

# Kapaa Elementary School, Kauai, Hawaii

<b>Organization:</b> Department of Education, State of Hawai'i	<b>POC Name(s):</b> [REDACTED] [REDACTED]	
<b>Address:</b> 4886 Kawaihau Road, Kapaa, HI 96746	<b>Phone:</b> [REDACTED] <b>Fax:</b> [REDACTED]	<b>E-Mail:</b> [REDACTED]
<b>Cost of final request:</b> \$ [REDACTED]	<b>Title of proposal:</b> Kauai Watershed Project: Kapaa's Community for Sustainability Understanding the Past, Connecting to the Present, and Leading the Future	
<b>Period of performance:</b> [REDACTED]	<b>Area of Interest:</b> Meaningful Outdoor Experiences	
<b>Person in Charge:</b> [REDACTED] Kapaa Elementary School 4886 Kawaihau Road Kapaa, HI 96746 [REDACTED]	<b>Partners:</b> 1. Department of Land and Natural Resources (DLNR) 2. University of Hawaii 3. Kauai Water Department Project Wet 4. Kauai Discovery Center (DOE, Koke'e) 5. Nawiliwili Yacht Club 6. Kauai Children's Discovery Museum 7. Kauai Kupuna (Hosea Lovell) 8. Aliomanu Restoration Project (Lovell/ Arinaga) 9. Kilauea Point and Wildlife Refuge 10. Kauai Eastside: Effective Communicators (DOE)	
<b>Address:</b> Hawaii DLNR 3060 Eiwa St., Room 306 Lihue, HI 96766	<b>Phone:</b> [REDACTED] <b>Fax:</b> [REDACTED]	<b>Resource:</b> [REDACTED] St, [REDACTED]
<b>Main Science Standard:</b> Malama I Ka 'Aina: Sustainability	<b>Number of Students:</b> 55 – 60 Grade 4 and Grade 5 students (direct); 850 K-5 students (indirectly)	<b>Summary of Work:</b> To engage students in Meaningful Outdoor Experiences through assessing and monitoring the Kealia and Kapaa river systems and bay, and by conducting restoration activities.

## Background

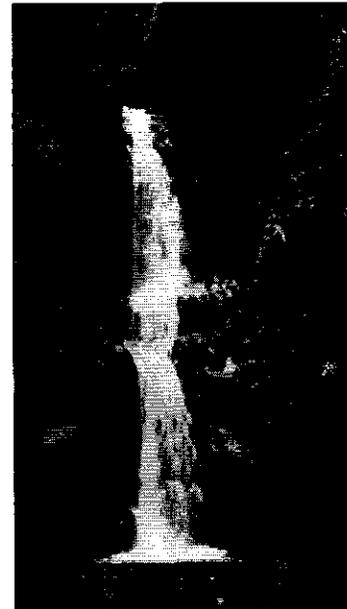
**Our Place.** The beautiful island of Kauai is an amazing environmental paradox. Picture paradise, and the media will show you Kauai, the “Garden Island.”

However, no garden is free of pests and the challenges facing our island are numerous. Plants run amuck with alien varieties strangling out endemic species on both the land and the reef. Natural forces including hurricanes and our abundance of rain cause Kauai to be known as the wettest spot on earth. Our land thus falls victim to elements that severely impact the landmass. An out of control pig and goat population tear up the remote forest environment, thus leaving the ground ravaged and defenseless. Local hunters and hikers from around the world walk a thin line to keep clear of each other. Tropical and sport fish introduced to mountain and valley streams voraciously drive the native species to the brink of extinction. Surf pounds the shore with twenty-foot faces but cannot undo the damage of waterfalls running red with eroded soil that blanket the reefs. Sugar cane fields have given way to agricultural lands subdivided and further parceled into condominiums into smaller lots for higher density development.

Kauai is loved by many, but cared for by few. The challenges we face are complex and



the resources to meet them are limited and very slow in coming. Regardless, in our classrooms at Kapaa Elementary School, we have moved beyond the “What ifs?” and research/ testing of our community based watershed and ocean project. We have opened the doors of our classrooms



to let Kauai, our place, be our laboratory. By studying the demands placed on our island, our students are taking an active role in restoring species and encouraging better stewardship. They are working to clean up some of the problems found in their own “backyard.”

Sustaining the environment is not the only aspect of our project. Leading and educating our community in efforts to restore healthy environments in our streams and oceans can be powerful through the voices of children. Students who come to understand the past, and who connect to the present issues become



stewards of their environment and powerful leaders for the future. Immediate actions can be accomplished to preserve and restore Kauai’s watersheds and ocean by being involved in authentic environmental learning activities that apply the concepts and performance standards of not only science, but all content areas including mathematics, social studies, language arts, and the fine arts. Teachers who are rooted in the theories of place-based and sustainable education enable our students to becoming the advocates for Kauai, for now and the future. Students’ voices can be heard in sophisticated presentations to a wide array of public organizations and the community. Students and teachers, in partnership with many of Kauai’s agencies, combine their knowledge to present their scientific findings in databases, websites, iMovies, and slideshows.

The direct target population for this proposal is sixty Grades 4 and 5 students at Kapaa Elementary School, a large rural school located on the eastside of the island of Kauai. As a result of the studies of this group of children, the entire school’s population will benefit from the multimedia documentation and presentations created for dissemination of their discoveries and findings. The large elementary school serves approximately 850 students who are bussed in from

many small neighborhoods from Anahola to Wailua. A significant percentage of the student population, 56%, receives free or reduced lunch qualifying the school for Federal Title I support. Additionally, 46% of the students are Hawaiian or part-Hawaiian who are also 95% of our lowest socioeconomic group.

The target community is Anahola to Kapaa and the Aliamanu Bay and the Kealia Bay watersheds. Formerly the eastside area of Kauai was sugar and pineapple plantations. Anahola and Kealia were built by the plantation for the sugar and pineapple workers. Kauai's eastside multicultural population reflects its roots. As a result of the plantation history, we are a mixture: Hawaiians, Portuguese, Japanese, Caucasian and Filipino. The Kapaa area of Kauai has been identified as the largest bedroom community on the island, and unfortunately, the area with the greatest amount of crime including theft, drug abuse, and violence. Added to this mix, is the recent development of large retirement homes in land tracks that have been used agriculturally in the past.

