



WAI: WASTEWATER ALTERNATIVES & INNOVATIONS

Work-4-Water

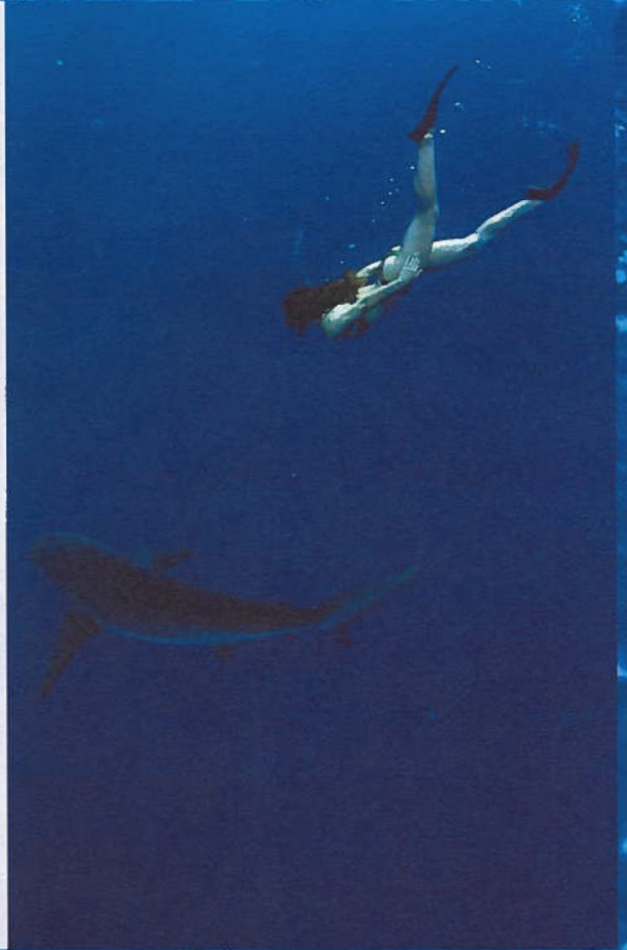
Pipe Dreams: Addressing the Wastewater Workforce Shortage in Hawai'i to
Improve the Health of Nearshore Ecosystems



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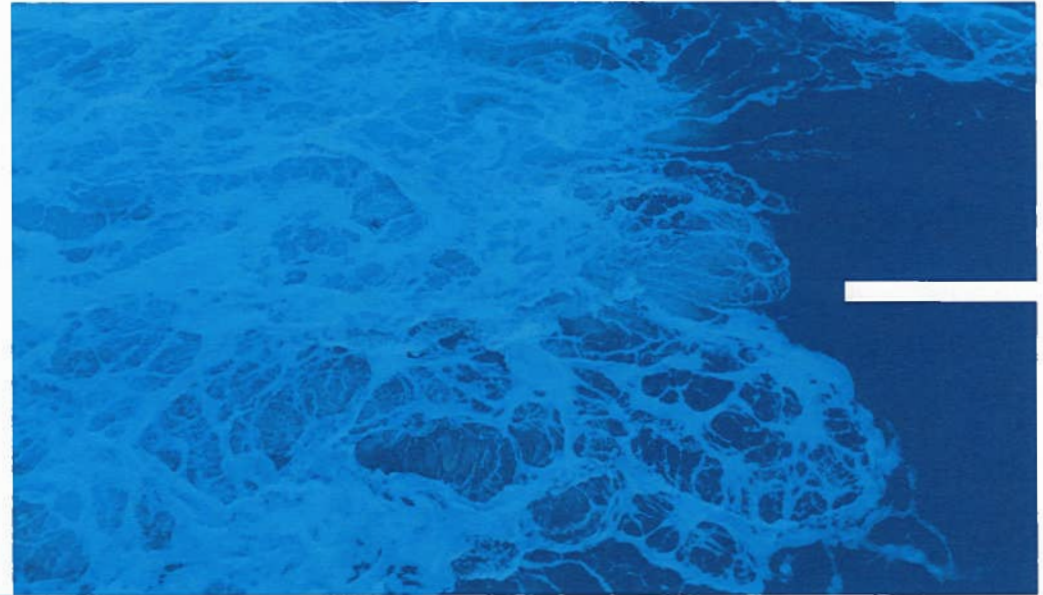
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- Program Manager & Curriculum Developer
 - Instructor Work-4-Water Program
- BA, MT University of Virginia



WAI's Mission

Protect water quality by providing
affordable, eco-friendly solutions
to wastewater management



