



WAI WASTE WATER
ALTERNATIVES &
INNOVATIONS

**Environmental
Entrepreneurship at
WAI**



NOWRA Pres., 2024

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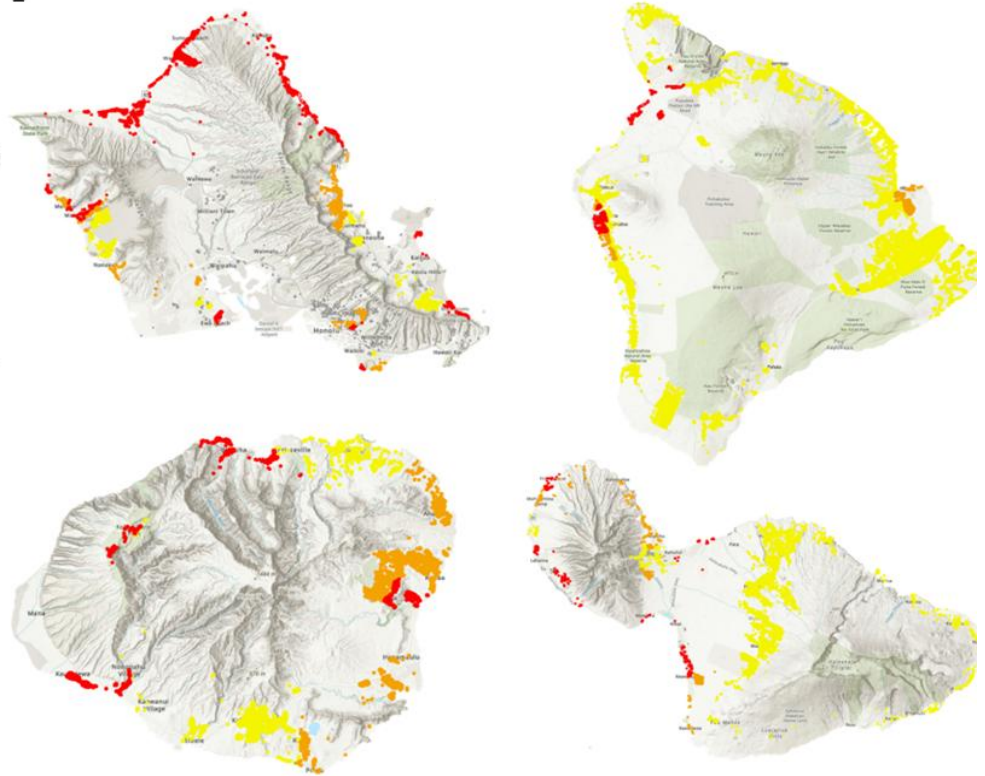


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The Problem in Hawai‘i

Each day, over **83,000** cesspools release **52 million** gallons of sewage into our groundwater risking public and environmental health.

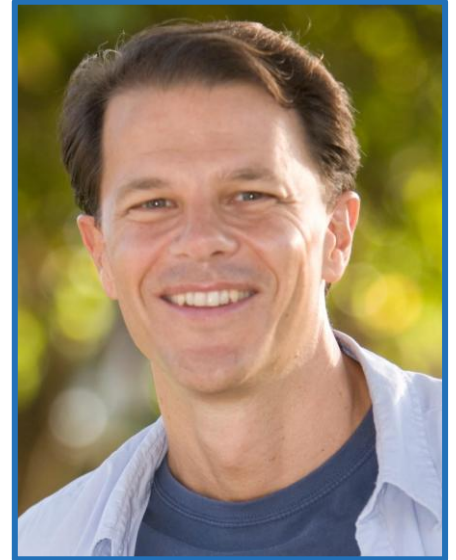
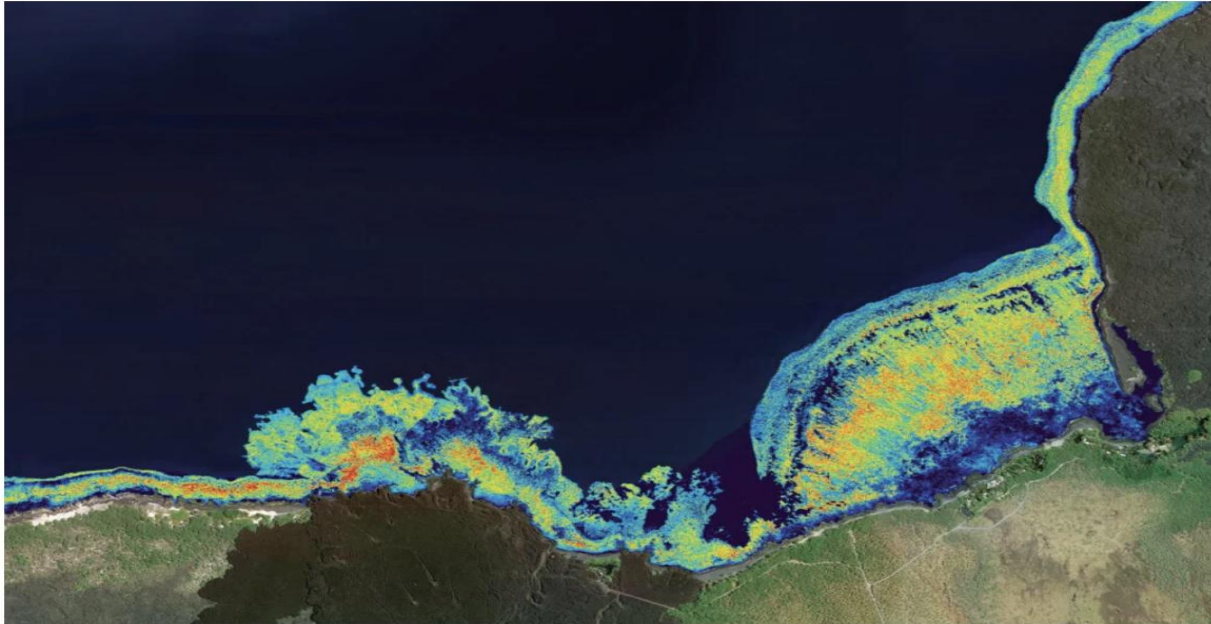
Act 125 mandates the upgrade of all cesspools by **2050 to septic tanks, aerobic treatment units, or connection to a sewer system**, but many homeowners can't afford the current price of conversions (minimum of \$20,000).