The lead teachers in this project, [REDACTED], represent a partnership that has been fostered through their mutual belief in place-based and sustainable education. Creating relevant learning experiences that engage the students as researchers, historians, and



community stewards is central to their localized curriculum. Both teachers have partnered with several community resources including the Kokee Discovery Center, the Department of Land and Natural Resources, the Kauai Children's Discovery Museum, Kilauea Point and Refuge, and the University of Hawai'i. The binding force of these partnerships is rooted in inquiry-based learning centered around the local environment and the issues

relative to the interaction of the Kauai people with the ecological domain. The children are fully engaged as scientists, and the teachers facilitate interdisciplinary curriculum based upon the water research and projects executed by the students. The teachers have historically been practicing this methodology for the past decade with each year indicative of their continuous improvement process. At this time, it is felt our collaborating community's goals and the goals expressed in the NOAA Bay Watershed Education and Training Program (B-WET) are in tandem. It is our hope that the knowledge and experience gained by this project will create a significant impact in the lives of many children, the community we serve, and the land and waters that need our protection and stewardship.

We have been seeking programs that match the criteria for ideal science instruction identified by the Hawaii Content and Performance Standards (HCPS) and place-based education. Our main standard is Malama I Ka 'Aina, Sustainability: Students make decisions needed to sustain life on earth now and for future generations by considering the limited resources and fragile environmental conditions. In an effort to use the Kauai ecosystem and its communities as resources, we are committed to utilizing the existing resources to facilitate our students' gain of a deeper understanding of their island, thus nurturing a proactive involvement in sustaining the island's natural resources and culture.

We believe that our people, history, and our environment are our strengths. We want our place-based science program to leverage these assets. The Anahola, Kealia, and Kapaa watersheds can provide the "hands-on" laboratories where students can see, touch, and learn about the environment they live in while providing the opportunity to make a difference in their own community and expand their knowledge to global issues. Additionally, Kauai's complex, diverse, and unique ecosystems can be brought alive in the classroom through a strong repertoire

and complement of outdoor and classroom experiences. Historically, the Hawaiians developed a stewardship philosophy that sustained the island's ecosystems and provided the foundation for developing a sustainable society. Consequently, the islands' ecosystems can provide a genuine, locally relevant source of knowledge that perpetuates the island tradition of sustainability and can be used to help advance student learning skills and problem-solving abilities across the entire school curriculum. These are the B-WET goals that resonate with our goals.

### **Project Objectives**

1. Continue to provide meaningful outdoor experiences for students (60) in grades 4 and 5 at Kapaa Elementary School.
2. Continue to utilize meaningful outdoor experiences to create awareness of Kaua'i's:
  - a. Ahupua'a System – from the mountain to the sea
  - b. Habitats
  - c. Adaptations
  - d. Change
3. Continue to promote the wellness and health of our island ecosystem by being stewards and “taking care of the land,” Malama I Ka Aina a Me Ke Kai:
  - a. Land and ocean
  - b. Land and streams
4. Continue to develop meaningful learning experiences that nurture a sense of place by putting students back in touch with nature causing them to be informed decision-makers and advocates for their local environment.

5. Continue to build partnerships that will focus attention on Kauai's eastside's Anahola to Kapa'a watershed and give students a common area of interest and a respected voice in the community. A focus will be place on documenting the stories of the elders, our kupuna.
6. Continue to assess the environmental quality and health of the Kealia river (Kapaa stream), tributaries, shoreline, coral reef and bay and teach students how to document and interpret data.
7. Continue to teach and facilitate students in how to use scientific tools to measure, survey, monitor, conduct tests and to recognize factors that indicate a healthy or troubled environment.
8. Establish a system to contribute to the body of data regarding stream consistence and source of rubbish in environment and fish populations and health.
9. Continue to restore the habitat through rubbish and plant removal on land and in the streams and ocean.
10. Expand and continue to monitor and grow limu in Aliomanu Bay.
11. Continue to monitor the repopulation of the o'opu in the Aliomanu to Kapaa watersheds and ocean.
12. Continue to expand awareness and understanding of the environment and ecology and increase science literacy through hands-on activities.

13. Continue to stimulate observation, motivate critical thinking, develop problem-solving skills, and raise students' social awareness and ability to contribute to the community.
14. Document the process and results through journals, posters, group reports, art, essays, photography and video and to educate the public, including the student population of the Kapaa Elementary School, through these media. The new information will be added to the present classroom and school websites that are available to the entire public.
15. Establish a communication process with the Kauai Children's Discovery Museum (KCDM) B-WET student team for their project, Malama Hoopili returning Hanamaulu. Students will be encouraged to share their findings and processes of discovery through the use of a variety of technological communication tools.
16. Increase sophistication of the use of technology as a means of investigation and communication.
17. Investigate and create other partnerships that provide students with experiences during non-school hours (afterschool, vacations/ intersessions, and weekends).

## **Purpose**

Kapaa Elementary School respectfully requests [REDACTED] from NOAA's B-WET program to fund an integrated environmental education program for students in the east Kauai'i watershed. Through Meaningful Outdoor Experiences and hands-on activities, students will investigate the health of the stream system and bays and take restorative action. Partners in this collaborative include the school, the Hawaii State Department of Land and Natural Resources

(DLNR), the Kauai Water Department Project Wet, the Limu Restoration Project, the University of Hawaii, Kilauea Point and Refuge, and the Koke'e Discovery Center.

**Meaningful Outdoor Experiences should make a direct connection to the marine or estuarine environment and the watershed system**

**Preparation Phase.** The students will participate in hands-on activities from the Project Wet curriculum, NOAA Resources, Baltimore Aquarium's Living Water curriculum, and other relevant sources to increase their awareness of the stream and ocean environments, influential issues and impactful practices. The central question will be raised: What is the present health of our eastside streams and bays, and how are they being affected by human practices?

During this phase, Department of Water's Project Wet, the Department of Land and natural Resources, the University of Hawaii, the Koke'e Discovery Center, the teachers, and the Kaua'i Children's Discovery Museum (KCDM) will facilitate the in-school and out-of-school activities. The curriculum used will be specifically designed to align with the Hawaii Department of Education's Content and Performance Standards (HCPS II) in science for each grade. Students will investigate historical data, and the teachers will bring in long-time and former residents to talk story about "how it used to be" in this watershed, and students will predict from their own previous experience what problems they will find when they investigate the stream and ocean.

Teachers and resource personnel will introduce the use of tools such as microscopes, magnifiers, periscopes, and water testing equipment for monitoring dissolved oxygen, water flow and nitrogen. Curriculum will also be concerned with literacy and technology standards.

