



*Ironically, much of world-famous Waikīkī Beach has no beach at high tide.*

## **Chapter 1**

### ***O ka makapo wale no ka mea hapapa i ka pouli***

**“If you're going nowhere, you're guaranteed to get there”**

### **Management of Our Shores**

Hawai‘i’s beauty is not subtle. Towering peaks, deep gorges, and azure waters paint stunning scenes. These mirror a physical and biological diversity that reflects the unique setting of the land, ocean, and climate. Island beauty extends from mountaintop to coast, and plunges into an equally diverse underwater world. The people of Hawai‘i, also, are known for their open hearts, welcoming and generous attitude, and for sustaining an integrated and unified multicultural society unrivaled on the planet. Yet Hawai‘i is not vast, and almost half the land and nearly every community lies within five miles of the shoreline. Indeed, no point on the islands is further than twenty-eight miles from the sea, which means that all locations in Hawai‘i are influenced by the ocean; the entire state is coastal.<sup>1</sup>

While Hawai‘i is promoted as a tranquil paradise, it is also the home of cataclysmic events such as tsunamis, hurricanes, rock falls, flash floods, and earthquakes. Communities in the islands have always existed in a balance between life-sustaining resources and the powerful geologic forces that shape the land: flowing lava wipes out a subdivision, a hurricane demolishes thousands of homes, a strong earthquake darkens an entire island, a tsunami takes dozens of

lives. These are just a few of the events continually shaping these restless islands. Residents, visitors, and the elected guardians of paradise need to be concerned with these hazardous processes and aware of the fact that these recurring perils are part of the natural landscape of Hawai‘i. We ignore the role of geologic hazards at our own risk. However, too often, efforts to mitigate these threats have been at a heavy cost to the environment to which we are inextricably linked.

Concern for the natural equilibrium of the islands has dissipated with the rise of western culture. It is the hallmark of animal life that we alter our environment in order to better live in it and resource husbandry has coexisted hand in hand with environmental damage since the first human foot was placed on Hawaiian soil. Researchers have documented dramatic and widespread impacts to both lowland and upland ecologies<sup>2</sup> due to the expansion of the native Hawaiian population; especially in the centuries immediately preceding the first western visit to the islands by Captain Cook in 1778. However, while the damaging imprint of the native hand was dramatic, the grip of western land abuses has been nothing short of catastrophic and has necessitated a near total reliance on imported goods and services because the land can no longer support us.

A fundamental shift in land use patterns accompanied the change from Hawaiian to western culture. The former practice of resource stewardship and environmental cultivation for human use under the rules set by natural rhythms was replaced by a continental ethic of managing resources from afar with broad rules insensitive to the local character of the land. This is exemplified by the system of modern land management, which is largely implemented on a permit by permit basis following the dictates of a legal framework instead of the dictates of the observed capacity of the environment. Modern stewardship is attempted through a blanket of jurisdictions that cover entire islands simultaneously and without acknowledgment of local variations in climate, ecology, ocean processes, geology, or human community. Alternatively, the traditional *ahupua‘a* system was place-based, with rules and customs tied to individual watersheds, shorelines, reefs, winds, and human needs. And with the power of management embedded in the local populace, economies of scale were achieved and sustainability more often attained.

Rarely a day goes by in Hawai‘i without the media reporting on environmental and land-use issues stemming from social debate. Most stories revolve around conflicting interests in land development, shoreline use, public access, water resources, and other controversies. Contradictory claims, often springing from differing personal priorities, confuse the gravity of the issues. Will that housing project block my access to the sea? Is global warming going to flood my home? Are the reefs over-fished? Is the water clean where I surf?

Despite similarities among western resource management jurisdictions (federal, state, county), there is little common vision nor a coordinated environmental plan among agencies. Bringing multiple agencies together in the same room to discuss resource management is an extraordinary event. The lack of coordination can result in chaos because broad jurisdictional rules (instead of place-based rules) may lead to unintended and, in some cases, irreversible consequences. Consider the following story of the cascading effects of jurisdictional management.

