Issue 9: Multi-State Issues

Overview

Tropical forests serve many unique and essential life-supporting roles for the world at large; as such tropical islands have the potential to be leaders in the global dialogue pertaining to climate change and conservation of rare plants, animals and cultures. Pacific islands represent the "canaries in the coal mine" – by feeling the impact of climate change in coastal areas.[1] The forested ecosystems on Pacific islands are also heavily impacted by deforestation, urban growth and expansion, increased carbon emissions, and threats to tropical biodiversity.

The Hawaiian islands have developed a myriad of ecosystems with high rates of endemism among the plant, animal and invertebrate inhabitants.[2] These islands also afford opportunities for many different human cultures to coexist. Various areas in Hawaii are highly developed; offering a wealth of products and technologies. There are also world class marine and terrestrial experiences that stimulate tourism, sporting events and unique research opportunities. The U.S. Military in the Pacific is also quite substantial, with Oahu and Guam having the largest total presence.

This Issue will offer a broad look at some of the important historic, present, and future issues related to Hawaii's interaction with other people and cultures from the Pacific and around the world. It will also explore ideas about how to improve technologies, expand opportunities, and offer ideas on how we can better manage and protect these natural resources of many islands in the Pacific.

Neighbors & Visitors

Hawaii is located between several continents: Asia, Australia, and North & South America. Nearby countries are: Mexico, Central American countries, South American countries, Canada, Russia, Japan, New Zealand, Fiji, Tuvalu, Kiribati, Tahiti, Tonga, Samoa, Cook Islands and Easter Island. There are a number of U.S. territories and affiliated islands in the Pacific.

Hawaii's vast beauty and convenient location in the Pacific make it a natural place for travelers to visit by air and sea using transportation such as: personally owned yachts, cargo vessels and small aircraft; national and international airlines, cruise ships; and a variety of military air and sea transportation.

This trend began when the whaling industry found Hawaii to be a convenient and hospitable port of call. This trend increased as international trade among Pacific Rim countries grew during the 20th century (see Figures 9.1 and 9.2).

Being an ideal place for millions of visitors, Hawaii, and other Pacific islands inevitably struggle with cultural and ecological resiliency. Despite having one of the most expensive costs of living

in of any state in the Nation, and with limited opportunity for 'mega' business opportunities, Hawaii's resident population continues to grow. This growth puts more strain on the natural environment and the services derived from it to sustain these growing populations.

U.S. Tropical Islands

The Hawaiian Islands are one of many U.S. Tropical Islands (USTI's), which together, contain virtually all of the tropical forests associated with the United States. Most of these islands have significant indigenous populations, many of which continue to live traditional subsistence lifestyles. These highly diverse native ecosystems on small land masses are subject to increasing development pressures, are frequently susceptible to significant storm events, and operate under strained economies. Due to their strategic locations, many of these islands play important roles in trade, cultural exchange and in maintaining national security of the United States. All of the USTI's share similar natural resource concerns, lifestyles and cultural practices. (See Table 9.1).

Islands	Total Area (acres)	Existing Forest (acres)	Number of Islands	Population
Hawaii*	4,110,720	1,490,000	8 main islands, with numerous atolls	1,275,000
American Samoa**	49,280	28,686	5	60,000
Commonwealth of the Northern Mariana Islands**	113,280	40,000	14	80,000
Guam**	135,680	65,005	1	170,000
Puerto Rico**	2,199,901	710,156	3	3,900,000
Virgin Islands**	85,760	not mapped	4	110,000
Republic of the Marshall Islands***	44,800	not mapped	5 and 29 atolls	60,000
Federated States of Micronesia *** (Kosrae, Pohnpei, Chuuk, Yap)	149,804	76,527	607	100,000
Republic of Palau ***	114,560	77,241	4 main islands, 200 rock islands, 6 remote islands	20,000

*State, ** U.S. Territory or Commonwealth, *** Freely Associated State (US Compact Agreement)

Table 9.1. Shared Characteristics of U.S. Affiliated Tropical Islands in 2006[3]