Students will receive instruction in the practice of digital storytelling, including the use of digital cameras (still and video), computer editing software, and the elements of critical thinking and storytelling.

Students and facilitators will set goals for investigation of the river system and ocean. A visitation schedule for sampling, observing, collecting and experimenting will be established.

**Meaningful outdoor experiences are an integral part of the instructional program.**

All students will participate in both classroom activities and field research. The teachers have created classroom websites that will have ongoing information for the project. Standards and other projects can be viewed at the following URL:

<http://www.kapaa@k12.hi.us>

During the 2005-2006 and 2004-2005 school years, the classroom teachers, [REDACTED] [REDACTED] have been developing place-based curriculum relative to Kauai and completely aligned with the Hawaii Content and Performance Standards. Though the current central content area is science, a concerted effort has been made to develop interdisciplinary curriculum. Both teachers are presently in the third semester of their studies in a University of Hawaii at Manoa Masters Degree program in Curriculum Studies. These two teachers and the former Staff Facilitator/ Curriculum Coordinator for Kapa`a Elementary School, [REDACTED] [REDACTED] have targeted their graduate work on place-based and sustainable education. All course projects have been instrumental in building upon the curriculum work that the teachers have been working on for over a decade.

The lead teacher for the B-WET project will be [REDACTED]. She will oversee this program's development and facilitate all aspects of the student participation to complement or enhance in-school standards-based activities. She will be supported by colleagues [REDACTED] who is lead developer of the Aliomanu Bay Limu Restoration Project and [REDACTED], Staff Facilitator, currently on sabbatical for the purposes of researching place-based and sustainable education.

**Action Phase.** There will be three (four) sites for field research: Kealia stream children), Kapa'a stream, (Anahola) river, Anahola/Aliomanu beach, Kealia Beach and rocky shoreline, and Anahola/ Aliamanu coral reef and bay. All students will keep journals and record their observations and experiments through writing and drawing. Some students will also use photography and videography.

Through group discussions, students will generate ideas, raise questions and make predictions. Teachers will work with students in each grade level grouping to design and construct simple and increasingly complex investigations using systematic observations. Examples of the curriculum that integrates with current classroom curriculum for each grade level are as follows:

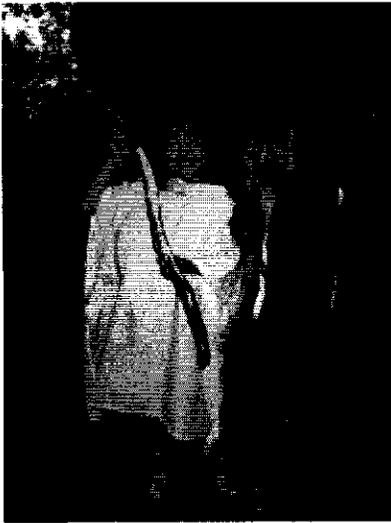
**Grade 5 students will study STREAM ECOLOGY.** During the preparation stage, students will have practiced using microscopes and preparing slides of inanimate objects. During their more active investigations, students will be taken to the river to study the abundance and biodiversity of macro invertebrates associated with accumulations of decomposing leaves in freshwater ecosystems. Observations will be made with magnifiers, periscopes and microscopes.

Field oriented experiments will help students determine the optimum conditions for biodiversity while also collecting and maintaining stream fish counts.

**The Foundation's Built! Time to Communicate.** Students in █████ fifth grade class have been collecting data on Kapaa stream for the past four years. During the 2004-2005 school year they partnered with students in the third, fourth and fifth grades for a project supported by a Hewlett-Packard technology grant. Students from the five classes used the wide range of technology supplied through the grant to record, compile, study, and share their findings based on the results of bi-weekly visits to the stream.

They visited the University of Hawaii Agricultural research center and spent three days in Kokee at the Discovery Center to further develop an understanding of how invasive species, land use, and changes in the ecosystem impact the water and land from the mountains to the sea. They shared their data with each other and presented their project experiences at the annual e-school conference on Oahu. Students were also recipients of a Mokihana grant, which supplied them with additional water testing materials and multiple copies of books related to the study of endangered species.

**Going public with their messages for stewardship.** Establishing a solid study of the watershed qualities must be communicated to the community in order to truly have profound impact. Though the school has computer labs and access to iBook carts, limited accessibility narrows the amount of time students can develop their projects, communicate their findings, and build their websites and iMovie presentations for public access and public service announcements. Providing additional time to investigate the environment and create products for communication through the use of technology can offer students constructive after-school, weekend, and vacation activity.



Students will spend several days in Kokee at the DOE Kauai Discovery Center, under the direction of [REDACTED]. Hikes will focus on indigenous, endemic, and the alien species that threaten them. The impact of introduced animals, such as goats and pigs will be studied, especially their contribution to land erosion and how it affects Kauai stream, estuary, and reef health.

Regular water quality testing of the Kapaa stream and estuary will continue, with students gathering data on water temperature, depth, pH, dissolved oxygen, nitrates, phosphates, clarity, odor, bacteria, salinity, and flow rate. Using Palm handheld computers, data will be compiled onsite with ongoing evaluation and assessment taking place back in the classrooms.

Students will participate in the Project Wet program sponsored by the Kauai Department of Water under the direction of [REDACTED], Manager and Chief Engineer. Student water testing results will be compared with sampling done through the Kauai Department of Water. Additionally, students will have the opportunity to get feedback on the validity of their results.

Under the guidance of DNLR fish and wildlife experts, students will conduct fish counts using catch and release techniques at the neighboring Kapaa Stream. In the classroom, students will raise native o'opu, documenting their growth and the environmental conditions of the classroom tanks. Students will review studies done on native o'opu so that they can set up healthy classroom tanks for firsthand study. After study, viable o'opu will be returned to the stream.

To contribute to building strong connections to the community, students will work with longtime community members to check Eastside streams for o'opu after heavy rains and invite senior residents into the classroom to share their stories of growing up in and around the Kealia plantation area. Using handheld GPS devices, students will plot areas of Kapaa Stream that test positive for high

levels of coliform, nutrients (nitrite, phosphate) and /or low levels of oxygen.

Based on personal preference and interest, students will choose one aspect of watershed health to address in a small group project (i.e. native birds, plants, fish, runoff, erosion, trash). Each group will present the results of their project to other classrooms at Kapaa Elementary School and set up a hands-on demonstration for K-5 students to explore.