WAI's Vision

WAI helps Hawai'i homeowners
and communities to upgrade
cesspools to new systems

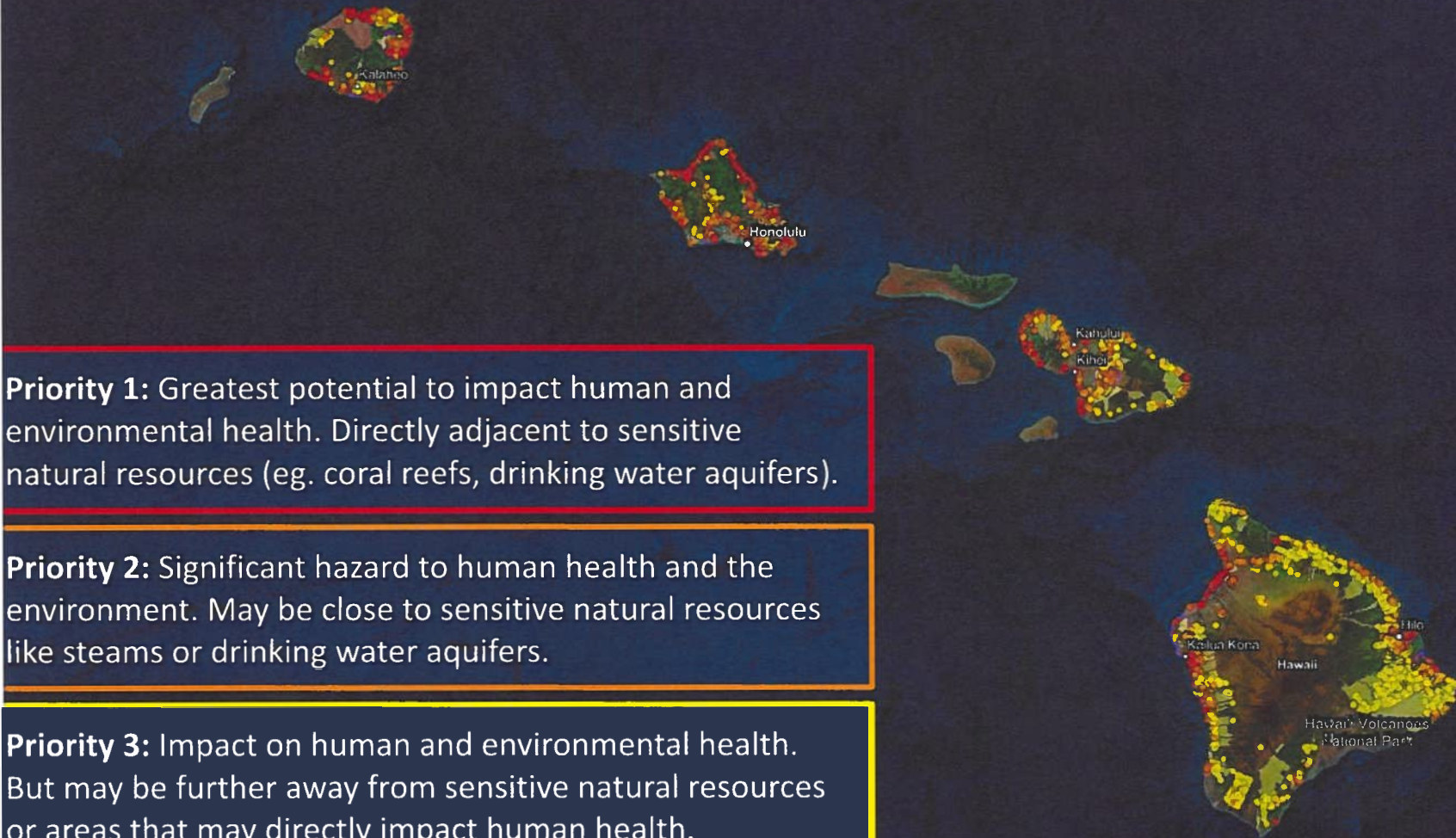


CESSPOOL PROBLEM

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

Priority 2: Significant hazard to human health and the environment. May be close to sensitive natural resources like streams or drinking water aquifers.

Priority 3: Impact on human and environmental health. But may be further away from sensitive natural resources or areas that may directly impact human health.



WASTEWATER POLLUTION

Public health hazards

Drinking water pollution

→ nitrate-related diseases

Pathogens in recreational waters

→ infections & other diseases

Environmental hazards

Sewage pollution

→ coral disease

Nutrient pollution

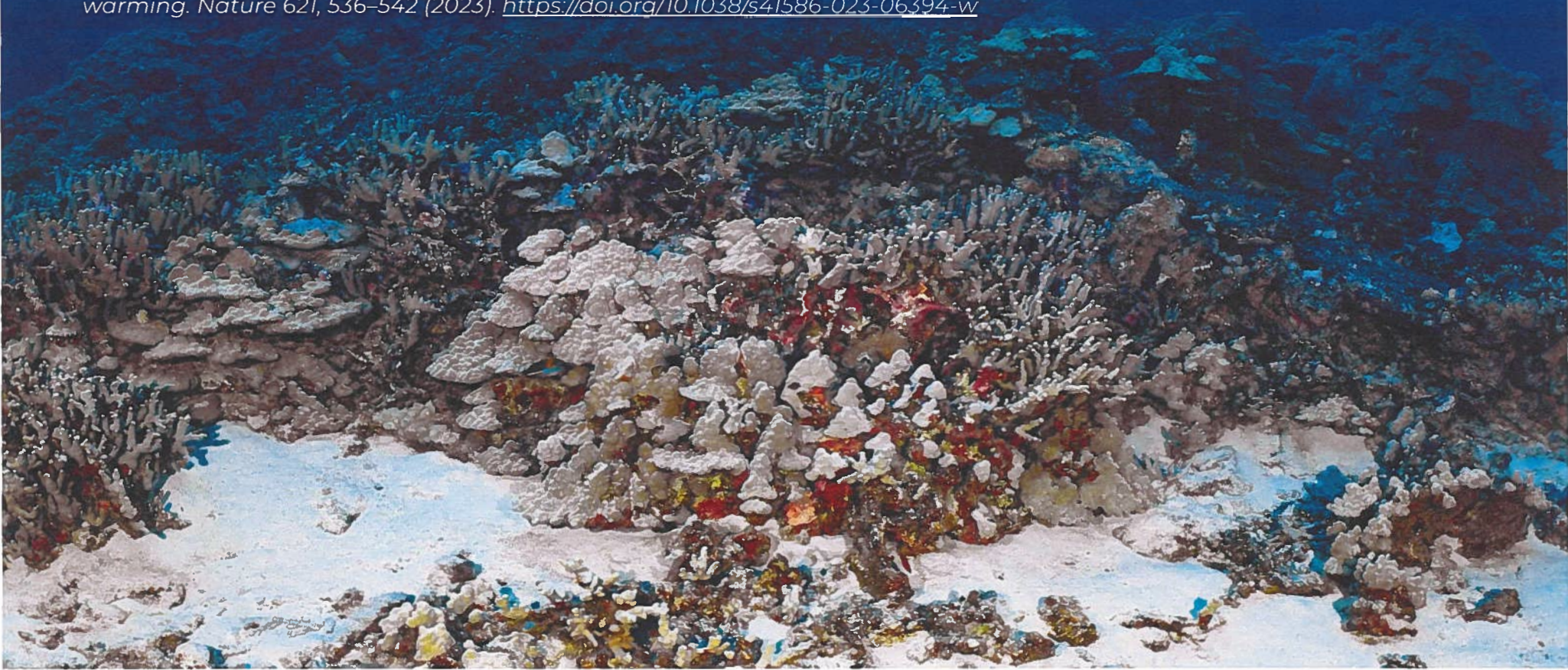
→ invasive algae overgrowth



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>



An aerial photograph showing a coastal area. On the left, a road runs parallel to a shoreline with several buildings and a swimming pool. The water is a deep blue, with some white surf visible on the right side. The land is a mix of green vegetation and brownish-yellow areas, possibly indicating some development or natural terrain. The overall scene is a mix of urban and natural coastal features.

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

WASTEWATER WORKFORCE SHORTAGE

HIGH DEMAND / LOW SUPPLY OF WASTEWATER EMPLOYEES ACROSS US & HAWAI'I

Silver Tsunami

- Rapidly losing the experts who have operated & maintained our systems for decades
- 1/3 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

Hawai'i Vacancies Needs

- 60 WWT operator vacancies on O'ahu, multiple wastewater related vacancies Maui & Hawai'i county
- Workers with the potential to enter the sector often lack exposure to decentralized knowledge and skills
- Engaging next generation requires early outreach to promote awareness of the promising career opportunities available in the water sector

[EPA America's Water Sector Workforce Initiative 2020](#)

[EPA Pipeline to a Sustainable Workforce 2021](#)

