sandbags do, indeed, provide some protection to his family's home. He told the board, "If we remove in March and are not able to process a [sand push] plan until November, then we're doomed. We have no protection. ... We'll be one storm away from the loss of the home."

Chang replied that the proposed motion was "as good as it gets."

After receiving a note from a deputy attorney general, Chang walked out of the meeting, returning with a clarified proposal: The Greigs would need to submit three bids from contractors on what it would cost to remove the bags. If the OCCL finds after its March inspection that the bags were removed, "we will then close that violation and permit you to submit an application to OCCL for the long-term solution," she said.

OCCL would continue to monitor the

beach and if, at any point, it found residual debris, it would notify the Greigs and give them an opportunity to cure the violation, she continued.

"It could jeopardize a future CDUP if you don't clear in a timely fashion," she said.

When Joshua Greig and Irons raised different scenarios about the timing of violation notices and cure periods, Chang told Irons, "I don't want to get into this at this hour, nitpicking, because we will never leave here." The agenda item was the last of the day.

Irons then suggested that his clients could just request a contested case hearing and in the interim work on a settlement agreement.

Patel shot that down immediately.

"Once we start contested case proceedings, OCCL is unlikely to want to renegotiate a settlement agreement, particularly because this is an extremely favorable offer that OCCL would not have made, but the board is clearly making it. So if you want a contested case hearing, we'll go contested case hearing, but OCCL is not going to continue to make offers," she said.

Chang made her motion to approve the fines, which could be offset by verifiable removal cost estimates, and to allow the Greigs to file an application for small-scale beach nourishment after the OCCL's initial follow-up inspection at the end of March. (Depending on the scope of the proposed beach nourishment project, the OCCL or Chang could approve it without bringing it to the Land Board.)

Also, the Land Board's action would be recorded with the Bureau of Conveyances.

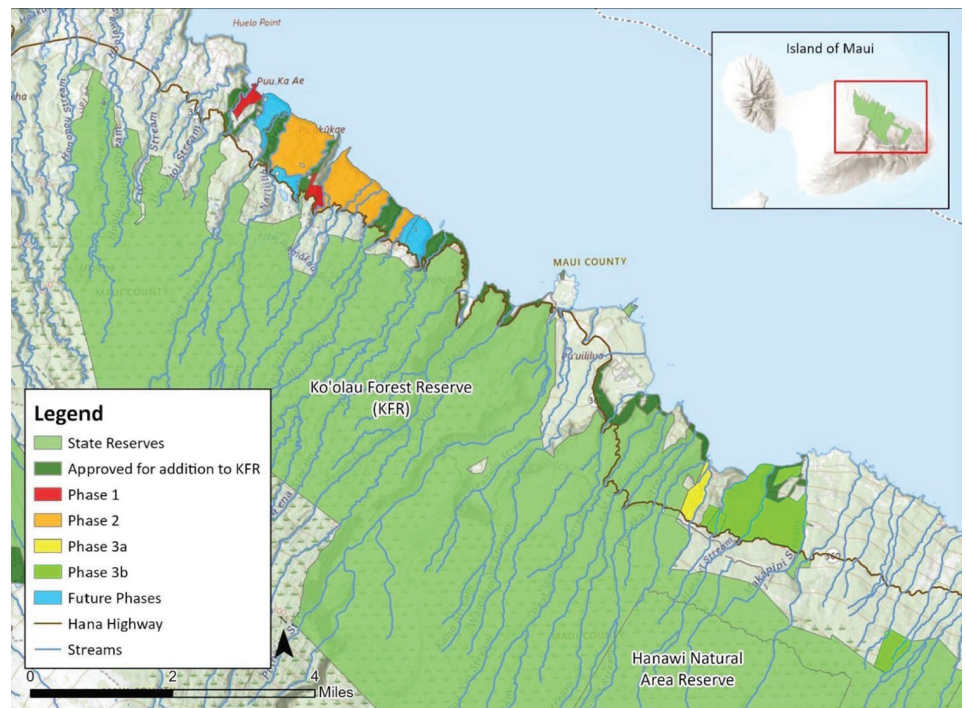
The motion was approved.



