

IPMEC LIST OF ABSTRACTS

BACKGROUND

The following presentations and other elements of the International Pacific Marine Educators Conference are available for viewing online at www.coexploration.org/ipmec

KEYNOTE PRESENTATIONS

Abstracts of keynote presentations provided in full in earlier pages of this journal are not included.

"The Coconut Wireless and Other Tools to Strengthen Environmental Awareness in the Pacific"

by Tamara Logan

The Secretariat of the Pacific Regional Environment Programme (SPREP) is the Pacific's key regional environmental organization working with Pacific Island countries and territories to strengthen environmental management and promote sustainable development. SPREP works primarily with government environment departments to support policy development and implementation and capacity building. In a constant bid to raise awareness of environmental issues in the region, SPREP uses a number of education and communication tools to highlight its work and the achievements of its members. This presentation will explore the ways in which SPREP aims to connect with its members and key organizations to engage them in initiatives that will support sustainable development in the Pacific Islands. It will look at ways that SPREP communicates with its members, the private sector, policymakers, and politicians to encourage greater engagement in environmental sustainability, highlighting the challenges of communicating a range of issues, in challenging environments that are not conducive to the ongoing global expansion of electronic communication tools such as email and the Internet.



IPMEC participants were generous in their handouts. The South Pacific Regional Environment Programme provided sea turtle bags, to reduce use of plastic bags, which can be harmful to sea turtles.

"Defining Ocean Literacy in the United States: Coming to Consensus, Building Momentum"

by Craig Strang

Ocean sciences in the United States are idiosyncratically absent from National Science Education Standards, state standards, curriculum, and assessments. Ocean concepts are hardly taught in K-12 schools, resulting in a decline in public attention to ocean issues. The Centers for Ocean Sciences Education Excellence, NGS, National Marine Educators Association, National Oceanic & Atmospheric Administration, U.S. Commission on Ocean Policy, and the Pew Commission have urgently called for inclusion of the ocean in science standards to increase ocean literacy. There has never been consensus, however, about what ocean literacy is or what concepts should be included in future standards. Scientists and educators had no guidance in prioritizing the content they present or in determining how it fits into an over-stuffed American science curriculum famous for being "a mile wide and an inch deep." In 2004, one hundred scientists and educators participated in an online workshop, "Ocean Literacy through Science Standards," to determine the essential information everyone should know about the ocean. Following several more meetings and extensive scientific and public review, the community agreed on an Ocean Literacy definition, seven essential principles and 44 supporting concepts. The overwhelming acceptance and quick, far reaching use of resulting documents is a tribute to the inclusiveness of the development process. In 2006, we began development of an "Ocean Literacy Scope & Sequence." It shows how the principles and concepts build in developmentally sound learning progressions across grade spans K-2, 3-5, 6-8 and 9-12, and guides teachers, curriculum developers, and scientists as to what concepts are appropriate at various grades. Achieving consensus about what should be taught resulted in nationwide attention and unprecedented momentum for Ocean Literacy and provided common language for scientists and educators working together. It has not, however, considered what changes might be necessary to adapt the ocean literacy definition for other Pacific countries.

CONCURRENT SESSION PRESENTATIONS

Presentations are listed by the last name of the primary presenter. Authors and co-authors not present at the conference are not listed.

"Aliomanu Limu Restoration Project" *by Kalei Arinaga*

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 Kapa'a Elementary School, we have moved beyond the "What ifs?" and research/testing of our 'Aliomanu Limu Restoration Project. We have opened the doors of our classrooms to let

Kaua'i, 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. The goal of our project is to reintroduce limu manaua (*Gracilaria coronopifolia*) back on the reef. Through this effort we have created and enhanced working relationships between government specialists, community members, scientists, and fourth-grade students of Kapa'a Elementary School EXCEL. For the last two years, students have been taking an active role in the project. Their deep engagement in the project allows them to easily share their learning with their peers at school, their families, and the community about the history and preservation of the edible and medicinal limu, and unite those whose goals include keeping this part of the Hawaiian culture alive and sustaining the Kauai ecosystems.



Teacher Kalei Arinaga and her fourth-grade students presented a demonstration on limu (seaweed) via the web from Kapa'a Elementary School on Kaua'i.

"Mahonia Na Dari Runs a Marine Environment Education Program (MEEP)" by Anaseini Ban

The Marine Environment Education Program (MEEP) is conducted to secondary schools via a voluntary approach introduced eight years ago. MEEP covers marine biology, ecology, geography, threats, and impact prevention. This is aided with the use of audiovisual resources and practical outdoor activities. MEEP gives participants a hands-on experience learning about the marine environment. Components of MEEP had been inserted into the reformed national primary school curriculum in the environmental studies and community living syllabus. Although, MEEP operates within West New Britain Province, marine studies content is reaching schools around Papua New Guinea via the curriculum. MEEP is also used by many other groups, including, elementary and primary students and teachers, local community groups, dive operations, church groups, and trainee teachers. The basic MEEP structure is used but amended to suit the level of the groups. The attitudes of communities and church groups are changing as MEEP creates community marine educators by training youths. This helps provide accessible information to the community using the local language.



Anaseini Ban delivered her presentation on the Marine Environment Education Program via the web from Papua New Guinea. The relocation of IPMEC from Fiji to Hawai'i hampered her plans to participate in person.

"Forming Research-Education Partnerships Across the Pacific: From Palau to Hawaii"

by Erin Baumgartner and Kanesa M. Duncan

We describe a workshop model for collaboration between scientists and teachers. University of Hawaii graduate fellows in the U.S. National Science Foundation Graduate K-12 program shared their knowledge of teaching science through inquiry while learning about Palau's biology and culture from local scientists, natural resource managers, and educators. Like other island ecosystems, the aquatic habitat in Palau and in Hawaii is directly tied to the adjacent terrestrial ecosystem. Both island chains are ecological hot-spots that have been dramatically altered by anthropogenic forces. The workshop engaged Palauan teachers in processes they could use to provide research-style scientific experiences for their students. The facilitation of partnerships between the teachers and scientists in Palau provided the opportunity for teachers to communicate with practicing scientists and to gain expertise in the practice of science. Our research during the workshop indicated positive experiences, and follow-up analysis showed successful utilization of workshop components in the teacher's classrooms. This indicates that the workshop was a successful model for shifting teachers' thinking about how to conduct science education. The workshop model was also successful at creating connections between researchers and educators, both within Palau and between Palau and Hawaii.

"The Associate of Science Degree in Marine Sciences at the College of Micronesia, National Campus, Pohnpei (FSM): The Problem of Transferring to a Higher Education Program" by Allain Bourgoin

An analysis has been undertaken to compare the curriculum of the associate of science degree in marine sciences offered at the College of Micronesia (COM)—National campus with corresponding academic programs offered at the University

of Guam, the University of Hawaii system, and the Hawaii Pacific University. The prerequisites needed in sciences by the associate-degree students wishing to transfer to a bachelor's program were equally analyzed. At the associate-degree level, it was noted that within the general education core requirements, there is high level of similarity between institutions, although the number of credits may vary somewhat within the disciplines. Within the requirements for the major or the target "certificate," the marine science program from the COM largely compares with the other associate programs, credit wise and in the diversity of electives offered. But when wishing to transfer to a four-year program in marine related sciences, the students from all programs analyzed appear to be lacking a strong basic scientific background and consequently are ill prepared to integrate into the bachelor's programs. How could these programs be revised in order to better bridge and harmonize credit transfer between institutions of the tropical Pacific nations?

"Experiential Learning in Higher Education: Linking the Marine Classroom and Community"

by Karolyn Braun

This presentation focuses on experiential learning in higher education. While recent literature suggests that experiential learning is a necessary and vital component of formal instruction in colleges and universities, controversy never-the-less exists among scholars and educators about its place and use. The American Samoa Community College's Marine Science Program faculty recognizes this need to provide experiential learning opportunities into their courses and programs to make learning more relevant for their students. Topics of discussion will be current state-of-the-art practices in experiential learning, with suggestions for program design and development. Program deliverables will be showcased.