Cesspools Are Killing Hawai'i's Coral – But It Doesn't Have to Be That Way

An expert explains how to reverse the damage from the state's 83,000 cesspools, including using treated wastewater for irrigation and landscaping.

SEPTEMBER 25, 2023 BY STUART COLEMAN



Article written by **Stuart Coleman**, published in the **Hawai'i Business Magazine**

Click [here](#) to read more.

Problem: Excess nutrients negatively affect corals

- Over a 20 year period, wastewater pollution and urban stormwater were tied to negative impacts from ocean heat waves.
- Bleaching alone from 2015-16 damaged 44% of west Maui reefs (DAR)



Gove et al. Coral reefs benefit from reduced land-sea impacts under ocean warming. In press. Nature.



Mission: WAI is 501(c)(3) non-profit working 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.

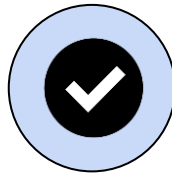
Vision: WAI helps Hawai'i homeowners and communities manage the difficult process of upgrading cesspools and failing septic systems across the state to new systems that are affordable, efficient and better for the environment.



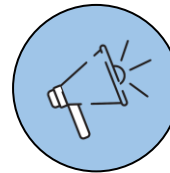
Outreach &
Education



Innovative
Technology



Pilot
Projects



Policy &
Advocacy



Financial
Resources

WAI's Technology Partners

WAI is committed to finding the best sanitation solutions to protect water quality & help restore Hawaii's watersheds & natural resources.

We value:

- Innovative technologies
- Reuse of resources
- Mission-driven ethos
- Commitment to help solve Hawaii's wastewater issues
- Pro-bono & low-bono donations of equipment & services for pilot projects
- Workforce development
- Support of WAI's Mission



Innovative Technology Introduced to Hawaii



Geotextile Sand Filter systems approved by local agencies and installed in 2 locations and ready for commercial launch. NSF 245 version reduces nitrate >50%



Bioreactor Garden passed local testing protocols, obtained agency approval, and two pilot installations are in progress. Over 80% nitrate reduction and likely CEC reduction

