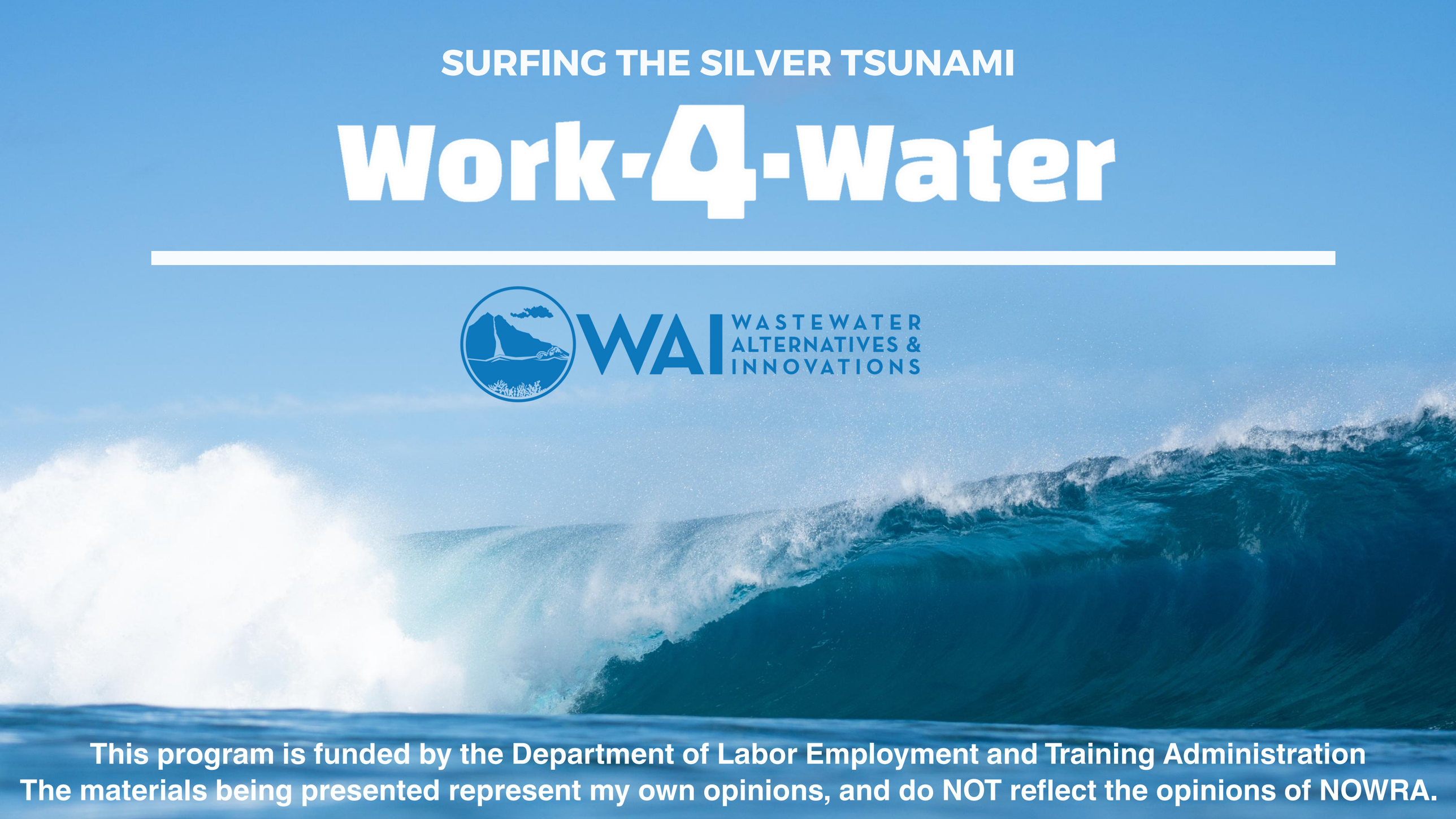
SURFING THE SILVER TSUNAMI

Work-4-Water

WAI WASTEWATER ALTERNATIVES & INNOVATIONS



This program is funded by the Department of Labor Employment and Training Administration

The materials being presented represent my own opinions, and do NOT reflect the opinions of NOWRA.

Gabby Saba Zimmer

gabby@waicleanwater.org

Program Manager,

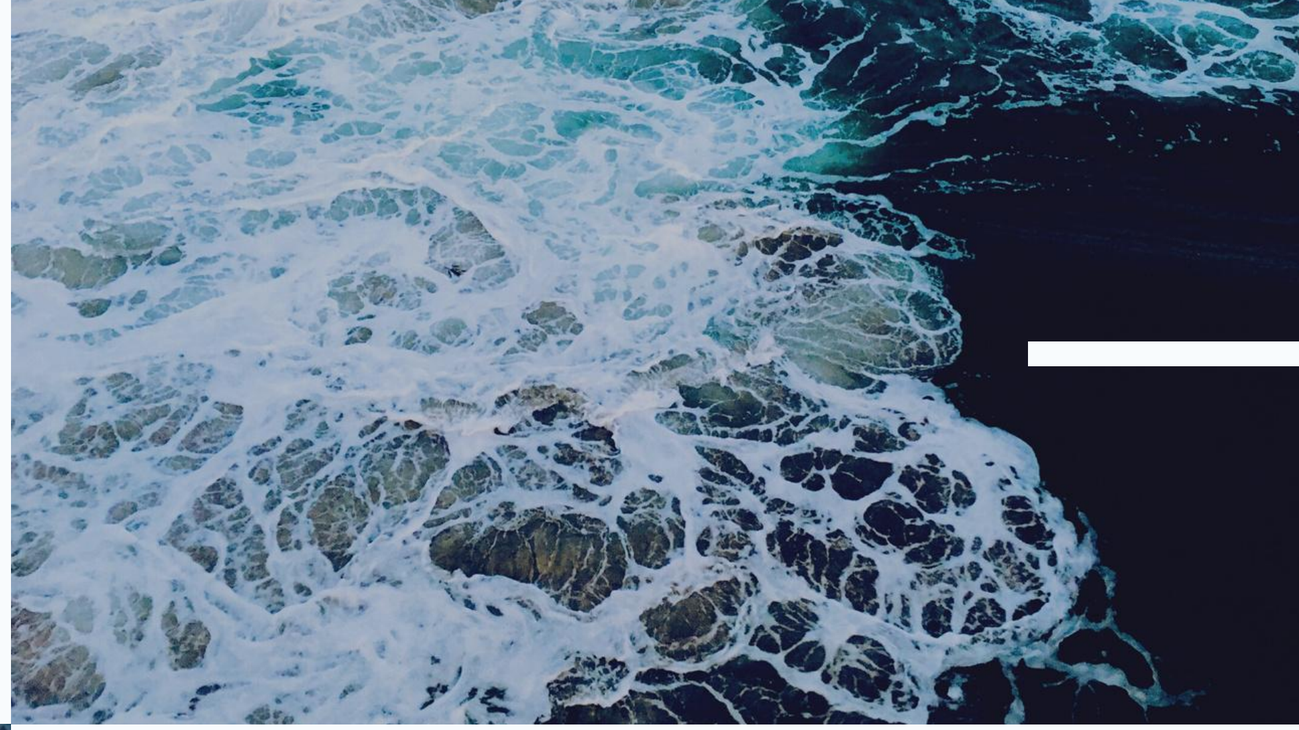
Curriculum Developer & Instructor

BA, MT University of Virginia

Lanikai, O‘ahu, Hawai‘i

WAI‘s Mission

Protect water quality, reduce sewage pollution, restore healthy watersheds by providing affordable, eco-friendly solutions to wastewater management



