STAKEHOLDER ADVISORY GROUP

Board of Water Supply, City & County of Honolulu
April 21, 2022
Meeting 42 - Virtual

WELCOME & INTRODUCTIONS

DAVE EBERSOLD, FACILITATOR

STAKEHOLDER ADVISORY GROUP MEETING 42

APRIL 21, 2022

VIRTUAL MEETING BEST PRACTICES

- Please stay muted unless you are speaking
- Use  or meeting chat to let us know you want to ask a question
- If you don’t have the “raise hand” function or meeting chat, unmute your mic/phone and speak
- Speak one person at a time
- Expect something to go wrong

MEETING OBJECTIVES

- Discussion on Albezia Removal and Watershed Protection
- Update on Strategic Plan
- Accept notes from meeting #41
- Red Hill Update and Impacts to Water System

PUBLIC COMMENT ON AGENDA ITEMS

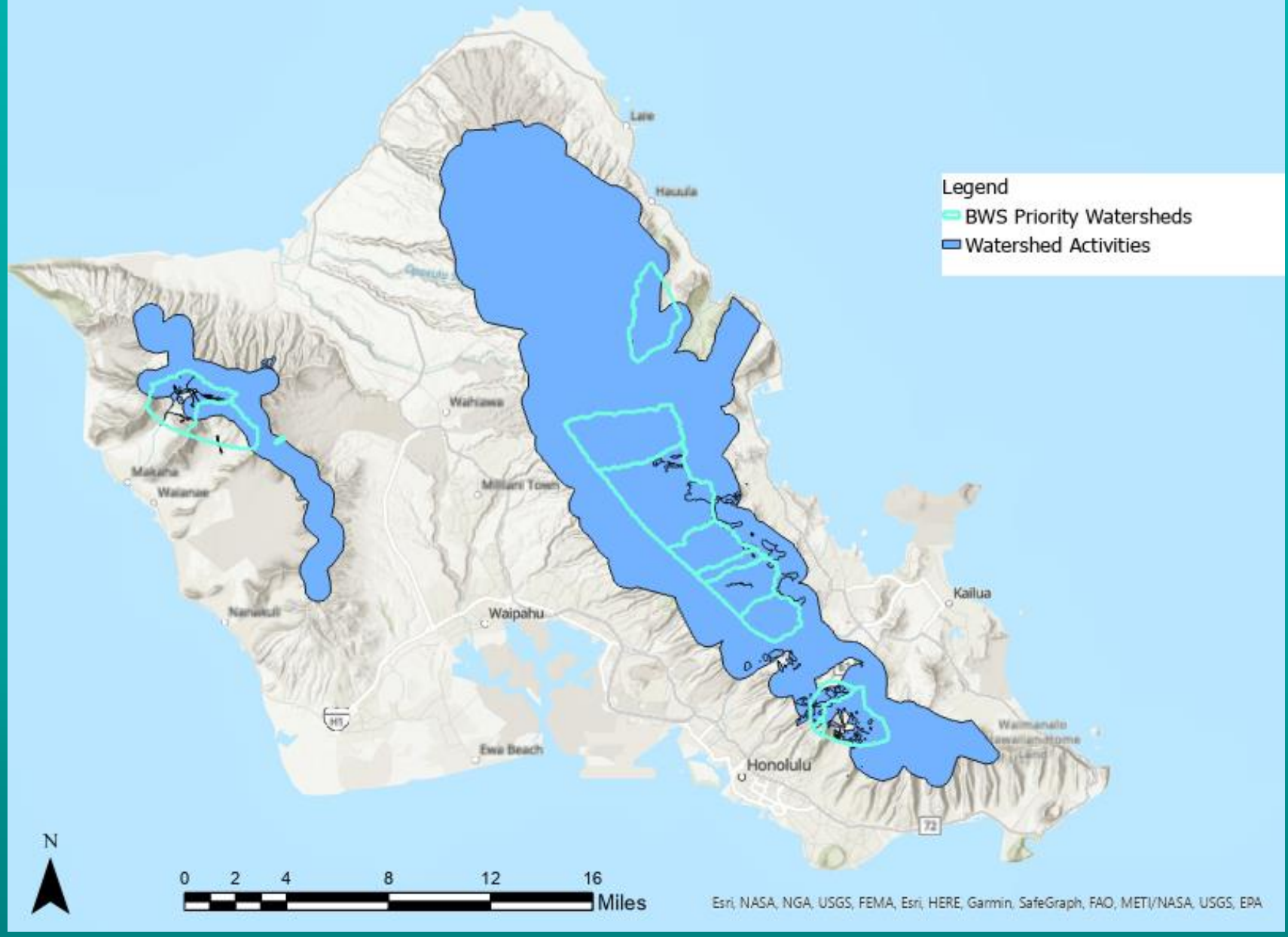
KO‘OLAU MOUNTAINS WATERSHED PARTNERSHIP ALBIZIA REMOVAL AND WATERSHED PROTECTION

Barry Usagawa
JC Watson
April 21, 2022
boardofwatersupply.com

BWS WATERSHED PROGRAM GOALS AND OBJECTIVES

1. Implement research/field efforts to restore and protect priority watersheds on O`ahu.
2. Serve as BWS Representative for watershed conservation issues.
3. Oversee watershed funding for management of Priority watersheds via Memoranda of Agreement, per BWS Directive No. 9.060, Watershed Program Funding.
4. Engage in targeted community outreach and education, including volunteer field work coordination on selected projects.
5. Collaborate with selected agencies and organizations working on similar watershed conservation endeavors.

BWS FUNDED WATERSHED WORK (2021)



KO‘OLAU MOUNTAINS WATERSHED PARTNERSHIP
ALBIZIA REMOVAL AND WATERSHED PROTECTION

- Albizia Overview
- Project Goals
- Methods
- Efforts to date
- Next steps

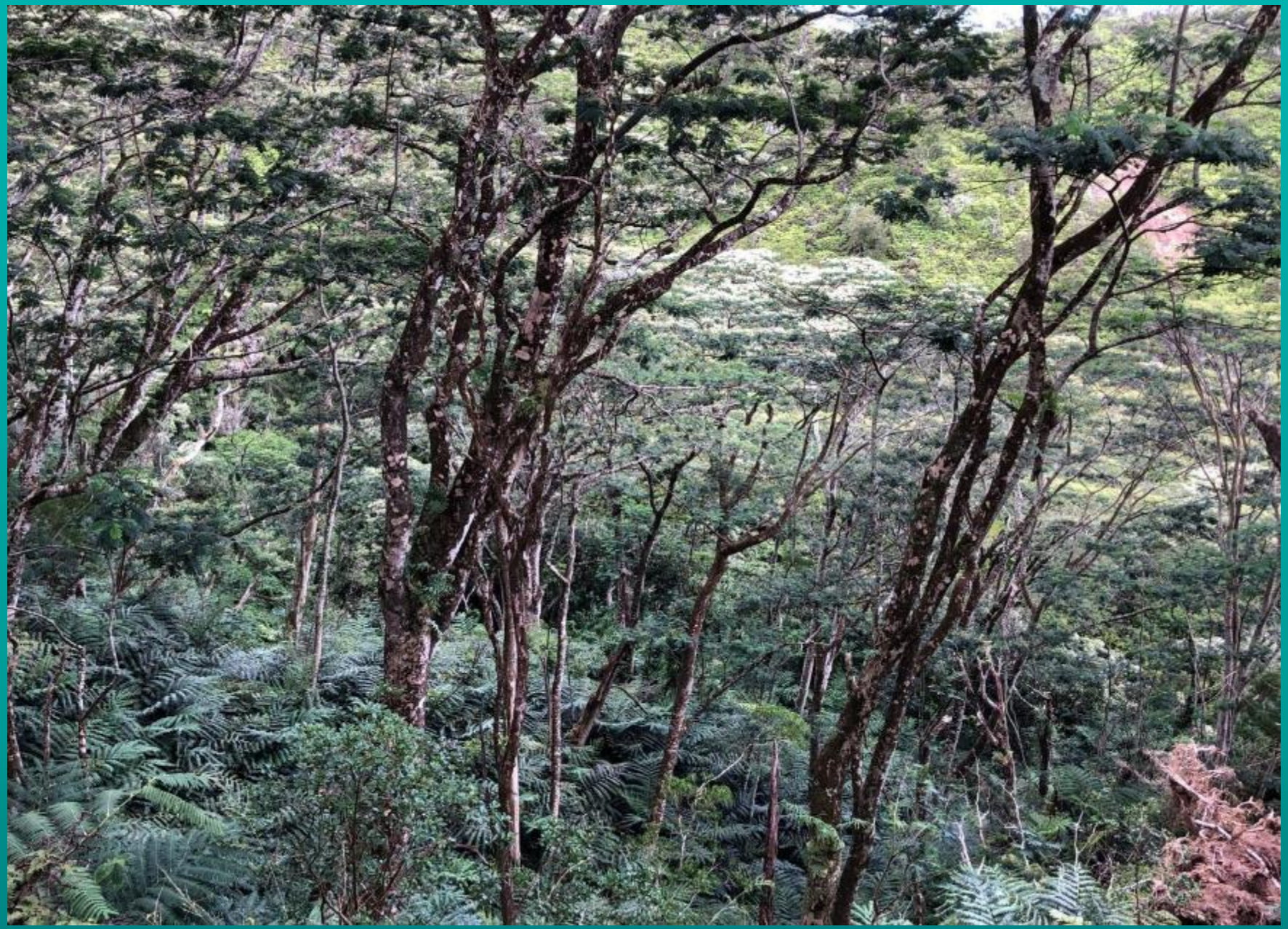
ALBIZIA – *Falcataria moluccana*

- Native to Papua New Guinea, Indonesia, Solomon Islands
- Introduced to Hawai‘i 1917
  - ~140,000 planted in 19th century
- Extremely Fast Growing
  - Can grow 15 feet/year
  - Grows over 100 feet tall
- Produces viable seeds in 4 years

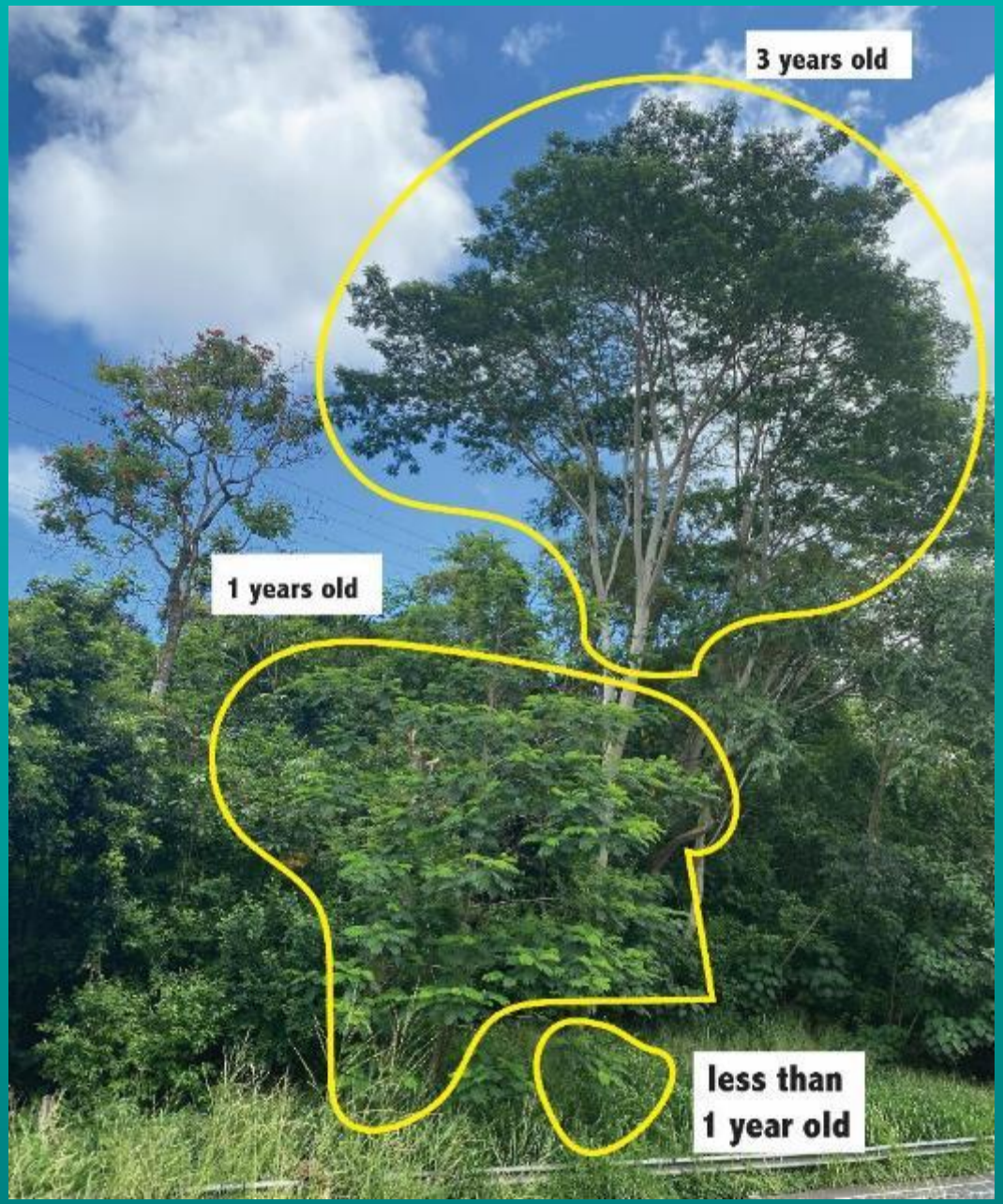
THE FASTEST GROWING TREE IN THE WORLD

- Nitrogen fixing → thrives in nutrient deficient areas (intact native forests)
- Produces large amounts of seeds by wind over distances
- Large trees → sudden limb shear
- Danger to community infrastructure (roads, homes, power lines, culverts, agriculture, human health)

↑ALBIZIA TREES ↑ STORMS ↑ COSTS/DAMAGE



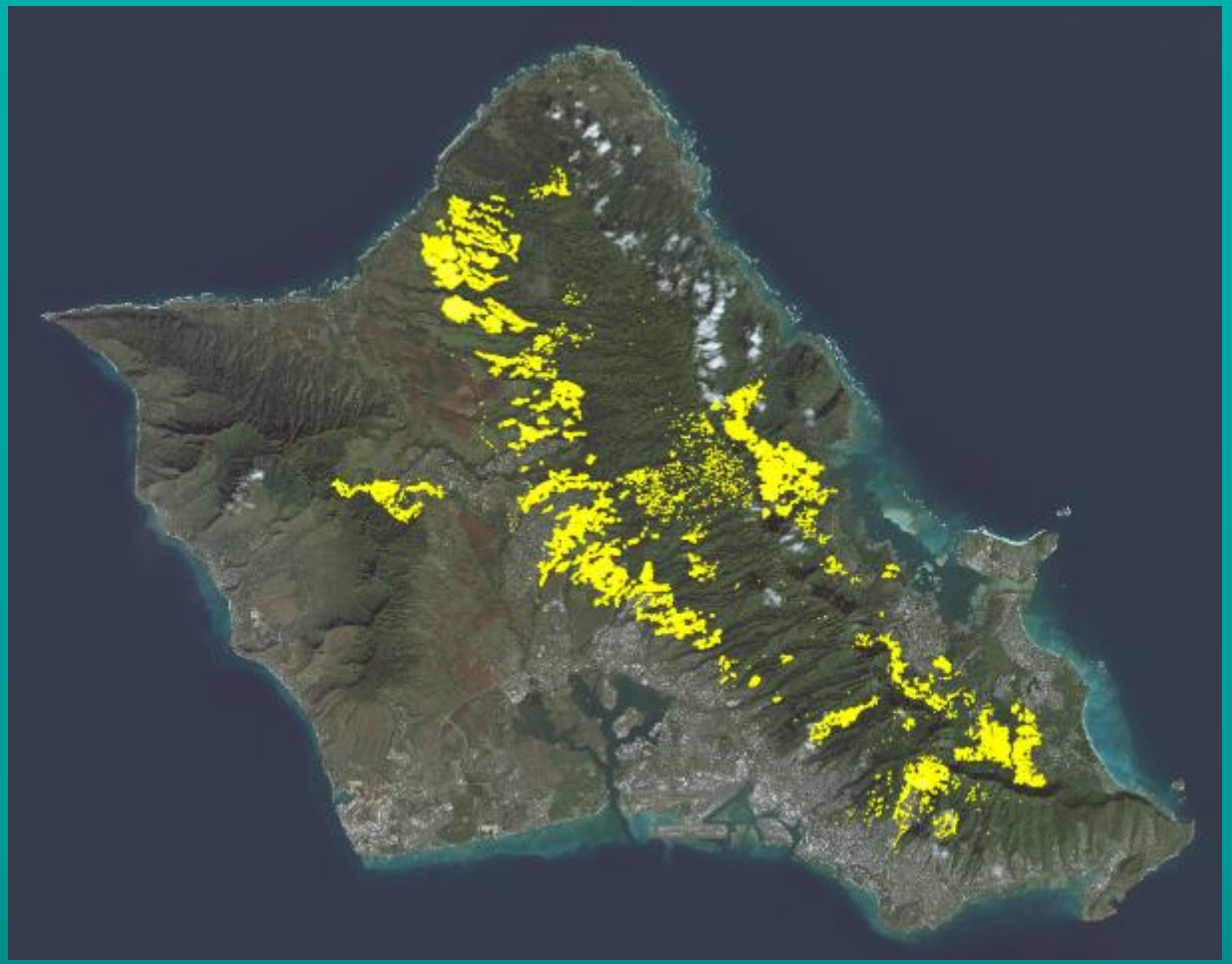
Albizia Growth Rates




2011
Google Earth
2021
Google Earth

Current Albizia Footprint

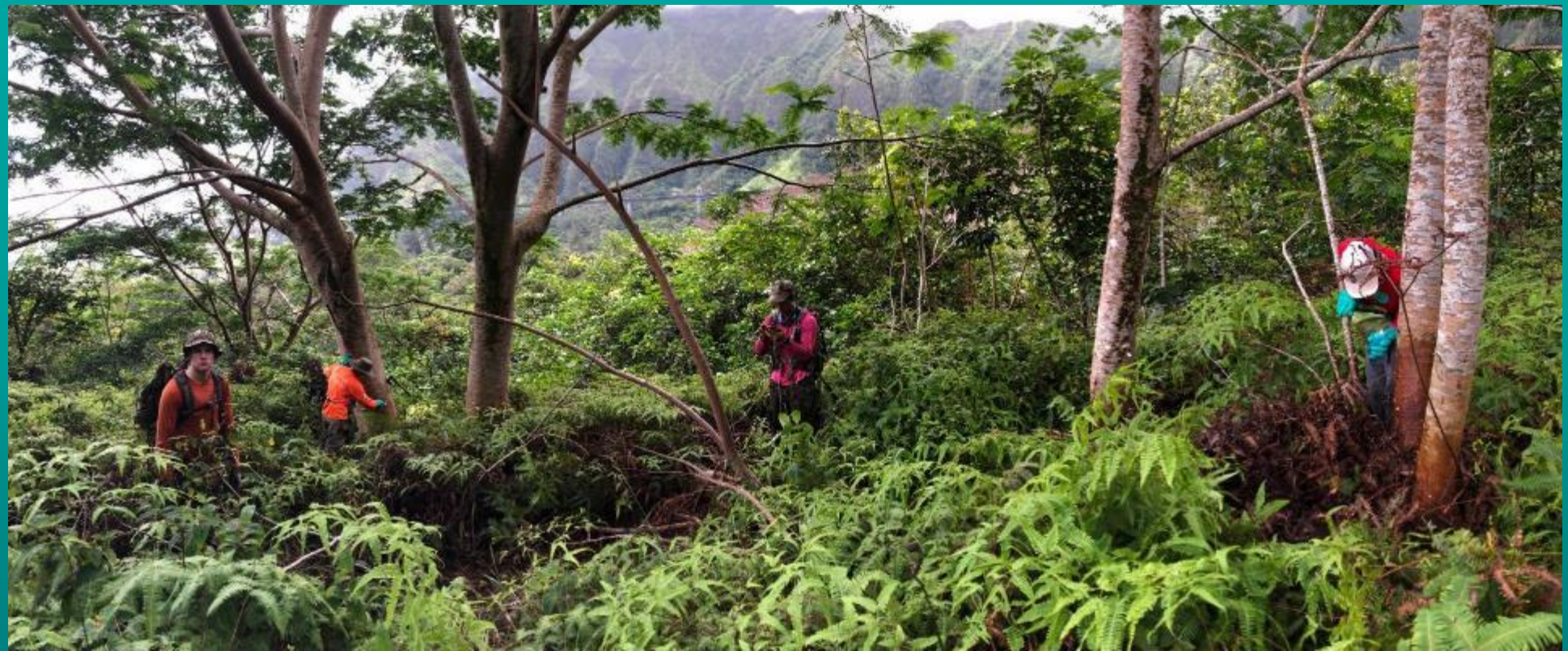
- Areas of heavy infestation in low elevation forests and agricultural areas
- Incipient populations in higher elevation forests



~20,000 acres are heavily infested with Albizia on the Island of Oahu.

