

Thorne Abbott

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Coastal Planners, LLC

Environmental Analyst
& Coastal Planner

Discipline Area

- > Coastal Management
- > Shoreline Permitting
- > Erosion Response
- > Managed Retreat
- > EIS/EA
- > Protected & Conservation Areas
- > SMA/SSA/SSV
- > Policy Formation
- > Public Facilitation
- > Stakeholder Development

Years' Experience:
21

Education

2005 / Doctoral Studies
University of Hawaii
Department of Urban & Regional Planning

2000 / Post-Masters
Coastal Planning
University of Maryland
Solomon's Island
Research Lab

1998 / Masters of Science
Environmental Management
James Cook University
Townsville, Australia

1993 / Bachelors of Arts
Environmental Studies
West Virginia University
Morgantown, WV

Summary of Experience

Mr. Abbott is an experienced coastal manager and environmental planner. His efforts to improve proposed developments by capitalizing on innovative natural resource conservation have led to worldwide experience including efforts in Vietnam, Singapore, Thailand, Japan, Indonesia, the Northern Mariana Islands, Australia, Turkey, Holland, and Hawaii, among others. Mr. Abbott's background integrates four broad topical areas including; constructed wetlands, water quality and watershed planning; shoreline, beach and coastal management; protected areas, species of special concern and sanctuary's; and policy, permitting and law. Mr. Abbott has worked in the government, non-profit, education and research, and private sectors. Based on that experience, he has served as a shoreline and coastal resources expert and has helped develop cross-jurisdictional, multi-sector approaches to solving complex coastal and environmental problems. A frequent presenter at NOAA's Coastal Zone conferences, he continues to research and author innovative methods to balance competing interests and promote sustained use within the coastal zone. He is active in the coastal community and presently serves on the Hawaiian Islands Humpback Whale National Marine Sanctuary Advisory Committee, Hawaii Audubon Society Board of Directors, and the Legacy Land Conservation Commission to which Hawaii's Governor appointed him.

Coastal Planning & Permitting

Beach Conservation, Managed Retreat and Shoreline Access Improvements, Maui, HI. Implemented beach restoration approaches to respond to coastal hazards along Maui's shorelines by facilitating the removal of seawalls and shoreline armoring as the County's shoreline planner. Improved beach access, increased public parking and restored shoreline and coastal trails at seven locations including five oceanfront resorts that relocated high-rises, buildings, and infrastructure inland based on projected beach erosion, sea level rise and shoreline retreat.

Managed Retreat at the Maui Lu, Kaanapali Ali'i, Maui Palms, Royal Lahaina, and private oceanfront landowners implementing site-specific avoidance strategies. Obtained high-quality sand resource allocations from Ameron Cement to help restore eroded beaches. Developed water quality monitoring plans, processed necessary permits, obtained government approvals, and garnered community and landowner support through public hearings and meetings. Gained community involvement in eight volunteer-based beach nourishment and dune restoration projects, including dune walkovers, native plant restoration, educational signage, and beach conservation outreach activities.

Coastal Adaptive Redevelopment Planning, Wailea, HI. Responsible for gaining Commission approval of a \$19 million renovation to the Wailea Marriott Resort, including renovating a 552-room hotel, cluster development and managed retreat from the shoreline including relocation of a 3-story building and a sewer trunk line.

Kapalua Public Access Trail Planning and Permitting, West Maui, HI. Provided planning and permitting assistance for a new coastal trail on West Maui. The 3.5-mile coastal trail connects five beach areas, expanded parking lots, improved comfort facilities, and areas with stunning oceanic views. Helped the landowner obtain coastal, shoreline and conservation district use permits and obtained authorization through public hearings and outreach meetings, including mediating and serving as a subject matter expert during contested case processes.

