

**SEA GRANT'S ROLE IN IMPROVING COASTAL MANAGEMENT IN HAWAII**

Christopher L. Conger, Hawaii Sea Grant

**Abstract**

Many of Hawaii's government agencies, operating in or near the coastal zone, are currently directed by statutes, rules, and ordinances that were drafted with the implicit assumption that neither sea-level nor the climate were undergoing long term change. As a result, Hawaii's Sea Grant College Program has actively supported placing scientists in positions where they may assist coastal management agencies, at county and state levels, with interpreting and revising these documents within the context of modern scientific knowledge. Currently there are two coastal lands specialists working directly with State agencies, and one specialist working with the Maui County. Their work, and the work of their predecessors, associate faculty, and Sea Grant funded researchers, has helped both Maui and Kauai Counties to rewrite their coastal construction setback ordinances to utilize scientifically derived erosion rates. Their ongoing work provides decision-makers a scientific basis for determining shoreline locations, reviewing environmental assessments and impact statements, Coastal Lands Program management, and beach renourishment and erosion response project design and monitoring. Additionally, they routinely work with various state and county agencies on coastal restoration and preservation projects. Hawaii's Sea Grant also supports programs and research targeting improved understanding of Hawaii's coastal hazards and hazard mitigation techniques. It appears that many of the impediments to adopting science-based policies result from individual or group perception. Consequently, Sea Grant has had success through supporting a wide spectrum of education and outreach focused on the introduction and use of modern scientific knowledge in the coastal environment.

**Introduction**

Hawaii's coastal zone resources are governed by Hawaii Revised Statute (HRS) Chapter 205A, which was signed into law in 1975. Hawaii's statute was in response to the federal Coastal Zone Management Act of 1972, and dealt with development, resources, and competing interests in the coastal zone. Specifically, Chapter 205A deals with coastal erosion and responses, coastal building setbacks, beaches, coastal ecosystems, and coastal recreation. It enabled the counties (Honolulu, Maui, Hawaii, and Kauai) to draft and establish ordinances aimed at fulfilling the goals and objectives stated in the statute, and provided clear directions for establishing shoreline construction setbacks and managing development near the shoreline. It also helped created the state's Coastal Zone Management Office, and provided direction for state agencies that regulate or manage interests near the shoreline. At the time of its inception, the

statute was based on the existing understanding of beach dynamics in Hawaii. The implicit assumption that may be inferred from the language of the statute is that shorelines were dynamic, but not necessarily moving in a trend during the time scales pertinent to the statute.

A suite of problems have arisen as a product of this assumption of limited, if any, long term migration of shorelines. Setbacks are generally insufficient, with arbitrary distances not able to keep pace with erosion rates that average one-foot per year on sandy shorelines. Zoning decisions, made before and after establishment of the statute, have allowed for dense development near the shoreline. The balance between private interest and the public resource, especially on beaches, does not work well on eroding shorelines. Additionally, some of the most effective coastal hazard mitigation strategies and technologies were either not in use or not developed at the time the statute was drafted.

### **Background Efforts**

As problems continued and management schemes were unable to adequately resolve issues with conflicting interests, a ground swell of interest began to develop in political, agency, and public awareness. The 1980s and early 1990s saw creation of targeted documents for agencies, by researchers and the professional communities, dealing with beach management programs, shoreline certification and setbacks, and coastal hazards. The outgrowth of these early documents was university research aimed at answering new questions. Initial work, funded by Federal Emergency Management Agency, US Geological Survey (USGS), and National Oceanic and Atmospheric Administration (NOAA), focused on identifying shorelines, calculating historical erosion rates, and analyzing different techniques for identifying trends in shoreline migration.

An early product of this work was an identification of lost or diminished beaches on the island of Oahu, and a correlation of those impacts to the presence of shoreline armoring structures. The three peer reviewed articles from this work (Coyne, *et al.*, 1996; Fletcher, *et al.*, 1997; Fletcher, 1997) led to a front-page story, in the Sunday edition of one of the local papers. The peer reviewed papers, combined with exceptional local media coverage, generated a renewed wave of public and government interest in coastal dynamics and their interaction with shoreline development, leading to an informal partnership between the University of Hawaii's Coastal Geology Group (CGG) and the state's Department of Land and Natural Resources (DLNR).

This relationship spawned the Hawaii Coastal Erosion Management Plan (COEMAP). This document took three years to write and over 50 public presentations statewide to educate the public and agencies on its impact and importance. Ultimately, through increasing public and political interest, it was adopted by all the effected agencies in the state as the accepted management plan for the coast. During this time the State passed "The Beaches Act" in 1999,

and the Board of Land and Natural Resources (BLNR) adopted three new policies in 2000: accepting COEMAP as its coastal management plan, creating a no-tolerance policy for unauthorized structures built on submerged lands, and creating the Coastal Lands Program (CLP).

### **Sea Grant's Emergent Role**

Concurrent with the early papers and subsequent interest was the creation of the first Sea Grant (SG) Coastal Processes Extension Agent position in late 1996. This position was based at Maui County Community College, was developed through mutual interest, and was funded through a partnership between SG and the county planning department. The position was created to provide technical assistance to county planners working on coastal issues, as well as assist other county agencies, conduct outreach work, and teach classes. This auspicious beginning highlighted the effectiveness of an in-house technical resource for decision-makers.