KMWP Albizia Removal Goals

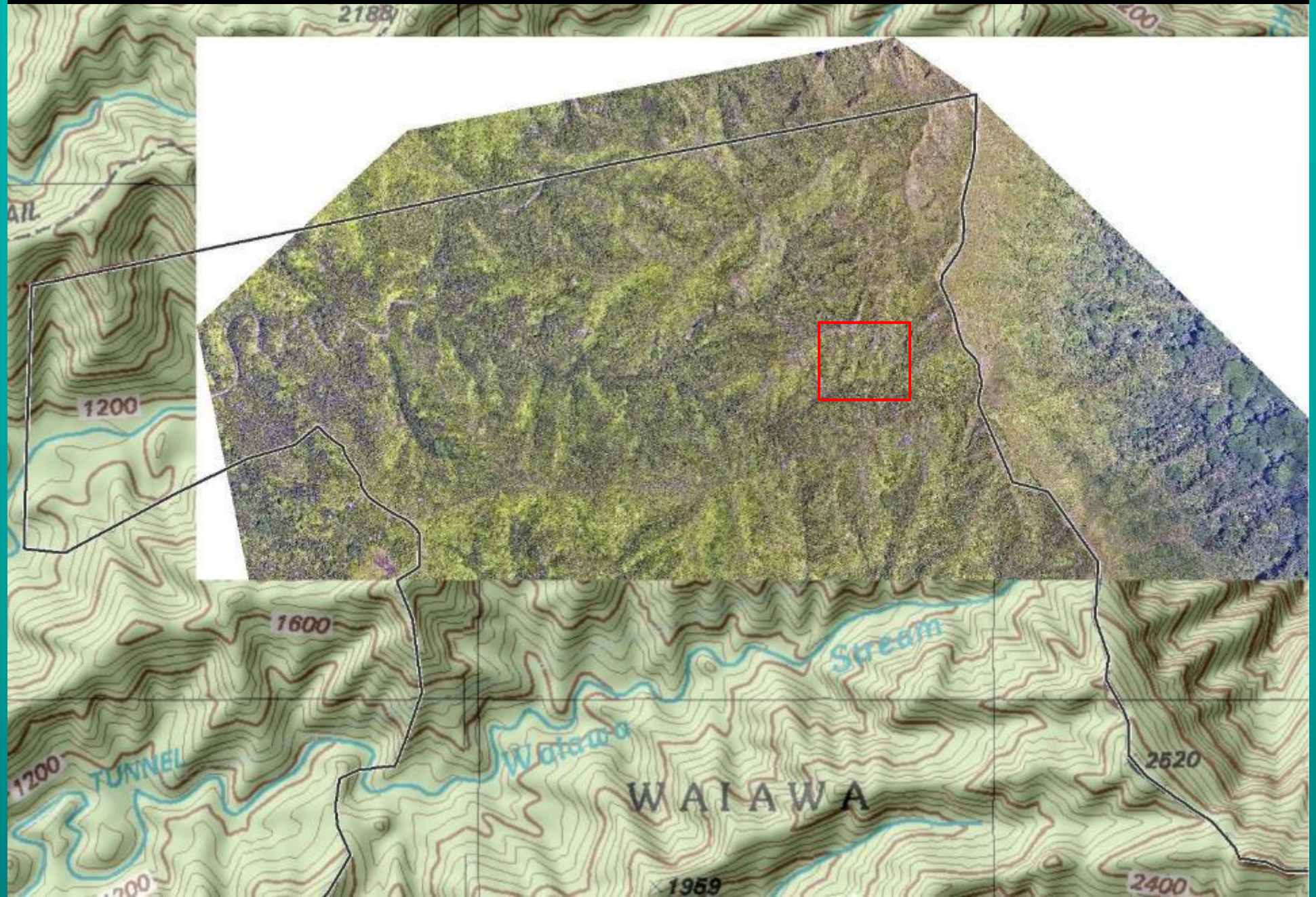
- Holistically reduce albizia impacts at a landscape scale
  - Protecting priority watersheds
  - Empowering and educating communities
  - Working with partners



Methods

- Detection
  - Aerial Imagery
  - Ground/sUAS
- Treatment
  - IPA
  - Ring-bark
- Management at scale
  - Regional Eradication
  - Containment
- Assessment
  - Hazard
  - Non-hazard
- Monitoring
  - Photo points
  - Follow-up
- Community
  - Education
  - RAD
- Partnership
  - SWAG

Detection Methods



Ring-Barking

What's Ring-Barking?

Removing the inner and outer cambium layers around the entire circumference of the tree.

No Herbicide Required

Materials:

Machete, hatchet, handsaw, or draw blade

In a nutshell:

Incision starts about 4 feet up the trunk. Strip the bark completely down to the soil level. Defoliation occurs between 6 months to 1 year. This method is not to be used on hazard trees.

Incision Point Application (IPA)

What's IPA?

Administering a lethal dose of herbicide into the vascular system of the tree.

Materials:

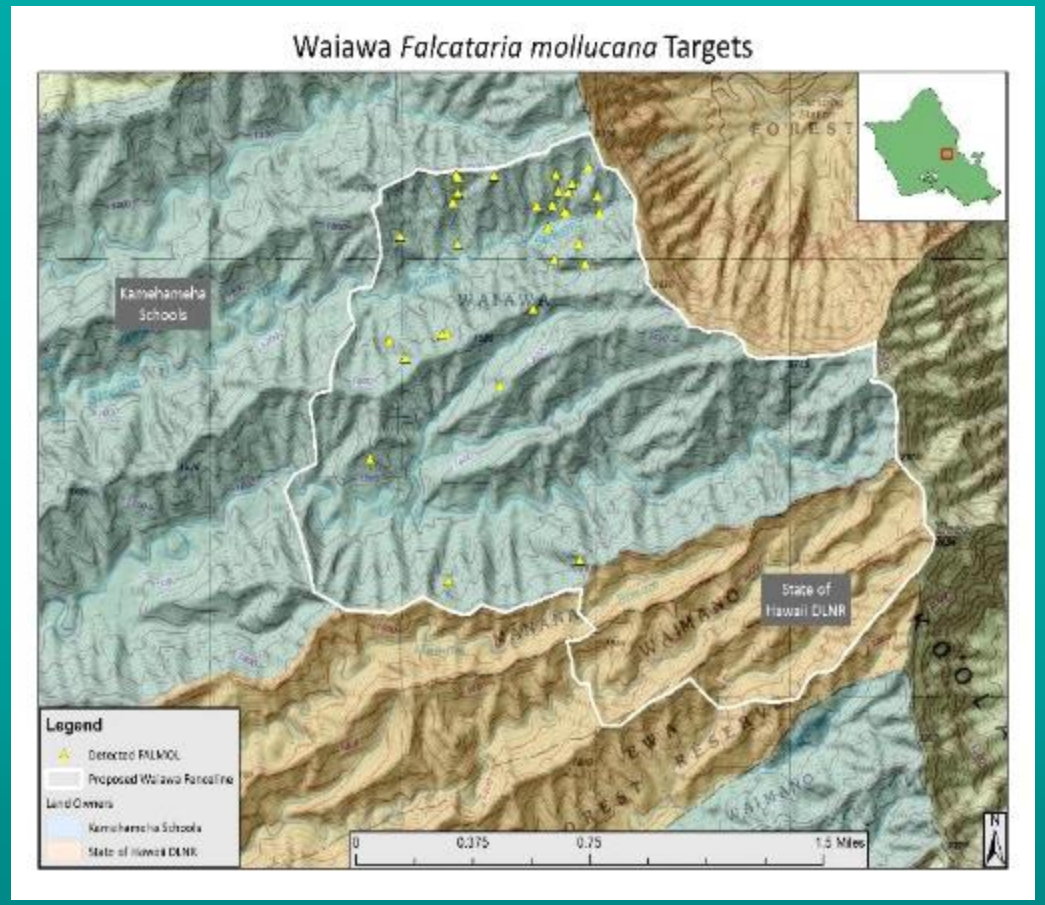
- ✓ PPE (safety goggles, nitrile gloves)
- ✓ Milestone Herbicide
- ✓ Hatchet/Machete
- ✓ Drop Bottles (1-8 fl. Oz.)

In a nutshell:

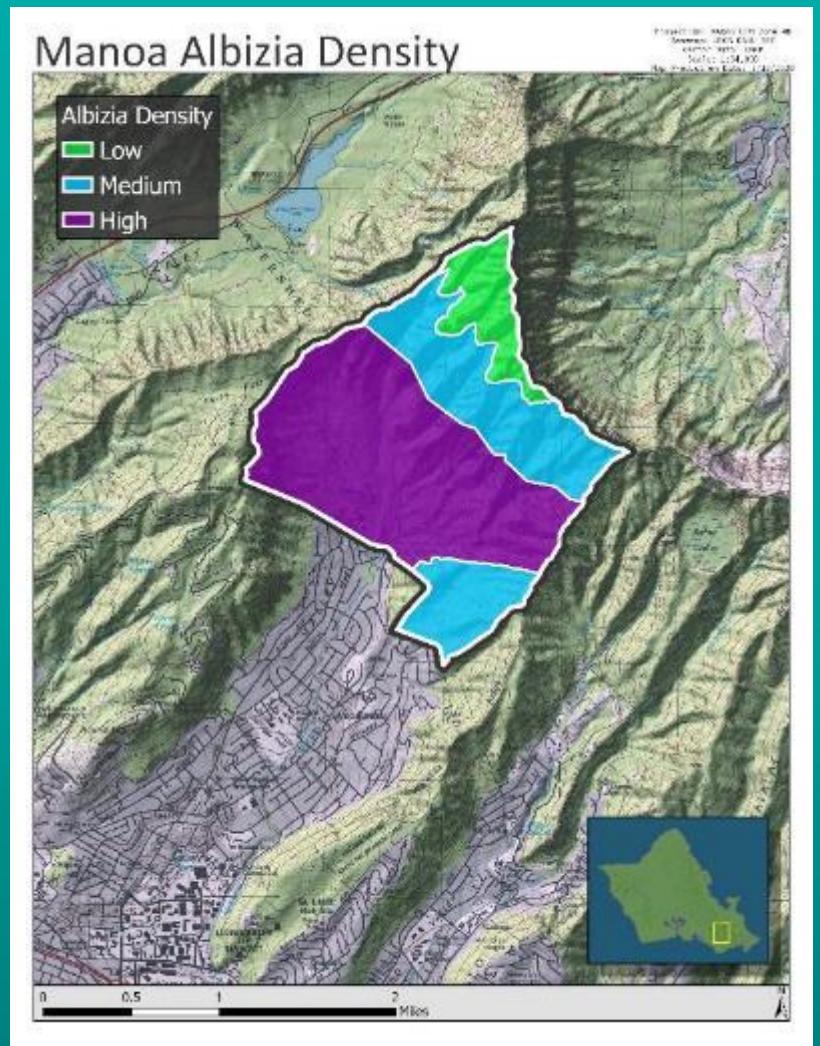
Using the hatchet, make a 45-degree cut around the circumference of tree 2-3 inches deep. Insert 0.5 mL (11-12 drops) per cut. Defoliation in 4-6 weeks. Do not use on hazard trees.