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

Advisory Council &
Curriculum Subcommittee
Meetings

APRIL 2023

Cohort 1
Career Expo
UHMC & Hawai'i CC

NOV. 2023

Cohort 2
Career Expo
UHMC & Hawai'i CC

FEB. 2024

Cohort 3
Career Expo
UHMC & Hawai'i CC

NOV. 2024

FEB. 2023

SEPT. 2023

JAN. 2024

SEPT. 2024

FEB. 2025

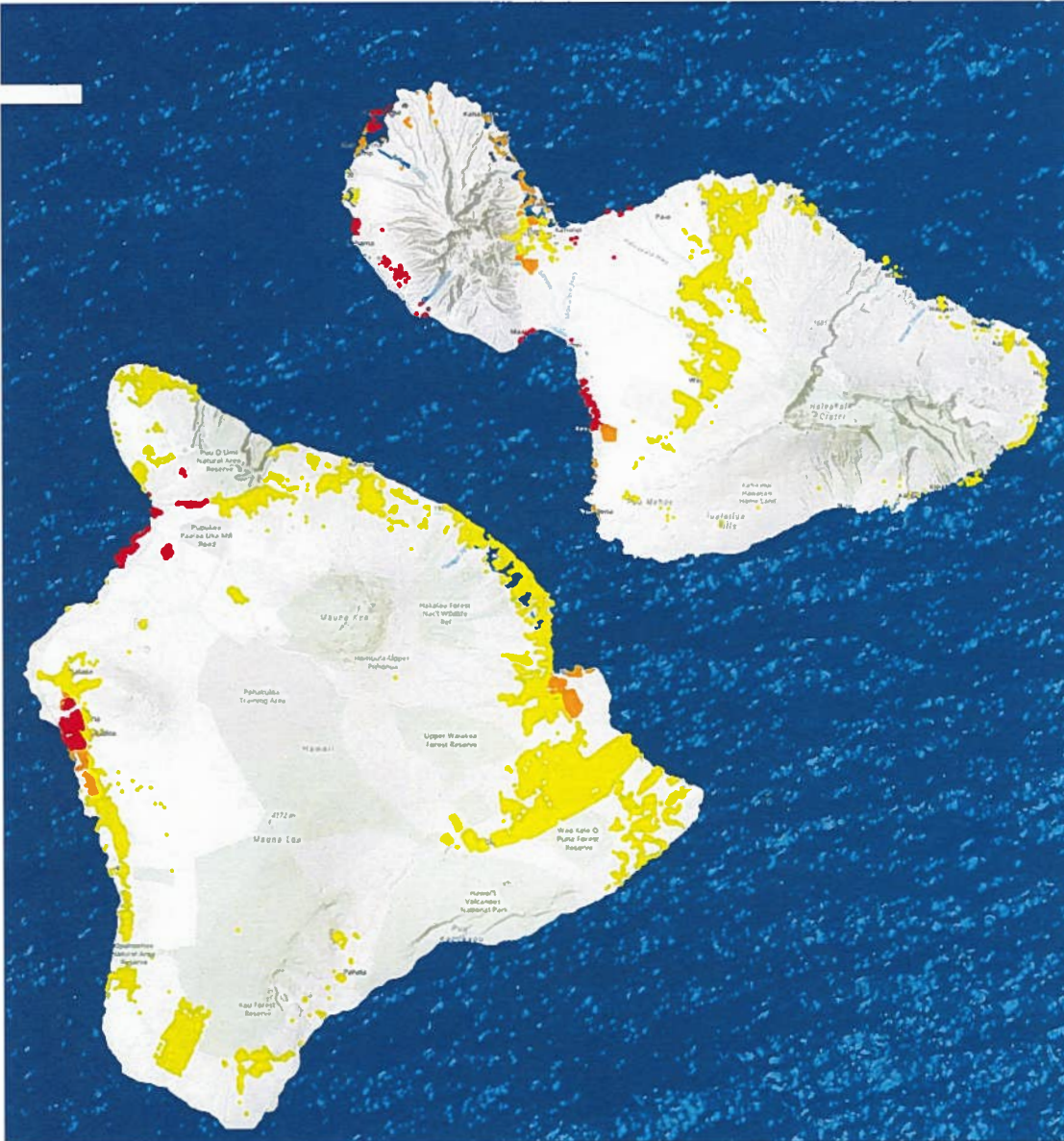
Plan & Curriculum
Design Phase

Cohort 1 starts
Maui & Hawai'i Island

Cohort 2 starts
Maui & Hawai'i Island

Cohort 3 starts
Maui & Hawai'i Island

End of Grant



PROGRAM OVERVIEW

- Maui & Hawai'i Island
- 8-week course
- Virtual evening classes
- In-person orientation, 2024 equipment install and site visits
- Networking Event / Career Expo
- Career focused: design, engineering, installation, inspection, operations and maintenance

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.





Attend partner events like the Common Ground Summit



Participate at career fairs on each island

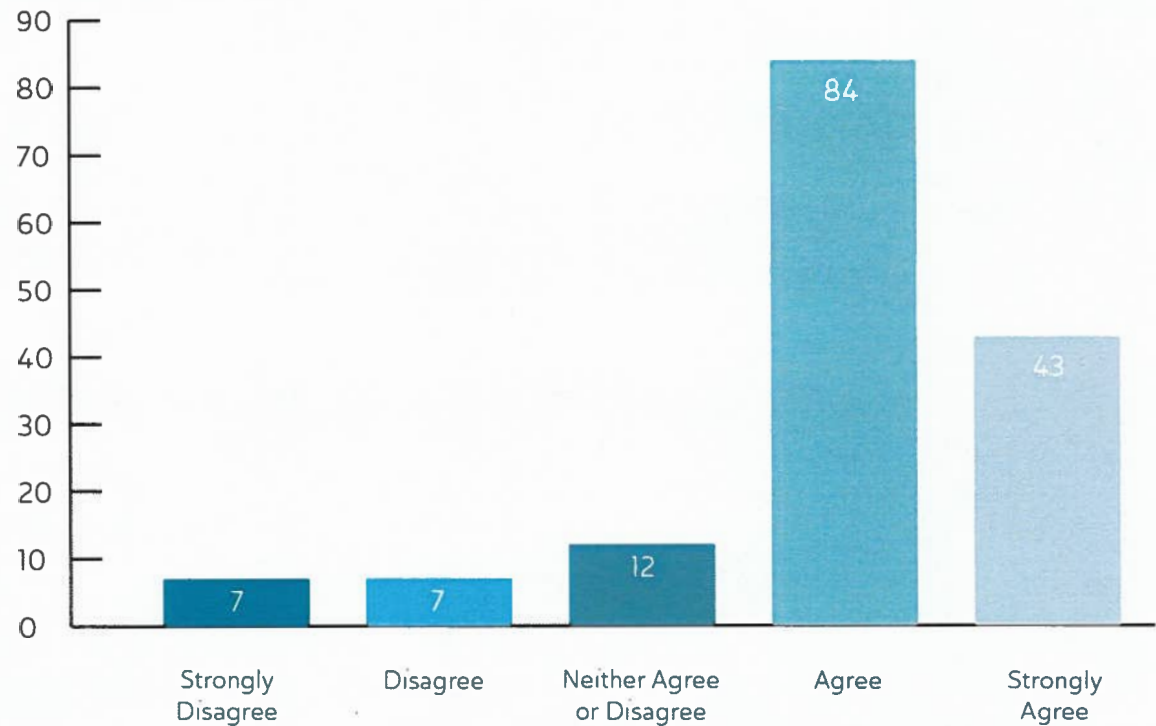


TOWN HALLS

Survey Results

My awareness of environmental and human health issues related to wastewater and cesspools **has increased** after attending this Town Hall meeting.

