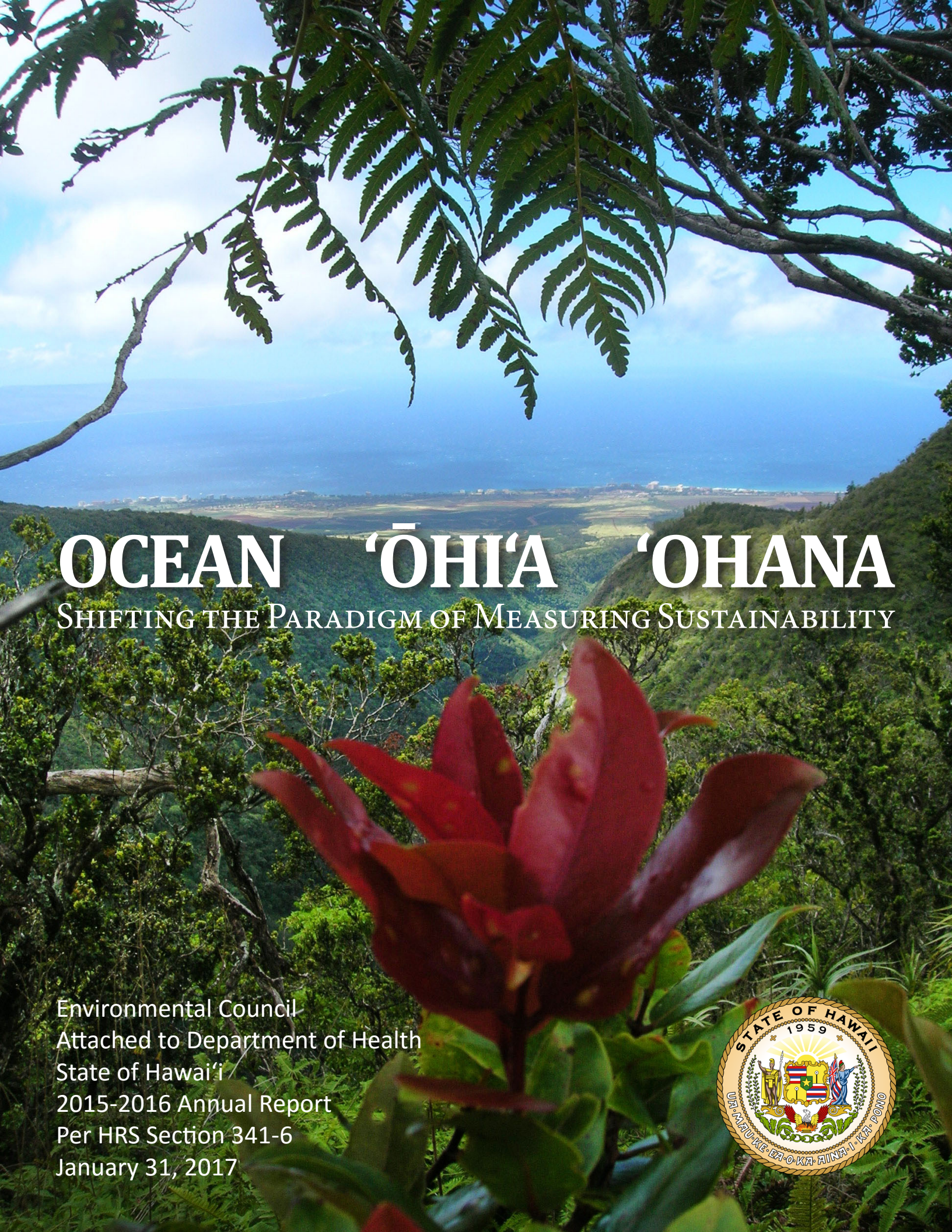

OCEAN ʻŌHIʻA ʻOHANA

Shifting the Paradigm of Measuring Sustainability

Environmental Council
Attached to Department of Health
State of Hawaiʻi
2015-2016 Annual Report
Per HRS Section 341-6
January 31, 2017

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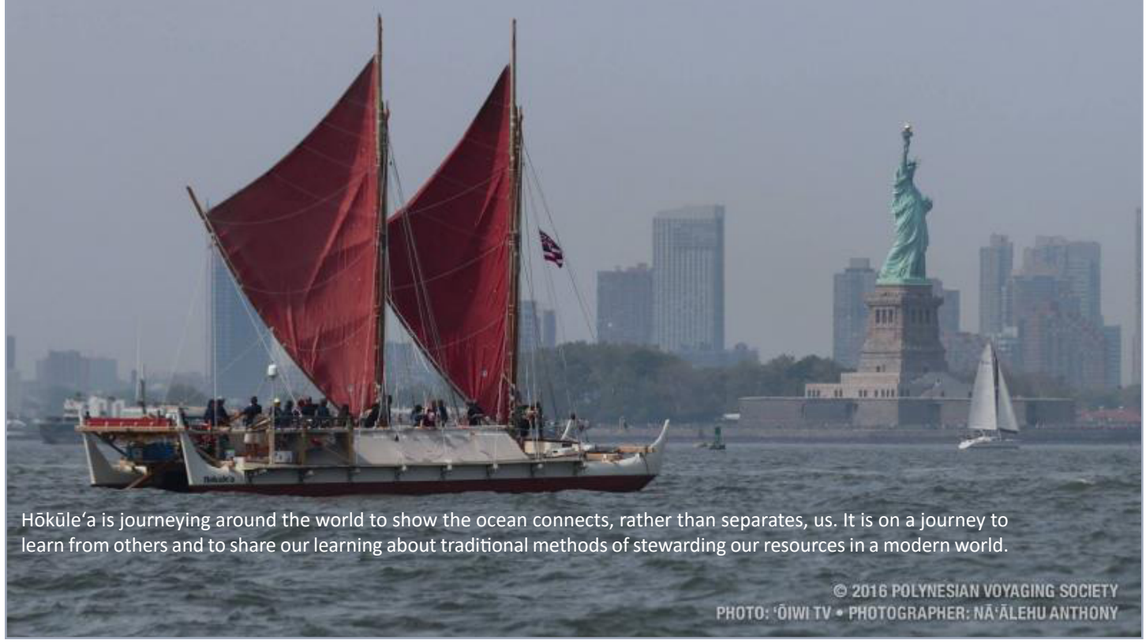

Hōkūleʻa is journeying around the world to show the ocean connects, rather than separates, us. It is on a journey to learn from others and to share our learning about traditional methods of stewarding our resources in a modern world.

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Special Message from Governor David Y. Ige

2015-2016 State of Hawaiʻi Annual Report on the Environment

January 9, 2017

I am pleased to present the 2015-2016 State of Hawaiʻi Annual Report on the Environment, prepared by the State Environmental Council and Office of Environmental Quality Control.

At the World Conservation Congress held in September 2016, I announced the Sustainable Hawaiʻi Initiative, which is aligned with our statewide commitment to the Aloha+ Challenge. After the tremendous opportunity and success of the Congress, we are focused on implementing our goals on natural resource management, clean energy transformation, local food production, and our legacy commitments to sustainability.

This Annual Report on the Environment helps bring together approaches to sustainability emerging in Hawaiʻi and highlights how they interrelate to each other and to global goals for sustainability, as well as examining a path forward on measuring our progress toward sustainability.

For the first time in years, the Environmental Council is fully appointed. The volunteers on the Environmental Council are highly capable individuals who take their responsibilities seriously. I thank them for their willingness to serve the public in this capacity.

I welcome everyone's involvement in this ongoing effort. I encourage residents across the state to provide the Environmental Council with their perspectives on issues that affect the environment and development. We are all stewards of the land and sea, and together we can make progress toward a sustainable Hawaiʻi for current and future generations.

With warmest regards,

DAVID Y. IGE
Governor, State of Hawaiʻi

MESSAGE FROM THE CHAIR

I'd like to reflect on the title of this year's report – Ocean, ʻŌhiʻa, ʻOhana. Regarding the ocean, the past two years were fraught with challenges for Hawaiʻi's marine ecosystem. An unprecedented coral bleaching event was studied extensively, and state agencies continue to search for ways to improve recovery efforts. Reports of unabashed taking of sea cucumbers prompted DLNR to step in with emergency rules to create much-needed protections. And towards the end of 2016, President Obama created the world's largest marine protected area with the expansion of the Papahānaumokuākea National Marine Monument.

ʻŌhiʻa (Metrosideros polymorpha) is the crowning tree species of our mauka watersheds and arguably the most culturally and ecologically significant native plant species to our island home. Yet, Rapid ʻŌhiʻa Death has decimated the ʻŌhiʻa forest population on Hawaiʻi Island, and there are serious concerns that the disease could spread throughout the state. The introduction and proliferation of pests such as little fire ants and cocqui frogs could cause widespread damage if left unchecked, as has been seen with well-known invasive species such as rats and mongoose. But these are just a few of the countless threats that may impact our unique ecosystem. It should be clear that investments in biosecurity will pay for themselves many times over in avoided mitigation costs.

Finally, as I write this, the Hōkūleʻa is crossing the Panama Canal, preparing for the final leg of its worldwide voyage. The groundbreaking journey over the past three years has brought an important message of hope, humanity, and caring for our environment to communities around the world. With the Hōkūleʻa, its voyagers, and the crew members coming back home, one of the most important lessons is the vital role that Hawaiʻi can play in a worldwide setting, and that we are all part of one ʻOhana.

Looking forward, the function and role of the Environmental Council continues to be relevant. There is a significant, vital nexus between environmental quality and economic prosperity, and I believe the two are not mutually exclusive. Yet, there are many challenges. How can we mitigate the impacts of climate change such as drought, coastal erosion, and severe weather? How do we protect and preserve our unique ecosystem from invasive species that seem to be attacking from every port of entry? How do we strike a balance between land use, development, housing cost, environmental protection, and homelessness? How can we support an agricultural sector to fulfill its promise of providing improved food and energy security?

Hawaiʻi is poised to be a global leader on these issues, and we recently had the opportunity to showcase our approaches and learn from others at the IUCN World Conservation Congress in Honolulu.

These are complex issues that impact numerous stakeholders, and require thoughtful consideration and execution of a progressive vision that challenges the status quo. We cannot solve these problems on our own, but we can help lead the way. The return of Hōkūleʻa and the hosting of the World Youth Congress in the summer of 2017 will be our next major milestones on this journey.

Joseph Shacat
Chair, Environmental Council

MESSAGE FROM THE DIRECTOR

Over the course of 2015-2016, the Office of Environmental Quality Control (OEQC) accomplished many achievements and milestones. The OEQC said mahalo and aloha to Genevieve Hilliard, Herman Tuiolosega, Director Jessica Wooley, Linda Hijirida, and Meg DeLisle, who have all moved on to other opportunities. We are fortunate to still have our institutional memory in Leslie Segundo, who recently celebrated his 25th anniversary with the Office.

As the new Office of Environmental Quality Control Director, I am committed to putting together a team able to realize the promise of this Office. Joining Mr. Segundo are our new planners Thomas Eisen and Zachary Stoddard and our new secretary, Charlotte "Coco" Needham. We are taking a fresh look at the Office's operations to make process improvements and upgrade the quality of technical support we provide to other agencies, businesses, and individuals interacting with the EIS process.

In addition to restaffing the Office, we supported Governor Ige in appointing 14 members to the Environmental Council (OEQC Director is the 15th member, *ex officio*). With a full Council and OEQC staff, we look forward to better serving the public and agencies.

OEQC has been refining and upgrading its internal operations. We have a new logo and have redesigned *The Environmental Notice* to emphasize its focus on the projects and programs undergoing environmental review. We are implementing Governor Ige's paperless initiative by digitizing our documents and upgrading our online presence. Look for an updated EA and EIS library in 2017 and more aspects of the EIS process transitioning to an electronic format.

At the Opening Ceremony of the World Conservation Congress, Governor Ige announced his Sustainable Hawai'i Initiative. To implement this initiative, he has asked Chairperson Suzanne Case of the Department of Land and Natural Resources and me to co-chair a collaboration among the Department of Land and Natural Resources, Department of Agriculture, and the Department of Business, Economic Development, and Tourism to make Hawai'i more sustainable.

More details on the Sustainable Hawai'i Initiative and how it meshes with the *Aloha+ Challenge* and other sustainability efforts underway are described in this report. OEQC looks for forward to working with everyone involved in these efforts on moving Hawai'i into a more sustainable direction.

Mahalo for everyone's support of the OEQC and the Environmental Council,

Aloha,

Scott J. Glenn

Scott Glenn
Director

EXECUTIVE SUMMARY

Hawai'i is home to 1.4 million people living a 21st century lifestyle on the world's most isolated islands. We have a sense that we are not living sustainably, but how do we start doing so? What does a sustainable society look like? How do we evaluate our wellbeing? What do we measure to see if we are making good decisions? How do we know we are moving in the right direction?

Instinctively, we know to look at our ocean, 'ōhi'a and family ('ohana) as yardsticks to gauge how well things are going. The health of these things around us--the water, the land, the ecosystem, our neighbors, and ourselves--speak to us intuitively. We see changes around us, in our natural resources, our economy, and our society and wonder if the balance is on a desirable path.

In the 1970s, the State enacted the State Environmental Policy (HRS Chapter 344) as a way to set goals for moving us forward on a desirable path. While comprehensive, it did not have measurable indicators attached to it or a means of enforcing the policy.

Recently, several approaches to sustainability have emerged in Hawai'i to attempt to measure how well we are doing in terms of our natural resources, economy, and society. These include Governor Ige's Sustainable Hawai'i Initiative, the *Aloha+ Challenge*, and the Mālama Honua Promise to Pae'Āina.

At the global level, the United Nations Sustainable Development Goals and the World Conservation Congress Hawai'i Commitments have been adopted to guide global efforts. Holding the Congress in Hawai'i highlighted three vital issues for conservation in the coming decades:

1. The significance of the world's ocean for biodiversity conservation and sustainable livelihoods (i.e., Ocean).

2. The threats to biodiversity from habitat loss, climate change, invasive alien species, unsustainable exploitation, and pollution (i.e., 'Ōhi'a).

3. The nexus between biological and cultural diversity, and how their conservation and sustainability requires a combination of traditional wisdom and modern knowledge (i.e., 'Ohana).

The Environmental Council summarizes these three issues as: Ocean, 'Ōhi'a, and 'Ohana.

These issues are shared throughout the world. As reported by the International Union for Conservation of Nature (IUCN) about the World Conservation Congress, "The Congress provided an opportunity to examine nature-based, life-affirming solutions and the roles of governments, civil society and the private sector in their development and delivery. Embodying Aloha 'Āina globally will help address the tremendous environmental challenges we face."

Yet, the most widely used method for gauging our well-being and setting public policy is based on the accounting of economic transactions, that is, the movement of money between people. This approach is called Gross Domestic Product, or GDP. Gross Domestic Product is widely used to guide important policy decisions, despite a number of commonly known limitations that may result in decisions leading us down a less sustainable pathway.

Not everything we do or care for is captured by paying money for goods or services. Many of us would say that what we hold most dear are those things we do for no pay. These are things that are invisible to Gross Domestic Product accounting.

It is worth highlighting four limitations of Gross Domestic Product. First, it only accounts for economic activity that takes place in the formal market. Second, because it focuses on transactions, it neglects the depletion of capital stocks like fish and forests. Third, cleaning up environmental damage counts as a positive contribution. Fourth, it is agnostic to societal inequality.

This year's report is called "Ocean, 'Ōhi'a, 'Ohana" after these important aspects in our life here in Hawai'i. This report relates these ways of looking at sustainability to our State Environmental Policy. What we find is that in almost all respects, they address similar goals using different approaches or targets.

Finally, the report describes the Genuine Progress Indicator (GPI), which the Environmental Council believes enables us to unite these efforts to evaluate and monitor our progress toward a more sustainable world and puts them on an equivalent footing with our more typical economic way of thinking.

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OCEAN ʻŌHIʻA ʻOHANA INTRODUCTION

The State Environmental Council is tasked with monitoring the progress of the State toward meeting Hawai'i's Environmental Policy, codified in Hawai'i Revised Statutes (HRS) Chapter 344.

While we continue to better understand how nature provides the conditions essential to life and wellbeing, all too often we do not incorporate those benefits into our economic thinking. We continue to degrade ecosystems and the services they provide, reducing biodiversity and diminishing traditional cultural relationships with our land.

The Environmental Council believes that nature conservation and human progress are not mutually exclusive but rather are essential partners in achieving sustainable development.

As declared in the World Conservation Congress Hawai'i Commitments, "We must undertake profound transformations in how human societies live on Earth, with particular attention to making our patterns of production and consumption more sustainable. We must recognize that human health and wellbeing depend on healthy ecosystems. We must recognize that every form of life has value – regardless of its worth to humans."

We need improved and more holistic monitoring to help evaluate the true benefits and costs of our actions, environmental and otherwise, and to assess the funding and resources dedicated to environmental programs. How we measure and track our growth will help us to continuously take stock and course correct.

Yet, monitoring progress is not always easy or straightforward. Deciding what to measure and how good the data are have been perennial issues. The Environmental Council has found that data vary in quality and thoroughness, making it difficult to understand the bigger picture and identify trends.

To address these issues, in 2012 the Environmental Council turned to the Genuine Progress Indicator as a means to standardize data and integrate them into a larger whole. The Genuine Progress Indicator, or GPI, is based on Gross Domestic Product (GDP).

Because Hawai'i is a state and not a country, the term "Gross State Product" is more accurate. However, this report uses Gross Domestic Product because more people are familiar with the term. Gross Domestic Product, for better and worse, is the main measure of economic activity used around the world for gauging the health of an economy, and by implication, society.

However, Gross Domestic Product does not consider many things which we as a society consider to be quite important. For example, Gross Domestic Product does not measure the volunteer activities so many people do—such as beach cleanups or native species restoration. Invasive species removal and beach cleanups are costs borne by third parties associated with remedying the byproducts of economic activities because someone who was not part of the original economic exchange was involuntarily affected by it. These activities are called "externalities" and are not measured by Gross Domestic Product.

The Genuine Progress Indicator uses techniques to put a dollar value on those costs and benefits and then adjusts the Gross Domestic Product up or down based on whether those changes are positive or negative. By doing so, we are able to gain a sense of whether and how much of our economic growth either aligns or comes at the expense of our environment and society.

While the Environmental Council was pursuing the Genuine Progress Indicator, others in our community began community-based, state- and county- supported, collaborative efforts to create indicators to track progress on vital goals such as ocean health, greener jobs, clean energy, waste reduction, local food, and natural resource management.