LANDSCAPE SCALE CONTROL EFFORTS

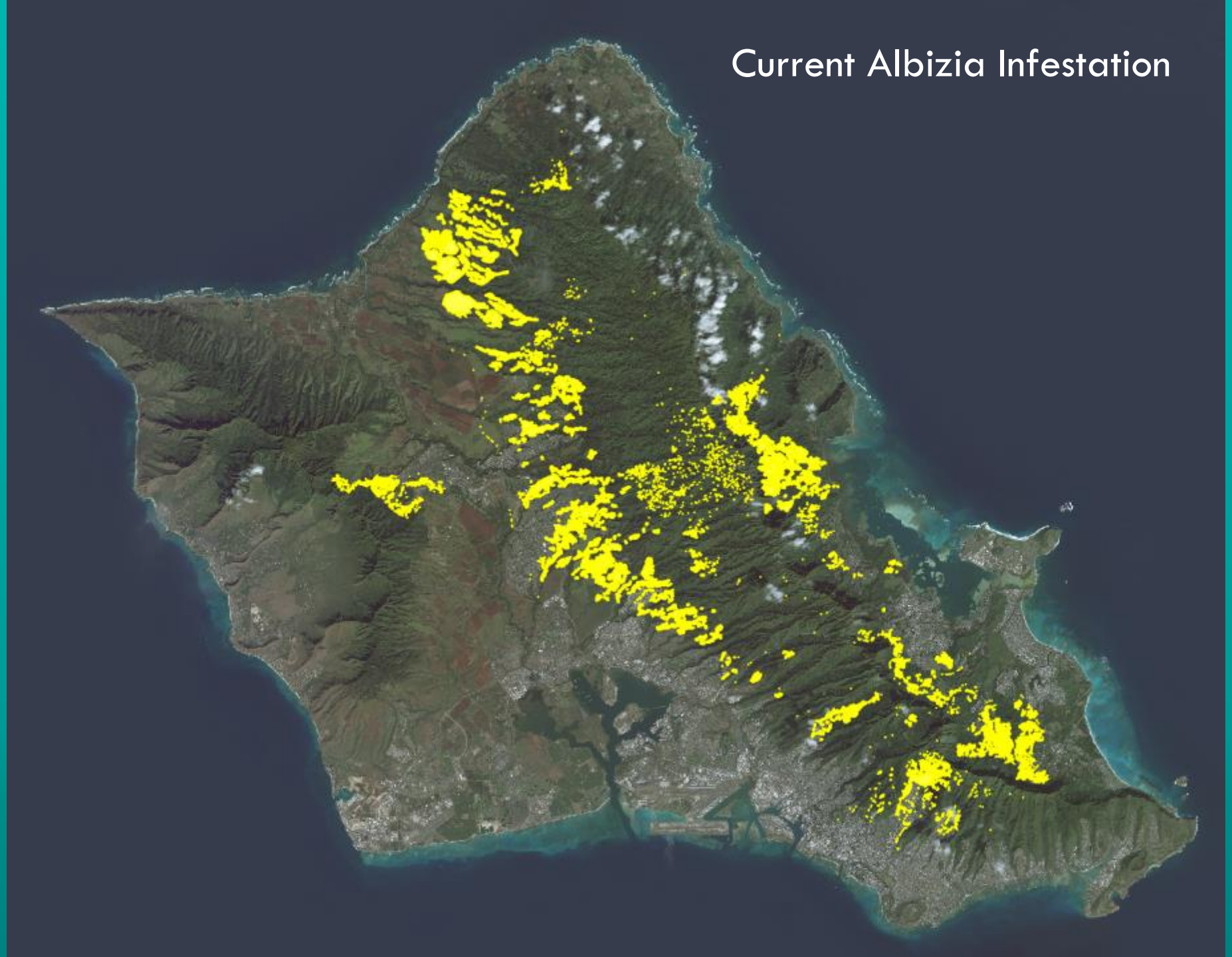
Regional Eradication



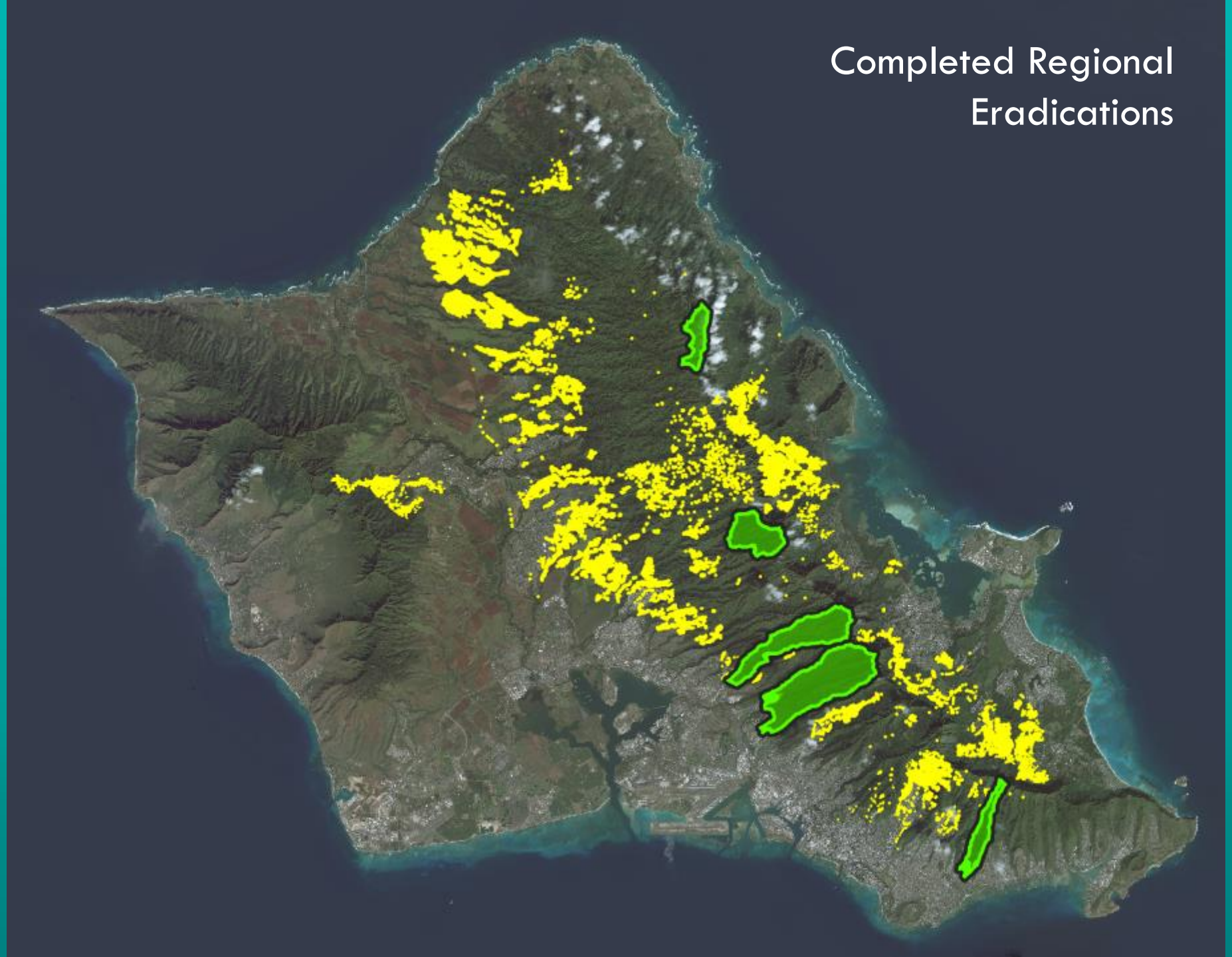
Containment



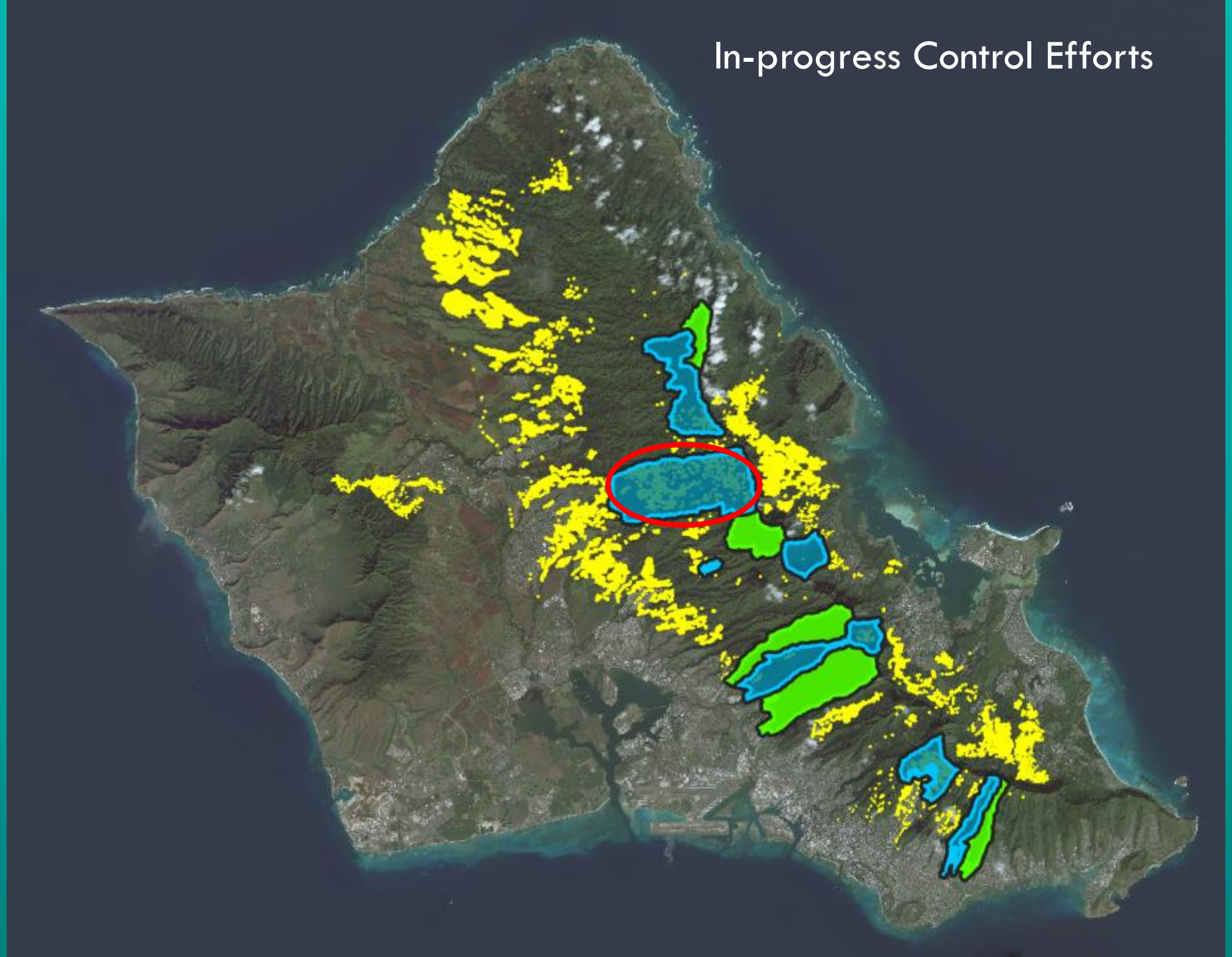
Current Albizia Infestation



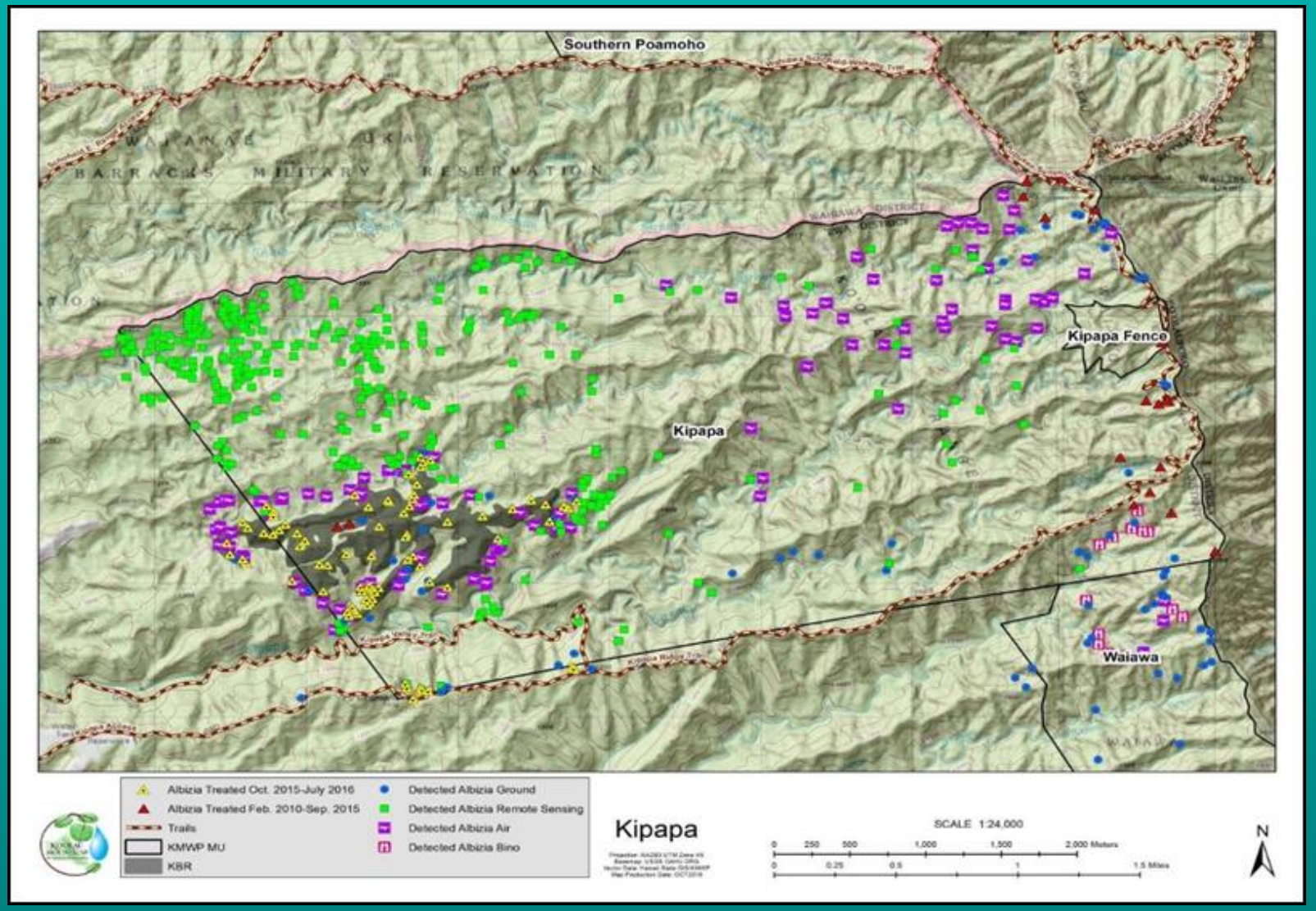
Completed Regional Eradications



In-progress Control Efforts



CENTRAL KOOLAU REGIONAL ERADICATION AND KIPAPA CONTAINMENT



COMMUNITY INVOLVEMENT

- RAD (Rapid Albizia Death) Hui
  - Dedicated community teams that receive training and some KMWP coordination
  - Mānoa and Waiāhole
- PSAs and how-to videos
- Albizia info mailers
- KMWP Albizia resource page
  - www.koolauwatershed.org/albizia


Water Tank
Gaging Stations
Pu'Upia
O'AHU AVE
MĀNOA VALLEY ROAD
Alaka
Cemetery
Woodlawn
WOODLAWN DR
Mānoa Sch
MANOA DISTRICT VALLEY PARK
LOWREY AVE
PATY DR
Albizia Trees


Mānoa Sch
VALLEY PARK

PARTNERSHIP AND LEVERAGING WORK EFFORTS

Current funders
- Hawaii Invasive Species Council
- Board of Water Supply
- US Fish & Wildlife Service Refuges
- DLNR DOFAW
- Queen Emma Land Company
- National Fish and Wildlife Foundation
- Kaulunani Urban Forestry Council
- Pilina Fund

Potential Funders
- US Navy / Department of Defense
- US Fish and Wildlife Partners Program

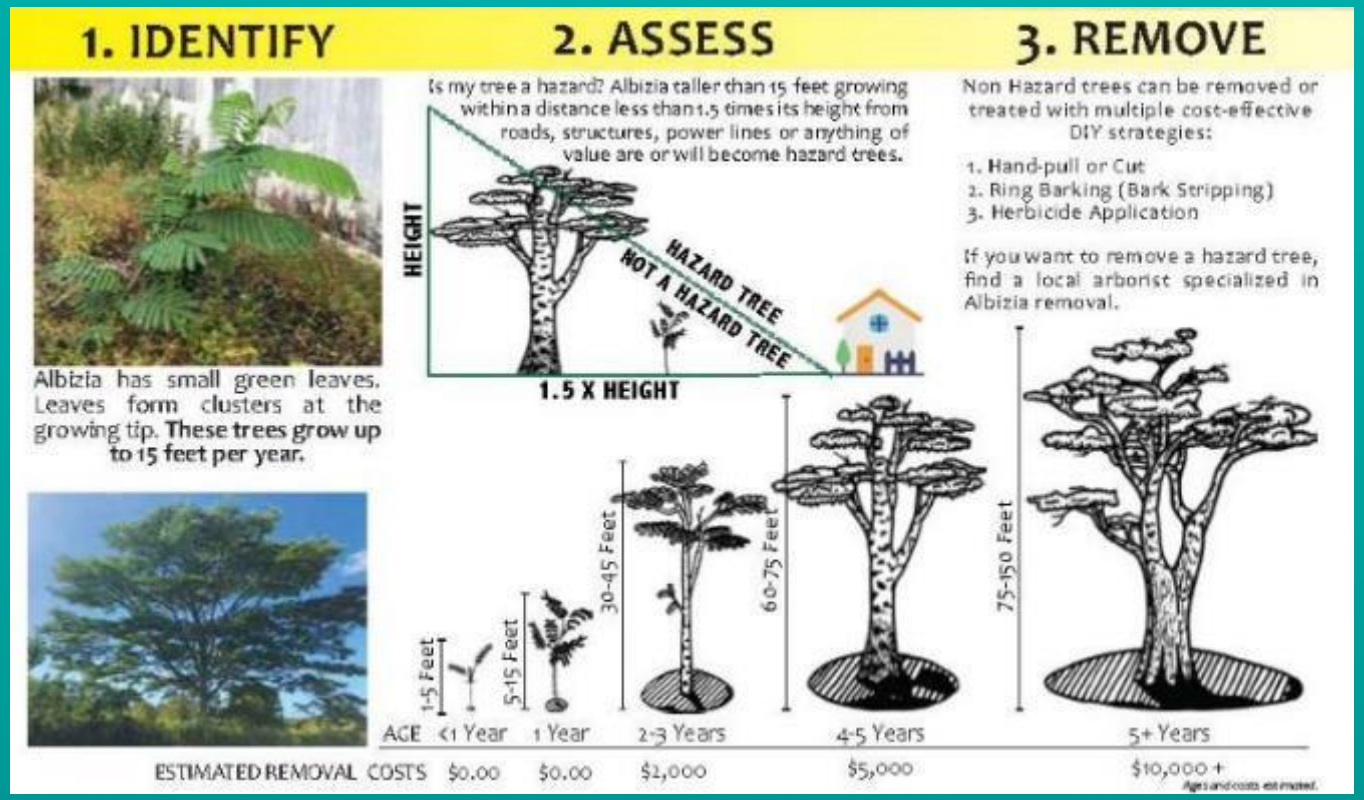
Community Supporters
- Mālama Mānoa
- Waiāhole Community Association
- The Outdoor Circle
- Ala Wai Watershed Collaborative
- Albizia Project

Leveraged work efforts
- Kamehameha Schools
- NRCS
- Kualoa Ranch
- ʻOhuehule Forest Conservancy
- Lyon Arboretum

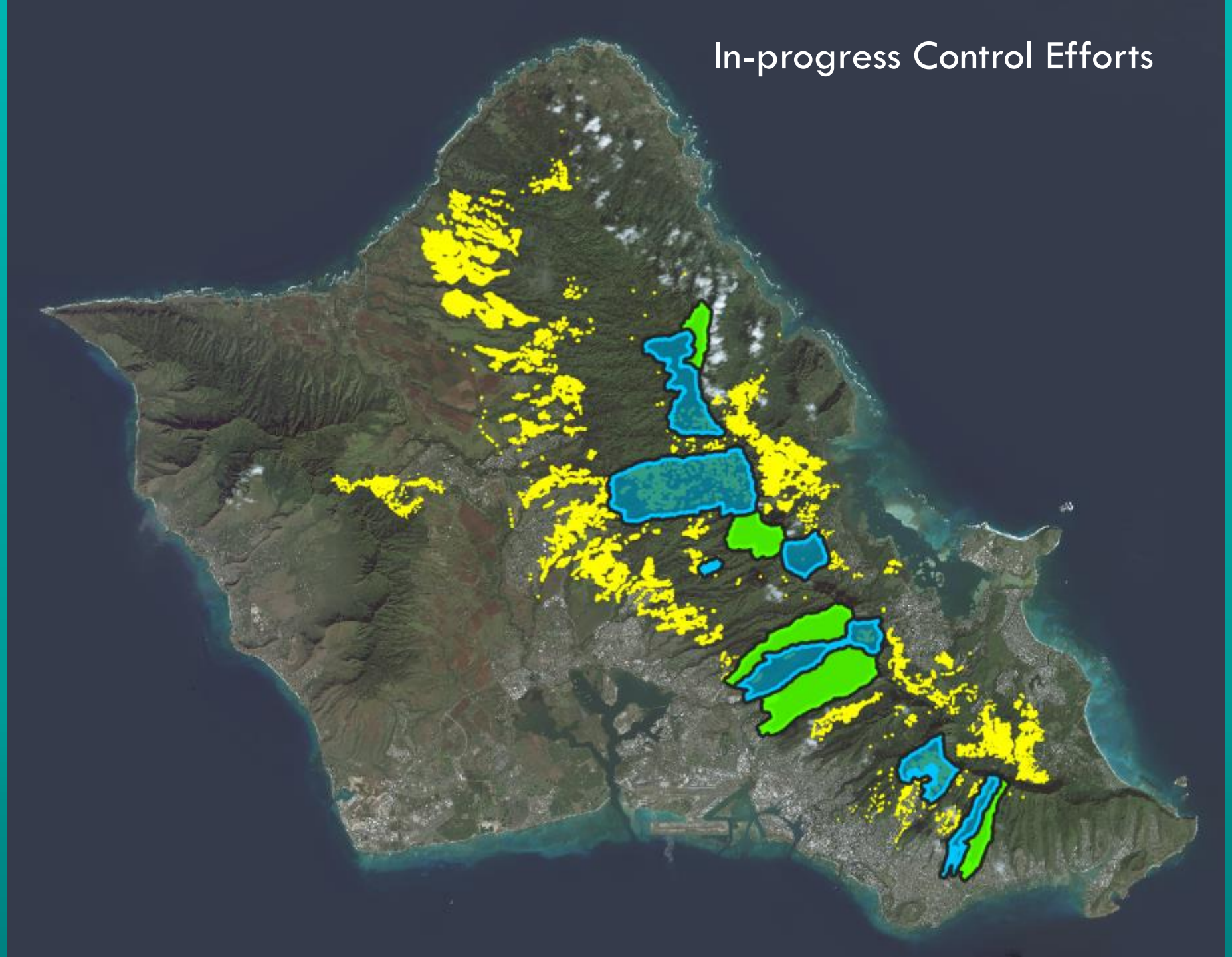
Statewide Albizia Working Group: KMWP, HISC, SWCA, BIISC, HECO, USFS, DOFAW, USGS, UH, MoMISC and others

NEXT STEPS

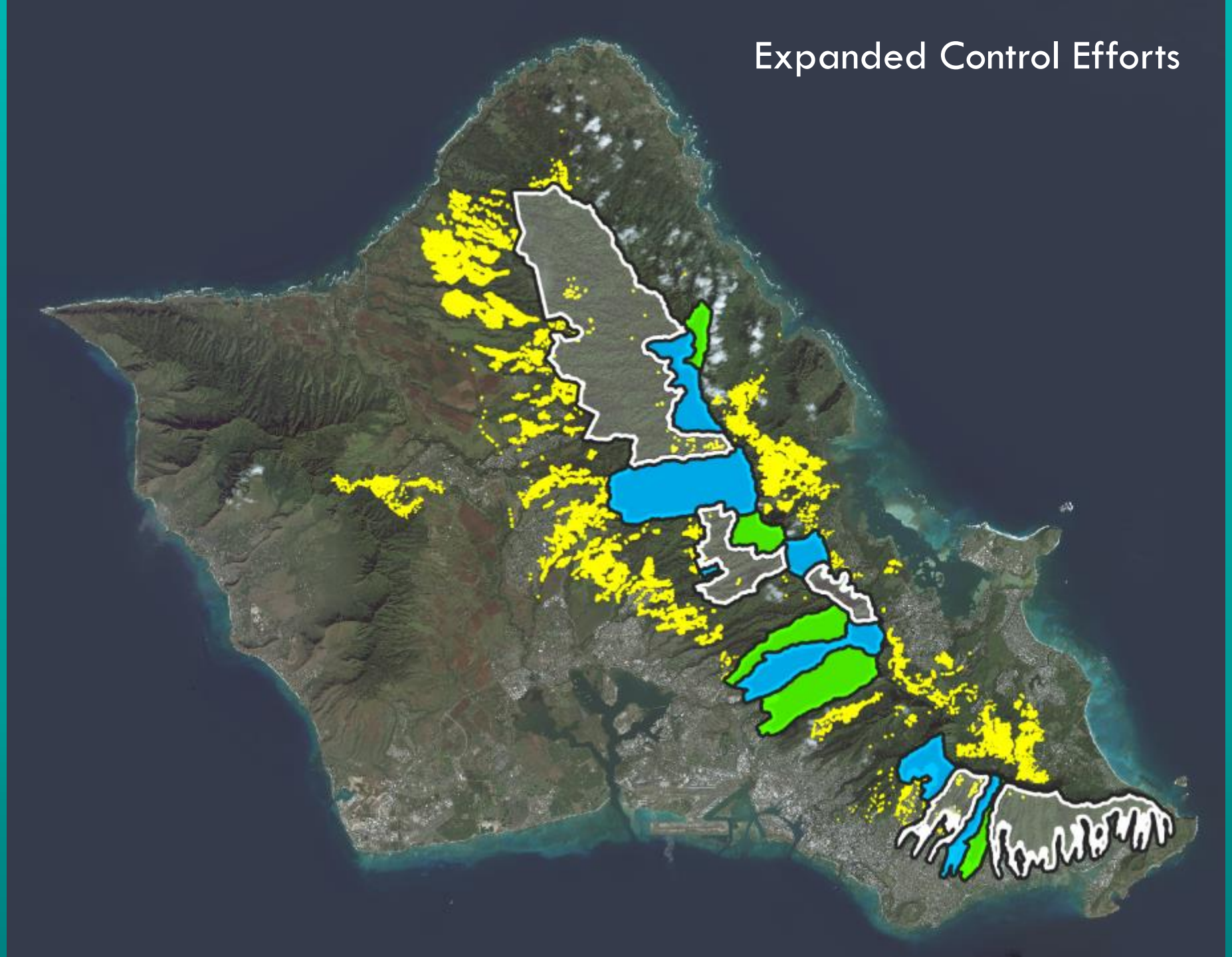
- Continue and expand regional eradication and containment efforts
- Continue outreach efforts and establishing RAD Hui
  - New RAD Hui
  - Annual mailers
- Statewide Albizia Working Group
  - BMPs



In-progress Control Efforts



Expanded Control Efforts



QUESTIONS / DISCUSSION


MAHALO!