"Service Learning and Marine Education"

by Karolyn Braun

The cultural and environmental service-learning exchange program at the American Samoa Community College (ASCC) is designed to benefit our community while allowing students to learn and develop through active participation in thoughtfully organized work experiences. By involving students in these activities, they learn the two-way street of service: When you give, you receive; when you receive, you give. American Samoa and Hawaii are both tropical Pacific Island communities that share cultural history, bio-geographic origins, and environmental challenges. These are some of the reasons that American Samoa has been asked to be part of the Hawaii Pacific Islands Campus Compact, a collaborative Environmental Service-Learning exchange program. The Compact develops faculty expertise and peer-mentoring relationships in service-learning pedagogy, as well as authentic partnerships among Hawaii Community College, ASCC, and the community-based stakeholders. In addition to the five ASCC students who will participate in the project, with their five counterparts from Hawaii Community

College, the target group includes other ASCC students, faculty and support staff, National Park of American Samoa, American Samoa Department of Marine and Wildlife Resources, residents in the project areas for stream restoration and invasive species eradication, and users who will benefit from trail restorations and educational displays and signs created as part of this project.

"Pacific Ocean Blue Armada Beachcombing"

by Harry Breidahl

The Australian based Southern Shores website (<http://www.southernshores.auz.info>) has been a worldwide web presence since 2001 and is about to take on a major revision in 2007. A new section called "Blue Armada Beachcombing" is planned to be part of this revision. This section will be a combination of the well-tested beachcombing and biological survey sections of the existing website. It will also be based on community response to the beachcombing pages, especially the many reports of beach-washed ocean drifters such as by-the-wind sailors and the Portuguese man-o-war—members of the delightfully named Blue Armada. Even though Southern Shores is an Australian website, these reports of Blue Armada strandings have been from a range of Pacific nations. Therefore, with support of IPMEC delegates, it could be possible to build a web-based Pacific Ocean Blue Armada community monitoring program based on beachcombing finds of these amazing oceanic drifters.

"Developing a Community Stewardship Guidebook: Getting Involved in Caring for Hawaii's Coastal Resources"

by Athline M. Clark and Petra M. MacGowan

Coastal communities statewide have become increasingly interested in taking a part in co-management of their marine and coastal resources. This trend towards stewardship of coastal resources has been increasing over the past decade. Communities across Hawaii have organized to care for their marine resources with a variety of approaches. Over the past three years, the Division of Aquatic Resources has been working with many of these communities and associated non-governmental organizations to document these examples of stewardship. Initially, communities were asked to contribute to a set of case studies that summarized their efforts. As more and more communities became interested in getting involved, it became necessary to formalize some of the methods being utilized and to develop a guide that additional communities could use to start their own programs. The guidebook was written to assist communities in every aspect of coastal stewardship from how to organize, to education approaches, biological, human use and water quality monitoring techniques, and the like. It also includes contact, funding, and information resources. The guide was written in concert with the Community Conservation Network (CCN) and field tested at a workshop hosted by CCN and others. Representatives from nearly 20 communities statewide were given a chance to review the guide and provide comments prior to its completion. This paper will examine the

approach taken to develop the guide and outline the contents of the document.

“Navigating Change: An Educational Voyage of Discovery and Awareness” by *Andy Collins*

Navigating Change is an educational partnership that promotes stewardship of Hawaii’s unique natural environments through educational voyages, a five-part curriculum, and teacher workshops. The partnership was founded in 2002 and, since that time, has conducted educational voyages, such as *Hokulea’s* voyage to the Northwestern Hawaiian Islands in 2003. The have trained hundreds of educators in the use of the five-part multimedia curriculum. Come and learn about the curriculum and opportunities and get involved in this exciting project. Copies of the *Navigating Change* curriculum will be distributed to attendees.

“The Environmental Education Model for the ‘Conservation Conferences for Children Program’ Acuario Mazatlán, Sinaloa, Mexico”

by *Angeles Cruz-Morelos, Raquel Briseño-Dueñas, and Dolores Monterrubio-Alvarez*

The Pacific Coast of Baja California and the Gulf of California as our bioregional frame and sea turtles and birds as our umbrella species are the major subjects in the “Conservation Conferences for Children Program.” Every year, since the creation of the program in 1987, Acuario Mazatlán coordinates and brings together an amazing team of scientists, educators, instructors, volunteers, cooks, drivers, sponsors, and consultants, from different government and private institutions and organizations, to support all the activities and take care of 100 kids that spend a complete week in Mazatlán learning, sharing, and enjoying their environment. The program has been improved and enriched over the years, and our model of education proves that environmental education can transcend when principles, values, capacities, resources, willingness, and convictions coincide.

“Establishment of a Moku ‘Aha (Traditional District Council) in Hawaii: Using Expert Traditional Cultural Practitioners and Hawaiian Science to Ensure Sustainability in Ocean Ecosystems”

by *Leimana DaMate and Robert DaMate*

Native Hawaiians have been managing and sustaining their specific districts and areas in the Hawaiian Islands for thousands of years using Hawaiian science and traditional methods. However, with the incredible influx of tourists, new residents, and technology over the past 100 years, the ocean resources in the Hawaiian Islands are in danger of a serious decline if serious effort is not made to protect sustainability. Local government, through a Western scientific approach, has not been successful in addressing sustainability methods. In the past, Native Hawaiian cultural practices have been relegated to myth without serious consideration by government. However, through a “Moku ‘Aha” approach, proven traditional cultural scientific

methods can be integrated into general communities through a hands-on approach using educational means. Communities are empowered; the Native Hawaiian culture is perpetuated; and logical proven Hawaiian science is implemented. This fulfills the government mandate to protect Hawaii’s natural resources and ensures ecosystem sustainability.

“Salvemos la Playa: Proyecto Comunitario”

by *Margarita Diaz*

The chaotic urban growth along the coastal zones in Mexico has caused severe damages along its coasts, particularly in Baja California. Despite the fact that Mexico has approximately 11,122.5 kilometers of coasts, its development depends mainly on land-based economic activities and has largely “turned its back to the sea.” There is not even a legal definition for “coastal zone” rooted in our Constitution, an omission reflected in the rest of our Laws. For the past six years, Proyecto Fronterizo de Educación Ambiental (PFEA) has coordinated a community volunteer project named “Salvemos la Playa” in a coastal community in Tijuana, Baja California, Mexico, featuring the implementation of two yearly beach cleanup campaigns, which have involved a total of 2,200 persons and removed 14,500 kilograms of debris from this beach. The greatest accomplishment has been getting so many residents to recognize the value of a healthy beach and begin taking an active role in conserving it. Our goal is to achieve a balance between population growth and conservation of our beaches, based on a collective vision and action strategy that includes citizen water quality monitoring activities, citizen patrol, and biodiversity conservation.



Margarita Diaz from Mexico and Hani Nusantari from Indonesia enjoy a light moment during a field trip to the Hawaii Institute of Marine Biology on Coconut Island.

“Exploring Alternatives on Community-Based Coral Reef Management: A Case Study from Beloi, Atauro Island, Timor-Leste” by *Leo X.C. Dutra*

Beloi is a community of 350 inhabitants located in Atauro Island, Timor-Leste (East-Timor). The community depends mainly on coral reef linked fisheries resources for their livelihood. High fishing pressure in the reefs, associated to some

destructive practices, contributes to the reduction of the fish stocks in the vicinity of Beloi. This problem will be aggravated in the future through population growth linked to the incipient tourism industry. Therefore, options for managing food security, income generation, and cultural aspects into the longer term are investigated in order to foster an environmentally-economically-culturally sustainable future. The organizational learning framework, upon which our methodology is based, offers a dynamic systems learning community of practice setting wherein all stakeholders (scientists, local community, governmental, and non-governmental agencies) are able to systematically explore the understandings and perspectives of others in a controlled dialogue process. In this paper, we argue that through adaptive learning processes, where communities are engaged in conversations, all interested stakeholders are able to develop shared understandings of their system and these understandings will help them identify and articulate current issues and opportunities, directions for change, and sometimes innovative ideas about pathways through which to realize long-term ecological-economic-cultural sustainability.