*As a shoreline erodes because of past sand mining by the local sugar company and removal of the coastal sand dune to accommodate development, waves encroach on a house that has been in one family for generations. The owner's first choice may be constructing a seawall to protect the family heritage, but state authorities disagree since they realize a wall may cause beach loss, accelerate erosion on neighboring property, and interfere with public access.*

*A consultant hired by the family recommends beach nourishment with sand dredged from offshore – an expensive and temporary fix. Environmentalists envision this will damage the reef, surfers worry it will change wave characteristics, and fishers say dredging sand will alter the food chain and impact the fishing. In the end, because the state owns the beach and the county manages the adjacent land, the owner decides to not go to the state but instead gets a seawall permit from the county simply by squeezing the wall a few feet closer to the family home.*

*But erosion continues on the seaward side of the wall and within five years the beach is gone and water laps against the stone face. Waves reflecting off the seawall carry away sand on the adjacent seafloor. What was naturally a soft substrate for shallow marine organisms becomes rocky and covered with fleshy algae. Environmentalists think that the algae bloom is sustained by nutrients running off the paved watershed, seeping from in-ground septic systems among the beach-front homes, and diffusing from coastal rocks where we inject sewage into the ground. Scientists think the algae blooms because it is an alien species filling a “niche” in the ecosystem where there is no natural competition. They also cite the lack of hard data supporting the “nutrient-rich runoff” hypothesis of the environmentalists.*

*Impacts to the coastal ecosystem on state submerged lands are significant despite the fact that state resource managers had little say in the awarding of a county permit for the wall. But that original wall was the first domino. Neighboring property now erodes and seawalls are built up and down the coastline – some are permitted, many are not. Surfers can't get to the ocean anymore because with no beach there is no ocean access, the water seems dirty, and the local surf break is rarely used.*

*In twenty years more than a half-mile of white sandy beach is gone, replaced by solid walls made of black volcanic rock. Did the seawalls cause the beach loss, or are they an innocent symptom of pre-existing erosion? There is no public access along the coast. The ecosystem consists of fleshy algae, dirty turbulent water, and a desert of limestone that once had a sparse but healthy community of coral growing on it. It has been years since any surfers or fishers have been seen in the area and the neighborhood is mostly new residents or transient vacation renters unaware that there was once a beach.*

*Now after heavy rainstorms the Department of Health posts signs warning you to stay out of the polluted water. The family home has been sold, torn down, and a large compound has been built in its place surrounded by high walls blocking the neighborhood view of the ocean. More than half the beachfront homes are vacation rentals and the profits go offshore to the mainland where the owners live.*



*On many shorelines seawalls have replaced sand dunes and the beaches have a sand deficiency.*

### **Symptoms of a Larger Problem**

The scenario described above is not fictitious. The most popular beaches and the most beautiful views are deep into this land-use sequence: Lanikai, Halama, Kahala, Ewa, Kahana, and Mokuleia. Sunset Beach, Kailua, Punalu‘u, Laie, and Waimanalo have started down the path. Even sleepy Kaua‘i has examples: Haena, Kapa‘a, Anahola, and others. Beaches silently disappear annually amongst our islands while beachfront homes are sold fractionally to families that visit only once a year.<sup>3</sup> The natural hazard of erosion has led to mitigation that has damaged the environment, and a caring and watchful community has been replaced by commerce focused on profit.

But beach loss, seawalls, and fractured communities are only symptoms of a larger problem:

- Streams now flow between high cement dikes that cut our communities in half because we have built homes on dangerous floodplains;
- Thirty percent of wetlands on O‘ahu have been lost over the years because we did not understand and protect their function as cleansing and nutrient-rich environments;<sup>4</sup>
- Many reefs are so over-fished it is rare to see an adult of some species because some people feel that they are entitled to unabated fishing;
- Coastal sand dunes have slipped into oblivion on O‘ahu and Maui because we wanted to build high-priced storm- and tsunami-vulnerable homes in their place.