Summary of Kailua-Kona, Hilo & South Maui Respondents

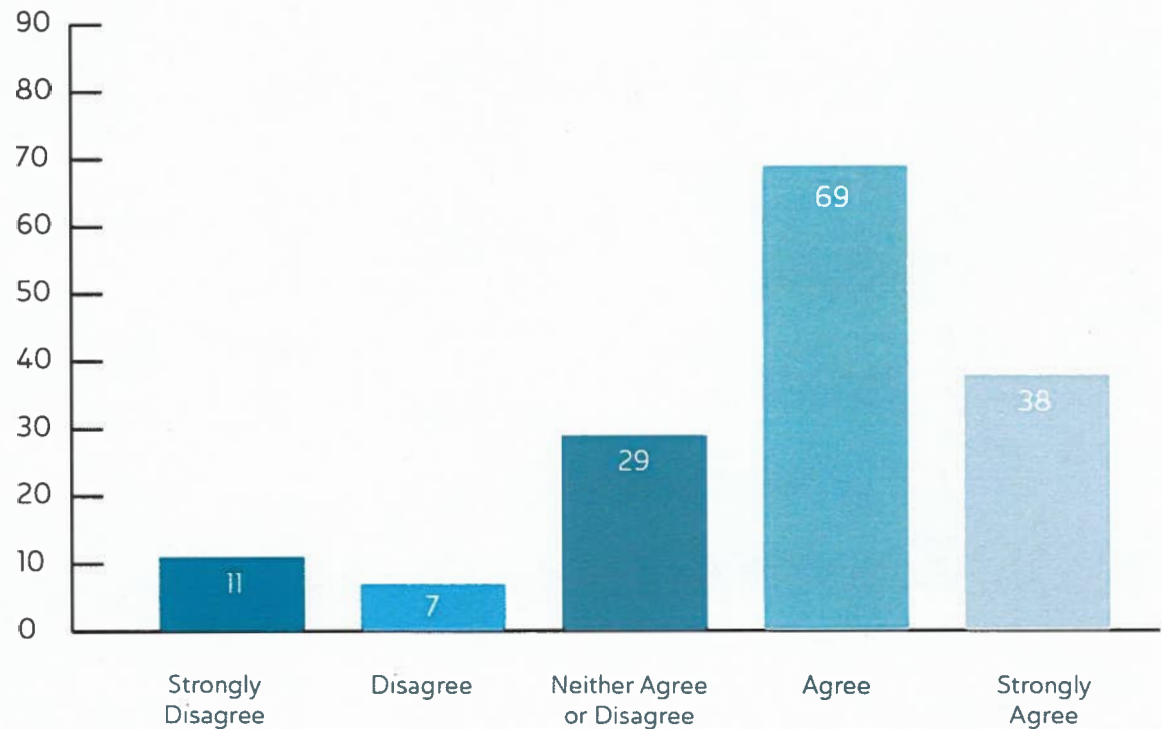


TOWN HALLS

Survey Results

My awareness of relevant cesspool-related government mandates **has increased** after attending this Town Hall meeting.

Summary of Kailua-Kona, Hilo & South Maui Respondents

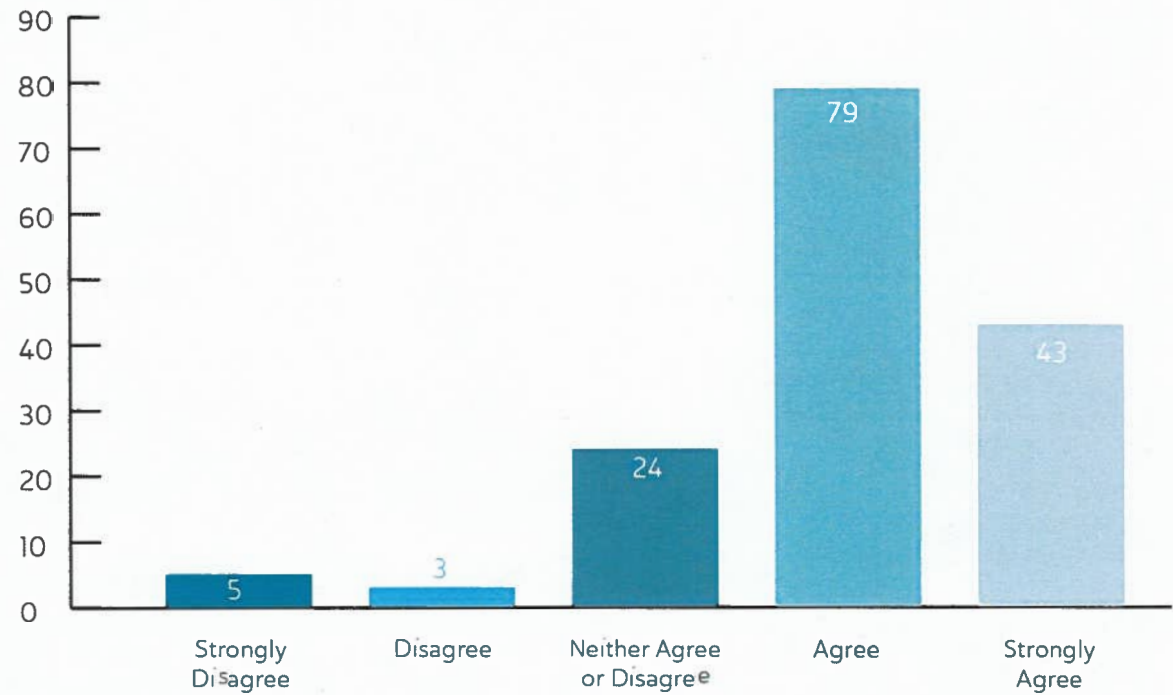


TOWN HALLS

Survey Results

My awareness about wastewater-related job opportunities **has increased** after attending this Town Hall meeting.

