DAVID Y. IGE
GOVERNOR OF HAWAII

ELIZABETH A. CHAR, M.D.
DIRECTOR OF HEALTH

STATE OF HAWAII
DEPARTMENT OF HEALTH
P.O. BOX 3378
HONOLULU, HAWAII 96801-3378

In reply, please refer to:
File: SDWB
Lahaina Aquifer Sector,
Maui

April 14, 2022

TO: M. Kaleo Manuel, Deputy Director
Commission on Water Resource Management
Department of Land and Natural Resources

THROUGH: Kathleen S. Ho, Deputy Director Kathleen Ho
Environmental Health Administration

Joanna L. Seto, P.E., Chief Joanna L. Seto
Environmental Management Division

FROM: Gaudencio C. Lopez, P.E., Chief Gaudencio C. Lopez
Safe Drinking Water Branch

SUBJECT: DOH POSITION ON DESIGNATING THE LAHAINA AQUIFER SECTOR A WATER MANAGEMENT AREA

This letter is response to a request from the Hawaii Department of Land and Natural Resources, Commission on Water Resource Management (CWRM), dated March 30, 2022, for a determination by the Hawaii Department of Health (DOH) of actual or threatened water quality degradation in the Lahaina Aquifer Sector of Maui. CWRM is currently in the process of considering whether Water Management Area (WMA) designation is appropriate for the Lahaina Aquifer Sector.

The Water Code in Hawaii Revised Statutes (HRS), Chapter 174C, specifies that CWRM can designate an area as a WMA to establish administrative control over the withdrawals and diversions of water if the water resources may be threatened by existing or proposed withdrawals or diversions of water.

Per HRS, "§174C-44 Ground water criteria for designation. In designating an area for water use regulation, the commission shall consider the following:

(1) Whether an increase in water use or authorized planned use may cause the maximum rate of withdrawal from the ground water source to reach ninety per cent of the sustainable yield of the proposed ground water management area;
(2) There is an actual or threatened water quality degradation as determined by the department of health; [emphasis added]

(3) Whether regulation is necessary to preserve the diminishing ground water supply for future needs, as evidenced by excessively declining ground water levels;
(4) Whether the rates, times, spatial patterns, or depths of existing withdrawals of ground water are endangering the stability or optimum development of the ground water body due to upconing or encroachment of salt water;
(5) Whether the chloride contents of existing wells are increasing to levels which materially reduce the value of their existing uses;
(6) Whether excessive preventable waste of ground water is occurring;
(7) Serious disputes respecting the use of ground water resources are occurring; or
(8) Whether water development projects that have received any federal, state, or county approval may result, in the opinion of the commission, in one of the above conditions."

The DOH is specifically tasked to evaluate whether Condition (2) is met. Figure 1 shows the Lahaina Aquifer Sector, the included sub-aquifer systems, and the locations of public drinking water wells therein. DOH reviewed drinking water contamination data contained in the Safe Drinking Water Information System (SDWIS) contaminant database as well as the chloride concentrations reported to CWRM for drinking water wells for the period from 2010 through 2021.

DOH found water quality issues within the Lahaina Aquifer Sector, but overwhelmingly these problems are from legacy contamination and will not be made worse by increased groundwater withdrawals or water diversions. For example, the only contaminants to exceed the drinking water Maximum Contaminant Level (MCL) are 1-2-Dibromo-3-Chloropropane (DBCP) (many exceedances), Ethylene Dibromide (EDB) (one exceedance), and 1-2-3-Trichloropropane (TCP) (one exceedance). All these MCL exceedances were at the Napili A Well (6-5838-001) in the Honolua Aquifer Sector so the contamination is not widespread. Hexachlorocyclopentadiene (a precursor to pesticides flame retardants and dyes) has been detected in trace concentrations at the Mahinahina Treatment Plant in nine (9) of 15 samples collected. There have also been infrequent low concentration detections of DBCP (5 detections), TCE (1 detection), Carbon Tetrachloride (1 detection), and Tetrachloroethylene (PCE) (1 detection) in the Kaanapali Water Public Water System in the Honokōwai Aquifer. The concentrations are all well below the MCL. All of these are legacy contaminants, and the severity of this contamination will not be affected by increased groundwater withdrawals.