Is this the inevitability of human land use? No, it is the product of ignoring nature’s signals when we change the land; signals that are largely known by host communities. There is a better way, and with Hawai‘i’s indigenous heritage, we have the tools and knowledge to lead the world and set the example.

At the same time, however, there are deep and complex ironies at work:

- It is ironic that beach-sustaining dunes are allowed to be flattened and replaced by hotels and buildings for tourists, destroying the very sandy shores tourists have come to see.

- It is ironic that many land use practices are perpetuated by a desire to strengthen our economy and yet, in the long term, serve to devastate ecosystems and our natural beauty – the very attraction that sustains our visitor economy and provides most of us with jobs.
- It is ironic that regulations enacted to protect our beaches, in practice, act as a guideline for their destruction rather than their preservation.
- And it is ironic that the more federal, state, and county governmental agencies that get involved to help protect the coast, the less protected the coast is – due to fractured enforcement, a lack of coordination and integration, and the insensitivity of jurisdictional rules to place-based needs.

### **A Ruined Shoreline**

Hawai‘i is filled with beachless beach parks where seawalls now welcome visitors instead of sandy strands: Swanzy, Kalama, Honokowai, and Kapa‘a are just a few. Football-field long walls are built and maintained by the various counties in a misguided attempt to stave off erosion. Because the structure impounds the sand, it acts to accelerate erosion – both in front of it and around adjacent properties that formerly shared sand with the now extinct beach. When property owners next to the park ask for permits to build walls to stop the erosion of their lands they are turned away after a round of embarrassing and expensive public hearings. Why? Because island-wide rules are blind to the local specifics.

If some of these parks were actually given a beach by tearing down the wall and nourishing the shore with sand, benefits to the local community might be significant. Neighboring properties might no longer need their own walls. The park could become a beach destination, improving the quality of life for residents, rather than a cement fortification. Throughout Hawai‘i, one hand of government builds seawalls to “protect” highways, parks, and other public lands - while the other hand denies them to abutting owners. The coast of Hawai‘i is littered with ruined shorelines from these practices.

But for whom is the shoreline ruined? It depends on your point of view. Consider our earlier case study.

*Unaware that a beach once graced this shore, the new owners see no problem. They make a tidy income from their rental property. Tourists purchasing the image of paradise are happy in their vacation home for a two week visit. Marketing images of white sands and blue seas in their heads obscure the fact that their seawall is a poor substitute – they are happy enough to hop in the car to find the last beaches on the island. There is no obvious impact to the visitor industry – tourists to the islands in 2007 exceeded seven million, an all time record.*

Does the resort industry care about beach loss? Elaborate pools with waterfalls, grottos, caves, and even kiddie sand pools with artificial beaches filled with Texas gravel divert the visitor from the truth that there is no beach on the adjoining shore.

So, again, for whom is the shoreline ruined? The shoreline is ruined for us and our children, and – ironically – its ruination has been permitted, literally, by the same set of rules and statutes we enacted to protect it. Only a small percentage of the voting population in Hawai'i cites the environment as their primary concern, pointing to the economy instead. Many fail to see that tourism profits live (and may one day die) on the beauty and health of our environment. But more importantly, beach loss is a bellwether for the decline in our quality of life.

## **The Many Voices of Hawai'i**

The paradox of environmental loss, under a management system viewed by many as one of the most stringent in the nation, is the result of a powerful discrepancy between various priorities. The chapters that follow discuss a wide range of environmental issues in Hawai'i with an eye toward more sustainable resolution of such conflicts in the future.