Publications

33 peer-reviewed publications and presentations in various forums such as:

International Journal of Ocean and Coastal Management

Journal of Environmental Design Research

American Society of Civil Engineers

Managed Realignment, Springer Books (contributing author)

The Beach Management Plan for Maui, 2008 (co-author)

Maui Coral Reef Recovery Plan (contributing author)

NOAA Coastlines

Coastal Zone Conferences 1999 – 2011

IUCN/WWF publications

Pacific Islands Fishery News

WESTPac presentations

US Coral Reef Task Force presentations

WEF/WERF Conferences and Journals

Publications may be viewed online at <http://...http://www.coastalzone.com/research.htm>

Managed Retreat Planning and Permitting, Maui County, HI. Responsible for coastal and environmental permitting of the 439 acre **Ukumehame subdivision**. The action resulted in 45 agricultural lots, a 77-acre protected riparian lot, and a 100 acre 1.4 mile lineal coastal park. Land was also allocated for the inland relocation of a major highway out of the erosion hazard and tsunami inundation zone.

SAND Alt - Sea Level Rise Risk Management. Obtained \$87,500 in competitive federal funding for a GIS-based oceanfront development and shoreline hardening risk model (SAND-Alt). The model is intended to incorporate sea level rise and flood inundation based on LiDAR, coastal erosion rate data, cultural preservation and ocean recreational sites, and a priority planning tool to determine which areas may harden the shoreline and which should be required to retreat from coastal hazards.

Seawall Repairs, Makani Sands and Kulakane Condominiums, Maui, HI. Facilitated federal, state and county government approvals for repairs to failing seawalls for two 1970s era condominiums along in West Maui. Performed drainage analysis and garnered government approval for drainage enhancements and created new public access to the shoreline. Developed a suite of best management practices accepted by the US Army Corps of Engineers and Department of Land and Natural Resources, and authored compliance reports for regulatory acceptance.

Site Development, Palauea Beach, Maui, HI. Developed a cogent, thorough analysis of land use entitlements and options for use of oceanfront property having conflicting land use designations (Park and Residential). The assessment critically evaluated land use history, regulatory "takings" lawsuits, and public involvement while avoiding, minimizing and mitigating the proposed development's potential for adverse impacts to coastal, environmental, archaeological, and public recreational use of a beach park, resulting in favorable approval of the landowner's preferred use.

Disaster Mitigation, Maui County, HI. Developed reconstruction guidelines and protocols (RGPs) for implementation after a hurricane or coastal storm to facilitate timely government approval of a large amount of individual rebuilding efforts, while incentivizing building back safe, stronger and smarter. The RGPs were created based on community focus workshops, including undeserved communities, and a site-sensitive decision matrix designed to conserve valued coastal resources.

Coastal and Shoreline Resource Planning, Maui County, HI. Lead Planner for actions within the coastal zone of Maui, Molokai, and Lanai Islands. Assessed proposed development projects in relation to ten integrated coastal management objectives; summarized impacts and recommended prudent mitigation measures to avoid, minimize and mitigate negative outcomes. Evaluated land use entitlements and their conformance with community plan, zoning, and state land use designations and restrictions. Reviewed and assessed traffic impact analyses, archaeological inventory/monitoring plans, drainage reports, environmental assessments (DEA/FEA/DEIS/FEIS), view plane analyses, landscaping plans, wetland delineations, flood hazards, shoreline surveys, architecture, building schematics and site plans. Conducted public hearings, processed public participation notifications, and presented development projects to decision making bodies and authorities. Authored final reports, findings of fact, conclusions of law, assembled exhibits, and recommended conditions of approval for each project.

Subdivision, Waialua, Oahu, HI. Analyzed the feasibility of developing oceanfront property on Oahu's north shore for residential use along a sandy, dynamic coastline.

Dry Dock Boat Repair, Inspection and Storage Facility, Kahului, Maui, HI. Developed plans and permits applications for a new boat maintenance facility with long-term trailered vessel parking and dry dock services including a dedicated site for boat repairs and inspections of vessels up to 75 feet long.