Also, students will share their ongoing water quality study with Anahola and Kapaa communities via Live presentations and public service announcements that will be a product of iMovie production. They will present various aspects of their study and their individual projects to participants of the Hawaii e-school Conference on Oahu.

**Grade 4 students will study ENVIRONMENTS** that focuses the students' attention on conditions that surround an organism and that are necessary for its survival. Concepts to be explored include biotic and abiotic environmental factors, adaptation, precipitation, evaporation, controlled experiment, range, optimum conditions, response and variation. Students will be engaged in the limu restoration project in Aliomanu Bay and will consider the impact of stream flow and run-off into the bay. Students will continue to contribute to setting and monitoring limu cages with the intent to restore the reef's growth.

Students will also collect native limu and competing species that they will then experiment with by manipulating various environments created in the classroom. Students will engage in an inquiry-based scientific process to identify cause and effects of a number of variables. Hypothesis will be tested and results shared.

Additionally, the students will be taken to the rocky shore to investigate crabs and isopods. During the activities students will observe and collect, record and interpret data in their

own journals. Students will also be involved in using the GPS units and other technology and equipment as described in the Grade 5 plan.

**A Plan for B-WET Year Two.** As we discuss our first year, we would also like to share an Idea that we would like to develop and implement in our second year of working with NOAA. It is our hope that in the second year of our B-WET project, we will be able to secure a partnership that would enable our students to go out to sea during non-school hours. In the past, the cages have been tampered with and/or removed when placed within close proximity of beachgoers. Sailing a short distance up or down the coast will allow easy placement of cages in areas difficult to approach by land. Students will learn navigation skills including charting, compass use, and plotting locations using handheld GPS devices. They will apply these skills to mark and relocate the limu cages they set out. Under the direction of Captains [REDACTED] [REDACTED] students will learn to sail and care for small sailboats that are capable of negotiating shallow waters along Kauai's east shoreline. Students will plan and document shoreline excursions with a strong awareness of weather and sea conditions. Ocean outing excursions will take place outside of regular school hours. A documented captain will be aboard for all excursions. Students and a group of supporting parents will participate in an eight-session Red Cross water safety/Level III swimming course. A variety of survival skills will be practiced including righting a capsized sailboat.

**During year one of the B-WET project,** we will use our communication productions to market for a partner that is willing to support our year two expansion. In the interim, we are investigating the requirements with the Department of Education in the event that the boats and equipment were owned by the DOE.

**All students will study HABITATS.** Students explore what living things need in order to survive, and they look at how these needs are met. The students examine the school and neighborhood as a habitat for human beings, and then select a small area for close examination, mapping its potential as a microhabitat for the small organisms living there. Students investigate the effects physical conditions have on the kinds and number of organisms living there. Students construct terrariums to serve as temporary microhabitats for the small organisms that they collect.

**All students will be taken to the rocky shore to examine MICROHABITATS in the tidal zone.** They will repeat the classroom procedures in the field. The terrariums will be converted to aquariums to serve as temporary aquatic microhabitats for the organisms that students collect and study.

**All students will study LIVING THINGS.** Students explore their local environment. They are taken outdoors to discover “What lives in the stream.” The students learn which ones were here before the early Hawaiians. Exploration is done with nets and senses.

**Meaningful outdoor experiences are project-oriented, hands-on, and investigative.**

Examples of investigative strategies, objectives and additional activities include the following:

1. Establish a water quality monitoring program for the streams; water quality parameters measured will include dissolved oxygen (DO), fecal coliform, pH, temperature, total phosphate, nitrates, turbidity, and total solids; additionally, biological features will also be monitored;

2. Educate students about watersheds, stream protection and restoration, and resource stewardship; instill a conservation ethic regarding the sustainable use of natural resources;
3. Teach students how to identify water quality problems, how to identify point and non-point sources of pollution, how to use water quality monitoring equipment, how to protect and restore water quality and other watershed resources;
4. Teach methods of how to live sustainably as part of the watershed community;
5. Survey and monitor the marine fish population; submit data to REEF and other organizations;
6. Survey and monitor the growth of limu in remote areas as compared to the close to shore areas that have been researched over the past three years. (Year Two on)

Students will conduct investigations in both stream and marine environments.

Students will plan and implement restoration projects, which will be conducted on the land and in the stream and ocean. Rubbish removal will include documentation of content and source. Students will participate in a beach cleanup program that quantifies the amount and identifies the sources of marine debris washing into Kealia from the watershed, and marine debris washing ashore from the ocean.

**Projects involve external sharing and communication**

**Reflection Phase.** Students will analyze their data in light of their initial question, discuss their conclusions and evaluate the results. They will communicate their process and outcomes through group reports, posters, exhibits, art, essays, photography and/or videography. Data will

be submitted to the appropriate agency such as REEF, the Ocean Conservancy, the National Marine Fisheries Service, and the DLNR for their further use.

Students will participate in reflection activities, which help to identify their ability to benefit the environment and other people. The work of all age groups will be compiled and shared as a comprehensive, coordinated body. Participants will be aware that they are a part of a community project involving students of all ages, their teachers, families, government agency staff and officials, and other interested community members.

The media will be contacted to present the story to the public. The project will be featured on the school's website with links to other community organizations. Facilitators, teachers and students will participate in evaluation activities to assess the effectiveness of the program and the learning achieved. The project will conclude with a celebration acknowledging the work of all participants and contributors.

Students will organize and host a hands-on exhibit that will be housed in the school's multi-purpose room for at least one week. During that time, all K-5 classes will be invited to sign-up for a slot to visit the exhibition. Additionally, there will be at least one evening when parents and community members can experience the exhibits which will be supported with technology.

Students will also participate in the fourth annual Kauai student watershed symposium, conducted in the spring of 2007, and the e-school conference conducted in February/March 2007.

### **Meaningful outdoor experiences are part of a sustained activity**

The project has been organized into a yearlong program of activities that can function in three phases that will augment and build on the actions that have already set the stage for the B-WET

project: the Preparation Phase, Action Phase and Reflection Phase. Tools acquired and systems that have been developed are meant to be used over many years and shared with the school and its neighboring communities.

### **Meaningful outdoor experiences reflect an integrated approach to learning**

History, story telling, art and technology are woven into all the planned activities.

The program is based on integrated learning and considers Gardner's "Multiple Intelligences" approach in lesson planning, taking account for all styles of learning.