“Ecosystem-Based Management (EBM) and Traditional Healing—Bridging Science with Tradition and Local Knowledge” by *Monifa Fiu*

The traditional healer functions as an integral part of the ecosystem and seascape. Through the practices of a traditional healer, all is connected by a complex world webbed with diverse plants and herbal remedies from the forest, for healing. It is said that when there is healing, the medicine bundle is thrown to sea but returns to land during ebbing tide bringing back with it healing powers to the shores, sifting to the mangroves and upstream, flowing further inland back to the forest. The traditional healer's many herbs reflect biodiversity in the forest, and that life is very much connected to the integrity of a system. The ecosystem-based management (EBM) approach is not any different in recognizing the strong interactions between forests, riversheds, and coastal systems to fashion management across sections of the entire ecosystem. This is exemplary at the district of Macuata where an entire coastline connected by tributaries of the Dreketi River, the largest river in Vanua Levu (largest island in Fiji), traditionally share one fishing ground that is fringed by the Great Sea Reef, third largest barrier reef in the world. Messaging the philosophy of the traditional healer in the EBM process is important to integrating local resource use, knowledge and practices, as well as managing for resilience across these systems. Additionally, functional services of a system and a healer in traditional society are at risk by the commanding effects of climate change. There are the climate witness stories of the salt-maker and the kuta mat weaver as master traders of their natural surroundings to prove it.

“LäjeRotuma Initiative (LRI): Mainstreaming Community-Based Conservation and Interpreting Marine Science to the Island Community of Rotuma, Fiji Islands” by *Monifa Fiu*

Rotuma, a 43 km² volcanic island about 465 kilometers north of the Fiji Islands, like other Pacific Islands are experiencing adverse impacts of climate change, as well as faced with the challenges of managing their resources. Rotuma has been politically part of the Fiji Islands since 1881; however, the culture more closely resembles Polynesian islands to the east and the people enjoy a comfortable standard of living with plenty of food and adequate housing. LRI was initiated to maximize the future environmental and sustainable options for Rotuma. Its main goal, to set up an environmental education and awareness program, is community-based where youth are encouraged to proactively participate in activities aimed at accessing and sharing information to strengthen the capacity of the island community in management of natural resources. LRI focuses on pertinent issues raised by the community in its environmental awareness outreach. Evidently, there is shifting baseline of local knowledge on islanders' use of resources and the state of their environment. This will then advertently affect fisheries, food security, and reduction of coastal vulnerability. LRI's main vision, to mobilize the island community of Rotuma and to manage their natural resources, has resulted in creating environmental awareness by making connections of local knowledge with science, to build community resilience.

“Improving the Informal Education Skills of Marine Recreation Providers to Raise Environmental Awareness and Reduce Tourism's Footprint on Coral Reefs” by *Liz Foote*

Discover the efforts of the Coral Reef Alliance (CORAL) in engaging the marine recreation community in proactive solutions that reduce threats to coral reefs worldwide. CORAL has developed a targeted approach to train marine tourism providers in informal pedagogic strategies for effectively communicating key environmental messages to their clients. Resources, tools, and techniques are provided that integrate informal learning and marine recreation with the goal of promoting Best Practices and preserving coral reef ecosystems. Participants will take part in a simulated, interactive training that demonstrates sustainable reef recreation while modeling effective conservation messaging.

“Preliminary Assessment of Persistent Organic Pollutants in Rarotonga Lagoon, Cook Islands” by *Imogen P. Ingram*

The authors present a lagoon water-sampling project (funded by NZAID) in which government and educational agencies cooperated to build the capacity in a Cook Islands non-governmental organization. The Cook Islands Ministry of Marine Resources was supportive because this Persistent Organic Pollutants (POPs) sampling program complemented its own programs.

The University of the South Pacific School of Marine Sciences staff advised in collation and interpretation of the results and in report-writing. In order to determine whether there were residual traces of POPs in the Rarotonga lagoon, samples were collected over a 12-month period from December 2004. These were sent to a New Zealand laboratory for analysis, providing much-needed data. The presence was detected of POPs, indicating that further work is needed, perhaps using other media such as animal tissue or marine sediments, to give a clearer picture. Sharing this experience with other educators might encourage similar collaborations in other countries. It is felt that monitoring of the environment empowers community groups by teaching them new skills and reducing apathy that stems from a sense of helplessness. Only through research can the cause of environmental problems be determined, and expert local knowledge will result in a greater likelihood of generating appropriate countermeasures.

“Time-Series Analysis and Hands-On Coral Reef Education in the Marshall Islands” by *Dean M. Jacobson*

The Republic of the Marshall Islands is becoming increasingly aware of the vulnerability and ecological importance of coral reefs, yet most citizens continue to regard coral as merely “rock” and do not understand the interdependence of healthy fish and coral populations. At the College of the Marshall Islands, students are provided with hands-on experience with coral reefs. I will illustrate how photographic time series (up to four years in length) of permanent reef sites illustrate processes difficult to visualize in situ (i.e., growth, disease, mortality, etc.). The time series strategy is being elaborated in a new coral mapping project. All coral colonies within a specific 100 meter reef flat quarry pool (blast-mined in 2001) are currently being mapped, using GPS and underwater photography. The student-collected data will document growth rate and survival of individual, labeled corals and fish diversity, which is expected to change over time as coral growth and diversity develops through time. (Currently 12 coral spp. and 42 fish spp. are found in the pool.) Macro-algal data will also be collected. By institutionalizing this project, many years of valuable data will be generated regardless of changes in biology staff, helping students better appreciate the dynamic nature of both coral reefs and the scientific process.

“Accommodating Traditional Conservation and Fishery Management Practices in the Face of Western Colonization: The Western Pacific Community Development and Community Demonstration Project Programs” by *Charles Kaai*

The deterioration of traditional fishery and subsistence systems is a serious constraint to sustainable development in some island communities. The past few years has seen the resurgence in the desire among indigenous island people to rebuild their traditional fisheries and expand access to the fisheries in the seas that surround their islands. In addition, there is growing interest in investigating contemporary applications of traditional

conservation methods used by indigenous Pacific Islanders. The Sustainable Fisheries Act of 1996 established, in statute, the Western Pacific Community Development Program and the Western Pacific Community Demonstration Project Program. These two programs share eligibility criteria. The Community Development Program makes possible administrative actions by the Council to address barriers to the participation of native people in fisheries managed by the Council. The Community Demonstration Project Program provides grants for projects that demonstrate and promote indigenous cultural and traditional fishing practice, management and conservation, community education, or research and the acquisition of materials and equipment needed to carry out such a project. The Western Pacific Regional Fishery Management Council has an opportunity to accommodate this growing interest in traditional fishery conservation and management practices through the Council process. The presenter will discuss the history, successes, and challenges of these programs.

“2006 Year of the Sea Turtle: Mobilizing Communities to Save a Pacific Icon” by *Megan Krolik*

Turtle numbers in the Pacific are reducing rapidly due to factors such as non-sustainable consumption, illegal trade, habitat destruction, and harmful fishing practices. In 2006 in response to this, the Secretariat of the Pacific Regional Environment Programme (SPREP) and its key partners coordinated the Year of the Sea Turtle campaign to increase awareness of the importance of sea turtles in the region and to reinvigorate the cultural relationship Pacific Islanders have traditionally shared with the sea turtle. The campaign has three key objectives: To promote the conservation of sea turtles by reducing adverse impacts from human activities; to promote sustainable management of sea turtle populations and their habitats; and to engage partners in regional conservation and awareness activities to promote the connection between individual actions and conservation initiatives. These key objectives have been achieved through a series of education and public awareness activities held throughout the region, raising the profile of the need to conserve these ancient mariners through increased collaboration and partnerships by governments, private sector, and community groups.

“Bringing Ocean Literacy into the Classroom” by *Mellie Lewis*

This presentation will guide participants through the process of bringing ocean literacy into the elementary classroom. We will discuss each of the seven ocean literacy principles and the accompanying fundamental concepts. A lesson plan focusing on each principle will be presented. Participants will have the opportunity to play an interactive game, “Kure Waste Chase,” which introduces students to the dangers of marine debris. In addition to lesson plans, participants will receive “Ocean Literacy: Essential Principles and Fundamental Concepts” brochures, Ocean Adventures magnets, and Seafood Watch cards. The session will conclude with an opportunity for participants to form a network of marine educators.