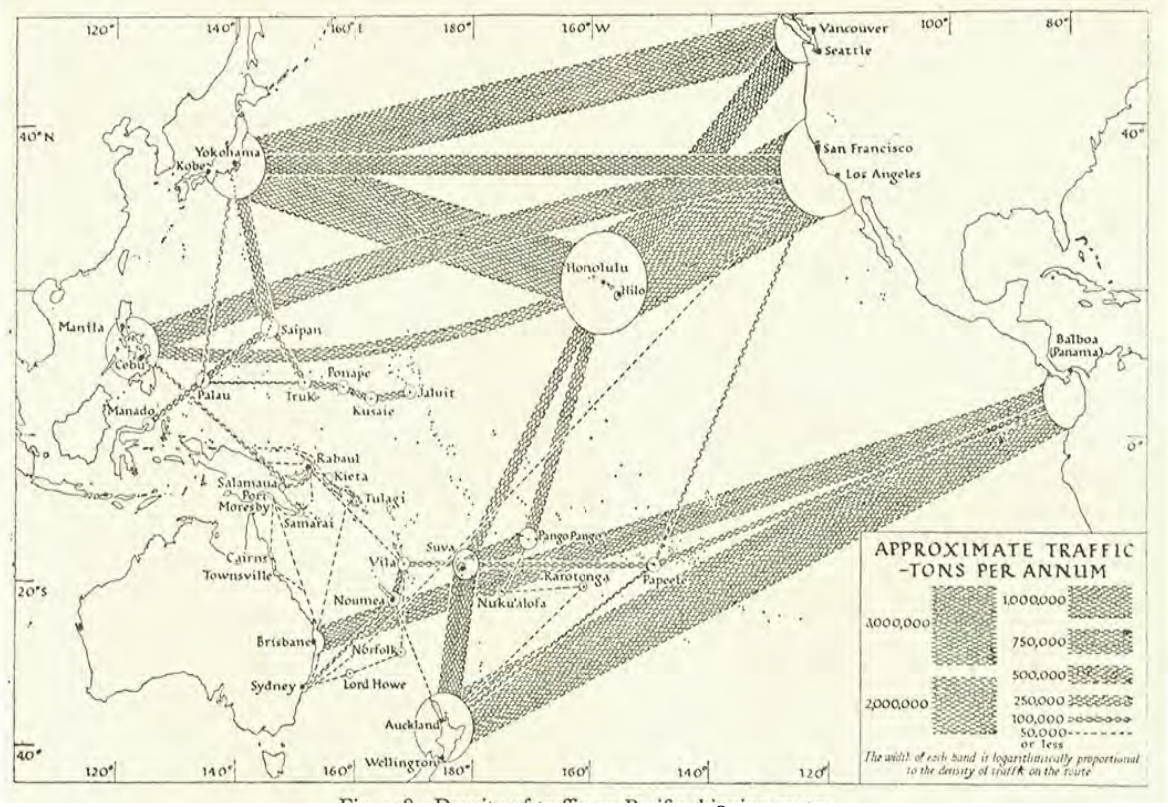

Figure 9.1. Density of Pacific shipping routes in 1938.[3]

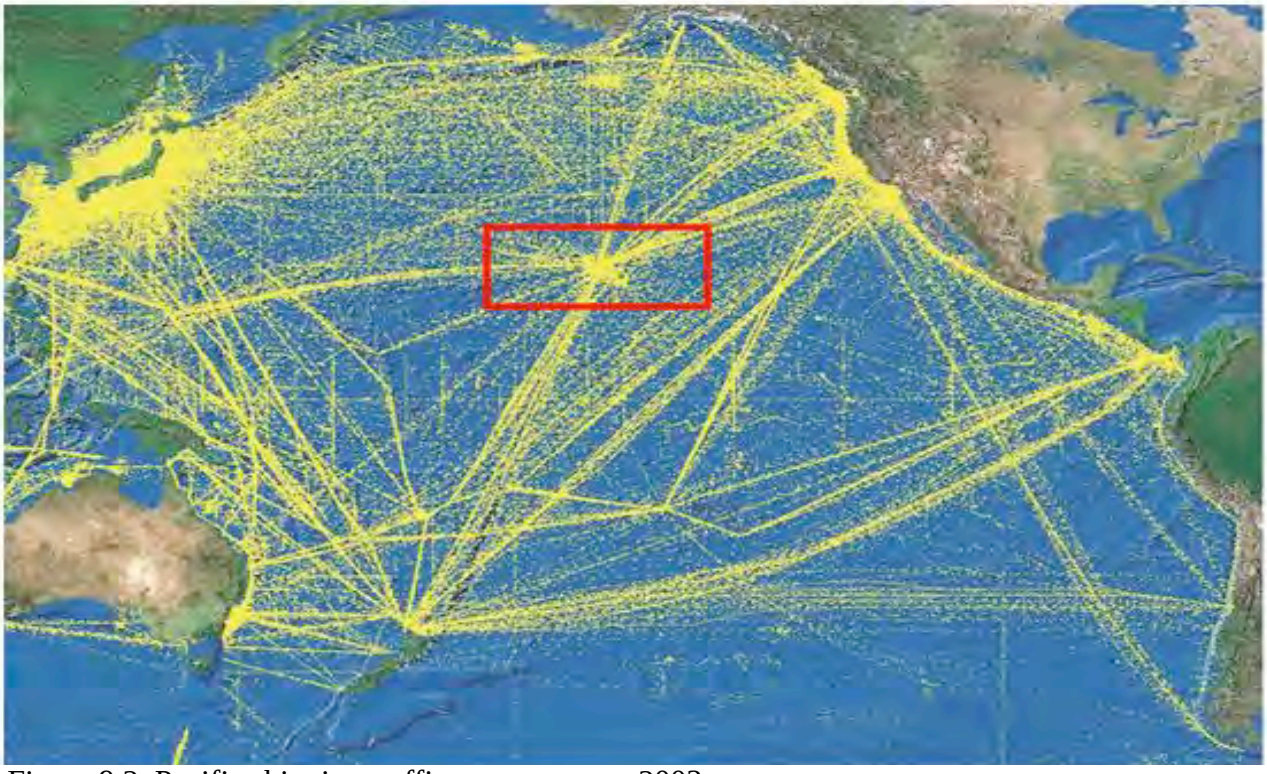

Figure 9.2. Pacific shipping traffic routes approx 2003.