### **Projects demonstrate partnerships**

This project brings an eclectic group of partners together who share a common vision. Each partner has a strong interest in science education, a passion for Kauai's environment, and a driving interest in nurturing Kauai's children, especially the neediest.

### **Experiences are for all students**

The target population for this proposal represents a diverse community of 850 students with 60 students becoming the leaders in creating an accessible resource of knowledge via the websites, videos, slideshow, writings, art, and presentations.

### **Why: Meaningful Outdoor Experiences:**

#### **a. Demonstrate to students that local actions can impact the greater marine environment.**

Students can observe interconnectedness and cause and effect through this project. Whether degenerative or restorative, many factors affect or can affect ecosystems, and what one does in

one area can directly influence change in another. Understanding this can lead to problem solving ideas and discussions regarding issues. Restoration projects can emerge from this process.

**b. Incorporate curriculum plans, which are supportive of both students and teachers and are appropriately aligned with classroom achievement goals and timeline.**

The integration of meaningful outdoor experiences within the classroom and out-of-school programs helps students connect with their environment and the greater world. This will be an area that facilitating partners can provide professional development opportunities by modeling for teachers. The program will also give the work of the teachers and students a larger reach and real-world impact as well as helping to address some standards that are more difficult to reach within the classroom setting.

**c. Include activities where questions, problems, and issues are investigated through data collection, observation and hands-on activities.**

Through hands-on activities in the preparation, action and reflection stages, data collection, and observation, students are engaged and make a connection with their field of study. They also learn science practices, expand their use of technology, and develop skills in inquiry and problem solving, which can lead to higher proficiency and interest for further study and possible career. Confidence in learning and positively affecting change can be achieved as students are encouraged to observe, think critically, come to conclusions, make action plans, complete their projects, and communicate their results and experiences.

**d. Meaningful outdoor experiences are part of a sustained activity that allows for an extended project.**

With this opportunity, students receive on-going instruction and mentoring from professionals in the field and experience a process which they can replicate or draw on in other areas of pursuit. Relationships with facilitators, peers and teachers will be enhanced and the opportunity to bring in the greater community will be possible through the extent of the project.

**e. Integrate disciplines to assist students in making connections and use diverse resources.**

Meaningful outdoor experiences are key to stimulating and engaging students and offer opportunities for many learning styles. Science explorations and techniques, when interpreted through or accompanied by arts and cultural experiences, involve students in thinking, feeling and doing - motivational strategies for deepening and broadening student perceptions and interest.

**f. Promote student sharing and communication with the greater community.**

During this program, students will be able to increase their awareness of their own abilities to learn and benefit the environment and other people. This is empowering, engendering self-esteem and motivation to continue. Training will offer protocols for sharing as well as facilitating creative artistic work, which will encourage students to communicate in effective, expressive ways. The positive interaction between participants will help to develop relationships both in school and out and contribute to community building.

**Who**

**[REDACTED], Grade 5 Teacher, Kapaa Elementary School**

[REDACTED] will be the Point of Contact for the B-WET project. She has been an advocate for innovative education programs for her entire 13 years at Kapaa Elementary School. Her talents as a Girl Scout Leader and Board member augment her skills. Prior to teaching, [REDACTED] was a

graphic artist. Her technology skills helped to launch the Enterprise School where technology has been integrated as a tool across the curriculum for over a decade. She is the leader developer and implementor of the Hewitt-Packard \$50,000 grant awarded to the Enterprise School.

[REDACTED]'s experience at Kapaa Elementary School include positions as summer school principal, technology coordinator, special education teacher, after school program instructor, guidance counselor, 5<sup>th</sup> and 6<sup>th</sup> grade teacher, and Enterprise school-within-school team leader, University of Hawaii graduate student, certified PADI/YMCA scuba diver, eight years experience as a Red Cross water safety instructor, fifteen years experience as a Girl Scout leader and leadership/outdoor skills trainer, 100-Ton U.S. Coast Guard Captain's license, Vice-Commodore Nawiliwili Yacht Club.

#### **[REDACTED], Grade 4 Teacher, Kapaa Elementary School**

[REDACTED] was born on Kaua'i and raised in a very small community on the east side called Anahola. Her teaching career began at Kapaa Elementary School, while a student herself in the cohort program with the University of Hawaii at Manoa. She volunteered as a parent in the Hawaiian Immersion Program, which led to a part-time teaching position and then full time teacher in the program for ten years. Currently, she is a Grade 4 teacher in Excel School-within-School (SWS) at Kapaa Elementary. Hawaiian Studies is the focal point of the Grade 4 Social Studies curriculum. [REDACTED] continues to work in the Hawaiian communities with our kupuna. For the past two summers, she has been the director of the Kapaa Elementary School summer school program that is a partnership with Kamehameha Schools and Bishop Museum.

As the manager of the Aliomanu Bay Restoration Project, she oversees the goals of working with the Grade 4 students to reintroduce limu manaua back on the reef with the help of Kupuna [REDACTED] of Anahola. Although the limu introduction effort has not put manaua back on the reef at the moment, it has succeeded in working out the issues that may be encountered when reintroducing limu. Issues of life phase, herbivore protection, nutrients, theft, source population, alien epiphytes and community awareness have been addressed. This effort has also bettered the working relations between government (DAR), community members (Anahola), science (UHM), and students of Kapaa Elementary School EXCEL Grade 4. A private funder, now stationed in Iraq, awarded [REDACTED] a \$ [REDACTED] grant to develop the project with students.

Both [REDACTED] and [REDACTED] have found that technology engages all students and promotes quality learning in which students work in small groups rather than in isolation or as a whole class. The technologies used in the classroom are not those designed explicitly to teach basic skills, but rather are real-world applications that support research, design, analysis, composition, and communication.

### [REDACTED], Kupuna

[REDACTED], a well-known Anahola fisherman, was eager to restore his community, by focusing on replenishing the limu manaua (ogo) from Anahola. The Aquatics division of the Department of Land and Natural Resources (DLNR), assigned [REDACTED], Mr. [REDACTED] granddaughter, and Mr. [REDACTED] to help Mr. [REDACTED] restore the native limu. Their process of anchoring cages to the coral was a success; there was an increase in limu and in fish. Mr.

[REDACTED] efforts include working with the DLNR, Aquatics Department, Kapaa Elementary School Excel Grade 4 and the University of Hawaii's Botany Department to incorporate the limu replenishment project into the invasive species removal project.