Affiliations

Governor's appointments
- Legacy Land
Conservation
Commission

- Hawaii Ocean &
Coastal Council

Board of Directors,
Hawaii Audubon Society

Board of Trustees, Maui
Coastal Land Trust (now
Hawaii Island Land Trust)

U.S. Delegate, World
Parks Congress

Hawaiian Island
Humpback Whale
National Marine
Sanctuary Advisory
Council

Hawaii Coastal and
Estuarine Land
Conservation Plan
Advisory Committee

Hawaii Ocean Resource
Management Plan
Working Group

Maui County Marine
Mammal Stranding
Network

Maui Nui Marine
Resource Council Advisor

US Coral Reef Initiative
Navigator, Local Action
Strategy, CNMI

East West Center Affiliate

Pine Creek Land
Conservation Trust

Environmental Impact Assessment

Honolulu Seawater Air Conditioning, HI. Developed and facilitated the approval and processing of the project's Special Management Area, Shoreline Variance, Community Development and Conservation District Use permits, and supporting environmental assessment through public hearings, discourse, and engaging decision makers. Co-authored and completed Coastal Zone Consistency Determinations and State and Federal Environmental Impact Statements for the project. This innovative, private utility-scale, energy conservation project uses cold seawater to cool a closed-loop air-conditioning system that will serve up to 65 high-rise buildings in downtown Honolulu, Hawaii, substantially reducing potable water use and wastewater generation, as well as saving considerable energy.

Hawaii Environmental Assessment (HEPA) – Marine Research Center Relocation Pier 34/35, Oahu, HI. Managed agency and public comments, responses, revisions of the Draft EA, public notification, dissemination and distribution of the Final EA, and issuance of the FONSI by the Hawaii Department of Transportation in order to relocate and expand the University of Hawaii's Marine Research Center in Honolulu Harbor, Oahu, HI.

Hawaii Environmental Assessment (HEPA) - Barber's Point Redevelopment, Kapolei, HI. Assisted the Hawaii Army National Guard with relocating troops, equipment and personnel to Kalaeloa as part of the Barber's Point redevelopment efforts. Served as the contributing author to the federal and state environmental assessment (EA) for which a Finding of No Significant Impact was issued. Additionally, I wrote a traffic assessment in support of the EA, which was accepted by local and state transportation agencies, as well as the National Guard Bureau in Alexandria, VA. I arranged and facilitated public outreach, Neighborhood Board and agencies meetings, was responsible for the publication and production of the EA, gathering and responding to public / agency comments and coordination with the National Guard personnel.

NEPA - Federal EIS - Guam and CNMI Military Relocation from Okinawa, Japan. Facilitated the development of specific mitigation measures and best management practices for the EIS. Ensured that each measure was consistent between the four separate proposed actions and internally consistent between and across resources.. Internal and intra-resource consistency was of critical importance since the measures became part of the Record of Decision and are legally enforceable.

NEPA – Federal Supplemental EIS (SEIS) – Department of Defense (DOD) Military Relocation from Okinawa, Japan to Guam. Contributing team author for the cumulative impact section. The SEIS evaluated the proposed action in light of past, present and reasonably foreseeable actions. Evaluated the potential impacts of collective actions by DOD and non-DOD parties and their additive effects relative to each of 13 alternatives considered in the SEIS. Required evaluating all currently permitted and proposed projects, their location and effect, and cumulative effect on natural, coastal, recreational, and environmental resources and public infrastructure.

NEPA - Federal Overseas EIS - Marine Corps Live Fire Training, CNMI. Socioeconomic analysis of the proposed action including developing questionnaires, lists of interviewees, and creating primary and secondary data sources. Facilitated stakeholder, agency, political actors, and decision maker interviews, topical research, and assessments of the potential impact of the proposed action and its alternatives on social and economic viability, environmental justice, public health, welfare and growth, particularly on the islands of Pagan, Tinian and Saipan.