What follows is background information on the State Environmental Policy, the Sustainable Hawai'i Initiative, the *Aloha+ Challenge*, the Genuine Progress Indicator for Hawai'i, global approaches such as the Sustainable Development Goals and the IUCN World Conservation Congress Hawai'i Commitments, and how the Environmental Council sees integrating these in the future.

WORLD CONSERVATION CONGRESS AS A CATALYST

The September 2016 World Conservation Congress in Hawai'i was a catalyst to leverage the national and international spotlight to drive sustainability in Hawai'i for future generations and to showcase Hawai'i as a model for integrated sustainable growth. Held every four years, this was the first time that the United States hosted the World Conservation Congress.

Themed "Planet at the Crossroads," the conference acknowledges that the health of the environment has reached a tipping point. Facing crises such as climate change, depleted forests, impoverished fisheries, and species declining to the brink of extinction, humans can choose to continue their current destructive practices, or change their behavior to restore and steward the planet's life-giving systems.

More than 10,000 leaders from more than 190 countries gathered in Hawai'i from September 1-10, 2016. These leaders came from government, civil society, indigenous communities, faith and spiritual traditions, the private sector, and academia.

Building on the Paris Agreement on climate change, the United Nations Sustainable Development Goals (SDGs; see page 16 for more), and other international agreements, including The Honolulu Challenge on Invasive Alien Species, the World Conservation Congress was an opportunity to learn and share lessons caring for our planet.

"Like the Hawaiian Voyaging Canoe, we are one canoe, one island, one planet. We cannot afford to mess this up. We need to change the downward trajectory of our natural resources, in Hawai'i and around Island Earth." – Governor David Ige

HRS CHAPTER 344 STATE ENVIRONMENTAL POLICY

Hawai'i has historically been proactive in promulgating environmental protection legislation and policies. In 1974, the State of Hawai'i passed the State Environmental Policy, codified as Hawai'i Revised Statutes Chapter 344 ("HRS Chapter 344"), a comprehensive set of goals and objectives for environmental policy.

The Environmental Council and Office of Environmental Quality Control look to the State Environmental Policy for monitoring "the progress of state, county, and federal agencies in achieving the State's environmental goals and policies" (HRS Section 341-6). The findings are presented in the Environmental Council's Annual Report.

The State Environmental Policy is broad in scope. It puts forth two policy statements and ten guidelines that, despite enactment more than 30 years ago, are relevant today. However, no indicators for measuring the ten guidelines were created. Agencies collected data that met their internal program requirements, which may not necessarily follow the guidelines.

In previous reports, the Environmental Council worked with agencies to collect data, yet those efforts generally resulted in snapshots in time for limited aspects of the environment, so it was difficult to gain an overall picture. Furthermore, agencies had no incentive to monitor beyond their requirements.

Purpose (HRS Section 344-1)

The purpose of HRS Chapter 344 is to establish a state policy which will "encourage productive and enjoyable harmony between people and their environment, promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of humanity, and enrich the understanding of the ecological systems and natural resources important to the people of Hawai'i.

Environmental Policy (HRS Section 344-3)

It shall be the policy of the State, through its programs, authorities, and resources to:

1. Conserve the natural resources, so that land, water, mineral, visual, air and other natural resources are protected by controlling pollution, by preserving or augmenting natural resources, and by safeguarding the State's unique natural environmental characteristics in a manner which will foster and promote the general welfare, create and maintain conditions under which humanity and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of the people of Hawai'i.

2. Enhance the quality of life by:

   A. Setting population limits so that the interaction between the natural and artificial environments and the population is mutually beneficial;

   B. Creating opportunities for the residents of Hawai'i to improve their quality of life through diverse economic activities which are stable and in balance with the physical and social environments;

   C. Establishing communities which provide a sense of identity, wise use of land, efficient transportation, and aesthetic and social satisfaction in harmony with the natural environment which is uniquely Hawaiian; and

   D. Establishing a commitment on the part of each person to protect and enhance Hawai'i's environment and reduce the drain on nonrenewable resources.

"Environment" means "the complex of physical and biological conditions that influence human well-being, including land, air, water, minerals, flora, fauna, energy, noise, and places of historic or aesthetic significance." (HRS Section 344-2)

STATE ENVIRONMENTAL POLICY GUIDELINES

Per HRS Section 344-4, in pursuing the state environmental policy, all agencies, in the development of their programs, as practicable, shall consider the following ten guidelines (summarized):

1 Population

(A) Recognize population impact as a major factor in environmental degradation and adopt guidelines to alleviate this impact and minimize future degradation;

(B) Recognize optimum population levels for counties and districts within the State, keeping in mind that these will change with technology and circumstance, and adopt guidelines to limit population to the levels determined.

2 Land, water, mineral, visual, air, and other natural resources

(A) Encourage management practices which conserve and fully utilize all natural resources;

(B) Promote irrigation and waste water management practices which conserve and fully utilize vital water resources;

(C) Promote the recycling of waste water;

(D) Encourage management practices which conserve and protect watersheds and water sources, forest, and open space areas;

(E) Establish and maintain natural area preserves, wildlife preserves, forest reserves, marine preserves, and unique ecological preserves;

(F) Maintain an integrated system of state land use planning which coordinates the state and county general plans;

(G) Promote the optimal use of solid wastes through programs of waste prevention, energy resource recovery, and recycling so that all our wastes become utilized.

3 Flora and fauna

(A) Protect endangered species of indigenous plants and animals and introduce new plants or animals only upon assurance of negligible ecological hazard;

(B) Foster the planting of native as well as other trees, shrubs, and flowering plants compatible to the enhancement of our environment.

4 Parks, recreation, and open space

(A) Establish, preserve and maintain scenic, historic, cultural, park and recreation areas, including the shorelines, for public recreational, educational, and scientific uses;

(B) Protect the shorelines of the State from encroachment of artificial improvements, structures, and activities;

(C) Promote open space in view of its natural beauty not only as a natural resource but as an ennobling, living environment for its people.

5 Economic development

(A) Encourage industries in Hawai'i which would be in harmony with our environment;

(B) Promote and foster the agricultural industry of the State; and preserve and conserve productive agricultural lands;

(C) Encourage federal activities in Hawai'i to protect the environment;

(D) Encourage all industries including the fishing, aquaculture, oceanography, recreation, and forest products industries to protect the environment;

(E) Establish visitor destination areas with planning controls which shall include but not be limited to the number of rooms;

(F) Promote and foster the aquaculture industry of the State; and preserve and conserve productive aquacultural lands.

6 Transportation

(A) Encourage transportation systems in harmony with the lifestyle of the people and environment of the State;

(B) Adopt guidelines to alleviate environmental degradation caused by motor vehicles;

(C) Encourage public and private vehicles and transportation systems to conserve energy, reduce pollution emission, including noise, and provide safe and convenient accommodations for their users.

7 Energy

(A) Encourage the efficient use of energy resources.

8 Community life and housing

(A) Foster lifestyles compatible with the environment; preserve the variety of lifestyles traditional to Hawai'i through the design and maintenance of neighborhoods which reflect the culture and mores of the community;

(B) Develop communities which provide a sense of identity and social satisfaction in harmony with the environment and provide internal opportunities for shopping, employment, education, and recreation;

(C) Encourage the reduction of environmental pollution which may degrade a community;

(D) Foster safe, sanitary, and decent homes;

(E) Recognize community appearances as major economic and aesthetic assets of the counties and the State; encourage green belts, plantings, and landscape plans and designs in urban areas; and preserve and promote mountain-to-ocean vistas.

9 Education and culture

(A) Foster culture and the arts and promote their linkage to the enhancement of the environment;

(B) Encourage both formal and informal environmental education to all age groups.

10 Citizen participation

(A) Encourage all individuals in the State to adopt a moral ethic to respect the natural environment; to reduce waste and excessive consumption; and to fulfill the responsibility as trustees of the environment for the present and succeeding generations; and

(B) Provide for expanding citizen participation in the decision making process so it continually embraces more citizens and more issues.

Sustainability Crosswalk

This table shows how the various sustainability efforts in Hawai'i and globally relate to the State of Hawai'i Environmental Policy Guidelines.

Environmental Policy Guidelines

- See pages 4-5 for details
- Scale: Hawai'i
- Timeline: Ongoing

Sustainable Hawai'i Initiative

- See pages 8-9 for details
- Scale: Hawai'i
- Timeline:

local food 2020 · biosecurity 2027 · watersheds 2030 · oceans 2030 · renewable energy 2045

Aloha+ Challenge 2030 Goals

- See pages 10-13 for details
- Scale: Hawai'i
- Timeline: 2030

Clean Energy · Local Food · Waste Reduction · Green Work Force & Education · Smart Sustainable Communities · Natural Resource Management

Māla Honua

- See page 11 for details
- Scale: Hawai'i
- Timeline: 2017

United Nations Sustainable Development Goals (SDGs)

- See page 16 for details
- Scale: Global
- Timeline: 2030

World Conservation Congress (WCC) Hawai'i Commitments

- See pages 14-15 for details
- Scale: Global
- Timeline: Ongoing

Environmental Policy Guidelines and Summary			Sustainable Hawai'i Initiative	Aloha+ Challenge	Māla Honua	UN SDGs	WCC
1	Population	Population growth and limits as they relate to environmental degradation.	biosecurity				
2	Land, water, mineral, visual, air, and other natural resources	Natural resource management that conserves resources, reduces waste, maintains natural areas, and integrates land use planning.	watersheds, oceans, renewable energy				
3	Flora and fauna	Flora and fauna protection that protects endangered species and promotes native plants as well as other plants compatible with our environment.	biosecurity, watersheds, oceans				
4	Parks, recreation, and open space	Parks, recreation, and open space that care for scenic, historic, cultural, park, and recreation areas, protect shorelines from artificial improvements and structures, and promotes open space for its natural beauty.	watersheds, oceans				
5	Economic development	Economic development that encourages industry in harmony with our environment, promotes and preserves agricultural lands, engages federal activities to protect the environment, establishes visitor destinations integrated with planning controls, and promotes and preserves aquaculture.	local food, watersheds, oceans				
6	Transportation	Transportation systems in harmony with the environment that alleviate impacts from motor vehicles, conserves energy, reduces pollution and noise, and provides for safe and convenient travel.	biosecurity				
7	Energy	Energy that is used efficiently.	renewable energy				
8	Community life and housing	Community life and housing for the variety of lifestyles traditional to Hawai'i, develops communities with a sense of identity, provides for live-work-play communities, recognizes the economic and aesthetic value of community appearance, and promotes mountain-to-ocean views.	renewable energy				
9	Education and culture	Education, culture, and arts with linkage to the environment and encourages formal and informal environmental education for all ages.	biosecurity, oceans				
10	Citizen participation	Citizen participation that encourages everyone to respect the environment, reduce waste and consumption, fulfill our responsibility to present and future generations, and provide for expanding citizen participation in decision making.	biosecurity, oceans				

SUSTAINABLE HAWAIʻI INITIATIVE

One canoe, one island, one planet

Hawaiʻi has established ambitious goals for sustainability, through the *Aloha+ Challenge*, which sets concrete measurable targets for both public and private sectors. As part of this effort, Governor Ige launched the Sustainable Hawaiʻi Initiative.

At the World Conservation Congress Opening Ceremony, Governor David Ige announced the Sustainable Hawaiʻi Initiative as a focused, accelerated effort to achieve specific goals in line with the *Aloha+ Challenge*. The following passage is from his speech:

"Hawaiian culture is deeply rooted in our natural environment – our forests, streams and reefs. We share a personal, ancestral, and spiritual connection with our natural and cultural heritage. We have a kuleana, a responsibility, to mālama, to steward our natural and cultural resources.

The health of our natural resources is vital to our way of life, our economy and our culture. We constantly strive to develop innovative solutions to the challenges we face and we also benefit from the knowledge of our neighbors in the Pacific and around the world.

Hawaiʻi's natural environment provides the foundation of our livelihood. Many of our business sectors, including our vitally important tourism economy, rely on a healthy environment.

Yet Hawaiʻi's natural environment faces many threats, from invasive species, wildfires, development, unsustainable fishing practices, climate change, and so much more.

We, in islands, especially know the limits of our natural environment. We see the impacts of our actions very close to home. We are a microcosm of our planet earth.

Like the Hawaiian Voyaging Canoe, we are one canoe, one island, one planet. We cannot afford to mess this up. We need to change the downward trajectory of our natural resources, in Hawaiʻi and around Island Earth."

double local food production

Double local food production by 2020 (Lead Agency: DoA)

In 2016, the Department of Agriculture completed a survey of all agricultural land use in Hawaiʻi to create a foundation for our efforts to increase local food production. To continue to provide food security and support our local farmers, we are committed to increasing agricultural loan programs, invasive species prevention and control, and purchasing and improving high-value agricultural lands.

implement interagency biosecurity plan

Implement Hawaiʻi's Interagency Biosecurity Plan by 2027 (Lead Agencies: DoA and DLNR)

Invasive species threaten our agriculture, natural areas, tourism economy, and health. We've made progress through quarantines and innovative response efforts, but we can do better. Our Hawaiʻi Biosecurity Plan provides the path forward. We will establish the Hawaii Invasive Species Authority to lead this effort and will create new research and inspection facilities, hire additional inspectors and first responders, and use new technologies to efficiently mitigate risks.

protect 30% of priority watersheds

Protect 30% of our highest priority watersheds by 2030 (Lead Agency: DLNR)

In the last 5 years, we've protected an additional 5% of our priority watershed forests through fencing projects done in collaboration with our community-based Watershed Partnerships. Today, we are halfway to our goal, with 15% of our priority watersheds protected. To reach 30%, continued funding is needed to control damaging invasive species and diseases, plant trees, prevent wildfires, and educate the community about the importance of our forests.

manage 30% of nearshore ocean waters

Effectively manage 30% of our nearshore ocean waters by 2030 (Lead Agency: DLNR)

Community partnerships and reliable enforcement are critical to achieving 30% effective management of nearshore marine waters. One way we've started to make headway is through our Community Fishery Enforcement Unit on Maui. Compliance there has increased from 60% to over 90%. Now we need to mirror the success by establishing units on all of our islands.

achieve 100% renewable electricity

Achieve 100% renewable energy in electricity by 2045 (Lead Agencies: DBEDT and DCCA)

Climate change poses the greatest threat to our forests, our coastlines, and our corals. Hawaiʻi is also the most oil-dependent state in the nation. We must do everything we can, globally and locally, to reduce our use of fossil fuels. Hawaiʻi is committed to reaching 100 percent renewable energy use in the electricity sector by the year 2045.

The primary agencies for the initiative:

Department of Land and Natural Resources
Department of Agriculture
Department of Business, Economic Development, and Tourism
Office of Environmental Quality Control

ALOHA+ CHALLENGE

The *Aloha+ Challenge* provides a platform and roadmap to frame signature initiatives and legacy items that are supported by government, business, nongovernmental organizations, philanthropy, academia, and community partners. Launched in July 2014, the *Aloha+ Challenge* is a statewide sustainability initiative by the Governor, the four county Mayors, the Office of Hawaiian Affairs, State Legislature, and public-private partners to build a more secure and resilient economy for the people of Hawai'i.

The *Aloha+ Challenge*, which builds on Hawai'i's history of systems-thinking, indigenous knowledge, culture and values, identifies six ambitious 2030 goals as a framework to build a more secure, sustainable, and resilient economy for Hawai'i. With a new set of globally agreed 2030 Sustainable Development Goals, the *Aloha+ Challenge* has been recognized as a model for locally appropriate implementation that can be adapted and scaled for local culture and context.

The *Aloha+ Challenge* outlines six ambitious 2030 goals in clean energy, local food production, natural resource management, solid waste reduction, smart sustainable communities (including climate resilience), and green jobs and education. See pages 12-13 for details on these six goals.

Hawai'i Green Growth (HGG) is a public-private partnership that catalyzes action across government, private sector, and civil society to achieve Hawai'i's 2030 statewide sustainability goals and serve as a model for integrated green growth. HGG formed in 2011 to develop innovative and collaborative solutions to pressing sustainability, resilience, and development challenges facing Hawai'i and the world. The first multi-sector collaboration of its kind, HGG built a diverse public-private network of over 100 partners, launched a high-level statewide sustainability framework with six time-bound goals, built a data-based accountability mechanism, and developed a robust process to facilitate shared action on policy outcomes, cross-sector initiatives and innovative finance.

HGG serves as the backbone organization for the *Aloha+ Challenge*, and coordinates a broad stakeholder base of both high-level institutional leadership and community partners to accelerate statewide action on Hawai'i's 2030 goals. As a network-based public-private partnership, HGG coordinates and convenes diverse stakeholders to:

- Integrate cross-sector sustainability priorities into long-term policy and planning.
- Identify and catalyze public-private actions to advance Hawai'i's 2030 goals.
- Support, uplift and amplify partner priorities through a shared statewide framework.
- Build capacity for community action and next generation leadership.
- Provide a platform for knowledge exchange, partnership building, and collaboration through an atmosphere of mutual respect and trust.

Trackable metrics are available for clean energy, solid waste reduction, and natural resource management on the *Aloha+ Challenge* Dashboard.

Hawai'i Green Growth

For more information, visit https://hawaiigreengrowth.org/

MĀLAMA HONUA
HŌKŪLE'A
POLYNESIAN VOYAGING SOCIETY

PROMISE TO PAE'ĀINA

As Hōkūle'a sails the Worldwide Voyage (WWV), a main focus is to compel the global community to acknowledge that the issues facing our environment are ultimately shared problems, for which we must devise shared solutions. Underscoring this need, Hōkūle'a and Hikianalia are sailing to locations throughout the world to seek out the worlds' great leaders, or navigators, whose bold and innovative solutions are being put to task. Consequently, the natural questions arise: what does this mean for our home, Hawai'i? During a worldwide voyage with worldwide implications, what will be done to improve our place? And how will the Hawai'i that the canoe comes home to be different from the Hawai'i they left behind four years prior? In response to these questions, 20 marine resource management organizations, spanning the federal, state, local government and private sectors, came together and penned the Promise to the Pae'Āina (the Hawaiian Archipelago). Today, more than 60 organizations and 150+ individuals have committed to and supported this unique collective impact initiative.

Ensuring that the health of our ocean is sustained as the lifeblood of our culture and well-being, is at the very core of the Promise to Pae'Āina, our collective promise to the islands of Hawai'i. Our reliance on our ocean has long been understood in Hawai'i as one of the most isolated landmasses on the planet. In light of a shrinking world in the face of technological advancement, and shrinking resources in the face of increasing demand, Mālama Honua, the responsibility to care for our Island Earth, gives voice to the understanding that earth itself is an island, to which we are all indigenous and wholly dependent. This dependence has long been understood amongst Hawaiians as key to sustainable communities. In Hawaiian culture, humans are related to the oceans and all of their living components. Consequently, human interactions with the oceans deserve the same kind of respect that relationships among humans require. Indeed, on a canoe, as on an island, as on a planet with no detectable life near it, our ability to care for our place is a direct reflection of our ability to care for each other. These are the lessons we in Hawai'i need to learn, relearn and share with each other, and with the world.