BWS STRATEGIC PLAN FY 2023-2027 DRAFT

Ellen E. Kitamura

April 21, 2022

boardofwatersupply.com

AGENDA

- STRATEGIC PLAN FOR 2023-2027 – IN PROGRESS
- Q & A

REQUESTED SAG FEEDBACK

- DO YOU AGREE WITH OUR DIRECTION FOR THE NEXT 5 YEARS?
- IS THERE ANYTHING MISSING?
- GENERAL COMMENTS

UPDATED STRATEGIC PLAN FY 2023-2027 WORKSHOP SCHEDULE

March 1, 2022	March 24, 2022	April 18, 2022/ April 21, 2022	May 26, 2022	July/August 2022
Workshop #1	Workshop #2	Workshop #3	Workshop #4	Board Report/Adoption
Review and update BWS Mission, Vision, Values, Sustainability Goals and Strategic Objectives	Continue discussion on Sustainability Goals and Strategic Objectives Review and update BWS Action Plans based on updated Sustainability Goals and Strategic Objectives	Continue discussion on Action Plans Review and update Performance Metrics based on updated Sustainability Goals, Strategic Objectives and Action Plans Stakeholder Advisory Group Presentation	Wrap up Session	July – Presentation to Board August – Adoption of Updated Strategic Plan

BWS STRATEGIC PLANS

FY 2018-2022

FY 2014-2017

SUSTAINABILITY GOALS

	2014 – 2017	2018 – 2022	2023-2027 (DRAFT)
Resource	Protect and manage our groundwater supplies and watersheds through adaptive and integrated strategies.	Protect, conserve and manage Oahu's water supplies now and into the future through adaptive and integrated strategies.	Protect and manage Oahu's water resources and watersheds now and into the future through adaptive and integrated strategies.
Operational	Foster a resilient and collaborative organization utilizing effective and proactive operational practices consistent with current industry standards.	Build an effective organization to continuously improve dependable service.	Manage and continuously refine an effective organization that can evolve and adapt its human and physical resources to provide dependable service.
Financial	Implement sound fiscal strategies to finance our operating and capital needs to provide dependable and affordable water service.	Implement sound fiscal strategies to provide safe, dependable and affordable water service.	Implement sound fiscal strategies to support our mission.

STRATEGIC OBJECTIVES – RESOURCE

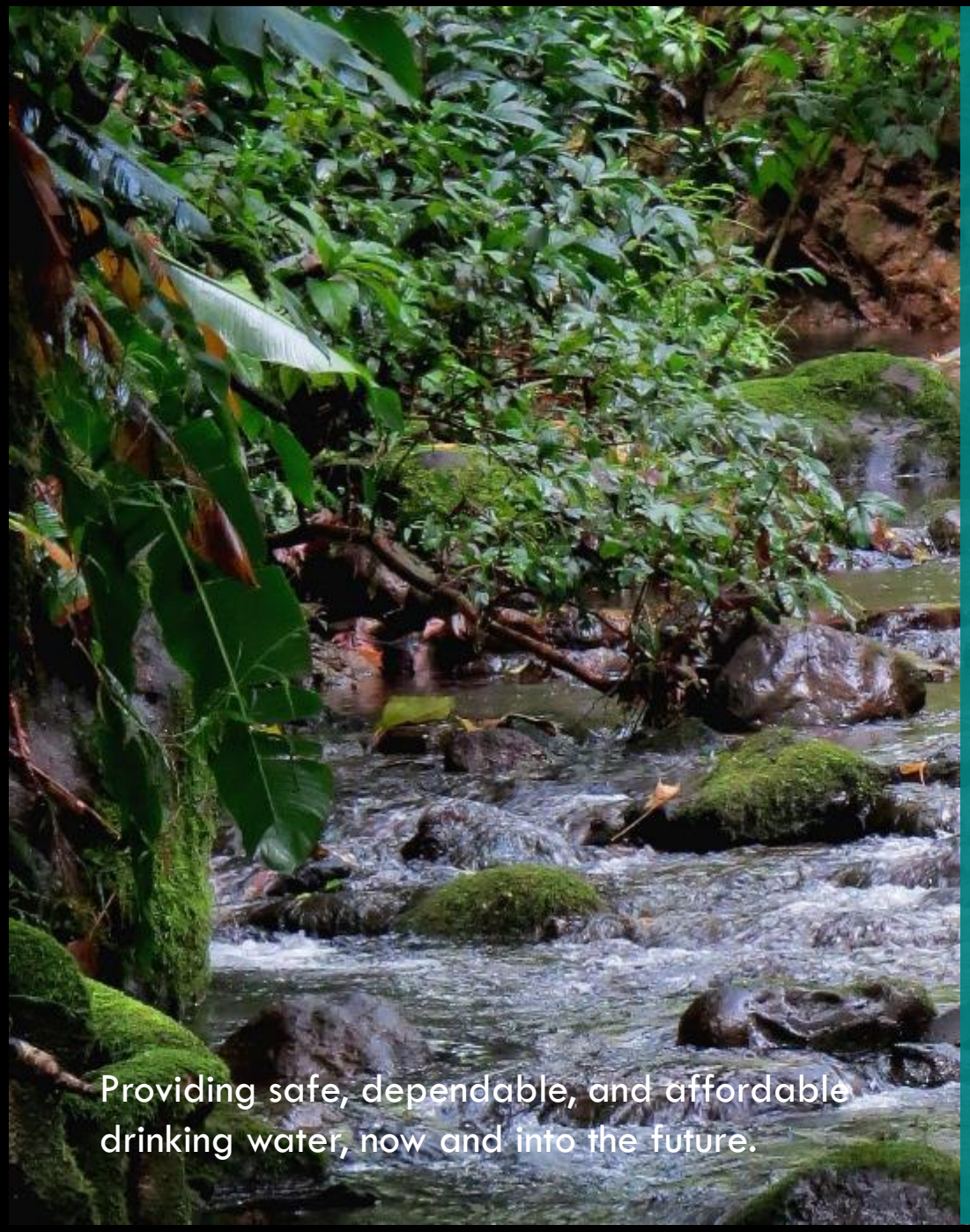
2014-2017		2018-2022		2023-2027 (DRAFT)	
Category	**Strategic Objective**	**Category**	**Strategic Objective**	**Category**	**Strategic Objective**
Climate Change	We will adapt to climate change to manage Oahu's water resources and protect the limited water supply.	**Climate Change**	We will increase our understanding and adapt to climate change to manage Oahu's water resources and protect the limited water supply.	**Resource Sustainability**	We will continuously adapt and implement resilient and sustainable solutions to mitigate climate and environmental changes to protect and manage Oahu's water resources and watersheds.
Water Quality	We will renew and improve the water system to ensure water system adequacy, dependable service, and operational efficiency.	**Water Quality**	We will protect, preserve and collaborate to ensure the safety and quality of Oahu's freshwater resource.	**Water Quality**	We will protect, preserve, and ensure the safety and quality of Oahu's water resources extending for at least seven generations.
Communication	We will communicate the value of water to engage the community in a shared stewardship of Oahu's water resources.	**Water Conservation**	We will conserve supply and system capacity by reducing per capita demand and increasing water efficiency.	**Water Conservation**	We will conserve Oahu's water resources, supply and system capacity by reducing per capita demand and increasing water use efficiency.
		Watershed Management	We will ensure healthy forests, recognizing the essential role of watersheds for a sustainable water supply (capture and recharge).	**Resource Advocacy**	Lead, promote and sustain partnerships with stakeholders to advocate and support community-driven initiatives to protect Oahu's water resources and watersheds.

STRATEGIC OBJECTIVES – OPERATIONAL

2014-2017		2018-2022		2023-2027 (DRAFT)	
Category	**Strategic Objective**	**Category**	**Strategic Objective**	**Category**	**Strategic Objective**
Organization	We will ensure the necessary workforce and competencies to support the BWS needs.	**Organization**	We will ensure the necessary workforce, competencies, tools and resources to support current and future needs.	**Organizational Resiliency**	We will ensure the necessary workforce, competencies, tools and resources to support current and future needs.
Infrastructure	We will protect, preserve and collaborate to ensure the safety and quality of Oahu's freshwater resource.	**Infrastructure**	We will renew and improve the water system to ensure water system adequacy, dependable service, and operational efficiency.	**Infrastructure**	We will proactively assess and address water system risks and vulnerabilities to ensure water system adequacy, dependable service and operational efficiency.
Customer Service	We will proactively and consistently provide a quality experience in every customer interaction.	**Customer Service**	We will proactively and consistently provide a quality experience in every customer interaction.	**Customer Service**	We will consistently provide dependable service and a quality experience in every customer interaction.
Technology	We will ensure that our technology systems are current and leverage opportunities in technology to effectively support current and future BWS needs.	**Technology**	We will ensure that our technology systems are current and leverage opportunities in technology to effectively support current and future BWS needs.	**Technology**	We will ensure that our technology is current, secure, and leveraged to effectively support current and future BWS needs.
				Strengthen Operational Partnership	We will proactively collaborate with external government and community decision-makers and stakeholders to ensure that there is a holistic approach to critical environmental and social issues; and in so doing, reinforce the utility as a valued and trustworthy partner.

STRATEGIC OBJECTIVES – FINANCIAL

2014-2017		2018-2022		2023-2027 (DRAFT)	
Category	**Strategic Objective**	**Category**	**Strategic Objective**	**Category**	**Strategic Objective**
Financial Management	We will pursue and leverage financial opportunities and implement strategies to affordably meet our financial and regulatory requirements.	**Financial Opportunities**	We will pursue and leverage financial opportunities.	**Financial Opportunities**	We will strategically pursue and leverage financial opportunities.
		Financial Planning	We will develop and implement short- and long-term financial plans and policies.	**Financial Planning**	We will determine and implement short-, mid- and long-term financial policies and plans.
				Financial Accountability	We will be accountable and transparent to our stakeholders through responsible and effective financial management.



Providing safe, dependable, and affordable drinking water, now and into the future.

Mahalo!

BOARD OF WATER SUPPLY

BWS Strategic Plan FY 2023-2027 Update

Ellen E. Kitamura
(808) 748-5066, ekitamura@hbws.org

boardofwatersupply.com for more information

April 21, 2022

IMPACT OF RED HILL SHAFT FUEL CONTAMINATION ON BOARD OF WATER SUPPLY

boardofwatersupply.com

SECRETARY OF DEFENSE MEMO

SECRETARY OF DEFENSE
1000 DEFENSE PENTAGON
WASHINGTON, DC 20301-1000

MM! 0 7 202!

MEMORANDUM FOR SENIOR PENTAGON LEADERSHIP
COMMANDERS OF THE COMBATANT COMMANDS
DEFENSE AGENCY AND DOD FIELD ACTIVITY DIRECTORS

SUBJECT: Immediate Actions to Permanently Close the Red Hill Bulk Fuel Storage Facility at Joint Base Pearl Harbor-Hickam and to Redistribute Fuel in Accordance with INDOPACOM Plans for Strategic Fuel Storage in the Pacific Region

In recent months, leaders across the Department of Defense have worked to address the November release and contamination at the Red Hill Bulk Fuel Storage Facility (RHBFSF) in Hawaii. Our approach has been guided by a commitment to protect the population, the environment, and the security of the nation. We believe these goals ae mutually reinforcing and we have taken broad actions to remedy environmental impacts, restore safe drinking water, and care for affected military families and the people of Hawaii.

We also launched a thorough review of the facility's long-term future, to include the option of defueling and permanently closing RHBFSF. Since late January 2022, we have been on an aggressive schedule to analyze and determine the distribution of fuel reserves for our operations in the Pacific theater. This work has been evidence-based and fully aligns with our focus on the population, the environment, and national security.

As an outcome of this review, today I am directing the Secretary of the Navy, in coordination with the Commander of the United States Indo-Pacific Command, to take all steps necessary to defuel and permanently close the Red Hill Bulk Fuel Storage Facility.

To carry out this direction, the Secretary of the Navy, in cooperation with the Director, Defense Logistics Agency (DLA), will defuel the facility in compliance with environmental safeguards and best practices. By no later than May 31, 2022, the Secretary of the Navy and Director, DLA will provide me with a plan of action with milestones to defuel the facility. The plan of action shall require that defueling operations commence as soon as practicable after the facility is deemed safe for defueling and target the completion of that defueling within 12 months. The Secretary of the Navy will also work with the U.S. Environmental Protection Agency and with the State of Hawaii Department of Health to plan for and implement the permanent closure of the RHBFSF in a manner that complies with all applicable laws. In connection with the permanent closure of the RHBFSF, the Secretary of the Navy shall plan and budget for all necessary corrective action for any prior releases from the facility. As we move forward in closing Red Hill, we will continue to involve our federal, congressional, state, and community stakeholders.

Redistributing our fuel reserve across the Indo-Pacific will better position the United States to meet future challenges in the region. Our approach will fully comply with best practices and environmental regulations for fuel storage on land and afloat.

In parallel with our work to dcfucl and permanently close RHBFSF, the Department of Defense remains committed to mitigating the impacts of the November incident We will complete environmental mitigation effor1s at the Red Hill drinking water well and any other impacted areas. We will restore safe drinking water to all affected residents and provide best-in class sampling and testing to ensure the continued safety of drinking water. And we will care for our military families by addressing any health impacts from this incident and by using available authorities to provide assistance to address displacement from homes or damage to household goods.

Today's decision will heller support our operations in the Pacific theater, while caring for the health and safety of the people of Hawaii and our military families. We will continue to do everything we can to safeguard the population, the environment, and the security of the nation.

CONGRESSIONAL FUNDING

02.07.2022

Schatz Secures $100 Million To Defuel Red Hill

Schatz's Red Hill Funding Provision Included In Must-Pass Appropriations Bill; Schatz Working To Secure Additional Funding For Defueling

WASHINGTON - U.S. Senator Brian Scha.t7. (D-Hawrri'i), a member of th-e- Senatl'! Ap-pt-opriations Co:mmitte , secured Sl00 :million in new federal funding to covtr the cost of defue-liilg the Red Hill Bulle Fuel Storage Facility and direct the Department of Oefen&e to c:ompty with th.e St.ate of Hawai'i'is emergency public health order. Schatz worked closely with bipartisan leaders of thi:l Seoete Appropriations Committee to Include the funding provi!ion in a critical three-week spending bill required to pass Congreu to .?.Vokl a govun:m.en.t ghutdown.

...ThJ• bill f"nn.4•4•fHlff19, a:a.d it. n t a b l l s h n Congren'• poll'tion on R.cl Hill: th• DoD m l lstchftl•l and follow th• :ltat•':l ardH bnmedlately,- said Senator Schatz. -We still ha•11 more wi>rLi:to do, 'but w11an maldn91 good pl'09'H-H to prot•ot aur wa;tez. ADlgattbla right.•

The new federal money repret with!llfJlnior l,a,,aden in the Bid• in the pnt5ident"s annual bud next month.

The full bill text of Schat.'s. fu

!n addlt(on t(l amounts otherwl: additional -amot.1.ntfi,.rfiscal yea 'Operation *and* Maintenance'. *'F fez* the Secretory *tif* Defense to < *BA-O:i,* -1igned *December* 6, .2oa.: Ston1ga Fa,oility: Provided, That ava iable,tQ the Department ofl transfer, obligation, or e pend[t Rfpre:.i.entatives and Senate reg, Integrity *of* the Red Hill faci[itv the Pacific: theater, os wsll as of / rther, That not less *than* 15 de the corign,.:5sional de/en:!le com11 dots *of* enactment of the Furthe year .20.23, *the* Sotcret,ary *of Dcfe* and SUnate, *settingfol'th* all cat subsection.

February 17, 2022

Senator Hirono Applauds Senate Passage of $350 Million for Red Hill Included in the continuing Resolution to Keep the Government Funded

WASHINGTON, D.C. - Today, Senator Mazie K. Hirano (D-HI) released the following statement on Senate passage of the continuing resolution-legislation to keep the government funded-which includes $350 million to address the Red Hill crisis. The legislation, which now heads to the Presidenrs desk to be signed into low, includes $250 million in funding for the Novy, Marine Carps, Army, and Air Force to *cover* expenses incurred related to drinking woter contamination ond $l00 million for the Department of Defense to comply with the State of Hawoii"s emergency order to defuel the Red Hill tanks. Senator Hirano will continue to fight for additional funding to defuel solely and for the DoD to develop and implement a long-term plan to meet the strategic fueling needs of the Indo Pacific region.

