

E ola hou ke kalo; ho‘i hou ka ‘āina lē‘ia

The taro lives; abundance returns to the land



TARO SECURITY AND PURITY TASK FORCE
2010 LEGISLATIVE REPORT

December 29, 2009



Harry Masashi “Cowboy” Otsuka

IN HONOR of all those who have perpetuated taro culture, we humbly dedicate the task force report to the late Harry Masashi “Cowboy” Otsuka who passed away on May 5, 2009. Harry was fondly known as “Cowboy” because of his love of and contributions to Paniolo culture. His leather braiding and saddle making skills were legendary as he was honored this year by the Paniolo Preservation Society in their Hall of Fame of Master Craftsmen of Hawaiian tree saddles.

But Cowboy was equally legendary within the taro farming community for his commitment to preserving the old Hawaiian taro varieties. He had a keen ear and a sharp memory, and was able to identify and describe most of the varieties we have today. Until almost his last days he maintained a lo‘i where he raised his favorite Hawaiian varieties and shared them with others to make poi. He also shared with many educational and cultural institutions and with individuals interested in perpetuating the old Hawaiian taro varieties.

As with many in his generation he sacrificed opportunities for a decent education to support his family on the east end of Moloka‘i. Cowboy attributed much to his wife Martha of Ho‘olehua, Moloka‘i, who encouraged him to seek out the last vestiges of the Hawaiian taro varieties, and escorted him to many taro collecting expeditions throughout the islands, acting as the front person to open the door to many Hawaiian taro farmers. He would seek out taro growers to learn all he could about the culture of taro, and always felt it was necessary to give them something for the huli, never to expect something for nothing. He was also steeped in the knowledge of Hawaiian utility plants, and learned from the maka‘āinana by living among them and always embracing this knowledge.

*To Harry Masashi “Cowboy” Otsuka, we owe a great debt of gratitude for all he taught and shared with us.
With deepest respect, mahalo piha, Uncle Cowboy.*

EXECUTIVE SUMMARY

The passage of Act 211 by the 2008 Hawai‘i State Legislature established the Taro Security and Purity Task Force. This Act directed taro farmers, agencies and University of Hawai‘i representatives to seek solutions to challenges facing taro, taro farmers and taro markets. Funding and administrative support from the Office of Hawaiian Affairs enabled the Task Force to meet consistently and to gather input from taro growing communities on all islands over the period of the last 12 months.

This effort and the report which follows represents the first time that guidance for taro, taro research, and solutions to problems taro farmers are facing comes from the real experts – farmers – and from the taro itself. It is precisely this perspective that has been missing from the table for decades. The indepth experience and knowledge of the taro community combined with the resources of state agencies and the University of Hawai‘i strengthen and balance the necessary relationships between all stakeholders as we seek to revitalize all that taro is and can be again in Hawai‘i – from cultural legacy and ancestor to vibrant economic and food crop self-sufficiency.

The report contains a critical section called CONCEPTS OF IMPORTANCE, which includes definitions of taro security and purity, descriptions of the taro farmer life style, the importance of taro to Hawai‘i’s identity, taro as a centerpiece of Hawaiian culture, its role in agriculture, and how current land designations impact on the cultural continuity of taro and its ability to contribute towards food self-sufficiency. These concepts are essential for legislators, agencies, institutions and researchers to grasp prior to engaging in work and decision-making related to taro farming. Understanding what is at risk is critical to re-valuing taro and its role in the wellbeing of the state.

The task force developed 87 recommendations and grouped them according to the following categories: LAND; WATER; ECONOMIC VIABILITY; BIOSECURITY; RESEARCH; COMMUNICATION, EDUCATION, AND PUBLIC AWARENESS; AND HAWAIIAN TARO VARIETIES.

This executive summary provides a short list of key recommendations the Task Force would like state legislators to act on in this session. However, this does not mean that these recommendations are more important than any other found in the report. The Task Force recognizes the constraints of current budgetary conditions in the 2010 session, but, is also aware of the need to initiate efforts now that we know will take some time to implement. Hence, the recommendations of this executive summary are strategic in nature.

Moreover, the final report contains details and specific actions for each recommendation in this summary. The numbering of recommendations selected for inclusion in this summary is identical to those in the final report to make referencing easier.

LAND

Lo‘i and dryland kalo terraces were a prominent feature in the pre-contact Hawaiian landscape. Despite the almost catastrophic decline of active taro producing lands in Hawai‘i (from more than 20,000 acres to perhaps 500 today), there remains hundreds, if not thousands, of acres of taro-growing lands that lay fallow with the potential for rehabilitation and productivity. Access to such lands is hindered by a number of obstacles; including, the cost of land and land leases, zoning, fencing, and agricultural land definitions and designations. The land use decision-making concept of “highest and best use” as applied to historic taro lands is problematic; “best use” of such lands should be to grow taro. A lack of solid incentives that increase protections for ancient lo‘i structures impacts the survival and potential future rehabilitation of taro growing lands.

RECOMMENDATIONS

A. Improve access to taro-growing lands.

1. Support a comprehensive study to research existing maps and records, survey state lands on the ground, identify parcels, stream, elevation, location within parcels, site condition, water and infrastructure (access, utilities, terraces, ‘auwai, etc.) availability and agency jurisdiction to determine the extent of traditional taro lands still present (wetland and dryland) and potential for rehabilitation, as well as new lands that would be suitable and available for taro production.
2. Develop long-term, reduced lease rent rates for taro farmers on state-leased lands under jurisdiction of DLNR, HDOA and DHHL.

B. Improve protections to taro-growing lands

1. Reconsider the state’s agriculture land capability class designations to better protect viable taro-growing lands.
2. Tighten land conversion laws (zoning) to better protect known taro growing lands.

C. Create incentives for active rehabilitation of taro-growing lands that result in taro lands protection

1. Provide a tax credit at the county level for landowners for the perpetual conservation of taro systems on private land (i.e. agricultural, conservation or cultural easements) and further for owners and lessees who enter into long term agreements (20 years) to rehabilitate taro systems to active use.
2. Allow lands in conservation districts dedicated to growing taro to receive tax rates equal to or less than agriculture dedication rates.

WATER

The Taro Security and Purity Task Force strongly supports the existing legal framework for managing Hawai‘i’s precious freshwater resources, and recognizes the importance of stewarding these resources as a Public Trust for the benefit of present and future generations. Article XI sections 1 and 7 of the State Constitution and the State Water Code, Hawai‘i Revised Statutes chapter 174C, should be enforced and implemented and must also be protected from attempts to dilute the Public Trust in Hawai‘i’s water resources.

RECOMMENDATIONS

A. Support and enforce the State Constitution and the State Water Code.

1. Support the full implementation of the existing legal framework for managing Hawai‘i’s precious freshwater resources and stewardship of these resources as a Public Trust per the State Constitution, Articles XI Sections 1 and 7 and the State Water Code, HRS 174C.
2. Provide more funding and staff to better implement fundamental mandates, including but not limited to: updating the Hawai‘i Water Plan, particularly the Water Resources Protection Plan, identifying and accounting for the existing and future needs of taro farmers and exercised and unexercised traditional and customary Native Hawaiian and appurtenant water rights; recognizing traditional and customary Native Hawaiian and appurtenant water rights to assure their protection; establishing scientifically-based interim instream flow standards (IIFS) for all streams in Hawai‘i; and supporting and expanding existing data on stream flows, especially stream gauges managed by the United States Geological Survey.
3. Hold DLNR and CWRM responsible for fulfilling their obligation to conduct appropriate water studies, such as baseline and interim instream flow standards studies and environmental assessments, to ensure that all stream diversions do not adversely affect the rights of traditional and customary Native Hawaiian and appurtenant water right holders as well as any other public trust purpose.
4. Implement all court and other administrative orders regarding stream flows and restoration.
5. Per the State Water Code, fulfill the intent of the Water Resources Commission membership to include at least one member with traditional water management knowledge, by appointing an experienced wetland taro farmer to the Commission.