“Challenges and Opportunities for Marine Education through Tourism” by *Jasmine Mason*

Orcas, the most widely distributed mammal on Earth besides humans, have fired the imagination of peoples from across the world for many thousands of years. The resident orcas of the Pacific Northwest are probably the most photographed whales in the world, with tourists coming from around the globe with a purpose and anticipation only tourists can have. Tourism provides a huge source of willing learners and a captive market for environmental education. Capturing their enthusiasm for the purpose of educating them can be challenging, but at the same time can be very effective. Discuss the challenges, benefits, and rewards of using ecotourism as an effective forum for marine education, with a focus on the whale watching industry in the Pacific Northwest.

“International Coastal Cleanup (ICC): Student Project” by *Barbara Mayer and Chris Woolaway*

The ICC Student Project involved about a hundred Hawaiian eighth grade (13-year-old) students as part of a community service and ocean stewardship middle school team goal. The project was composed of three parts: (1) A pre-field trip classroom lesson about ocean currents around Hawaii that cause the islands to be a trap for marine debris, the previous year's ICC data, graphics of marine debris in Hawaii, and a practice activity in small student groups to sort, according to ICC categories, marine debris previously collected by the teacher; (2) a field trip to participate in the annual ICC; and (3) a post-field trip classroom lesson to graph and discuss the similarities and differences in marine debris at different locations along the beach.

“Establishment of Support Teams: A Decentralization Process to Sustain Resource Management Intervention at the Province Level in Fiji” by *Semisi Meo*

The Fiji Locally Managed Marine Areas (FLMMA) Network, since its formal inception in 2001 has put in place a systematic engagement process that has worked well with communities. This approach has resulted in the proliferation and epidemic of the community's interest throughout Fiji. To reach out to communities in a consistent basis would acquire a substantial amount of funding and human resources, which the limited resources of FLMMA are not able to complement. The establishment of support teams based and operating at the provincial level is an effort aimed at decentralizing the role undertaken by FLMMA. The operation of support team advocates a more organized way to assist provincial governments and organizations in coordinating their roles and functions for each community. This approach is being carried out in three provinces in Fiji, and the progress has demonstrated motivating outcomes. One of FLMMA's concerns is the tenacity of the community's involvement in allowing a smooth disengagement process from communities. The formation of support teams has the potential to strengthen institutional support at the government level and provide a simple access for communities in the area, hence, complementing the disengagement process.

“Marrying Traditional Values and Sciences Mechanism in an Effort to Sustain Community Conservation Efforts in Fiji” by *Semisi Meo*

Conservation initiatives by the Locally Managed Marine Areas Network in the Asia Pacific region manifest a recognition of the importance of involving local communities completely, especially indigenous populations, in sustainable management of marine resources. Past practices by conservation practitioners were, in principle, adamant on the fulfillment of their donor driven objectives without flexing a turn to building community for the sustainability of the initiative. This paper highlights on the community resource management approach that promotes adaptive management and capacity building for local communities, in order to cement the sustainability of their conservation efforts. This approach ensures the involvement of key respective social groups and communities in a collective effort of formulating a practical community resource management action plan that incorporates the social, economic, cultural, political, and demographic structure of the community. The combining of key complementary elements in traditional and scientific aspects brings about a motivation on their effort for communities to respect and comply, hence, leading to its sustainability.

“Strengthening Village Governance: An Approach to Underpin Communities Effort in Sustainable Development and Resource Management in Fiji” by *Semisi Meo*

The sustainable management of resources is a common goal in almost all the countries in the Asia Pacific region. Most conservation agencies and practitioners servicing in this area have indicated successful partnerships with communities. This is through awareness and education with participatory means, thus developing community resource management action plans. However, in most cases, the implementations by communities are not carried out diligently for reasons such as conflicting roles in communities and their formed groups and linking this to the policymaker's level. This is due to the fact that community management planning is focused in restoring dwindling marine resources, but the systematic organization of people in their villages is a challenge to be undertaken. This paper highlights an integrated community resource management approach that recognizes to strengthen village governance in order to generate unambiguous functional structure for communities to sustain any village development, in particular resource management. The understanding of the internal groups in the community and their core functional roles is the key to guide them in implementing sustainable resource management.

“Sustainable Reefs: An Education Program for Youth and Communities” by *Richard Murphy and Allamanda Amituanal*

Created at the request of village elders in Savusavu, Fiji, the Sustainable Reefs program presents an understanding of reef ecology, the value of reefs to people, threats to reef health, and

alternatives for sustainable reef use. Based on field tests in Fiji, the British Virgin Islands and American Samoa, this program is now being implemented around the world in conjunction with the United Nations Small Islands Developing States program, UN Environment Programme, UN Educational, Scientific and Cultural Organization (UNESCO), the International Coral Reef Action Network, Reef Check, and the Marine Aquarium Council. *Sustainable Reefs* consists of culturally appropriate, multi-media educational resources, including a DVD/video, introduced and concluded by a well-known and respected local hero or spokesperson; the cartoon book *Treasure on the Reef* translated in the native language; an interactive Power Point show on coral reefs for student outreach; a primary grade ocean and coral reef curriculum with teacher's guide; an overview of critical reef issues; and an extensive list of additional web-based coral reef lesson plans, activities, and other resources. Jean-Michel Cousteau's, Ocean Futures Society and the local educational community (often non-government organizations or the Ministry of Education), form a collaborative partnership to implement the program. The program begins with a series of school presentations to students and educator workshops, involving the Ocean Futures education team. After these initial activities, the program is carried out by our local partners. Our recent implementation of this program in American Samoa, with the Fagatele Bay National Marine Sanctuary will serve as a case study to describe the program. It is our intention that these educational and entertaining materials will engage young people in thinking about the value of reefs and that, with an understanding of basic ecological principles, they will become better stewards of their coral reef resources. Ocean Futures Society is actively seeking local partners to implement the Sustainable Reefs program in any country that has coral reefs.

"The Conservation Mosaic: A Model for Multinational Marine Conservation" by Wallace J. Nichols

The conservation mosaic is a model program for social change and the protection of highly migratory species, with potential application in other areas of social change and environmental conservation work. The goal in the case study presented is to reduce poaching and bycatch of endangered sea turtles in the eastern Pacific. Preliminary results indicate positive changes in partner communities, increased numbers of sea turtles on nesting beaches and foraging grounds, and an emerging "sea ethic." Over the past decade, we have developed this approach to sea turtle conservation in the Californias (U.S. and Mexico) through the integration of three strategies: 1) Facilitate the growth of a diverse international NETWORK of fishermen, students, teachers, activists, researchers, funders, managers, indigenous community members, and other coastal citizens; 2) draw on these relationships to understand threats, generate new KNOWLEDGE, and develop practical solutions; and 3) empower local leaders to facilitate COMMUNICATION and sharing of these solutions and knowledge through an array of resonant media. The novelty, simplicity, and effectiveness of our methodology are based on an integrated, innovative approach informed

by regular evaluation and monitoring. We have adapted and exported the conservation mosaic model to community-based projects focused on leatherback turtle conservation in Indonesia and shark conservation in the eastern Pacific, among other projects. However, the model should prove useful across the range of conservation and social change programs.



Fred Nucifora delivered his presentation via the web from the Great Barrier Reef HQ Aquarium in Australia.

"Reef Videoconferencing—On the Cutting Edge of Environmental Education" by Fred Nucifora

Reef Videoconferencing is an initiative of the Great Barrier Reef Marine Park Authority through its education program Reef ED. Wherever you are in the world, you and your students can experience the Great Barrier Reef with Reef Videoconferencing. During this underwater fact-finding mission, classrooms, lecture theatres, conference venues, and even boardrooms are virtually transported to the Coral Reef and Predator exhibits at Reef HQ Aquarium (the world's largest living reef exhibit). State-of-the-art videoconferencing technology is used to unlock unique teaching and learning experiences, including information delivered *live* by a scuba diver. During 2005-2006, Reef HQ Aquarium has delivered Reef Videoconferences to over 2,300 students both nationally and internationally. International locations have included the USA, France, UK, New Zealand, South Africa, Japan, and Greece. The latest example of how Reef Videoconferencing has been used for learning and leading with technology was when a group of students from Venetie, Alaska, came to school on snow sleds and went for a virtual dive on the Great Barrier Reef. Reef Videoconferencing is also now being used to facilitate an ESL (English as a second language) program to students in Greece. The primary aims of Reef Videoconferencing from Reef HQ Aquarium, the Education Centre for the Great Barrier Reef Marine Park Authority are to share the uniqueness of the Great Barrier Reef with the community (on a national and international level); encourage and stimulate understanding of the issues surrounding the Great Barrier Reef from social and environmental perspectives; provide opportunities for students to share knowledge and interact with each other in a fun and

educational setting; develop knowledge and understanding of the Great Barrier Reef; engage students and exemplify attitudes, values, and patterns of behavior that will empower them to make effective contributions to the ecologically sustainable use of the Great Barrier Reef; and enable students of all ages from all over the world to see thousands of live reef creatures, watch them interacting, and discover the latest reef research.