Board Approves Acquisition Of A&B's Coastal Land on Maui

On October 24, the Land Board unanimously approved acquiring three parcels from Alexander & Baldwin subsidiary East Maui Landholdings, LLC, (EML) totaling 651.77 acres. It also approved the post-closing issuance of a management right-of-entry to DLNR's Division of Forestry and Wildlife, as well as permission to hold a public hearing on the addition of those lands to the Ko'olau forest reserve.

According to a DOFAW report to the board, this is the second phase in the East Maui Coastal Rainforest acquisition, "an ambitious, multi-phase initiative to safe-



Overview of East Maui Rainforest Project. CREDIT: DOFAW.

guard one of Hawai'i's most treasured landscapes. Through acquisition and donation of fee title, this request aims to secure three additional parcels, totaling more than 650 acres, that are directly threatened with subdivision and private development. These Phase 2 parcels encompass undeveloped coastline, freshwater streams, endangered species habitats, and lowland wet forests. They are strategically located next to existing state lands, creating stronger mauka-to-makai and coastal connections and preserving public shoreline access. Protecting them will also safeguard water quality, nearshore fisheries, and habitats for rare native species. ...

"EML is currently in the process of selling non-core land assets, including the subject parcels. Private subdivision and development are the greatest threats to the lands along this treasured coastline."

The lands are zoned for agriculture and conservation and are largely vacant, with some licensed for pasture. Those leases will be terminated prior to the land transfer to the state.

The Land Board approved the first phase in the acquisition project in May 2024. The lands were finally acquired on March 21, 2025.

DOFAW's report states that \$1.5 million in federal funding to acquire one of the Phase 3 parcels has been secured, as well as \$300,000 in state Legacy Land Program funding for other Phase 3 parcels.

"The division is currently seeking additional federal, state, and private funding to acquire the remaining parcels," it states.

The funding source for the Phase 2 acquisition is all private, DOFAW administrator David Smith told the board. DOFAW Maui branch chief Scott Fretz added that there was an urgent need to acquire the lands.

"A&B does plan to sell these lands. We know what happens from experience ... They tend to be purchased by investors and developers. We know that results almost always in loss of public access, loss of shoreline access. ... We have this rare opportunity," he said.

The acquisition received support from the Trust for Public Land, which is facilitating the acquisition.

"TPL will continue to partner with DLNR/DOFAW to complete the project over multiple phases and years to protect up to 1,750 acres of coastal land in East Maui," the organization stated in a project overview submitted to the board.

The 'Aha Moku representative for the Ko'olau region, Nā Moku Aupuni o Ko'olau Hui, the Sierra Club Maui Group, the state Commission on Water Resource Management, Maui County's East Maui Water Authority, Mayor Richard Bissen, state Rep. Mahina Poepoe, and others also provided letters of support.

— Teresa Dawson

As Haleakalā Trail Injunction Takes Effect, DLNR Pleads to Maintain Vehicular Access

On January 1, the stay of an injunctive order that was initially set to take effect last April expired. This, despite efforts by the state to extend the stay or amend the order to give the Department of Land and Natural Resources and its agents vehicular access across points of the historic Haleakalā trail that intersect with Haleakalā Ranch roads used by resource managers to reach the mauka forests.

Under the injunction, the six-foot-wide trail may only be used 1) for hiking, walking, or running by members of the public, 2) as an access for those exercising traditional and cultural rights or practices, or 3) by the Maui Department of Water Supply and Maui Electric Company to maintain utility infrastructure.