Pacific islands are particularly vulnerable to a number of natural perturbations such as tsunamis, earthquakes, hurricanes and sea level rise. The problem is so dire that, Mr. Fredrick Mueller, Secretary of Environment, Republic of Marshall Islands, stated that "at the current rate of sea level rise the Marshall Islands will be gone in 50 years."[3] Low islands and atolls must face climate change and sea level rise issues with cooperation from all levels U.S. and International governments, and begin implementing management actions, as this is an urgent problem.

Human caused problems that exacerbate natural resource management and sustainability are: deforestation due to increased population; hydrology changes; over harvesting; and invasive species. Outcomes from these pressures on the land often result in reduced water percolation into aquifers, increased soil erosion, coral reef siltation/reduction of marine resources, increased fire frequency and severity, reduced plant and animal habitat, and reduced forest products. These pressures can lead to the loss of indigenous cultures, traditional knowledge and continued island exodus to places that hold the chance of a better life.[4]

Benefits & National Interests in the U.S. Tropical Islands

- USTI's preserve a rich array of flora and fauna – a national and international biological heritage found no where else in the nation or the world.
- Sustainability of the tropical forests is integral in efforts to provide resilient communities, to diversify the local economies, and to mediate the impacts of burgeoning tourist industries.
- Forests replenish important fresh water aquifers and river systems, protect reefs, shelter and protect shorelines and coastal communities from hurricanes, storm surges, tsunamis and floods.
- The USTI's in general are the equivalent of "canaries in the coal mine" for issues of global warming, sea level change, storm frequency and severity, environmental degradation and effects of climate and environmental change on vulnerable human populations due to ecosystem sensitivity and connectivity.
- The USTI's provide unique opportunities for scientific research in tropical ecology. Due to the vigorous growth potential, adaptations to natural disturbances and invasions of alien plants and animals, USTI's offer many opportunities to test approaches to management, and to understand the national and international landscape level effects.
- The USTI's provide significant cultural diversity. To know, understand and maintain these intact cultures, with their knowledge of sustainable agroforestry systems and cultural uses of forest products, may help guide the future management of continental areas.
- The USTI's are important in creating bridges to international neighbors and a window to the cultures of the Caribbean, Latin America, and the Pacific and Asian countries. These

islands can be models for sustainable tropical forestry management in an international arena.

- The USTI's, especially Guam, Kwajalein, American Samoa, Oahu and Puerto Rico provide strategic military locations highlighting the need to sustain the services provided by the environment (e.g. potable water) to support military personnel and their families. Today, the islands are stepping stones for movement of people (including illegal aliens), drugs, weapons, and invasive species which could threaten national security. Sufficient attention is not currently provided to prevent the potential negative affects of these trends. The United States has an intrinsic interest in ensuring a sustainable environment, vital economic development, and safety for those who live in and visit these special places.

Present Conditions, Trends & Opportunities

Traditionally, the Forest Service has not been deeply involved in coastal and nearshore marine resource protection, nor the management of terrestrial threatened and endangered species. This is in part due to the assumption that the U.S. Fish & Wildlife Service, NOAA and other federal agencies or initiatives focus on and provide adequate funding for these resource needs. This is changing in the Pacific due to the overwhelming need, and scientific information is now available that supports coastal and marine resource conservation via upland forest management. There are many countries and organizations working collaboratively in the Pacific, either on isolated issues, islands or states, that understand the relationship between terrestrial and marine ecosystems. Tables 9.2 and 9.3 list a few examples of interactions Hawaii is currently involved in with a number of countries and international organizations that support education and technical capacity exchanges, research and natural resource management cooperative efforts.

Table 9.2. Examples of Hawaii's Collaborations with Other Countries in the Pacific Region.

Country	Area of Focus
Tahiti (A Department of France)	Miconia Suppression
New Zealand	Weed Risk Assessment
Australia, Caribbean	White Water to Blue Water
Thailand	Tsunami Technologies
Chile	Disaster Preparedness Collaborations

The connection between the uplands, lowlands and marine areas has long been part of the indigenous Pacific Island life. The balance between what the people need and what the terrestrial and marine environments can offer, has always been central to Polynesian and other Pacific Island cultures' ability to live in harmony with the land and sea. Population increases, development, and reduced resources demand drastic changes in land use practices. Current practices result in extreme sedimentation from coastal and upland development, dredging, shoreline modifications, upstream agriculture and development. Coral reef impacts include smothering of live corals, and the prevention of successful establishment of new coral colonies

Table 9.3. A Selection of International Organizations working on Pacific Island Issues.