“Increasing Marine Conservation Awareness through Curriculum-Based Competency in Local Primary Schools” by Hani Nusantari

Indonesia has more than 17,000 islands and is the largest archipelagic nation in the world. Indonesia has nearly 33,000 square miles of coral reefs and it's a home to a third of the world's total corals. Although Indonesia's coral reefs are the most extensive and diverse in the world, they are also the most threatened. Human activities such as destructive fishing and unregulated tourism have contributed to coral reef degradation. One of the problems is the lack of awareness of the marine environment. There is a need to increase awareness and motivation for marine conservation among local coastal community members. Investing in education for children, as the part of the coastal community, could make an important contribution to developing marine conservation awareness for the future. Through curriculum-based competency, local schools have the opportunity to base their local curriculum on coastal and marine environments, particularly coral reef ecosystems. This research will provide an opportunity to explore the primary school students' perspective about coral reef ecosystems, and how curriculum-based competency could encourage them to increase their awareness of coral reef conservation, particularly, and marine environment conservation, generally.

“Utilizing the Sea Grant Model to Foster Ocean Literacy” by Diana Payne

This session will feature the efforts of more than 30 Sea Grant programs in the United States and internationally to highlight successful practices that may be used as models for marine educators in the Pacific. Environmental stewardship, long-term economic development and responsible use of coastal, ocean, and aquatic resources are at the heart of Sea Grant's mission. Sea Grant is a nationwide network (administered through the National Oceanic and Atmospheric Administration [NOAA]) of university-based programs that work with coastal communities. Through a variety of partnerships, Sea Grant seeks to educate future professionals and leaders, as well as enhance marine and aquatic literacy among the general public.

“An Ecosystem Approach to Chilean Fjords in Southern Patagonia” by Luis A. Pinto

One of the last remains of undisturbed water bodies in the world corresponds to the Chilean fjords in southern Patagonia. The coastline of southern Chile (below 41°30'S) stretches 1,600 kilometers to Cape Horn and covers an area of almost

240,000 km² creating a system of channels, fjords, and sounds. The region is rugged, being composed by hundreds of islands, two glacial fields, and the Darwin Mountain Range. Only during the last 10 years have Chilean researchers been systematically exploring the area to understand the physico-chemical and biological characteristics of the fjord ecosystem. There is an increasing usage of the area for extensive commercial aquaculture, which may be causing an impact on the system with pressure over a rich cold-water biodiversity. The continuous presence of harmful algal blooms in the area is also of serious concern to subsistence economy. It is of the utmost importance to educate society to actively promote sustainability within these marine ecosystems. One of our current marine education programs has been conceived to engage teachers and students into an exciting scientific exploration of Chilean fjords. It is also an open invitation for all those young explorers to come and visit one of the least known regions of the planet.

“International Projection of Highly Stimulating Marine Science Projects for Middle and High School Students” by Luis A. Pinto

The Center AquaSendas, a non-for-profit organization in Chile, is developing a series of engaging marine science projects for middle and high-school students that deal with global change. Based on current knowledge about the effects of a climatic planetary change, we designed a science program where students use local water bodies such as coastal embayments, wetlands, and fjords as natural laboratories to understand and discriminate between natural and anthropogenic changes. The Oxygen Minimum Zone, El Niño Southern Oscillation, and the Humboldt Current System are marine phenomena we study with a multidisciplinary approach designed to engage students through discovery, observation, and measurements to promote analytical skills, language acquisition, stewardship, and equity as part of their learning process. Part of the equipment used during the field sampling, such as water and sediment samplers, have been built by the students themselves. By using the ongoing Argo International project as a resource, students are enabled to explore how the ocean is responding to global change. Students “Adopt a buoy” following its track, collecting salinity and temperature data. We expect to have in 2007 a network of Latin American middle schools participating on this international effort.

“Networking among a Community-Based Organization, a Marine Research Center, and Public and Private Sectors as a Model for Capacity Building among K-12 Science Teachers” by Luis A. Pinto

Center AquaSendas, a community-based organization addressing marine issues through K-12 innovative hands-on aquatic science programs, has been successful in the inclusion of the private sector, a Marine Research Center, and a governmental department to improve capacity building among K-12 science and technology teachers. These apparently unrelated sectors of the

society are becoming painfully aware of the poor performance of our K-12 students in national scholastic assessment. High-school graduates are ill-prepared in science and technology subjects when entering college, conflicting with the high standards required to achieve excellence in engineering, science, and technology careers. In light of the disturbing results, there is a pressing need for innovative ways to include other actors with revitalized ideas and proven experience. Cooperation with outside partners to develop a marine science programs is helping teachers improve educational programs at their schools and empower the school community. Close collaboration with the above institutions is increasing the access to resources, the ability to serve larger audiences, the selection of partners who add certain expertise or a different perspective, visibility, and community goodwill. Application of a management model based on local participation is causing a shift in how science and technology can be taught in our K-12 schools.



Solialofi Tuamu from American Samoa, Leo Dutra from Brazil, and Luis Pinto from Chile enjoy an informal networking session.

“Survey of the Understanding towards Marine Science Education Differences between USA and Japanese Marine Educators” by *Tsuyoshi Sasaki*

Survey of the differences of understanding towards marine science education between USA and Japanese marine educators was conducted using a questionnaire method. Both sides believe that marine science education is important for citizens to have a concern of the ocean (K-12 educations are also needed), but both sides aren't concerned about the ocean and marine science education in the same way. U.S. marine educators have a strong consciousness about environmental conservation and think that the ocean is a good field for scientific research or leisure activity. On the other hand, Japanese marine educators have a strong expectation that the ocean is a place of seafood production (not only fish but seaweed) and a place of leisure activity. These results suggest that U.S. and Japanese marine educators have a different way of thinking about the ocean.

“Awakening Understanding and Putting Together the Pieces: The Role of a Marine Educational Center in Hilo, Hawaii” by *Linda Schubert*

NOAA's Mokupapapa Discovery Center opened its doors to the public in 2003 to increase awareness of the Northwestern Hawaiian Island's rich biological diversity and cultural heritage. Since that time, we have seen our audience grow to 56,000 people a year. Come and hear about how we bridge the miles between one end of the Hawaiian Archipelago and the other through exhibits and educational programs. Highlighted programs will include our summer youth program that brings topics such as tide pool exploration and Polynesian voyaging to life for local children.

“Working Together towards Saving Our Planet and Oceans” by *Leonard Sonnenschein*

After years of planning, a global mission of scientists, community leaders, organizations, institutions, and governmental departments are starting a plan of action to deal with issues of pollution of our oceans and waterways, overfishing, global warming, and working towards sustainability through developing local actions. On January 1, 2007, 15 actions were announced that will begin immediately in over 50 countries affecting millions of people that may just start changing the tide of impending doom. Because of the efforts of the Concert for the Oceans Foundation (CFTOF), over \$250,000 is being committed to start to directly impact several million people. The word concert is used to create the embodiment of many voices who through celebrations are intended to raise the spirits of people towards positive actions to save the planet, the oceans, and to preserve our climate and save ourselves. The initial series of events will culminate on the weekend of World Ocean Day June 8, 2007, to celebrate the initiatives and actions convened previously, as well as to identify renewing and emerging actions. Each individual is hoped to be inspired to take action to reduce the human environmental footprint through reducing pollution (fuel consumption, chemical, solid waste, and biological), campaigning for pro-environmental policy, preserving the world through wise use of foods and protection of natural spaces, and supporting local environmental groups in spreading information and promoting actions. Communicating will occur through press conferences, press releases, calls to action collaboratively disseminated through local organizations, gala events, concerts, television, radio, Internet, phone messaging, billboards, and other forms of advertisement. Funding and actions are contemplated to occur over a 10-year period in order to ensure the widest and deepest possible pragmatic application. The Concert for the Oceans (www.CFTO.org) is a call to action, an opportunity for an awakening to the state of our planet.