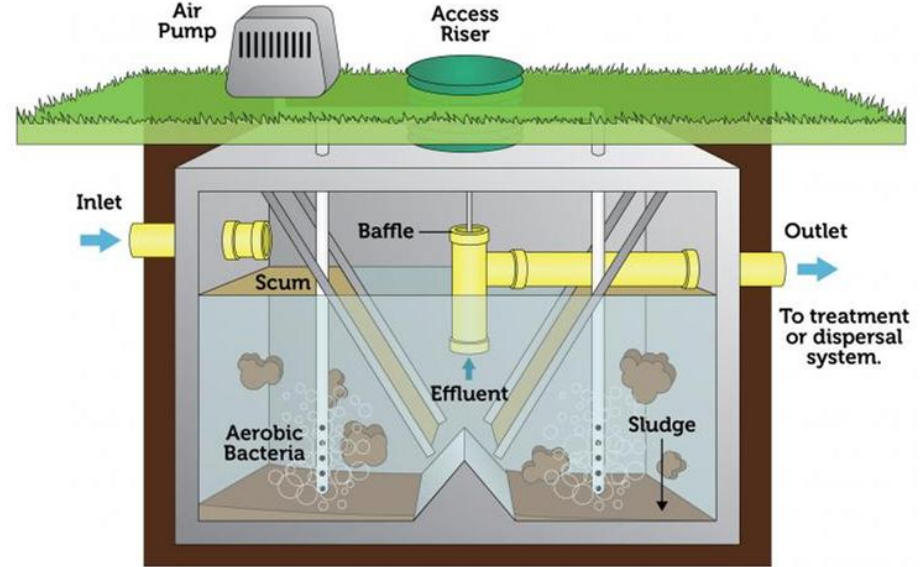


Over 50 incineration toilets have been installed as replacements to porta-potties, facility toilets, and home toilets. Zero water, zero effluent

Options for Conversion- Individual Wastewater Systems (IWS)

Aerobic Treatment Units (ATUs)

- Alternatives to septic tanks
- Provides chambers that add or remove oxygen to increase microorganisms to break down organic matter and nutrients



Options for Conversion- Individual Wastewater Systems (IWS)

Geotextile Sand Filters(GSF)

- Percolates the wastewater after a septic tank into different layers in the ground to filter out contaminants
- Enhanced leach field for higher treatment
- Eljen system creates module configuration
- Reduces the leach field size by 40%, which is the most expensive component of an onsite system



Successful installation of Eljen system at HPP home

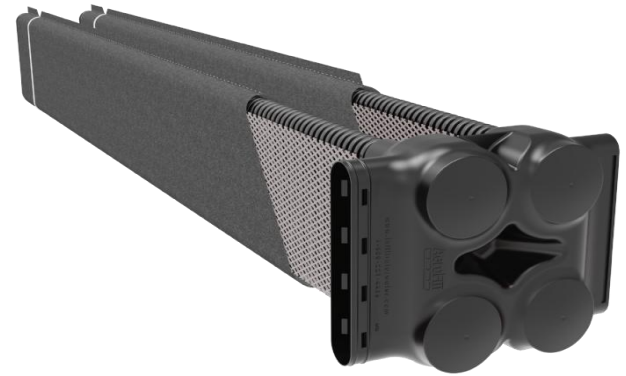
- Replaced existing cesspool
- Donation from Eljen & ACSI
 - Eljen is veteran-owned (3x Hire Vets Award)
 - Recipient: Local veteran Jarvis Valera



Options for Conversion- Individual Wastewater Systems (IWS)

AeroFin Technology

- Passive onsite wastewater treatment system
- Treats & disperses wastewater in the same footprint
- Removes 99% of wastewater contaminants
- Minimal space needed- each unit is 8 feet long and an outside dimension of 12.75 inches



Innovative Technology- Greywater Reuse System

Greywater treatment technology

- LeapFrog is a plant-powered ecological water treatment system
- Plants and microbes clean greywater for reuse in toilet flushing and irrigation
 - Could work alongside incineration toilets or composting toilets
- Kitchen blackwater cleaning version coming in 2024!



Cesspool Conversion Rates

- Mandate goal is 83,000 by 2050
- Currently 200-300 conversions per year
- Increase to 3,000 to reach mandate goal
- Costs \$30,000 - \$50,000 per home, estimated total cost ~\$3-4 billion



Community Scale Wastewater Systems

- Cluster or Decentralized Systems
- Ideally between 20 and 200 homes
- Pressurized Liquid-Only Sewer (Prelos)
 - Wastewater is directed into a tank for the purpose of retaining sludge
 - Small diameter piping, shallow, easily installed
 - Less clogging and subsequent O&M cleaning or flushing
 - Effluent is transported to a small-scale treatment facility package plant



Community Scale Wastewater Systems

Packaged Wastewater Treatment

- New WAI Partnership
- Stainless steel package wastewater treatment plants - corrosion resistant for coastal areas
- Can treat wastewater to reuse standards
- Features include remote monitoring, small footprint, pre-design for faster implementation



Innovative Cesspool Conversion Programs

EPA's Supplemental Environmental Projects (SEP)

- A SEP is an environmentally beneficial project that is included as part of a settlement with the EPA for environmental violations (like large capacity cesspools)
- Violators voluntarily agree to undertake such projects in lieu of penalty reductions for the violations. Funds are used to help low-moderate income folks.
- A Win-Win: Funds are used locally on environmentally beneficial projects like cesspool conversions. That gets us closer to converting more cesspools by 2050.

Successful Projects (current and ongoing)

- 2024: 3 residential cesspools for low/middle income replaced with clean water technology on Hawaii Island
- 2025: 2 residential cesspools to be replaced in Hawaii





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Questions?

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