Both unprecedented and necessary, it marked the first time that many of these individuals and groups came together, agreeing to set aside their differences to focus on our shared interests and how we can build on them. On the shoulder of this promise, five commitments (Livelihood, Island Home, Future, Responsibility and Heritage) were developed with specific, measurable and time-bound targets, to be achieved or implemented by the time Hōkule'a returns home to Hawai'i on June 17th, 2017. The significance of these targets is that, like Hōkūle'a, they serve as a platform that brings us together, as a canoe that propels us to work toward shared destinations.

1. **Our Livelihood** - Ocean-based enterprises are sustainable; guided by cultural heritage, facilitated by relevant science, authorized by sufficient management capacity, and optimized by new opportunities.
2. **Our Island Home** - Caring for our island communities, lands and waters through partnerships and action.
3. **Our Future** - Collective investment in our future leaders is priority, providing the proper tools, training, and experience to advance this work beyond our own lifetimes and abilities.
4. **Our Responsibility** - Build capacity to sustainably manage Hawai'i's ocean resources for generations to come. Aligned with Governor Ige's goal to effectively manage 30% of nearshore marine waters in the Main Hawaiian Islands by the year 2030, this effort will develop a shared narrative and a checklist of 5-year collective priorities focused on: collaborative science; aggregate impact of coordinated statewide, regional, and place-based management efforts; improved enforcement, and; innovative and optimized funding.
5. **Our Heritage** - Our island way of life will thrive through community-based co-management of our marine resources.

Aloha+ Challenge 2030 Goals

Clean Energy

70% clean energy :
40% from renewables & 30% from efficiency

Local Food

At least double local food production :
20-30% of food consumed is grown locally

Natural Resource Management

Reverse the trend of natural resource loss mauka to makai by increasing freshwater security, watershed protection, community-based marine management, invasive species control and restoration of native species

Waste Reduction

Reduce the solid waste stream prior to disposal by 70% through source reduction, recycling, bioconversion and landfill diversion methods

Smart Sustainable Communities

Increase livability and resilience in the built environment through planning and implementation at the state and county levels

Green Workforce & Education

Increase local green jobs and education to implement these targets

Background

The State of Hawai'i adopted an ambitious energy goal into state law in 2008: achieve 70% clean energy by 2030, with 40% from renewable energy sources and 30% from efficiency.

In 2015, the State of Hawai'i made history in its landmark commitment to reach 100% renewable energy by 2045. This goal is a major step forward in the global shift from reliance on fossil fuels to renewable energy sources.

The goal to double local food production for local consumption came from stakeholder input to the Hawai'i 2050 Sustainability Plan, and Hawai'i Green Growth members agreed on this recommendation.

The State Department of Land and Natural Resources has committed to conserve 30% of priority watershed by 2030, and is working with partners to develop specific, measurable sub-targets for invasive species, marine resource management, freshwater security, and native species.

The State of Hawai'i established a state law mandating solid waste stream reduction by 50% by January 1, 2000. However, this goal was not reached in Hawai'i for many reasons. It also has not yet been achieved by any state in the US. Hawai'i Green Growth members agreed to recommit to the State's waste reduction goal as a 2030 target. Before the launch of the *Aloha+ Challenge*, the State of Hawai'i, the counties, and the Office of Hawaiian Affairs agreed to make the goal even more ambitious by increasing to 70% waste reduction by 2030.

This initial goal was agreed by Hawai'i Green Growth members to capture the critical importance of climate resilience and smart growth/infrastructure to Hawai'i's future. Hawai'i Green Growth is facilitating the Smart Sustainable Communities Roundtable to convene a high-level dialogue on environmental stewardship, sustainable economic growth, and community resilience; develop targets for the Smart Sustainable Communities 2030 goal; and kick-start projects for implementation.

Hawai'i Green Growth members developed this target to make a clear commitment to create local green jobs and provide essential training and education programs so achieving these targets also strengthens our communities and economy. Hawai'i Green Growth is working with the State of Hawai'i, counties, University of Hawai'i, and other partners to further develop measurable green workforce and education targets.

Measuring Progress

To ensure Hawai'i is reaching its clean energy goal, energy stakeholders are developing a variety of indicators to track progress:

- The Blue Planet Foundation launched Hawai'i's first Energy Report Card in 2013 to track annual progress on the state's clean energy target.
- The Hawai'i Energy Policy Forum developed a set of indicators with guidance from a broad stakeholder group and professional experts to measure and report progress on Hawai'i's clean energy goals and objectives.

Trackable metrics are available on the *Aloha+ Challenge* Dashboard.

In 2012, the County of Hawai'i released Hawai'i Island Food Self-Sufficiency Baseline 2012, which included the first examples of a "local food" scorecard.

The basic metrics needed to track statewide food self-sufficiency are currently under development by a partnership between the State Department of Agriculture, Ulupono Initiative, and Sustain Hawai'i. Together, they will identify benchmark indicators, existing data and data gaps that need to be addressed in order to build out a robust food security metrics database.

Many leadership organizations listed above track progress on their lands, waters and internal natural resource management targets. In recent years, these stakeholders came together to develop shared indicators that could track statewide progress on conservation. The Hawai'i Conservation Alliance, Natural Resource Data Solutions LLC, and the State Department of Land and Natural Resources are leading this initiative, starting with indicators for our watershed and marine resource management goals across the state.

Trackable metrics are available on the *Aloha+ Challenge* Dashboard.

To ensure the State of Hawai'i is reaching its waste reduction goal, stakeholders are developing indicators to track progress on the State's target.

- The State Department of Health submits an annual Solid Waste Management report to the Legislature to demonstrate yearly progress.
- Non-profit organizations such as Kupu Hawai'i's Rewarding Internships for Sustainable Employment (RISE) program are also collecting food waste and marine debris metrics.

Trackable metrics are available on the *Aloha+ Challenge* Dashboard.

To ensure the State of Hawai'i is reaching its Smart Sustainable Communities target and commitments to climate resilience, stakeholders are developing indicators to track Hawai'i's progress.

- A major priority for the Office of Planning Hawai'i Ocean Resources Management Plan Working Group is climate change adaptation. The statewide plan sets ocean and coastal resource management priorities, provides a method for performance measures and reporting, and informs statewide climate adaptation planning. It was recently updated in 2013.
- The University of Hawai'i SeaGrant College Program is also working to identify indicators to measure progress on the Smart Sustainable Communities target.

To ensure the State of Hawai'i is reaching its Green Workforce target, stakeholders are beginning to develop indicators that track Hawai'i's progress.

- The State Department of Labor and Industrial Relations completed Hawai'i's first Green Workforce Baseline Assessment in December 2010.
- In 2016, the UH Economic Research Organization (UHERO) supplemented this report with Foundations for Hawai'i's Green Economy: Economic Trends in Hawai'i Agriculture, Energy, and Natural Resource Management. The UHERO report was co-sponsored by the Hau'oli Mau Loa Foundation, The Nature Conservancy and Hawai'i Green Growth.

WORLD CONSERVATION CONGRESS HAWAIʻI COMMITMENTS

The following commitments were made by the delegates to the World Conservation Congress while it was held in Hawaiʻi. These commitments are known as the "Hawaiʻi Commitments" internationally. This text is from the International Union for the Conservation of Nature report.

To achieve the transformation required to promote a 'Culture of Conservation' while respecting human rights and gender equity, we need to support and build constituencies for nature, and to address the way human societies are changing nature and our world.

Cultivating a Culture of Conservation

• Linking Spirituality, Religion, Culture and Conservation

The world's rich diversity of cultures and faith traditions are a major source of our ethical values and provide insights into ways of valuing nature. The wisdom of indigenous traditions is of particular significance as we begin to re-learn how to live in communion with, rather than in dominance over, the natural world. The Encyclical Letter Laudato Si', the Islamic Declaration on Global Climate Change, and the Interfaith Climate Change Statement to World Leaders among many other statements from world religions, provide insights.

Solutions: To create a stronger culture of conservation, we need to look beyond mere technical means. The values and wisdom of indigenous peoples, Elders, and the world's rich faith and spiritual communities offer a deeper understanding of our connections with nature, and help inform the necessary transformational changes in the financial, technological, industrial, governance and regulatory systems of our societies. To incorporate such insights, spiritual leaders and the conservation community need to come together to share the values that connect us. Artists, educators and innovators all can contribute to this expanded vision.

• Engage and Empower Youth

We need a global movement that nurtures a new generation across all sectors of society to connect with nature and take action to support conservation. And we need to engage and empower youth to work for the planet, creating together a culture of conservation that will endure. In an increasingly urbanized world, people, especially children, often have little chance to experience and connect with the natural world. Young adults have a greater stake in long-term sustainability, yet can feel that conservation is irrelevant to them.

Solutions: When navigating Island Earth, we rely on the winds of youth to fill our sails. Their vitality and innovation catalyzes and sustains conservation action. Nurturing youth requires access to nature, and investing in protected areas and parkland, especially in and near urban zones, so that they provide threshold experiences that lead to a life of conservation. Technology can help provide the means to connect and network. The conservation community has a responsibility to help youth by inspiring those who have yet to care for nature, empowering young professionals already inspired to develop their capacities and networks, and by lending our time and experience as mentors -- recognizing that youth have as much to teach as they have to learn.

Addressing the Challenges of a Planet at the Crossroads

• The Challenge of Sustaining the Global Food Supply and Conserving Nature.

The need to provide food for people has resulted in the intensification and industrialization of agriculture, including aquaculture, while traditionally farmed areas, biodiversity and natural ecosystems have been lost, and water resources have been depleted and degraded. Ecological communities and evolutionary processes have been disrupted. Ongoing use of pesticides, herbicides and fertilizers affect the biodiversity and ecosystem services that support our food production systems, and we have lost crop genetic diversity, nitrified our freshwater and coastal ecosystems, and disrupted pollinator systems. Traditional farming practices are under pressure and associated knowledge is being lost.

Solutions: Providing global food security requires increasing the cost effectiveness of food production, reducing food loss in the distribution chain, decreasing the waste of food, changing food consumption preferences, and ensuring that water resources are managed sustainably. We need to generate the knowledge – and do so with urgency -- to create the 'roadmap' that can transform our complex food production/consumption systems so that they do not degrade the biodiversity and ecosystem services on which they depend. This will require bringing together currently fragmented organizations and initiatives, and reform of the current systems of counterproductive and perverse subsides, taxes and other incentives, according to national circumstances. We must strengthen the governance system managing the food production system. While we need to increase overall efficiency of food, we must also maintain crop genetic diversity and local systems of production.

• The Challenge of Preserving the Health of the World Ocean

The world's oceans, and the communities that depend on them, are under immense and unprecedented human pressures. Sea level rise and natural disasters not only affect livelihoods but threaten human security. Destructive, illegal and unsustainable fishing practices deplete fish populations and degrade their habitats and spawning grounds. Mining activities, pollution and plastic debris threaten marine ecosystems and species, destroy life and jeopardize the achievement of the Sustainable Development Goals in the long term. The integrity and resilience of key ecosystems such as coral reefs and other ocean life are threatened by rising temperatures, depletion and pollution of terrestrial water flows, over-fishing, and ocean acidification

Solutions: Throughout the world, countries are embracing vast marine protected areas as an approach to support resilience and secure the future of humankind. The scale at which oceanic biological and ecological processes operate demands matching conservation efforts. The United States of America on August 31, 2016 expanded the Papahānaumokuākea Marine National Monument, making it the biggest protected area on the planet at 1,508,670 km2. French Polynesia announced the creation of Taini Atea, a marine managed area covering their entire economic exclusive zone, a 5,000,000 km2 area nearly half the size of Europe, building on the traditional management system of rāhui. Colombia has announced a quadrupling in size of the Malpelo Fauna and Flora Sanctuary bringing this UNESCO World Heritage site to 27,000 km2. These were preceded by other designations of large scale marine protected areas by governments such as Palau. At the other end of the scale, there is a proliferation of locally managed marine areas. The total area of marine protected areas now exceeds that of land under protection and the rate of increase is an order of magnitude greater. However, protected area approaches alone are not sufficient, and linking diverse methods and tools, such as fisheries and coastal zone management, is essential if we are to solve the multiple, interacting challenges facing oceans. Ocean warming and acidification cannot be ignored. The pervasiveness of plastic waste in the ocean, and its effects on marine food chains demand that we find ways to "turn off the plastic tap".

• The Challenge of Ending Wildlife Trafficking

The illegal trade in wildlife generates tens of billions of dollars for criminals every year and it continues to grow at an alarming rate. The involvement of organized criminal networks and militias pose a threat to national and international security as well as to social and economic development. The illegal trade in wildlife is leading to declines in the populations of target species, and often to their local extirpation, pushing some species to the brink of extinction. Local people lose access to the natural resources upon which they depend for their livelihoods, community integrity, and jobs.

Solutions: Stopping this illegal trade will require concerted efforts on many fronts: better protection of wildlife populations, both through laws and strengthened enforcement, behavioral change to reduce demand for these illegal products, and enhanced cooperation at all levels, including greater involvement of local communities. Solving this problem requires an integrated approach that addresses the whole supply chain of illegal products – from source to consumer – and involve all stakeholders, national and local government, as well as local communities. Real outcomes can only be realized by addressing the needs of local people, so that the benefits of a legal economy outweigh those of the illegal economy.

• The Challenge of Engaging with the Private Sector

The finance sector is increasingly aware of the potential that investing in nature has for generating returns, both in natural capital stock and also in economic yield. The corporate sector is also cognizant of the importance of maintaining nature to secure supply chains and manage institutional risk, especially under the uncertain conditions that climate change brings. And the conservation community is pressing hard for everyone to acknowledge the undeniable urgency of sustaining nature for the future of humanity.

Solutions: Economic and legal systems are needed that reward communities and companies for actions and investments that protect and restore nature. Equally, economic activity that destroys and degrades nature should be viewed as an economic cost imposed on the capacity of humanity and the greater community of life to survive and flourish. There is a palpable and urgent need to significantly increase investment in conservation action from both public and private sector sources. A precondition for attracting private investment is that conservation opportunities exist at scale. Additionally, regulatory and policy regimes that create a level playing field for business operations and that incentivize private investment to promote conservation are necessary. Ultimately, a collaborative approach, including government, civil society and the private sector, is essential for success.

• The Challenge of Climate Change

Climate change is one the most pressing global challenges confronting humanity today. Healthy ecosystems – terrestrial, freshwater, marine and coastal – can act as powerful carbon sinks and reservoirs, and provide the basis for resilience to climate change impacts. Their better management, conservation and restoration – can make a crucial difference in enabling a low-carbon climate-resilient world, while also safeguarding biodiversity and aiding sustainable development. Furthermore, ecosystem-based adaptation helps reduce people's vulnerability to climate change impacts, providing significant co-benefits for local communities. Climate change is exacerbating the challenge of invasive alien species. The Paris Agreement recognizes the value of these ecosystem services and the importance of ensuring the integrity of all ecosystems, including oceans and the protection of biodiversity.

Solutions: The Paris Agreement confirms that the world community now accepts the reality of climate change, current and projected impacts, and the difficult fact that emissions from all sources must contract in line with what science prescribes to meet agreed targets. Nature-based solutions, such as protected areas, have become widely recognized as an essential component of a comprehensive approach to climate change mitigation and adaptation. Restoration of forests and peatlands are examples of such solutions. Critical to the successful implementation of the Paris Agreement is building trust across the full range of stakeholders, especially indigenous peoples and women in local communities, who engage directly in mitigating climate change. The conservation community's contributions are vital, providing solutions that reduce emissions, help vulnerable human communities adapt, manage impacts on native species, strengthen biosecurity measures to control and eradicate invasive alien species, and generate co-benefits for sustainability.

THE GLOBAL GOALS
For Sustainable Development

UNITED NATIONS SUSTAINABLE DEVELOPMENT GOALS

The Sustainable Development Goals (SDGs), otherwise known as the Global Goals, are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. The following description is provided by the United Nations Development Programme (UNDP) website.

The 17 Sustainable Development Goals build on the successes of the Millennium Development Goals, while including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities. The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.

The SDGs work in the spirit of partnership and pragmatism to make the right choices now to improve life, in a sustainable way, for future generations. They provide clear guidelines and targets for all countries to adopt in accordance with their own priorities and the environmental challenges of the world at large. The SDGs are an inclusive agenda. They tackle the root causes of poverty and unite us together to make a positive change for both people and planet.

The Sustainable Development Goals (SDGs) were born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world.

The SDGs replace the Millennium Development Goals, which started a global effort in 2000 to tackle the indignity of poverty. The MDGs established measurable, universally-agreed objectives for tackling extreme poverty and hunger, preventing deadly diseases, and expanding primary education to all children, among other development priorities.

Key MDG achievements:

- More than 1 billion people have been lifted out of extreme poverty (since 1990).
- Child mortality dropped by more than half (since 1990).
- The number of out of school children has dropped by more than half (since 1990).
- HIV/AIDS infections fell by almost 40 percent (since 2000).

The legacy and achievements of the MDGs provide us with valuable lessons and experience to begin work on the new goals. The SDGs are also an urgent call to shift the world onto a more sustainable path.

The SDGs are a bold commitment to finish what we started, and tackle some of the more pressing challenges facing the world today. All 17 Goals interconnect, meaning success in one affects success for others. Dealing with the threat of climate change impacts how we manage our fragile natural resources, achieving gender equality or better health helps eradicate poverty, and fostering peace and inclusive societies will reduce inequalities and help economies prosper. In short, this is the greatest chance we have to improve life for future generations.

The SDGs coincided with another historic agreement reached in 2015 at the COP21 Paris Climate Conference. Together with the Sendai Framework for Disaster Risk Reduction, signed in Japan in March 2015, these agreements provide a set of common standards and achievable targets to reduce carbon emissions, manage the risks of climate change and natural disasters, and to build back better after a crisis.

The SDGs are unique in that they cover issues that affect us all. They reaffirm our international commitments, permanently, everywhere. They are ambitious in making sure no one is left behind. More importantly, they involve us all to build a more sustainable, safer, more prosperous planet for all humanity.