"Including Sustainable Fisheries in Classroom Curricula" *by Sylvia Spalding*

Getting a sustainable fisheries message—based on science—in class curricula in the U.S. takes some effort and ingenuity. The Western Pacific Regional Fishery Management Council has pursued a variety of initiatives, including guest presentations, a TV series and teacher guidebook, and one-day teacher workshops on the seafood industry. Lessons show the connection between the seafood on one's plate and resource harvesting activities, as well as ways to successfully manage human activities so fishing and eating fish can be enjoyed in the future. The Council has also partnered with a local public school to offer a summer course on marine resources to high school students. The success of the course lies in its ability to teach students to see the connection between what is taught in the classroom and what is happening in the real world—their world. Globally, the U.S. is the third largest seafood importer, and our national consumption rate of seafood is increasing. Given our dependence on the ocean for food, more focus on the "people component" of the ocean seems warranted in the U.S. classroom, if we are to have ocean literate citizens who make political decisions and consumer choices that consider ocean resources from a global perspective.

"Public Marine Education Projects Promoting Coral Reef Conservation in the Commonwealth of the Northern Mariana Islands" *by Teny Topalian*

The Commonwealth of the Northern Mariana Islands (CNMI) has some of the most beautiful coral reefs in the world. The CNMI is composed of an island chain consisting of 15 islands. The southern islands include Saipan, Tinian, Agijuan, Rota, and Farallon de Medinilla and are mostly raised limestone, sloping platforms protected by barrier reefs and well-developed fringing reefs to the west. The largely uninhabited northern islands—Anantahan, Sariguan, Gusan, Alamagan, Pagan, Agrihan, Ascuncion, Maug, Uraxas, and Farallon de Pajaros—are mostly volcanic, including some active volcanoes, and have much less reef development. There are six marine protected areas, including Managaha Marine Conservation Area, Bird Island Sanctuary, Forbidden Island Sanctuary, Trochus Reserve, and Sea Cucumber Reserve, which are in Saipan and Sassanhaya Bay Fish Reserve in Rota. This presentation will be a discussion of the different projects the Pacific Islands Regional Office of NOAA in Saipan has initiated and implemented that promote the protection of the coral reefs of the Commonwealth of the Northern Mariana Islands. Some of the projects that will be discussed include workshops for teachers and principals; marine attitude and knowledge surveys; school visitations; radio programs; forums for local fishermen of Chamorro and Carolinian descent; interviews with fishermen; workshops for fishermen; and the development, publication, and distribution of marine educational resource materials.

"Community-Based Wetlands Management Program in American Samoa" *by Solialofi Tuamu*

The Community Based Wetlands Management Program was formed in 1993 and is a bottom-up resource management program in which the village actively participates in managing, conserving, and protecting its wetlands. It is a learning process for both the government and local villages. Thus, the community is empowered and therefore more likely to accept and follow the self-created plan. The opposite is the traditional top-down regulatory approach where the heavy hand of the government and the law rule. Looking into the future, one looks at these resolutions and delineations as the foundation upon which active resource management, including preservation, conservation, restoration, and utilization (agriculture, ecotourism, aquaculture) spring from in a united effort.

"Networks of Learning and Learning Networks" *by Peter Tuddenham*

What are some of the characteristics of networks of learning and learning networks for International Pacific Marine Educators to consider? Some ideas, lessons learned, and reflections from working in and with existing marine education networks, the U.S. Ocean Literacy process, 20 years personal experience with online learning networks, and networks of learning will be presented. Design considerations for networks of learning and learning networks from architecture, to online social networks will be summarized.

"Sacred, Heritage Pride—Protect our Sea Turtles" *by Christianera Amituana'i Tuitele and Meredith Speicher*

The Territory of American Samoa's RARE PRIDE campaign chose the green sea turtle as its flagship species for various reasons: Green sea turtles are endangered; it is American Samoa's sacred reptile; 2006 is the Year of the Sea Turtle in the Pacific Islands; and historically, it is our heritage to hold onto the Fa'asamoa (Samoan way of life) of which sea turtles are a part. The flagship species (green turtle) not only represents the decrease of turtles found in our territorial waters, but it also represents their habitats and marine resources that are in need of conservation. RARE inspires people who live in the planet's most bio-diverse places to embrace conservation with an agenda to change attitudes and behavior towards the environment. The RARE module has been adopted to accomplish year-round educational activities and projects. A pre-survey identified the community's knowledge of sea turtles; the importance, threats, and habitats of the turtles; and the project's objectives and activities. Two stakeholder meetings were done to involve the community from various backgrounds and professions in the planning process. A post survey will be conducted throughout the Territory to identify local knowledge on sea turtles after the year-round campaign.

“Networking as a Tool for Marine Education in the Pacific Islands: Potential Role of the USDA Land Grant Program of the College of the Marshall Islands in a Pacific-wide Network” by *Nacanieli Tuivavalagi*

The College of Marshall Islands Land Grant Program (CMI-LGP) comes under the College of Micronesia Land Grant Program (COM-LGP). Aquaculture has been a key program area in COM-LGP, and in its next five-year plan (2007-11), one of the eight activity-areas is “conservation of biological diversity.” This requires education of youths and adults in the school system, as well as those in the community. However, education is a two-way process, and LGP staff members expect to learn much from the community as well. At the CMI-LGP, the Aquaculture Scientist and Agriculture Scientist have been working on developing a training program to be offered at their field station at Arrak, Majuro atoll, where students, high school teachers, and members of the community could attend a training program in marine science and also cover agriculture and other land based activities that have an impact on marine life. These two scientists have wide experience in networking and collaborative activities in the various regions of the Pacific, including Melanesia, Micronesia, and Polynesia; and in this paper, they share their experiences and views on formation of a regional network and discuss how CMI-LGP could contribute to such a network for marine educators in the Pacific.

“Community Participation in the Upper Gulf of California/Colorado River Delta Biosphere Reserve: Lessons from 25 Years” by *Paloma Valdivia*

The Upper Gulf of California and Colorado River Delta of northwestern Mexico are recognized worldwide for their socio-economic and ecological importance. High productivity and habitat diversity historically supported important fisheries and high biodiversity. Today endemic species like Vaquita (*Phocoena sinus*) and Totoaba (*Totoaba macdonaldi*) are threatened with extinction. Many fisheries are in decline. Tourist developments threaten coastal habitats. Causes of this environmental degradation include 1) open access to fisheries, overfishing, and non-selective methods; 2) decreased flow of the Colorado River; and 3) inadequate planning and management. In 1993 a marine protected area was established to offer solutions, but lack of information and resources and increasing social conflicts challenge progress. The Intercultural Center for Study of Deserts and Oceans (CEDO) initiated educational activities in the region in 1980 before environmental degradation was evident. Initial programs focused on the ecosystem and species. Later specific issues were addressed with local communities and decision makers. Today programs integrate traditional knowledge, science, and community participation to create models for community-based conservation. With a 25-year trajectory, participants have included fishers, oyster growers, developers, school children, and teachers. The current challenge is to multiply the successes and develop permanent local capacity to keep pace with accelerated growth.

“The 2006 International Youth Coastal Conference”

by *Andrew Vance*

The first International Youth Coastal Conference (www.youth-coastalconference.com) was held in Melbourne in October 2006. It was part of a process that involved students working with expert mentors many months prior to the event and resulted in some amazing presentations from children who are motivated and have high self-esteem and respect for others. Using the Kids Teaching Kids model, the 2006 International Youth Coastal Conference provided students with skills in marine and coastal education, but more importantly, it showcased students who are optimistic, have a sense of future, are capable public speakers, and can communicate ideas in many different forms. Most importantly, the process for this conference was about promoting kids teaching kids as the highest form of learning as we aim for a cultural change in the way we view, use, and perceive our natural environment. The 2006 International Youth Coastal Conference was less about a conference and more about a lasting commitment to our youth and the sustainable use of our marine and coastal resources and environment.

