

Wastewater Alternatives & Innovations Summary

Mission: To protect water quality, reduce sewage pollution & restore healthy watersheds.

Category: Environment Preservation & Education

Contact: Stuart Coleman, Executive Director

Address: 2927 Hibiscus Place, Honolulu, HI 96815

Grant History: N/A

| | |
|----------------------|---|
| 2025 Request: | \$25,000 for general operating support |
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Notes:

- Founded in 2019 to detect wastewater pollution, monitor, and provide innovative solutions to wastewater management.
- SeaSick is a reporting tool for ocean-associated illnesses/infections. It is a centralized database for reporting presence of suspected pathogens.
- Accessible for individuals/businesses related to recreation, fishing, cultural practices, conservationists, government, etc.
- WAI works with partners to create innovative solutions to reducing wastewater and sewage pollution.



SeaSick: An Outreach Program for the Health of Communities and Coastal Ecosystems

Contact Name: WAI Org Inc (DBA WAI: Wastewater Alternatives & Innovations)

Main POC: Stuart Coleman

Mailing Address: 2927 Hibiscus Pl., Honolulu, HI 96815

Deadline: Jan. 31, 2025

Funding: \$25,000

Title of Proposal / Program: SeaSick

Need(s) being addressed: Public and environmental health; water quality

Geographic Region: State-wide in Hawaii

Clientele & Number of Individuals Served: Swimmers, surfers, divers, paddlers, subsistence fishers, legislators, and state agencies responsible for coastal management.

Organization Description

WAI is a nonprofit whose mission is to protect water quality, reduce sewage pollution, and restore healthy watersheds by providing innovative, affordable, and eco-friendly solutions to waste and wastewater management for all people. WAI's vision is to help Hawai'i homeowners and communities manage the difficult process of upgrading cesspools and failing septic systems across the state to new systems that are affordable, efficient, and better for the environment. WAI's work spans five pillars: Innovative Sanitation Technology; Pilot Projects; Financial Resources for Homeowners; Policy & Advocacy; and Community Outreach & Education.

Since its establishment in 2019, WAI has been continually expanding its programs and capacity. WAI has formed partnerships with innovative wastewater companies and helped new wastewater technologies gain approval from the Hawai'i Department of Health. WAI is also leading efforts to develop the wastewater workforce in Hawai'i via our Work-4-Water Program. This program includes an extensive community outreach component and has reached an estimated 2000 people through a combination of in-person and virtual outreach. Building on our commitment to water quality, we partner with state, federal, and international organizations to bring focus to land-based sources of pollution as a critical aspect of nearshore coastal management.

The key staff for this project provide a wide breadth of expertise for the proposed work:

- **Stuart Coleman, MA:** Executive Director and Co-Founder. Expertise: Non-profit management, environmental legislation, public speaking, journalism. Affiliations: Hawai'i Cesspool Conversion Working Group; University of Hawai'i Sea Grant Program's Advisory Board; former Surfrider Foundation Hawai'i Regional Manager; Omidyar Fellow.
- **Christina Comfort, MSc, PhD Candidate:** Water Quality Program Director. Expertise: Coastal oceanography, water quality, oceanographic instrumentation, citizen science management. Affiliations: University of Hawai'i Oceanography Dept.; Surfrider Foundation - O'ahu Chapter.
- **Nicolas Storie, PhD Candidate:** Water Quality Specialist. Expertise: Coastal oceanography, water quality, microbial source tracking, public health, community outreach. Affiliations: University of Hawai'i Oceanography Dept.; Surfrider Foundation - O'ahu Chapter.

Problem or Opportunity

Globally, sewage pollution is a leading cause of water quality degradation. Swimming and recreating in sewage-contaminated water leads to an estimated 3.5 million water-related illnesses annually. Hawai‘i struggles with numerous sewage pollution sources, including accidental overflows from overwhelmed infrastructure during heavy rainfall, inundation of coastal systems by sea level rise and extreme tides¹, and groundwater contamination from over 82,000 cesspools releasing more than 53 million gallons of untreated waste every day².