**[REDACTED] Department of Land and Natural Resources**

An education specialist on Kaua'i with the DLNR's Division of Aquatic Resources, [REDACTED] won the awards for his exceptional performance in bringing together community organizations and government agencies to promote expanded recreational activities as well and continues to coordinate planning efforts to integrate activities at the reservoir such as hiking, biking, camping, kayaking, fishing and bird-watching, with opportunities for conservation education of the public. He also serves the public by selling freshwater and commercial marine fishing licenses, and monitoring the Koke'e Public Fishing Area to ensure the area is stocked with fish and available to the public for recreational fishing. He also acts for the department during shark attacks, ship groundings, and organizing public meetings and hearings.

**[REDACTED] Kokee Discovery Center**

[REDACTED] works as an Environmental Education Resource teacher for the Koke'e Discovery Center on Kauai. Trained in Biological Sciences education, he focuses on watersheds and forest ecosystems. [REDACTED] has also written for several local publications and has authored two Hawaiiana books. He has collaborated with both of the classroom teachers and the school for over a decade. [REDACTED] provides an integral component of knowledge relative to the source of water and "from the mountain to the sea" concepts. He recently participated in the NOAA study on the island of Nihoa which provides our community with a resource to untouched environments.

**[REDACTED] Manager and Chief Engineer, Kauai Department of Water**

[REDACTED] has been working closely with teachers [REDACTED] for the past decade. He is an advocate for student work in the field of water studies.

**[REDACTED] University of Hawaii at Manoa**

[REDACTED] is a University of Hawai'i at Manoa professor in Curriculum Studies department. She specializes in Department of Education Hawaii Content and Performance Standards (HCPS II), curriculum development and assessment, and Hawaiian culture.

**[REDACTED], K-5 Hawaiian Studies Resource, Island School**

[REDACTED] is a teacher of Hawaiian Studies for grades K-5 at Island School on Kaua'i. She also works for the Department of Education as the cultural resource person, coordinating and planning training for all Hawaiian studies teachers on Kaua'i. She has a particular interest in ethnobotany, which she shares with her students of all ages.

**[REDACTED], Director, National Tropical Botanical Garden, Haena**

[REDACTED] is responsible for Lyon's Hawaiian Ethnobotany Collections and leading in the Organization of [REDACTED] outreach programs to the Hawaiian Community has been named new Director of National Tropical Botanical Garden's 1000 acre Limahuli Garden and Preserve (LPG) in Haena on Kauai's North Shore. LGP is one of five botanical gardens run by the National Tropical Botanical Garden, which manages gardens in Hawai'i and Florida. He is a PhD candidate in Botany, with a focus in cognitive ethnobotany.

**Kauai Children's Discovery Museum (KCDM)**

KCDM is the Manager of the Hanama'ulu ahupua'a B-WET project. The museum has an on-going relationship with all the school. During the last ten years, the Museum has regularly worked with Kapaa Elementary in developing outreach programs such as the Books Alive! We hope to use their van to assist with transportation for certain activities.

**County of Kauai**

The school hopes to build a partnership with the **County of Kaua'i's Technology On Wheels (TOW)** program. During the initial stages of development, Kapaa Elementary submitted input relevant to the use of TOW for their watershed projects.

**[REDACTED] Research Biologist**

[REDACTED] has been featured by National Geographic for his discovery of indigenous plants in remote areas of Kauai. He is involved with research with Pelea Polynesia and the National Tropical Botanical Gardens.

**[REDACTED]**

[REDACTED] has been a teacher at Kapaa Elementary School for 16 years. She is currently on sabbatical leave and is working with [REDACTED] to develop place-based and sustainable education curriculum. She is certified in the Developmental Approaches to Science, Health and Technology (DASH) developed by the Curriculum Research and Development Group at the University of Hawaii at Manoa. Also a trained facilitator for strategic planning, Total Quality Management and Learning, and the Seven Habits of Highly Effective People. [REDACTED] has provided curriculum and organizational improvement training sessions and presented at local, state, and national conferences.

**Where**

The project will take place in the Puna and Koolau Ahupua`a and at Kapaa Elementary School Elementary School, along and in Kapaa stream, tributaries, shoreline, coral reef and bay.

**Need**

While Kapaa Elementary School and the teachers have been successful at achieving funding and in-kind donations to meet many needs of our youth and community, we are still

seeking funds to carry out this project. Financial aid from this federal grant would make it possible to carry out this project and maximize the interest we have already generated in our community.

### **Benefits or Results Expected**

Many benefits have been described in the “Why” section above. Young students will be introduced to scientific inquiry and community stewardship in a way that could affect them for the rest of their lives. Students will have real life experiences, will improve the environment, and will also increase the awareness of the greater community.

Kapaa Elementary School serves several middle to low-income neighborhoods with many immigrant families and drug related issues. Students will be involved in regular positive afterschool activities with healthy role models and a hands-on projects that affect positive change. This project offers the opportunity for the community to come together around common environmental interests and for youth of all ages and their families to immediately make a difference in their community.

### **Project Evaluation**

Various methodologies will be used to measure the goals of this project. Pre and post tests will be taken by students designed for their developmental stage. The program is based on group activities where each student will demonstrate grade-level proficiencies. The **examples** below come from State of Hawaii science standards will indicate success:

1. Applies appropriate measure(s) to set up, analyze and interpret data, clearly explaining what the data suggests or infers (alternate solutions).

2. Asks questions to clarify and understand all points of views to a problem. Understands implications for the consequences of alternate solutions. States clear and relevant questions to address the problem.
3. Collects, organizes, analyzes and displays data/information, using tools, equipment and techniques that will help in data collection, analysis, and interpretation.
4. Communicates and defends scientific procedure used and conclusion and explanation drawn from evidence.
5. Explains/describes the investigation to an audience. Provides a mechanism for the audience to respond to the investigation. Defends the investigation appropriately and logically. Completes a laboratory report of a scientific investigation in written form.
6. Reflects and revises conclusion and explanation based on new evidence given from other valid points of view.
7. We will have succeeded if at the end of the project, every intern has identified an environmental issue and has developed a question for scientific investigation.
8. Students will keep their own journals and undertake their own evaluation process concerning the data collection and their experiences in the project. The results of data will be shared via national databases and educational websites (e.g. GREEN, and REEF) and used locally to plan and implement restoration activities.
9. Art, essays, posters, photography and videos will be submitted for showing or competitions through various opportunities.
10. Students, teachers, project facilitators and partners will be surveyed at the end of the project for how the project increased their understanding and abilities, and how it met their needs.