MEASURING GENUINE PROGRESS IN HAWAI'I

In 2012, the Environmental Council voted to explore the Genuine Progress Indicator (GPI) as an alternative approach to measuring the progress of state, county, and federal agencies on meeting Hawai'i's environmental goals. Environmental Council members reached out to the academic community for advice and help. Two environmental economists also researching alternatives to Gross Domestic Product responded - Professor Regina Ostergaard-Klem, PhD, Hawai'i Pacific University and Professor Kirsten Oleson, PhD, University of Hawai'i. They are the authors and architects of the "Island-style Genuine Progress Indicator" for Hawai'i.

From 2012-2014, the Environmental Council published their work in its annual reports. In 2012, the authors adapted the standard Genuine Progress Indicator's environmental leg to Hawai'i. Their preliminary finding was that Hawai'i's economic growth came at the cost of environmental depletion (see page 10).

In 2013, the authors expanded the Genuine Progress Indicator to include all three legs—environmental, social, and economic—and customized it "Island Style" for Hawai'i. They created a preliminary baseline and began working with Hawai'i Green Growth on identifying indicators and data. They found that Hawai'i has made genuine progress, though it has been at the cost of the environment and compensated for by Hawai'i's strong social fabric.

In 2014 the authors did a deep dive into invasive species. Invasive species is not a traditional part of the Genuine Progress Indicator, but they and the Environmental Council realized that it is a vital part of Hawai'i's life, ecosystems, and economy. The report found that the Genuine Progress Indicator can be customized to address specific issues to Hawai'i, though to do so may require additional research and modeling.

In 2015, the Hawai'i Economic Association hosted a conference on new ways to measure prosperity, looking specifically at the Genuine Progress Indicator. Interest in the Genuine Progress Indicator is growing as we move toward a more sustainable development model.

There's No Such Thing as Free Growth

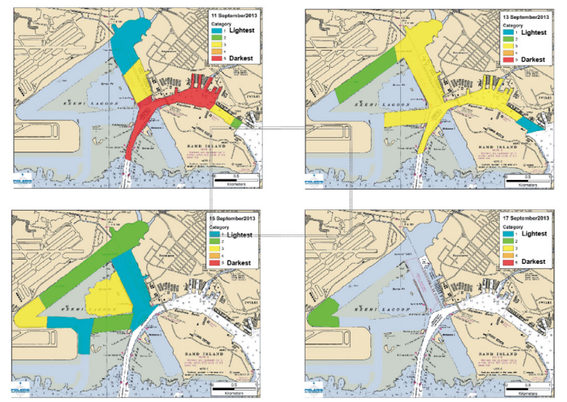
The most dominant and widely used economic measure is Gross Domestic Product (GDP). Gross Domestic Product measures the size of an economy by adding up the final goods and services sold during a particular time period. As production and consumption increases, Gross Domestic Product tracks the associated increases in economic activity. Designed by post-Depression era economists seeking a way to monitor economic health, a rising Gross Domestic Product implies a growing and healthy economy. An increase in Gross Domestic Product has come to imply more than just a healthier economy, but a better-off society as well.

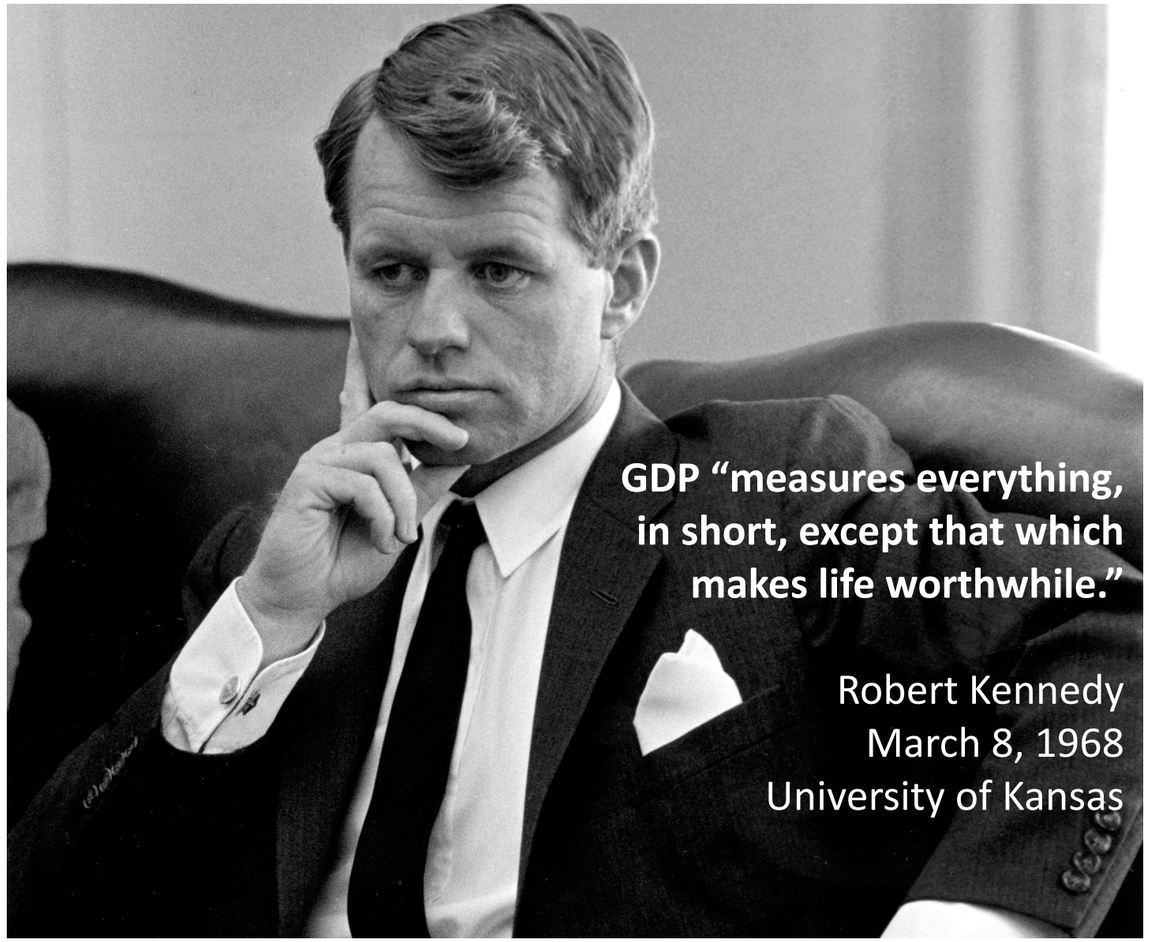
Yet while Gross Domestic Product growth might be good for the economy *per se*, it is not always good for society; economic growth is not "free" because it comes with associated costs. Traditional Gross Domestic Product accounting falls short of capturing many impacts on society (both negative and positive) that result from economic activity. On the cost side for example, Gross Domestic Product fails to account for pollution or environmental damages stemming from economic growth. In fact, the economic activity associated with cleaning up an environmental disaster, such as an oil spill, actually increases Gross Domestic Product. On the benefits side, many important contributions to society, like unpaid housework or childcare, are non-market activities, so are automatically excluded from Gross Domestic Product. And while economic growth may bring benefits to a society overall, Gross Domestic Product does nothing to track whether those benefits are distributed fairly or equitably.

This portion of the report is authored by Professors **Regina Ostergaard-Klem**, Hawai'i Pacific University and **Kirsten Oleson**, University of Hawai'i.

What GDP does not measure (clockwise from top left): natural capital depreciation, volunteerism like beach cleanups, family care, pollution from economic growth, cultural traditions, and income inequality.

Molasses Flow Trends 9/11 Through 9/17 2013





Time to Go Beyond Gross Domestic Product

Over the last two decades, growing recognition of the limitations of Gross Domestic Product has sparked a movement within the field of economics referred to as "Beyond Gross Domestic Product." Proponents of Beyond Gross Domestic Product stress the need to measure economic, environmental, and social welfare (i.e., changes in quality), not merely the size of the economy (i.e., changes in quantity).

This movement highlights alternative, supplemental, and replacement indicators that incorporate other elements (such as health, education, happiness, leisure) that are important to society but are still missing from traditional Gross Domestic Product accounting.

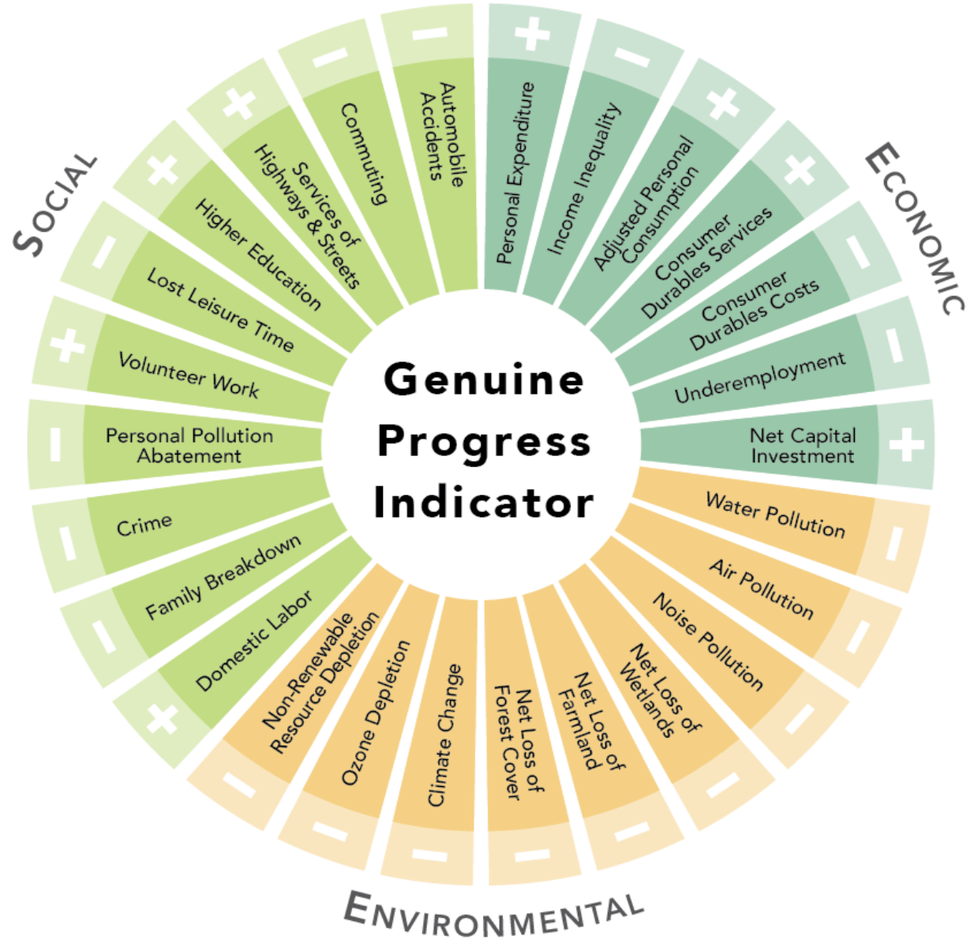
The ultimate goal is to offer a more complete picture of progress within a society, not just one drawn by economic growth.

Gross Domestic Product was initially designed only to measure the size of the economy. Yet according to Nobel Prize winning economist Joseph Stiglitz, Gross Domestic Product "…is not wrong, but wrongly used" when applied as a measure of social progress.

"Going beyond Gross Domestic Product" means exposing the hidden costs and benefits of economic growth and tempering the role of Gross Domestic Product through the use of other indicators to capture social progress.

Measuring Genuine Progress

One indicator under the Beyond Gross Domestic Product umbrella, the Genuine Progress Indicator, was developed in 1995 and has been gaining traction within the Beyond Gross Domestic Product community. The Genuine Progress Indicator is designed to offer a more holistic view of progress than Gross Domestic Product; its framework includes more than two dozen environmental and social, as well as economic indicators.



Conceptually, the Genuine Progress Indicator and Gross Domestic Product start from the same basic figure – personal consumption expenditures – but the Genuine Progress Indicator then incorporates changes, both positive and negative, that are ignored by Gross Domestic Product.

As it moves through the indicators, the Genuine Progress Indicator adjusts for hidden costs such as greater pollution or longer commutes, or unrecognized benefits like increased volunteerism.

The Genuine Progress Indicator is measured in dollars, adjusted upwards by adding the benefits or downwards by subtracting the costs, and compared directly with Gross Domestic Product. The gains or losses are indicated by the + and - signs on the Genuine Progress Indicator wheel in the figure above.

Studies comparing Gross Domestic Product and the Genuine Progress Indicator over time show both rising initially, until a "threshold point," after which the two measures diverge. While Gross Domestic Product continues to rise, the "genuine progress" is flat, suggesting that economic growth is occurring but at a cost.

The Genuine Progress Indicator's real potential is in its ability to tell a more complete story by tracking overall trends; the story can then be shared among policy makers, the public, and other stakeholders. Two excellent examples come from the states of Maryland and Vermont.

Following a 2009 initiative by the Maryland Governor's office to find alternative measures for the Gross State Product, the Genuine Progress Indicator now aids state agencies in tracking environmental and social impacts of the state's actions. The Genuine Progress Indicator informs the decision making process at a range of levels: from departmental decisions such as facility siting; to agency project selection and priority setting using Genuine Progress Indicator valued added tables; to state-wide policy analysis, such as using Genuine Progress Indicator indicators to assess policies for public transit ridership. Likewise, an extensive and user friendly and interactive website, hosted by the state's Department of Natural Resources, informs all stakeholders about the Genuine Progress Indicator and genuine progress in Maryland.

In 2012, a baseline value for the Genuine Progress Indicator was calculated using indicators for which data were available in Hawai'i (see figure on bottom of facing page). The outcomes of the "Island Style Genuine Progress Indicator" are best illustrated by the year 2005 (a year for which data were complete and calculated in year 2000 US dollars). Per capita adjustments for that year showed approximately $6,200 loss due to environmental costs, $874 loss due to economic costs, along with a gain of social benefits of approximately $8,558, highlighting a host of negative and positive factors that are important to society but not captured in traditional accounting methods like Gross Domestic Product.

Vermont took a slightly different approach to the Genuine Progress Indicator. In 2012, Vermont passed legislation requiring that the Genuine Progress Indicator be used to measure real progress in the state. As of 2014, the five-year economic development plan from the state's Agency of Commerce and Community Development adopted the goal to increase the Genuine Progress Indicator by 5% over the national average by 2020. By formally instituting the Genuine Progress Indicator into the process, the state is addressing the limitations of relying solely on Gross Domestic Product as an indicator.

Island Style GPI

An effort known as "Island Style Genuine Progress Indicator" is currently being piloted in our state, demonstrating the need for alternative measures to gauge real social progress in Hawai'i. Beginning in 2012, researchers from Hawai'i Pacific University and University of Hawai'i together are applying the Genuine Progress Indicator to the Hawai'i context. The Genuine Progress Indicator was showcased as technical reports within the state's Environmental Council Annual Report for the years 2012 through 2014. Over the years for which data were available in Hawai'i, Genuine Progress Indicator calculations identified both hidden costs like non-renewable energy use, lost leisure time, or underemployment, as well as unrecognized benefits such as the value of volunteerism or higher education.

While the Genuine Progress Indicator in its standard format is proving to be a useful tool for Hawai'i, more work needs to be done to customize the framework to make better sense for our state yet still remain within the proven Genuine Progress Indicator structure. For example, "Ocean, 'Ōhi'a, and 'Ohana" are three important and valuable assets not directly captured in the standardized Genuine Progress Indicator and definitely not captured in Gross Domestic Product at all. By adapting the framework to better capture the values of near shore coastal systems, native species, and multi-generational households in Hawai'i, while avoiding any double counting, the Genuine Progress Indicator can better reflect the flow of costs and benefits in our islands.

The Genuine Progress Indicator uses readily available, publicly accessible data to populate each of the 26 indicators. Yet barriers to implementation in Hawai'i include poor quality, outdated, or missing data. Likewise, valuation studies that reflect localized conditions are also needed. Nevertheless, the Genuine Progress Indicator process is beneficial for evaluating data gaps and identifying opportunities for stakeholders throughout the state to work together to improve data availability, quality, and relevance.

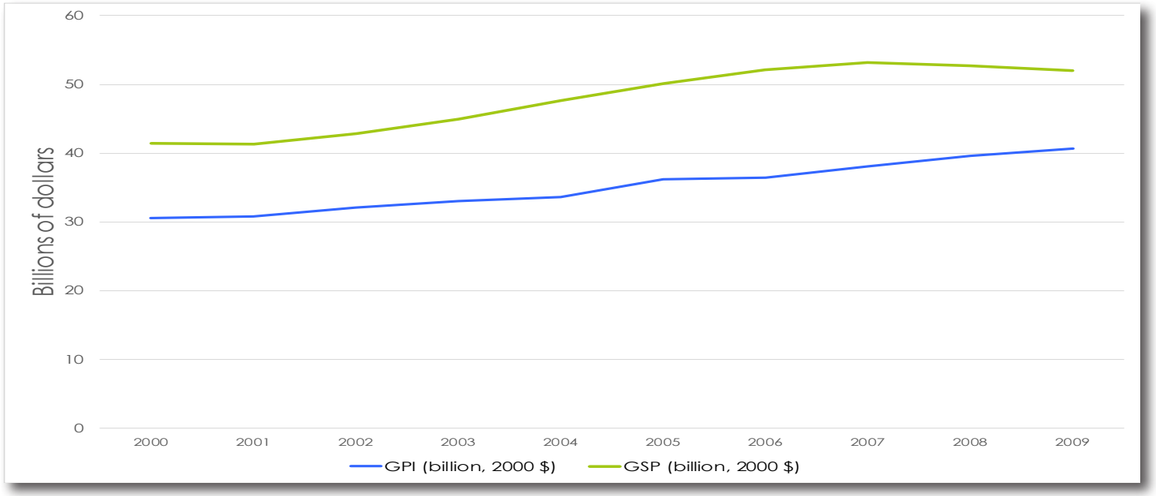
The Take Away

The Genuine Progress Indicator provides a more holistic framework through which economic, social, and environmental changes are aggregated into a monetary value that can be directly compared with Gross Domestic Product in order to assess social progress. Comparing changes across the three categories can highlight trade-offs between environmental, social, and economic goals. Likewise, observing Genuine Progress Indicator trends over time can provide insight into the true progress and sustainability of the state.

