Summary of Key Findings

This section of the report summarizes interviewees' responses to questions regarding the most relevant and pressing environmental issues facing Hawai'i. It also outlines solutions that the interviewees identified as critical to the protection of Hawai'i's natural environment.

As a geographically isolated island chain characterized by its rich biodiversity, Hawai'i faces numerous threats that endanger its ability to maintain healthy ecosystems. From the interview process, the top threats to Hawai'i's environment are (in no meaningful order) 1) invasive species eradication/management, 2) endemic species preservation, and 3) land-based marine pollution. Although many threats to Hawai'i's environment were discussed within interviews, these are the three *physical* issues that surfaced repeatedly. While other topics were also discussed within interviews, such as agriculture and energy, they fall outside of the research scope of land conservation, marine conservation and climate change adaptation established by the Foundation for purposes of this study.

Land Conservation

The two "priority threats" regarding land conservation fall generally under the purview of endemic species preservation and invasive species eradication/management. While there is clearly great overlap between the two issue areas, they are nonetheless somewhat distinct in terms of the identified needs and solutions.

Hawai'i has an incredibly unique and fragile ecosystem. Many of its plants and animals are found in no other place in the world. One respondent, a specialist in the field of endemic species preservation, said, "Hawai'i could really make itself into a model for biological diversity… Researchers often go to the Galapagos, but Hawai'i is just, if not more, interesting." As stated in the interviews, the greatest threats to endemic species in Hawai'i are 1) invasive species and 2) wildfires.

Invasive species are one of the largest threats to native ecosystems. Interview respondents identified several ways to categorize invasive species management in Hawai'i: prevention, zero tolerance, management, and triage.

Several interview respondents said that Hawai'i is not doing an adequate job of limiting and inspecting incoming plants, resulting in the introduction of invasive species. Although there is a "noxious weed" list, it was said to be quite out-of-date and not enforced. Thus there are an unknown number of plants coming into the borders of Hawai'i that are potentially invasive. For example, *Miconia*, a highly problematic invasive species, was brought to Hawai'i as an ornamental plant for landscaping purposes. In addition, "hitchhikers" make their way to Hawai'i on imported plants that may also become pests. Coqui frogs, for example, are considered an "accidental" introduction. It was also stated that there is a general lack of knowledge among the public regarding the effects invasive

species have on the ecosystem and the role that humans play in these introductions. One respondent cited that among all species, it is estimated that nearly "20,000 species of plants have been brought to Hawai'i through the actions of people." Humans have changed the introduction rate of new species in a phenomenal way.

While there was likely too little inspection capacity to begin with, the state fiscal crisis has worsened the situation. The state revenue mechanism for inspection, quarantine and eradication of invasive species comes from a 50 cent per 1,000 pounds of cargo tax levied on maritime and airline companies (State of Hawaii, 2010). Among the 78 agricultural inspectors employed by the Department of Agriculture, 50 were given pink slips in late 2009. After protests from multiple stakeholders, twenty-two of the plant quarantine inspectors targeted for lay-offs were (temporarily) retained. The "$1,800,000 funding for the twenty-two positions includes $600,000 earmarked for the Hawai'i invasive species council and $1,200,000 from fees collected in the pest inspection, quarantine, and eradication fund" (State of Hawaii, 2010). As such, the funding for invasive species management, along with other environmental programs, is greatly at risk of being (further) cut in the current legislative session. Several respondents said that, as a result of this reshuffle, it's likely the role of the Invasive Species Committees (ISCs) will be nearly eliminated.

The ISCs are critical to eradicating and managing invasive species once in the state. For some new species and known threats there is "zero tolerance," meaning that the goal is total eradication upon detection. For other species that are more established, the goal is management to minimize harm. In addition, invasive species managers said that various forms of "triage" are critical. This includes the preservation of pristine areas, through building fences to keep out ungulates and other pests as well as general management strategies.

In addition, rare species should be preserved and propagated, not just in the wild but also in captivity. As species extinctions are an apparent epidemic in Hawai'i, one respondent stated that, "not all Hawaiian species have to survive, nor will they." Nonetheless, it is critical to preserve culturally and biologically important species. One identified area of need in regard to species preservation is improved storage and propagation facilities. Currently, the Lyon Arboretum, the National Tropical Botanical Garden, and the Army's Directorate of Public Works are a few of the organizations fulfilling this capacity within the state. Respondents felt that additional and improved facilities could greatly increase the resiliency of the system. Say, for example, if one facility failed, then it would be beneficial to have redundancy of species in multiple facilities. This requires more coordination between managers and facilities than currently exists. For this reason, facilities should be spread out among the islands, both reducing transportation issues and decreasing vulnerabilities to threats such as storms and power outages. The National Tropical Botanical Garden recently upgraded its facility and this could serve as a model or standard for storage and propagation facilities for endemic species preservation across the state.