WAI‘s Vision

WAI helps Hawai‘i homeowners and communities to upgrade cesspools and failing septic systems to new systems

INDIGENOUS KNOWLEDGE

Ahupua‘a Systems

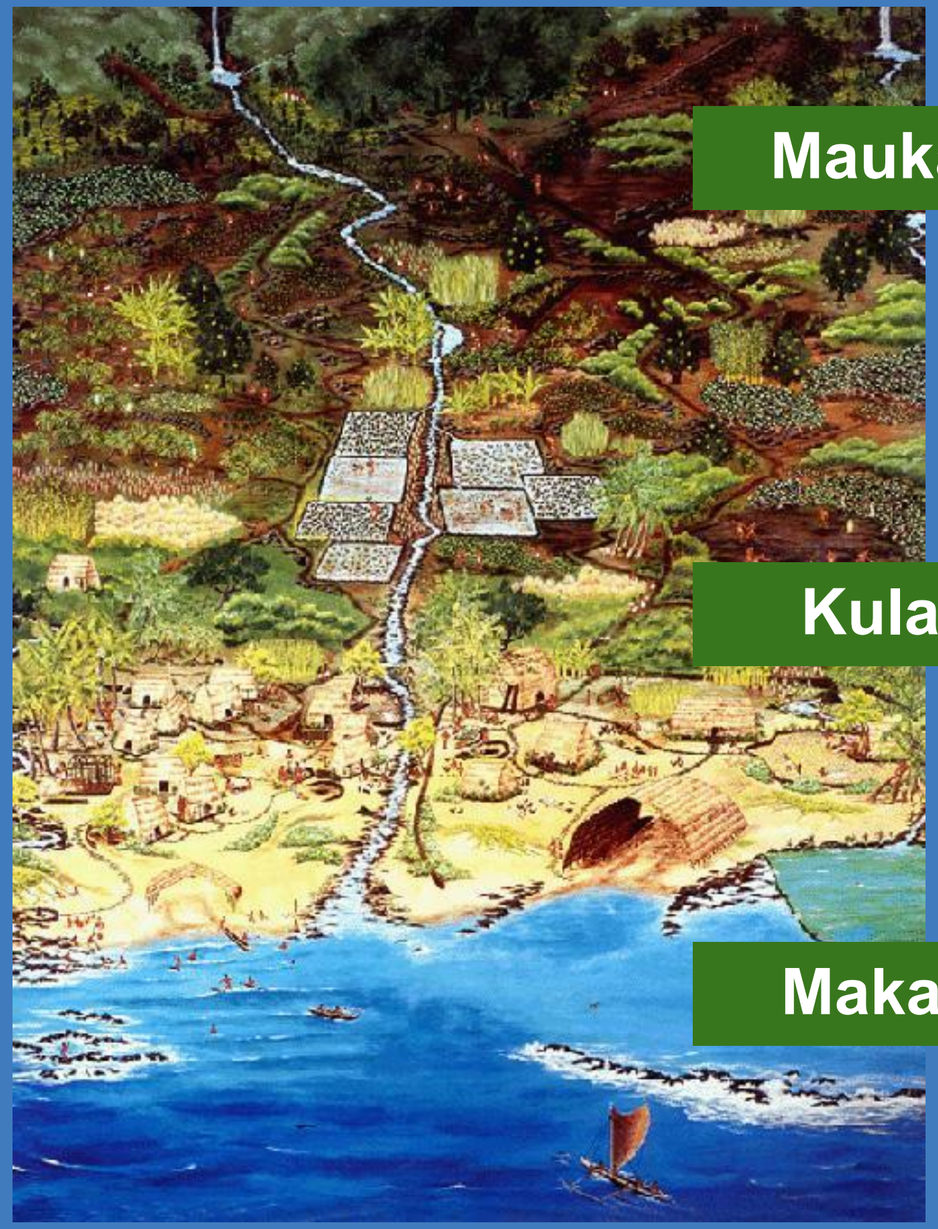
- Interdependence mauka to makai
  - water quality & wastewater management
  - need for balanced ecosystem

- Harmonious **island ecosystems**
  - unique geology, sensitive groundwater tables

Native Hawaiian ‘Ike

- Modern water & wastewater management can benefit from **indigenous knowledge**
  - Integrated watershed management
  - Community engagement
  - Sustainable practices

- Crucial for addressing contemporary challenges like climate change and resource depletion



83,000+ CESSPOOL PROBLEM

Act 125- 2050 deadline:

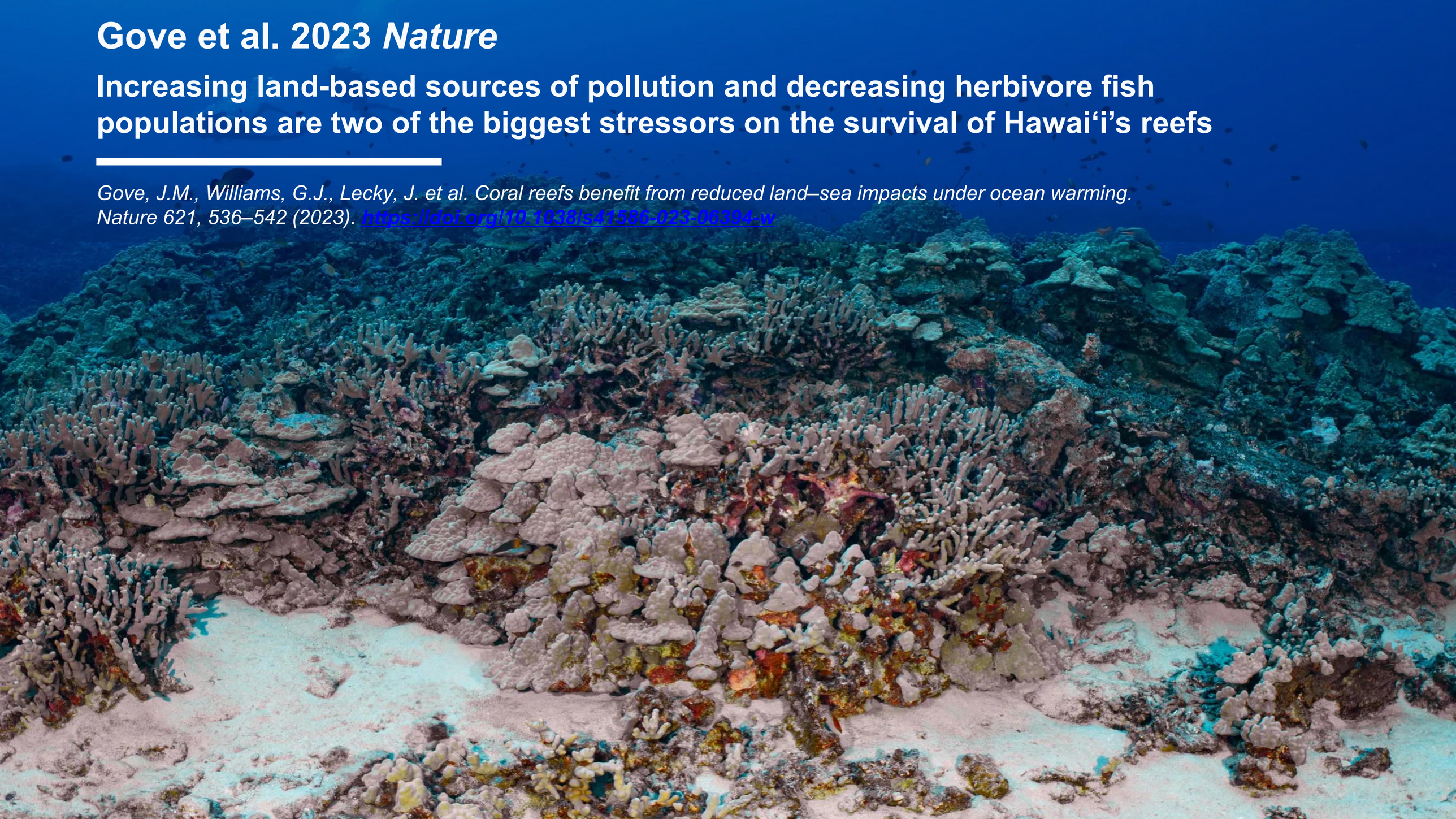
- **Priority 1 zones (13,821 cesspools) converted by 2030**
- **Priority 2 zones (12,367 cesspools) converted by 2035**
- **Priority 3 zones (55,237 cesspools) converted by 2050**

Priority 1: Greatest potential to impact human and environmental health. Directly adjacent to sensitive natural resources (eg. coral reefs, drinking water aquifers).

Gove et al. 2023 *Nature*

Increasing land-based sources of pollution and decreasing herbivore fish populations are two of the biggest stressors on the survival of Hawai‘i’s reefs

Gove, J.M., Williams, G.J., Lecky, J. et al. Coral reefs benefit from reduced land–sea impacts under ocean warming. Nature 621, 536–542 (2023). https://doi.org/10.1038/s41586-023-06394-w



WASTEWATER WORKFORCE SHORTAGE

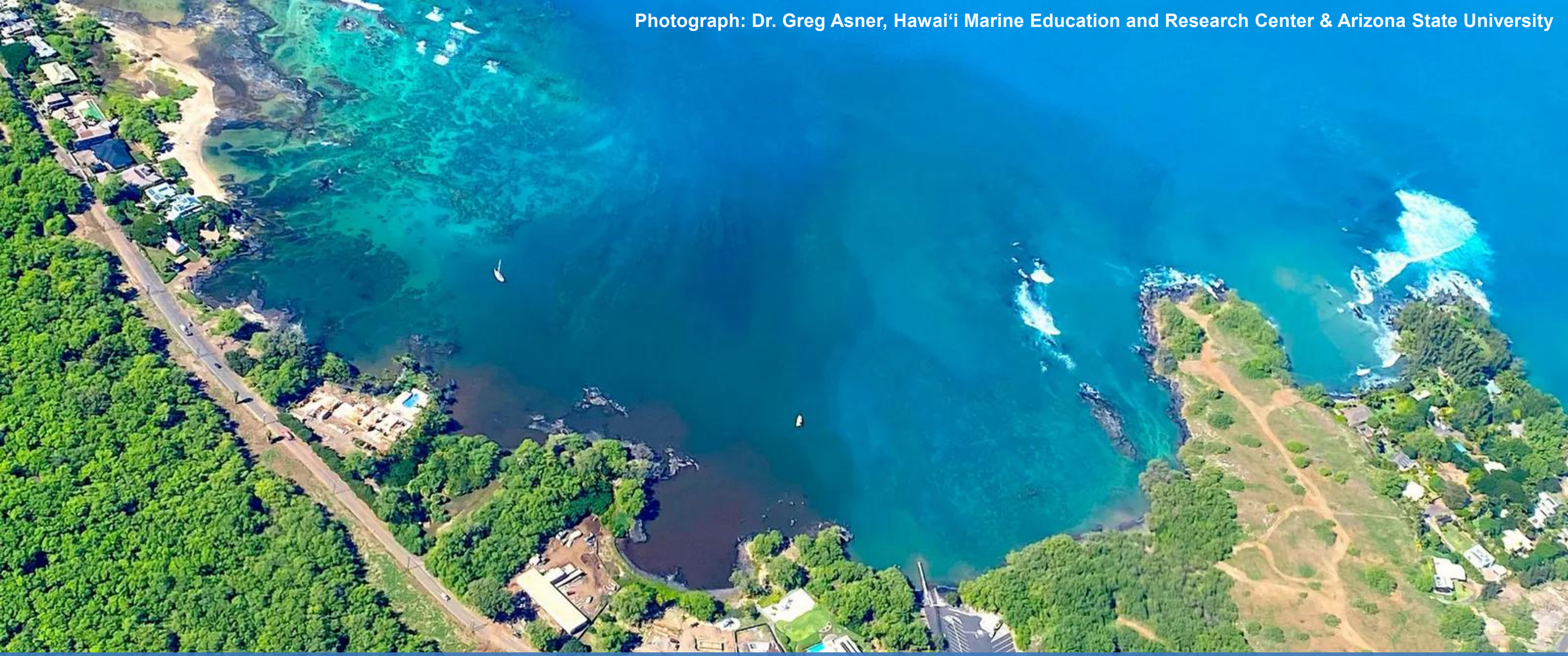
HIGH DEMAND / LOW SUPPLY OF WASTEWATER EMPLOYEES ACROSS US & HAWAIʻI

Silver Tsunami

- Rapidly losing the experts who have operated & maintained our systems for decades
- ⅓ of US water sector's current workforce becoming eligible for retirement in the next 10 years
- Over the next ten years estimated 30%-50% of water industry positions will be left vacant

Hawaiʻi Vacancies Needs

- 40+ operator vacancies on Oʻahu, multiple wastewater related vacancies across the state
- Workers with potential to enter the sector often lack decentralized knowledge and skills
- Engaging next generation requires early outreach to promote awareness of promising career opportunities



Photograph: Dr. Greg Asner, Hawai‘i Marine Education and Research Center & Arizona State University

CONVERSION RATES

- Act 125 mandates 83,000 converted by 2050
- Increase from < 300 conversions per year to 3,000 to reach mandate goal
- Costs $30,000-$50,000 per home = estimated ~$3-4 billion total cost