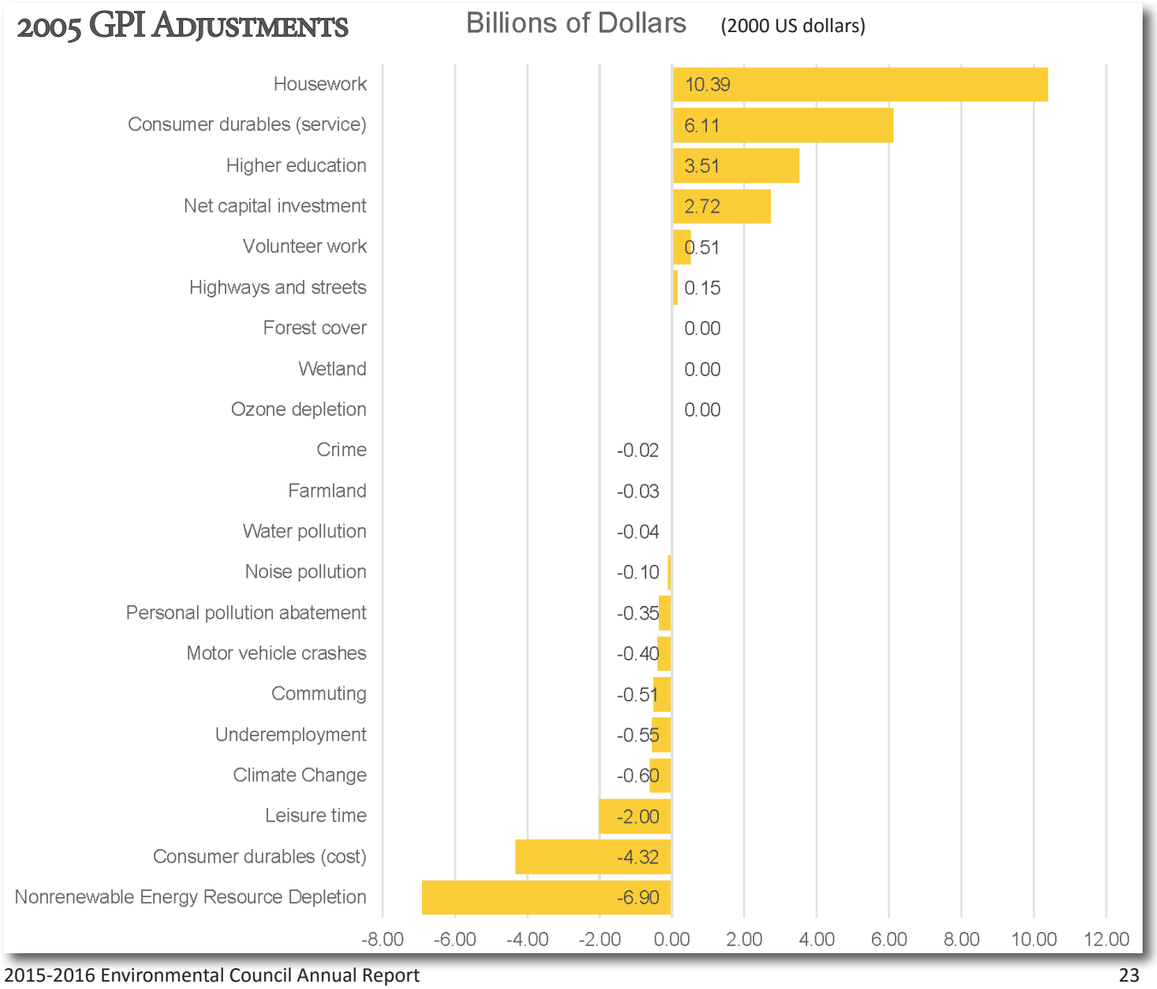
In some ways, the Genuine Progress Indicator process itself is more important than the final number, as a better-integrated approach can help lead to better-informed decisions.

Moving forward, the authors will continue to lead the effort to customize the Genuine Progress Indicator to Hawai'i and integrate it, as appropriate, into the *Aloha+ Challenge*.

Estimated Trend Line Comparing Gross State Product (GSP) to GPI



2005 GPI Adjustments



CONCLUSION

Given the comprehensive nature of the State Environmental Policy and the difficulty of measuring the progress of each of these guidelines and their subcomponents, the Environmental Council decided to develop the Genuine Progress Indicator as a high-level indicator that directly engaged the underlying issue of our environmental stewardship.

While the Environmental Council was developing the Genuine Progress Indicator, others began to develop approaches with measurable targets for pursuing sustainability in Hawai'i and serving as a model to others throughout the world.

Hawai'i Green Growth began leading the *Aloha+ Challenge* Dashboard collaboration to more effectively communicate progress on statewide goals to Hawai'i decision makers and the public in a transparent and interactive format through its online data dashboard.

The Environmental Council and Office of Environmental Quality Control have partnered with Hawai'i Green Growth to integrate the Genuine Progress Indicator into the *Aloha+ Challenge* while looking to the *Aloha+ Challenge's* six goals as a primary vehicle to monitor progress towards Hawai'i's environmental goals.

In 2016, the Environmental Council, Office of Environmental Quality Control, and Hawai'i Green Growth will continue to move this collaboration forward. In some ways, the Genuine Progress Indicator process itself is more important than the final number, as a better-integrated approach can help lead to better-informed decisions.

The continued development of the Genuine Progress Indicator will assist the Environmental Council with monitoring progress, while the completion of the *Aloha+ Challenge* indicators will assist the Environmental Council with making recommendations for improvement.

More importantly, we hope that by introducing the Genuine Progress Indicator to Hawai'i, we can stimulate and contribute to a discussion of what good governance could look like. Moreover, we hope that:

- Important parts of life like family time will receive as much weight as jobs when touting the health of our economy.
- Our government will devote as many resources to monitoring these factors and improving them as it currently does to monitoring its key Gross Domestic Product indicators.
- Agencies tasked with these missions have the expertise and resources to collect valid data consistently over time and the political and social support to take steps to improve these factors.

Finally, we hope that our Gross Domestic Product and Genuine Progress Indicator will converge so that we can proclaim ourselves to be a healthy society, living in a healthy environment, and creating a healthy economy.

APPENDIX 1: SELECTED ISSUES EXAMINED IN 2015 & 2016

This section presents selected issues the Environmental Council examined during 2015: climate change, aquarium fish collecting and coral reef health, water quality, exemption list updates, and high bacteria levels in streams.

Climate Change Impacts

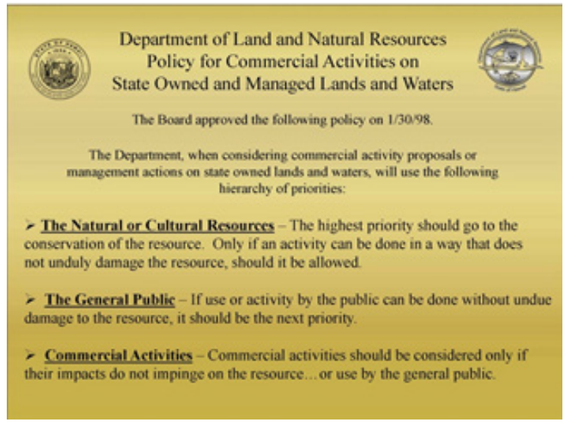
A decade ago, climate scientists from University of California at Santa Cruz predicted that reduced sea ice in the Arctic Ocean would cause changes to atmospheric conditions over the Pacific Ocean, and would lead to unprecedented drought conditions in America's western states.[1] In 2014 and 2015, that phenomenon manifested itself in what is referred to as the "ridiculously persistent ridge," which in turn created the atmospheric conditions that led to the severe drought in California.[2] It can be difficult to assign a direct causal relationship between climate change and severe weather events. But data compiled by the National Snow and Ice Data Center show that arctic sea ice extent has progressively diminished over the past two and a half decades, to record low levels today.[3]

The onset of El Niño in 2015 (perhaps the most powerful El Niño on record[4]) provided much-needed relief to the California drought, but also caused the onset of severe drought conditions in Hawai'i.[5] El Niño also created a record-breaking hurricane season in the Pacific Ocean.[6] In Hawai'i, we were somehow spared from a direct hit. With an expectation that climate change will bring increasingly strong El Niño events,[7] the chances of a hurricane making landfall in Hawai'i can be likened to a ticking time bomb. The fact that Hurricanes 'Iwa and 'Iniki both occurred during El Niño events is a chilling reminder of how lucky we were during the 2015 hurricane season.

Finance and Climate Change

On a global scale, businesses are learning that equities valuation and environmental performance go hand in hand. One report by the Blackrock Investment Institute shows that companies who have reduced their carbon intensities the most have outperformed their peers in the stock market in recent years.[8] There is a growing concern among investors around the world that fossil fuel assets may become "stranded" as changing climate policy is expected to limit consumption of fossil fuels.[9] Recognizing this risk, in 2015 UH joined a growing number of institutions to divest its endowment fund from fossil fuel assets.[10] Also this year, Hawai'i became the first state in the nation to commit to 100 percent renewable energy by 2045.[11]

1 Disappearing Arctic Sea Ice Reduces Available Water in the American West. Geophysical Research Letters, March 24, 2004.
2 Climatologist Who Predicted California Drought 10 Years Ago Says It May Soon Be 'Even More Dire.' Climate Progress, March 7, 2014.
3 February Continues Streak of Record Low Arctic Sea Ice Extent. National Snow and Ice Data Center, March 2, 2016.
4 El Nino Could Be The Most Powerful On Record, Scientists Say. Los Angeles Times, November 17, 2015.
5 El Nino Leads To Return of Severe Drought Conditions in Hawaii. Honolulu Star-Advertiser, March 3, 2016.
6 End of 2015 Hurricane Season. EarthSky, December 7, 2015.
7 Study Strengthens Link Between El Nino and Climate Change. Scientific American, January 4, 2013.
8 The Price of Climate Change: Global Warming's Impact on Portfolios. BlackRock Investment Institute, October 2015.
9 "Stranded Assets": Will Efforts to Counter Warming Render Energy Reserves Useless? The Washington Post, December 5, 2014.
10 Board of Regents Approves Fossil Fuel Divestment. University of Hawai'i Press Release, May 21, 2015.
11 Governor Signs Bill Setting Hawaii's Renewable Energy Goal at 100%. Pacific Business News, June 8, 2015.




Yellow tang.

Aquarium Fish Collecting and Coral Reef Health

The Environmental Council's September 17, 2015 Strategic Planning meeting included a panel presentation on Hawai'i's commercial aquarium fisheries program and is summarized below.

U.S. consumer demand for tropical reef fish like Hawai'i's yellow tang and other species popular with aquarium hobbyists is degrading Hawai'i's fish assemblages and coral reefs. The demand is significant: of the more than 1,800 species found in the global marine aquarium trade, Hawai'i's yellow tang ranks among the top three. In addition, the volume of fish captured makes Hawai'i the world's third largest source of marine life for U.S. hobby aquariums. Studies reveal the substantial impacts of this trade to coral reef environments. On O'ahu, where the trade began in the 1950s, heavily targeted species are depleted by 90%. In the areas where they are captured on Hawai'i Island, yellow tangs are depleted by 60% to 80%, while other once-common species are now rare.

Changes over the years are readily apparent to long-time divers and snorkelers of Hawai'i's reefs, especially in West Hawai'i where reported catch of yellow tangs, for example, increased six-fold in the 1980s and in the last decade has averaged 14 times higher than it was 35 years ago. Also noticeably missing are a number of Hawai'i's charismatic and endemic species, such as the Hawaiian turkeyfish and bandit angelfish.


Yellow tangs cleaning a turtle.

Management efforts to protect fish populations have had limited success: yellow tangs have increased inside the no-take areas established in 2000, but the areas open to the trade (representing 65% of West Hawai'i's coast) have fewer yellow tangs than they did before the area closures. In addition, heavily targeted species have failed to respond to the no-take areas and now have populations that are depleted further overall.

The aquarium trade's heavy focus on herbivores, the algae-eating fishes such as yellow tang and kole, is especially problematic. Herbivores are essential for maintaining the balance between coral and algae. They play a crucial role in reef recovery from and resilience to stressors, especially those resulting from climate change and ocean acidification.

An unprecedented and lethal coral bleaching event is currently impacting Hawai'i's reefs statewide. Triggered by rising temperatures in late summer, this bleaching event has somewhat abated with cooler winter waters, but the dramatic effects to Hawai'i's reefs will last for years to come. The ability, extent and timing of reef recovery from this event will largely depend on whether there are enough herbivores to prevent overgrowth of algae. Given the numerous studies showing years of herbivore depletion and a shift to algae dominance on reefs across the state, there is an urgent need to increase their populations.

The State Department of Land and Natural Resources annually approves hundreds of commercial permits for taking near limitless numbers of reef fish and other creatures for aquarium purposes. State Department of Land and Natural Resources has never engaged in environmental review of this program, though the permitting of this commercial activity on state submerged lands and compliance with the Hawai'i environmental review process has been in question since at least 1977, several years after Hawai'i Revised Statutes (HRS) Chapter 343 was enacted. The Department of Land and Natural Resources has, however, reviewed a number of Special Activity Permits that allow very limited take of reef fish for public and large display aquariums, and in each case, issued a HRS Chapter 343 exemption determination.


Hawaiian turkeyfish.


Bandit angelfish.

It is perplexing that the Department of Land and Natural Resources screens Special Activity Permits under HRS Chapter 343 even though, arguably, they have little impact on the resource, but gives no HRS Chapter 343 review to commercial permits that allow a level of take that is orders of magnitude higher and has been shown to degrade and threaten reef environments. Permitting commercial activities that damage or negatively impact natural resources is also contrary to State Department of Land and Natural Resources' own hierarchy of priorities that places conservation before commercial activities (top left, facing page).

Based on the presentation, the Environmental Council voted to make a recommendation to the Department of Land and Natural Resources in response to the unprecedented coral bleaching currently occurring on the state's reefs. The recommendation was that the Department of Land and Natural Resources consider a temporary moratorium on commercial collection of marine life under that program. Given the controversial nature of the practice, the Council likely will continue to monitor this topic.

In consideration of public concerns and the Environmental Council recommendation, the Department of Land and Natural Resources announced that it would develop a comprehensive coral bleaching recovery plan for near-shore water due to mass coral bleaching.

The Department of Land and Natural Resources stated that such a coral reef management plan is a top priority for the department. The issue of HRS Chapter 343 is currently under court review.

In February 2016, the Department of Land and Natural Resources, Division of Aquatic Resources launched an initiative to identify effective management actions to promote bleaching recovery and enhance the resilience of the state's coral reefs.

An online survey solicited input of a global group of coral reef scientists and managers with research and management experience relevant to coral bleaching and recovery.

The survey consisted of 22 possible management actions to promote coral reef recovery and resilience following a bleaching event.

The respondents rated the ecological effectiveness of these actions from 'very effective' to 'not effective' using a five-point weighted Likert scale. Respondents also provided other management recommendations that would promote post-bleaching coral recovery and resilience.

The survey was sent to 176 coral bleaching experts from 20 countries around the world. The survey received 82 complete responses (47%). The majority of respondents were scientists (78%) with more than 10 publications in the field and more than 10 years of experience. Effectiveness scores were created for each of the 22 management strategies using the weighted answers. Survey respondents ranked reducing sediment stress and nutrient stress to coral reefs as the two most ecologically effective management interventions to accelerate coral recovery following a bleaching event. The third most-effective was increasing enforcement of state rules related to protecting coral reefs. The establishment of permanent, no-take Marine Protected Areas and areas specifically protecting herbivorous fishes, or Herbivore Fishery Management Areas were also among the top five strategies. For example, West Hawai'i Marine Protected Area has closed about 35% of West Hawai'i's coastline to aquarium fishing.

Additional questions revealed that most respondents thought no-take Marine Protected Areas should make up 21-30% of reef habitats and that Herbivore Fishery Management Areas should make up more than 30% of reef habitats. Related to protecting herbivores, coral bleaching experts believed that protecting parrotfishes (*Scaridae*) and surgeonfishes (*Acanthuridae*) would be most ecologically effective.

Following the survey, a workshop of Hawai'i-based scientists and managers was convened in August 2016 to prioritize management strategies to promote coral recovery following the 2014-2015 coral bleaching event. Once finalized, the Coral Bleaching Recovery Plan will be one component of the Statewide Aquatic Resources Management Plan that the Division of Aquatic Resources is planning to support the Governor's Sustainable Hawai'i Initiative commitment to effectively manage 30% of Hawai'i's nearshore waters by 2030.

Water Quality

Since the passage of the Clean Water Act in 1972, significant progress has been made in mitigating environmental and public health impacts from point source discharges, such as those involving disposal of treated wastewater effluent. This is primarily the result of eliminating most wastewater treatment plant discharges to streams, bays and nearshore waters. The frequency and volume of sewage spills have also been reduced by upgrades to sewer systems. These upgrades are largely the result of enforcement actions by regulators and citizen lawsuits.

Significant water quality problems, particularly after major storm events, unfortunately continue to be a significant environmental concern largely due to non-point source pollution. Discharge of sediments, trash, pesticides and herbicides, nutrients from fertilizers and livestock wastes, and other detrimental constituents into inland and nearshore waters though stormwater runoff is a major unresolved environmental challenge. Problems persist despite many regulations and programs developed to address non-point source pollution.

Limited funds and manpower for natural resource management and water pollution control is a key obstacle. Well-vetted and clearly defined priorities must be established to select the most appropriate environmental protection measures and maximize their effectiveness. With so many pressing environmental challenges, Hawai'i is at a crossroads.

Reducing non-point source pollution would be congruent with other desirable natural resource management actions. For example, improving nearshore water quality would work in concert with other actions to reduce stress on sensitive coral reef resources, such as upgrading regulation of commercial aquarium fish collection. Controlling feral pigs and goats in the upper watershed will help reduce soil erosion and sediments in stormwater runoff. Effective watershed erosion control is dependent on maintaining healthy growth of desirable vegetation. Directing resources to control invasive species and plant disease will help promote this. With respect to sustainable food production, assisting farmers in controlling fertilizer and herbicide/pesticide use and reducing agricultural soil loss would contribute to sizable reductions in non-point source pollution. In evaluating resource management and environmental protection needs and costs, the effectiveness and benefits of meeting multiple objectives should be considered in the assessment.

Exemption Lists

Over the past two years, the Exemption Committee continued to work to ensure that all applicable agencies, both State and county, have an exemption list. These lists identify actions that an agency may take that do not have a significant impact on the environment, and are, therefore, exempt from preparing an Environmental Assessment. The lists are proposed by each agency, reviewed by the Exemption Committee, and must be concurred to by the Environmental Council.

With a concurred list, agencies can be confident that they can move forward with minimal concern that a project consistent with the list would be challenged on environmental grounds. The process is also beneficial to the public because it includes the opportunity for public comment on any proposed list by way of a required 30-day comment period that is announced in *The Environmental Notice*.