B. Improve stream maintenance capacity in taro-growing communities

1. Provide guidance and support to taro-farming communities with flooding and stream blockage issues on how to interface with federal and state agencies and the permitting process.

ECONOMIC VIABILITY

In order to increase the commercial supply of taro, farmers need to be able to make a living. This means reducing the costs of inputs, creating a committed labor force, and increasing returns for products. Young farmers are looking at the future and self-sufficient farms; fuel and food independent, more small poi processing and community kitchens, everything local and within reach. And, they are clear that to entice long term commitment to the hard work of taro farming you have to start when kids are young and keep them in it all the way through. That has to be part of the viability – the ability to continue the work passed down from each generation.

The taro industry is unique to Hawai‘i because it is part of the foundation of Hawaiian culture. It is also the oldest and first agriculture industry in the state. Taro growers and state agencies have an exceptional opportunity to prioritize taro and promote it from this perspective. It provides the perfect symbol for the future of food security and should lead the effort towards state self-sufficiency. In order to do so, however, resources must be allocated and commitments made to truly support the economic revitalization of the taro industry and all levels of taro farming. Taro-specific “Buy Local,” “Grown Local,” “[Island] Made,” “Seal of Quality” and “Low Fuel Miles” labeling campaigns are part of this effort.

During these difficult economic times, state resources are limited. One viable alternative for raising the necessary funding to implement programs that will increase local food production was HB1271, the so-called “barrel tax” that was proposed but vetoed in the 2009 Legislature. The Task Force strongly recommends that another attempt be made to pass this legislation.

RECOMMENDATIONS

A. Establish taro advocacy group to represent the voice and interests of all taro growers

1. Establish a taro advocacy group to represent the voice and interests of all taro growers, using the TSPTF to serve as the POC as a starting point for initial dialogues and the development of a long term entity.
2. Adopt and implement a regular holistic analysis of the state of taro in Hawai‘i, in coordination with the TSPTF, HDOA and UH CTAHR.

B. Improve taro markets and identify ways to advocate for taro farmers

1. Develop a program to facilitate and encourage distributors, wholesalers and other buyers to purchase local taro and taro products before considering importing taro from outside Hawai‘i. (Act 211, Section 2 (c)(6))
2. Promote “Buy Local” for locally-grown taro products and improve the existing “Local Grown” and “Seal of Quality” food labeling programs as a model for the future and to provide opportunity for taro farmers to indicate “miles traveled” and “point of origin” information to help concerned consumers make environmentally healthy purchasing decisions.

C. Improve access to farming resources

1. Develop a supply of local, sustainable input resources such as organic fertilizers, bonemeal, bloodmeal, ground coral and invasive or beached seaweed with no net negative impacts or losses to the environment.
2. Support the ability of taro farmers to live where they farm to reduce the cost of farming and provide greater protection for farm assets and crops.
3. Develop a taro farming grant program to assist taro farmers in need to preserve the cultural legacy of taro farming for future generations. (Act 211, Section 2 (c) (7))

F. Improve taro farmer access to quality health insurance

1. Provide low-cost health and farm insurance options for taro farmers.

G. Heighten awareness of food security issues in Hawai‘i

1. Conduct a Food Security Disaster Response Assessment involving all state agencies, farmers and the Governor to assess what needs to be implemented now in order to feed Hawai‘i from local sources in the case of a natural disaster or fuel crisis. (SCR206 Taro Farmers Report to the Legislature)

BIOSECURITY

“Bio” refers to life, and “security” indicates protection. Biosecurity is the key to keeping our islands natural resources (terrestrial and aquatic), people and food crops healthy. This includes reducing the chances of invasive pest species and infectious diseases entering the state, being transported to farms, between farms, or escaping into open areas, watersheds, coastal waters, etc. by means of people, animals, equipment, boats or vehicles, either accidentally or on purpose.¹

RECOMMENDATIONS

B. Improve and expand inter-island inspection capacity

1. Support improved joint inspection facilities for incoming produce and non-agriculture cargo on barges, at harbors and airports on all islands.

C. Improve and expand HDOA authority to conduct agricultural and non-agriculture commodity inspections

1. Improve HDOA capabilities to track and access to cargo manifests
2. Support HDOA’s request to expand its authority to allow for inspection of non-ag commodities and to require more specific manifest information. (SCR206 HDOA report; SCR206 Taro Farmer Report)

D. Improve USDA and HDOA risk management capacity for taro in Hawai‘i.

1. Support efforts to adopt and implement the USDA-HDOA Pathway Risk Analysis, Maritime Risk Assessment and HDOA Biosecurity Program. (SCR206, HDOA; Taro Farmer Report SCR206)

E. Develop funding mechanisms to improve biosecurity measures for taro pest and disease risks in Hawai‘i and to fund strategic apple snail control and controls research.

¹ Adapted from APHIS Biosecurity definitions for birds. http://www.aphis.usda.gov/animal_health/birdbiosecurity/biosecurity/basics.htm

1. Support passage of the proposed changes to the proposed cargo fee law which increases HDOA’s ability to enforce and impose penalties for non-payment (Pest Inspection Quarantine and Eradication (PIQE) fund) and the “barrel tax” as funding sources for biosecurity measures recommended in this report.
2. Require a “taro tax” on all taro and taro products imported into the state whose revenues go directly to HDOA inspection funds.

F. Increase incentives and dis-incentives to improve pest and disease-free product and cargo shipments in and out of the state.

1. Support increased resources to HDOA to implement compliance reviews and revoke import permits and export certifications and/or fine offenders who introduce and/or import invasive species.

RESEARCH

Research is an important component that needs to be addressed to insure the security and purity and the future of taro. There has been a long history of collaboration between taro practitioners and CTAHR faculty and staff, which in recent years has reached a broken place over differences on genetic engineering, patenting, hybridization and their subsequent release, bioprospecting, and a lack of understanding and communication. It is imperative that the rift that has developed between the research community and many in the taro farming community be set right. The Taro Security and Purity Task Force and UH CTAHR acknowledge there is a need for healing, so that meaningful, rigorous, collaborative research can move forward. The Task Force strongly advises the establishment of an advisory group made up of Hawaiian practitioners and taro farmers from all sectors to work with UH Systems, UH CTAHR, PBARC and HARC to help address taro related issues, set policy on taro research, and educate researchers towards a more holistic and appropriate approach to research projects.

The apple snail, *Pomacea canaliculata*, introduced to taro systems around 1983, is by far the worst pest facing taro farmers today. The Task Force strongly recommends that state and federal funding/resources be found and directed towards research for control of this pest with direction from the 2006 Apple Snail Control Plan and taro farmers.

B. Apple snail control research

1. Develop taro research and outreach for the control and eradication of apple snails using the guidance of the 2006 Apple Snail Control Plan.

COMMUNICATION, EDUCATION AND PUBLIC AWARENESS

It is critical that we educate our next generation to ensure that taro culture will survive. Our Hawaiian varieties of taro are cultural treasures that need to be grown in backyards all around the state in order to perpetuate them for generations to come, to expand taro farmers options, public awareness and food choices. Equally important, is a need to develop more taro farmers actively farming and contributing to taro production in the state.

