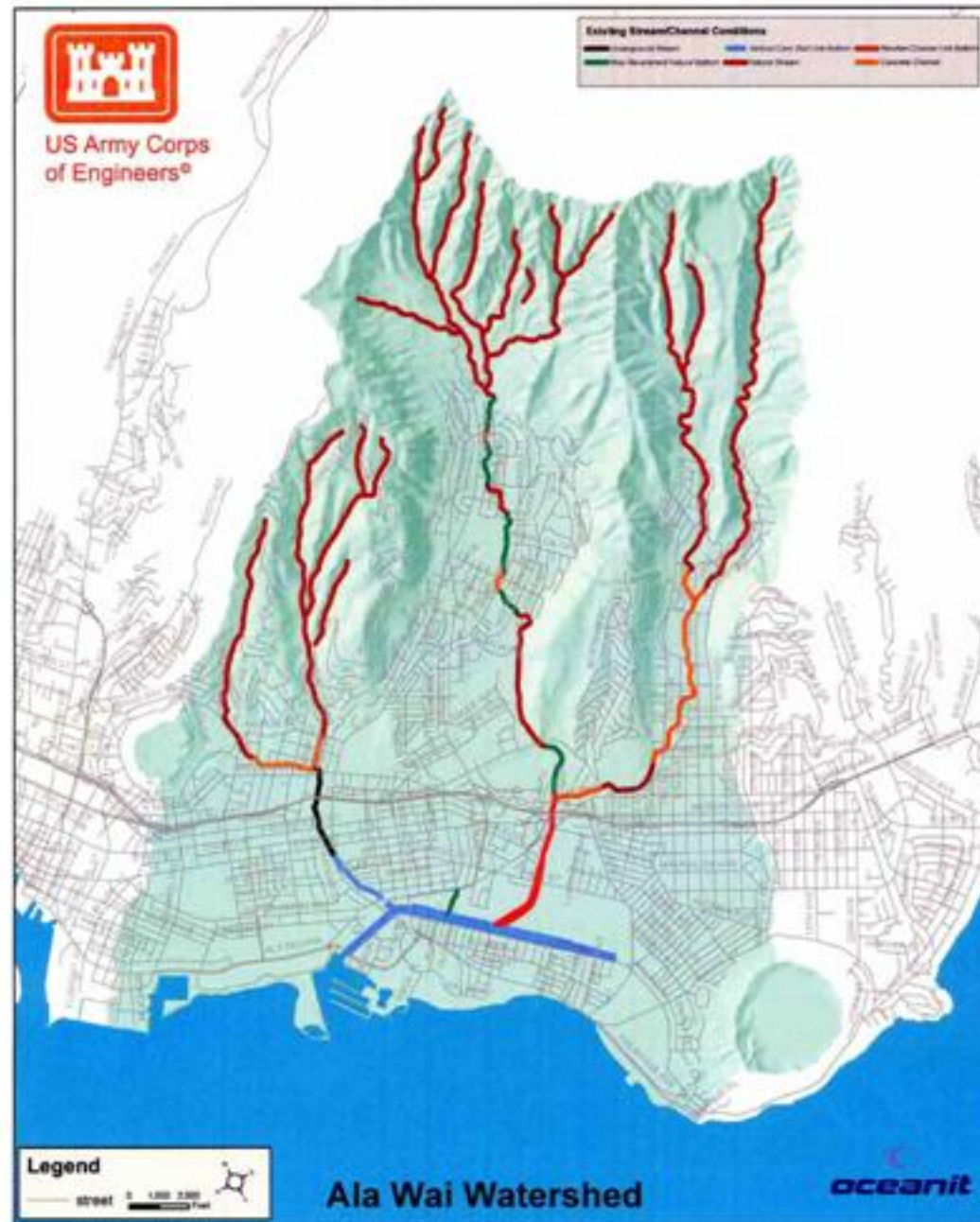


Designing A Constructed Wetland to Treat Urban Stormwater Runoff in Manoa

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Background

- ▶ Ala Wai Canal drains Manoa and Palolo Valleys
- ▶ Listed by EPA as an impaired waterway for sediments and nutrients
- ▶ Urban pollutants (pesticides) are of concern
- ▶ Water receives NO treatment on its way to the ocean



Community-Based Solutions

- ▶ Reducing use of outdoor chemicals—fertilizers, pesticides, cleaning solutions, etc.
- ▶ Keeping soil covered
- ▶ Cleaning up after pets
- ▶ Establishing and maintaining green belts around waterways
- ▶ Capturing and treating urban runoff in natural or constructed wetlands