Continuing Education

NEPA & Section 7
Updates

(USCOE)

Water Quality Permitting
(USCOE)

Ethics in Planning

(HI APA)

Watershed Planning
(USEPA)

Comprehensive
Conservation Plans
(USFWS)

Community Profiling &
Identity (USEPA)

Effective Presentation
Skills (AMA)

Negotiation & Mediation
Techniques (AMA)

Coral Reef Histology
(George Wash. Univ.)

Utility, Site & Transportation Planning

Kauai Fuel Terminal SMA and Zoning Permit Approval. Authored applications to obtain various approval for renovations and improvements to a fuel terminal at Nawiliili Harbor, including installation of new impervious liners, ecology block retaining walls, new fuel conveyance system, and restoration of the existing fuel tanks to enhance resiliency to coastal hazards.

Solar Utility-Grade Production Facilities, Oahu, Maui, Big Island, HI. Developed various City, County and State land use and Special Use applications and supporting cultural and environmental information to facilitate utility scale energy production from PV, Concentrated PV, and PV with on-demand storage system projects in Oahu, the Island of Hawaii and Maui County. Worked closely with the DBEDT Energy Division and State Land Use Commission office to facilitate expeditious approval of these innovative renewable energy projects.

Hydroelectric Plant Development - Federal Energy Regulatory Commission (FERC) and Phase I Environmental Site Assessment (ESA), Kauai, HI. Prepared a list of requisite permits and approvals and wrote environmental portions of the Federal Energy Regulatory Commission (FERC) application. In recognition of its thoroughness, FERC granted the client an exemption from preparing a full application, moving the project more towards completion. Subsequently conducted a Phase I site assessment and worked with the Hawaii Department of Health in ascertaining previous remediation efforts and activities to support due diligence efforts for the hydroelectric plant power facility.

Ferry System (Inter-Island) and Small Boat Harbor Improvements for Maui, Lanai, & Molokai Islands, HI. Lead County Regulatory Planner responsible for processing coastal permit applications, shoreline variances, and supporting environmental assessment documents for major facility improvements at the County's small boat harbors and its inter-island ferry system. The seven separate projects, each with its own coastal and environmental review and approval process, updated and improved commercial vessel operations and ocean recreational facilities at Lahaina Harbor, Mala Wharf, Maalaea Harbor, Kihei Boat Ramp, Hana Boat Ramp, Manele Bay, Lanai, and Kaunakakai, Molokai. Coordinated public input and presented each project to the respective island Planning Commission during public hearings where the merits, mitigation strategies, best management practices and conditions of approval were discussed, debated, and voted upon. Managed all aspects of the environmental, coastal and public permitting and review process. Facilitated incorporation of lighting restrictions, sewage pump out facilities, refueling limitations, architectural review and improved public and trailer-vessel parking facilities at Maalaea and Manele Bay. Minimized concerns about dredging operations and contaminants at Mala and Kihei locations by recommending conditions to implement site-specific best management practices and protocols.

Traffic Impact Analysis, Kalaeloa, Oahu, HI. Completed a traffic assessment for the relocation of Hawaii Army National Guard staff, troops and equipment from Fort Ruger to Kalaeloa (Kapolei), Oahu, HI. Facilitated public involvement and input from community committees on impact mitigation. The report and its mitigation measures were approved by the Hawaii State Department of Transportation. The project included creation of low-cost mechanisms such as traffic calming and traffic flow enhancement to alleviate potential congestion during peak rush hour periods and enhancing roadway capacity without resorting to costly infrastructure improvements.

Lipoa Street Commercial Center, Kihei, HI - Obtained Commission approval for three LEED certified buildings and the first use of porous concrete parking areas on Maui to facilitate onsite storm water treatment. Project included dedicated bike lanes, pedestrian friendly access, and traffic calming traffic flow improvements.