**Hawaii Content and Performance Standards (HCPS) Science and Mathematics Standards**

<b>Strand</b>	<b>The Scientific Process</b>
<b>Standard 1: The Scientific Process: SCIENTIFIC INVESTIGATION: Discover, invent, and investigate using the skills necessary to engage in the scientific process</b>	

<b>Topic</b>	<b>Scientific Inquiry</b>
<b>Benchmark SC.5.1.1</b>	Identify the variables in scientific investigations and recognize the importance of controlling variables in scientific experiments

<b>Topic</b>	<b>Scientific Inquiry</b>
<b>Benchmark SC.5.1.2</b>	Formulate and defend conclusions based on evidence

<b>Strand</b>	<b>The Scientific Process</b>
<b>Standard 2: The Scientific Process: NATURE OF SCIENCE: Understand that science, technology, and society are interrelated</b>	

<b>Topic</b>	<b>Unifying Concepts and Themes</b>
<b>Benchmark SC.5.2.1</b>	Use models and/or simulations to represent and investigate features of objects, events, and processes in the real world

<b>Strand</b>	<b>Life and Environmental Sciences</b>
<b>Standard 3: Life and Environmental Sciences: ORGANISMS AND THE ENVIRONMENT: Understand the unity, diversity, and interrelationships of organisms, including their relationship to cycles of matter and energy in the environment</b>	

<b>Topic</b>	<b>Interdependence</b>
<b>Benchmark SC.5.3.2</b>	Describe the interdependent relationships among producers, consumers, and decomposers in an ecosystem in terms of the cycles of matter

**Hawaii Content and Performance Standards (HCPS) Science and Mathematics Standards**

B-WET Project: Kauai Watershed Project

**Language Arts Content Standards**  
**Reading and Literature Grade Cluster Benchmarks - Grade 4/5**

<b>RANGE</b>
Read a range of literary and informative texts for a variety of purposes.
<ul style="list-style-type: none"><li>• Read a variety of genres.</li><li>• Read for literary experience and to develop aesthetic appreciation.</li><li>• Read information and instructions to perform tasks and solve problems</li></ul>

<b>COMPREHENSION PROCESSES</b>
Use strategies within the reading processes to construct meaning.
<ul style="list-style-type: none"><li>• Modify initial interpretations in light of new information and prior experience.</li></ul>

<b>RESPONSE</b>
Respond to texts from a range of stances: initial understanding, personal, interpretive, critical.
<ul style="list-style-type: none"><li>• State the important ideas and interpret author's message, theme, or generalization.</li><li>• Compare own ideas with ideas in text, and analyze similarities and differences.</li><li>• Demonstrate a critical response by representing text in another form, genre, or medium.</li></ul>

<b>DIVERSITY</b>
Interact thoughtfully with texts that represent diversity in language, perspective, and/or culture.
<ul style="list-style-type: none"><li>• Interact thoughtfully with each other about texts that represent diverse perspectives.</li></ul>

**Writing Grade Cluster Benchmarks - Grade 4/5**

<b>RANGE</b>
Write using various forms to communicate for a variety of purposes and audiences.
<ul style="list-style-type: none"><li>• Write using forms appropriate to purpose and topic.</li><li>• Write to create understanding of ideas and information for self.</li><li>• Write to communicate information, express opinions, and influence others.</li></ul>

<b>COMPOSING PROCESSES</b>
Use writing processes and strategies appropriately and as needed to construct meaning and communicate effectively.
<ul style="list-style-type: none"><li>• Include information from people and texts in writing.</li><li>• Use feedback from others to revise and edit writing.</li><li>• Publish-in a variety of ways-selected finished products.</li></ul>

<b>CONVENTIONS AND SKILLS</b>
Apply knowledge and understanding of the conventions of language and research when writing.
<ul style="list-style-type: none"><li>• Apply knowledge of spelling, punctuation, and grammar to write text(s) and correct errors.</li></ul>

- Cite sources used in gathering information.

**RHETORIC**

Use rhetorical devices to craft writing appropriate to audience and purpose.

**PRODUCE WRITING THAT**

- Conveys meaning, provides important information, makes a point, and fulfills a purpose.
- Uses language that is clear, colorful, and natural.
- Reveals the writer's developing voice and style.

**ATTITUDES and ENGAGEMENT**

Demonstrates confidence as writers, and find value and satisfaction in writing and sharing writing with others.

- Write readily for a variety of purposes on a range of topics.

**DIVERSITY**

Understand diversity in language, perspective, and culture in order to craft texts that represent diverse thinking and expression.

- Write from perspectives of own cultural background.

**Oral Communication Grade Cluster Benchmarks - Grade 4/5**

**RANGE**

Communicates orally using various forms-interpersonal, group, and public-for a variety of purposes and situations.

- Participate in groups to exchange ideas, explore issues, solve a problem, or complete a project.
- Participate in dramatic and interpretive oral activities (e.g., media presentation, oral interpretation, reader's theater).

**COMMUNICATION PROCESSES**

Use strategies within speaking and listening processes to construct and communicate meaning.

- Use feedback to clarify, adjust, change, continue, or stop communication.

**CONVENTION and SKILLS**

Apply knowledge of verbal and nonverbal language to communicate effectively.

- Apply knowledge of verbal and nonverbal language to create and interpret messages.

**RHETORIC**

Adapt messages appropriate to audience, purpose, and situation.

- Support ideas with research information as well as personal experience and knowledge.
- Organize ideas to give clarity to messages.
- Use language that is clear and understood by the listener(s)
- Use delivery appropriate to audience and situation.

**ATTITUDES and ENGAGEMENT**

Demonstrate confidence as communicators, and find value and satisfaction in sharing ideas with others.

- Demonstrate confidence in speaking situations that enables one to become an active participant.

**DIVERSITY**

Understand diversity in language, perspective, and/or culture and use speaking and listening to foster understanding.

- Know that cultural differences may affect communication and accept shared responsibility for understanding.