The extension position worked closely with key planners at Maui County, while the CGG worked on identifying erosion rates for the county through aerial photogrammetry with USGS and NOAA funding, and with Maui County and SG funding later in the project. The research started in 1997 and was creating its first annual erosion rate products by 2001. The SG agent was working with willing staff and administrators to rewrite the county setback ordinances to accommodate the newly produced annual erosion rate data. SG, CGG, and Maui County planners conducted 12, often hostile, outreach workshops on the island, dealing with the proposed changes to the ordinances. The planning and outreach efforts culminated in revised shoreline setback ordinances in 2003.

That same year, SG and DLNR entered into a partnership by creating a Coastal Lands Specialist for the CLP. This co-funded position is tasked with providing technical assistance to the CLP and conducting outreach work. The specialist helped the CLP to create the first statewide beach nourishment program. Additionally, the specialist administers the beach nourishment program and emergency erosion control activities, reviews permit applications for development on or near submerged lands, reviews Environmental Assessments (EA) and Environmental Impact Statements (EIS), assists in the resolution of encroachments on state submerged lands, and helps private and public parties to remove unauthorized materials from the shoreline.

SG has also actively funded research and graduate students focused on coastal processes and coastal hazards. SG funded research has generated new data and tools for identifying and projecting annual erosion rates, relating shoreline changes to climate variability, monitoring environmental impacts of beach nourishment activities, generating tsunami run-up maps, evaluating Hawaii's wave climate, quantifying beach morphodynamic and wave energy relationships, and creating and updating beach management plans. Impressively,

these research projects, and their subsequent peer reviewed papers, were driven by stakeholder and partner needs, as a direct response to the community input.

SG's role in the coastal processes and management communities has extended beyond research and establishing agents. SG has broadened its scope to include publication of outreach products (Hwang, 2005; Eversole and Norcross-Nuu, 2006; Hwang and Okimoto, 2007) geared for the educated community with interests in Hawaii's coastal zone. These publications are currently in use by county and state planning and regulating agencies, and the development, realtor, surveyor, architect, engineering, and landowner communities, as well as others.

As need for technical expertise extended beyond the capacity of the existing agents and publications, the successful track record for SG agents and university and agency partnerships led to the creation of another SG agent position at the DLNR in 2005. SG worked with the CLP and the Department of Accounting and General Services (DAGS) to create a Shoreline Specialist position. This position provides direct recommendations to DAGS and DLNR personnel on certified shoreline location. The shoreline is the starting point for county planners when they measure out shoreline setbacks for determining building and development potential and granting permits. The Shoreline Specialist also works closely with the Coastal Lands Specialist in advising the DLNR on coastal issues and conducting outreach work.

Documented success with Maui's new shoreline setback ordinances and annual erosion rate data peaked interest in other counties. Kauai County and Honolulu City and County both contracted the CGG to calculate erosion rate data for their respective shorelines, which SG helped to fund. Creation of the data, combined with increasing public interest and political pressure, led Kauai County to revise their shoreline setback ordinances to utilize annual erosion rates. This process, though streamlined by comparison to Maui's ordeal, still required extensive effort from SG agents, SG affiliate faculty, and drew heavily from SG supported research. Ultimately, the new ordinances and the promise of new annual erosion rate data led Kauai County to partner with SG and create a Coastal Land Use Specialist position, which is currently being filled. This specialist will aid the county at interpreting annual erosion rates for setbacks, reviewing EA, EIS, and permit applications, and assisting other county agencies with coastal projects. Additionally, the specialist will conduct a series of outreach workshops for the county to educate the public about the new ordinances and coastal hazards, mitigation, and resiliency.

Currently, with extension agents working directly with Maui County and the DLNR, SG is able to provide a direct link between modern coastal science data and tools and decision makers at county and state agencies. These agents provide recommendations directly to decision makers dealing with shoreline locations, EA's, EIS's, development permits, shoreline setbacks, encroachments and removal of unauthorized structures on state coastal lands, emergency

erosion actions, and help to administer the state beach nourishment program and the Maui County beach and dune management plan. SG agents also facilitated significant revision of both Maui and Kauai county ordinances, as well as drafting revisions to HRS Chapter 205A and Hawaii Administrative Rules (HAR) Chapter 13-222. The HRS revision is an active administrative bill in the State Senate, and the HAR revision is currently being reviewed by the State Attorney General's Office.

### **Conclusion**

Sea Grant's capacity to create an effective presence in the coastal management community of Hawaii required decades of background work, creating an interested political and public climate. Continued coordinated effort between government agencies and university researchers showed that extension work was viable. A history of significant peer reviewed work detailed the effectiveness of the science and attested to the credibility of the researchers. Desire for change by administrative and staff level personnel helped facilitate knowledge transfer and uptake with decision-makers. And lastly, Sea Grant's capabilities to fund targeted research, to create and staff needed specialist positions, to generate useful publications, and to gauge their own success through engaging the relevant stakeholders has allowed years of a developing ground swell of interest to culminate in products that help agencies improve the way they conduct business in the coastal zone.

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Christopher L. Conger  
Hawaii Sea Grant  
Office of Conservation and Coastal Lands, DLNR  
1151 Punchbowl Street, Room 131  
Honolulu, Hawaii 96813  
(808) 587-0049  
conger@hawaii.edu