Sewage-contaminated waters can contain harmful pathogens such as *Vibrio cholera*, *Salmonella*, *Shigella*, and *Staphylococcus aureus*, leading to painful skin lesions, gastroenteritis, and death³. Hawai‘i has a much higher prevalence of Methicillin-resistant *S.aureus* infections (MRSA) than the national average⁴. This pathogen is present in freshwater, coastal waters, and beach sands in Hawai‘i⁵. Higher infection rates of MRSA have been found in Native Hawaiians, Pacific Islanders, and children. However, MRSA is just one example of many antibiotic-resistant bacteria affecting our communities, highlighting sewage’s broader public health threat that demands attention and action.

Antibiotic resistance is among the most significant global public health threats⁶. Sewage is enriched with antibiotic-resistant bacteria (ARB) and antibiotic-resistance genes (ARGs). As untreated sewage leaks into the environment, it facilitates the transmission of ARGs among bacteria, promoting human pathogens to acquire novel ARGs from environmental bacteria. Furthermore, bacteria within the same genus can more easily transmit ARGs to one another, increasing overall environmental antibiotic resistance. For example, the genus *Acinetobacter*, which includes the human pathogen *A.baumannii*, is abundant in sewage and groundwater in Hawai‘i⁷. *A. baumannii* can cause infections in the bloodstream, lungs, urinary tract, and open wounds. Carbapenems are a class of antibiotics, and the US EPA has listed carbapenem-resistant *Acinetobacter* as an urgent threat that requires urgent and aggressive action. Due to the lack of sewage treatment, cesspools could aid the transmission of the carbapenem-resistance gene among environmental bacteria. Unfortunately, climate change is predicted to increase antibiotic resistance⁸ and exacerbate other wastewater-related public health issues.

As sea surface temperatures increase, research has shown accelerated growth² and virulence¹⁰ (i.e., the severity of illness) of *Vibrio vulnificus*, a human pathogen found in estuarine habitats. A recent study in Waikiki showed that this pathogen is anticipated to expand landward due to rising sea levels and coastal flooding, as it prefers brackish waters⁹. As sea levels rise, the inundation of coastal wastewater infrastructure will increase connectivity between sewage infrastructure and coastal waters. The increased severity of heavy rain events and floods will also damage sewage systems, promoting the release of sewage into the environment. As global temperatures rise, we anticipate increased recreational water-related activities and, thus, increased exposure to several waterborne diseases. This will likely increase infection rates and further strain the state’s limited medical resources.

Understanding the geographic prevalence of waterborne illnesses in Hawai‘i is challenging, and there is currently no centralized place for community members to report suspected waterborne illnesses easily. This project, ‘SeaSick - A reporting tool for ocean-associated illness and infections in Hawai‘i,’ aims to create a centralized database for reporting suspected waterborne illnesses/infections. This initiative will serve community members who use Hawai‘i’s coastal waters for recreation, sustenance fishing, and

traditional cultural purposes, as well as researchers and conservationists working to identify regions that need immediate attention to reduce sewage pollution to protect public and environmental health. This project will benefit 20 scientists and public health officials, who will receive data and insights to inform policy and public health decisions, as well as more than 500 laypeople across the state who will receive educational materials and/or report suspected waterborne illnesses. If results show specific areas with high numbers of waterborne illness reports, we plan to share these results with county and state representatives to highlight the need for immediate action to protect coastal water quality.

Literature Cited:

1. <https://doi.org/10.1002/lo12.10186>
2. Mezzacapo, M. *et al.* Hawai'i's Cesspool Problem: Review and Recommendations for Water Resources and Human Health. 41 (2020).
3. 10.1016/bs.aambs.2016.08.001
4. <https://doi.org/10.1016/j.ajic.2012.02.001>
5. <https://doi.org/10.3390/antibiotics10080980>
6. <https://doi.org/10.1155/2022/3348695>
7. <https://doi.org/10.1038/s43705-023-00261-5>
8. <https://doi.org/10.1038/s41579-019-0222-5>
9. <https://doi.org/10.1016/j.scitotenv.2022.154075>
10. <https://doi.org/10.1038/s41558-022-01426-1>

Project Overview

The SeaSick program aims to address the challenge of sewage pollution in Hawai'i's ocean waters by creating a reporting tool for community members to submit reports of illnesses related to swimming in the ocean. This approach was chosen to empower the community to take an active role in monitoring and reporting waterborne illnesses. The program envisions a user-friendly online platform where community members can access a dynamic map displaying areas where people have reported waterborne illnesses after engaging in various water activities, such as swimming, surfing, and diving. These reports will be aggregated to reveal trends in areas with higher incidence rates, providing valuable insights into the scope of the issue.