"The Department of Defense must fully comply with the State of Hawaii's Executive Order to defuel the tanlcs at Red Hill and this funding is necessary step to ensure that happens. This crisis has caused significant financial burden and severe hardships for famllles and businesses in Oohu, Including the almost 4,000 famllie1 who are still displaced. I'm **pleased we** were also able to secure funding for costs **incurred to cover emergencies and extraordinary expenses for families and businesses who have been Impacted. The Navy must do everything possible to suppon famllles and businesses while they work: to defuel the tanks and resolve this crisis ae quickly as possible.**

March 09, 2022

Hirano Applauds $686 million in Funding to Address the Red Hill Water contamination Crisis, Close the Facility

WASHINGTON, D.C. - Today, U.S. Senator Mazie K. Hirono applauded the $686,429,000 in funding for the Red Hill Bulk Fuel Storage Facility water contamination crisis included in the fiscal year 2022 omnibus spending bill, which was unveiled this morning. In February, Senator Hirano helped secure $100 million in the must-pass continuing resolution spending bill to defuel the facility. Today's announced appropriations bill includes additional funding specifically dedicated to defueling

partment of Defense
,cision senator Hirano

liable ta cover the costs
t clean drinking water to
aid from day one that
d hard with my colleagues
he Senate, as well as, the
Jnd the Department of
,fuel and permanently close
irono

03.09.2022

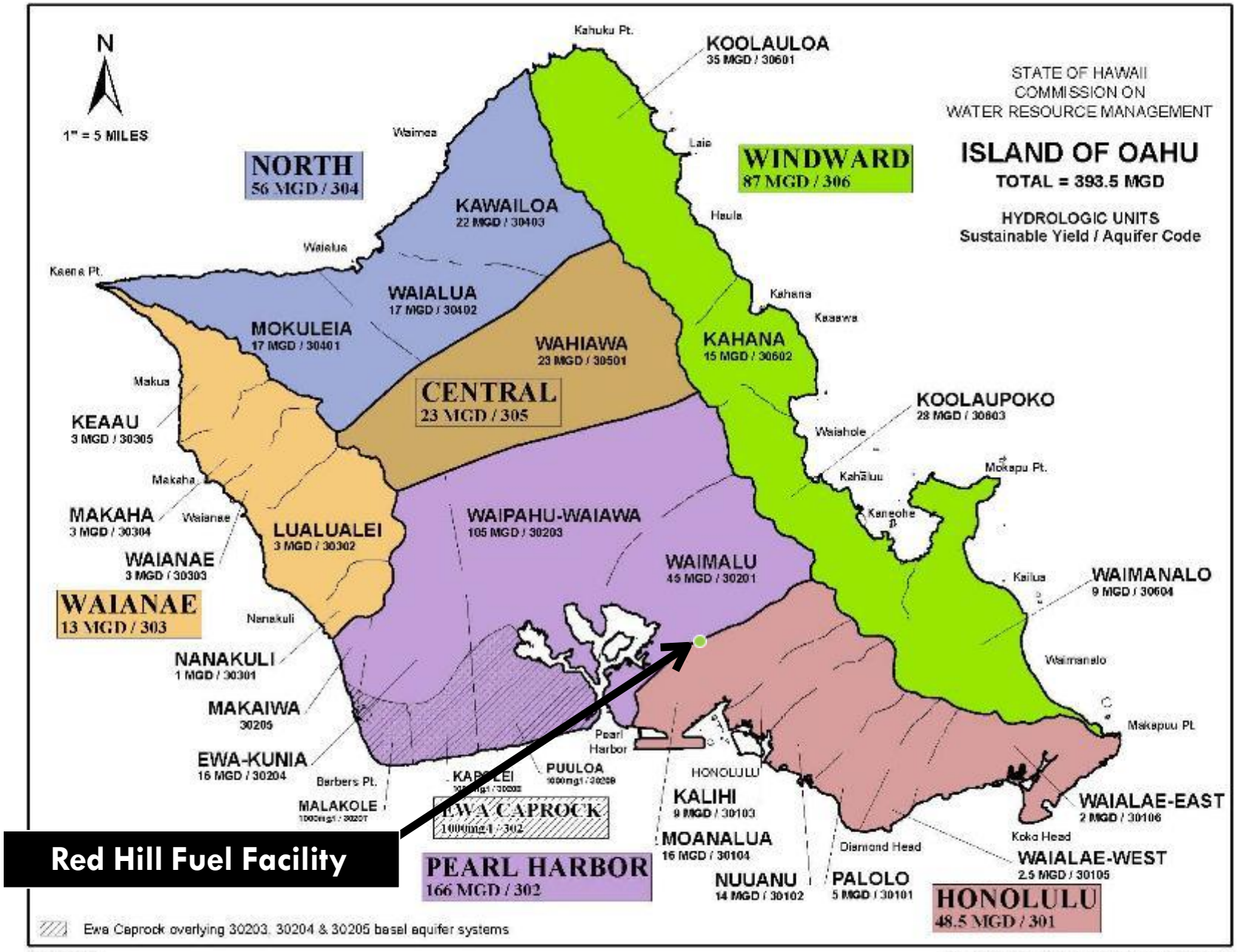
Schatz Secures Additional $150 Million In New Federal Funding To Defuel, Permanently Close Red Hill, Clean Up Water

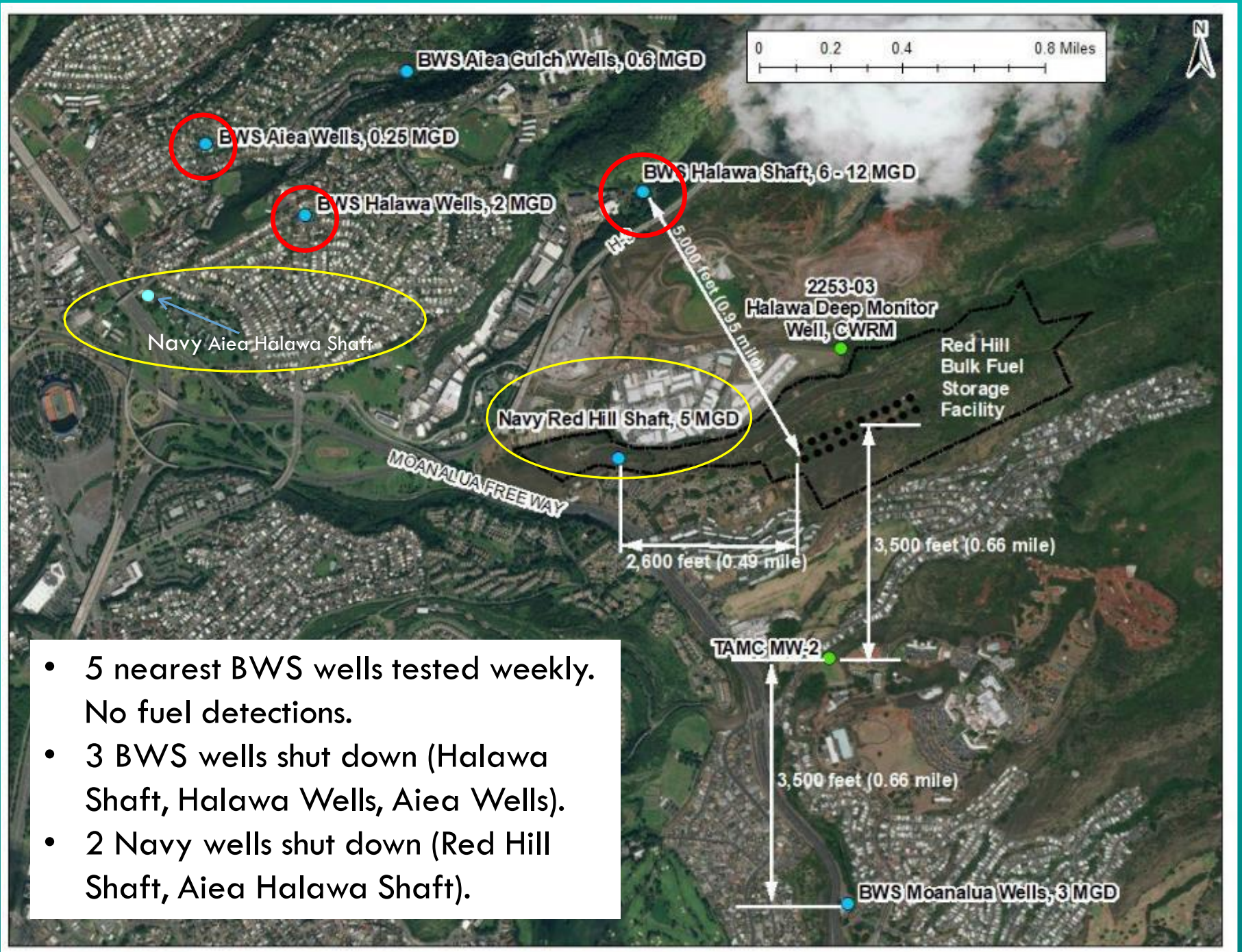
New Funding Follows $100 Million Schatz Secufed Last Month To Defuel Red Hill

WASHINGTON - U.S. Senator Brian Sch.at-z (D·Hawai'i), a member of the Senate Appropriation.s Committee, se-cured an additional SlSO million in new federal fwiding to cover the cost to defuel, permanently do:i-e the Red HiH Bulk Fuel Stozage Facility, and clean up-contaminated water in the-affected are.as. Schatz worked closely with top leaden in the Biden Administration and the Senate Approp:rfations Committee to include hi! funding provision in thri new appropriations bill.

9Tbis Is now lll!dciral mon•y to d&fuel a:11d pei•m.a.u•ntly ah1,lt.down Red Hin.• said Senator Seha.tz. "We .stlll have- mon, WQrll;to do to, make sure Reel Hill :leclo•ed. safely, Wt we nowhaw-e •lgnifiaaut naour-cea to cl.rain th• tank■l1111lHlgt thia right,•

Theenewfunding follows the 4100 million $1.buh umored lut month for defueling Red Hill and an anno1JJ1cerneat yesterday tha;t the Department of Defcnise wlll permanently close do-wn the facility, aftir calls from Schatz to do so.


N
1" = 5 MILES
STATE OF HAWAII
COMMISSION ON
WATER RESOURCE MANAGEMENT
ISLAND OF OAHU
TOTAL = 393.5 MGD
HYDROLOGIC UNITS
Sustainable Yield / Aquifer Code
NORTH
56 MGD / 304
KAWAILOA
22 MGD / 30403
WAIALUA
17 MGD / 30402
MOKULEIA
17 MGD / 30401
WINDWARD
87 MGD / 306
KOOLAULOA
35 MGD / 30601
KAHANA
15 MGD / 30602
CENTRAL
23 MGD / 305
WAHIAWA
23 MGD / 30501
KEAAU
3 MGD / 30305
MAKAHA
3 MGD / 30304
WAIANAE
3 MGD / 30303
LUALUALEI
3 MGD / 30302
WAIANAE
13 MGD / 303
WAIPAHU-WAIAWA
105 MGD / 30203
WAIMALU
45 MGD / 30201
KOOLAUPOKO
28 MGD / 30603
WAIMANALO
9 MGD / 30604
NANAKULI
1 MGD / 30301
MAKAIWA
30205
EWA-KUNIA
16 MGD / 30204
PUULOA
KALIHI
9 MGD / 30103
MOANALUA
16 MGD / 30104
NUUANU
14 MGD / 30102
PALOLO
5 MGD / 30101
WAIALAE-EAST
2 MGD / 30106
WAIALAE-WEST
2.5 MGD / 30105
HONOLULU
48.5 MGD / 301
EWA CAPROCK
PEARL HARBOR
166 MGD / 302
Red Hill Fuel Facility
Ewa Caprock overlying 30203, 30204 & 30205 basal aquifer systems
06/20/2018
Map Projection: Universal Transverse Mercator

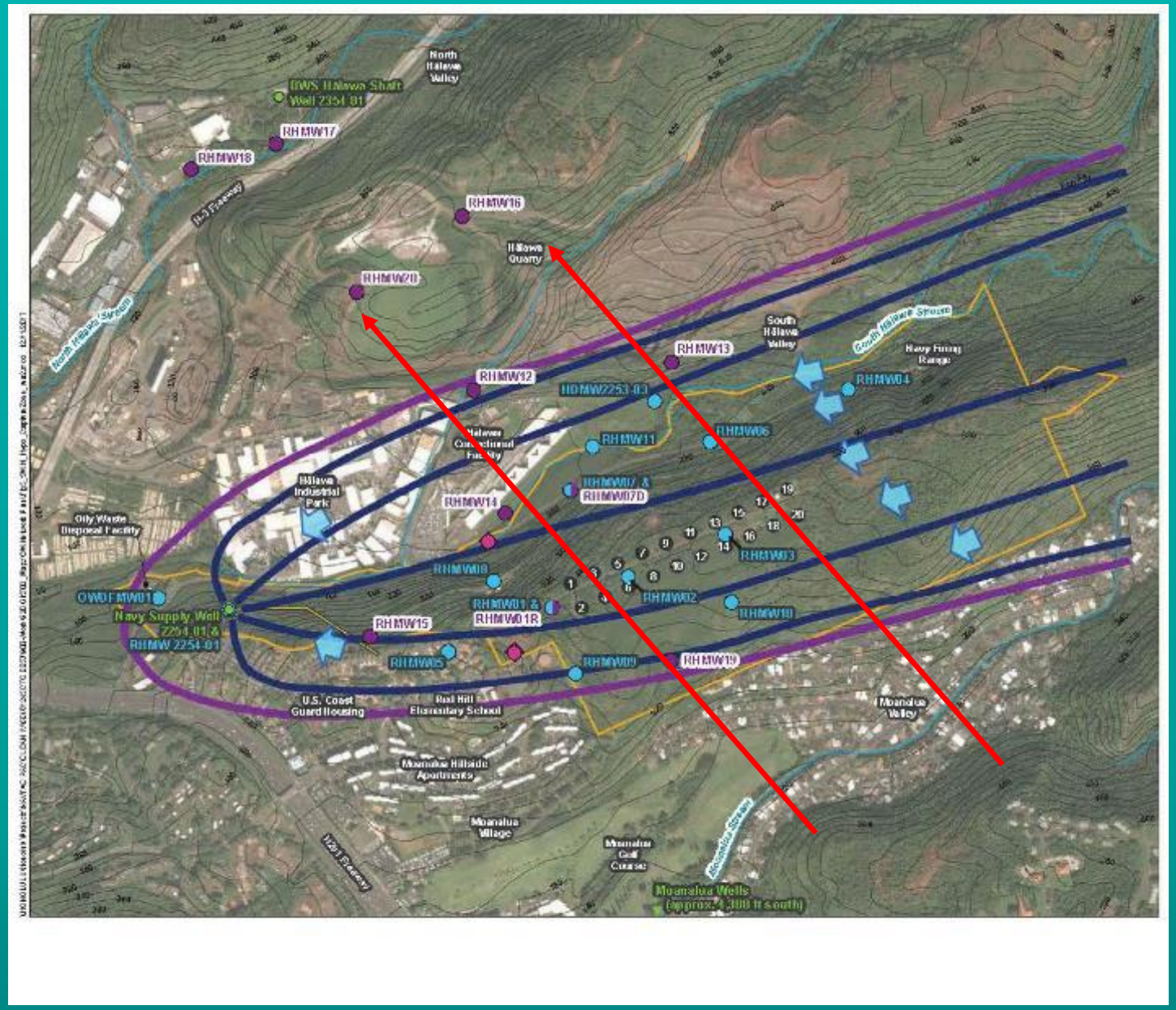


- 5 nearest BWS wells tested weekly. No fuel detections.
- 3 BWS wells shut down (Halawa Shaft, Halawa Wells, Aiea Wells).
- 2 Navy wells shut down (Red Hill Shaft, Aiea Halawa Shaft).

BWS REVIEW – GW FLOW

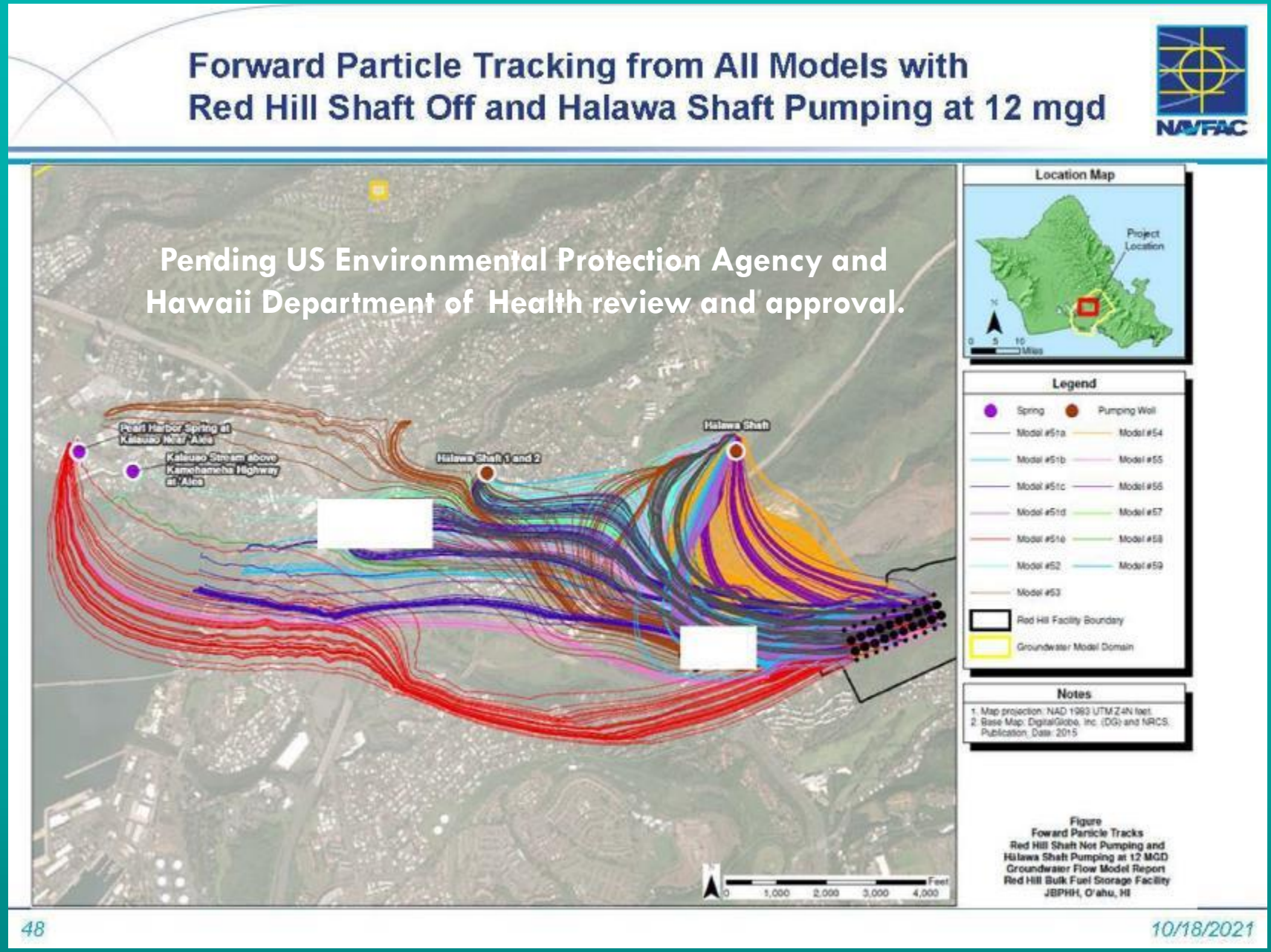
Navy presents that there is no GW flow from Red Hill to any BWS wells and that Red Hill Shaft captures all groundwater flow from beneath the tanks.

BWS: Pumping test data from 2017-18 show water level changes across the valleys. EPA and DOH have asked the Navy to look at this stating some of the field data contradict Navy interim groundwater model flow paths.



Ref. Sentinel Well Network Development Plan, Red Hill Bulk Fuel Storage Facility, Dec. 11, 2017

Navy groundwater model of cross valley flow



Ref: Groundwater Flow Model Report, Red Hill Bulk Fuel Storage Facility JBPHH, Oahu, Hawaii, Naval Facilities Systems Command Hawaii, March 25, 2020. https://www.epa.gov/sites/default/files/2020-04/documents/red-hill-groundwater-flow-model-report-redacted-2020-03-25-.pdf.