As a result of the initiative by the Exemption Committee, major agencies have recently updated their lists, notably the State Department of Land and Natural Resources and the Department of Hawaiian Home Lands. The Department of Land and Natural Resources, in particular, underwent a comprehensive analysis of all of its divisions to develop a list applicable across the department, yet sensitive to the specifics of individual divisions. Lists have also been adopted or updated by county agencies in Hawai'i, Kaua'i, Maui, and Honolulu.

Public Education/Notification for High Bacteria Levels in Streams

Based on concerns expressed by the Surfrider Foundation, the Environmental Council's Information and Outreach (I&O) Committee spent much of 2016 researching and discussing the issue of educating and notifying the public on potential health hazards associated with high bacteria levels in Hawai'i's streams and nearshore waters. Pertinent findings and conclusions include the following:

- In tropical climates, water quality indicator bacteria such as Enterococci are naturally occurring in soils and decaying matter, and are not always associated with human waste contamination.
- While high bacteria levels are typically high in "brown water" caused by stormwater runoff, some streams with clear waters have chronically high bacteria levels during normal dry weather conditions.
- The State Department of Health, in cooperation with the Surfrider Foundation and the EPA, has made good progress in resolving issues related to posting of water quality warning signs in areas with chronically high bacteria levels, and informing the public of brown water conditions and potential health hazards.
- It would be helpful to inform visitors that high bacteria levels may be present in streams and nearshore waters due to Hawai'i's warm climate, and that those with open wounds and sores or compromised immune systems should stay out of the water. This information could be included on websites and with other sources of information that warn visitors of local safety hazards such as high waves and strong currents.

APPENDIX 2: OEQC PUBLICATION DATA 2015-2016

Overview

	2015	2016	Total
Unique Actions	116	137	**253**
Actions Published	166	201	**367**

An action (a project or a program) may be published in *The Environmental Notice* multiple times as it moves through environmental review, (e.g. draft and final EA). The table on the right is a breakdown of actions published that were proposed by government agencies. The table below is a breakdown of actions that were proposed by private applicants to the agencies listed.

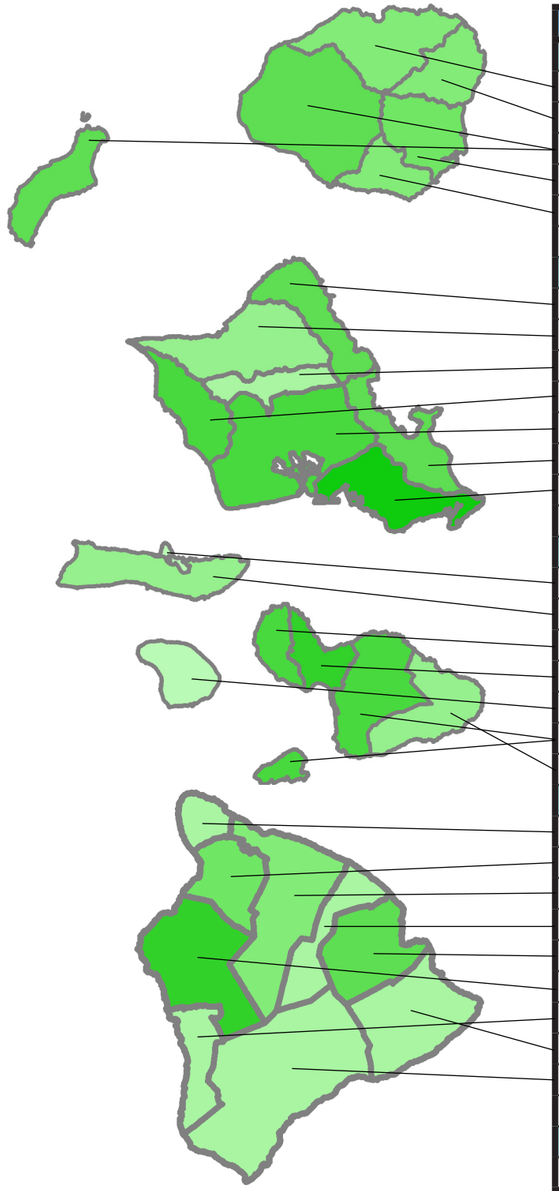
Applicant Action Publication

Approving Agency	#
Hawai'i County	**6**
Department of Water Supply	2
Planning Department	4
City and County of Honolulu	**30**
Board of Water Supply	1
Department of Community Services	3
Department of Planning and Permitting	26
Kaua'i County	**2**
Planning Department	2
Maui County	**21**
Department of Housing and Human Concerns	8
Department of Water Supply	2
Planning Department	11
State	**86**
Department of Agriculture	2
Department of Business, Economic Development, and Tourism	27
Department of Hawaiian Home Lands	6
Department of Health	2
Department of Land and Natural Resources	42
Department of Transportation	4
Department of Land and Natural Resources	1
Hawai'i Housing Finance and Development Corporation	2
Grand Total	**145**

Agency Action Publication

Proposing Agency	#
Hawai'i County	**25**
Mass Transit Agency	2
Department of Water Supply	3
Department of Public Works	5
Department of Parks and Recreation	10
Department of Environmental Management	5
City and County of Honolulu	**35**
Department of Environmental Services	3
Department of Design and Construction	23
Board of Water Supply	9
Kaua'i County	**16**
Office of the Mayor	2
Housing Agency	4
Department of Water	4
Department of Public Works	6
Maui County	**20**
Police Department	4
Department of Water Supply	3
Department of Public Works	9
Department of Environmental Management	4
State	**126**
University of Hawai'i	9
Hawai'i Public Housing Authority	1
Department of Transportation	15
Department of Land and Natural Resources	46
Department of Health	1
Department of Hawaiian Home Lands	14
Department of Education	20
Department of Business, Economic Development, and Tourism	10
Department of Agriculture	5
Department of Accounting and General Services	5
Grand Total	**222**

Environmental Notice Publications by Judicial District



District	DEA	FEA	EISPN	DEIS	FEIS	Other	Total
Kaua'i	**23**	**19**	**3**	**3**		**3**	**51**
Hanalei	4	2	1	1			8
Kawaihau	5	3		1			9
Waimea	5	6				2	13
Līhu'e	5	4				1	10
Kōloa	3	3	1	1			8
(Multiple)	1	1	1				3
O'ahu	**66**	**63**	**7**	**9**	**5**	**8**	**158**
Ko'olauloa	6	3		2	1	1	13
Waialua	2	2	1			1	6
Wahiawā		1		1	1		3
Wai'anae	8	9		1	1		19
'Ewa	7	8		1		1	17
Ko'olaupoko	5	4	2	1		1	13
Honolulu	37	35	3	3	2	4	84
(Multiple)	1	1	1				3
Maui	**36**	**30**	**4**	**1**	**1**	**7**	**79**
Kalawao	1						1
Moloka'i	5	2					7
Lahaina	5	6	1		1	4	17
Wailuku	11	12	2	1		2	28
Lāna'i	1	1					2
Makawao	10	7				1	18
Hāna	3	2	1				6
Hawaii	**40**	**33**	**1**			**4**	**78**
North Kohala	2	1					3
South Kohala	5	4				1	10
Hāmākua	4	4	1				9
North Hilo	2	2					4
South Hilo	8	7					15
North Kona	11	12				2	25
South Kona	1	1				1	3
Puna	2	1					3
Ka'ū	3	1					4
(Multiple)	2						2
Statewide			**1**				**1**
Grand Total	**165**	**145**	**16**	**13**	**6**	**24**	**367**

Glossary

Draft/Final Environmental Assessments (DEAs/FEAs) are required when an action triggers environmental review per HRS 343 to determine whether the action's environmental impact will be significant.

Environmental Impact Statement Preparation Notices (EISPNs) are filed if the proposed action may have a significant impact on the environment and to notify the public that an EIS is being prepared.

Draft/Final Environmental Impact Statements (DEISs/FEISs) explain the environmental consequences of an action, including direct, indirect, and cumulative impacts and their mitigation measures.

Other actions include Acceptance and Supplemental determinations (whereby EISs are deemed acceptable or require supplemental information); Exemptions (whereby actions are exempted from environmental review); and Withdrawals (whereby actions are withdrawn).

Find publications, guidance, rules, and council information at health.hawaii.gov/oeqc/.

APPENDIX 3: ENVIRONMENTAL QUALITY CONTROL

The Environmental Council

The Environmental Council is responsible under the law for representing the public on issues concerning "ecology and environmental quality." The Environmental Council consists of 15 dedicated and conscientious volunteers who are appointed by the Governor and confirmed by the Hawai'i State Legislature. Membership on the Environmental Council is "a broad and balanced representation of educational, business, and environmentally pertinent disciplines and professions, such as the natural and social sciences, the humanities, architecture, engineering, environmental consulting, public health, and planning; educational and research institutions with environmental competence; agriculture, real estate, visitor industry, construction, media, and voluntary community and environmental groups." (HRS 341-3 (c))

The Environmental Council holds HRS Chapter 343 rule-making powers, which are compiled as Hawai'i Administrative Rules 11-200 Environmental Impact Statement Rules. It also reviews and provides concurrence on agency exemption lists, which is a compilation of regular activities that an agencies does and has little to no significant effect. The Environmental Council is charged with communicating to the Governor via the Office of Environmental Quality Control Director environmental concerns as well as policy and legislative recommendations.

Environmental Council Committees

The Environmental Council maintains five standing committees for conducting its primary business. Each committee has a chair and at least two other members. For all committees, the Environmental Council delegates a subject or activity to the committee or requests the committee to further investigate a matter.

Annual Report Committee

This committee is responsible for developing the theme and content of the Annual Report. The committee works with the OEQC and volunteers to translate direction from the Environmental Council to complete the report.

Exemptions Committee

This committee works with state and county agencies to review and update exemption lists. When an agency chooses to update its exemption list, the request is sent to the Environmental Council, which in turn delegates the detailed work to this committee.

Information/Outreach Committee

This committee is the primary vehicle for the Council to engage the public on issues of concern and is often tasked with looking into specific environmental issues that the Environmental Council has chosen to pursue.

Legislative Committee

This committee reviews proposed measures at the State Legislature related to Chapters 341, 343, or 344, HRS, or pertaining to environmental quality, and prepares testimony on behalf of the Environmental Council.

Rules Committee

This committee develops proposed changes to HAR Chapter 11-200 or Chapter 11-201.

The Office of Environmental Quality Control

Along with the Environmental Council, the Office of Environmental Quality Control was established in 1970 to help "stimulate, expand and coordinate efforts to maintain the optimum quality of the state's environment." (HRS Section 341-1) The Office of Environmental Quality Control implements HRS Chapter 343, which governs the environmental review process. Office planners review hundreds of environmental disclosure documents and respond to thousands of inquiries each year from both the public and the private sectors. Twice a month, the Office of Environmental Quality Control publishes the Environmental Notice which announces the availability of Environmental Assessments and Environmental Impact Statements undergoing public review. The Office of Environmental Quality Control staff also provides support to the Environmental Council regarding amendments to the administrative rules, exemption lists, and the Council's annual report. The Office of Environmental Quality Control is attached to the Hawai'i Department of Health for administrative purposes.

The Office of Environmental Quality Control Director provides advice and assistance to private industry, government agencies, and community groups regarding HRS Chapter 343. The agency is also empowered by law to conduct research; develop legislative initiatives; do public outreach; and recommend programs for the long-range implementation of environmental quality control.

The Director is an ex-officio voting member of the Advisory Committee on Plants and Animals with the Hawai'i Department of Agriculture, the Hawai'i State Emergency Response Commission with the Hawai'i Department of Health, and the Environmental Council.

At the request of the Governor, the Director of the Office of Environmental Quality Control may also be empowered to coordinate and direct state agencies in matters concerning environmental quality.

APPENDIX 4: ENVIRONMENTAL COUNCIL MEMBERS 2015-2016

Joseph Shacat, Chair

Joseph attended Miami University (Ohio), where he studied philosophy and environmental science. He moved to Hawai'i in 2001, where he earned a M.S. degree in Oceanography and an Executive MBA from the University of Hawai'i Shidler College of Business. He currently works as the Environmental Compliance Manager for Grace Pacific LLC. He has advocated for improving environmental performance in the construction industry through cooperation with government agencies and active engagement with industry associations, including the General Contractors Association of Hawai'i, Associated General Contractors of America, and National Asphalt Pavement Association. Also, Joseph volunteers on the boards of the Hawai'i Yacht Racing Association and the Waikīkī Yacht Club.

Roy Abe

Roy is a life-long Hawai'i resident who attended Kaimukī High School and received a B.S. degree in Civil Engineering from University of Hawai'i. He has a Master's of Science in Civil and Environmental Engineering from the University of California, Berkeley. He is a licensed civil engineer who has completed many challenging wastewater, water and infrastructure projects during a 35-year career as a consulting engineer specializing in sanitary engineering. Roy, who is a Vice President and Senior Project Manager at HDR, Inc., transitioned to part-time retired status in 2015. He continues to be actively involved in the Hawai'i Water Environment Association, the local affiliate of the Water Environment Federation. Roy enjoys talking to anyone about sewers, sewage pump stations, sewage treatment plants and any other topic related to sewage. He is passionate about obtaining the most "bang-for-the-buck" from our precious pollution control dollars by making rational science-based decisions.

Mark Ambler (former member)

Mark served as a member of the Environmental Council from May 2012 until he stepped down in June 2015. He served as its Chair and as Chair of the Information and Outreach Committee. Born and raised in Kailua, Hawai'i, Mark received degrees from 'Iolani High School and the University of Illinois at Urbana-Champaign. Mark's career has been devoted to pursuit of innovative and sustainable environmental engineering. He is a Professional Engineer registered in Hawai'i and a Project Management Professional. These certifications represent a career demonstrating technical and leadership training as well as professional experience. Mark has championed implementation of sustainable concepts, such as Green Roofs and Green and Sustainable remediation in Hawai'i, and has had the opportunity to share those positive examples across the country.

Mary Begier

Mary Begier is principal broker and owner of Mary Begier Realty, with offices both on O'ahu and Hawai'i Island. She is a past president of both the Hawai'i Island Realtors (HIR) and Honolulu Board of Realtors and has 36 years of experience selling real estate across the Hawaiian Islands. She represented HIR on the Big Island Business Council, where she served as president from 2002-2003. She is also a past president of the Rotary Club of Hilo Bay for 2008-09 and the Hawai'i Island Chamber of Commerce 2009-2010. Begier served in the United States Navy, going to schools in Florida and California before being assigned to Honolulu. She served 8 years on The Hawaii State Foundation on Culture and the Arts including one year as chair and has represented Hawai'i Island Chamber of Commerce on the Big Island Housing Foundation board. Begier prides herself in building coalitions between other business and community organizations to strengthen the ability to accomplish smart goals in the community. This brought about recognition from DLNR/HISC as Community Hero for work performed eradicating invasive weeds on Mauna Kea.

Stephanie Dunbar-Co

Steph Dunbar-Co works for The Nature Conservancy, Moloka'i Program. As the East Slope Project Manager, Steph oversees activities in southeastern (Mana'e) Moloka'i where she lives, was raised, and is a fifth generation landowner.

Steph received MS and PhD degrees in Botany from the University of Hawai'i, focusing on the evolution, ecology, and conservation of the native Hawaiian flora. Her education and background have aligned to focus her efforts on the conservation of native ecosystems, long-term fresh water supply, and sustainable agriculture.

She lives with her husband and two young children on her family's ranch in Kainalu, Moloka'i.

Scott Glenn

Scott has served on the Environmental Council since 2011 and serves as Vice Chair of the Council. He served as Chair of the Council in 2013. Scott completed his appointment on June 2015, served as a holdover appointee, and now serves on the Environmental Council *ex officio* as the Office of Environmental Quality Control Director. Prior to coming to the Office of Environmental Quality Control, he worked as an environmental planner in the private sector. He received his Master's Degree in Urban and Regional Planning from the University of Hawai'i in 2009. Scott specializes in asset management, environmental planning and compliance, environmental review, and climate change adaptation planning. Scott has helped create better data and data analysis tools such as the Genuine Progress Indicator as well as enhance the Environmental Council's role in communicating the public's concern about environmental quality to decision makers.

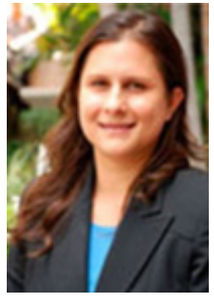
Barbara Maka'ala Ka'aumoana

Barbara "Maka'ala" Ka'aumoana was born in Kāne'ohe, Hawai'i in 1948. Educated throughout the Pacific and California, she pursued careers in both nursing and public school teaching before returning "home" in 1989. Always active in environmental education and conservation organizations and activities, she soon became involved in local projects supporting community management of cultural and environmental resources. In 1999 she was elected by the Hanalei community to head the newly formed Hanalei River Hui. Maka'ala believes in community participation and transparent process and has continued to guide this organization through the founding of the nonprofit, Hanalei Watershed Hui, and the development and implementation of the Hanalei Watershed Action Plan, the Targeted Watershed Initiative project, the Hanalei Makai Watch Program, Hanalei Watershed Management Plan, and the Hanalei to Hā'ena Disaster Resilience Plan. Maka'ala and her husband, a native Hawaiian, live on the north shore of Kaua'i, have a small banana farm, and enjoy fishing and family time.

Paulette Ka‘anohiokalani Kaleikini

Paulette Ka‘anohiokalani Kaleikini serves as a Lead Cultural Resource Monitor & Manager and Native Hawaiian Cultural Advisor. Ms. Kaleikini has years of experience with Environmental Assessments and Environmental Impact Statements, including Archaeological Monitoring Plans, Archaeological Inventory Surveys, Archaeological Data Recovery Plans, Burial Treatment Plans, and Cultural Impact Assessments, in line with Section 106 of the National Historic Preservation Act and Native American Grave Protection and Repatriation Act.

Koalani Kaulukukui (former member)



Koalani was raised on Hawai‘i Island and then attended Kamehameha Schools, Kapālama Campus. She received her B.A. from the University of Hawai‘i Environmental Center. She earned a Juris Doctorate and Certificate in Environmental Law from the William S. Richardson School of Law in 2006. She has worked as an associate attorney for Earthjustice and as a policy advocate for the Office of Hawaiian Affairs. She was Counsel for Environmental Law and Native Rights at the Office of Hawaiian Affairs. As a member of the Environmental Council, Koa helped shape environmental policy for a robust future for our keiki without compromising the cultural and natural resources of our islands.