Partnerships and Organizations	U.S. Natural Resource Agencies/Organizations
• Pacific Island Ecosystems at Risk (PIER) • South Pacific Regional Environment Programme (SPREP) • Secretariate of the Pacific Community (SPC) • International Union for the Conservation of Nature (IUCN) • German Technical Operation/ Deutsche Gesellschaft für Technische • Zusammenarbeit (GTZ) • United Nations Food &Agriculture Organization (UN FAO)	• National Oceanagraphic Atmospheric Administration • USGS Pacific Biodiversity Information Node (PBIN) • Fish & Wildlife Service (F&WS) • Natural Resource Conservation Service (NRCS) • Farm Services Agency (FSA) • Pacific Coast Joint Venture (PCFV) • National Fish & Wildlife Foundation • Trust for Public Lands (TPL) • The Nature Conservancy (TNC) • National Association of State Foresters (NASF) • National Association of University Forest Resources Programs (NAUFRP) • Society of American Foresters (SAF) • Association of Fish & Wildlife Agencies (AFWA) • National Urban & Community Forestry Advisory Council (NUCFAC)

during periods of peak freshwater storm events on land. Simple changes to a limited number of practices could bring about dramatic changes that could not only reduce the negative impact on the coral reefs, but also improve the human practices that regulate these important ecosystems.

It is important to "strengthen policy frameworks and institutional capacities to reduce impacts to coral reef ecosystems from pollution due to land-based activities"[5]. Traditional land tenure systems include ridge to reef management of the land and are viewed as models of whole watershed or ecosystem-function management systems that are valuable to contemporary conservation.

Threats & Concerns

A summary of the threats and concerns pertaining to regional Pacific island issues is provided in Table 9.4. While many are stand alone issues, they often relate and exacerbate each other leading to complicated connections that require complex solutions. Vast distances amongst Pacific islands can be a buffer for unwanted species entry, however, these distances can also limit an already strained human collaboration capacity. Clearly more education and capacity building is needed in the Pacific if these threats and concerns are to be adequately addressed.

Table 9.4. Key Regional Threats and Concerns

Threats and Concerns	Forest Service National Themes
Aquatic health concerns i.e., litter, sustainable fishing practices, wetland protection and implementation of Best Management Practices.	2.2, 3.1, 3.5, 3.6, 3.7
Climate Change – changes in temperature, fire frequency and other potential impacts. (*Refer to Issue 5: Climate Change/Sea Level Rise)*	1.1, 3.5, 2.2, 3.1, 3.3, 3.7
Food security (land, sea and near shore reefs) - loss of traditional crops, native plants & genetic diversity, dependence on imports.	1.1, 1.2, 3.4, 3.6
Loss of threatened & endangered species, habitats and the associated indigenous knowledge/culture.	1.1, 1.2, 2.2, 3.4, 3.6
Human health concerns related to water quality - parasitic insects (dengue fever, filiriasis, malaria, schistosomiasis), drainage & industrial waste contaminants, etc.	1.1, 1.2, 2.2, 3.1, 3.4, 3.5, 3.6
Need to target research and educational efforts and communicate results with partners and neighbors in the Pacific.	1.2, 3.6
Human population increases and associated development pressures.	1.1, 1.2, 2.2, 3.5, 3.6
Impacts on Biodiversity – plant & animal extinctions due to loss of wildlife & their habitat and insects & disease.	1.1, 1.2, 2.2, 3.4, 3.5, 3.6, 3.7
Impacts of and increases in the number and intensity of tropical storms and typhoons.	1.1, 1.2, 2.2, 3.1, 3.5, 3.7
Invasive species transport and biosecurity i.e., brown tree snake, rhinoceros beetle, erythrina gall wasp, coqui frog, little fire ant. (The little fire ant is particularly widespread in the Pacific Islands region.	1.1, 1.2, 2.2, 3.4, 3.5, 3.6
Smart urban growth. Green growth is needed. Need to engage in more projects like the Hawaii Urban Tree Canopy Project that strives to help the City of Kapolei grow environmentally smart.	1.1, 1.2, 3.1, 3.5, 3.6
Sea level rise and associated migration. When native peoples loose the ties to their culture & community/land; it often leads to a loss of land ethic and increases in drug & alcohol use. More attention needs to be paid to preserving indigenous knowledge and historic management systems.	1.2, 2.2, 3.4, 3.6
Tourists and visitors as a method of plant, insect and disease dispersal.	2.2, 3.6
Tourists and visitors influence on cultural land ethics.	2.2, 3.6

Priority Issues & Strategies for Inter-island Coordination

1.) Invasive species - There are the most important threat to Pacific biota and native ecosystems. The challenge is not only to control existing populations of invasive species, but also to prevent new introductions. The most detrimental exotic invasive species can vary from country to country or island to island, but there are a number of species that appear to be a problem on almost every island they are found. Rats, especially the Pacific rat, and introduced insect such as ants such as the little fire ant are particularly widespread.[6]

The classic example of the impact of an introduced predator is the brown tree snake (*Boiga irregularis*). In the past 40 to 50 years, this predator from the Papua region has caused the extinction of nine of 11 native species of forest birds and the apparent extinction of three skink species and two species of gecko on Guam. The snake has now spread to Saipan and there are serious fears that if the snake were to spread throughout the Pacific it would cause similar devastation.[6]

Figure 9.3 shows a real-time snapshot of flights in and out of Hawaii at 7:00 PM. As you can see, flights originating in many parts of the world use Honolulu as a hub, but because it is a U.S. state, Hawaii cannot unilaterally implement quarantine procedures to the extent that an independent country can. In addition to commercial air traffic, many military flights and ocean vessels that frequent areas around the world and through the Pacific subject to an even greater variety in regulations or lack thereof. It is important that individual States and Islands increase the level of biosecurity to protect their islands from inadvertent entry of landscape level damaging weeds and pests. New Zealand, with its strict plant and animal quarantine procedures for incoming and outgoing travelers could serve as a model for all Pacific Island USTI's in an effort to prevent the introduction of new invasive species.