WAI’S SOLUTION

Work-4-Water

KEY OBJECTIVES

1. Enhance public awareness
2. Increase wastewater participation
3. Improve wastewater knowledge
4. Strengthen wastewater career pathways

KEY COLLABORATORS & FUNDERS

This program is funded by the Department of Labor Employment and Training Administration

TIMELINE

FEB. 2023

Plan & Curriculum
Design Phase

APRIL 2023

Advisory Council & Curriculum
Subcommittee Meetings

SEPT. 2023

Cohort 1 starts
Maui & Hawai‘i Island

NOV. 2023

Cohort 1
Career Expo
UHMC & Hawai‘i CC

JAN. 2024

Cohort 2 starts
Maui & Hawai‘i Island

FEB. 2024

Cohort 2
Career Expo
UHMC & Hawai‘i CC

SEPT. 2024

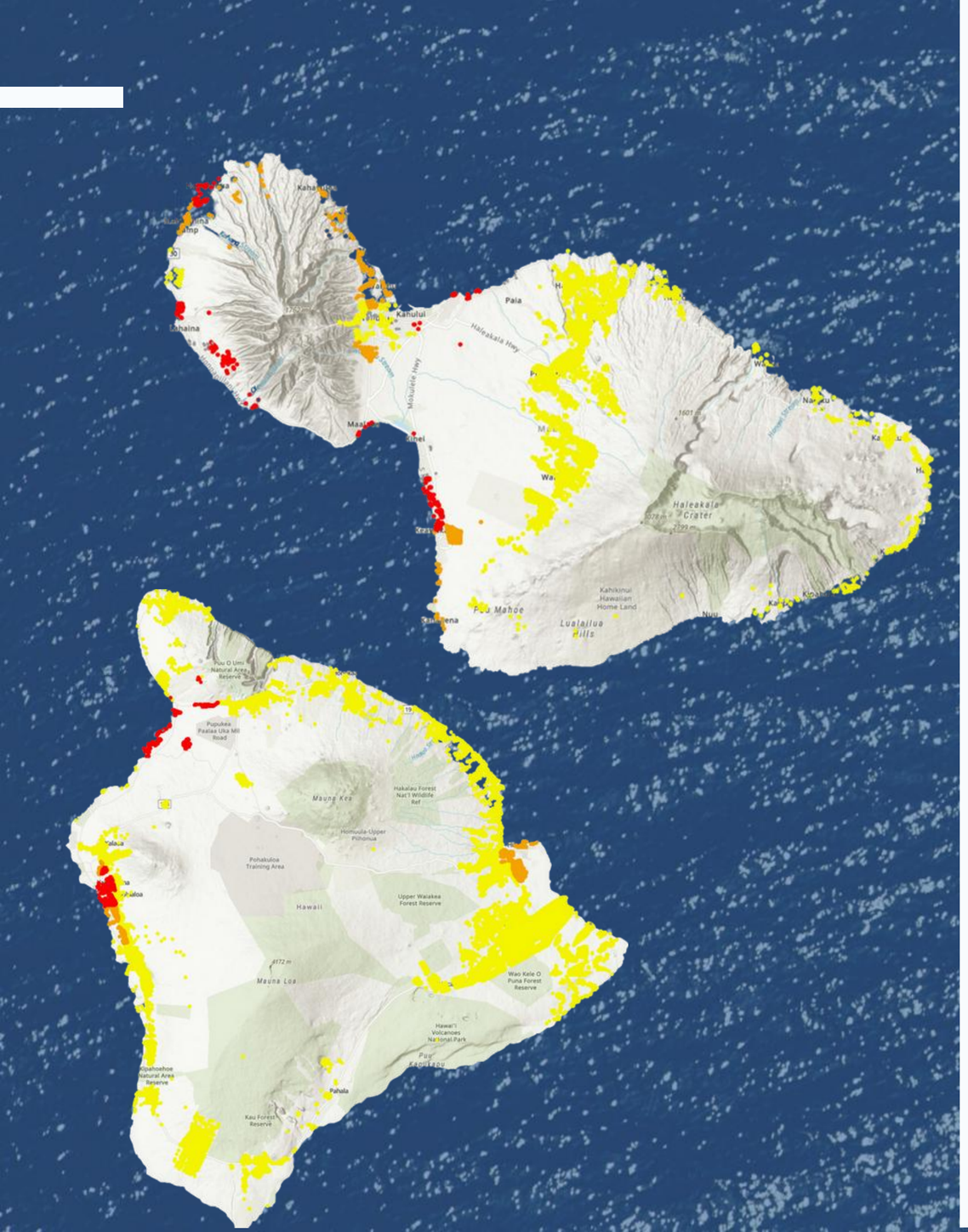
Cohort 3 starts
Maui & Hawai‘i Island

JAN. 2025

Cohort 1-3
Career Expo
UHMC & Hawai‘i CC

FEB. 2025

End of Grant



PROGRAM OVERVIEW

- Maui & Hawai‘i Island
- Introduction to Hawai‘i Wastewater Field
- Decentralized Wastewater Specialist Certificate
- Hybrid: In-person & online
- Career services
- Networking/ Career Expo Events
- 2024 film cesspool conversion processes

UNIQUE PROGRAM BENEFITS

- **Decentralized Focus**
  Thousands of cesspools can’t connect to sewer (rural, lava rock)
- **Graduate Stipend**
  $500 to be used for accessibility, additional training & education
- **Community Career Stability**
  Livable wage, competitive benefits, not tourism dependent
- **Environmental Impact**
  Protect Hawai‘i limited natural resources, boost conservation efforts

01

ENHANCE PUBLIC AWARENESS

Promote awareness of pressing environmental and public health concerns, government regulations, alternative wastewater systems, and job opportunities in the wastewater field to the community.