Summary of Kailua-Kona, Hilo & South Maui Respondents

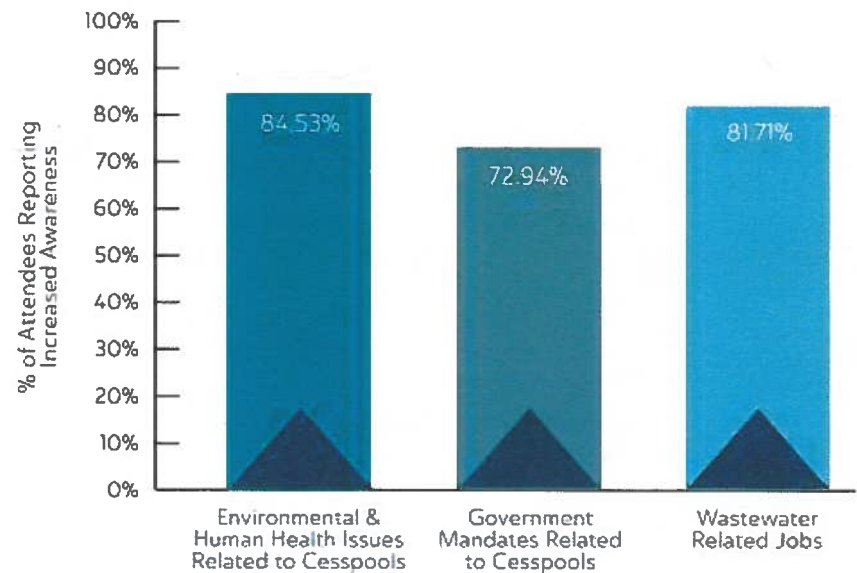


TOWN HALLS

Survey Results

151 community members who attended the Town Halls responded to pre-event and post-event surveys which were used to gauge the impact of the events.

Summary of Kailua-Kona, Hilo & South Maui Respondents



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



70 participants
complete the program
and receive a stipend



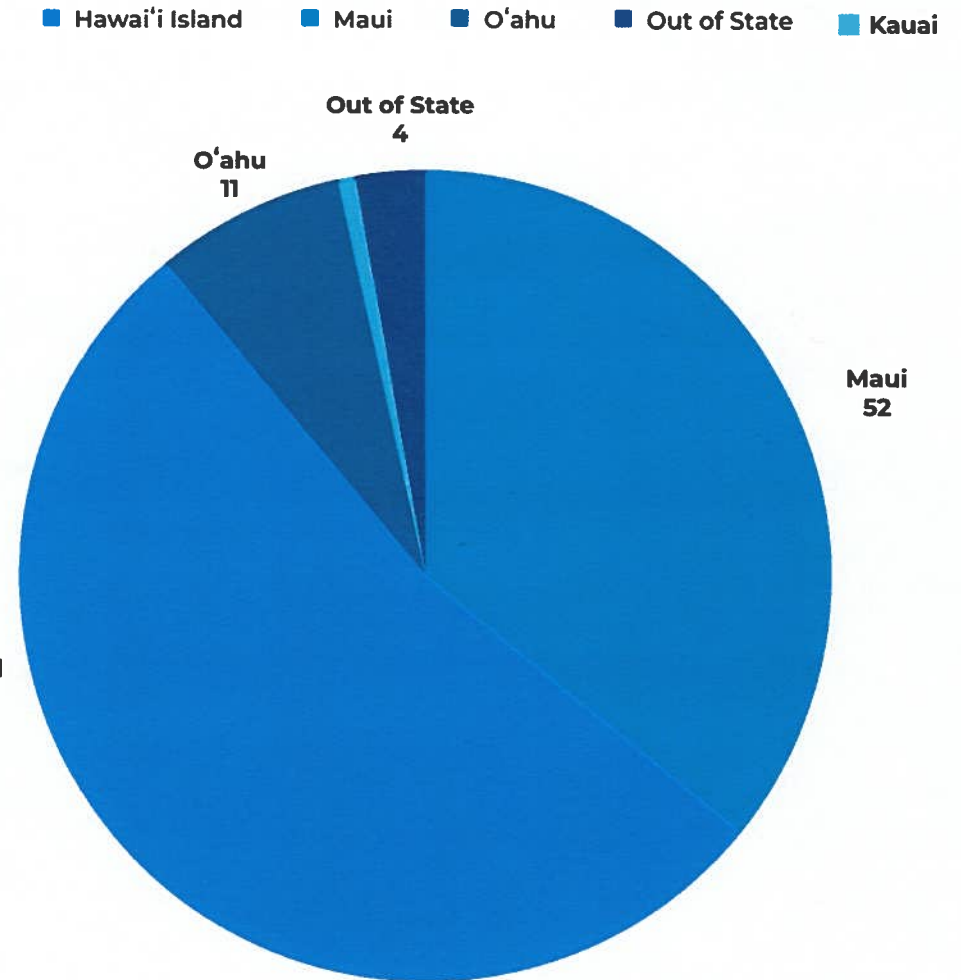
Establish Advisory
Council and Curriculum
Subcommittee