Further development in West Maui may cause an increase in the groundwater concentration of Nitrate which is a regulated drinking water contaminant. The primary drinking water MCL for nitrate is 10 milligrams per liter (mg/L). The highest Lahaina

Aquifer Sector nitrate concentration in the SDWIS contaminant database is 2.7 mg/L from wells in the Mahanalua Nui Subdivision Public Water System wells located in the Launiupoko Aquifer System. Figure 2 shows the groundwater nitrate concentrations in these wells. A stable nitrate concentration of 2.7 mg/L is not a concern to DOH. More typical of groundwater nitrate concentrations in the Lahaina Aquifer Sector are those in the Kaanapali Public Water System wells in the Honokōwai Aquifer System. Figure 3 shows a decreasing groundwater nitrate concentration trend that began when sugar cane cultivation ended in 1999. This trend is typical of wells located where sugar cane was once grown.

Increased groundwater withdrawals will have the greatest impact on chloride, which is a secondary drinking water contaminant, meaning the secondary MCL of 250 mg/L is a recommendation rather than an enforceable limit. A review of the SDWIS contaminant database found the highest recorded chloride concentration of 160 mg/L was in the Kaanapali Public Water System in the Honokōwai Aquifer.

Chloride is also an indication of saltwater intrusion. CWRM has a more extensive chloride data set and provided this data to DOH for evaluation of trends and for concentrations above the 250 mg/L secondary MCL for public drinking water wells. The chloride in the Honokōwai and Launiupoko Aquifer Systems did show that 250 mg/L was periodically exceeded during periods of higher pumping.

Chloride in the Honokōwai Aquifer System is of greatest concern. The chloride concentration in six (6) of nine (9) public drinking water wells in the Honokōwai Aquifer System periodically exceeded 250 mg/L during periods of increased pumpage. Figure 4 shows the relationship between pumping rate and chloride concentration at the Kaanapali 5A Well (State Well Number 6-5739-004) for the period from 2010 through 2021. A fitting line for both parameters is included to better visualize the average pumping rates and chloride concentrations. Inspection of Figure 4 indicates that as the pumping rate increases above 0.6 million gallons per day (mgd) incidents of the chloride concentration exceeding 250 mg/L increase significantly. This pumping to chloride relationship in the Kaanapali 5A well is typical of six (6) of the public drinking water wells in the Honokōwai Aquifer.

Three (3) of the seven (7) public drinking water wells in the Launiupoko Aquifer System reported some chloride concentrations exceeding 250 mg/L during the recent drought. For example, the Launiupoko Well 1 (6-5138-001) shows that pumping greater than 0.4 mgd starting in late 2019 resulted in periodic chloride concentrations exceeding 250 mg/L (refer to Figure 5). A similar situation occurs when the Kanaha 1 and 2 Wells (6-5339-003 and 004) where the reported chloride concentrations periodically exceed 250 mg/L when either of these wells are pumped at a rate greater than 0.15 mgd. The

chloride in the other four (4) wells in this aquifer remain below 250 mg/L indicating a more localized impact in the Launiupoko Aquifer System than in the Honokōwai Aquifer.

DOH's assessment of the need for WMA designation for the Lahaina Aquifer Sector is that criteria are not met for five (5) of the six (6) aquifer systems in this sector. However, WMA designation is appropriate for the Honokōwai Aquifer System. The chloride data from wells in the Honokōwai Aquifer System do indicate withdrawals in this groundwater body are approaching the maximum that can be sustained without degradation of this resource.