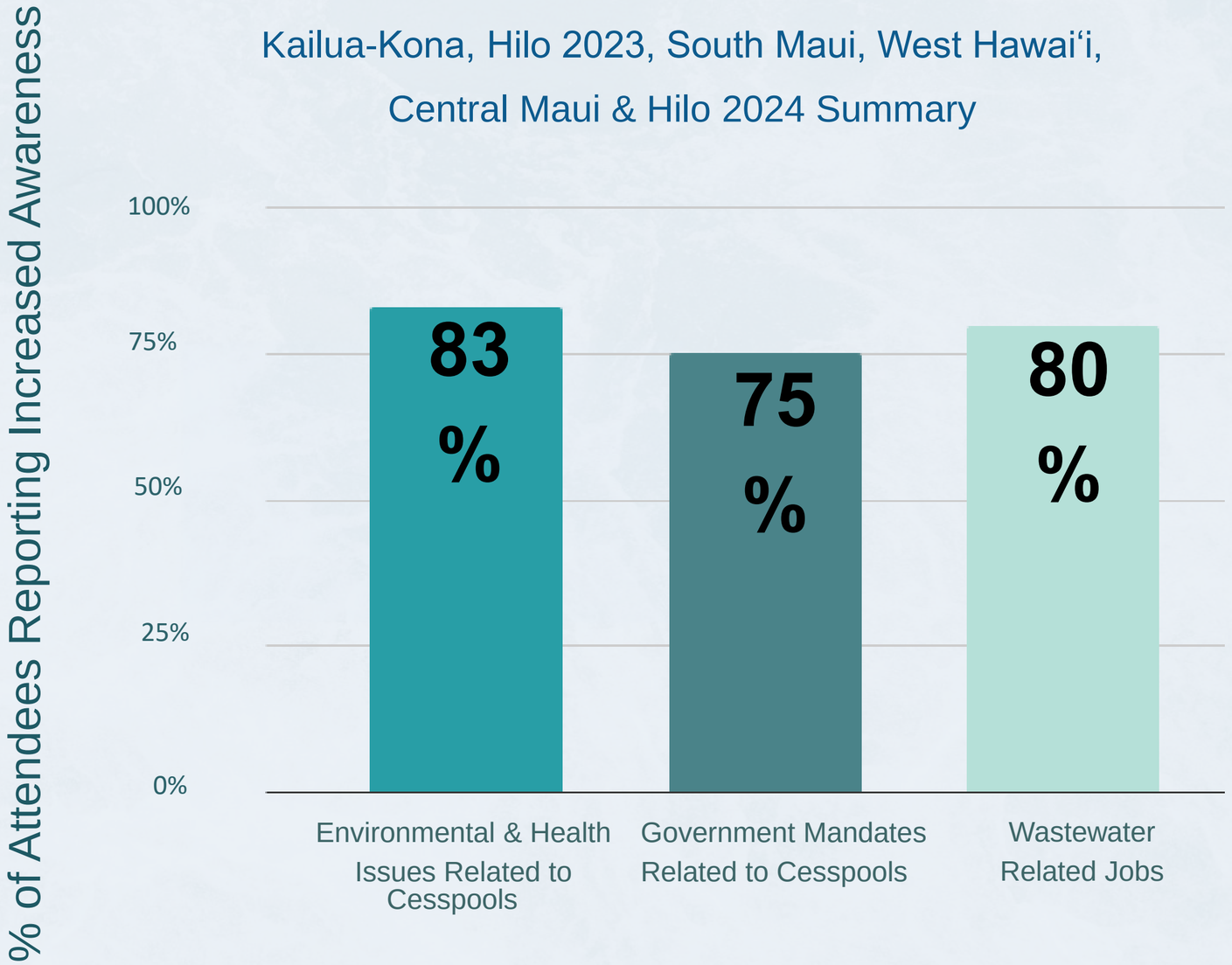
COMMUNITY OUTREACH

engaged over 2,7000 community members

TOWN HALLS

Survey Results

from **269 participants** across **6 Town Halls** highlight the significant impact of these community events in raising public awareness



02

INCREASE WASTEWATER PARTICIPATION

Increase participation of underrepresented populations in wastewater-related professions by providing training and pathways that lead to employment or continued education.

EXPECTED OUTCOMES

100 participants

recruited from Maui and Hawai'i Island

WAI WASTEWATER ALTERNATIVES & INNOVATIONS

Certificate of Completion

WAI HEREBY RECOGNIZES

Chris McKay

FOR SUCCESSFULLY COMPLETING

Work-4-Water: Introduction to the Hawai'i Wastewater Field

To earn this credential, learners must earn a 70% mark or higher on all summative module quizzes and final project within the 8-week program. This represents the learning and mastery of concepts covered in the following modules: Wastewater Management, Hawai'i Cesspool Problems and Policies, Design, Installation, Operations & Maintenance of Onsite Treatment and Disposal Systems, and Wastewater Industry Career Preparedness. WAI's Work-4-Water program is funded by the Department Of Labor Employment and Training Administration.

Completion Date: November 15, 2023

Work-4-Water

70 participants complete the program and receive a stipend

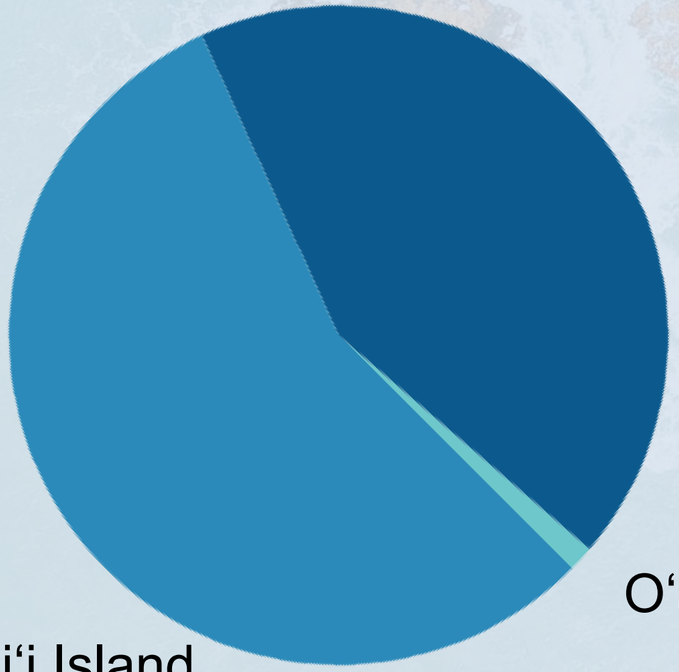
Establish Advisory Council and Curriculum Subcommittee

EXCEEDED EXPECTED OUTCOMES

	Cohort 1 Sep-Nov 2023	**Cohort 2** Jan-Mar 2024	**Cohort 3** Sep-Nov 2024	**Totals**
Applicants	58	84	52	**182**
Graduates	31	48	23 expected	**~102**