There are many opportunities for expanding student experiences with taro within the existing school system; however, once students leave the education system, taro farmers have access to general business skills training but no programs exist shaped specifically around the values that taro farmers articulate in the taro-farming lifestyle. Business classes and workshops to assist in the establishment of community-based poi mills are strongly encouraged.

RECOMMENDATIONS

A. Increase public awareness of the designation of taro as the State Plant, the value of taro and its role culturally, socially, in health and well-being, environmentally, and economically in the state.

1. Document the full value of taro to the State of Hawai‘i economically, environmentally, educationally, socially, culturally, and in health and well-being.
2. Raise the cultural awareness of the general public about taro

B. Develop a program to provide taro education and training opportunities.

1. Develop taro education and training opportunities for students, adults, communities, agencies, decision-makers and taro farmers
2. Educate the general public, taro farmers and legislators of taro farmer water rights.

HAWAIIAN VARIETIES

From a small number of taro starts that arrived with the first Polynesians to the Hawaiian Islands and with a limited gene pool, an estimated 300 to 400 cultivars were developed prior to Captain Cook’s arrival in 1778.

What made this proliferation of taro varieties unique in Hawai‘i was not so much the fine-tuned adaptation to a range of elevations, soil conditions and climates; this occurred in many places under the skilled hands of local farmers throughout the Pacific and Asia. In Hawai‘i, it was the development of cultivars that favored fresh or brackish water, cool or warm water systems; varieties that could shift between complex dry and wetland systems and thrive in both conditions; along with their colors, leaf shapes, fragrances, and tastes, that distinguished them from all others. The revision of *Bulletin 84: Taro Varieties in Hawaii* is the primary manual for understanding those varieties today, but is in critical need of revision for student, researcher and taro grower education. A currently voluntary effort towards this goal requires significant dedicated time and funding to support in order to move this project to the next level.

The value of the collections reaches beyond revitalizing taro farming. Taro farmers interested in growing the traditional varieties on a larger scale have limited options except to start with a few huli and expand in the field over time. The creation of dedicated huli banks and a tissue culture lab would significantly reduce the time frame for expanding availability to growers.

RECOMMENDATIONS

A. Support the recovery of traditional Hawaiian taro cultivars throughout the state.

1. Create a network of farmers, researchers, and botanical gardens to document cultivar characteristics, best growing conditions, preferred growing sites, pest and disease resistance, and productivity (corm and huli) under a range of conditions, sites, and growing practices.
2. Protect and support the Moloka‘i taro varieties collection.
3. Establish huli banks with clean (disease-free), pure plant stock on each island to revitalize taro field diversity.
4. Support local germplasm and tissue culture preservation of traditional Hawaiian taro varieties for use statewide and as a second tier of conservation.

B. Conduct archival and ethnographic research of the history of taro and taro practices in Hawai‘i and the traditional Hawaiian cultivars to aid in [taro’s] revival and revision of *Bulletin 84*.

1. Revise *Bulletin 84: Taro Varieties in Hawaii* (1939) which is the key reference for taro growers and researchers.

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I. INTRODUCTION

The passing of Act 211 by the 2008 Hawai‘i State Legislature established the Taro Security and Purity Task Force. This Act directed taro farmers, agencies and University of Hawai‘i representatives to address non-gmo alternatives to problems facing taro, taro farmers and taro markets.² Funding and administrative support from the Office of Hawaiian Affairs enabled the Task Force to meet consistently over the period of the last 12 months.

This effort and the report which follows represents the first time that guidance for taro, taro research, and solutions to problems taro farmers are facing comes from the real experts – farmers – and from the taro itself. It is precisely this perspective that has been missing from the table for decades. The in-depth experience and knowledge of the taro farming community combined with the resources of state agencies and the University of Hawai‘i strengthen and balance the necessary relationships between all stakeholders as we seek to revitalize all that taro is and can be again in Hawai‘i – from cultural legacy and ancestor to vibrant economic, and food crop, self-sufficiency. This shift in focus back to the piko (center) of holistic agricultural practice and local context is cause to hope that future efforts in sustaining and expanding taro production will have a high rate of success.

The core of this report begins with CONCEPTS OF IMPORTANCE that are essential for legislators, agencies, institutions and researchers to grasp prior to engaging in work and decision-making related to taro farming. Understanding what is at risk is critical to re-valuing taro and its role in the wellbeing of the state.

The PROCESS used by the Task Force to gather information and designate priorities is outlined. This report draws on the mana‘o and ‘ike (thoughts and knowledge) of taro farmers throughout the state, from Kaua‘i, O‘ahu, Lāna‘i, Moloka‘i, Maui, and Hawai‘i, along with investigation and consultation with experts and agencies.

RECOMMENDATIONS and actions for follow-up are made, including legislative action, agency rule changes and program incentives, institutional policy, research direction, and on-the-ground practices and programs to support, protect, and improve the future of taro and the survival of a farming lifestyle that is fast disappearing in these islands; and for the economic survival of the smallest taro patches to the largest. They all feed us.

The members of the Taro Security and Purity Task Force would like to express their deepest mahalo to the Office of Hawaiian Affairs and its Board of Trustees for generously providing the funding – as well as administrative support – that allowed us to fulfill our legislative mandate outlined in Act 211. OHA funding and staff support allowed the task force to meet regularly and to travel to gather input from taro farming communities throughout the state. We extend our gratitude to Linda Colburn for facilitating the many fruitful discussions that have occurred during the last year. We would like to convey our appreciation to the following individuals who graciously lent their time, energy and mana‘o to the Task Force: Carol Nishi, State Office of Information Practices; Sandra Kunimoto, Chair, and Carol Okada, Branch Chief, Plant Quarantine Branch, Department of Agriculture; Ken Kawahara, Deputy Director, and Ed Sakoda, Hydrologic Program Manager, Commission on Water Resource Management, Department of Land and Natural Resources; Moses Haia, Executive Director, and Alan Murakami, Litigation Director, Native Hawaiian Legal Corporation; Lorrin Pang, District Health Officer – Maui County, Department of Health; Neil Hannahs, Director, Land Assets Division, Kamehemehe Schools; Virginia Hinshaw, Chancellor, and Gary Ostrander, Vice Chancellor, Research and Graduate Education, University of Hawai‘i at Mānoa; and Nellie Sugii, Jr. Researcher, Hawai‘i Rare Plants Program, Lyon Arboretum who made time to provide briefings to and meet with this body. We would also like to thank the attorneys who assisted us in the review of this document to ensure its consistency with current water law.

Finally, the collaboration of Task Force members and their commitment to produce a report that understood and reflected the needs of the whole of the taro farming community has provided each member of this body with new insights and commitment to the outcomes of recommendations in this report. A huge mahalo goes out to all the taro farmers and communities that hosted, sheltered and fed us with the incredible bounty of their ‘āina and shared their mana‘o with us throughout this effort. It has been a privilege to visit each farm and community. The work of the Task Force would not be possible without the collective effort of all stakeholders and their important input. This is our report.

² The full language of Act 211 can be found in Appendix A. The Act does not reflect that funding assigned to this task force was vetoed by the Governor.

A NOTE ON THE USAGE OF TARO AND KALO IN THIS REPORT

In Hawai‘i, “taro” and “kalo” are the two most commonly used terms to describe the plant, *Colocasia esculenta*. While the Task Force understands the importance of both terms, this report uses the term “taro” (except where it quotes a taro farmer or where it appears in the cultural discussion in telling of the importance of Hāloa) to remain consistent with Act 211, Session Laws of Hawai‘i 2008, and Senate Concurrent Resolution 206, Session Laws of Hawai‘i 2007, which both use the term “taro.”