The injunction was initially set to go into effect on April 1, but was stayed until a hearing in May, where the parties to the case — plaintiffs Public Access Trails Hawai'i and David Brown and the state defendants — agreed to a stipulation to stay until January 1 those parts of the order that limit how the trail can be used. This would allow resource management efforts to continue, including fire and invasive species control.

The state committed to expeditiously work to get the trail surveyed and marked according to a metes-and-bounds survey approved by the court more than a decade ago.

That survey was completed last October and showed that the trail does not intersect with Haleakalā Ranch's Olinda gate, as previously thought, but does cross the ranch's mauka roads at certain points.

On December 19, less than two weeks before the stay was to expire, deputy attorney general Miranda Steed filed a motion on behalf of the DLNR and the Board of Land and Natural Resources to amend the order "to remove the prohibitions against incidental uses of the subject trail for purposes other than hiking, walking, or running by DLNR and its agents where the trail crosses existing roads. This court has already accommodated critical public interests by amending the order twice to ensure continued access for Maui Electric Company, Limited and the County of Maui Department of Water Supply. The state seeks similar accommodation for equally essential conservation efforts and wildfire response access. Just as the court recognized the importance of utility infrastructure, the state asks the court to recognize the comparable public interest in maintaining these

conservation initiatives and allow wildfire response through appropriate vehicular access," a memorandum in support of the motion states.

A December 19 declaration by Scott Fretz, Maui branch manager for DLNR's Division of Forestry and Wildlife, stated that vehicular access to the roads mauka of Olinda Gate is critical for the division's management activities. In particular, Fretz stated that vehicular access to the roads was critical to stage and implement operations for DOFAW's Birds, Not Mosquitos project, which is aimed at suppressing mosquito populations to prevent avian malaria from driving the island's critically endangered honeycreepers — the kiwiku and ākohekohe — to extinction.

The project involves the weekly release of a batch of sterile, lab-reared male mosquitos that mate with wild female mosquitos that then produce no offspring. Fretz stated that missing just one release that required vehicular access to roads mauka of the Olinda gate would set the project back, as more wild females would then mate with wild males and produce offspring.

"Without access through the Olinda Gate access, DOFAW cannot sustainably continue the Birds Not Mosquitoes project until alternative logistical arrangements are made, including construction of a new road, landowner agreements, and a significant in-

crease in helicopter transport costs, expected to be in the hundreds of thousands of dollars per year," Fretz stated.

Judge Cahill decided on December 26 to grant the state's application for a hearing on its motion to modify the order, but he set the hearing for March 27. Despite the state's request, Judge Cahill chose not to stay the order in the meantime.

— Teresa Dawson

For Further Reading

For more background on this, see the following stories, available on our website, www.environment-hawaii.org:

- "State Commits to Survey, Mark Haleakalā Trail Under Stipulation to Stay Injunction Order," September 2025;
- "Judge Allows Delay, But Scolds DLNR For Failure To Mark Haleakalā Trail," July 2025;
- "Board Talk: Managing Climbing, Hiking on Maui," November 2019;
- "Board Talk: Unpaid Lease, Lehua Island, Haleakalā Trail and More," August 2017;
- "Jury Finds State Owns Haleakalā Bridle Trail," EH-XTRA;
- "Land Board Shuns Ranch's Offer to Privatize Haleakalā Bridle Trail," February 2014;
- "Board Talk: Board Approves Limited Access over Old Haleakalā Trail," June 2012.



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Water Commission Gets Dire Report On Diminishing Flows in Nā Wai 'Ehā

In June 2024, the state Supreme Court ordered the Commission on Water Resource Management to revisit its findings in a contested case over stream flows in Nā Wai 'Ehā, the four great waters of central Maui.

That was the second time that CWRM's decision on allocation of water in the area was rejected by the court.

This time, the court determined, among other things, that the commission had not fulfilled its obligation to restore stream flows in the wake of the closure of the HC&S sugar plantation, which for more than a century had been receiving stream water through a series of ditches and diversions.