By overlaying community health reports with cesspool density data and environmental data, the program will create a comprehensive narrative about the far-reaching impacts of wastewater pollution on Hawai'i's public and environmental health. This interactive tool will not only inform policy and public health decisions but also serve as a powerful educational resource, raising awareness about waterborne illnesses and empowering individuals to take action to protect their health and the environment.

WAI has created a reporting form where community members can submit reports of illness and infection related to swimming in the ocean and collect the data essential to display the GIS wastewater hotspots throughout the state. Community members have begun submitting reports. The form is available here: <https://forms.gle/xbZDLN2ttc2hxr7>.

Activities and Impact

The primary activities of this program are to design and implement an outreach strategy for the SeaSick program, create an interactive map using community-provided waterborne illnesses reports that are

overlaid with cesspool densities and environmental data, and analyze and report summary data to the community, legislators, and state agencies responsible for coastal management.

The Dorcy Foundation funds will help drive awareness of waterborne illnesses caused by chronic wastewater pollution plaguing our coastal waters and illustrate the need for further environmental protection. The SeaSick Program will cover all of the Hawaiian Islands and be the first of its kind to track waterborne illnesses and infections in the state.

Goal 1: Develop and implement an outreach strategy to increase the visibility of the SeaSick program.

Activities: First, we will implement our outreach strategy on O‘ahu, where our team is based, and then expand outreach throughout Hawai‘i. We will design and produce outreach materials and distribute them to businesses and clubs that are related to ocean activities. We will promote the SeaSick tool on various social media and environmental newsletters and present the tool in at least four community meetings and to at least six ocean-related community groups. Particular effort will be made to collaborate with groups and businesses in Priority 1 cesspool conversion areas identified by the Hawai‘i Department of Health. We have established relationships with non-profits and coastal communities across the state through our Water Quality program, providing a strong foundation for expanding the SeaSick program.

Measuring success:

We will track how many views our online content receives (LinkedIn, Instagram, Facebook, newsletter, email lists) and attendance at community meetings and outreach events. We will also track the number of commercial locations we engage with to distribute outreach materials (surf, dive, and fishing shops).

Goal 2: Using GIS, create an interactive map using waterborne illnesses reports that are overlaid with cesspool densities and environmental data.

Activities:

We will use GIS to embed an interactive map of Hawai‘i on the SeaSick website. The map will include several layers, including a) cesspool locations, b) HDOH priority cesspool conversion areas, and c) submitted waterborne illness data. Additional optional layers include environmental data, water quality data, and socioeconomic data. As reports come in from the community, an anonymous summary will be shown geo-referenced on the interactive map.

Measuring success: To determine if our outreach efforts have been successful, we will quantify the number of responses in the SeaSick form each month. It is expected that as SeaSick's visibility increases, so will the number of reports. We can also track the number of page views showing the SeaSick interactive map. This map will be a helpful tool for the public and government agencies to visualize hotspots where there are waterborne illnesses.

Goal 3: Analyze and report summary data to the community, legislators, and state agencies responsible for coastal management.

Activities: We will compile data at the end of the grant period in a summary report showing maps, trends, and highlighting high-risk areas for sewage-related waterborne illnesses that have emerged as a result of this program. We will share the summary report with legislators, particularly representatives of high-risk areas, management agencies such as the Department of Health, and communities via public meetings and online outreach.

Measuring success: Success will be measured by successfully publishing a summary report and tracking the number of representatives, agencies, communities and individuals we reach. Ultimate success will be measured by the SeaSick's ability to shift public policy toward highlighting the need to convert cesspools and reduce the amount of wastewater pollution in our nearshore waters.

Conclusion

Our coastal communities and ecosystems face chronic human-driven stressors globally, and sewage pollution is a critical public health issue that can be tackled on a regional level. Engaging with community members who use coastal waters for recreation, resources, and cultural practices to share their experiences of waterborne illnesses will further highlight the State's need to tackle cesspool pollution head-on. Our ultimate goal is to convert more cesspools at a faster rate and improve water quality across the state. This will benefit all those who enjoy and depend on our coastal waters.