Ian Robin Kaye

In 1974, Robin and his wife moved to Lāna‘i to document a threatened lifestyle as the island was facing a transition from a pineapple plantation economy to resort development. As a result of that effort, he published a photographic documentary called *Lanai Folks*. Shortly thereafter, Robin began a career in the arts and nonprofit sectors, working for the Hawai‘i State Foundation on Culture and the Arts, the California Arts Council, the Pennsylvania Council on the Arts, and the Pittsburgh Cultural Trust. In 1992, he and a partner launched the management consulting firm of Dewey & Kaye, Inc. (DKI), which worked with nonprofit organizations, foundations and government agencies. Robin's work with nonprofits involved board development, long range planning, and executive searches for foundation program staff and nonprofit executive directors. Robin was one of the original founders of the Lanai Limu Restoration Project, and currently serves as spokesperson for Friends of Lana‘i. Robin recently co-created Lāna‘i Changes, a community development corporation dedicated to providing diversity in Lāna‘i’s economic future.

Theresita Balmores Kinnaman

Theresita's interest and service for the Council is due to her upbringing, during territorial and plantation days, when the environment and natural resources were fresh, plentiful, clean, and life was simple, fun, honest and about how we cared for the island's land, ocean, streams, natural resources and not deplete these life sustaining resources. Today, with development of once open lands and spaces, land-based activities are straining the environment and natural resources. Her involvement in community service has spanned 30 plus years advocating for community needs pertaining to environmental, archeology, and natural resources, among other concerns; all that our sense of place, and identity to hopefully recharge and preserve for future generations to a highly sustainable level.

Robert Parsons

Appointed in May 2015, Rob is in his 11th year of serving as Maui County Environmental Coordinator, a position first created by Mayor Alan Arakawa. He serves as liaison to county, state, and federal agencies and many non-profit conservation organizations, including watershed partnerships and Maui Invasive Species Committee. He also is the ad hoc Sustainability Liaison and is part of the Hawai‘i Green Growth Core and Measures Teams, supporting the goals of the *Aloha+ Challenge*. Rob is a well-known free-lance writer and environmental advocate, with over 180 articles published since 2007. He is a 35-year Hawai‘i resident, originally from the Midwest, as is his wife Heather. “I feel it is essential to learn as much as I can about issues that affect us all, and share that information so people can make informed decisions as part of establishing a future with the ability to sustain ourselves and the multitude of other living species with whom we share this fragile planet.” Rob also chairs the Environmental Council Annual Report Committee.

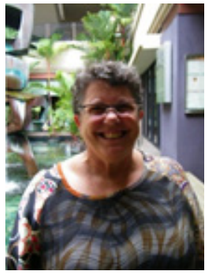
Charles Prentiss

Chuck is a former city manager and retired city planner with the City and County of Honolulu. He holds degrees in economics, planning, and government management. He is a former Executive Secretary of the Honolulu City Planning Commission, a Vietnam veteran pilot, and a retired Lieutenant Colonel of the Hawai‘i National Guard. Chuck is also President of Hawai‘i’s Thousand Friends and Chairperson of the Kailua Neighborhood Board. Chuck possesses a strong belief in citizen participation in government. For him, “participation aids in government openness and honesty, and provides a countervailing force to special interests in government decisions. In Hawai‘i, the environment is our economy.”

John Richards (former member)

John was born and raised on a cattle ranch on Hawai‘i Island. John has lived in different parts of the world for both schooling and military service, which lent him a unique perspective on sustainable land and resources use. As the sixth generation of his family here, John has a desire to see the islands thrive: “The Council offers the opportunity to help the systems that protect the islands. A careful balance must be found to ensure business has what it needs to function well, while protecting the spirit, lands and people of Hawai‘i. Laws and their application can either make us greater or limit our potential. The Council has the opportunity to facilitate the former.”

Mary Steiner (former member)



Mary served in a variety of roles on the Environmental Council, including as Chair. Having spent almost 20 years as CEO of The Outdoor Circle, Mary has been the policy advocate for the Hawaiian Humane Society. She has also acted as the Hawai‘i Campaign Manager for the non-profit Compassion and Choices, an organization that works to improve care and expand choice at the end of life. Mary helped to obtain proper staffing levels and funding for the OEQC and demystify the environmental review process so that the grassroots, project proponents and developers alike are able to understand the procedures. Mary strongly believes that a strong economy goes hand-in-hand with a healthy environment. The Environmental Council bid aloha and mahalo to Mary when she completed her term on the Environmental Council at the end of June 2015 after eight years of service.

Ron Terry

Ron Terry is a graduate of University of Hawai'i Hilo and has a PhD from Louisiana State University. After five years as a professor of Geography at University of Hawai'i Hilo, he started Geometrician Associates in 1992. He has worked solely or teamed with others to prepare nearly 500 environmental assessments, environmental impact statements, and biological reports for projects throughout the Hawaiian Islands. Clients include many federal, state and county agencies as well as private sector firms. He has served on three State boards and several non-profits. Married with two grown daughters, he also surfs, kayaks, travels, and plays senior softball.

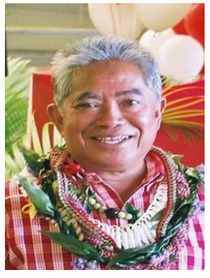
Glenn Teves (former member)

Glenn has been a County Extension Agent for the University of Hawai'i College of Tropical Agriculture and Human Resources on Moloka'i for the last 35 years. He also serves on the University of Hawai'i Professional Assembly Collective Bargaining Committee and Moloka'i Community Services Council, and has served as a member of the Department of Land and Natural Resources Molokai Water Working Group and the 2001 and 2015 Molokai Community Plan Advisory Committee. He is actively involved in Hawaiian Homes, agriculture, water, and land use issues on Moloka'i. He is a Hawaiian Homestead farmer in Ho'olehua and grows apple banana, taro, and other vegetables for the local market. "What makes Hawai'i special are its unique environment, and especially its island communities. These are inextricably connected, and we must preserve both equally. This only comes through deliberate and diligent planning."

Puananionaona Thoene

Puananionaona P. Thoene was born on O'ahu and raised in Hilo. She is a graduate of the Kamehameha Schools, Kapālama Campus. Onaona received her J.D., magna cum laude, from the University of Hawai'i at Mānoa, William S. Richardson School of Law with certificates in environmental law and native Hawaiian law, and a B.B.A., cum laude, from the University of San Diego. Onaona is a fourth year associate at Carlsmith Ball LLP in the Honolulu office. Her practice focuses on real property, environmental, business and corporate law, land use, and administrative law. She is also a member of the O'ahu Island Advisory Council for the Hawaiian Islands Land Trust.

Mike Tulang



Mike entered the federal service in 1967 with U.S. Department of Agriculture, National Resource Services, serving in a variety of responsibilities. He was a Watershed Planning Economist, District Conservationist, Resource Conservation, and Developer Coordinator for Maui County, Hawai'i County and the State of Hawai'i. He retired after 31 ½ years of federal service and accepted an executive position with the State Association of Conservation Districts for 7 years. He then went on to serve for 2 years as a councilman on the Hawai'i County Council, followed by 3 years of substitute teaching at his former elementary school. He has served his community as Director of the Boys and Girls Club and the Hawai'i Agricultural Cooperative, as a Board Member of HIWEDO, and as a Certified Trainer at Positive Coaching. His hobbies include fishing, hunting, cattle ranching, and singing.

N. Mahina Tuteur

Mahina Tuteur is currently a Post-Juris Doctor Fellow at the Ka Huli Ao Center for Excellence in Native Hawaiian Law. Raised on the windward side of O'ahu, she graduated from the William S. Richardson School of Law in 2014 with certificates in Environmental and Native Hawaiian Law. She has worked on policy advocacy and natural resource management issues for various non-profit and government agencies, and has also worked in state and federal courts.

Jessica Wooley (former member and OEQC Director)

Jessica served as Director for the Office of Environmental Quality Control and an *ex officio* member of the Environmental Council. Before, she was the State Representative for District 48 (Windward O'ahu), and served as Chair of the Committee on Agriculture in the State House. She was elected in 2008, after 5 years working closely with community and family organizations and raising her two children. Wooley graduated with a Bachelor of Arts in Economics from the University of California, Santa Cruz, and received her Master's of Science in Agricultural and Resource Economics and her Juris Doctorate from the University of California at Berkeley. Throughout her personal academic and professional career, she has maintained a consistent focus on the connections between the environment and the economy, including issues relating to agriculture, land use, poverty, and water resources. Jessica completed her position as Office of Environmental Quality Control Director and Environmental Council member at the end of October 2015.

APPENDIX 5: OFFICE OF ENVIRONMENTAL QUALITY CONTROL STAFF

Scott Glenn, Director

Scott has served on the Environmental Council since 2011 and serves as Vice Chair of the Council. He served as Chair of the Council in 2013. Scott completed his appointment on June 2015, served as a holdover appointee, and now serves on the Environmental Council *ex officio* as the Office of Environmental Quality Control Director. Prior to coming to the Office of Environmental Quality Control, he worked as an environmental planner in the private sector. He received his Master's Degree in Urban and Regional Planning from the University of Hawai'i in 2009. Scott specializes in asset management, environmental planning and compliance, environmental review, and climate change adaptation planning. Scott has helped create better data and data analysis tools such as the Genuine Progress Indicator as well as enhance the Environmental Council's role in communicating the public's concern about environmental quality to decision makers.

Thomas Eisen

Truthfully a geographer, Tom Eisen has been engaged with Hawai'i's planning community for over 25 years. Presently serving as the senior planner in the Office of Environmental Quality Control, Tom also has natural resource planning experience with the Coastal Zone Management Program and the Office of Conservation and Coastal Lands. His planning perspective has been broadened by employment with two county planning departments, as well as working as a sole proprietor consultant and with a large local planning firm. Preferring to surf and practice yoga in his free time, Tom has also been a Neighborhood Board & Community Garden Board member, volunteered as a docent at the Waikīkī Aquarium, and built yurts, permaculture gardens and photovoltaic systems.

Charlotte K. Needham

Charlotte K. Needham, known as "Coco," is of Native Hawaiian descent and is passionate about issues involving the education of Native Hawaiian youths who will be the future leaders of Hawai'i. Raised in the place of her ancestors, Coco has a very strong sense of connection to place, community, and family. She currently serves as Vice President of the Maunalaha Valley Community Association (MVCA). During her tenure as President (1998–2004), the MVCA, together with the UH Center for Hawaiian Studies and the Papakōlea Community Association, received a grant from the US Department of Housing and Urban Development (2001). Also while MVCA President, she helped form the Makiki Watershed Partnership with DLNR Forestry and Wildlife and the Hawai'i Nature Center. To further serve the community, she helped to form Na Mamo o Makiki, a nonprofit 501(c)3 community land trust, where she also serves as Vice President. She established Maunalaha Church, a Native Hawaiian church. She also previously served on the United Church of Christ, Association of Hawaiian Evangelical Churches as a partnership ministry representative.

Leslie Segundo

After completing a baccalaureate in chemistry, Leslie Segundo worked with the Solid and Hazardous Waste Branch of the Department of Health for several years before transferring in 1991 to the Office of Environmental Quality Control. He continues to provide professional support for the Environmental Council and assists in the day-to-day operations of the Office.

Zachary Stoddard

Zack earned a BA in International Political Economy from the University of Puget Sound in Tacoma, Washington and a Master's of Public Administration from the University of Colorado, Denver. He taught English as a second language in Taiwan and Colombia and served as a human resource professional for the City of Philadelphia Law Department before moving to Honolulu. Zack joined the OEQC in 2016 after working at the State Department of Labor and Industrial Relations, Research and Statistics Office. He is on the Nu'uanu/Punchbowl Neighborhood Board and is particularly interested in government processes as they relate to sustainability, social well-being, and quality of life.

APPENDIX 6: AQUARIUM FISH COLLECTING AND CORAL REEFS CORRESPONDENCE

DAVID Y. IGE

GOVERNOR OF HAWAII

JESSICA E. WOOLEY

DIRECTOR

STATE OF HAWAI'I
OFFICE OF ENVIRONMENTAL QUALITY CONTROL
Department of Health
235 South Beretania Street, Suite 702
Honolulu, Hawai'i 96813
Telephone (808) 586-4185
Facsimile (808) 586-4186
Email: oeqchawaii@doh.hawaii.gov

File No.

OEQC 15-101
DLNR-Commercial Aquarium

October 19, 2015

The Honorable Suzanne Case, Chairperson
Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813

SUBJECT: Commercial Aquarium Fish Collection Activities

Aloha Chair Case:

I would like to share with you new information, data, and critical issues that have come to my attention so that you can better make decisions on issues relating to activities that take place in our nearshore waters.

Evidence shows that Hawai`i is experiencing dramatic changes as the effects of climate change have begun to take their toll, i.e., record high temperatures, ocean acidification, and massive coral bleaching events. The changes in our nearshore waters in particular effects our economy, the environment and our future. The science and data now also show significant negative effects from nearshore commercial aquarium fishing throughout much of the Hawaiian Islands and the importance of protecting areas, at least for a period of time, to allow fish populations to recover. The urgency of this issue is increasing as scientific evidence has shown that the effects of coral bleaching can be ameliorated when there are robust herbivore reef fish populations.

Attached are several figures among many that were recently presented to the Environmental Council by several organizations. The figures show not only the dramatic decline of many critical Hawaiian nearshore reef fish that are captured in the wild by permittees in the commercial aquarium fishing market, but also that reef fish can return to robust numbers in a short period of time if given the opportunity to recover.

This data has been corroborated time and time again by fisherman and nearshore area residents, not to mention the daily news — many argue our reefs and reef fish are in desperate need of applying a precautionary approach to activities, particularly commercial activities that may negatively affect our environment. In addition, there are now opportunities cropping up that will allow people to create sustainable aquarium fish industries using new techniques to raise and hatch fish. These new business opportunities can replace the practice of taking wild animals out of the wild (to send them to far away confined aquarium tanks in a process where only some survive), similar to many aquaculture ventures that are humane to the fish as well as helpful (not harmful) to our fragile ecosystems.

Given the immediacy of the crisis facing our nearshore waters due to unprecedented and ongoing coral bleaching and the detrimental effects of commercial aquarium fishing, specifically the removal of critical herbivore populations, the Office of Environmental Quality Control urges DLNR's immediate issuance of a moratorium, for at least 180 days, to allow time for DLNR to evaluate the health of the nearshore waters and work with potentially affected permittees to find solutions. Time is of the essence because massive coral bleaching is currently occurring and immediate action is required to minimize further negative impacts and promote recovery of the coral, to the extent possible.

Also, as requested by numerous organizations and individuals, and after reviewing information regarding the health of our nearshore reefs and the commercial aquarium collection impacts, and hearing requests by scientists, the public, non-profit organizations, and commercial fishing interests, the Office of Environmental Quality Control has determined and advises you that commercial aquarium extractive activities are subject to and should go through the environmental review process under the Hawai`i Environmental Protection Act (HEPA), HRS Chapter 343. We recommend the environmental review process be completed before any of these commercial activities are allowed to occur in state waters.

I believe your leadership provides a window of opportunity at a critical juncture for Hawai`i to succeed with this endeavor.

Mahalo for your consideration, hard work, and public service.

Malama pono,

Jessica Wooley

Jessica E. Wooley, Director
Office of Environmental Quality Control

Attachments

SW Oahu Yellow Tang Collapse: Honolulu Airport to Kaena Point

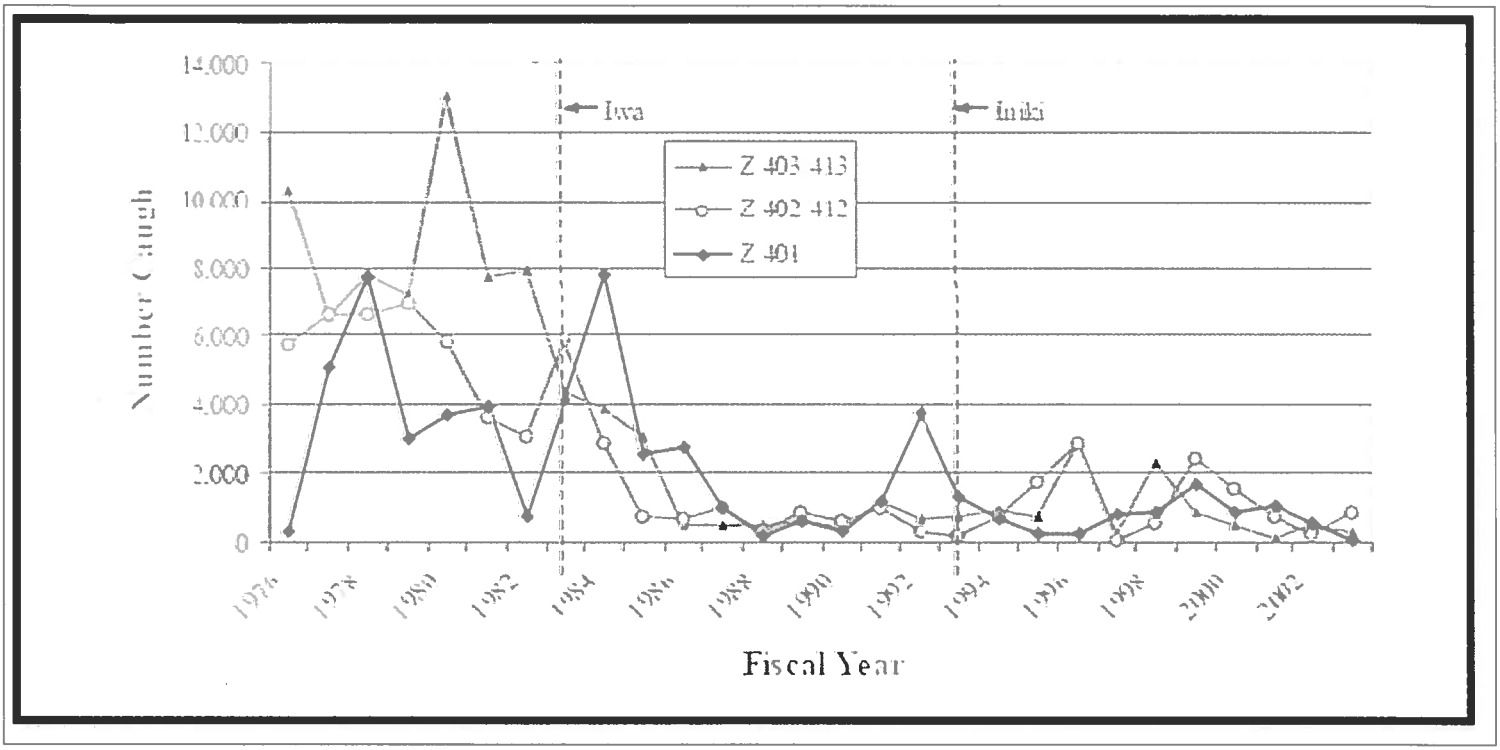
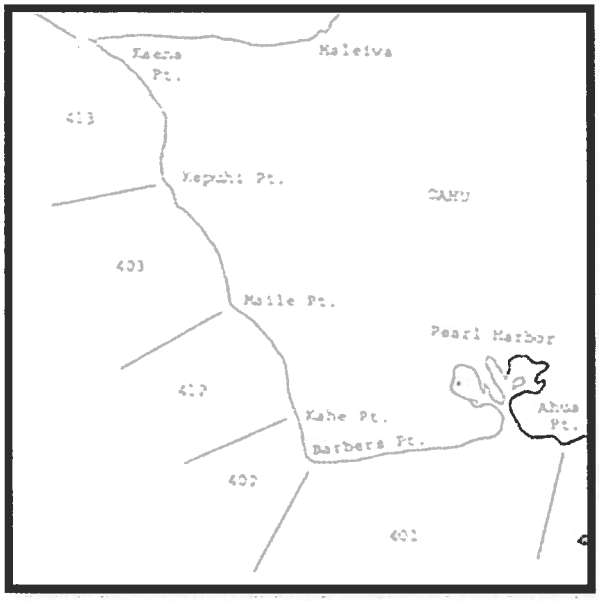


Figure 1. Number of yellow tangs caught in southwest O'ahu reporting zones.
Walsh, et al. (DLNR & UH) The Commercial Marine Aquarium Fishery in Hawai'i, 1976-2003



Southwest Oahu has seen a drastic reduction in yellow tang caught since 1976 (Walsh et al 2003). This decline has left a very low number of yellow tang on the reefs. This once very common species has become rare. Other herbivorous fish, as well as yellow tang, are in decline all around Hawaii. Currently, most of Hawaii's reefs are dominated by algae due to the low population levels of herbivores. This is indisputably from the significant impacts the aquarium collection has made on herbivorous fish biomass.

