Performance Report for Award No: NA030AR4810138
For the Period from July 01, 2005 to December 31, 2005

University of Hawaii-Manoa

EEP Environmental Demonstration Project: Watershed Management to Protect Coastal Areas of Hawaii

Section I: Status of Award Activities

During this reporting period, three student interns and one graduate research assistant were employed, trained and mentored. As stated in previous Performance Reports, the graduate research assistant is Mrs. Dana Okano. Student interns for summer and fall 2005 were David K. Bishaw, Katie L. Kamelamela, and Mark Manuel.

Mr. Bishaw is a junior and enrolled in the Bachelor's of Science degree program in Tropical Agriculture at the University of Hawaii, Hilo. Ms. Kamelamela is a junior at the University of Hawaii, Manoa. Her major is Botany and Hawaiian Studies. Mr. Manuel is a senior at the University of Hawaii, Hilo and is majoring in marine science.

Student interns had the following watershed assignments and mentors for the reporting period:

(i) In Summer and Fall 2005, David Bishaw worked in watersheds along the Hilo and Hamakua coasts on the island of Hawaii. His agency mentor is the USDA Forest Service Pacific Southwest Research Station (Institute of Pacific Islands Forestry Research Laboratory in Hilo), in cooperation with the University of Hawaii-Hilo, Department of Marine Science (see assignments and mentors for Mark Manuel below).

(ii) Katie Kamelamela continues working in the Kaiaka Bay and Kailua Bay watersheds located on the island of Oahu. The State of Hawaii Department of Health located in Honolulu is her agency mentor.

(iii) Mark Manuel is assigned to the Hilo Bay watershed, island of Hawaii. His agency mentor is the University of Hawaii-Hilo, Department of Marine Science, in cooperation with the USDA Forest Service Pacific Southwest Research Station (see assignments and mentors for David Bishaw above).

(iv) During summer 2005, the interns completed their University of Hawaii Hawaiian Internship Program (UH-HIP) orientation, submitted summer project proposals, participated in intern seminars and field trips, attended the Hawaii Conservation Conference, completed the project work, gave oral presentations on their results during the summer and wrote reports on their efforts. During the fall 2005 internship, students continued project-related field work, attended bi-weekly seminar meetings at which they presented and discussed their project results, and planned research papers for submission to NOAA's Education Partnership Program, Education and Science Forum in fall 2006.

Section II: Success Stories

Environmental Demonstration

1. Through the summer and fall internships and research assistant participation, students learned and applied the following knowledge, skills, tools and technologies (see Table 1, new entries for this reporting period are italicized)

Table 1:

Knowledge, Skills, Tools, and Technologies	**Equipment Make/Model**	**Software**
Hawaii Stream Visual Assessment Protocol	USDA/DOH	
Hawaii Stream Bioassessment Protocol	UH/DOH	
Freshwater aquatic vegetations sampling and identification		
GeoPositioning System Operation	Trimble	Pathfinder
GeoPositioning System Operation	*Trimble*	*ArcPad*
Watershed mapping		*ESRI-ArcView*
Systematic Planning Process for Water Quality Data Collection and Analysis	*USEPA/USDOE*	*DQO Workbook, Visual Sample Plan*
MultiParameter Water Quality Probe Operation and Maintenance	YSI 85 and YSI 6920	
Turbidity Meter Operation and Maintenance	Hach	
Aquatic Temperature Sensor Operation and Maintenance	Onset HoboTemp	Boxcar
Stream velocity measurement	Swoffer velocity meter (prop type, digital) Price velocity meter (pygmy/cup type, mechanical)	
Stream channel geometry measurement	Measuring tapes, sonic rangefinder	
Stream discharge calculation	USGS Mid-section method	
Stream discharge estimation	USGS Slope-area method	
Culvert discharge estimation	USGS	
Digital photography	Various	Image processing and file management
Water level recorder operation and maintenance	USGS	
Rain gage operation and maintenance	USGS	
Water quality grab sampling	DOH	
Water quality automated sampling	USGS, DOH	
Bacterial indicator sample analysis	IDEXX Enteroalert	

Table 1 (continued)

Water Quality Data Analysis		Microsoft Excel statistical analysis functions
Water Quality Modeling	USDA	AnnAGNPS
Water Quality Modeling	NOAA	N-SPECT

2. The project graduate research assistant (Okano) and PI Penn participated in a Science Review of NOAA Pacific Service Center water quality modeling tools (see item 5 below) and served as beta testers for software development. Use of this software (N-SPECT) was demonstrated to project interns and is being applied, along with other watershed modeling tools to the Hilo Bay watershed. Okano has done sensitivity analysis and calibration with N-SPECT. She also attended the Hawaii Ocean Resources Management Plan (ORMP) Workshop coordinated by the Department of Business, Economic Development and Tourism, Office of Planning, OHA, and DLNR in October, 2005. She learned how to identify problems and opportunities for ocean resource management in the State as part of the State's long-range planning goals.

3. Kamelamela received a fellowship from the Society of Wetland Scientists to present her internship results at an annual conference.