“U.S. National Marine Fisheries Service, Pacific Islands Regional Office’s Protected Species Workshops”

by *Lewis Vanfossen*

Sea turtles, marine mammals, and seabirds are protected from harvest and taking by U.S. and international laws and are considered *protected species*. The National Marine Fisheries Service’s Pacific Islands Regional Office Sustainable Fisheries Division conducts protected species workshops to educate owners and operators of U.S. federally permitted pelagic longline vessels about protected species and applicable laws. U.S. Federal regulations require that vessel owners and operators attend these workshops and be certified annually. At the workshops, fishermen and owners are given instruction on identification, handling and release techniques, and regulatory requirements for protected species occurring in the Pacific region. Instructors convey this critical knowledge to fishermen through media such as presentations, demonstrations, videos, and printed materials. The protected species workshops also provide fishermen with a means to voice concerns and give suggestions to improve mitigation techniques and future regulations. About 250 fishermen are trained in Hawaii and about 100 fishermen are trained in American Samoa annually.

“Communicating Marine Conservation Results: The Two Levels” by *Ron Vave*

A majority of people living in Fiji and the Pacific live along the coastline and, as such, depend on marine resources for their subsistence and commercial livelihood. Communities, however, have noted these resources to be dwindling and have sought assistance from the Institute of Applied Science to help them conserve resources for future generations. To this end, local

communities are trained in biological and socioeconomic data collection, analysis, and interpretation. This paper highlights a case study on how community conservation practitioners are trained to collect data pertaining to marine conservation efforts, and the means of how they can effectively disseminate the results to two distinct audiences; the local community and to partner organizations (including government). At the local community level, the use of tallying and totals of results is used and information relayed to wider community audiences using simple bar graphs. To partner organizations, the community collected data is analyzed using t-tests for within site comparisons (MPA versus Control) and meta-analysis is used to compare results from within and between countries in the Asia Pacific region of the Locally Marine Managed Area (LMMA) network.

“Imi O Na Ala O Ke Moana (Learning the Ways of the Oceans): An Evaluation of Ocean Education and Marine Tourism Practices in Hawaii” by *Carlie Wiener*

Over the past 10 years, there has been a dramatic increase in the marine tourism sector. Island communities have economically benefited from this fascination with marine life, creating a multimillion-dollar marine tourism sector. While funds are being generated from marine resources, rarely are the negative impacts of these sensitive ecosystems evaluated. Government, non-government organizations, and private businesses need to create more extensive interpretation programs, as they often fail to evoke a sustaining concern for environmental issues. While awareness may be encouraged through these outlets, participants remain oblivious to the direct impact they have, failing to get involved in solutions. In an attempt to draw parallels between marine tourism and education, this presentation will examine current interpretation programs that are provided through the marine tourism sector in Hawaii. A comparative analysis will be done through recreation and tourism programs and advertisements amongst several of the Hawaiian Islands. Structured snorkel and scuba diving programs and marine mammal swim programs (including whale and dolphin watching) will be evaluated. Using cross-comparative analysis, the research demonstrates a need for improved interpretation programs in marine activities that foster a stewardship ethic among tourism participants.

POSTER PRESENTATIONS

“The Keys to Science Education” by *Karolyn Braun*

The Keys to Science Education was a comprehensive training and professional development program that took a cadre of middle school and upper-elementary teachers through a two-week workshop of experiential institutes in marine science education facilitated by practicing sciences and exemplary educators. The institutes gave American Samoa teachers the opportunity to extend their understanding of the marine and terrestrial environment and to develop strategies and curriculum resources for effectively utilizing the oceans, coastal, and

terrestrial environments as a teaching tool. This was accomplished by engaging the participants in a 10-day field based institute during the summer with extensive follow-up activities and continued support.

“Our Fluid Earth: A Multidisciplinary Approach to Aquatic Science Education for Grades 9-12”

by *Kanesa Duncan and Erin Baumgartner*

This presentation describes *Our Fluid Earth* program under development by the Curriculum Research & Development Group at the University of Hawaii. The current Fluid Earth and Living Ocean (FE/LO) is a widely disseminated marine science program for grades 9–12. Results from education research are being used to revise the course materials (last updated in 1995) into a more widely useable format, and we will be soliciting feedback from meeting participants and educators in the Pacific region. Our additions highlight the important critical thinking skills needed by students. We have also restructured the focus to general aquatic systems in order to teach about the connected nature of terrestrial and aquatic environments, which is an especially important concept for Pacific Rim societies. We have incorporated project-based instructional modules that (1) allow students to identify and resolve a scientific question and (2) engage students in activities connected with their world. Our curriculum theme is ecology, which allows teachers to use biological systems to introduce physics and chemistry by connecting the abiotic features of the environment to the organisms living there. Activities targeting the nature of science are integrated within the curriculum, as are activities connecting marine, freshwater, and terrestrial systems.

“Ecosystem Approach to Fisheries Management in the Western Pacific Region” by *Jarad Makaiau*

The “ecosystem-based” approach to fishery management has been promoted since 1986 by policymakers, fishery management agencies, and environmentalists worldwide, including the President’s Commission on Ocean Policy, the Pew Ocean Commission, NOAA, and the UN Food and Agriculture Organization. The Western Pacific Regional Fishery Management Council is in the process of changing its species-based fishery management plans (FMP) to place-based fishery ecosystem plans (FEPs). Existing FMPs for insular resources (bottomfish, crustaceans, precious corals, and coral reef resources) are being restructured as archipelagic fishery ecosystem plans (FEPs). These include a Mariana Archipelago FEP (for Guam and the Northern Marianas Islands), a Hawaii Archipelago FEP, an American Samoa Archipelago FEP, and a Pacific Islands Remote Island Areas FEP (for islands and atolls of Baker, Howland, Jarvis, Johnston, Palmyra, Wake, and Kingman Reef). An existing FMP for pelagic resources will become a Pacific Pelagic FEP. The structural changes will facilitate the incorporation of ecosystem-based principles in the management of fisheries in the federal waters (generally, 3 to 200 miles offshore) surrounding the U.S. Pacific Islands. A major component of the FEPs is the emphasis

on greater community involvement and integration of traditional environmental knowledge into the Council's management and decision-making process.

"Integrating Conservation into the Culture of Gau Island, Fiji" by C. Brooks, L. Brown, S. Hart, W. MacLennan, S. Pace, and H. Rousham

Gau Island, the fifth largest in Fiji, supports a population of ca. 6000, with fishing traditionally providing an important source of dietary protein. The island supports fringing reef around its entirety and has an extensive barrier reef located on its western side. Although traditional fishing techniques prevail, the reefs of Gau are under greater pressure from increasing human population and more technological, but less sustainable fishing methods. Following consultation with the University of the South Pacific, every village around Gau has voluntarily established a Locally Management Marine Area (local version of MPA). Since April 2006, Frontier Fiji has been assessing the status of the fringing reefs of Western Gau and providing relevant information to the local inhabitants. Frontier Fiji aims to increase local working knowledge of MPAs and promote sustainability of the marine resources. In order to be successful, conservation must integrate fully with local needs and culture. By raising awareness, for example, of the plight of Fiji's marine turtles and introducing sustainable methods of harvest, the inhabitants of Gau may continue to enjoy turtles in future generations. Working closely with Lomani'Gau Council (Guardians of the Island) and with the local schools, Frontier Fiji hopes to further integrate conservation into the culture of Gau.



The island of Gau was scheduled to be a field trip destination prior to the relocation of IPMEC to Honolulu due to the December 2005 coup in Fiji.

"Teachers without Borders" by Barbara Mayer

Teachers Without Borders (TWB) is a non-profit (501c3), non-denominational, international NGO founded in 2000, devoted

to closing the education divide through teacher professional development and community education. The organization focuses on the building of teacher leaders. The work occurs primarily, but not exclusively, in developing countries, in order to build self-reliance, health, and capacity. The table at IPMEC will feature the TWB Republic of South Africa project that has worked with math and science teachers over the past six years. By conservative estimates, a half million students are benefiting from their teacher's upgraded skills. This grass-roots program has also provided the opportunity both for professional development and public service to more than 30 U.S. (Hawaii) teachers in six years—a life-changing experience, and ultimately one which benefits students in U.S. classrooms. In the words of one of the South African administrators of the program, "to see colleagues from opposite ends of the Earth share knowledge and culture with such great warmth and caring, is a sight to behold. This is an example of international cooperation and global understanding at its best."