II. BACKGROUND

As a food crop, taro is a multi-million dollar industry in the State of Hawai‘i. Raw taro alone (4.4 million pounds) was valued at \$2.7 million in 2008; the retail value of poi alone ranges between \$16.13 and \$25.77 million which provides an estimated \$0.67 to \$1.07 million in tax revenues to the state.³ Statistics do not include the market value of kūlolo, lū‘au leaf, taro oil, taro flour, breads and chips, taro poke, desserts and other value-added food products found in local stores, at farmers markets, fairs and festivals, bakeries and restaurants. Its contributions to health, education, family and community economics, the arts, and the visitor industry have never been quantified. Its importance in Hawaiian culture is beyond measure. Taro farmers have worked hard to provide food for Hawai‘i and continue to persevere despite all of the challenges of the last 150 years.

Taro farming dates back an estimated 1,200 to 1,500 years to the time of the first arrivals of Pacific Islanders to Hawai‘i.⁴ By the time of Captain Cook’s landing in 1778, wet and dry taro-growing systems here were the most fine-tuned production systems in the Pacific⁵ and taro had become the Hawaiians most important staple crop, feeding an estimated 300,000 to 1 million people.⁶ In 1991, E.S. Craighill Handy, an important contributor to our understanding of taro and taro culture in Hawai‘i, writes that “pioneers [to Hawai‘i] could not have brought with them their knowledge of terracing and irrigation for only vestiges of such systematic agriculture existed in the [Pacific].”⁷ Vitousek elaborates, “within the range of cultural variability evident in Polynesia, both the agriculture intensity and sociopolitical complexity reached their peak in the Hawaiian Islands.” The scale of wetland taro complexes in Hawai‘i are found nowhere else in the world.⁸

Today, production of taro is only a shadow of its former prosperity and the number of taro farmers has reached dangerously low levels. Ensuring that taro and poi will continue to be found on market shelves and family tables in the future has become increasingly difficult with lack of water, access to taro-growing lands, and crop diversity; the increasing cost of farming; the apple snail and taro diseases; declines in soil fertility; a shortage of taro farmers; and increasing competition from taro imports.

It is important to note that the demographics of taro farmers have also changed. Prior to the 1900s, growing taro was solely a Hawaiian practice, with rare exception. Chinese and later Japanese workers for the plantations joined the ranks of taro farmers in the early part of the century; a few of those early families are still growing taro, particularly in the commercial sector. Beginning in the 1970s, the renaissance in Hawaiian culture also spurred a return to the taro patch, not just for Hawaiians but for others as well. Today’s taro farmers mirror the many ethnic and cultural groups found in Hawai‘i.

In 2007, under Senate Concurrent Resolution No. 206, the Hawai‘i Department of Agriculture was tasked with opening a dialogue to look at non-gmo alternatives to research, policy, education, and crop and market issues for taro. A report from that effort was provided to the Hawai‘i State Legislature in January 2008 by taro farmers and March 2008 by HDOA, respectfully. Participants from the October 8, 2007 HDOA meeting expressed a desire to continue working together, to reach as much of the taro farming community as possible and set clear priorities to improve taro farming conditions.

Based on that recommendation, Senate Bill 2915 proposing the formation of a two-year, funded, Taro Security and Purity Task Force was submitted to the Legislature in 2008. The bill and its budget received unanimous support from the Legislature in May 2008. SB2915 was passed into law, becoming Act 211, on July 3, 2008 (Appendix A). In this same year, taro was formally designated as the State Plant (Act 71). A line-item veto by the Governor from the State’s general appropriation fund forced the Task Force to pursue its work without the necessary financial support to meet or implement projects outlined in the Act.

Act 211 designated the Office of Hawaiian Affairs as the administrative entity for the Task Force. OHA provided funding and staff to the Task Force which allowed members to gather input from taro-farming communities throughout the state and to hold regular meetings.

³ NASS estimated 4.3 of the 4.4 million pounds of raw taro to be for poi production. Assuming a conversion rate of 1: 0.75 or 3.23 million pounds of poi with a value of \$5 to 7.99/lb at market to consumers. Tax revenues are based on a retail rate of 4.16 percent and does not include the 0.5 percent taxed at the farm.

⁴ Cordy, R 2000; Athens, S. 1995; Kirsch, P. 1995.

⁵ Vitousek et al 2004, Hand, E.S.C and E.G. Handy 1991.

⁶ Stannard, D. 1989

⁷ Handy, E.S.C and E.G. Handy 1991:16.

⁸ Jared Diamond, in his Pulitzer Prize winning book, *Guns, Germs, and Steel* (1997) writes, “Irrigation agriculture reached its peak on the westernmost Hawaiian islands of Kaua‘i, O‘ahu, and Moloka‘i, which were big and wet enough to support not only large permanent streams but also large human populations available for construction projects. Hawaiian labor corvees built elaborate irrigation systems for taro fields yielding 24 tons per acre, the highest crops yields in all of Polynesia.”

Act 211 required that the Task Force have one representative from each of the following agencies and organizations:

- Hawai‘i Department of Agriculture
- Hawai‘i Department of Land and Natural Resources
- Hawai‘i Farm Bureau Federation
- University of Hawai‘i
- Office of Hawaiian Affairs
- ‘Onipa‘a Nā Hui Kalo⁹

The Act also called for the task force to have a minimum of two taro farmer representatives from each of the following islands: Hawai‘i, Maui, Moloka‘i, O‘ahu and Kaua‘i, along with one representative for the botanical collections community involved in the cultivation and protection of traditional Hawaiian varieties of taro. Although not named in the legislation, Lāna‘i provided a representative, as well.

OHA advertised a call for applicants in the *Ka Wai Ola* and *Honolulu Advertiser* newspapers in August and September 2008 to establish Task Force membership. The criteria for qualifying candidates were a minimum of three years of taro-farming experience and a commitment to attend meetings regularly. Members met for the first time in December 2008 and have met monthly since that time.

Act 211 states that “*at no time shall less than 50 percent of the Task Force be comprised of taro farmers.*” The Taro Security and Purity Task Force has a total of 18 members; 14 of whom are taro farmers, including the representatives for ‘Onipa‘a Nā Hui Kalo, the botanical collections and OHA. All serve voluntarily.

TARO SECURITY AND PURITY TASK FORCE MEMBERS:*

Hawai‘i Department of Agriculture	Leslie Iseke
Hawai‘i Department of Land and Natural Resources	Patrick Chee
Hawai‘i Farm Bureau Federation	Roy Oyama
University of Hawai‘i	Wayne Nishijima
Office of Hawaiian Affairs	John A‘ana, Makaweli*
‘Onipa‘a Nā Hui Kalo	Jerry Konanui, Puna*
Kaua‘i	Chris Kobayashi, Wai‘oli*; Rodney Haraguchi, Hanalei (KTGA)*
O‘ahu	Alapaki Luke, Kahana and Ka Papa Lo‘i o Kānewai Lo‘i*; Keoki Fukumitsu, Hakipu‘u*
Moloka‘i	Glenn Teves, Ho‘olehua*; Les Yee-Hoy, Hālawa*
Lāna‘i	Kawehi Ryder, Lāna‘i City*
Maui	Hōkūao Pellegrino, Waikapū*; Kyle Nakanelua, Wailuanui*; alternate Lyn Scott, Honopou*†
Hawai‘i	Jim Cain, Waipi‘o*; Kalae Mock-Chew, Waipi‘o*

Taro varieties collections Penny Levin, Wailuku *

* Taro farmer

† Alternates were selected by a member when they were unable to attend meetings; not all members provided alternates.