Another issue discussed in regard to endemic species preservation is the devastating effects of wildfires. One respondent said, "One fire could ruin my entire life's work." Currently, the states' resiliency to the effects of wildfires, from a biodiversity perspective, is quite low. The respondent relayed an event that occurred in 2007 that resulted in a fire that consumed nearly 7,000 acres of biodiversity-rich ground. Following the devastation of one fire, a habitat is simply unrecoverable.

To mitigate the impacts of wildfires, the respondent said that road buffers could be improved to serve as a firebreak. This would be particularly important for former agricultural areas where irrigation systems are no longer in use.

Marine Conservation

The single most important threat to Hawai'i's marine environment is from land-based pollutants. Although over-fishing and destructive fishing methods, such as longlining and lay gillnets, were also often mentioned by interview participants, the primary driver of degradation to near-shore marine environments was stated to be land-based marine pollution; resulting in the death of coral reefs, invasive species and general over-growth of species from nutrient enrichment (particularly algae), and dwindling fish populations. Overfishing exacerbates this interaction.

While a large majority of interview respondents spoke to the great issue of non-point source pollution and its impact to near-shore marine environments, one interviewee directed the conversation about the issue very specifically: storm water management. The interviewee identified that there is a major "gap" in attention to storm water systems and its effect on Hawai'i's oceans. Specifically, the hardening of natural waterways in the name of flood protection (also known as channelization), as well as the general hardening of surfaces, has led to highly effective pathways for debris and other pollutants to make their way into the ocean. An emphasis on storm water management would include creating processes to make better decisions regarding the hardening of waterways as well as the potential for reverting ecologically sensitive waterways back to their natural state. In addition, it could include research and implementation of how to filter sediment from existing waterways and storm water systems. This would reduce sedimentation on coral reefs as well as reduce habitats that support invasive marine species, such as *Avrainvillea amadelpha* in Maunalua Bay.

The larger issue of non-point source pollution (exacerbated by channelization) involves the run-off of pollutants such as pesticides and debris, as well as the injection of pollutants from coastal septic tanks. State laws regarding non-point source pollution have yet to be strongly developed, thus this is an open arena both in terms of high-level policy and on-the-ground impacts to local communities. At the national level, the interpretation and extension of the Federal Clean Water Act, which was designed to address point-source

pollution, to include non-point source pollution could be tremendously impactful in addressing run-off and near-shore marine environments.

The Lens of Climate Change

Climate change adds yet another layer of environmental management in Hawai‘i. It was often stated that managers are still trying to "figure out what managing for climate change really means." One interview respondent said that, "some agencies are looking to take the same old principles and actions and apply them under the climate change banner, which will be a real mistake."

Nonetheless, because highly regional climate change impacts are not particularly well-documented, there were few concrete suggestions in this arena. For some species and places, it may mean to shore up existing ecosystems to be as resilient as possible and thus better able to adapt to changing circumstances. For others, this may be unrealistic because human-induced climate changes simply outpace the ability of species to adapt. One specific recommendation, as temperature changes are quite likely (and already occurring), is to establish corridors within forest areas by which species can migrate (upland) and persevere under altered climatic conditions.

To many, it is a clear difference between looking at typical problems of alien species and trying to identify how climate change is accelerating or compounding the problem. The best way to help uncover these concerns is to work with pilot projects (both on land and sea) – to help determine what it really means to "manage in the face of climate change."

Addressing storm water systems in Hawai‘i crosscuts land management, near-shore marine health, and climate change. Such a strategy could be made to address the larger function of sewage systems, including the deleterious impacts of both run-off and sewage spills into the near-shore marine environment as a result of both weather events and changes in sea level.

Given the current challenges facing endemic species and near-shore marine environments posed by invasive species and land-based pollutants, potential strategies to address these issues include forms of "climate change adaptation" but also strategies with "no regrets." This means that they should be addressed regardless of climate change because of the immediate and pressing need.

The connection between conservation and adaptation efforts is strong. One of the most effective climate change adaptation methods will be the enhancement of the environments' natural resiliency and adaptive capacity, something achieved through conservation measures. In this way, adaptation (in the context of the Foundation's strategy) should not be viewed as its own agenda, but as part of a broader environmental strategy for the restoration and preservation of Hawai‘i's environment.