"Experience-Based Learning at Its Best: Using a Wildlife Refuge and an Endangered Species as a Case Study to Promote Stewardship" by Lindsey Peavey

To date, approximately 97 percent of natural habitat in San Diego Bay (SDB) has been lost due to development. In June of 1999, 3,940 acres encompassing South SDB was made a Wildlife Refuge, which is now home or stopover to numerous endangered and threatened species of plants and animals. The SDB, and especially the Wildlife Refuge, is an area that the local community must take ownership in protecting into the future. Increasing the significance of the refuge is its close proximity to the U.S.-Mexico border, integrally linking it to other ecologically important wildlife areas that merit immediate attention and protection. Our goal in reaching out to the communities of San Diego is to promote stewardship and expand the public consciousness of the urgency of conserving the dwindling natural resources in the region. The Southwest Fisheries Science Center (SWFSC, <http://swfsc.nmfs.noaa.gov/>) monitors a population of endangered green sea turtles that feed on rare eel grass beds and, although unusual, stay as year-round San Diego residents. This provides an excellent educational resource to the community. Each year Pro Peninsula leads almost 300 sixth grade students from Southern San Diego on field trips to SDB to observe scientists from the SWFSC's Marine Turtle Research Group as they study the green sea turtles that inhabit SDB. Using South SDB and its endangered green sea turtles as a case study, the students are exposed to an international conservation effort and learn why scientific research and community activism go hand-in-hand when protecting natural resources, wildlife, and habitats. This unique program serves low-income, under privileged students, many of whom speak both English and Spanish, and is generously sponsored by the Port of San Diego and the LS Power Company.

"Teaching Aid for Marine Educators in the South Pacific" by Peter Craig

Our South Pacific communities depend on coral reefs for many reasons (food, culture, coastal protection, tourism), but there is a continuing need to communicate with the public about the importance and vulnerability of these resources. How can we hope to protect coral reefs if people are not really sure what coral is? A teaching aid was developed that can be modified for use in schools. It's a booklet called the *Natural History Guide to American Samoa*. Although it focuses on American Samoa, the booklet describes some of the important marine resources found across the South Pacific region. The booklet can be used as a reference document, or change the text to fit your island locale and add your own articles. The guide is also available online at www.nps.gov/npsa/naturescience/.

"World Ocean Network's Sustainable Actions Committee and the First Findings of the Sustainable Seafood Campaign" by Leonard Sonnenschein

Since 1989, numerous surveys about bringing information to the public have been undertaken to determine the basis for setting short- and long-term goals that will create a wider awareness of the fragile state of the ocean ecosystems, identify actions we can do to bring about a positive conservation change, and develop tools for implementation of the United Nations World Summit on Sustainable Development (WSSD) Ocean Goals. This information has been gathered on local, regional, national, and international bases. Goals are set to achieve these defined needs to accomplish the mission of developing tools for implementation of the WSSD Ocean Goals: Achieve greater sustainability of ocean resources, achieve decrease in pollution activities, and achieve mechanisms for better environmental understanding. Since 2002, the Sustainable Seafood Campaign has been developed and actions have been taken towards identifying and implementing best practices towards balancing the consumer need for seafood and nature's ability to respond. Reports of the findings from surveys for global implementation will be distributed. In 2007, the World Aquarium, chair organization of the committee has announced its \$15 million, 10-year program expansion: Concert for the Oceans Foundation. www.cfto.org

"USC Sea Grant Parent Child Program" by Lynn Whitley

The University of Southern California (USC) Sea Grant Parent Child Education Program (PCEP) is aimed at making basic science concepts approachable and fun for parent and child together, as well as developing a sense of environmental stewardship. PCEP is usually based at an inner city school or community center; participants in Southern California are primarily Latino and African-American. As a team, parent and child attend a short course in marine/environmental science which focuses on the urban/ocean connection and includes a field trip and culminating project. Many of these participants have never been

to the beach or seen the ocean and have no understanding of how their actions can impact the marine environment. Through the innovative PCEP learning process, parent-child teams gain an elementary understanding of science and develop an increased regard and sense of responsibility relating to local environmental issues. Additionally, PCEP introduces effective communication techniques, initiates thoughts of new and exciting future career paths in marine, environmental or social science, and fosters a lifelong interest in science and quality of self, family, and home. While created for a U.S. Southern California marine environment, this model program can easily be adapted for coral reefs and other environments, as well as other cultures.

VIDEO PRESENTATIONS

"Reef Videoconferencing"

by the Great Barrier Reef Marine Park Authority

This video is referenced in Fred Nucifora's oral presentation (see abstract above) delivered from Australia. 40 minutes.

"Hawaiian Blue—The Encounters" by Ziggy Livnat

The Encounters was born of 400 dives (day and night) and over two years of filming. The 45-minute video gets you up close and personal with the marine life wonders that surround the main Hawaiian Islands. The stars of the film are corals, fish, urchins, crabs, octopus, turtles, sharks, manta rays, dolphins, monk seal, and many more. The animals move to Hawaiian music, slack key guitar, and cello, from some of Hawaii's top musicians. It features English and Hawaiian animal name subtitles and optional commentary on locations and animal factoids. www.ForTheSea.com

"Hawaii Reef Etiquette PSA" by Ziggy Livnat

The Hawaii Reef Etiquette public service announcement (PSA) is the winner for Best PSA 2006 at the International Wildlife Film Festival. The PSA precisely yet whimsically teaches visitors how to enjoy, respect, and preserve the Hawaiian reefs. The PSA encourages action and shows viewers that "you can make a difference." With stunning underwater video of the Hawaiian Islands from award-winning filmmaker Ziggy Livnat, the seven-minute PSA is a visual experience that speaks to adults and children alike. It happens entirely underwater with the fish talking to deliver the message of conservation. It is based on Hawaiian lore with original musical background and narration from some of Hawaii's best entertainers. www.ForTheSea.com

"FishQuest: Fishing for Facts, Fishing for Food, Fishing for Solutions" by the Western Pacific Regional Fishery Management Council

FishQuest features fisheries in American Samoa, Commonwealth of the Northern Mariana Islands, Guam, and Hawaii, highlighting the importance of fisheries to island communities and the complexity of managing them to ensure continued

use by future generations. The Council partnered with the Hawaii Department of Education and the Pacific Resources for Education and Learning to produce this three-part television series in 2002. The program was broadcast through KidScience, an interactive distance-learning program and aired in classrooms and homes through local cable and public TV stations. Teachers were provided a companion guide containing lesson plans and student activities. The video is referenced during Sylvia Spalding's oral presentation (see abstract above).

"Get Hooked: Fishing Sustainability" by the Western Pacific Regional Fishery Management Council

This 10-minute student video won second place in the Sustainability Video Contest conducted by the Islands of the World IX: Sustainable Islands—Sustainable Strategies conference in 2006. It was produced by students participating in the High School Summer Course on Marine Fisheries and Resources, which was co-hosted by the Western Pacific Regional Fishery Management Council and Moanalua High School. This video is referenced during Sylvia Spalding's oral presentation (see abstract above).

MORE RESOURCES:

College of Exploration:

<http://www.coexploration.org/ipmec>

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Page 43: Courtesy of Ron Vave

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- **Sustainability Education in the Pacific** (keynotes: Greg Manning, Department of Environment, Water, Heritage & the Arts, Australia, and Stephen Hammond, NOAA Office of Ocean Exploration, USA)
- **Linking the Pacific** (keynotes: John Sibert, Pelagic Fisheries Research Program, Hawaii, and Sereima Savu, South Pacific Regional Environment Programme, Samoa)
- **Capacity Building** (keynotes: Joeli Veitayaki, University of the South Pacific, Fiji, and Philippe Vallette, World Ocean Network, France)

With special guest Charlie Veron, author of *A Reef in Time: The Great Barrier Reef from Beginning to End*, in recognition of the International Year of the Reef

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