Figure 9.3 Real-time flights to and from Hawaii, 7 PM, June 3, 2010.

2.) Public Land Management Funding - Hawaii and all U.S. Pacific Islands do not have National Forests (with the exception of El Yunque in Puerto Rico), which receive substantial funding from the U.S. Forest Service to manage and maintain. As such, many public lands (State or Territory owned) represent the majority of productive/service producing lands in USTI's yet they are rarely eligible for many Landowner Assistance funding programs (*See Appendix C Forestry Related Assistance Programs*).

3.) Unique Inventory/Monitoring Needs - In order to understand the trends, threats and patterns in the loss of forests and inherent biodiversity in them, tropical forests must use more intensive survey, inventory and monitoring methods that are specifically devised for tropical forests, rather than methods applicable to less diverse continental forests. If surveys are to be used to assess forested conditions and trends locally, and then aggregated to reflect a national level for the determination of funding levels, the changes in tropical forest structures need to be accurately assessed and considered. The high degree of spatial variability in tropical forests must to be captured in vegetation surveys in order to adequately define and describe them.[7]

Equally important is the need to inventory and monitor urban forests where population increases and frequent storm events are projected. Catastrophic storms are not localized, but regional. When storms damage urban trees, it typically affects large populations and multiple jurisdictions. The ability of individual citizens, communities, and local governments to prepare and respond can be quickly overwhelmed. Regional and national organizations should organize emergency plans along regional lines so that recovery efforts and resources are delivered more efficiently to multiple communities and states. The time for the recovery and restoration of infrastructure through human response systems can be hastened after a storm. Information products necessary to speed response include high-resolution aerial or satellite imagery obtained before and after a storm, a coordinated effort before a storm to estimate biomass/volume removal for after the storm, and an economic and environmental assessment of damage to urban forests the storm event.[8]

4) Land Development Pressures - In Hawaii, agriculture zoned lands that were formally used for mono-crop production like sugar or pineapple, are being converted to support human development pressures, as opposed to being restored to their former food crop productivity. Formerly forested and/or marginal pasture lands are also being pressured to support human development needs and biomass production for fast growing single species, which are often very invasive.

5) Food Security - Pacific island societies have traditionally depended on the environment and natural resources for food, shelter, water, and medicine through agriculture and fisheries. Today, these traditional resources are vulnerable to increasing pollution, invasive species, over harvesting, climate change and sea level rise. In 2010, at the Pacific Island Committee meeting held in Chuuk, Federated States of Micronesia (FSM), representatives from seven island affiliated states and territories gathered to talk about important forestry issues and their importance to local communities. Food security was a top priority for nearly every representative

present at the meeting. In March 2010, the FSM launched an intensive research expedition gathering baseline data to answer questions such as: how much food does each island generate from their own lands; how vulnerable are individual islands to sea level rise; what are current development and land use threats, etc. The study will also integrate marine and terrestrial biodiversity information with socio-economic data. In Hawaii, an estimated 80 to 90% of food is imported. Because of recent economic pressures there is a growing interest in local food production and sustainable practices. More thought should be put to strategically planning for all of these needs and reducing Hawaii's dependency on imported food, fuel and other supplies.

6) Technology Sharing - There are a number of positive examples demonstrating the effectiveness of sharing technologies or methodologies for resource management in the Pacific. A good example is Hawaii's use of the New Zealand "Weed Risk Assessment". *(See Issue 2: Forest Health: Invasive Species, Insects and Disease for additional information.)* An important need in the Pacific is imagery. The Pacific Imagery Consortium is a collaboratively funded group of federal agencies that purchase satellite imagery on a regular basis. These images are used for a variety of purposes throughout the Pacific. Typically, the images cover very large swaths of areas around the specific island it is being used for, however, none of the images are shared with neighboring countries and some are desperately in need of this type of resource management tool.

7) Technical Capacity - Perhaps the most limiting factor to implementing successful natural resource programs throughout the USTI forests is limited technical capacity. Local professionals are essential for participation in collaborative efforts, implementation of on-the-ground actions, integration of cultural knowledge and practices into conservation practices, and for raising local community awareness about inter-island environmental threats, such as invasive species transport.[9]

8) Fisheries – Pacific island cultures historically and presently are dependent on marine resources. Any island management plan must have elements pertaining to the ocean and the interaction between the two ecosystems. Pacific Islands Fish & Wildlife Office, in their 2008 report, emphasize the global relationships between coral reef ecosystems, showing the importance of working collaboratively across borders.