Employment History

Coastal Planners, LLC
3993 Maalaea Bay Place
Wailuku, HI 96793

Cardno TEC, Inc,
Honolulu, HI
2009 - 2013

Maui County Planning
Department, Wailuku, HI
2004-2009

CNMI Division of Fish &
Wildlife, Saipan, CNM
2001-2003

University College /
College of Southern
Maryland, College Park
La Plata, MD
1999 - 2002

Water Environment
Research Foundation,
Alexandria, VA
1996 -1999

CRC Reef Research
Center, Townsville,
Queensland, Australia
1994 -1995

Curtis Industries,
Cleveland, OH
1987-1991

References & Referrals
provided upon request

Hazardous Material, Hazardous Waste, Petroleum Oil & Lubricants Facility Analysis, Guam. To support the US Marine Corp with plans to relocate from Japan to Guam, developed data and information for *Conceptual Development Plans* to manage HM/HW/POL. Analyzed handling, public transit restrictions, usage, distribution, individual accumulation sites and processes, 90 day storage and long-term disposal and storage restrictions were evaluated.

Kane Street Mixed Use Commercial Development, Kahului, HI – Obtained Commission approval for an innovative, pedestrian friendly, multi-modal urban infill redevelopment project which improves sense of community and place with walkable landscapes, traffic calming devices, complete streets and affordable housing. The site design mixes residential condominiums above commercial establishments and an expanded pedestrian-oriented corridor with restaurants, cafes, shops and open space areas creating a linear corridor between neighboring malls, Maui Community College, dormitory's and a government service center. LEED certification obtained.

Conservation & Protected Areas

Marine Protected Area Effectiveness and Evaluation of Indicators for the IUCN/WWF. Lead Local Evaluator for an international study of governance indicators of protected areas. The project tested a suite indicators for their applicability and usefulness in determining effective management, site planning, and implementation strategies of marine conservation areas and sanctuaries. Serving as one of 23 international test sites, locally appropriate socio-economic, biophysical and governance indicators were developed for evaluation. This culminated with a global decision-making matrix to accurately gauge and compare conservation planning and management success. Results of the collaborative international project were published by the IUCN/WWF in *How is your MPA doing?* by R. Polmeroy in 2006.

Marine Protected Areas Inventory, NOAA National MPA Database. Completed a full inventory of the CNMI's marine conservation areas, sanctuaries, and managed areas for NOAA's national MPA initiative. Researched and developed site information, visitor activities, created GIS shape files, aerial and topographic maps, and evaluated permissible and prohibited activities, legal designations and authority. Posted all information to NOAA's federal marine protected area website and database. Designed the CNMI DFW website to incorporate this information and disseminate public outreach material. The project received national recognition for being the first State or Territory to complete its inventory as noted in Pacific Islands Fishery News and NOAA's Coastlines quarterly magazine.

Endangered Species Mitigation Bank, CNMI, Co-author of an innovative, adaptive management Plan for the long-term protection of the Nightingale Reed Warbler, a federally listed endangered species. The U.S. Fish & Wildlife Service approved the plan that serves as mitigation for the incidental take of critical habitat and/or wildlife and presented the Plan at the National Mitigation Banking Conference.

Wetland & Biological Resources Evaluation, Guam. In support of an EIS for proposed military expansion on Guam, assisted with reporting on the quality, type, diversity, species richness and abundance, and threats to wetlands, flora and fauna.

Environmental Monitoring and Marine Protected Area (MPA) Site Planning, Great Barrier Reef Marine Park Authority, Townsville, Australia. Devised and field tested a new method of environmental monitoring and MPA site planning for the Great Barrier Reef Marine Park Authority, Townsville, Australia. Conducted meetings and developed collaboration among stakeholders to promote sustainable use of a high-use dive / snorkel site within the MPA. Developed proposals, status and technical reports, tracked budgets, designed the equipment and sampling methods, conducted field work, performed statistical analysis, and published the final results.

Policy & Regulatory Development

Legislative & Regulatory Amendments. Facilitated two significant amendments to the Hawaii Coastal Zone Management Act, Hawaii Revised Statutes Chapter 205A and prevented a third from passage. Contributed to revisions of Hawaii's Environmental Review law (HRS 343) and regulations (HAR 11-200). Routinely advised the public, developers and the Maui, Lanai and Molokai Planning Commissions on coastal and environmental issues, and conducted annual training for each Commission. Served as an expert witness in legal proceedings, depositions and lawsuits and frequent guest speaker / lecturer on coastal issues. Lead author of seven amendments to county shoreline rules relating to site permitting, shoreline hardening and oceanfront building setbacks and two amendments to the state law to strengthen coastal management and streamline project permitting.