## Social Studies

### History Content Standards and Grade Cluster Benchmarks - Grade 4/5

<b>HISTORICAL EMPATHY</b>
Students learn to judge the past on its own terms and use that knowledge to understand present day issues, problems, and decision making.
<ul style="list-style-type: none"><li>• Explain how rules and values of a society determine the behavior and attitudes of its members.</li></ul>
<b>HISTORICAL INQUIRY</b>
Students use the tools and methods of historians to transform learning from memorizing historical data to "doing history."
<ul style="list-style-type: none"><li>• Distinguish historical fact from opinion.</li></ul>
<b>HISTORICAL PERSPECTIVES AND INTERPRETATIONS</b>
Students explain historical events with multiple interpretations rather than explanations that point to historical linearity or inevitability.
<ul style="list-style-type: none"><li>• Explain how beliefs and education and/or the society in which a person resides shape his/her "point of view."</li></ul>

### Political Science/Civic Content Standards and Grade Cluster Benchmarks - Grade 4/5

<b>GLOBAL COOPERATION, CONFLICT AND INTERDEPENDENCE</b>
Students understand similarities and differences across cultural perspectives, and evaluate the ways individuals, groups, societies, nations and organizations change and interact.
<ul style="list-style-type: none"><li>• Identify and evaluate how a community or region's collective behaviors, decision, actions, or inaction impact and interrelate with the behaviors and decisions of others.</li></ul>
<b>POLITICAL ANALYSIS</b>
Students understand and use the tools and methods of the political scientist to explain ideas, events, and behaviors and use this knowledge to make reasoned decisions.
<ul style="list-style-type: none"><li>• Use the tools and methods of political scientists, including polls, analysis, and perspective taking to investigate issues or events of relevance to them, e.g., taking polls on voter issues.</li></ul>

### Cultural Anthropology Content Standards and Grade Cluster Benchmarks - Grade 4/5

<b>CULTURAL SYSTEMS</b>
Students understand culture as a system of beliefs, knowledge, and practices shared by a group.
<ul style="list-style-type: none"><li>• Explain how language, stories, music, dance, artifacts, traditions, beliefs, values and behaviors are elements of culture and contribute to the preservation of cultures.</li></ul>
<b>CULTURAL DIVERSITY AND UNITY</b>
Students understand and respect the myriad of ways that society addresses human needs and wants.
<ul style="list-style-type: none"><li>• Examine and explain how individuals, groups, and nations deal with conflict, cooperation, and interdependence to become more adept at perspective taking.</li></ul>

### Geography Content Standards and Grade Cluster Benchmarks - Grade 4/5

<b>WORLD IN SPATIAL TERMS</b>
Students use geographic representations to organize, analyze, and present information on people, places, and environments.
<ul style="list-style-type: none"><li>• Collect, organize, and analyze data to interpret and construct geographic representations.</li></ul>

<b>PLACES AND REGIONS</b>
Students understand how distinct physical and human characteristics shape places and regions.
<ul style="list-style-type: none"> <li>• Use physical and human characteristics to compare places and regions in Hawai'i, the United States, and other countries.</li> </ul>

<b>PHYSICAL SYSTEMS</b>
Students understand how physical processes shape Earth's surface, and create, sustain, and modify the ecosystems.
<ul style="list-style-type: none"> <li>• Explain how physical processes affect formation and distribution of climates, natural resource, and ecosystems.</li> </ul>

<b>ENVIRONMENT AND SOCIETY</b>
Students demonstrate stewardship of earth's resources through the understanding of society and the physical environment.
<ul style="list-style-type: none"> <li>• Analyze the consequence of human modification of the physical environment in Hawai'i, the United States, and other parts of the world, and implement a plan of action to address the consequences.</li> </ul>

**Economics Content Standards and Grade Cluster Benchmarks - Grade 4/5**

<b>LIMITED RESOURCES AND CHOICE</b>
Students understand costs and benefits of economic choice and use this knowledge to make sound economic decisions.
<ul style="list-style-type: none"> <li>• Describe a personal decision-making situation that requires a choice and identify the opportunity cost of the decision.</li> </ul>

**Science** (add habits of mind, inquiry process)

<b>HABITS OF MIND</b>
Students
<ul style="list-style-type: none"> <li>•</li> </ul>

**Fine Arts** (add drama, music)

<b>DRAMA</b>
Students
<ul style="list-style-type: none"> <li>•</li> </ul>

<b>MUSIC</b>
Students
<ul style="list-style-type: none"> <li>•</li> </ul>

**Mathematics**

Students
<ul style="list-style-type: none"> <li>•</li> </ul>

B-WET: Kauai Watershed Project: Kapaa Elementary School  
Hawaii Content and Performance Standards (HCPS II)–

Students

B-WET: Kauai Watershed Project

Books and Media that will be literature references to our project:

- Bates, G. (1984). *The Jewel in the Forest*.
- Bellamy, D. (1988). *The River*. New York: Clarkson N. Potter, Inc./Publishers.
- Boynton, D. (2000). *Discover Hawaii's Natural Forest*. Honolulu: Island Heritage.
- Bunting, E. (1993). *Someday a Tree*. New York: Clarion Books.
- Cherry, L. () *The Big Book for the Planet from Island to Island*.
- \_\_\_\_\_ (1990). *The Great Kapok Tree*. San Diego: Harcourt Brace & Company.
- \_\_\_\_\_ (1994) *A River Ran Wild*. San Diego: Harcourt Brace & Company.
- \_\_\_\_\_ (2004 ) *The Sea, the Storm, and the Mangrove Tangle*. San Diego: Harcourt Brace & Company.
- Cheshire, G. (2001). *The Tropical Rainforest*. New York: Crabtree publishing Company.
- Dahl, R. (1991). *The Minpins*. New York: Viking.
- Denny, J. (1999). *The Birds of Kaua'i*. Honolulu: University of Hawai'i Press.
- Knife, R. (1983). *The Water of Life*.
- Locker, T. (1997). *Water Dance*. San Diego: Harcourt Brace & Company.
- \_\_\_\_\_ (1984). *Where the River Begins*. New York: Dial Books.
- Matsumoto, L. (1996). *Beyond `Ohi`a Valley, Adventures in a Hawaiian Rainforest*. Aiea: Lehua, Inc.
- Miller, G.T. (1996). *Living in the Environment*. Belmont: Wadsworth Publishing Company.
- Morgan, S. (1999). *Acid Rain*. New York: Franklin Watts.
- O'Conner, M. (1972). *Flowing to the Sea*. Hawaiian translations by Keola Wong.
- Pollack, S. (1993). *Ecology*. New York: Dorling Kindersley.
- Puku'I, M.K. ( 1979 ). *Tales of the Menehune*. Retold by Caroline Curtis.
- Wickman, F. B. (1985). *Kaua'I Tales*. Honolulu: Bamboo Ridge Press
- \_\_\_\_\_ (1991). *Polihale and Other Kaua'i Legends*. Honolulu: Bamboo Ridge Press.