Information on primary funding sources:

- WAI receives funding from various sources, including federal grants and national and regional foundation grants.
 - Federal grants:
 - Department of Labor (DOL)
 - National Science Foundation (NSF)
 - Environmental Protection Agency (EPA)
 - Foundations:
 - Hawaii Community Foundation (HCF)
 - Castle Foundation
 - Dorrance Family Foundation
 - Healy Foundation
 - DigDeep
 - Ulupono Initiative
 - And other foundations and individual donors

Statement of Activity

November 2024

| | Nov 2024 | Jan - Nov, 2024 (YTD) | Total |
|--|------------------|-----------------------|-------------------|
| REVENUE | | | |
| 43400 Support | | | 15,300.00 |
| 43410 Corporate Contributions | | | 279,518.20 |
| 43420 Foundation Contributions | 32,500.00 | | 372,531.10 |
| 43430 Government Grants | 50,672.86 | | 42,462.78 |
| 43450 Individual Contributions | | | 60,000.00 |
| 43460 Tech Partners | 7,500.00 | | |
| Total 43400 Support | 90,672.86 | | 769,812.08 |
| 43500 Special Event Revenue | | | 305.00 |
| Total Revenue | 90,672.86 | | 770,117.08 |
| GROSS PROFIT | 90,672.86 | | 770,117.08 |
| EXPENDITURES | | | |
| 62100 Contract Services | | | 34,632.25 |
| 62110 Accounting & Audit Fees | 3,200.00 | | 10,880.00 |
| 62150 Outside Contract Services | 0.00 | | |
| Total 62100 Contract Services | 3,200.00 | | 45,512.25 |
| 63000 Operations | | | |
| 63100 Advertising & Marketing | | | 2,173.53 |
| 63110 Ads & Promotions | 7.21 | | 36.60 |
| 63130 Website & Social Media | | | 381.31 |
| 63140 Graphics & Design | | | |
| Total 63100 Advertising & Marketing | 7.21 | | 2,591.44 |
| 63150 Bank & Processing Fees | | | 305.15 |
| 63200 Dues & Memberships | | | 707.55 |
| 63400 Meetings & Meals | 404.82 | | 4,382.89 |
| 63480 Events | | | |
| 63481 Food and Beverage | | | 2,408.91 |
| 63482 Event Materials | | | 2,430.02 |
| Total 63480 Events | | | 4,838.93 |
| 63500 Insurance | | | |
| 63511 General Liability | 352.82 | | 2,180.52 |
| 63512 Workers Comp Insurance | 308.66 | | 3,799.25 |
| 63513 Temporary Disability Insurance | | | 1,852.74 |
| 63515 Other Insurance | | | 85.45 |
| Total 63500 Insurance | 661.48 | | 7,917.96 |
| 63520 Postage & Delivery | | | 54.05 |

11-month

| | Nov 2024 | Jan - Nov, 2024 (YTD) | Total |
|---|------------------|-----------------------|-------------------|
| 63550 Printing and Copying | | | 48.24 |
| 63554 Software & Apps | 796.43 | | 6,676.30 |
| 63555 Supplies | | | 5,192.23 |
| 63580 Office Expense | | | 592.75 |
| 63600 Staff Development & Education | | | 1,436.83 |
| 63640 Staff Appreciation | | | 259.20 |
| 63650 Staff Recruitment | | | 27.11 |
| 63700 Interest Expense | 275.44 | | 990.27 |
| 63740 Taxes, Licenses, Registrations | | | 262.00 |
| 63750 Telephone & Internet | 60.22 | | 755.28 |
| 63900 Travel | | | |
| 63910 Airfare | | | 11,869.44 |
| 63911 Lodging | | | 8,816.01 |
| 63912 Travel Meals | | | 2,718.19 |
| 63919 Transportation & Mileage | | | 3,607.60 |
| Total 63900 Travel | | | 27,011.24 |
| 65000 Payroll and HR | | | |
| 65100 Salaries and Wages | 34,821.12 | | 339,927.63 |
| 65200 Officer Compensation | 11,250.04 | | 166,250.44 |
| 65300 Payroll Taxes | | | |
| 65301 Social Security | 2,856.41 | | 31,426.41 |
| 65302 Medicare | 668.02 | | 7,349.57 |
| 65304 SUI | 251.57 | | 5,896.18 |
| Total 65300 Payroll Taxes | 3,776.00 | | 44,672.16 |
| 65400 Employee Benefits | 5,082.59 | | 47,172.04 |
| 65500 Payroll Processing | 841.94 | | 9,142.97 |
| 65700 Retirement Plan | 1,382.11 | | 14,769.68 |
| Total 65000 Payroll and HR | 57,153.80 | | 621,934.92 |
| Total 63000 Operations | 59,359.40 | | 685,984.34 |
| 70000 Program Expenditures | | | |
| 71000 Program Supplies | 4,714.24 | | 49,076.59 |
| 71500 Program Equipment | | | 5,205.67 |
| 72000 Program Stipends | 8,000.00 | | 31,500.00 |
| 74500 Program Contractors | 15,395.00 | | 47,880.00 |
| Total 70000 Program Expenditures | 28,109.24 | | 133,662.26 |
| Total Expenditures | 90,668.64 | | 865,158.85 |
| NET OPERATING REVENUE | 4.22 | | -95,041.77 |