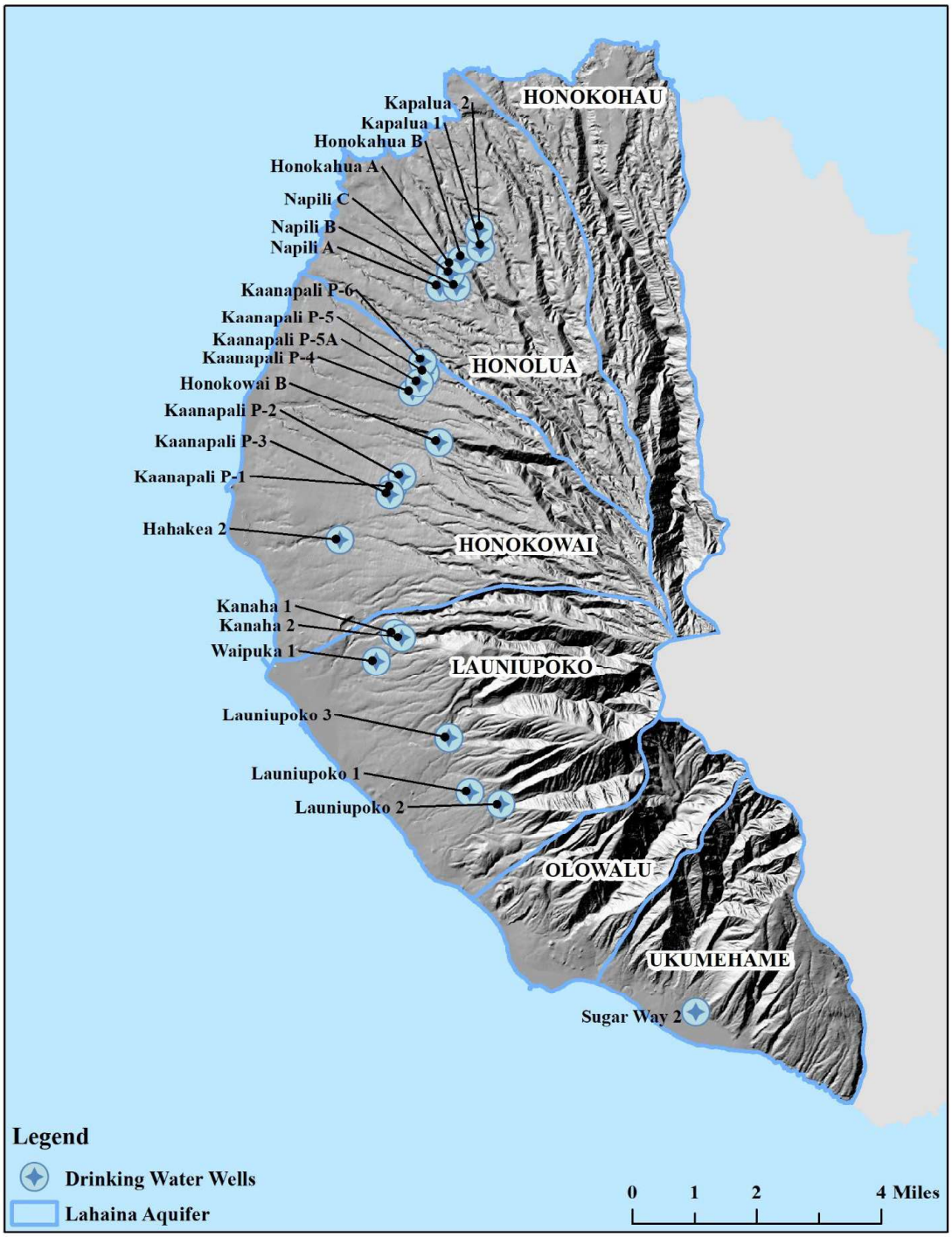

Figure 1. Location of drinking water wells in the Lahaina Aquifer Sector

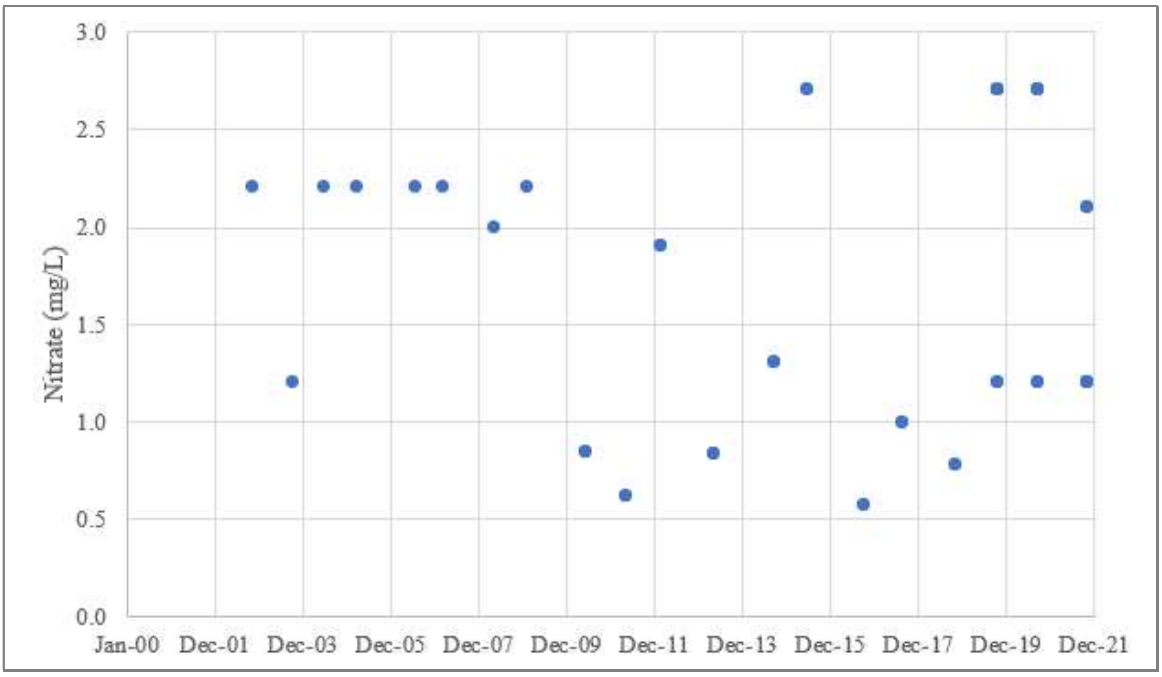

Figure 2. Nitrate concentrations in public