Instead, in making its findings in what has been called Nā Wai 'Ehā II, CWRM relied on interim instream flow standards that had not been changed since 2014. Referring back to CWRM's decision and order in the first contested case, the court noted that the commission had found that the interim instream flow standards should "increase incrementally over time." That finding, the court continued, suggested that time would be needed to "properly study the effects of stream flow restoration, but the commission has not sought out the information it needs through additional scientific studies or otherwise."

"Rather than proactively addressing the historic opportunity to restore stream flows," the court wrote, the commission's decision "appears to be the result of a passive failure to take the initiative to protect the public trust in light of HC&S's closure."

But well before the court released its 134-page-long ruling, CWRM staff had begun to undertake the kind of studies, of stream hydrology and ecology, that could underpin future allocations of stream water that the commission would need to make in

deciding the remanded contested case.

In October, Ayron Strauch of CWRM's Stream Protection and Management Branch, gave the commission a brief overview of a report that he and staff hydrologist Cody Chacon had authored and published on the commission's website in August.

There were "two takeaways" from their work, Strauch said. "We have approximately 10 to 15 percent less water ... across the board, based on the 20-year period of record from 2004 to 2023."

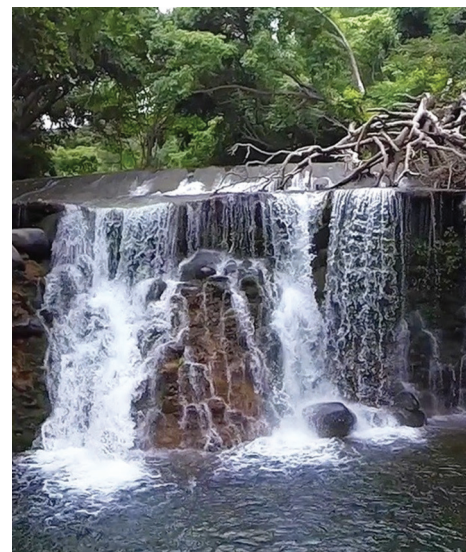
The presentation was brief, but the 62-page report has detailed information on the interaction of streams with groundwater, the response to restored stream flows, the biological resources supported by the streams, and years of streamflow measurements.

Commission member Hannah Springer thanked Strauch for the updated information.

"That came up in past discussions about how long contested cases take and dealing with old statistics and old hydrological data that may not be relevant today," Strauch replied. "We're trying to be a little bit more proactive in developing these data sets."

The only member of the public to comment on Strauch's presentation was Hōkūau Pellegrino, board president of Hui o Nā Wai 'Ehā. He thanked Strauch and his team, but added that this year, "we're experiencing an unprecedented drought. We're seeing stream flows much lower than the stream flow standards that have been put in place. We're seeing base flows lower than anything we've experienced in the record."

In the introduction to the report, Strauch and Chacon write, "Long-term shifts in the magnitude and distribution of rainfall across Maui have resulted in reductions in baseflow and an increase in the frequency of low-flow conditions. This is evident in declines in the



Wailuku River. CREDIT: CWRM.

median and low-flows observed at continuous-record gaging stations in Nā Wai 'Ehā and has consequences for water availability to meet public trust uses, including habitat for aquatic species, water for domestic use, and traditional lo'i kalo production dependent on the delivery of water through irrigation systems."

The report details just how significant the reductions in stream flows have been. To give just two examples: Monitoring stations on Waihe'e River show that in the 2004-2023 period, median flows (Q_{50}) declined 9.6 percent from the median flows recorded from 1984-2007. The magnitude of the Q_{70} flows (the volume of water in the stream 70 percent of the time) declined 11.4 percent. The Q_{95} flows dropped 8.8 percent.

Flows in the Wailuku River showed a similar decline in the two periods: 12.8 percent in the Q_{50} flows, 11.1 percent in Q_{70} , and 11.8 percent in Q_{95} .

— Patricia Tummons