Overarching Solutions and Identified Needs

While specific solutions were discussed above in response to various environmental threats, the interviews also revealed an important set of more general solutions to address Hawai‘i’s environmental challenges.

Education, education, education

The most prevalent answer to the question of how to best address Hawai‘i’s environmental issues was: education, at all levels. This includes education among children, adults, decision-makers, communities, and resource users.

Education of the general public, including children, is seen as a more “long-term” strategy to environmental protection. Many interviewees said that much of the problem with “making environment a priority” is that people simply do not get outside. Children stay indoors more often than before and thus never develop a relationship with nature. As such, youth education that includes outdoor field trips, such as the work accomplished by the Foundation’s Hope for Kids Partners, is not only a youth education strategy but also a long-term environmental plan.

Many respondents stated that a critical gap currently exists between the general public and conservation education. Environmental programs that reach out to communities are dually impacting not only the environmental issue they work on but also a broader educational component. Restoration projects with a service learning component or volunteer opportunities are thus incredibly valuable. “Tree planting” days or invasive algae pulls serve not only to accomplish the task, but also to reconnect people to their communities and become stewards of their local environments.

In addition, an educated public will lead to greater support for environmental conservation at the policy level. While a voting public influencing the decisions of policy-makers is also a long-term approach, more targeted engagement opportunities with decision-makers is a more immediate strategy.

Many interview participants pointed to the importance of building a pathway for Hawai‘i’s youth into conservation careers. They cited the former Hoa ‘Āina program run by The Nature Conservancy as a success story in building conservation professionals. The development of a career pathway is important to “build the field” as well as provide career development opportunities for young people in Hawai‘i.

Get Scientific Research to the Community

Many interviewees discussed the great disconnect between scientific information and the communities that need it. Although there is considerable research being done regarding specific environmental issues, it is not often well-communicated to the community. Moreover, one interview participant stated that there is sometimes a sense of communities feeling "used," meaning that they help scientists to develop their problem statement and to receive research dollars, but often do not benefit from the results. As such, researchers should be mindful to include a project component that articulates relevant findings to community members.

A large part of this is a "translation" issue – making reports more accessible and in plain language. Another part is simply building the connections between local scientists and local communities. Getting them to work together could entail the community taking more of a lead within the scientific process, including helping to determine the right questions as well as helping collect "samples" or other data. This type of collaboration could lead to better engagement of community members with their local environments as a result of knowledge-building and local empowerment.

Location-Based Management

Location or community-based management programs present numerous opportunities for successful environmental initiatives. They provide the physical area that contains an immediate constituency of people with direct ties to the land and marine environment. Although community-based projects are good examples of environmental programs, the most successful are those that are community-driven (an important distinction). These programs emphasize that community is not simply a component, but the driver of preservation. Community-driven projects define their own environmental priorities and pursue pathways to success with the assistance of collaborative partners. Not only will the community drive the process, it will also serve as a long-term resource manager. One respondent indicated that these processes encourage people to be, "less pessimistic about environmental protection, less pessimistic about landowners, and less pessimistic about the government in general." Therefore, one way to achieve environmental goals is to create this critical mass of communities that co-manage the land, near-shore marine environments, and the activities conducted within them.

Most respondents conveyed the importance of modeling successful activities, programs, and organizations from various sources. Although not every component will work in every location, it becomes easier to adapt principles to fit locations rather than re-creating the model each and every time. One interview participant who works in communities stated, "The community is less suspicious when there are models to demonstrate." Thus it is

critically important to link community-based projects through various networking strategies.

Advocacy and Policy

A majority of interview participants identified policy as an important piece of the solution framework. Of the forty-eight people interviewed, 77% specifically stated that advocacy and/or policy is an appropriate and recommended approach to address environmental issues. Environmental preservation efforts experience more widespread gains when laws govern and enforce appropriate use and protection of resources. Often, furthering the policy solutions requires education among decision-makers responsible for bringing about legislative change. Therefore, the ability to work within the political system presents numerous opportunities for those seeking solutions to environmental issues. One respondent identified a common problem in that, "successes are associated with an opportunity in time and they aren't sustainable without policy mechanisms to provide permanence."

Success in the policy arena, however, does not necessarily translate to successful environmental outcomes. Without adequate funding (as discussed above), environmental enforcement agencies are unable to monitor and ensure compliance with policies currently in place. As such, compliance becomes an honor system and it may take a "watch dog" organization to ensure enforcement. One respondent said, "Before we touch more laws, we must give enforcement agencies the right amount of resources to enforce them." Therefore, on the policy front, it is essential to create laws that can be enforced within the limits of current capabilities or there must be changes to the budget structure providing increased enforcement support.

References

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