⁹ ‘Onipa‘a Nā Hui Kalo is a statewide taro growers organization formed more than 12 years ago, with over 300 practitioners and enthusiasts who grow kalo in backyard gardens, on reclaimed kuleana lands, and in large, medium, and small-scale farming operations. Its members come from all the islands. Members help each other to increase their knowledge of growing taro and taro issues, encourage more taro farmers on the land and reactivate lo‘i kalo to productive use.

III. CONCEPTS OF IMPORTANCE

A tremendous amount of work has gone into the Taro Security and Purity Task Force 2010 Report to the Legislature; all voluntary. The Task Force and taro farmers desire outcomes that will yield a high level of response and success. The CONCEPTS OF IMPORTANCE are intended to improve that possibility.

Taro and taro farming is like no other crop that grows in Hawai‘i. Without understanding the key definitions and concepts which follow here, policy and agency decisions that target taro and taro farmers will continue to miss the mark.

1. DEFINING SECURITY AND PURITY

Defining “taro purity” and “taro security” was determined to be an essential step in guiding Taro Security and Purity Task Force recommendations, agency decisions and future research priorities.

The Task Force formally adopted the following definitions originally drafted during the October 8, 2007 SCR206 dialogue and further refined under the Task Force’s tenure. The multi-faceted definitions are a reflection of the holistic way in which taro farmers relate to the taro.

TARO PURITY

The majority of Task Force members agreed with the original instincts of 2007 participants that the meaning of “taro purity” had several distinguishable layers.

Landscape level - the definition of taro purity begins within the larger landscape of land and water (i.e. soil health and water quality). If these are not pure and healthy, then neither is the taro. Preservation and revitalization of traditional taro varieties, cultural practices, taro-growing places and lifestyles are also part of taro purity at this level, each of which support the production of pure (healthy) taro.

Morphological level – the defining characteristics that distinguish one variety from another. The history of what has happened to taro over centuries, along with identifying the unique genetic makeup of each variety, tracing the lineage of a cultivar (genealogy) and the knowledge of kūpuna all help to identify and verify each cultivar found here, throughout the Pacific, and the world.

Molecular level – simply put, no genetically engineered (GE/GMO) taro; purity is that which occurs naturally within the cells and mitochondria of a taro plant. Any variety within the species of *Colocasia esculenta* derived from natural processes, inclusive of traditional hand-pollinated crosses.

TARO SECURITY

The Task Force defined security as protection from outside threats, from existing pests and diseases, and outside competition, as well as more secure and improved livelihoods and markets. It also meant protection of traditional taro cultivars, of cultural practices and taro lands, and taro-farming family well-being; to be secure in knowing that taro will not only persevere but be revitalized.

Five key aspects of taro security – prevention, control and eradication of existing pests and diseases, cultural protection, livelihood and lifestyle protection, and education – are described below:

- Prevention – concerns can be broken down into three main sectors:
 - 1) preventing new pests and diseases at State borders - the need for stronger inspection programs to prevent new pests and diseases from entering the State (border protection). Increased pest and disease surveillance, improved communication regarding observed pests between USDA, Homeland Security and HDOA (responsible agencies for inspecting and tracking pests and diseases), and more stringent state and federal importation regulations are part of prevention.

- 2) preventing loss of local growers markets – from a producers' perspective reducing taro imports is critical, yet the lack of regulations and accessible and affordable land and water resources to allow for improved fallow practices and increased local production is real. Local growers need a more secure market in the same way that many other agricultural crops locally and nationally have received assistance (i.e. import tariffs and raw product bans). We should support all efforts to grow all we need here, first.
- 3) preventing the loss of taro farms and growers – the number of taro farms and intergenerational taro-farming families has been in steady decline for many years as the cost of doing business for taro growers rises. Access to good taro lands and water resources at affordable rents is a major concern. Permits for farm-based poi factories are complex and expensive. In the larger perspective, the issue of food security is also part of taro farmer concerns. Natural disasters such as the 2006 earthquake demonstrated how rapidly Honolulu would run out of food and how little fresh food, including taro and poi, is actually grown locally.

Prevention also meant assessing the long term impacts of short-term solutions.

- Control and eradication of existing pests and diseases - the lack of solutions or supports for existing problems is high on the list of farmer concerns; at the top is the lack of funding, agency and resource supports for farmer-based solutions for apple snail control in the last decade. Equitable partnerships are needed to implement taro purity and security.

There is a recognized need for more alternative research and holistic solutions that do not include genetic engineering.

- *Cultural protection*¹⁰ – a range of connected issues revolved around the need to recover, protect and revitalize the traditional taro varieties and practices that are the heritage of Hawaiians and to understand the strengths, weakness, importance and preferred places of each variety. There is a lack of understanding and recognition of varieties among taro growers, researchers, students, and consumers. As research, collection and revival proceeds, the rights of taro farmers and Hawaiians over these varieties needs to be safeguarded along with the right to safely continue the practice of sharing planting materials (huli).
- *Livelihood and lifestyle protection* – concerns beyond economic survival included a lack of protection for traditional lifestyles and landscapes including a current trend of granting permits to build new homes on top of functioning ancient taro systems that are still in operation. Affordable health and farm insurance is something most taro farmers lack access to. Farmers noted that the next generations will no longer be familiar with taro and poi as they are not eaten by young people; taro, poi and lū'au leaf are not available in schools and need federal DOE approvals and federal funding to make that happen. Without access to traditional taro varieties for comparison, consumers don't make alternative choices about preferred varieties and tastes.
- *Education* – there is an awareness that information is lacking on many levels and a concern that more education is needed in legislative, agency, researcher, farmer, consumer and general public sectors to increase understanding of the importance of taro to Hawai'i, inform policy, improve taro research selection criteria, improve markets, increase taro varietal identification accuracy, improve pest and disease control efforts and ensure taro farmers economic success.

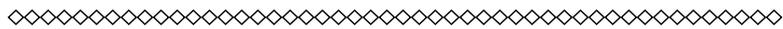
¹⁰ "Cultural protection" in the context of taro security and throughout this report refers to both protecting the heritage and relationship between taro, growing taro, Hawaiian culture and traditional cultural practice, and the horticultural definition of "the growing of plant material".

2. THE TARO FARMING LIFESTYLE

E pū pa‘akai aku a pa‘a ka houpo.
Take a bit of salt till the diaphragm is solid.
Said by one whose fare is humble, consisting mostly of poi with salt or kukui relish.
“Eat till you are satisfied of this humble fare.”

“The taro farming lifestyle” was cited in Act 211 and in Task Force meetings as in decline and important to protect. The term has been heard frequently in the state Legislature and county councils in recent years as taro farmers try to articulate to decision-makers why support for their work is so badly needed. There are those who consider this lifestyle a cultural relic, a quaint vestige of the past like the old plantation camps, to be preserved for its “Hawaiian sense of place” or to provide a beautiful image for the tourist industry. Taro farming communities are a critically important repository of traditional knowledge and practice and a model for sustainability. The lifestyle is one that some dream of moving into right from school or retiring to, sometimes unaware of the hard work it entails. It is also a vibrant, gratifying, humble way of life, multi-faceted and full of responsibilities little understood by those who are not taro farmers.

The taro farming members of the Task Force share their mana‘o here so that decision-makers, agencies, researchers and partners might better understand the taro farming lifestyle and grasp how decisions they make effect taro farmers and the communities they reside in.