DEMOGRAPHICS

Graduate Locations

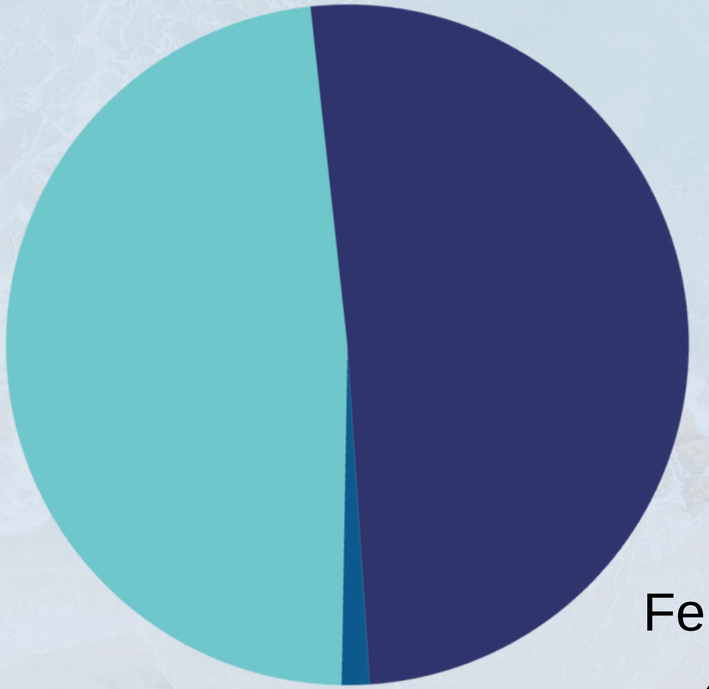


Maui
42

O‘ahu
3

Hawai‘i Island
57

Gender



Male
49

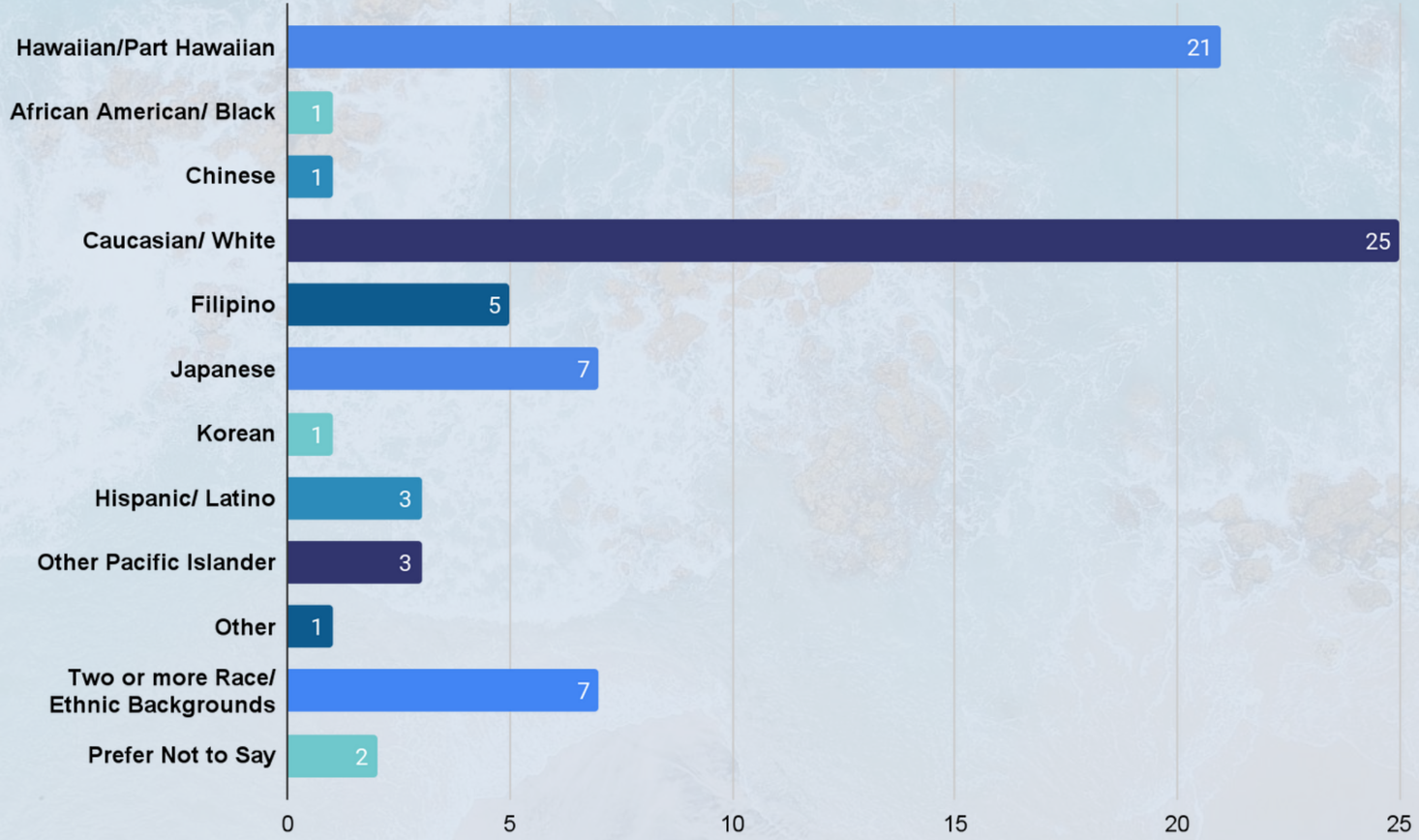
Female
48

Nonbinary
1

APPLICANT DATA

Cohort 1 & 2

Collaboration with the Council for Native Hawaiian Advancement and increased local recruitment efforts helped us reach underrepresented Native Hawaiian populations



W4W STUDENT TESTIMONY

“The webinar introducing and explaining the topic in great detail in combination with the zoom class to clarify and answer any questions that came up during the webinar was the most helpful to me.”

“I really enjoyed the format and pace of the class. I work full time and have various other obligations and the class made it possible to do classwork and learning on my own schedule.”

“If you’re not too sure about taking this course, I say just do it. It’s a great opportunity to expand your knowledge and connect to people with similar interests. The workload is manageable and the assignments are catered toward your interests.”

“This is a well-rounded course for anyone to take, regardless of skill level or knowledge. I highly recommend any environmental professional and even home-owners to take.”

03

IMPROVE WASTEWATER KNOWLEDGE

Improve wastewater knowledge by strengthening participants’ skill-set and adding an industry-recognized credential to the participant's resumes.