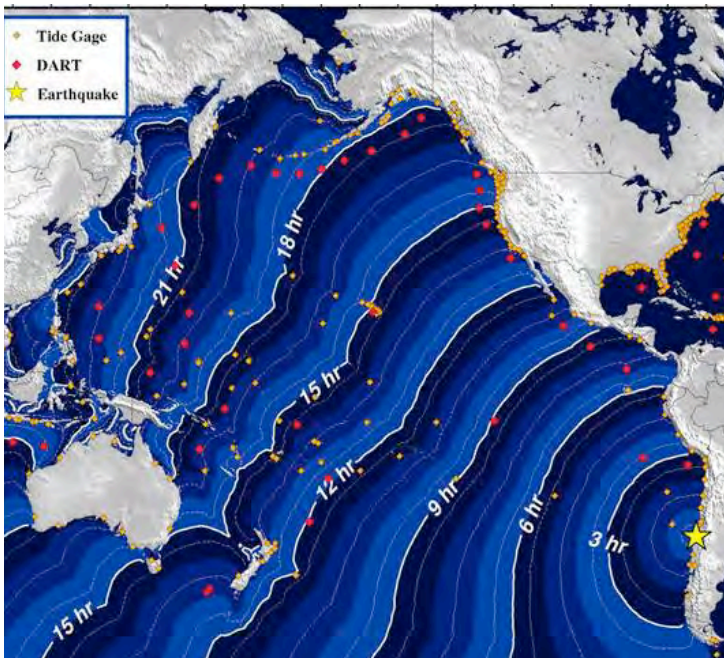

Figure 9.4. A tsunami travel time map for the Chilean earthquake generated tsunami in March 2010 that occurred across the Pacific.

> "International efforts to promote healthy, resilient coral reef ecosystems also benefit coral reefs in U.S. waters. Most coral reef ecosystems in U.S. waters are interconnected with, depend on and affect coral reefs in other countries. Ocean currents carry not only essential larvae and juvenile corals, fish, and other invertebrates that replenish reefs but also potentially harmful pollutants and diseases. Thus, strategies for supporting healthy coral reef ecosystems in the United States must also consider protecting coral reefs beyond U.S. waters".[10]

Projects that support both terrestrial and marine ecosystem health are necessary, not only for cultural preservation, but also for food security and protection of fragile marine habitat and those important species that occupy them.

9) Environmental Education - Education, outreach and training needs to be elevated in the priorities for the Pacific islands. Education is an important focal point of President Obama's administrative agenda, is new among the Forest Service National Themes, and is part of the newly redesigned Forest Service's Pacific Southwest Research Station Programs. This newly designed program is a critical program, yet it has been given no specific programmatic designation within the Western Region 5 Forest Service. For this reason, Conservation Education

Table 9.5. Climate Change and its Effects on Food & Agriculture in Hawaii[9]

Primary Vulnerabilities	Primary Adaptations
1. Changes in temperature and sea level 2. Changes in rainfall amount and patterns 3. Rising atmospheric concentrations of CO^2 4. Changes in water availability 5. Increase in extreme weather events (droughts, floods, hurricanes)	1. New crops and controversial genetically modified organisms (GMO's) 2. Manage water 3. Alter management practices 4. Shift crop production/species 5. Change human development areas & increase coastal vegetation resiliency

is not given the funding and support it desperately needs among the various programs offered to States and Territories. Conservation Education is a component of many existing S&PF programs and is an integral aspect of all environmental work done on islands. It is important that education funding be either included in the programs themselves or as a stand alone program so that islands have dedicated and continuous funding for enhancing public support for natural resources management.[11] More effort should be made to be creative with information sharing, capacity development and ensuring that important land management actions are based in sound best management practice technologies.

Figure 9.5. Kolea or Pacific Golden Plover (*Pluvialis fulva*)

10) Coastal Area Protection - In tropical islands, the majority of human populations are found in coastal areas, where people live, work and play. These areas serve as very important protection of the inland areas from ocean sea storms/events, as well as protecting the near shore marine resources from inland/upland erosion and siltation depositing. Vegetation is important for shoreline protection and wetland preservation.[11] Direct the Forest Service to support comprehensive land use plans for all islands and coastal communities, including: coastal zone protection plans and regulations; watershed and land use management; draft and adopt local and regional ordinances to implement comprehensive land use plans; vegetation selection for coastal protection for example; mangroves".[12] Because islands utilize all parts of the island equally, we can not separate marine and coastal areas from our 'island resource' management planning efforts.

11) Shorebirds and migratory waterfowl can travel tremendous distances in the Pacific. For instance Kolea or Pacific Golden Plover (*Pluvialis fulva,* See Figure 9.5) breed in Alaska and winter anywhere from American Samoa, Hawaii to Saipan. “Kolea can spend eight months away from Hawaii each year and then return to the same grassland or wetland”.[13] Habitat protection for these migratory birds must be collaboratively undertaken because they utilize and need more than one type of environment in order to flourish.

12) Rare forest types and the species that occupy them are a priority for Hawaii. For instance “90% of Hawaii’s native dryland forest has been destroyed, largely by human activity and encroachment”.[14] Hawaii’s Plant Extinction Protection Program (PEP) states on its website “Hawaii has the dubious distinction of being the endangered species capitol of the world,” with 37% of all endangered plant species in the United States and the highest number of endangered plant species on earth.[15] Yet Hawaii comprises only a small fraction of the earth’s land area (0.02%), resulting in extreme diversity over very small areas. To date, Hawaii is home to an overwhelming 173 species that have fewer than 50 plants remaining in the wild, coined “PEP species.”[16] It is important that more collaborative efforts take place in the Pacific and Caribbean to ensure that rare species protection and proliferation occur within and among island groups that can sustain them.