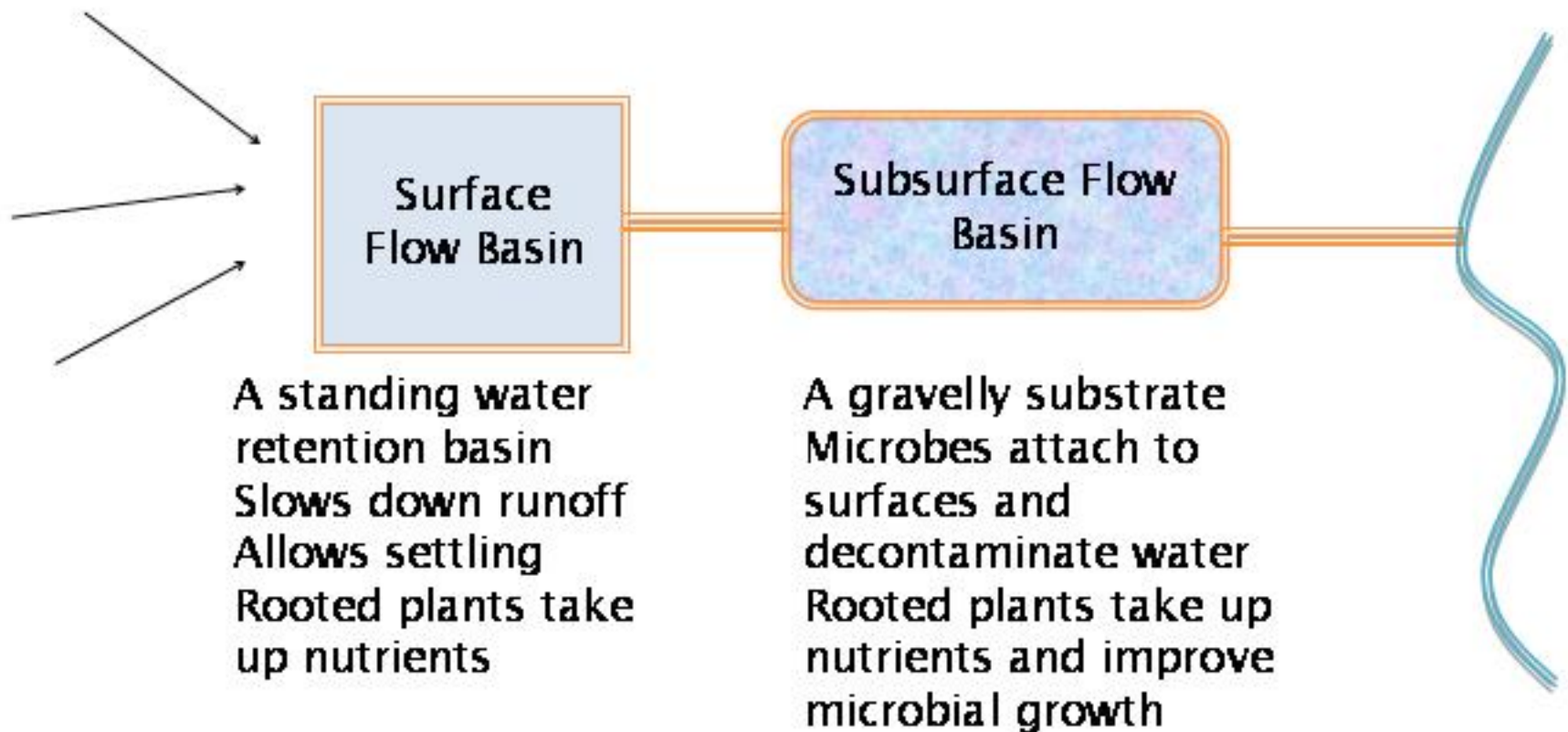
What is a Constructed Wetland?

- ▶ An engineered wetland designed to capture, filter, and treat a wastewater source
- ▶ Can be household, commercial, or industrial wastewater
- ▶ Can be runoff from an urban or rural area
- ▶ Often is multiple “cells” to slow water movement