APPLICANT DATA

Cohort 1 & 2

145 total applications received
from March 2023 - January 2024

79 total graduates



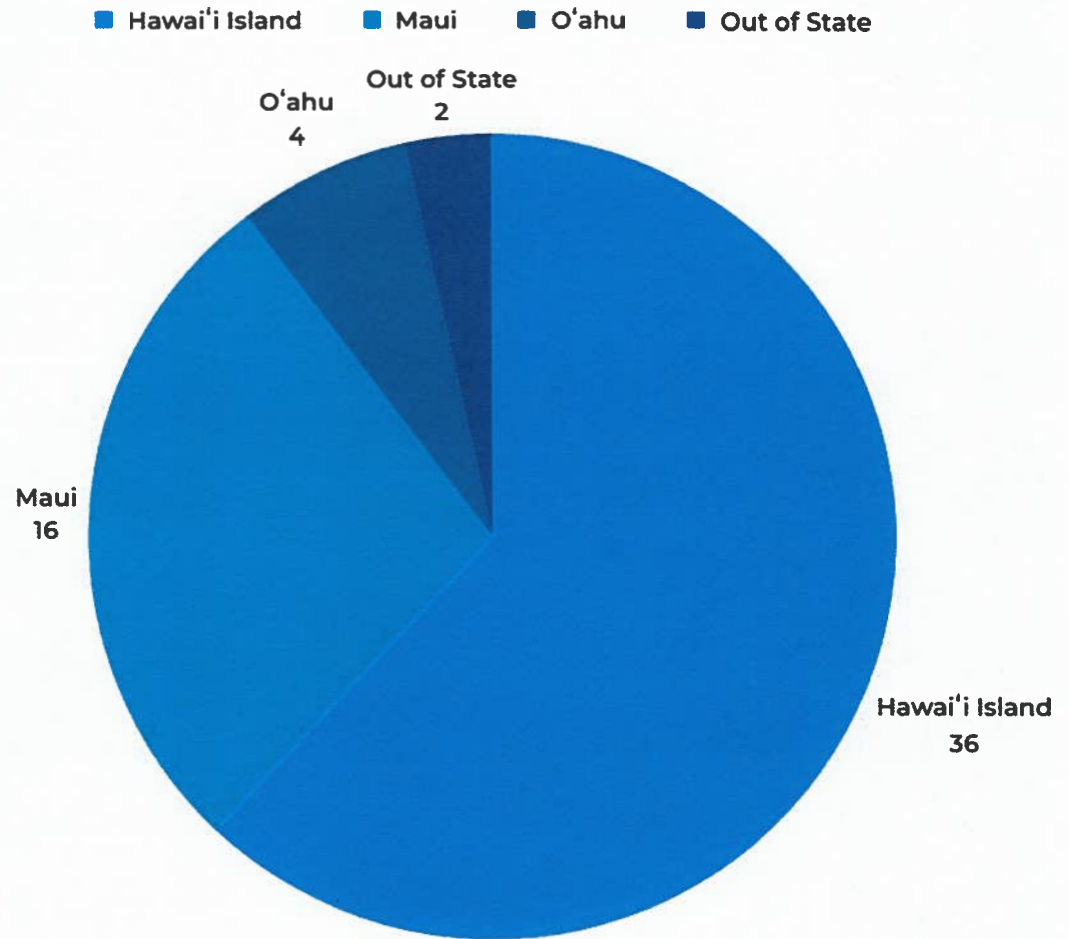
APPLICANT DATA

Cohort 1

58 total applications accepted

March - September 2023

31 total graduates

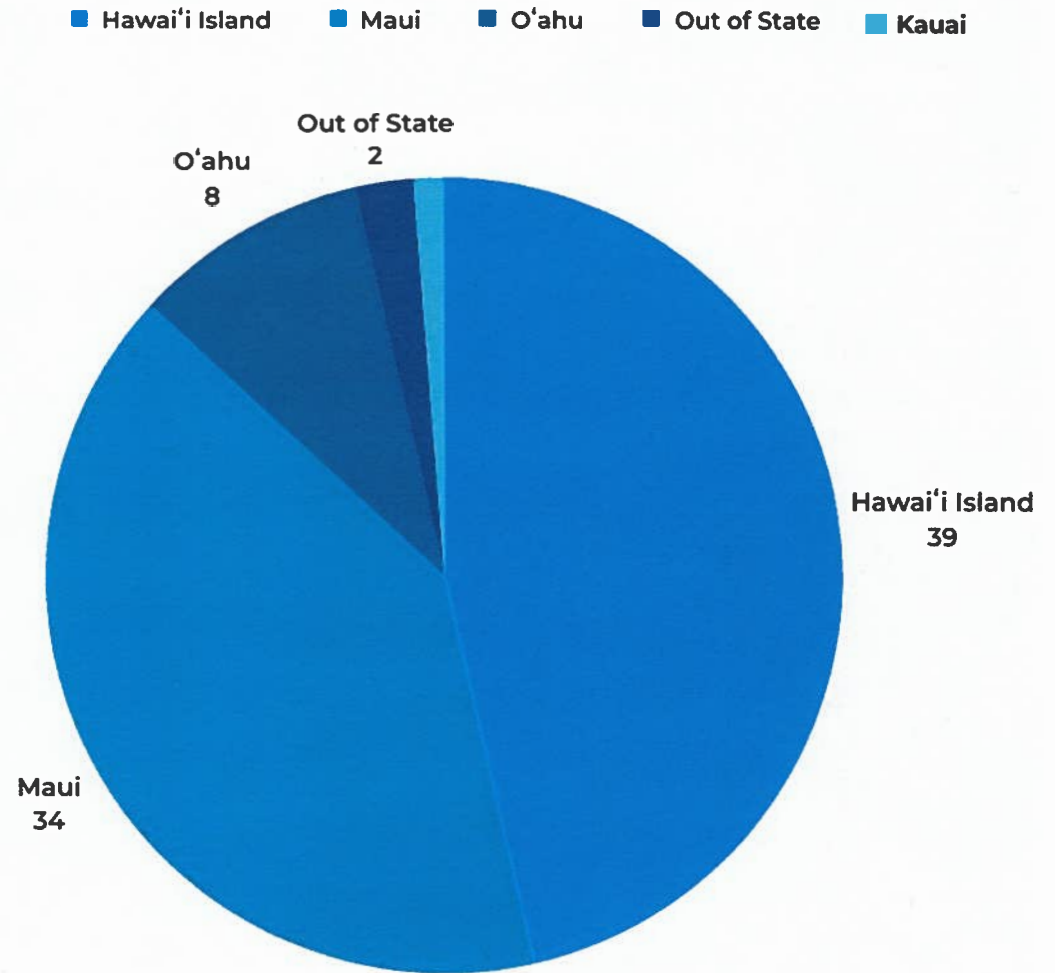


APPLICANT DATA

Cohort 2

84 total applications accepted
October 2023 - January 2024

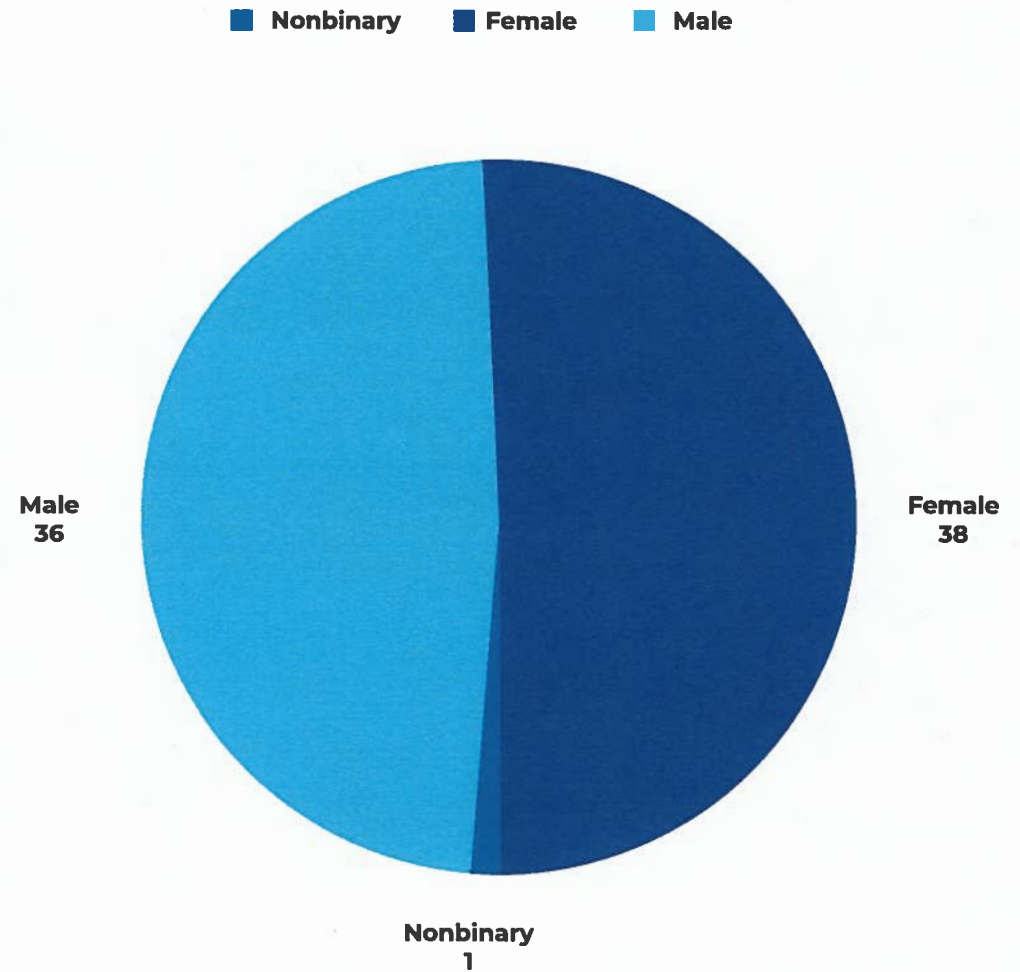
48 total graduates



APPLICANT DATA