4. Interns and their efforts continue to serve as catalysts for interactions and collaborations between researchers and managers. Through this EPP program effort, program coordinators were able to recruit UH-Hilo's Tracy Wiegner as a mentor for intern Mark Manuel, both of whom work collaboratively on watershed projects with intern David Bishaw and mentor Flint Hughes with the USDA Forest Service. Additionally, Wiegner hosted a local middle school teacher through UH-Hilo's Research Experience for Teachers (RET) program, who worked with both interns over the summer and learned about their projects so as to connect those ideas back into her classroom
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5. This demonstration project continues to engage students in applied, hands-on learning about their environment. Benefits to NOAA include training of students for NOAA and other environment-related careers and complementing existing Sea Grant minority internship programs. Results from this project will also help the State of Hawaii to optimize its water quality management strategies.

Section III: Education and Outreach Efforts

1. Three undergraduate students participated in internship opportunities and one graduate student participated in research opportunities. Intern participation with partners was coordinated by the University of Hawaii Pacific Internship Program for Exploring Science (PIPES, which includes the UH Hawaiian Internship Program (UH-HIP); PIPES

facilitates, helps structure , and monitors the 10-week, full-time, paid summer internships) and the University of Hawaii Department of Natural Resources and Environmental Management (which administers project finances through the Research Corporation of the University of Hawaii).

2. Students are participating and will continue to participate in numerous projects of varying scope (see Table 2, new entries for this reporting period are italicized).

Table 2:

Project (Current Scope of Intern Participation[1])	Watershed/Island	Project Leader[2]
Examine storm flow data in terms of bioavailability of dissolved organic matter and nutrients to bacterial communities (ii, iii)	Hilo Bay/Hawaii	UH-Hilo
Impacts of land-cover/land use change on water quality: sampling stream chemistry from forest to sea (i,ii,iii)	Hilo Bay/Hawaii	USDA-IPIF
TMDL Development for Waiakea and Alenaio Streams (i,ii,iii)	Hilo Bay/Hawaii	DOH-EPO, USGS, and URS, Inc.
Hilo Bay Watershed Background File and Watershed Advisory Group (i,iii,iv)	Hilo Bay/Hawaii	DOH-PRC and UH-WRRC
Hilo Bay Watershed Based Plan (i,iii,iv,v)	Hilo Bay/Hawaii	DOH-PRC and UH-WRRC
TMDL Development for the Kaelepulu Stream System (i,ii,iii)	Kailua Bay/Oahu	DOH-EPO and Kaelepulu TMDL Work Group
TMDL Development for Kaukonahua Stream and Wahiawa Reservoir (i,ii,iii)	Kaiaka Bay/Oahu	DOH-EPO and TetraTech EM, Inc.
Kaiaka-Waialua Bay Watershed Background File and Watershed Advisory Group (i,iii,iv)	Kaiaka Bay and Waialua Bay/Oahu	DOH-PRC and UH-WRRC
TMDL Development for Kapakahi, Waiawa, Waimano, Waimalu, Aiea, Kalauao, and Halawa Streams (i,ii,iii)	Pearl Harbor/Oahu	DOH-EPO and TetraTech EM, Inc.
TMDL Implementation for Kawa Stream (ii,iii)	Kaneohe Bay/Oahu	DOH-EPO
Surface Water Quality Monitoring and Assessment (ii)	Oahu and Hawaii islands	DOH-MON
Water Resource Data Collection (i,ii,iii)	Hawaii and Pacific Region	USGS
Water Resource Investigations (i,ii,iii)	Hawaii and Pacific Region	USGS

[1]Tasks from Project Objectives (p. 5) and Table 4 (Training Objectives, p. 10) in NOAA proposal
(i) Gather and assess watershed background information
(ii) Monitor Watershed Conditions
(iii) Compute Water Quality Goals

(iv) Develop Management Plans to Achieve Goals
(v) Evaluate Management Plans

[2]DOH = State of Hawaii Department of Health
EPO = Environmental Planning Office
PRC = Polluted Runoff Control Section, Clean Water Branch
MON = Monitoring and Assessment Section, Clean Water Branch
UH-WRRC = University of Hawaii Water Resources Research Center
USGS = U.S. Geological Survey

3. Entrepreneurial training courses, workshops, conferences or seminars were held during this reporting period. During the Fall 2005 semester, students were enrolled in a seminar course that covered the following topics:

Date	Seminar Topic	Speaker	Affiliation
09/12/2005	Student progress updates	Bishaw & Manuel	Interns (NOAA)
09/26/2005	Continue student progress updates	Kamelamela	Intern (NOAA)
10/10/2005	N-SPECT modeling update and data gathering	Okano	Research Assistant (NOAA)
10/23/05	Statistical procedures	Penn, Yanagida	DOH-EPO, UH-NREM
11/07/05	Data collection and statistical procedures	Penn	DOH-EPO
11/21/05	Cost-benefit analysis	Yanagida	UH-NREM

N-SPECT is a tool for examining the relationship between land cover, nonpoint source pollution, and erosion. This is a relatively new tool whose first version will be soon made publicly available. N-SPECT was introduced to the interns as a geospatial tool for watershed modeling. It can help them to rate water quality and target improvement efforts in the watershed.

In July, all three undergraduate interns attended the Hawaii Conservation Conference, which is the main annual environmental conference in Hawaii. Interns (Kamelamela, Bishaw, and Manuel) and research assistant (Okano) participated in several community-based watershed meetings, including the Surfrider Foundation (Oahu Chapter), the Kaelepulu TMDL Work Group convened by the State of Hawaii Department of Health and the Hilo Bay Watershed Advisory Group convened by the University of Hawaii Environmental Center (contract with the Department of Health).