Beach Management Plan for the Island of Maui, HI. Co-author of the Plan that describes best practices for managing and conserving beaches, shoreline access, dunes, and discerning appropriate response to coastal and episodic erosional events. The Plan addresses 13 priority objectives, including sea level rise, reef ecosystems, beach nourishment and coastal erosion and hazard data. The Plan offers practical, integrated recommendations and tools to solve coastal erosion and oceanfront development issues. New development proposals are expected to address consistency with the Plan's recommendations in recognition of its incorporation by reference into the Maui Island (General) Plan ordinance.

Shoreline Setback Ordinance, Kauai, HI. Policy Analyst, Joint Author and Speaker in collaboration County Council, the Planning Department, and Sea Grant. Developed an innovative shoreline setback ordinance for the island of Kauai that incorporates building lifespan, footprint, and site-specific coastal erosion rates with incentives to encourage managed retreat from the shoreline for oceanfront developments. The multi-year collaboration included multiple presentations to the Kauai County Council and Planning Commission, guest appearances on radio talk shows, and training workshops for regulatory and disaster management personnel.

Shoreline Setback Regulatory Implementation, Maui, Molokai, Lanai, HI Established appropriate locations for building construction based on historic shoreline positions. Determined setbacks by using GIS, aerial photographs, parcel depth, property configuration and substrate information. Provided site plan alterations to ensure public beach access was maintained and to minimize or avoid adverse impacts to coastal, beach and shoreline resources while minimizing potential property damage from coastal hazards and shoreline erosion. Enacted new procedures to protect beaches and structures and recommended alternatives to shoreline hardening. Where appropriate, assisted landowners with the design, location and permitting of shoreline hardening in response to erosion crisis.

Commercial Fisheries Act and Workshop, CNMI, Guam. Coauthored new, innovative law to regulate commercial, subsistence and recreational fishing in the CNMI. Worked with the Attorney General's Office, Senate sub-committee for Natural Resources, and Department of Land and Natural Resources to jointly author the legislation, subcommittee report, and supporting documents. Subsequently analyzed regional fisheries laws and regulations between Guam and CNMI and developed presentations for the first Pacific Fisheries Workshop, held in Guam. Helped commercial, recreational and subsistence fishermen from the CNMI and Guam create a decision making process to maintain, sustain and regulate regional fishing.

Marine Sanctuary Enforcement, Saipan, CNMI. Obtained funding and purchased two Boston Whaler boats and equipment for enforcement officers. Conducted training to the officers on the proper adjudication of violations of fishing, hunting, harvesting and sanctuary regulations. Consolidated disparate regulations into a cogent set of rules and developed outreach materials, signs, brochures and multi-lingual maps with icons for the tourism industry to educate marine park users.

Community Planning & Public Outreach

Post-Disaster Reconstruction Guidelines and Protocols for Maui County. Coastal Planners is the lead for developing a series of guidelines and protocols to facilitate expeditious reconstruction after a major coastal storm while protecting and conserving important community cultural and natural coastal resources. Project involves locally sensitive protocols based on community input through focused workshops. A Project Advisory Group representing a cross section of Federal, State and County officials, and deliberation of the project's ideas with academics and government regulators at the PRiMO Conference and quarterly ORMP meetings.

Public Involvement Plan, Tinian, CNMI. Developed a public involvement plan (PIP) and sensitivity workshop for the US Marine Corp and Navy. The PIP supported scoping exercises for a NEPA-based Overseas EIS. The PIP helps engage the CNMI residents in decision making on live fire training of troops from overseas. Issues addressed in the PIP include environmental, coastal, marine, socio-economic, cultural, water, public safety, transportation, and shoreline access issues.