NAVY RISK ASSESSMENT STUDY

- Greater than 27% probability of a sudden release of between 1,000 and 30,000 gallons of fuel each year
- Greater than 34% chance of a sudden release of more than 120,000 gallons of fuel in the next 100 years
- Greater than 5% probability of a sudden release of more than 1 million gallons of fuel in the next 100 years
- For chronic, undetected releases, the expected fuel release is 5,803 gallons per year (facility-wide)

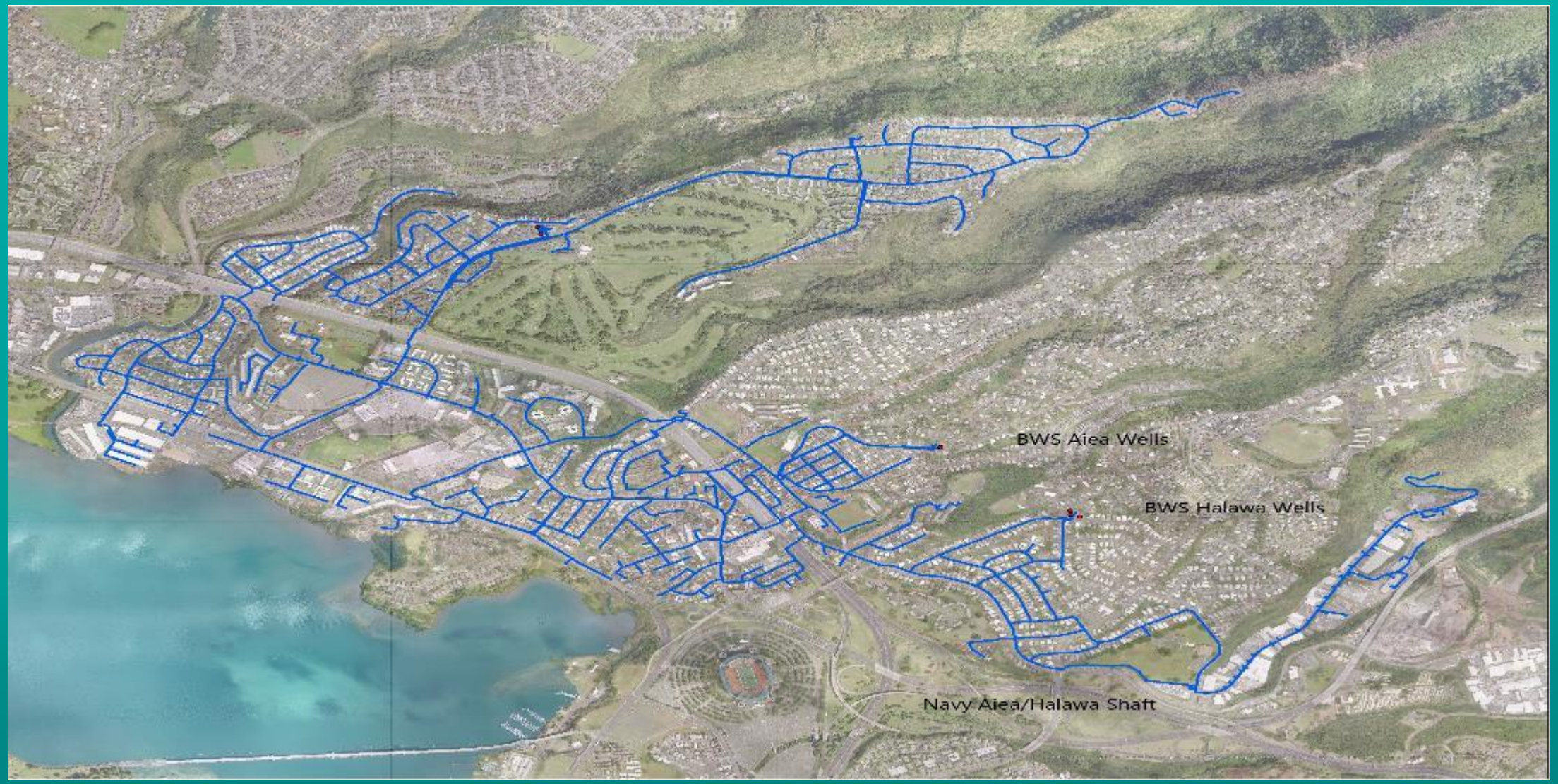
  [For example: 25 years x 5,803 gallons/year = 145,075 gallons released]

A BALANCING ACT …

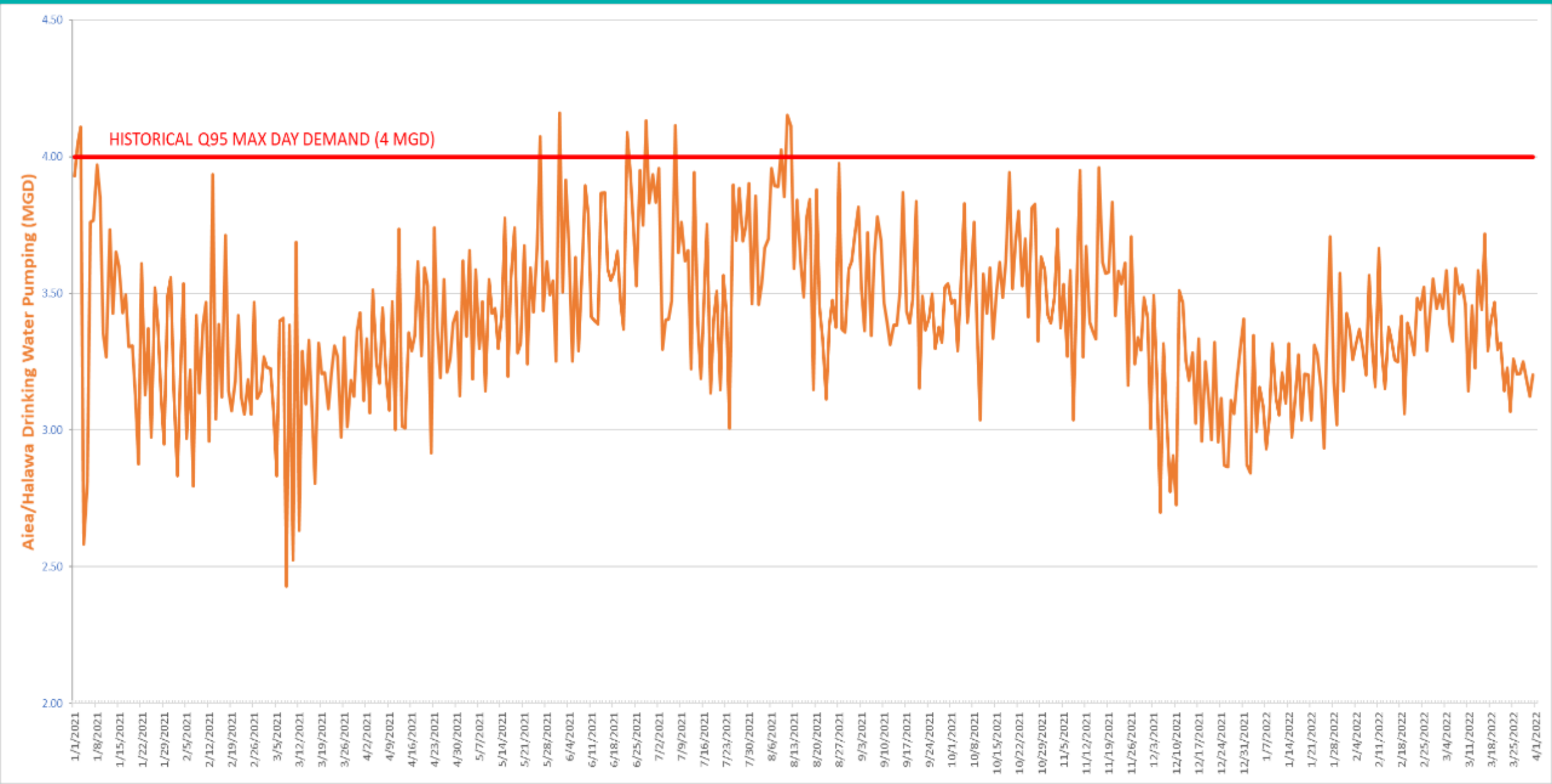
Halawa Shaft (**20%** of the supply for metropolitan Honolulu)

Halawa Wells and Aiea Wells (**50%** of the supply for the Aiea-Halawa 277' System)

AIEA HALAWA WATER SYSTEM

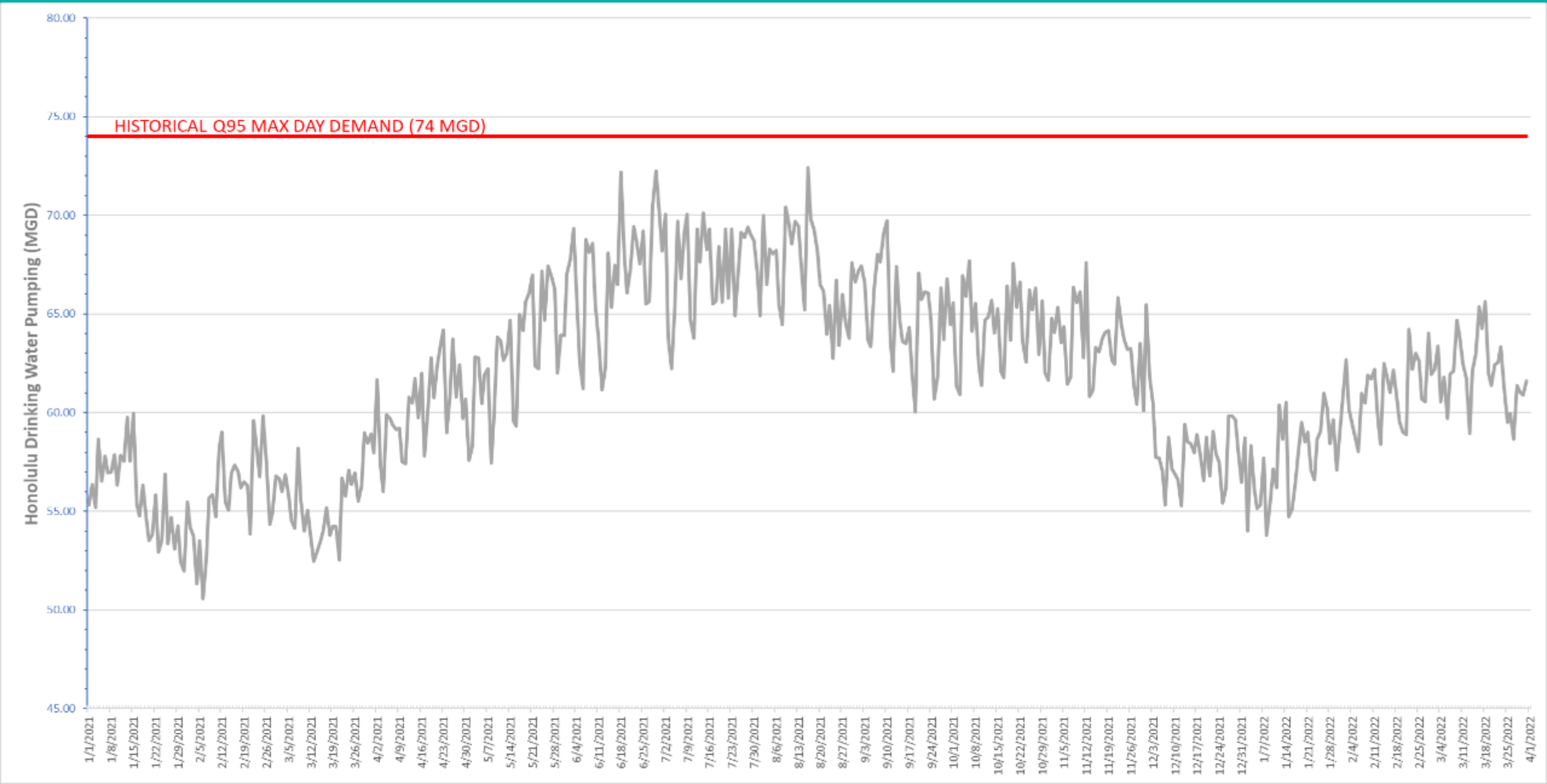


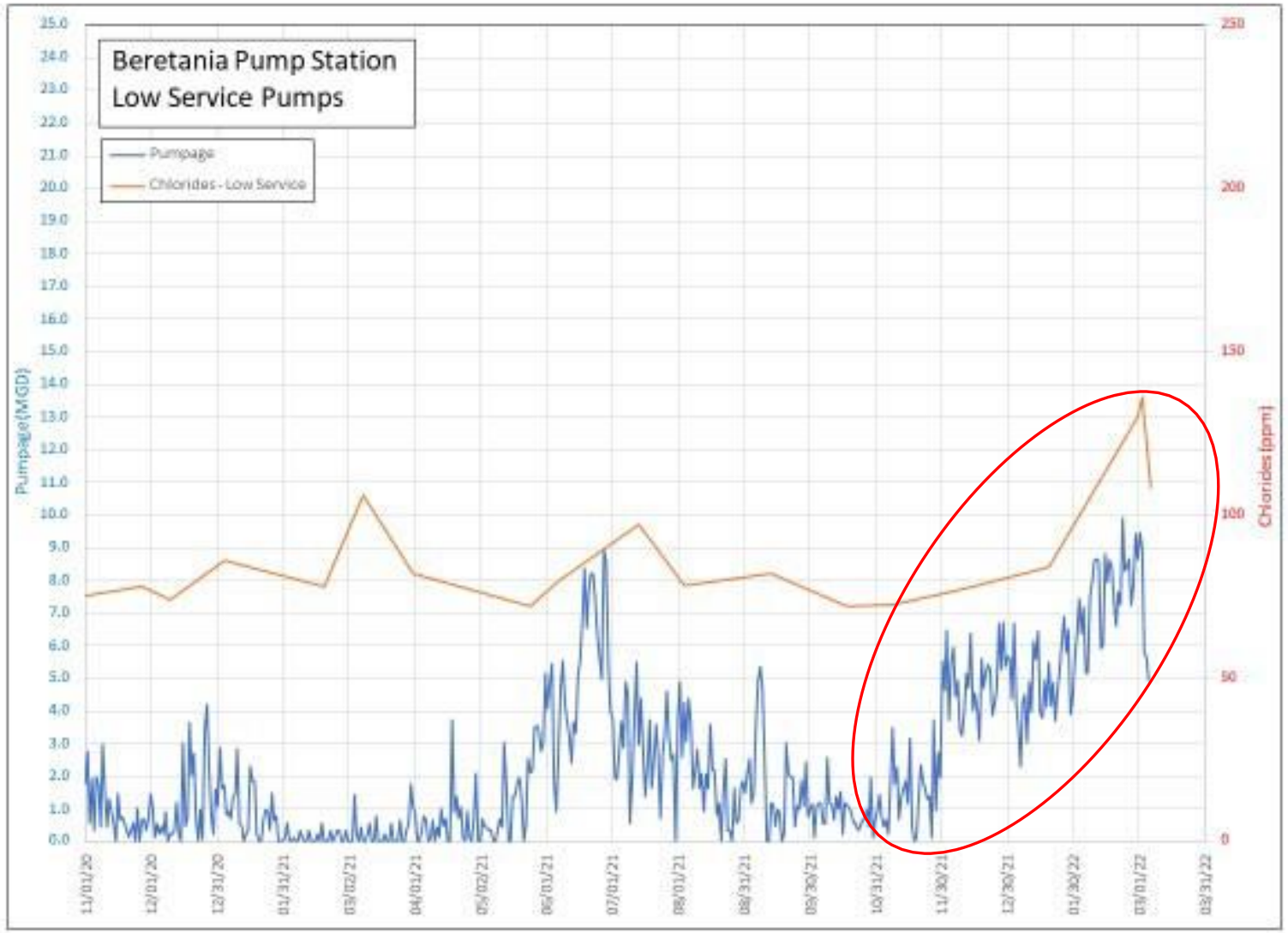
AIEA HALAWA WEEKLY PUMPING - January 2021 to Present




HALAWA SHAFT
HALAWA
KAILUA
MAUNAWILI
KEOLU HILLS
SALT LAKE
KALIHI
KALIHI PUMP STATION
Honolulu International Airport
WAIMANALO
MANOA
MAKIKI
BERETANIA PUMP STATION
WILDER WELLS
MAUNALUA
SAND ISLAND
AINA HAINA
KAIMUKI PUMP STATION
HONOLULU
HAWAII KAI
WAIKIKI
©2021
DIAMOND HEAD
KOKO HEAD

HONOLULU WEEKLY PUMPING - January 2021 to Present




Beretania Pump Station
Low Service Pumps
Pumpage
Chlorides - Low Service
Pumpage (MGD)
Chlorides (ppm)
25.0
24.0
23.0
22.0
21.0
20.0
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
250
200
150
100
50
0
11/01/20
12/01/20
12/31/20
01/31/21
03/02/21
04/01/21
05/02/21
06/01/21
07/01/21
08/01/21
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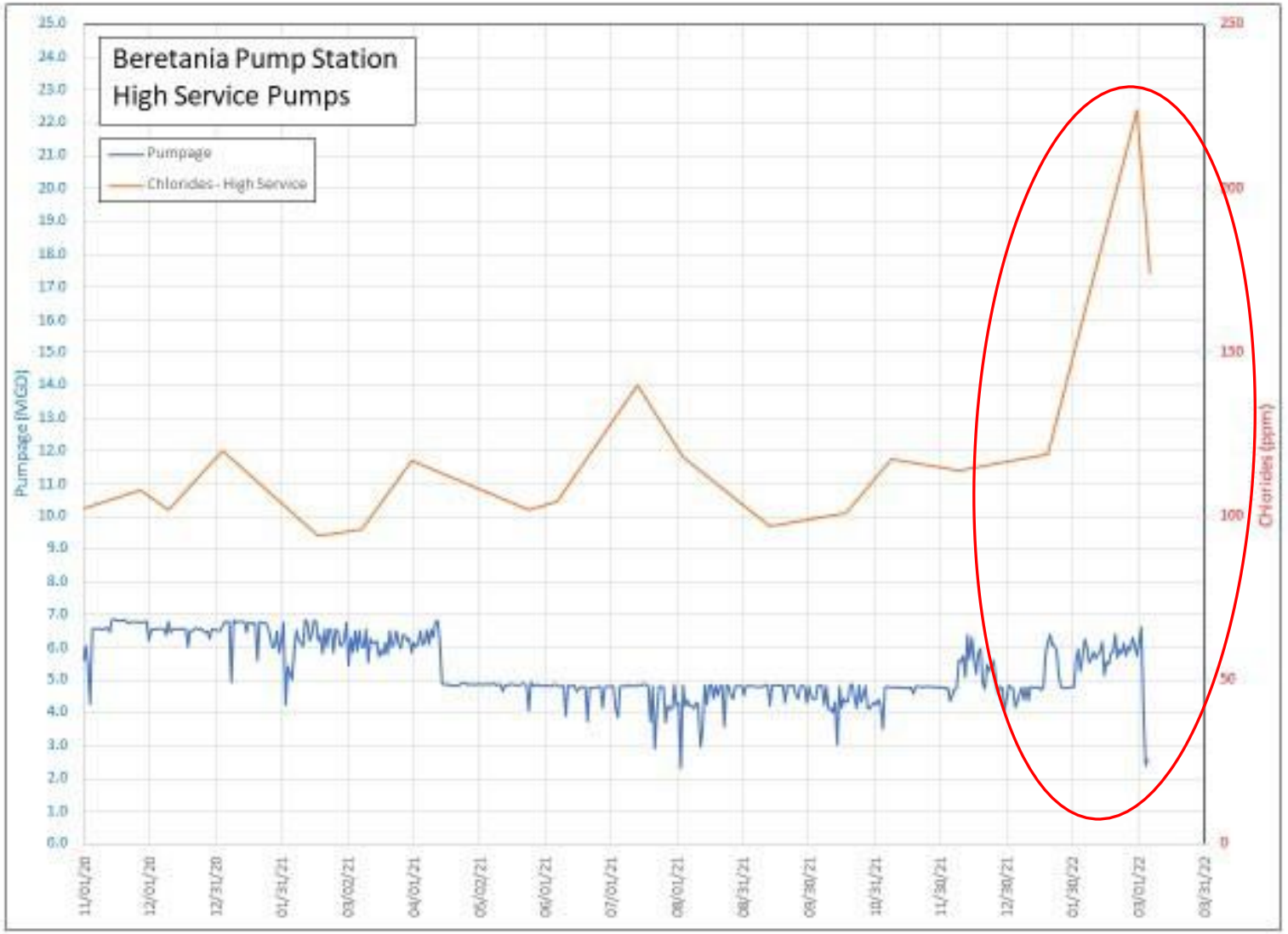
12/30/21
01/30/22
03/01/22
03/31/22


