WERI 2017 Research, Education, and Outreach Agenda

WERI's Research, Education, and Outreach Agenda is based on WERI's mission statement (previous section) and advice obtained from its annual WERI Advisory Council Meetings. Staffing decisions, research priorities, and annual funding decisions are agreed upon by the faculty, guided by WERI's vision statement, below:

WERI Vision Statement

WERI maintains a faculty with expertise in each component of the natural water cycle and water resource management stream pertaining to the islands of Guam, FSM, and CNMI—from precipitation to coastal discharge, and from drinking water production to wastewater treatment. Research is strongly focused on local and regional needs, but also extends to basic research on topics of broader scientific interest. WERI leverages its local expertise by collaboration with the USGS Pacific Islands Water Science Center, with which it jointly administers a comprehensive hydrologic data collection program for Guam. WERI maintains laboratories staffed with expert technicians, and equipped for water quality analyses, GIS applications, field instrumentation, and database maintenance. WERI faculty support the University of Guam's graduate environmental science program and have lent crucial assistance to the establishment of the university's new School of Engineering. WERI recognizes that excellence in graduate instruction, deliberate recruitment, ample funding, and conscientious mentorship of talented graduate research assistants is fundamental to its success. WERI takes great pride in the success of the young scientists and professionals whose careers began under the guidance of its faculty. WERI faculty also provide vigorous programs for local professional development and school outreach in water resources education.

I. Research, Training, Education and Outreach Programs

Guam Activities

I. Northern Guam Aquifer Research

A. Baseline/Core Products

1. Maps and Databases
   a. Northern Guam Map Series
      i. Aquifer map (since 2014, ongoing, 5-yr update due 2019)
      ii. Sinkhole map (King, Kottermair, Wen, Habana)
      iii. Aerial mapping of northern Guam sinkholes and other hydrologic features (Heitz, Habana, Wen)
   b. NGLA Database (since 2014, ongoing) (Kim-Habana/Bautista)
      i. Restore Coastal Aerial Imagery of northern Guam (Taborosi)
2. CWMP data collection program (Kim & Habana/USGS-PIWSC) (since 1998, ongoing)
   a. CWMP-MSERP data collection and monitor-well expansion (Habana & Kim) [GWA]
3. One-Guam Aquifer Monitoring Program (OGAMP) (Jenson-Anthony, prospective) [GWA]

B. Water quantity/availability

1. Groundwater modeling: sustainable yields (Habana/Superales) (since 2015, ongoing)
2. Exploration of coastal discharge by remote sensing (King-Habana-Jenson) (new, 2018-2021)
3. NGLA freshwater lens thickness (Habana/Dougher) (since 2015, ongoing)
4. 2016-2017 GWA production-well rehabilitation assessment: Lessons Learned/Manual for Well Exploration and Development (Kim, Habana, Jenson)

C. Water quality

1. Patterns and trends of salinity in the NGLA (Habana) (since 2015, ongoing)
2. Contaminant profiles in GWA drinking water production wells over last 20 years (Denton) (new, 2017)
3. Wastewater and contaminant assessment and control (Habana, Rouse) (Since 2015, ongoing)

II. Southern Guam Watersheds Research

A. Baseline/Core Products

1. Maps and Databases
   a. Southern Watershed Map Series
      i. Restore Coastal Aerial Imagery of southern Guam (Taborosi)
      ii. General watershed map from aerial imagery? (Habana-Heitz, others)

B. Water quantity/availability

1. Santa Rita Spring rehabilitation (Jenson-Habana-Lander/Bourke)
2. Quantifying ungauged streamflow (Heitz-Lander)

C. Water quality

3. Toguan River hydrology and quality (Lander-Khosrowpanah)

III. Guam Water Resource Management

A. Baseline/Core Products

1. Guam Water-Use Database: Water-use data compilation and research (Kim)

IV. Guam Training, Education and Outreach Activities

A. Baseline/Core Products

1. GHS-CWMP Website (Kim & Habana)
2. Annual GHS Trend Reporting (Habana and GHS Team: Kim, Wen, Bautista + students)
   a. Rainfall and recharge (Lander, Habana, Jenson)
   b. Aquifer salinity (Habana, Kim, Wen, Jenson)
   c. Wastewater markers (Habana, Rouse, Wen)
3. Annual Workshops & Presentations
   a. GHS Professional Workshops (same topics as trends reports + related topics)
   b. Presentations to policy-makers: Legislature, CCU/GWA
   c. Aquifer tours (Jenson & Habana)
      i. Executive/professional tour: 2018—Legislature & One-Guam (with GWA)
      ii. Educational: UOG students (physical geography, civil engineering)
      iii. Outreach: local school science teachers, with Water Kids (see below)

B. Water Kids (Card & Card)

1. K-12 teacher workshops (including aquifer tour, above) (Card & Card)
2. School presentations (Card & Card)

FSM Activities

I. Wastewater management and treatment

A. Yap sewage composting (Rouse)

II. Education and outreach

A. Yap digital atlas (Taborôši)

B. New outreach education on water resources for K-12 (update previous work)

CNMI Activities

I. Water quality

A. Impact of past and present land-use activities on heavy metals and other recalcitrant contaminant in fisheries resources and bio-monitors from Saipan coastal waters (Denton)
B. Arsenic speciation and Hg/Se ratios in popular table fish from Saipan Lagoon (Denton)
C. CNMI Park Service opportunities—follow on to current work

II. Water Resource Management

A. Baseline/Core Products

1. CNMI Water-Use Database: Water-use data compilation and research

Regional Research and Outreach Activities

I. ENSO – PEAC (Lander)

1. ENSO Newsletter
2. Conference/workshop presentations

Basic Research (of interest to region and beyond)

I. Karst Aquifer Evolution (Jenson, NSF collaboration with Gulley, USF)

1. Water & air sampling in new and existing wells
2. Dovetail with new well installation projects (MSERP)

II. Guam/West Pacific Paleoclimate (Jenson, unfunded collaboration with UT-A, CalTech)

1. Maintain Jinapsan Cave database (2008-2016 records), UT collaboration
2. Speleothem analyses for Bomb Tritium and past 1500 years paleoclimate