Cohort 1 & 2

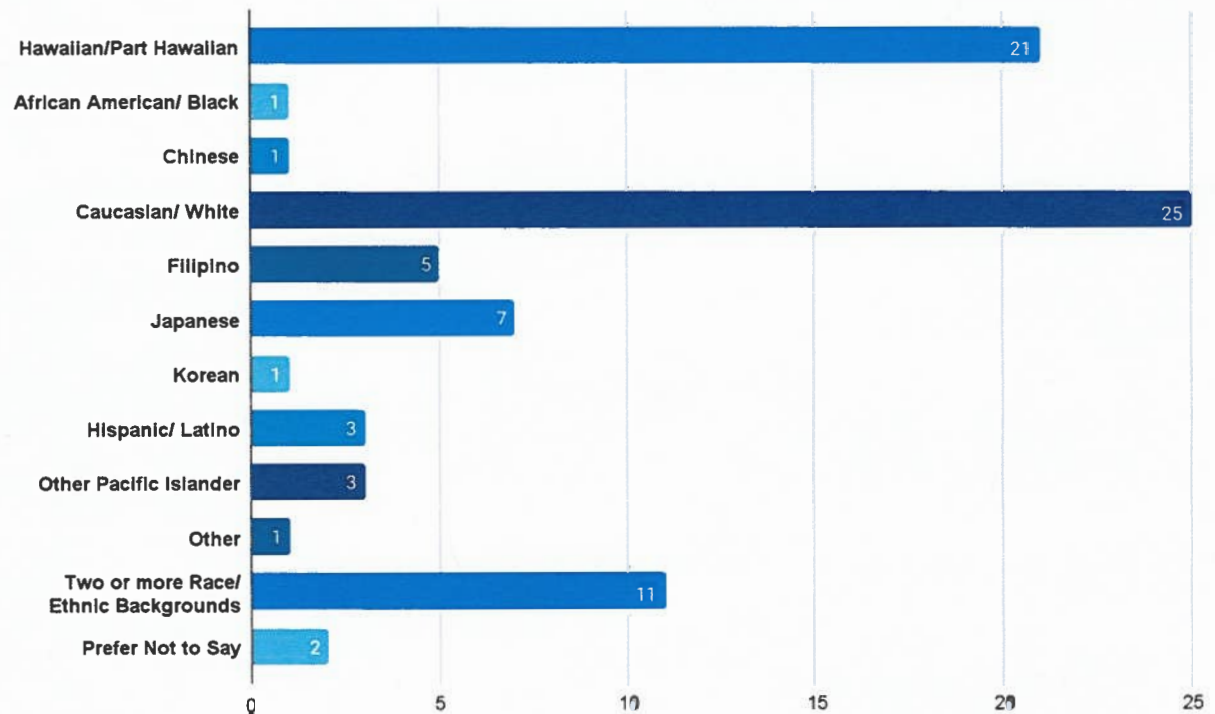
Of the 74 total graduates of Cohort 1 and Cohort 2 who responded to our exit evaluation survey, 38 identified as female, 36 identified as male and 1 identified as nonbinary.



APPLICANT DATA

Cohort 1 & 2

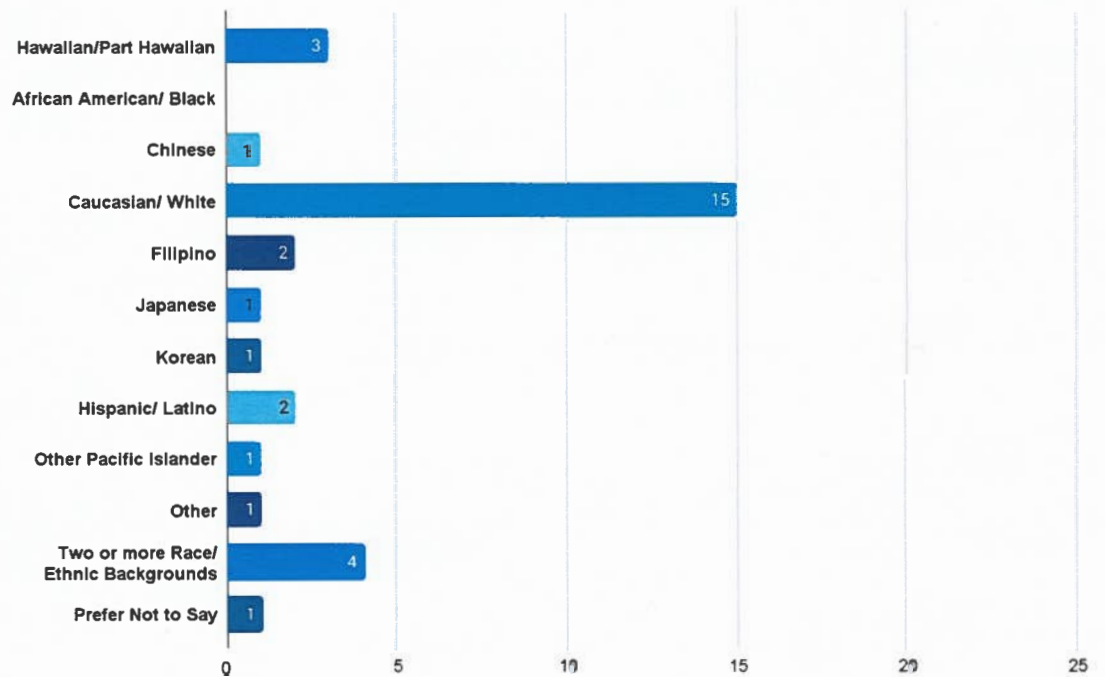
Collaboration with the Council for Native Hawaiian Advancement and increased local recruitment efforts helped us reach underrepresented Native Hawaiian populations.



