2nd Conference on Water Resource Sustainability Issues on Tropical Islands

December 1-3, 2015

Darren T. Lerner, PhD
Director, Sea Grant College Program
Interim Director, Water Resources Research Center
University of Hawai‘i at Mānoa
Introduction

1. Mission
2. Faculty Research
3. Funding & Support
4. Competitively Funded Research (104b)
5. Future Directions
Mission

WATER
WATER
WATER
WATER
FRESHWATER
Mission

WHAT

WHO

HOW

WATER
To promote understanding of critical state and regional water resource management and policy issues through research, community outreach, and public education.
Partnerships

- WRRC & CEE (2.0 FTE)
- WRRC & GG (1.0 FTE)
- WRRC (2.5 FTE)
Faculty Research

Research Divisions

- Hydrological Sciences
- Water & Wastewater Engineering
- Human Dimensions & Economics
- Environmental Assessment & Protection
- Water Quality, Ecology & Public Health Sciences
Faculty Research

Hydrological Sciences Division

- Application and Assessment of Watershed & Groundwater Models
- Flow and Transport in Field Soils
- Databases and GIS
- Bioremediation in Tidal Aquifers
- Contamination by Agricultural and Cesspools
- Modeling Multiphase Flow & Transport of Hydrocarbons

See Sessions K & N
Faculty Research

Hydrological Sciences Division

- Earth Remote Sensing
- Land-Atmosphere Interaction
- Data Assimilation: Techniques, Development and Applications
- Optimization Techniques and Parameter Estimation in Hydrology
- Application of Artificial Intelligence Methods
Faculty Research

Water & Wastewater Engineering

- Water Reuse
- Biodegradation of Toxic/Hazardous Waste
- Biological Water and Wastewater Treatment
- Membrane Separations

See Session M
Faculty Research

Water Quality, Ecology & Public Health Sciences

- Environmental Microbiology
- Microbial Source Tracking
- Recreational Water Quality
- Rapid Methods for the Quantification of Enterococci

See Session J
Faculty Research

Water Quality, Ecology & Public Health Sciences

- Environmental Microbiology
- Environmental Virology
- Aquatic and Terrestrial Microbiology
- Public Health Microbiology
- Disinfection Toxins in Water
- Water Quality Standards
- Bacterial & Viral Contamination
Faculty Research

Information & Technology Transfer

• Environmental Health
• Contaminant Fate and Transport
• Groundwater Hydrology
• Land-Based Over-the-Horizon Ocean Radar
• Watershed Studies
• Water Supply and Sanitation
Faculty Research

Environmental Assessment & Protection

- Environmental History
- Environmental Education
- Protected Area Politics
- Ecotourism
Funding & Support 2005-2015

NON-FEDERAL
- State Civil Defense
- State Department of Health
- Board of Water Supply
- DOT Highways
- DLNR
- HI Department of Agriculture
- C&C of Honolulu
- Korean Inst of Geoscience
- N Carolina State University
- Louisville Water Company
- Environet
- AECOM
- Clear Environment LLC

FEDERAL
- US Fish & Wildlife
- USGS
- DOD Army
- NOAA-NMFS
- USDA-NIFA
- Federal Hwy Admin
- US Agriculture
Competitively Funded Research (104b)

Hawai‘i

American Samoa
Water supply: satisfying growing water demand, including desalination, reuse, transfer, conservation, demand management; identifying and assessing new water sources

Water system infrastructure: modeling of asset replacement; analysis of infrastructure integrity; forensic analysis

Water quality: methods to restore water quality, especially leading to increasing usable water supply, including models of the fate and transport of contaminants and methods of treating wastewater

Water institutions, law, economics: methods of increasing usable water supply through institutional refinement; water allocation laws and institutions in Hawaii; methods of planning for or pricing water to increase efficiency of use.
Toward an Understanding of Residential Water Conservation Behaviors on Oahu

A Novel Approach for Estimation of Evapotranspiration

Numerical Simulation of Cold Intermediate Depth Seawater Circulation Through the Keauhou Aquifer in North Kona, Hawaii
Competitively Funded Research
American Samoa (2015)

- Geochemical Delineation of Aquifer Boundaries and Assessment of Groundwater Quality on Tutuila Island, American Samoa
- Identifying Future Hotspots for Algal Blooms: A Multi-dimensional Analysis Evaluating Impacts of Potential Land-based Sources of Pollution
- Capacity Building and Science Communications for Groundwater Sustainability Work in American Samoa
- Rainwater Harvesting in American Samoa: Current Practices and Health Risks

University of Hawai'i
Water Resources Research Center

NIWR
USGS
Future Directions

National Science Foundation EPSCoR:
Experimental Program to Stimulate Competitive Research
Future Directions

EPSCoR Objectives

1. Develop new conceptual models of subsurface water distribution and flow that account for the Pacific island volcanic geology and geophysics.

2. Develop tools to allow decision makers to make informed choices about water resource management.

3. Provide STEM pathways to develop diverse water scientists and policymakers.
Future Directions

Faculty Hires

50/50 Splits

Hydro Geophysicist (HIGP)
Groundwater Hydrologist (CEE)
Economist (SSRI/UHERO)
“[Obtaining water security] will be more readily achieved if an entity dedicates itself to facilitating consistent metrics and tracking of measures over time, ensuring that data from multiple sources is harmonized in a centralized and secure location...”
Future Directions

Partnerships & Leveraging University Assets
Future Directions

University of Hawai‘i Partnerships

- Water Resources Research Center
- International Pacific Research Center
- Pacific Islands Climate Science Center
- Department of Geography
- Cyberinfrastructure & ITS
- Hawai‘i Groundwater & Geothermal Resources Center
MAHALO