Priority Geographic Areas for Multi-State Issues

The areas described at the beginning of this Issue are frequently involved in Hawaii's economy, and therefore are high priorities for future collaborations. However, the greatest priority will be given to those areas that Hawaii interacts with the most: Australia, mainland United States, New

Zealand, Tahiti, Fiji, Tonga, Samoa, Philippines, Indonesia; and all of the U.S. territories and affiliated island groups.

As technologies, climates and interests change so too will priority areas upon which to focus natural resource management efforts. For the immediate future, collaborations with the Pacific Island states and Pacific Rim countries will be a priority for Hawaii.

Summary

The United States Tropical Islands offer unique opportunities for Forest Service State and Private Forestry Programs and other local, regional and National programs (*See Appendix C Forestry Related Assistance Programs*) to work collaboratively at international, national and local levels. These types of collaborations support projects directly tied to the protection of forests, culture and marine resources; thus shaping land use on a scale and in a manner that optimizes benefits in critical watersheds to protect important ecosystem services.

Working collaboratively on biosecurity, transport of invasive species, health of coral reefs, preserving traditional knowledge, protection of rare species, sustainable fishing practices and other shared issues, benefits not only the natural resources and communities among tropical islands, but also the nation as a whole. The islands are harbingers of the future given their high population densities and dependency on external subsidies for energy, food and materials. U.S. Tropical Islands are also where the effects of global climate change are expected to be first and most seriously observed and experienced.

The way in which islands address and resolve these issues will benefit the Nation and the world. The lessons from our tropical islands are exportable to continental systems where the connections between the social and ecological conditions are sometimes not as obvious as they are on islands. Vibrant programs and efforts, while crafted uniquely to suit islands and their associated cultures, will create valuable benefits that can be leveraged by states and nations located well beyond the islands themselves. Multi-state and regional programs, projects and collaborations are essential for sustainable management of island ecosystems, and are essential for our nation to learn from the past and present as we plan for the future.

Figure 9.6. Erythrina on a small atoll in Majuro Lagoon in the Marshall Islands.

Strategies for Issue 9: Multi-State Issues

Tropical forests serve many unique and essential life-supporting roles for the world at large. These important ecosystems are heavily impacted by deforestation, urban growth and expansion, increased global warming, and threats to tropical biodiversity. It is important to engage in the sharing of ideas, funding and opportunities with our Pacific Island neighbors because there is a vast amount of knowledge among peoples of these islands and their intimate knowledge of how to sustainably manage these unique and fragile ecosystems. Climate change and sea level rise are perhaps the number one threat the Pacific Island cultures and ecosystems and we must work together as a global community to ensure that the unique plants animals and peoples of these regions endure for generations to come.

Multi-State and Regional Issue: Invasive Species Transport

Long Term Strategy	Priority Landscape Area(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available/required	Measure of Success	Supports National Objective
1) Develop and Implement a Collaborative Improvement Strategy (CIS) to raise awareness and implement programs to stop transport of insects & diseases, and export/import of species rated highly invasive across the Pacific.	Pacific-Wide, US & International	Airlines contribute to screening protocols; more inspectors at high vector areas; coordinated message across the Pacific.	Forest Health Protection & Monitoring, UCF, CE/EE, EQIP, CIG, FSCG, UN FAO, SOPAC, NARF, CGAPS, SPREP, SPC	US Dept. of Ag. in all, HCA, PIC, SPREP, SPC, New Zealand DOC, Australia, NPS, NOAA, NRCS, Forest Service, DOT, TNC, US Airline Companies, APHIS, Homeland Security, RISC, DOD	USFWS, PICCC, UH, University of Guam, Australian Universities, New Zealand Universities, Community Colleges, Heads of Forestry across Pacific, NOAA and National Weather Service, NRCS, TNC	Better boarder entry protocols; More awareness of invasive spp. issues by travelers that visit Pacific Islands and countries; More stringent screening for incoming visitors to Pacific Islands; Reduce trans-portation and relocation of highly invasive species.	1.1 2.2 3.1 3.4 3.5 3.6

Multi-State and Regional Issue: Protection of Genetic Diversity and Important Food Plants

Long Term Strategy	Priority Landscape Area(s)	Secondary Issues Addressed	Program Areas that Contribute	Key Stakeholders	Resources Available/required	Measure of Success	Supports National Objective
1) Workshops among Hawaii and various Pacific Islands to share technical and cultural knowledge related to sustainable agroforestry and marine resource practices.	Chuuk, American Samoa, Yap, Hawaii, other international Pacific Islands.	Coral reef protection; critical habitat protection; cultural knowledge sharing.	Seacology, FSCG, CE/EE, FSP, Forest Health, UN FAO, SOPAC, FWS, Seagrant	Private and public land owners in the Pacific, HCA, PICCC, TNC, NOAA, DOD, UH Ocean & Earth Sciences, USGS, NWHI, Seagrant,	USFWS, PICCC, UH, University of Guam, New Zealand, Heads of Forestry across Pacific, NOAA, TNC	A series of workshops aimed at bringing highly successful agroforesters and near shore fishery management experts that allow cross-sharing of this rare knowledge. Brochures and videos describing the techniques and rotational practices.	1.1 2.2 3.1 3.4 3.5 3.6
2) Work collaboratively to mitigate impacts of loss of genetic diversity of food plants, native species and	Pacific Wide	T&E species protection; improved remote nursery	FWS Section 7 grants, UCF, Conservation Education, FSP,	HCA, PICCC, USFWS, NPS, USDA, HDOA, DOT, TNC, NOAA, DOD,	US FWS, Dept. of Ag across Pacific, Local and Fed. EPA, Dept. of Transportation, NOAA,	Increased food security; More studies that define monitoring of Hawaiian biodiversity, test new crop species under new climate	1.1 2.2 3.1 3.4