drinking water wells in the Launiupoko Aquifer System

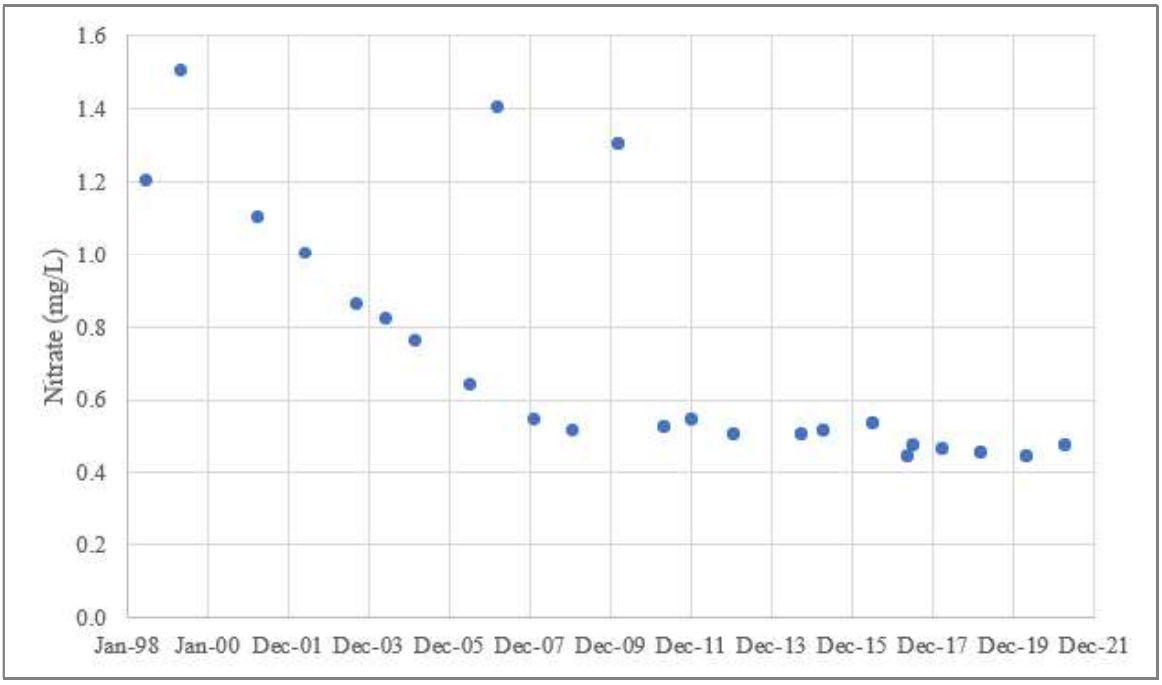

Figure 3. Nitrate concentrations in the public drinking water wells in the Honokōwai Aquifer System