Beretania Pump Station
High Service Pumps
Pumpage
Chlorides - High Service
Pumpage (MGD)
Chlorides (ppm)
25.0
24.0
23.0
22.0
21.0
20.0
19.0
18.0
17.0
16.0
15.0
14.0
13.0
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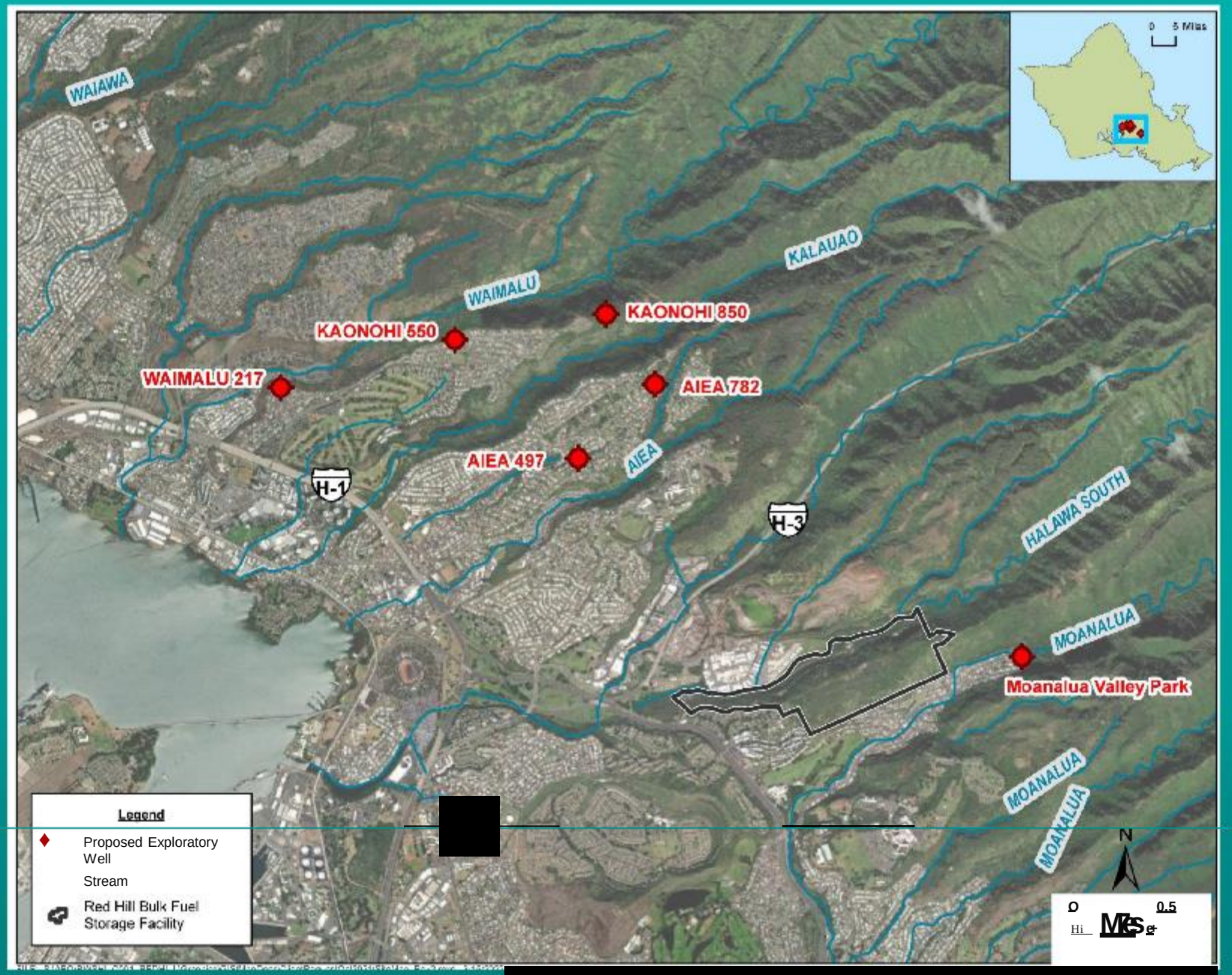
08/01/21
08/31/21
09/30/21
10/31/21
11/30/21
12/30/21
01/30/22
03/01/22
03/31/22

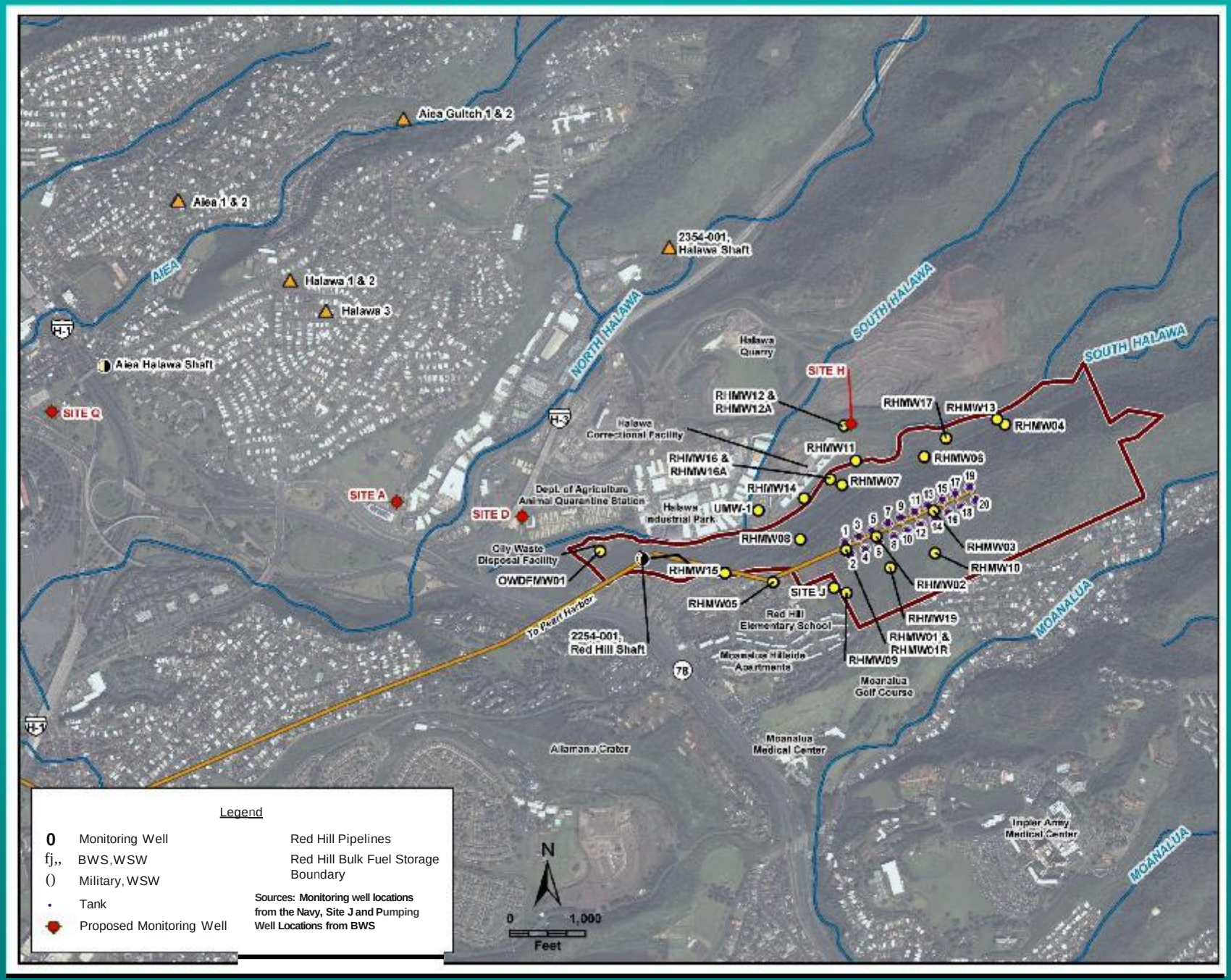
RED HILL PROPOSED PROJECTS IN RESPONSE PROJECTS

- Construct 5-6 exploratory wells in Waimalu & possibly Moanalua to replace 3 pump stations shut down due to Red Hill contamination
- Install 4 sentinel monitoring wells in Halawa Valley
- Interconnect Pearl City 285' water system with Metro 180' and Aiea-Halawa 277' water systems
- Test pump existing Waimalu II, Kaonohi II and Kaamilo pump 2 for yield and chloride levels (salinity)
- Ewa Shaft Well Field
- Kunia Wells IV
- Waikele Gulch Wells
- Waialae Nui Valley Well
- Wailele Well
- Kalaeloa Seawater Desalination DBOM
- Complete repairs of Kalihi Pump Station and Kalauao Wells

Proposed BWS Exploratory Well Locations



BWS & Navy Monitoring Wells – Existing & Proposed



BWS WATER SHORTAGE DEFINITIONS

A water shortage condition exists when water supply is not available to meet existing and/or future water demands due to degradation of water quality or extended disruptions to water system delivery infrastructure.

A low groundwater condition exists when 3 or more index well levels fall below levels designated (caution, alert, critical), and chloride levels rise for 3 consecutive months at sufficient sources to hamper operations. *Sec 3-318 to 322 BWS Rules & Regulations*

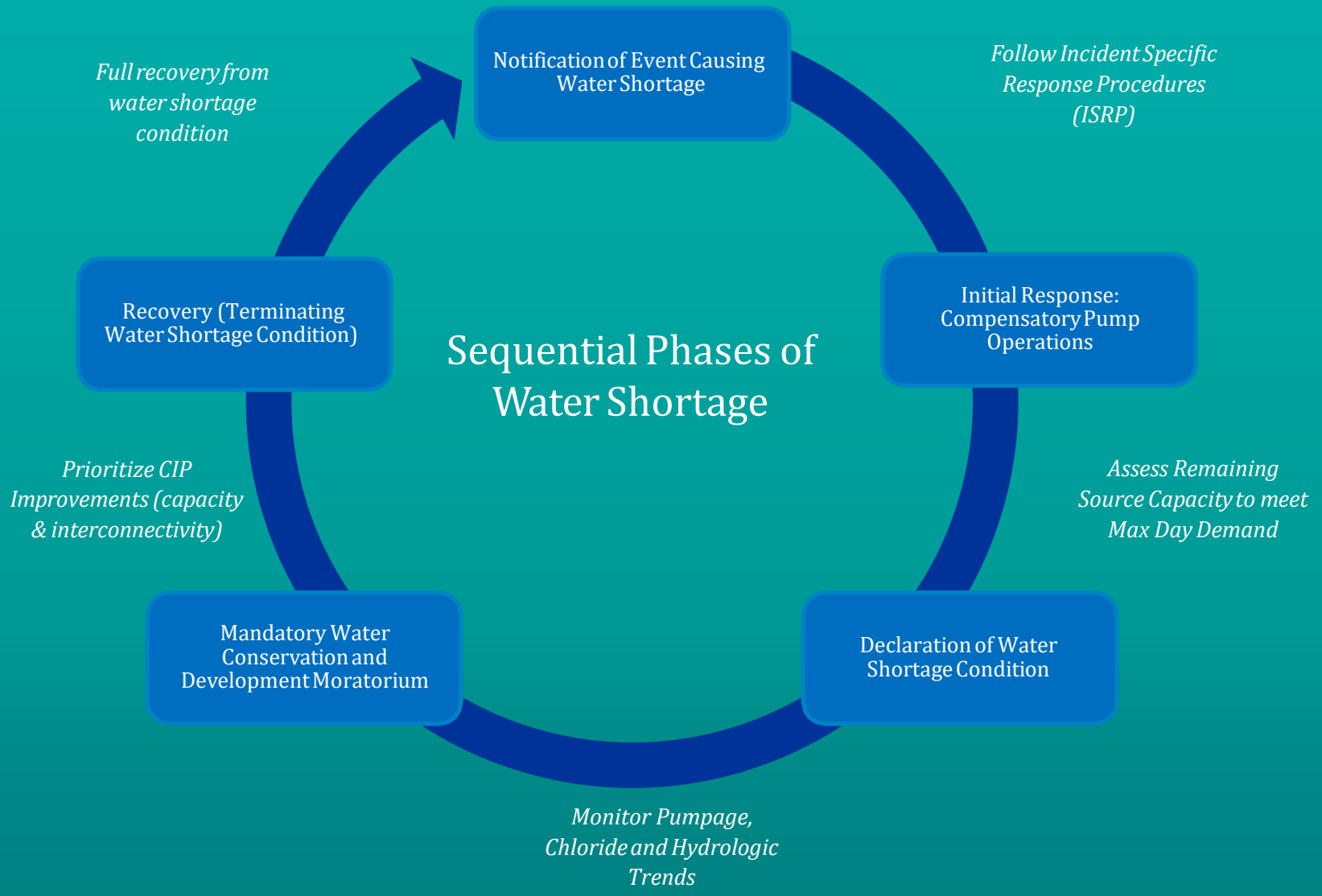
BWS RULES AND REGULATIONS
CHAPTER II: WATER SERVICE TO CONSUMERS

Sec. 2-209: Conservation Measures and Interruption of Water Supply

1. The Department will exercise reasonable diligence to deliver water to the consumer and avoid shortages or interruptions in service, but will not be liable for any interruption, shortage, insufficiency of supply, or any loss or damage occasioned thereby.

2. Whenever, in the Department's opinion, special conservation measures are advisable in order to forestall water shortages, the Department may restrict the use of water by any means or method of control.

WATER SHORTAGE PLAN PROVIDES STRATEGIC AND TACTICAL STEPS TO ASSESS, DECLARE AND CONTROL WATER DEMAND



WATER SHORTAGE CONDITION TRIGGERS (DRAFT)

Water Shortage Condition	Source Capacity Demand Trigger	Chloride Content Trigger*
No Water Shortage	Available pumping units meet max day demand in 16 hours w/ standby not included.	Stable Chloride and Head Level Trends
Alert	Available pumping units meet Q_{95} max day demand in 20 hours, standby pumps not included.*	Chloride content rises between 12 ppm and 16 ppm over three consecutive months at sufficient sources to hamper operations.
Critical	Available pumping units cannot meet Q_{95} max day demand in 22 hours, standby pumps not included*	Chloride content rises over 16 ppm over three consecutive months at sufficient sources to hamper operations.

*Assumes 5-10% Water Conservation Reductions to flatten max day demand peaks

Requirement for Monitoring chloride trends and index well head levels more frequently (from monthly to weekly). Available remaining pumping stations may have to be pumped harder to meet Q95 max day demand and with drought, may increase chloride levels and decrease head levels into Alert or Critical low groundwater levels.

PROGRESSIVELY RESTRICTIVE WATER CONSERVATION RESPONSES BY WATER SHORTAGE CONDITION (DRAFT)

Water Shortage Condition	Source Capacity/Demand Trigger	Conservation Response
No Water Shortage	Available pumping units meet max day demand in 16 hours, standby pumps not included	Voluntary – General Seasonal Messaging
Alert	Available pumping units meet Q_{95} max day demand in 20 hours, standby pumps not included.	Voluntary – Targeted Seasonal Messaging Requesting 10%+ Water Use Reductions
Critical	Available pumping units cannot meet Q_{95} max day demand in 22 hours, standby pumps not included	Mandatory in Progressively Restrictive Order 1) Require Targeted Water Use Reductions 2)Water Allotments, Flow Restrictors, Rate Surcharges 3)Moratorium if improvements extend more than 2 years

SECTION 1-101 AVAILABILITY OF WATER

1. General Requirements

a. Extensions from and connections to the public water system will be approved by the Department where pressure conditions permit; provided, that the water meters are within the service limit except as provided for in Sec. 2-217, Elevation Agreement, and the Department has sufficient pressure and water supply available for domestic use and fire protection and can assume new or additional service without detriment to those presently being served.

SECTION 1-101 AVAILABILITY OF WATER

5.Availability of Water for Proposed Developments. The Department may issue water commitments to proposed developments as follows:

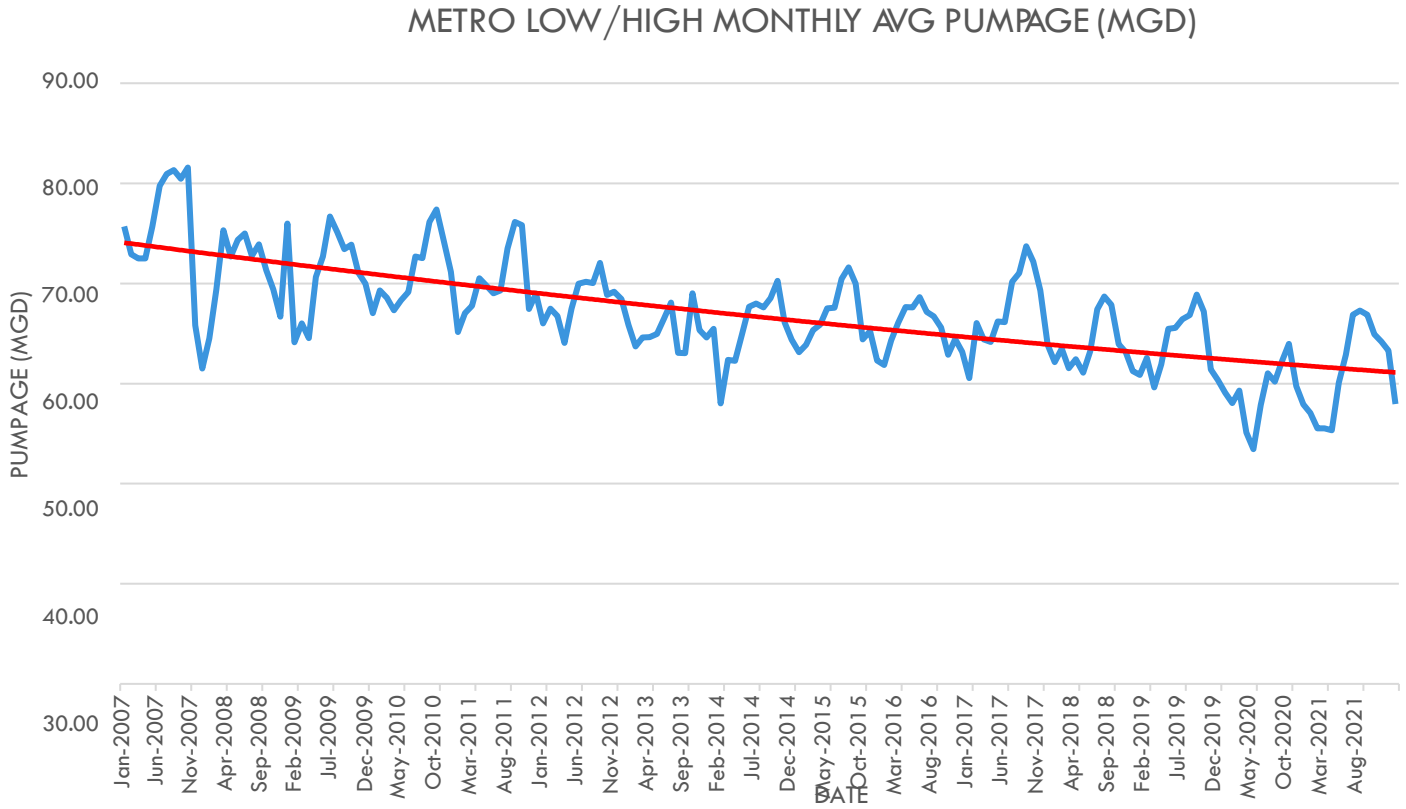
- ***Category 1: Areas with Adequate Water Supply**. The Department may issue advance water commitments to proposed developments in areas where the water system has adequate supplies to assume new or additional services.*
- ***Category 2: Areas with Limited Additional Water Supply**. The Department may restrict the issuance of advance water commitments to proposed developments in areas where the water system has limited additional supplies to assume new or additional services.*
- ***Category 3: Areas with No Additional Water Supply**. The Department shall not issue water commitments to proposed developments in areas where the water system has no additional supplies to assume new or additional services. The only exception shall be the issuance of a single 3/4-inch meter to proposed developments on existing single vacant lots.*

BWS typically operates under Category 2 water availability, where **water commitments are confirmed when residential subdivision construction plans are approved or when building permits are approved for all other developments.** In a Critical Water Shortage Condition with Mandatory Conservation, BWS will operate under Category 3, for water systems with no additional water supply until the water system improvements to increase capacity are completed.