Strategies for Issue 9: Multi-State Issues

2) Work collaboratively to mitigate impacts of loss of genetic diversity of food plants, native species and culturally important species.	Pacific Wide	T&E species protection; improved remote nursery installation techniques; invasive spp. controlled.	FWS Section 7 grants, UCF, Conservation Education, FSP, FLP, schools, volunteer groups, NARF, PEP	HCA, PICCC, USFWS, NPS, USDA, HDOA, DOT, TNC, NOAA, DOD, CWRM, UH Ocean & Earth Sciences, USGS, NWHI	US FWS, Dept. of Ag across Pacific, Local and Fed. EPA, Dept. of Transportation, NOAA, Coastal Zone Mgmt Program, Forest Service Competitive grants, PBIN	Increased food security; More studies that define monitoring of Hawaiian biodiversity, test new crop species under new climate conditions; Shift agriculture to suitable new lands; Initiate more trainings and expanded nurseries production areas for rare plant seed protection and propagation with forest plants and food crops; Use methodologies that can be duplicated.	1.1 2.2 3.1 3.4 3.5 3.6
Multi-State and Regional Issue: Migratory Shorebird Protection							
Long Term Strategy	**Priority Landscape Area(s)**	**Secondary Issues Addressed**	**Program Areas that Contribute**	**Key Stakeholders**	**Resources Available/required**	**Measure of Success**	**Supports National Objective**
1) Collaborate on the protection and enhancement of known migratory habitat. Increase capacity to monitor and protect these birds.	Pacific Wide	Wetland and upland bird habitat protection; Improved Best Management Practices for bird habitat.	FWS Section 7, FLP, Forest Health Protection, Watershed Partnerships, Fire & Aviation, EQIP, WHIP, FLP, FSP, FSCG, NARF, SPREP, SPC	HCA, NOAA, DOD, HTA, USFWS, NPS, DOT, Office of Planning, HDOA, TNC, DOH, Marine & Coastal Zone Advocacy Council, US Coast Guard, Sea Grant , SPREP, SPC	PICCI, CZM Pacific-wide, US FWS Section 7 grants, Audobon Society, Ducks Unlimited, Audubon Society	Increase in habitat; Increase in knowledge about these birds; More collaboration with international countries in the Pacific for collaborative opportunities.	1.1 2.2 3.1 3.5 3.6 3.7
Multi-State and Regional Issue: Collaborative Multi-Regional Plan							
Long Term Strategy	**Priority Landscape Area(s)**	**Secondary Issues Addressed**	**Program Areas that Contribute**	**Key Stakeholders**	**Resources Available/required**	**Measure of Success**	**Supports National Objective**
1) Work collaboratively across the Pacific to identify the highest	Pacific-Wide	Incorporate multiple resource needs	UCF, Forest Health Protection, Watershed	HCA, NOAA, DOD, HCA, USFWS, NPS, Office of Planning,	Center for Island Climate Adaptation and Policy (ICAP) at UH,	Develop a clearly defined plan detailing priorities; Reiterations in the process to review management	1.1 2.2 3.5

Acronyms Used:

1. CZM – Coastal Zone Management
2. OHA – Office of Hawaiian Affairs
3. C&C – City & County of Government of Hawaii
4. NARF – Natural Area Reserve Fund
5. PEP – Plant Extinction Prevention
6. FRS – Forest Reserve System
7. DOFAW – EE – Environmental Educational
8. HARC – Hawaii Agriculture Research Center
9. LLCF - Legacy Land Conservation Program
10. FLP – Forest Legacy Program – Forest Service
11. FSCG - Forest Service Competitive Grants
12. DAR - Division of Aquatic Resources
13. HTA – Hawaii Tourism Authority
14. HISC – Hawaii Invasive Species Council
15. FSP – Forest Stewardship Program
16. CGAPS – Committee Group on Alien Pest Species
17. HCA – Hawaii Conservation Alliance
18. IPIF – Institute of Pacific Island Forestry
19. UCF – Urban & Community Forestry (Kaulunani)
20. NOAA – National Oceanographic and Atmospheric Administration
21. USGS – US Geological Service
22. YCC – Youth Conservation Corps
23. STDP - Special Technology Development Program
24. PSWRS – Pacific Southwest Research Station
25. SPC – The Secretariat of the Pacific Community
26. SPREP – South Pacific Regional Environmental Program
27. FAO UN – Food and Agriculture Organization of the United Nations
28. SOPAC – Secretariat of the Pacific Applied Geoscience Commission
29. PBIN – Pacific Biodiversity Information Node

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