Kagman Wetland Educational Exhibit, CNMI. Lead consultant for the design and content of four interpretive wetland signs, funded by the National Resource Conservation Service. The multi-lingual signs target student audiences to inform them of the importance of wetlands within the landscape. Responsibilities included text, graphics, indigenous language translation, integrating and formatting high-resolution photographs, use of local names, places and native species, and writing in Chamorro, Carolinian and English languages.

He'eia State Park, Koa Canoe Hale and Education Pavilion, Oahu, HI. Authored City Special Management Area and Shoreline Management permit applications. Facilitated Land Board and agency acceptance of an Environmental Assessment Exemption for the construction of new education center by the Pukea Foundation, in collaboration with Kama'aina Kids. The facility will allow 'Uncle Bobbie' to continue sharing traditional Koa canoe and paddle making techniques while educating participants in cultural, coastal and environmental issues and sustainable practices.

Hawaii's Ocean Resource Management Plan, HI. Generated public and Native Hawaiian support and input for new approaches and strategies to manage Hawaii's coastal resources as a member of the Hawaii Ocean and Coastal Council. Subsequently served as a contributing author in collaboration with 24 other agency representatives for the development of a long-range plan to sustain, protect and conserve Hawaii's coastal resources. Looking towards traditional resource management paradigms, Hawaiian concepts of ahu' pua'a, were incorporated into the Legislatively accepted, cross-sector, multi-agency approach to managing Hawaii's coastal resources for the next five years. Implementation of the plan included ongoing, active participation on the ORMP Working Group, reporting on progress and milestones achieved, and collaborative projects.

Wastewater Utility Water Quality Research. Development Manager for a variety of collaborative NPO, NGO, Academic and public research projects designed to assist wastewater utilities. Research endeavors addressed watershed planning, infrastructure development, public health, wastewater and storm water treatment, membrane technology, wet weather and alternative treatment systems, ecological risk, constructed wetlands and agricultural application. Secured over \$1 million in renewable funding to support the research program. Created a national study on pathogen removal in reclaimed wastewater effluent resulting in new state and federal reuse policy. Disseminated research results at conferences and public meetings.

Website, Division of Fish & Wildlife, CNMI. Created the agency's website which describes native and endangered species, offers downloadable materials, permit applications, maps of protected areas, teacher packets, informational brochures, tide charts, and describes the agencies services. Rules and regulations, boat ramp and fish aggregating device locations,

marina rules, fishing and hunting rules and licenses, and staff contacts are also provided. The site was recognized for its excellence by the NOAA Coastal Services Center in a 2004 edition of *Coastlines*.

Maui Island Plan (MIP), 2030. Facilitator for a weekend workshop where 60+ participants established urban growth boundaries through charettes, interactive density and mapping exercises, and delineated growth centers for year 2030. Subsequently co-authored coastal, recreation, habitat, watershed and natural resource sections of the MIP developing goals, objectives, strategies, and benchmarks, plus funding needs to achieve the Island's sustainable growth to 2030.

Community-based Natural Reserve Zoning, CNMI. Lead Consultant to develop user-friendly rules and regulations, and maps that could be easily implemented and were consistent, for all protected areas in the CNMI. Using laminated maps and markers, stakeholders, including community and village leaders, small and large business interests, fishermen, marine sports operators, tourists and tour companies, recreational interests, and members of the public described where and what activities they conducted in protected areas. Through one-on-one and community-based discussions the variety of stakeholder's needs and interests were mapped, compiled and analyzed. GIS shape files were created for each protected area based on topographic maps, areas of trade-off, and/or mutually beneficial exclusion areas. Maps and site descriptions were developed that delineated each protected area in various zones including active use, passive use, no take, limited take, restoration, and restricted entry. Penalty and use matrixes were also developed to facilitate public understanding of permitted and prohibited activities (and their costs) and to help enforcement officers determine the correct penalty to assess for violations.