Figure 2. Southwest O'ahu reporting zones. Walsh, et al. (DLNR & UH) The Commercial Marine Aquarium Fishery in Hawai'i, 1976-2003

Difference in Herbivore Biomass on West Hawaii between open areas, MPAs and FRAs

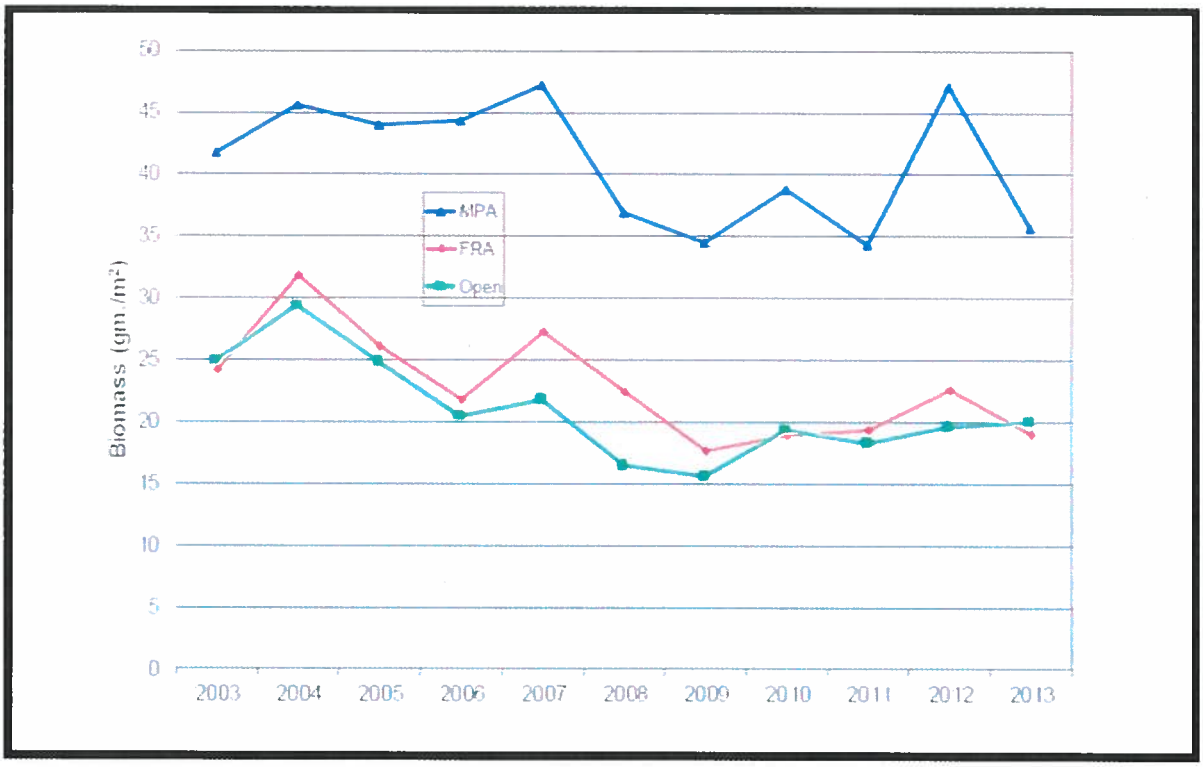


Figure 3. Overall change in herbivore biomass in open areas, MPAs and FRAs, from 2003-2013. DLNR (2014). Report to the Legislature on the Findings and Recommendations of Effectiveness of the West Hawai'i Regional Fishery Management Area

Open areas and Fish Replenishment Areas (FRAs) showed the same decline in biomass and lack species recovery from 2003 to 2013, implying that the only successful recovery strategy are the no-take and other restrictive policies of Marine Protected Areas (MPA). Fish Replenishment Areas will not provide sufficient enough recovery to the low herbivore populations to help boost overall biomass. Increased no-take areas or a moratorium on the herbivorous fish collecting of the aquarium trade are the only viable solutions to maintaining healthy reefs for the future.

STATE OF HAWAI`I
ENVIRONMENTAL COUNCIL
235 SOUTH BERETANIA STREET, SUITE 702
HONOLULU, HAWAI`I 96813
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Fax (808) 586-4186
Email: environmental.council@doh.hawaii.gov

October 20, 2015

The Honorable Suzanne Case, Chairperson
State of Hawai'i Department of Land and Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813

Dear Chairperson Case,

I am writing to you on behalf of the State of Hawai'i Environmental Council. We are concerned about the impact that the commercial aquarium fishing trade is having on nearshore reef ecosystems around the Hawaiian Islands, in particular O'ahu and West Hawai'i. We provide here the following recommendations to the Department of Land and Natural Resources (DLNR), with the rationale for these recommendations outlined below:

1. The DLNR should conduct an environmental review, pursuant to Hawai'i Revised Statutes (HRS) Chapter 343, of the commercial aquarium fisheries permit program.
2. The DLNR should consider a temporary moratorium on the collection of commercial aquarium fish in response to the unprecedented coral bleaching event that Hawai'i is currently experiencing.

The Environmental Council is comprised of 15 members appointed by the Governor to assure a broad and balanced representation of educational, business, and environmentally relevant disciplines and practices. The Council serves as a liaison between the State government and the general public on environmental matters pursuant to HRS Chapter 341, and also has rulemaking authority under HRS Chapter 343.

Environmental Review of Commercial Aquarium Fish Permit Program

The Council is aware that DLNR has a statewide permit program for the collection of commercial aquarium fish, as promulgated under HRS Chapter 188, HAR 13-77 (for O'ahu), and HAR 13-60.4 (for West Hawai'i). The Council believes that issuance of these permits for the collection of commercial aquarium fish constitutes an action

that is subject to environmental review pursuant to HRS Chapter 343. Thus, we urge the DLNR to commence an environmental review of the commercial aquarium fish permit program.

Coral Bleaching Event – Temporary Moratorium

There have been numerous articles in the local, national, and international news media about the unprecedented coral bleaching event that Hawai'i's reefs are currently experiencing,[1,2,3] including the DLNR in its own press release.[4] In the context of the "Big Three" human threats to coral reef ecosystems (overfishing, pollution and climate change), wise management choices are imperative.[5] Estimates of the economic value of Hawai'i's coral reefs range from the hundreds of millions to billions of dollars.[6,7] If left unchecked, the current bleaching event could have a significant economic impact in Hawai'i. Rapid recovery after this current bleaching event will be critical to ensuring the long-term health of the reef.

If macroalgae populations are established in the recently bleached corals, the prospects for long-term recovery are bleak. Given the potential importance of herbivorous reef fishes in controlling macroalgae populations (such as the yellow tang, which is the most heavily harvested of the aquarium fishes in Hawai'i), the Council feels that the DLNR should consider a temporary moratorium on the harvesting of fish for the aquarium industry to help assist recovery of these critical ecosystems, especially in areas where bleaching is occurring. This action, which is in line with the DLNR's policy for commercial activities on State owned and managed lands and waters, could help to preserve the fishery and ensure a healthy reef for future generations.

The Council recognizes that DLNR has the expertise and resources to thoroughly evaluate the best strategy for responding to the coral bleaching event that Hawai'i is currently experiencing. We trust that the DLNR will make wise decisions based on

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[1] http://khon2.com/2015/10/09/coral-bleaching-in-molokini-crater-shows-winter-scene-under-water/

[2] http://www.csmonitor.com/Science/2015/0914/Why-global-warming-bleaches-coral-in-Hawaii

[3] http://www.theguardian.com/us-news/2015/sep/13/hawaii-coral-bleaching-scientists-predict-worst-ever

[4] http://dlnr.hawaii.gov/blog/2015/09/11/nr15-135/

[5] Pandolfi, John. Deep and complex ways to survive bleaching. Nature **518**, 43-44, 2015.

[6] Cesar, Herman, Pieter van Beukering, Sam Pintz, and Jan Dierking. *Economic Valuation of the Coral Reefs of Hawaii*. National Ocean and Atmospheric Administration, 2002.

[7] Bishop, Richard C., David J. Chapman, Barbara J. Kanninen, Jon A. Krosnick, Bob Leeworthy, and Norman F. Meade. *Total Economic Value for Protecting and Restoring Hawaiian Coral Reef Ecosystems: Final Report*. Silver Spring, MD: NOAA Office of National Marine Sanctuaries, Office of Response and Restoration, and Coral Reef Conservation Program. NOAA Technical Memorandum CRCP 16, 2011.

the available science. In order to continue this dialogue, I would like to invite you (or your representative) to attend the next Council meeting and further discuss these issues. I can contact you separately after our next meeting has been scheduled.

Thank you for your time and attention to this matter.

Sincerely,

Joseph Shacat, Chairperson
Environmental Council

DAVID Y. IGE
GOVERNOR OF
HAWAII

SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
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STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Nov. 12, 2015

Mr. Scott Glenn
Director
Office of Environmental Quality Control
235 S. Beretania Street, Suite 702
Honolulu, HI 96813

Dear Mr. Glenn,

On October 19, 2015, Jessica Wooley sent me a letter expressing concerns about coral bleaching in Hawai'i. She urged the DLNR to immediately issue a moratorium on commercial aquarium fishing, for at least 180 days, because she believes it is removing critical herbivore populations. She also stated that that OEQC had determined that commercial aquarium extractive activities are subject to and should go through the environmental review process under the Hawai'i Environmental Protection Act (HEPA), HRS Chapter 343, and recommended that the environmental review process be completed before any of these commercial activities are allowed to occur in state waters.

Coral bleaching in the Main Hawaiian Islands this year is extensive and intense, and in some areas (e.g. West Hawai'i), unprecedented in recorded history. There is no question that herbivores, which feed on marine algae, play a key role in the overall health and subsequent recovery of coral reefs after disturbances such as hurricanes and bleaching. However, some herbivore populations are much more important than others in enhancing coral reef recovery. Numerous studies throughout the world have reported that one particular group of herbivores, namely 'scrapers' (i.e. parrotfishes) play the key role in reef recovery. A recent study found that throughout the Hawaiian archipelago, a positive relationship with scraper (i.e. parrotfish) biomass was the most important predictor of structurally complex and healthy coral reefs. In contrast, when the reef systems are comprised primarily of grazers (i.e. tangs and other surgeon fishes, which crop algal turf), the probability of algal turf dominance increases. Aquarium fish collecting is not considered to contribute significantly to the issues of coral bleaching or subsequent coral recovery. Commercial aquarium fish collecting, in fact, does not occur to any great extent off most of the Hawaiian Islands. The fishery is primarily centered in West Hawai'i and on O'ahu. In a 2014 Report to the Legislature on the Effectiveness of the West Hawai'i Regional Fishery Management Area, fifteen years of data show that the herbivores making up most (92%) of the catch have increased over the years and are now more numerous there than

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any other place in the Hawaiian archipelago. Significantly, no parrotfishes are taken by West Hawai'i aquarium collectors. On O'ahu, less than 20% of all the aquarium animals collected are herbivorous fishes. Again, parrotfishes are essentially not taken by collectors, averaging only 5/year recently. In short, there is little to indicate that aquarium fish collecting is having significant negative effects on the coral community or on the capacity of corals to recover from widespread bleaching events.

The stressors that may impact coral growth differ depending on the specific conditions in any ecosystem. Nevertheless, scientists have come up with a number of management measures that apply to most situations. They include:
1) Efforts to minimize direct sources of coral mortality, such as sedimentation and pollution, as well as restoring ecological processes, such as herbivory.
2) Maintaining healthy herbivore populations, especially parrotfishes, to mitigate the negative impacts of ocean warming since abundant herbivores can control algae that inhibit coral recovery following coral.
3) Better spatial management of fishing to minimize trade-offs between the need to maintain high levels of grazing while supporting sustainable fisheries.
4) Implementation of marine protected areas or other spatial restrictions on herbivore fishing. Note that these are only effective if herbivore populations are sustainably managed outside of protected areas.

Accordingly, to ensure that Hawai'i's coral reefs recover, it would be prudent to protect herbivore populations, particularly large fishes and especially parrotfishes. The State Division of Aquatic Resources (DAR) intends to solicit recommendations from experienced coral reef scientists and marine resource managers around the world on effective ways to restore coral reefs and ultimately develop a comprehensive Coral Recovery Management Plan. The objective will be to identify and implement scientifically valid measures which will minimize further coral reef damage and promote recovery of impacted corals. With the strong El Niño effect currently impacting water temperatures around Hawai'i, the situation is undoubtedly going to get worse before it gets better. Like you, DLNR is deeply concerned about the recent coral bleaching and the long-term well-being of our coral reefs and island lifestyle. We welcome your involvement and support for actions that can be implemented to promote recovery and resilience of our bleached coral reefs.

With respect to commercial aquarium extractive activities being subject to the environmental review process under the Hawai'i Environmental Protection Act (HEPA), HRS Chapter 343, please be advised that in May 2013, in the First Circuit Court, the Honorable Jeannette H. Castagnett ruled that, "*The court finds that as a matter of law, "aquarium collection" does not specifically identify any program or project to review for hepa purposes. Accordingly, the court finds that as a matter of law, "aquarium collection" is not an applicant "action" that triggers hepa.*"

This ruling is under appeal, but unless it is overturned and as it stands now, aquarium fish collection does not trigger HEPA review as determined by this court.

I hope this information is helpful to you and members of the Environmental Council. We welcome your involvement in finding ways to effectively mitigate the impacts of climate change and the recovery of our reefs from coral bleaching. If you have any questions, please do not hesitate to contact me or Dr. Bruce Anderson, Administrator of the Division of Aquatic Resources.

I look forward to working with you.

Aloha,

Suzanne Case
Chair

DEPARTMENT OF LAND AND NATURAL RESOURCES

DAVID Y. IGE
GOVERNOR

SUZANNE D. CASE
CHAIRPERSON

FOR IMMEDIATE RELEASE
November 17, 2015

STATE INITIATES COMPREHENSIVE CORAL REEF MANAGEMENT PLANNING
Scientists and managers globally being asked to provide input

(HONOLULU) – Extensive, mass coral bleaching across the entire Hawaiian archipelago is prompting the development of a comprehensive coral reef management plan for near-shore waters in the main Hawaiian Islands. Dr. Bruce Anderson, the administrator for the DLNR Division of Aquatic (DAR) Resources explained, "Coral bleaching in some parts of Hawaii is unprecedented in recorded history, placing our corals at much greater risk of dying. We need to ensure our reefs are as healthy and resilient as possible to maximize the chances of recovery." However, in a response to a recent inquiry, Anderson added "Aquarium fish collecting is not thought to contribute significantly to the problem, while declines in populations of large-scale coral scraping herbivores such as parrot fish (*uhu*) are a significant issue for our reef health."

In October, the then head of the State Office of Environmental Quality Control (OEQC) asked the DLNR, to consider a temporary moratorium on commercial aquarium fish extraction in response to Hawaii's significant coral bleaching event. In a response to the OEQC request, DLNR Chair Suzanne Case wrote, "Commercial aquarium fish collecting, in fact, does not occur to any great extent off most of the Hawaiian Islands. The fishery is primarily centered in West Hawaii. 15 years of data show that the herbivores making up most (92%) of the catch have increased over the years and are now more numerous there than any other place in the Hawaiian archipelago. Significantly, no parrotfishes are taken by West Hawai'i aquarium collectors. On Oahu, less the 20% of all the aquarium animals collected are herbivorous fishes. Again, parrotfishes are essentially not taken by collectors, averaging only 5/year recently."
Dr. Anderson added, "The development of a statewide coral reef management plan is a top priority for DAR, given the extent and severity of coral bleaching across Hawaii the last two years. Coral reef resilience and recovery is very complex, so the plan will have to address site-specific stressors; this can't be a one size fits all approach."

Dr. William Walsh, the DAR Aquatic Biologist on Hawaii Island has a long-history of collecting data on coral reefs on the Big Island. He explained that herbivores are not created equally and ocean scientists categorize them based on what they feed on, their role on a reef and their role in coral health and recovery. "Grazers are the main fish collected by the aquarium industry. They crop the low-lying turf algae and include many species of surgeon fish like yellow tang. The other two categories are browsers and scrapers/excavators. It's this last category that current global scientific research suggests are the key players in overall coral reef health, by regenerating coral reefs and controlling invasive algae.

These include parrot fish. We anticipate Hawaii's management plan might address protection of grazers/excavators as well as certain species of sea urchin."

"Addressing large-scale stressors like land pollution is a tough but important challenge. In the management plan we hope to reiterate steps that every Hawaii resident and visitor can take to help our coral reefs," said Case.

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