Stormwater Constructed Wetland

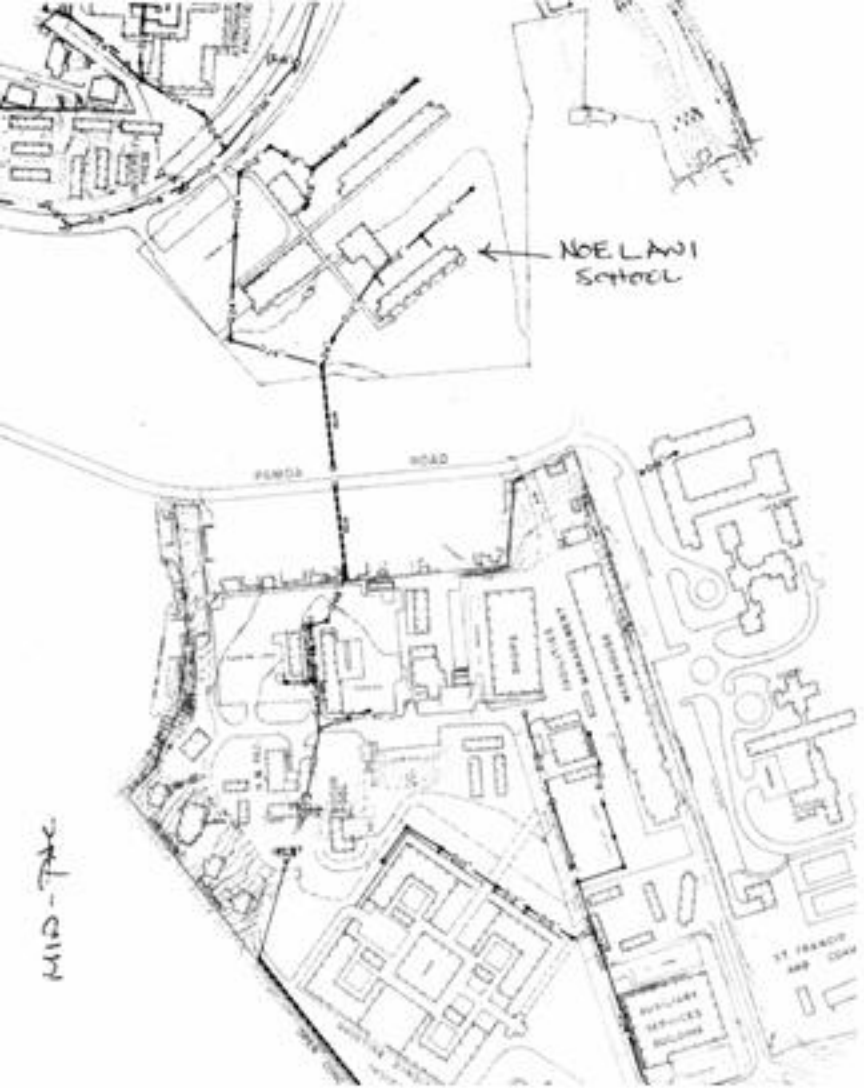
Runoff Inflows

Outlet Stream



UH Manoa Constructed Wetland

- ▶ A 48-inch stormwater pipe empties onto campus behind the Biomedical Building
- ▶ The pipe drains surrounding area, including Noelani School, Institute for Astronomy, and part of Manoa Marketplace
- ▶ Water flows through open channels to Manoa Stream
- ▶ We are designing a multi-cell constructed wetland to treat this stormwater runoff



MID-TRAC



Our Project

- ▶ **Funded by the EPA P3 program**
 - P3 = people, prosperity, planet
 - Student sustainability design challenge grants
- ▶ **Phase 1**
 - identify the challenge
 - design a sustainable solution
 - present design at annual symposium in DC
- ▶ **Winners receive the Phase 2 implementation award**

Work So Far

- ▶ **Assemble the team of faculty, students, and professionals**
 - Environmental science
 - Biological engineering
 - Oceanography
 - Education
 - Army Corps of Engineers
 - Noelani School

Work So Far

- ▶ **Delineate the drainage basin**
 - Size and elevation contours
 - Inlet points for the storm drain
 - Potential pollutants entering the drainage system

Next Steps in the Process

- ▶ **Collect weather and storm flow data**
 - Rainfall intensity and duration
 - Storm water flow rates
- ▶ **Collect and analyze water samples from inlet and outlet points**
 - What are the major pollutants?
 - Compare to pollutants in the Ala Wai Canal

Next Steps in the Process

- ▶ Model hydrology of the basin
- ▶ Design a custom wetland to handle flows and pollutants
- ▶ Select native plants to grow in the basin cells
- ▶ Present design at DC symposium
- ▶ Begin talking to UH, City and County, State of HI, and EPA about funding for implementation

The Team

▶ Faculty

- Travis Idol and Carol Ferguson, NREM
- Loren Gautz, MBBE
- Eric DeCarlo, Oceanography
- Pauline Chinn, Education

▶ Students

- Verawati Olivera, Alyssa Cho, Kaori Caraway, Devin Takara, Edward Muhlbauer, Vernelle Oku

▶ Partners

- Dr. John Cusick, UH Environmental Studies Center
- Roxanne Adams, Head of UH Landscaping Department
- Derek Chow, Army Corps of Engineers, Ala Wai Restoration Project Coordinator
- Noelani School, Principal Mahoe and the 3rd grade class