BUILDING MORATORIUM CONTROLS (DRAFT)

In a Critical Water Shortage Condition, if mandatory conservation measures and available pumping units are insufficient to accommodate existing and/or future growth, BWS may implement building development conditions to control the rate of water demand growth and the risk of water shortage. Limitations could include:

- **Limit approvals to a single minimum size water meter for existing vacant lots.**
- **For redeveloped parcels, limit water demands to existing water meter sizes, previous water allocations and/or existing use prior to redevelopment.**
- **Require alternative onsite water supplies such as grey water reuse, stormwater catchments, A/C condensate recovery and high efficiency plumbing fixtures. Refer to the National Blue Ribbon Committee Distributed Nonpotable Water Manual.**
- **If additional water supply is still needed for a development, the developer could consider funding conservation measures in other existing buildings within the same water system where the actual water savings equates to the additional supply needed. (No Net Gain in Water Use)**



- Conservation plays a significant role in a decreasing trend in Metro (Salt Lake to Hawaii Kai) monthly source production from 2007-2021.
- Reduced aquifer withdrawals and reduced max day demand
- The polynomial trendline shows a slight flattening of the rate of decrease, which will plateau in the future as conservation saturation is reached.
- The trendline is expected to then increase with the rate of growth.

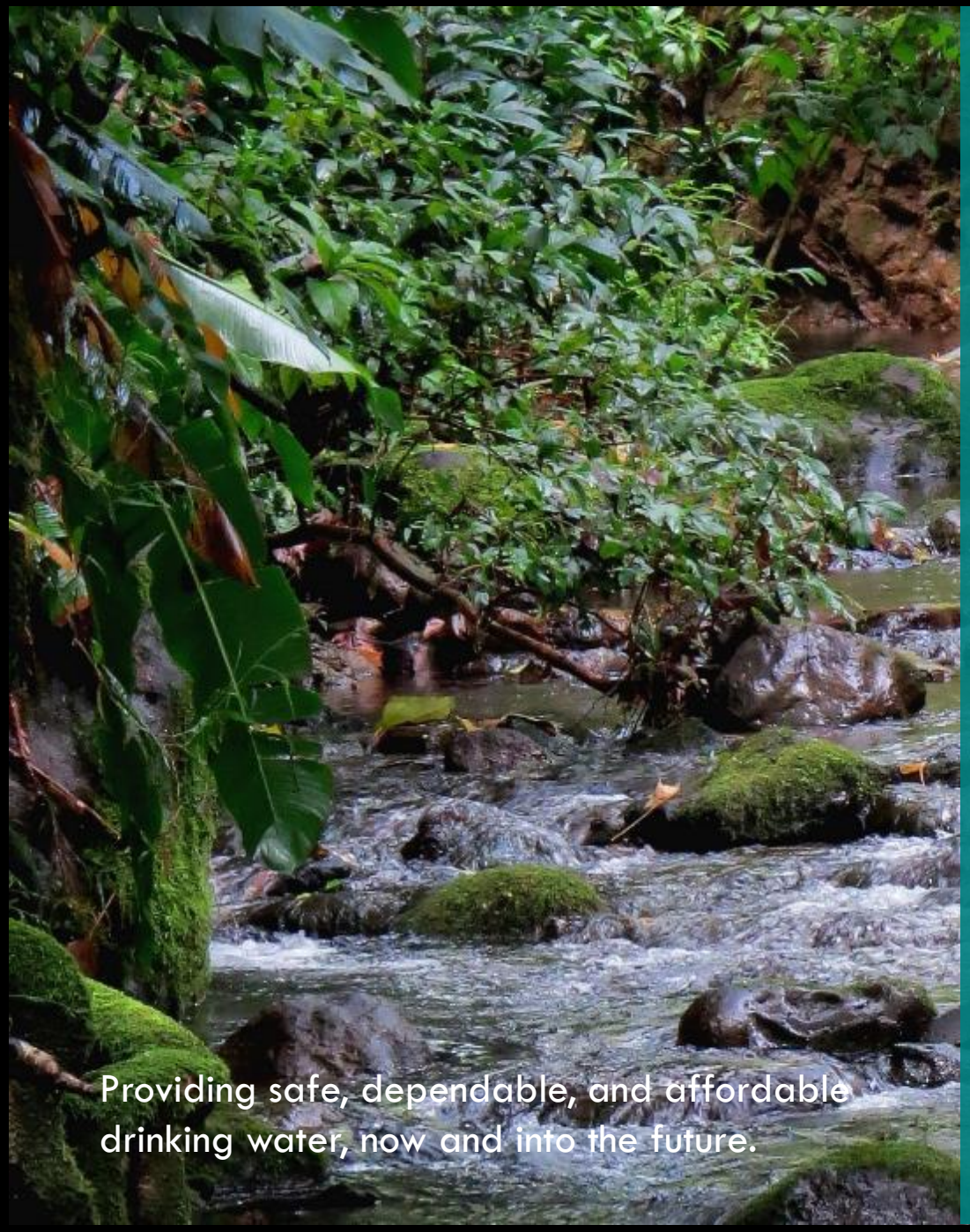
RECOVERY PHASE

- Ensure sufficient source and aquifer recovery post incident by reducing pumping when the next wet seasons reduce water demands.
  - Identify pumping stations that have been pumped harder to meet max day demand and affected by drought, where chloride levels increased and head levels decreased into Alert or Critical low groundwater levels.
  - Continue to monitor chloride trends and index well head levels.
  - Step down water conservation measures accordingly.
  - Continue “Last On – First Off” pump operations until full recovery is achieved.

SUMMARY

- BWS' Halawa Shaft, Aiea Wells and Halawa Wells are shut down in response to Navy announcement of petroleum contamination at Navy Red Hill Shaft and distribution system sample point for Navy Aiea Halawa Shaft. 17.5 mgd of capacity (14.0 mgd for Honolulu and 3.5 mgd for Aiea-Halawa 277' Systems) is offline.
- Continued storage of Red Hill fuel above the aquifer endangers the resource to further contamination and it should be relocated away from being over our drinking water aquifer.
- We appreciate the first step taken Secretary Austin to approve de-fueling the facility and the eventual permanent shutdown of the Red Hill Bulk Fuel Storage Facility (March 7, 2022 memorandum).
- Water conservation is critically important for these water system areas: Metro Honolulu (Halawa to Hawaii Kai), Aiea-Halawa (Hekaha St. to Iwaena St.).
- Water demand can't exceed the supply from the remaining BWS wells, or there will be water service disruptions.

QUESTIONS / DISCUSSION

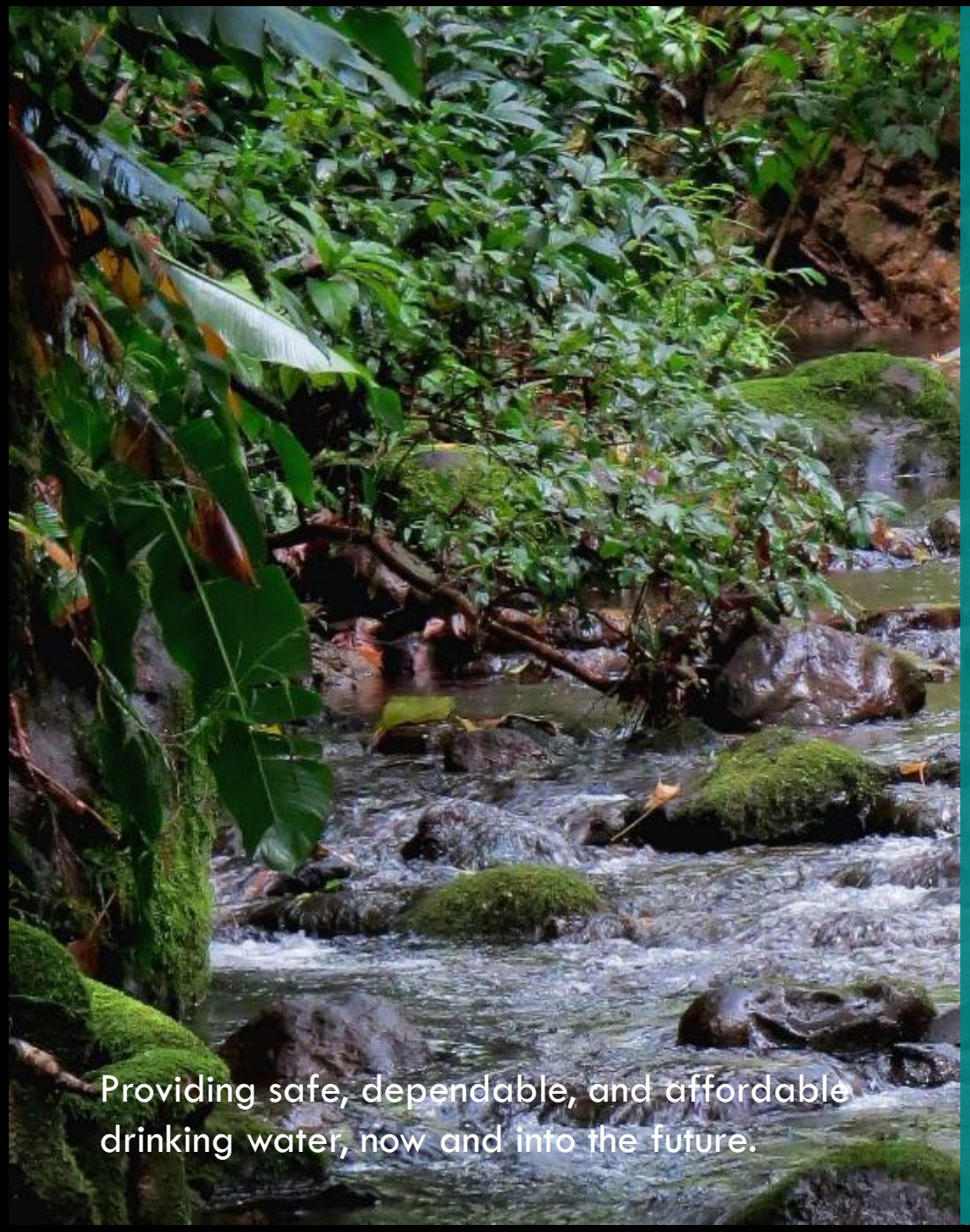


Providing safe, dependable, and affordable drinking water, now and into the future.

Mahalo!

STAKEHOLDER ADVISORY GROUP MEETINGS FOR 2022

- Thursday, July 21, 2022
- Thursday, October 20, 2022



Providing safe, dependable, and affordable drinking water, now and into the future.

Mahalo!

BOARD OF WATER SUPPLY

Stakeholder Advisory Group
Meeting 42
April 21, 2022

WATER CONSERVATION IS CRITICALLY IMPORTANT!

TIP #1 - WATER LAWNS JUST 1-2 TIMES A WEEK

TIP #2 - DON'T WATER LAWNS BETWEEN 9 AM AND 5 PM

TIP #3 - CHECK FOR PLUMBING LEAKS

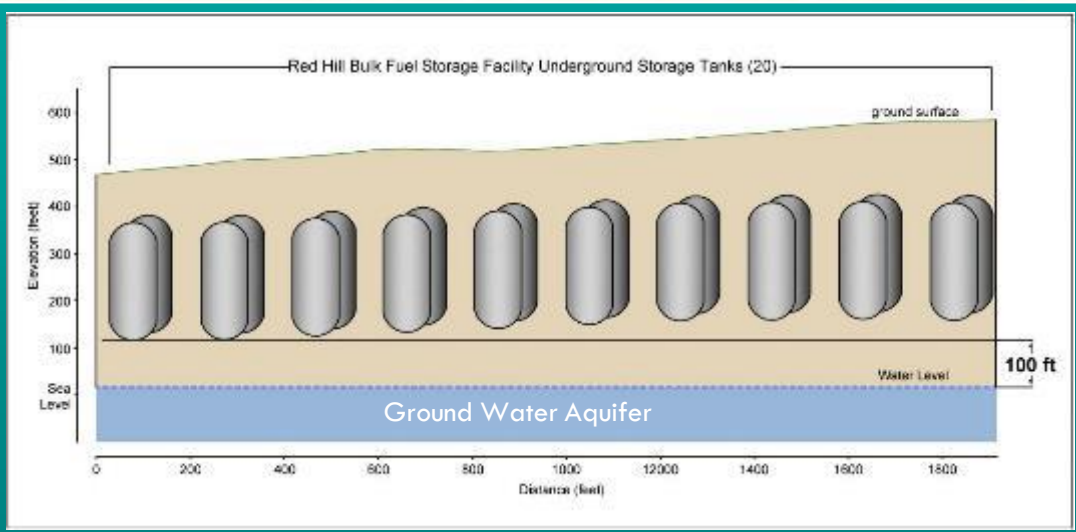
TIP #4 - INSTALL WATER-EFFICIENT FIXTURES

TIP #5 - TAKE SHORTER SHOWERS

TIP #6 - PUT A NOZZLE ON YOUR GARDEN HOSE

TIP #7 - DON'T LET THE FAUCET RUN AND RUN

www.boardofwatersupply.com

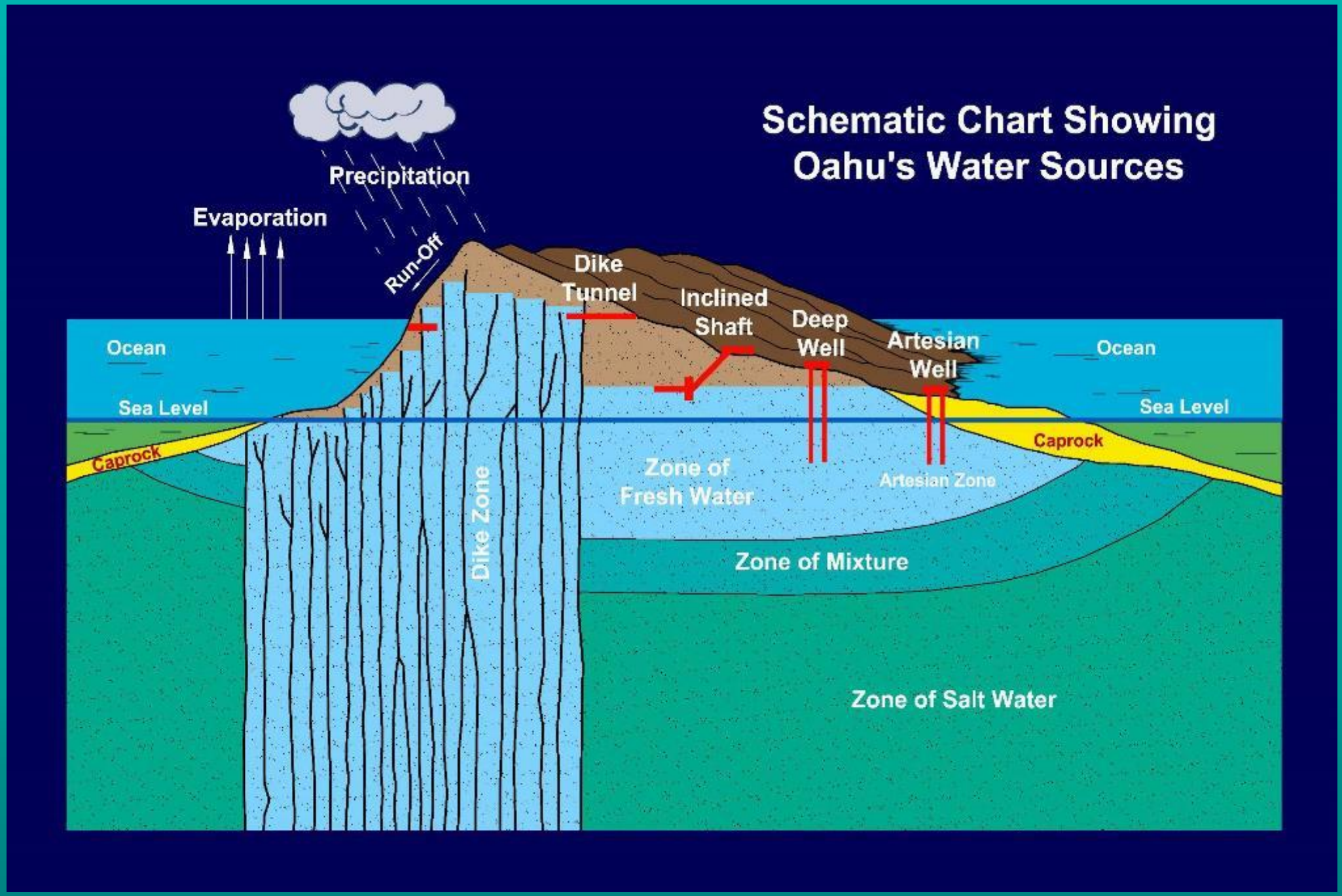


- Twenty tanks sitting on end connected by an upper and lower access tunnel.
- Constructed from 1940 to 1943.
- Each tank is 250 feet high and 100 feet in diameter.
- 12.5 million gallon capacity per tank.
- Concrete with ¼ inch steel liner. (Lower dome base is ½ inch)
- Facility declassified in 1995.
- Navy's Red Hill Shaft approx. 2,500 feet down gradient from the facility.
- **Tanks located 100 feet above the groundwater table.**

OAHU'S GROUNDWATER BODIES AND CAPROCK

- Oahu is 598 square miles
- About 461 square miles of Oahu (77% of the island) are inland of the caprock
- About 137 square miles (23% of the island) are covered by caprock

Ref. Izuka, Engott, Rotzoll, Bassiouni, Johnson, Miller and Mair, Volcanic aquifers of Hawai'i—Hydrogeology, water budgets, and conceptual models, Scientific Investigations Report 2015-5164, United States Geological Survey, 2015


Schematic Chart Showing
Oahu's Water Sources
Precipitation
Evaporation
Run-Off
Dike
Tunnel
Inclined
Shaft
Deep
Well
Artesian
Well
Ocean
Ocean
Sea Level
Sea Level
Caprock
Caprock
Dike Zone
Zone of
Fresh Water
Artesian Zone
Zone of Mixture
Zone of Salt Water

RECENT RED HILL RELEASES

- 72 releases reported in Red Hill AOC studies (180,000 to 200,000 gallons of fuel)
- January 2014 – 27,000 gallons from Tank 5
- March 2020 – Fuel release from Kilo Pier pipelines at Red Hill
- May 2021 – Pressure surge releasing approximately 1,600 gallons of jet fuel (JP-5) from supply piping in the lower access tunnel (later revised to 19,000 gallons)
- September 2021 – Navy shut down Red Hill facility for 9 days without informing the DOH.
- November 2021 – 14,000-gallon fuel water mixture release in lower access tunnel quarter mile downgradient from Red Hill Shaft.