CURRICULUM TOPICS

Topic 1

Wastewater Pollution and Impacts

Topic 2

Wastewater Science

Topic 3

Hawai‘i Cesspool Problems and Policies

Topic 4

Wastewater Treatment Technology

Topic 5

Wastewater Disposal Technology and Innovative Alternatives

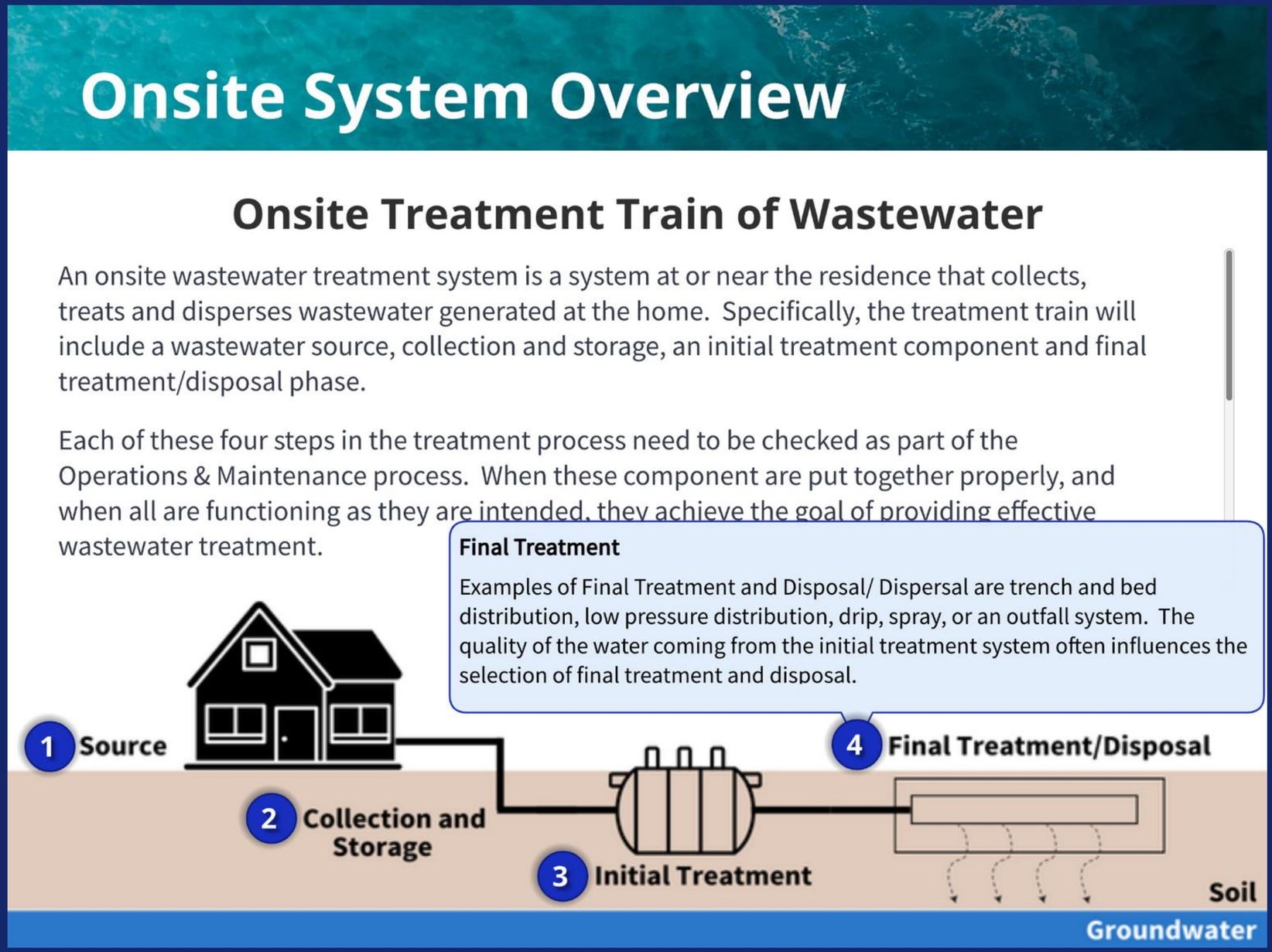
Topic 6

Wastewater Industry Career Preparedness

WEBINARS

Designed in response to the needs of participants:

- Self-paced
- Interactive models
- Multimodal learning
- Comprehension quizzes
- Webinars due before each weekly collaborative virtual Zoom discussion class



Topic 2

NSF Standards

NSF Standards Overview

The National Sanitation Foundation (NSF) sets wastewater effluent quality standards with two primary standards: NSF 40 and NSF 245. These standards provide guidance on achieving proper wastewater treatment based on specific criteria and testing protocols set by the NSF. As we review different systems, these standards will be used to describe the effluent quality.

NSF 40	NSF 245
• Requires secondary-level wastewater treatment, which cannot be achieved in a septic tank alone. • Includes criteria for typical wastewater pollutant parameters such as BOD5, TSS, and pH. • Can be achieved by using an Nitrifying Aerobic Treatment Unit (ATU-N) or combining a septic tank with a secondary treatment system. We will cover these systems in the next few weeks.	• Includes the criteria of NSF 40 and adds the requirement of at least 50% removal of total nitrogen (N). • Can be achieved through a Denitrifying ATU (ATU-N/DN) or a combination of septic tanks and advanced secondary treatment systems. • The rigorous standard helps wastewater treatment providers meet a growing demand for nutrient reduction in coastal areas and sensitive environments.

Next

Topic 2

NSF Standards

NSF 40 and NSF 245

The Department of Health requires NSF245 and/or NSF40 certification in order to install advanced treatment technologies in Hawai‘i under HAR 11-62. The table below shows the characteristics of influent wastewater (wastewater directly from the source with no treatment), and the standard levels of NSF 40 and NSF 245.

Parameter	Influent Wastewater	NSF 40	NSF 245
BOD	100 - 300 mg/L	25 mg/L	25 mg/L
TSS	100 - 360 mg/L	30 mg/L	30 mg/L
pH	6.5 - 9.0	6.0 - 9.0	6.0 - 9.0
Total Nitrogen	35 – 70 mg/L	N/A	50% Reduction

Next

Real World Application

Site Conditions Description: The installation location is on a site where there is a groundwater table of 4 feet. The percolation rate is 99 min/in and the ground slope is 7%. The site is 75 feet from coastal waters. * 1 point

Site Conditions for Different Onsite Disposal Technologies

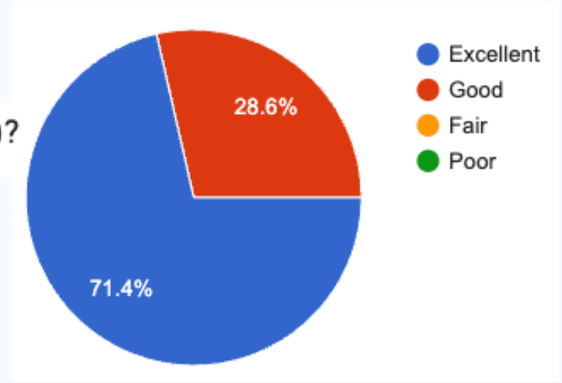
Technology	Technology Status	Proximity to Groundwater	Soil Perc Rate	Maximum Ground Slope	Proximity to Coastal Waters
Absorption Bed	Approved	> 3 feet	< 60 min/in	<12 %	> 50 ft away
Absorption Trench	Approved	> 3 feet	< 60 min/in	8 % < slope < 12 %	> 50 ft away
Seepage Pit	Approved	> 3 feet	< 60 min/in	≥ 12 % and absorption system not feasible	> 50 ft away
Evapotranspiration	Approval Required	< or ≥ 3 feet	> 60 min/in	< 12 %	> 50 ft away
Constructed Wetland	Approval Required	> 3 feet	> 60 min/in	< 12 %	> 50 ft away
Drip Irrigation	Approval Required	> 3 feet	> 60 min/in	Bed if < 8 % Trench if 8 % < slope < 12 %	> 50 ft away

- [ ] Absorption Bed
- [ ] Absorption Trench
- [ ] Seepage Pit
- [ ] Evapotranspiration
- [ ] Constructed Wetland
- [ ] Drip Irrigation (Bed)
- [ ] Drip Irrigation (Trench)

Advisory Council Evaluation

Overall Quality

How would you rate the overall quality of the webinar(s)?