The taro farming lifestyle is holistic; when a farmer tends the taro he or she is connected to everything else – the land, the streams and the reefs. The hard work is an automatic part of the lifestyle. The nature of the taro plant means hand labor is unavoidable. But, that hand labor, is what keeps the farmer connected and aware of the conditions of his soil and water; the health of the system. The daily changes in the heavens – the clouds, the winds, the rain, sun and moon – are always a part of their observations. It’s an outdoors lifestyle; its flexible schedule dictated by the needs of the plant.

“You learn not to fight nature [and] end up appreciating the earth more. You get out what you put in; it’s honest work.”

“It provides me with a sense of security because we are the source of the lands abundance and prosperity; if we don’t care for it well, we are also the source of its decline and impoverishment – and our own.”

Commercial growers have kept poi on the table of those without access to this unique resource but it is much more than a way to make a living – it’s a way of life.

“You can’t reduce [taro] to a bunch of agricultural statistics because you miss all the other things that are going on. A lot of farmers are part time because they can’t make enough income to support their families solely by growing taro. Being able to live on the farm is what makes it affordable.”

Producing food that feeds family and community provides a sense of security and creates self-sufficiency. *“If I grow taro, I know my family is not going to starve.”*

A healthy family-based taro farm is a strong foundation for a vibrant rural community. Even where there are differences of scale between small growers and larger farms, values are similar. It boils down to respect, kōkua and sharing. Those values change the economic decisions that are made and redefine success.

“It’s a mind shift from economic income and a commodity to priceless treasure. You understand you have to take care of the kalo and the resources will flow from that.”

Most growers, Hawaiian and non-Hawaiian, consider themselves fortunate to be a taro farmer; a privilege not many have. It is their

identity. If they could not grow taro any longer, they would lose their sense of self and sense of place in the world, as well as a connection to the community that surrounds them. The taro farming lifestyle provides a foundation that builds resilient communities and families.

“It’s about feeding and taking care of people. It comes back; you can’t buy that with money. Anyone who’s been around kalo knows this intrinsically.” “As long as I have poi, I can share.”

“Growing kalo skipped a generation in my family. My grandfather grew it but not my father. I feel fortunate to be able to come back to it. My sister used to have to stand in line to buy poi at Times Supermarket. Now she gets from me. I am keeping my promise that she never has to go to buy poi again.”

Growing taro is a physically, mentally and spiritually healthy lifestyle. Everyone in the family can get involved and benefit from it. The diet of taro farmers remains close to the traditional Hawaiian diet; today ‘ai pono programs are a call for Hawaiians to return to that once healthy diet. The lifestyle is also a socially healthy institution; taro farming connects new people to the community and provides a place for kūpuna to pass on knowledge to children. A whole culture revolves around mālama Hāloa.

For Hawaiians, the identity goes much deeper. They are carrying on their cultural traditions. The taro farming lifestyle grounds and connects them to their kūpuna; it represents being born of this ‘āina. Hawaiian taro farmers are a living connection between the two.

“When I am tending the kalo, I am also tending to my ancestors, the kupuna who came before me and those still living who I now feed. I love my poi – it tells me everything because I was raised on it.”

Kyle Nakanelua, a Maui taro farmer, Hawaiian cultural practitioner, and member of the Task Force describes the profound and sacred relationship of the mahi‘ai kalo (taro farmer) to Hāloa embedded in the taro farming lifestyle;

“The lifestyle of taro is one of discipline and care and affection. In one word I would sum it up as religious. Not the dogmatic blind faith robotic unconscious drudgery. But a pragmatic, dedicated, committed and continuous act on a daily basis that is serene, solemn and thus sacred. A taro lifestyle dictates that one must organize and plan his/her daily life around the caring of taro forever. Your thoughts of taro will greet you in the morning and the accomplishments of your day will put you to sleep at night.

It is a way of living day to day and processing the ability to recognize the spirit of God alive in your life. You bow down to it constantly as Muslims do in prayer. You utter invocations of hope and petitions for abundant growth as a Hindu prays his prayer beads. When disease and famine come, you seek the fault within yourself as the caretaker or recognize the dire condition of our society reflected through this condition in the kalo as a kanaka kū kahi o Hawai‘i, and you beat your chest to mea culpa, mea culpa e domino mea culpa [just] as a true catholic [does].

Serving the elder sibling by tending to the tedious mundane drudgery of cleaning nourishing and supporting his leadership day in and day out is necessary in this relationship, for it is the elder sibling that sacrifices his life on behalf of all those that come after him. This is a relationship of Alo Hā. The sharing of each other’s essence face to face. I give to you, you give to me, and together we live. Eia nō ka ‘oihana Kalo. This is the work of Taro, [the taro lifestyle].

KULEANA

Those who benefit from the resources that taro farmers provide, the konohiki of this state (the decision-makers), buyers and consumers also have kuleana (responsibility) tied to the taro farming lifestyle. In the traditional system, it was the responsibility of the konohiki and the ali‘i to ensure that the maka‘āinana (those who cared for the land) were cared for in turn. They depended on the farmer to provide for everyone who did not grow their own food.

Taro farmers hold up their end of the kuleana by caring for the water, the land and the kalo, but what do they get in return? For today’s consumer to expect cheap poi on the shelves all the time, for today’s visitor industry to expect that the beautiful viewplanes of Hanalei, Ke‘anae and Waipi‘o will always be there or lo‘i will be available to visit, for the restaurant and raw food buyers to expect the farmer to produce a consistent quality product without providing active support for that to happen is out of sync with the reciprocity that is required of this lifestyle and for the taro to survive.

As one farmer stated *“We cannot feel ke akua if we have to come out of our taro farms to fight for the things that are supposed to be*

already there to support the kalo – the wai, the ‘āina, our ability to mālama – this is what is disrupting the balance. We care, we work, we suffer, we toil in quiet, and the whole thing is we shouldn’t have to. We’re doing what ke akua wants us to do; this is our kuleana. Everyone has to take care of their side of this kuleana so that we can continue to care for the kalo and for those who eat our food.”

The heart of the taro farming lifestyle: *Take care of that which cares for you.*

It is time to lessen the burden on the taro and the taro farmer and support their survival, so that the rewards to everyone continue to grow.

‘Ai no i kalo mo‘a.

One can eat cooked taro.

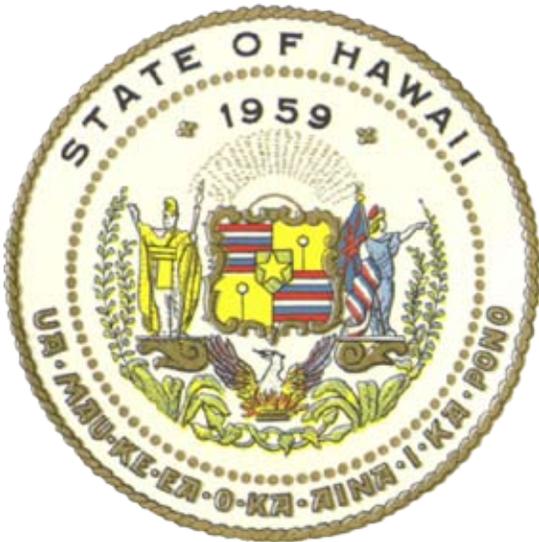
The work is done; one can sit at ease and enjoy himself.

3. TARO AND STATE IDENTITY

State identity depends on who is telling the story and what point in history the story begins. However, through it all, taro is a constant physical, spiritual and symbolic presence.