This book is comprised of twelve chapters. Chapter Two traces the history of the Hawaiian Islands and the increased tempo of destructive land-use practices with the arrival of western immigrants. Chapter Three discusses volcanoes and explores the risk of placing homes and families in locations vulnerable to natural hazards. Chapter Four explains both earthquakes and tsunami and the potential detriment of a complacent public. Chapters Five, Six, and Seven survey various water issues, including scarcity, flooding, and pollution. Chapter Eight goes over climate change and the possible outcomes of projected sea rise for Hawai'i. Chapter Nine explains coastal erosion and beach loss. The geologic history and current status of coral reefs and the problem of overfishing and ocean acidification is discussed in Chapter Ten. And Chapter Eleven, on hurricanes, assesses our risk and volunteers mitigation techniques. Chapter Twelve provides a summary.

This book also highlights trends and the connection between the environment, communities, and natural hazards. With concepts grounded in long-standing Hawaiian resource practices that acknowledge the variability of the environment from one place to another, and the need to understand local environmental character, it may be possible to more effectively integrate sister agencies and embrace local communities in resource management. By combining tools, such as interagency konohiki teams and ahu councils of resource managers who become experts in local ecosystems, and conservation funds designed to purchase key lands with sensitive environments, the tide of environmental loss might be turned. For a multifaceted system to be successful it must be grounded in *pili 'āina* (sustainability), a preservation/reconstruction ethic that stimulates local communities to police themselves and enforce the rules over their resource. This ethic must be formulated through a community process, be characterized by technical aspects that enhance the natural gifts of the place, and utilize a variety of mitigation techniques to preserve natural assets.

Responsibility for the decay of the Hawaiian shoreline rests squarely on the shoulders of the rules and regulations that govern the permit process. To fix this regulatory system it must be adjusted to view natural resources as more than a patchwork of parcels – the sky, land, and ocean form a continuous chain of environments that share water, dissolved compounds, organic matter, mineral particles, and energy. These environments fall under various jurisdictions of government

– federal, state, and county – that are not well integrated and that typically have differing mandates. Even within one jurisdiction, different agencies may have competing agendas. For instance, Hawai‘i Department of Transportation wants seawalls to protect coastal roads yet must get a permit from Hawai‘i Department of Land and Natural Resources whose mandate is to protect the beach.

To perpetuate our environment these various layers of government need to unite under a common vision that is focused, with laser-like attention, on place-based assets. The rules that result from that union need effective enforcement, ideally by the community of users themselves. It is easy to point to developers as culprits in this process – but that is naïve. Most developers operate legally within our regulatory environment and many fully understand that undermining the environment that is their main attraction is not of long-term benefit. The failure to protect our islands occurs where federal, state, and county authorities neglect to work for a common vision (despite the existence of community plans where explicit visions are defined), where good laws are weakly enforced, and where rules and regulations do not fit the many and unique personalities of our environment.

Our land is filled with many voices that do not always speak in unison. As the line of tension tightens between conflicting standards, differences in understanding these islands, and contradictions between ideals and actions, we put at risk our economy and the quality of our lives. Sound decision-making starts with asking the right questions. This book attempts to describe the context of sustainable answers, and in so doing, directly influence the future that Hawai‘i’s voters choose for the shores of paradise.

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<sup>1</sup> For an overview of state information and specific Hawaiian environmental issues, see Federal Emergency Management Agency, State of Hawai‘i, <http://www.fema.gov/plan/eHP/regionix/hawaii.shtm>.

<sup>2</sup> For a review of early human impacts to island ecosystems see Chapter 19 “Aina and Ahupua‘a” in J.L. Culliney, Islands in a Far Sea: The Fate of Nature in Hawai‘i, revised edition, University of Hawaii Press 420p.

<sup>3</sup> Andrew Gomes, Developing Trend Offers Ownership of Homes for 60 Days Each Year, Honolulu Advertiser, June 24, 2007.

<sup>4</sup> Karen Evans, David Woodside, and Marie Bruegman, A Survey of Endangered Waterbirds on Maui and O‘ahu and Assessment of Potential Impacts to Waterbirds from the Proposed Hawai‘i Geothermal Project Transmission Corridor, U.S. Fish and Wildlife Service Pacific Islands Office Ecological Services, Final Report August 1994, p 4.