Engaging & Interactive

Testing knowledge slides and **interactive model** effectively engage and reinforce learning

Accesible & Organized

Content is **user-friendly**, easy-to-follow materials (videos, pictures, diagrams, media) supports deeper understanding

Informative & Practical

Clear and simple explanations make septic system concepts understandable for non-technical audiences

Hawai‘i Specific

Strong connection to Hawai‘i's unique challenges ensures curriculum is locally **relevant** and **applicable**

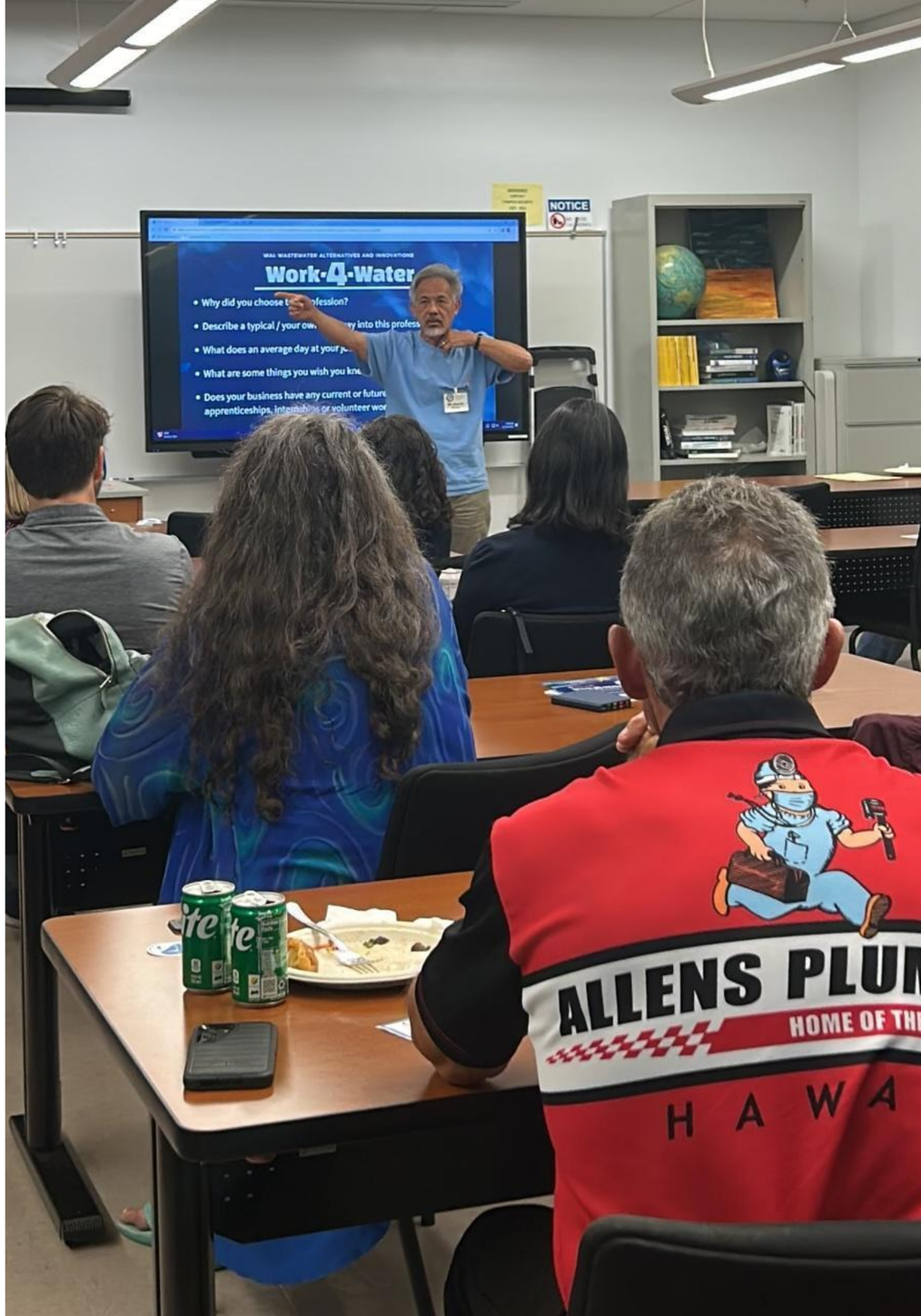
Depth of Knowledge

Abundant **additional resources** and **links** provide opportunities to explore topics or interests in greater depth

04

STRENGTHEN WASTEWATER CAREER PATHWAYS

Support workers and new entrants to gain skills and transition from unemployment to (re)employment quickly or continue in more advanced certificate, credential program and post-apprenticeship career pathways.



Career Capstone Project

Individualized Career Pathways

KEY OBJECTIVES

- Utilize class workshop time, customized 1:1 feedback and career services
- Choose a career field within the wastewater industry to learn more about and create personalized pathway into that preferred field
  - Explore future education, internships, apprenticeships, on the job training and immediate employment opportunities
- Create a resume tailored for chosen career path
- Develop an actionable 5-year plan with measurable milestones and detailed timeline

COUNCIL for NATIVE HAWAIIAN ADVANCEMENT

HAWAIIAN TRADES ACADEMY

The Hawaiian Trades Academy (HTA) provides community-based workforce development programs to enhance the economic welfare in Hawai'i households.

Since its inception in 2019, HTA has delivered 18 academies spanning Kaua'i, Maui, Moloka'i, and O'ahu; and, serviced over 483 students in:

- Carpentry
- Craftsmanship
- CDL-A Licensing
- Fire Exam Prep
- Police Exam Prep
- Solar Energy

HTA is exploring more programs to deliver across the pae 'āina. Accelerator classes take place over a 3-14 week span. Participants learn and develop trade skills, gain mentoring, and leave the program with various certifications, like CDL license, OSHA-10, First Aid/CPR and AED. All academies include trades-training by an industry professional, Native Hawaiian cultural enrichment, financial empowerment, and job readiness.

hawaiiancouncil.org/trades

Council for Native Hawaiian Advancement

- **Collaboration**
  - Outreach & recruitment support
  - Employer network
  - Career services and workshops

- **Kākoʻo Maui**
  - Lahaina survivor relief & aid services
  - Lahaina rebuild project employment

- **Hawaiian Trades Academy**
  - More training and education: forklift, heavy equipment, CDL-A licensing, Hazmat endorsement, carpentry certifications

CALL TO ACTION

EXPAND WORKFORCE DEVELOPMENT

Collective action & investment towards building a robust and sustainable wastewater workforce ecosystem in Hawai‘i

Program Expansion Goals

Increase Public Awareness

Expand W4W Statewide

On-the-Job Training

Online Library

Sustainable Wastewater Workforce Needs

EXPAND WORK-4-WATER ACROSS HAWAIʻI	CREATE APPRENTICESHIPS OPPORTUNITIES	STAKEHOLDER PARTICIPATION	INVESTMENT IN SUPPLIES AND STIPENDS
Recruit and train participants across all islands. Increase K-12 outreach & education.	Engage and invest in employers to create on the job training and apprenticeships.	Advisory Council & Curriculum/ Recruitment/ Apprenticeship Subcommittees	Funds needed to support demand for stipends and supplies beyond existing scope

Advisory Council Engagement

How can you continue to support WAI's Work-4-Water Program?

- Collaboration on materials development
- Feedback on curriculum content and instructional design
- Contribute to resource library
- Guest lecture
- On-the-job-training opportunities
- Outreach and recruitment

WAICLEANWATER.ORG/WORK4WATER

Work-4-Water

This program is funded by the Department of Labor Employment and Training Administration

gabby@waicleanwater.org

@waicleanwater