The expanse of food that was grown in these islands prior to Captain Cook’s arrival in 1778 and even into the early 1900s was tremendous. One estimate suggests more than 20,000 acres were in production prior to Western contact.¹¹ On the arable land along each stream on each of the main Hawaiian Islands except Kaho‘olawe, from the narrowest upper reaches of valleys such as Maunalei on Lāna‘i and Honokōhau on Maui, to the isolated valley floors of Pololū to Waipi‘o on Hawai‘i, and Hālawā to Wailē‘ia on Moloka‘i, and along the broad, estuaries of Hanalei, Kaua‘i and in the long valleys of windward O‘ahu, taro was grown and the stone walls that identify them persist in the landscape. The long lines of dryland taro terraces on the slopes of Kohala, Hawai‘i remain a testament to the incredible productivity of Hawaiian taro farmers.

The foundations of urban Hawai‘i, from Downtown Honolulu and Waikīkī, Nu‘uanu, Mānoa, Pālolo to Hilo, Wailuku and Lahaina are literally built upon lo‘i kalo; all were former taro-growing places. The industries of sugarcane, pineapple and ranching ploughed over or grazed upon taro and sweet potato terraces and diverted water from lo‘i kalo systems to grow crops for export.¹² Taro fed those who came to build and those who worked in the new fields.¹³



All that Hawai‘i is now was built on the shoulders of Hāloa.

The kings and queens of Hawai‘i recognized the importance of taro to the lives of their people and the chiefs. For this reason, King David Kalākaua’s crown included representation of a taro leaf – a symbol of Hāloa the ancestor of the Hawaiian people, and of long life.¹⁴

Taro was still considered to be an important staple food with great religious significance at the time of statehood in 1959. Despite the overthrow of the monarchy, first the Territorial Seal and then the Great Seal of the State of Hawai‘i, continued to include taro in its design with the presence of eight leaves at the bottom of the seal - the foundation that supported the rise of the kingdom and then the State of Hawai‘i.

Today, the landscapes that include surviving taro-growing lands are some of the most valuable visual images in the state; particularly to the tourist industry. Like the hula, taro is an ambassador for the state’s identity to the rest of the world.

In 2008, the Legislature acknowledged the integral role taro has played in the state’s history and cultural identity by designating it as the official State Plant (Act 71).

¹¹ Hollyer, J. ed. 2007.

¹² Wilcox C. 1996; numerous early survey maps and Boundary Commission Records indicate the location of taro and sweet potato fields and walls, kula (upland gardens) and other food resources that have been supplanted by large-scale agriculture and development over the last 150 years.

¹³ This is evident in the many ethnographic stories and old photographs of that era, including pictures of family and social gatherings around lū‘au where poi bowls are a prominent feature even in mixed gatherings.

¹⁴ Pukui, M. K. and S. Elbert. 1981.

4. TARO AS CULTURAL PIKO

Ka i‘a o ka ‘āina.
Big-leaved fish of the land.
 Lū‘au, or taro greens.

Hāloanakalaukapalili was born in the twelfth era of the Kumulipo, the Hawaiian creation chant, a stillborn child of the gods Wākea and Ho‘ohōkūkalanī who when planted in the ground becomes the Hawaiians most important food plant. He is followed in birth by Hāloa, the first man.¹⁵ At the very point in the genealogy of the Hawaiian people where the lineage of man begins, sits the pair Hāloanakalaukapalili, the trembling leaf - the kalo (taro) - and Hāloa, the man; inseparable in their relationship and responsibility to each other.

Knowing where one originates, who one’s ancestors are, is an important aspect of Hawaiian thinking.¹⁶ Larry Kimura, a well-known Hawaiian language instructor at the University of Hawai‘i, suggests the status of the first born carried with it great importance and prestige.¹⁷ Mary Kawena Pukui and her co-authors in *Nānā I Ke Kumu (Look to the Source)* write that “Hawaiians placed great value on traditional ways and in knowing family genealogy and the family ancestor gods (*‘aumākua*). Yet, there is no written language to record this history.” The hiapo, the first-born, was the “living history book.” Expanding on this, Pukui continues “In old Hawai‘i, ones relatives were both earthly and spiritual.¹⁸ Reaching back to the manuscript notes from the Hale Nauā Society, this communication from the past is found; “Now you must understand that the children born from Hāloa, these are yourselves.”¹⁹

The first voyaging canoe that arrived in these islands likely carried a few precious taro plants (perhaps corms; perhaps huli) carefully chosen for their endurance in the long journey across the breadth of the ocean. Both real and god, Hāloa, the kalo was the first plant which nourished those who decided to remain in this new home just as an elder brother would do. From this stems the deep connection between Hawaiians and the taro plant and the indebtedness to the plant for the life of man.

Caring for the taro brings man back into balance with the ‘āina and all of nature; tempers his use of resources and turns his relationship to one of reciprocity and stewardship. The cycle of preparing the lo‘i, planting, growing, harvesting, preparing the food and eating is also the cycle of creation.

Hāloa is recognized as a kinolau (body form) of Kāne, one of the four major gods in the Hawaiian cosmology also connected to fresh water.²⁰ Here again, the relationship between the farmer, the natural elements and the gods is bound.

Taro is woven into the mo‘olelo (legends) of Hawai‘i, including the great epic of Hi‘iakaikapoliopole. A chant within the story recognizes the lineage of Hāloa at the crater of Kīlauea.²¹ The tender young lū‘au (leaves) are described as the favorite food of Pele and were used in healing by Hi‘iakaikapoliopole. At times, taro was an acceptable offering in place of fish in ceremony.

In the last 50 years, the taro plant has become a frequent symbol of the family for many organizations and agency programs in the state. The makua (parent) at the center surrounded by nā ‘ohā (the children); together the generations create ‘ohana. From the field to the table, the kalo as poi brings the family together. Such was the relationship that when the poi bowl was open, no grumbling was allowed. Jerry Konanui, a Puna taro farmer, cultural practitioner and Task Force member notes that everything is tied to the kalo – food preparation, cultural protocols, knowing how to act with respect, how to care for each of our kūpuna and our keiki – all that is tied to how the family lives. The reverence for the plant in the field and the food on the table is recognition of kalo as a higher being. Using ancestral knowledge, everything falls into place.

15 Beckwith, M. 1951; Malo, D. 1903. Hāloa is considered to be the ancestor of the Hawaiian people. His mother, Ho‘ohōkūkalanī, is the daughter of the gods Papahānaumoku and Wākea.

16 Pukui, Haertiz and Lee, 1979.

17 Kimura, L, 1983:183.

18 Pukui, Haertig and Lee, 1979:52; 168.

19 Kepelino, 2007: 192. The Hale Nauā Society (also known as the Hawaiian Nauā Society) was “[a] secret society formed or revived by [King Kalākaua] for the study of the ancient Hawaiian religion and manner of living. Hale nauĀa place where genealogy was scanned to see whether applicants were related to the high chief and therefore eligible to become members of the royal household.” Pukui, M. K. and S. Elbert. 1981

20 Handy 1991.

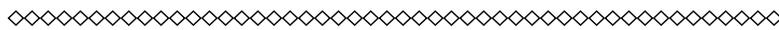
21 Nogelmeier, P. 2006; chant 344, pg 264. The writing of Hi‘iaka’s name follows this version of the tale.

He ali‘i ka ‘āina, he kāua nā kānaka.
The land is the chief; man is the slave.
Man cares for the land and the land provides.