APPLICANT DATA

Cohort 1

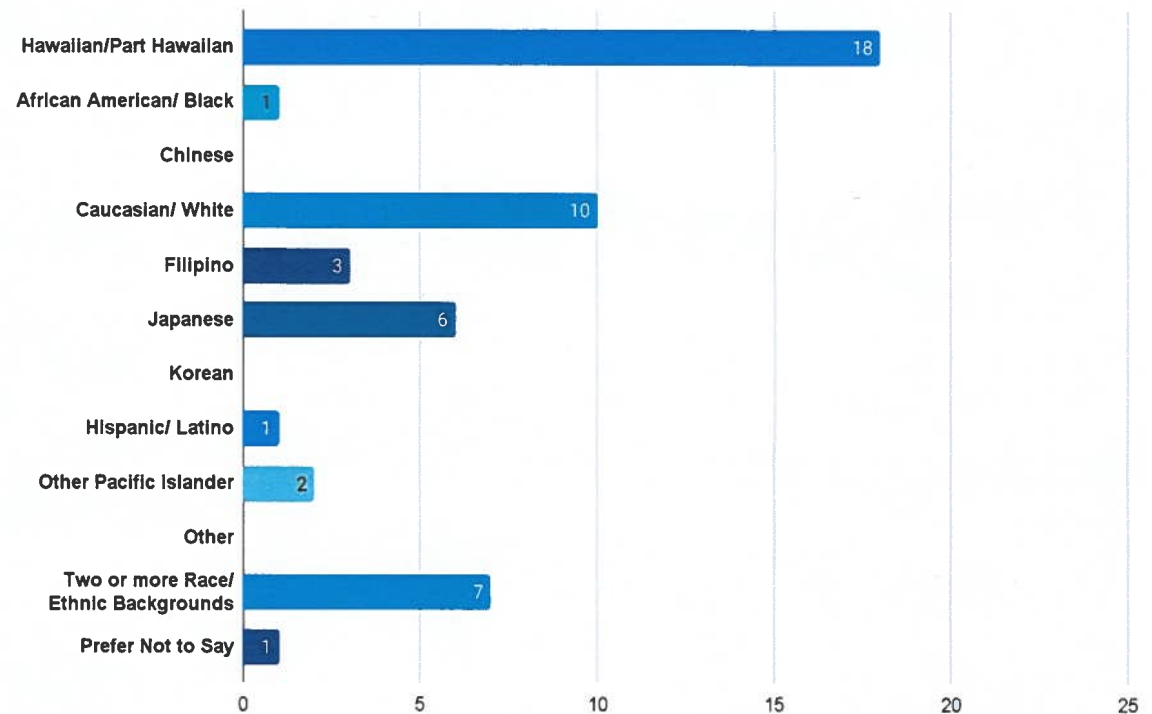
Race/Ethnicity Distribution
Summary of Exit Evaluation
Survey data about
race/ethnicity- How many total
students replied to this? 32?



APPLICANT DATA

Cohort 2

Race/Ethnicity Distribution Based on exit evaluation data of the 45 total graduates of Cohort 2, 18 or 40% identify as Hawaiian/Part Hawaiian, 10 or 22% identify as Caucasian/White, 6 or 13% identify as Japanese, 3 or 7% identify as Filipino, 3 or 7% identify as Two or More Race/Ethnic Backgrounds, 2 or 4% identify as Other Pacific Islander, 1 or 2% identify as Hispanic/Latino, 1 or 2% identify as African American / Black, and 1 or 2% prefer not to say.





“

“My takeaway: wastewater is a huge industry in Hawai‘i with lots of different ways to plug in. There are many business and career opportunities associated with cesspool conversion.”

W4W STUDENT TESTIMONY

03

IMPROVE WASTEWATER KNOWLEDGE

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



COURSE 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 Zoom discussion class

Onsite System Overview

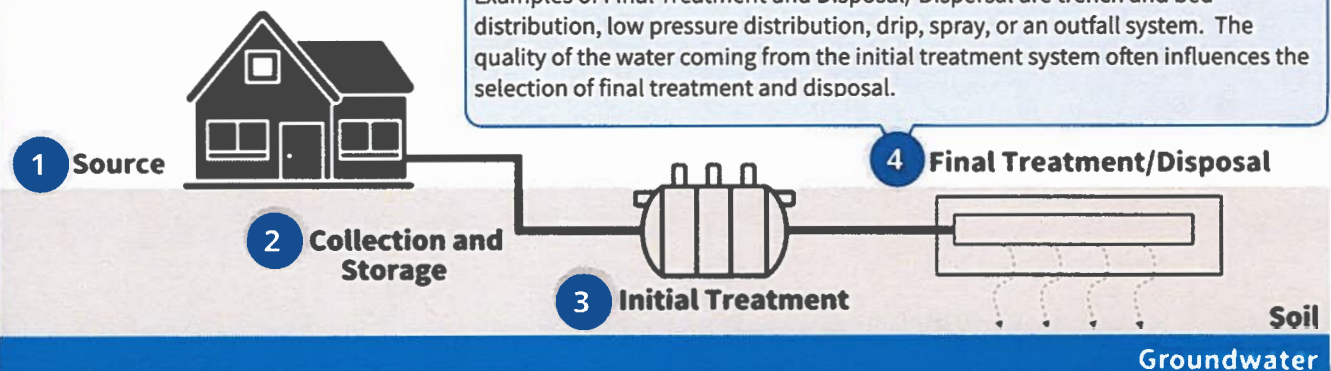
Onsite Treatment Train of Wastewater

An onsite wastewater treatment system is a system at or near the residence that collects, treats and disperses wastewater generated at the home. Specifically, the treatment train will include a wastewater source, collection and storage, an initial treatment component and final treatment/disposal phase.

Each of these four steps in the treatment process need to be checked as part of the Operations & Maintenance process. When these component are put together properly, and when all are functioning as they are intended, they achieve the goal of providing effective wastewater treatment.

Final Treatment

Examples of Final Treatment and Disposal/ Dispersal are trench and bed distribution, low pressure distribution, drip, spray, or an outfall system. The quality of the water coming from the initial treatment system often influences the selection of final treatment and disposal.



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

CALL TO ACTION

EXPAND WORKFORCE DEVELOPMENT

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



Sustainable Wastewater Workforce Needs

EXPAND WORK-4-WATER ACROSS HAWAI'I

Recruit and train participants across all islands. Increase K-12 outreach & education.

CREATE APPRENTICESHIPS OPPORTUNITIES

Engage and invest in employers to create on the job training and apprenticeships.

STAKEHOLDER PARTICIPATION

Advisory Council &
Curriculum/
Recruitment/
Apprenticeship
Subcommittees.

INVESTMENT IN SUPPLIES AND STIPENDS

Funds needed to support demand for stipends and supplies beyond existing scope.

WAICLEANWATER.ORG/WORK4WATER

Work-4-Water

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



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