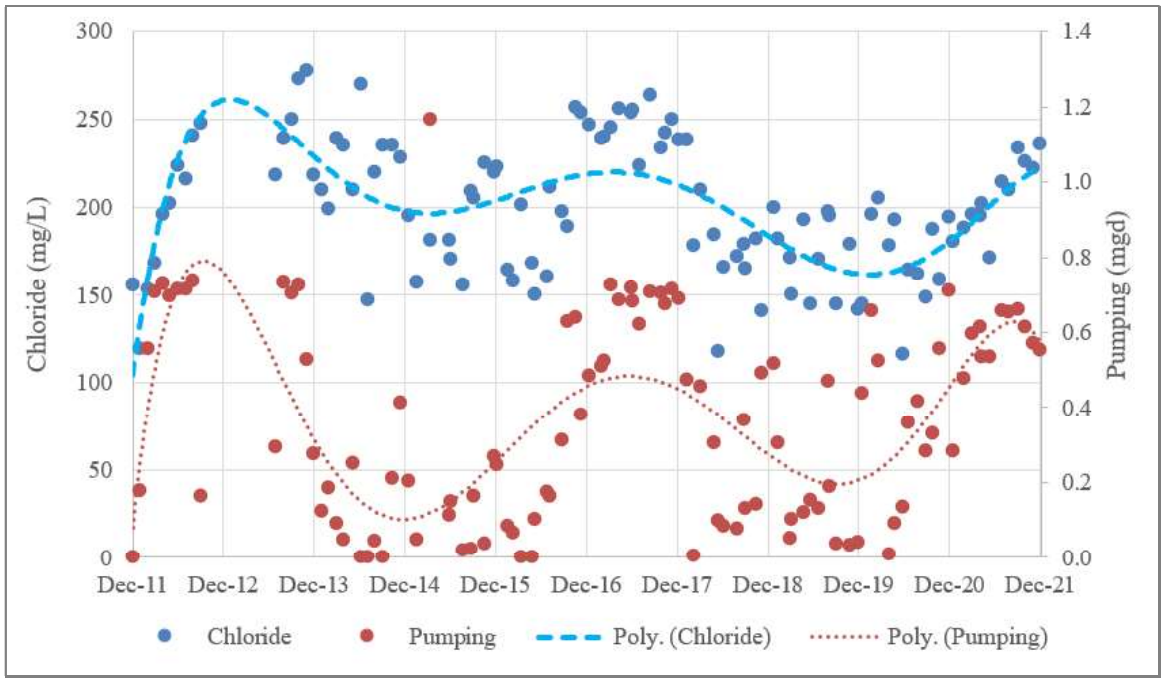

Figure 4. Temporal trend of pumping and chloride concentrations in the Kaanapali 5A Well

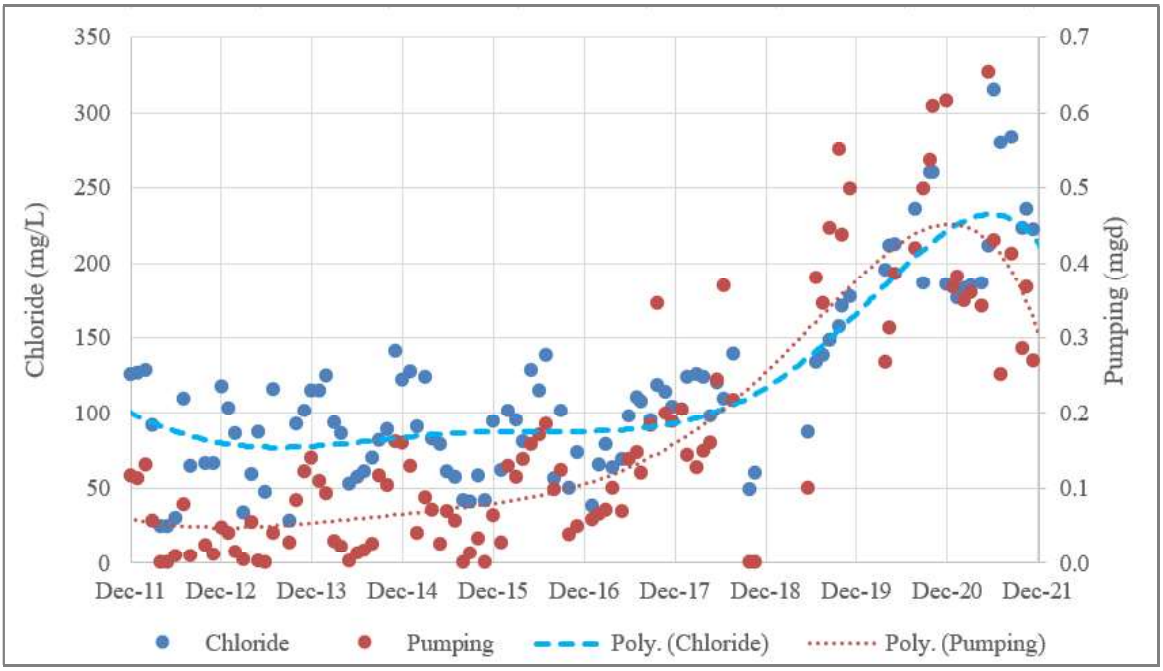

Figure 5. The relationship between pumping rate and chloride concentration in the Launiupoko 1 Well