OTHER REVENUE

93000 Allocate Change in Net Assets

| | | Total |
|--|--------------------|-----------------------|
| | Nov 2024 | Jan - Nov, 2024 (YTD) |
| 93001 (Increase) / Decrease - Available to Operating | 4,489.28 | 40,626.90 |
| 93002 (Increase) / Decrease - Purpose Restrictions | 31,694.86 | 90,603.23 |
| Total 93000 Allocate Change in Net Assets | 36,184.14 | 131,230.13 |
| Total Other Revenue | 36,184.14 | 131,230.13 |
| NET OTHER REVENUE | 36,184.14 | 131,230.13 |
| NET REVENUE | \$36,188.36 | \$36,188.36 |

Statement of Financial Position

As of November 30, 2024

| | Total |
|--|---------------------|
| ASSETS | |
| Current Assets | |
| Bank Accounts | |
| 10100 Operating Checking - 1778 | 257,608.33 |
| Total Bank Accounts | 257,608.33 |
| Accounts Receivable | |
| 12000 Pledges Receivable | -9,000.00 |
| 12010 Partnerships | 75,096.93 |
| 12013 Grants | 66,096.93 |
| Total 12000 Pledges Receivable | 66,096.93 |
| 12100 Accounts Receivable (A/R) | 36,188.36 |
| Total Accounts Receivable | 102,285.29 |
| Other Current Assets | |
| 18500 Prepaid Insurance and Expenditures | 3,304.81 |
| 18501 Prepaid Expenses - PICHTR | 5,764.47 |
| 18600 Other Assets | 4,340.16 |
| Total Other Current Assets | 13,409.44 |
| Total Current Assets | 373,303.06 |
| TOTAL ASSETS | \$373,303.06 |

LIABILITIES AND EQUITY

Liabilities

Current Liabilities

Accounts Payable

20000 Accounts Payable

3,742.33

Total Accounts Payable

3,742.33

Credit Cards

22100 AMEX x1007

10,328.60

22200 Credit Card - 4408

3,052.25

22300 Credit Card - 8459

3,895.05

22400 Bill Spend & Expense

836.43

Total Credit Cards

18,112.33

Other Current Liabilities

23500 Due To/From Staff

-242.25

24000 Payroll Liabilities

24001 Payroll Tax Payable

7,391.30

24002 401k Payable

2,375.81

24003 NY Tax Payable

158.61

24004 Health Payable

-651.84

Total 24000 Payroll Liabilities

9,273.88

| | Total |
|---|---------------------|
| Total Other Current Liabilities | 9,031.63 |
| Total Current Liabilities | 30,886.29 |
| Total Liabilities | 30,886.29 |
| Equity | |
| 31000 Unrestricted Net Assets | -42,991.44 |
| 31300 Temporarily Restricted Net Assets | 349,219.85 |
| Retained Earnings | |
| Net Revenue | 36,188.36 |
| Total Equity | 342,416.77 |
| TOTAL LIABILITIES AND EQUITY | \$373,303.06 |