5. TARO IN AGRICULTURE - SUBSISTENCE, SUSTENANCE AND ABUNDANCE

Agricultural statistics, agencies and lawmakers in Hawai‘i typically divide food producers along economic lines into subsistence and commercial growers and resources are allocated accordingly. After World War II, taro production, along with many other food crops, was viewed in comparison to sugar, pineapple and ranching as a minor contribution to agriculture in Hawai‘i. In 2008, seed crops and alternative energy are fast becoming the new yardstick. It’s all about numbers – acres, inputs, outputs, yields, number of jobs, tons of fertilizer, revenues for the state. There is no room in the model for resources not spent, costs and environmental damages not incurred, resources shared, the web of direct beneficiaries.

The importance of economic survival cannot be denied. A commercial taro grower must make enough to stay in business; however, a perspective that only focuses on economic concerns marginalizes the value of taro and those who farm it in the state’s economy. It is also difficult from this model to be able to support taro growers. It suggests a need to consider an alternative model for defining agriculture status – one that moves us towards an accounting of abundance.



The Taro Security and Purity Task Force found that small-scale taro farms in Hawai‘i are often divided into subsistence and commercial agriculture frameworks in the minds of legislators and agencies; a distinction that suggests small growers are “less than” and contribute less to the revenues, resources and self-sufficiency of the state.

The largest taro farms in Hawai‘i are 20 to 50 acres; a more typical farm is five acres or less. Collectively, taro farming here is, as a matter of scale, all “small”; they are also mostly family-run owned and operated. This range of small, family farms represents a continuum of contributors to food supplies and local markets that is critically important to the whole of taro’s role in agriculture and to sustainable food supplies statewide.

What does subsistence mean and does taro farming go beyond the model?

Webster’s Dictionary defines subsistence as “the condition of maintaining existence; the minimum (as of food and shelter) necessary to support life.”²²

In Hawai‘i, “subsistence” use of resources such as fishing, hunting, and gathering and cultivation of plants carries with it legal definitions and case law which protects and supports Hawaiian cultural practice.²³ There are also clearly taro farmers who grow purely to feed their families. There are important legal definitions of subsistence in Hawai‘i included in the State Constitution (Article XII, Section 7) and the State Water Code (Section 174-101, Hawai‘i Revised Statutes).

The Moloka‘i community, in their 2008 Future of a Hawaiian Island plan, defined subsistence as “*the customary and traditional use [...] of wild and cultivated renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, transportation, culture, religion and medicine, for barter or sharing, for personal or family consumption, and for customary trade.*”

To understand where the problem lies in defining taro farming as solely subsistence or commercial consider this comparison from a typical study in agriculture:²⁴

22 Merriam-Webster Dictionary online.

23 Such as the 1995 P.A.S.H. decision which asserted Hawaiian gathering rights.

24 Osborn, A. San Diego State University, 2007. This view is representative of a persistent bias in economic geography, cultural geography, horticulture, and agriculture regarding the contributions of small-scale farms to local and regional economies. The column on taro farms has been added for comparison. Feeding one’s family in the Hawai‘i context may also mean providing taro to many families in an extended ‘ohana which goes far beyond the typical economic unit of a small family.

Characteristics	Subsistence	Commercial	Hawai‘i taro farms
1. PURPOSE	Consumption	Off-farm sales	Both
2. PERCENTAGE of famers in the population	Majority	Minority of the population	Minority of the population
3. MACHINERY	Mostly hand	Mostly mechanized	Mostly hand after planting; field preparation often mechanized
4. FARM SIZE	Small	Large	Small
5. FARMS and other industry	Mostly isolated markets	Highly integrated into regional or global economies	Highly integrated into local, county and state economies; some export through distributors

Subsistence agriculture can be synonymous with self-sufficiency, crop diversity and the ability to feed one’s family and community. Farms are managed for long term sustainability rather than market or export crop production cycles or fluctuations in market prices.²⁵ The term subsistence; however, has too frequently been politicized to indicate low-income farmers who fail to contribute to Gross National Product (GNP) or state revenues; something outside of or “below” the mainstream market. The small family farms that contribute to commercial taro production statewide clearly demonstrate otherwise.

Of the 105 farms recorded by HDOA as commercial growers in 2008, less than 10 percent are at the large end of the scale (20-50 acres). Numerous small taro growers, many not included in the statistics, not only bridge the gap between feeding their immediate families, their extended families and community, but also growing enough to support a vibrant trade and cash economy and engage in and purchase goods from the market on a regular basis.

But what else is going on?

Consider the dictionary definitions of “sustenance” - a “means of support, maintenance or subsistence; living; food; provisions;” “nourishment” and “something that gives support, endurance, or strength.”²⁶ This suggests a definition more in line with how taro farmers perceive of their own labors and relationship with the taro – nourishing and supportive.

Island economies have finite resources. Wetland taro farming uses very small amounts of natural resources. While a lot of water is required to pass through the system to produce healthy taro, most of it returns back to the stream.²⁷ Native freshwater and marine fauna do not suffer a loss of habitat nor are they hindered from moving up or downstream. In addition, the taro patches provide an alternative means to get to and from streams where impediments occur. No dust plumes (soil loss) plague wetland taro patches on windy days and soil movement within the system under normal conditions is contained from one patch to the next. Excess biomass (roots, older leaves, etc) is returned to the mud to create more soil.

Taro farms reduce the state’s global warming footprint in several ways. They have very small fuel and fuel-based inputs such as fertilizers and herbicides and small carbon footprints in comparison to conventional agriculture. If Hawai‘i lost access to fuel tomorrow, the state’s taro farmers could still produce food. Collectively, they reduce the state’s need to import food, which means low fuel-miles from farm to table. The minimal distance fresh food travels when imported is 2,500 miles from the coast of California, not including the distance from farm to shipper. Organic taro growers further reduce fossil fuel accounts by eliminating chemical fertilizer additions to soils.

Community, family, generational and school-to-farm learning and sharing occur daily. Community relationships create a high degree of self-sufficiency and resiliency. Taro farmers donate a high percentage of their “income” and resources in the form of fresh produce, labor, equipment use and time to charity, including local fundraising efforts that support education, families in need, non-profits, churches and community revitalization.²⁸

25 Waters, T., 2007.

26 Merriam-Webster online dictionary.

27 Gingerich, S. et al, 2007.

28 Levin, P. 2006. An economic study cited in this report indicated the charitable contributions of taro farmers in Hawai‘i “had a retail value of \$577 to almost \$1,000 per month ... One taro farm whose purpose [was] to educate and benefit the community reported that ‘for every two bags we harvest, we give one away.’” The report continues “A loss of these gifts to the community could seriously curtail local fundraising outcomes and increase costs of local celebrations dramatically.” Given current budget climates this is more true than ever.

The State of Hawai‘i imports 85 to 90 percent of its food.²⁹ All of the taro plant is edible; the entire crop represents a proportionally high contribution to local food self-sufficiency. A ratio of 1 to 0.75 exchange between raw taro and poi³⁰ means taro growers provided over 3.2 million pounds of poi to consumers in Hawai‘i in 2008.³¹ A one pound bag of poi for a family of four wouldn’t go far for poi lovers, but that would still mean 12.9 million local meals. While no data exists at this time, it suggests taro farmers produce more food for local tables per capita than any other crop in the state. Being able to generate food from almost nothing but sweat equity and to produce so much food annually creates a measurable picture of abundance.

Abundance is defined by Merriam-Webster as “a degree of plentifulness; ample quantity; profusion; affluence, wealth.” In the Hawaiian worldview, wealth (waiwai) connects right back to the source of quality taro production – wai (water) – that which sustains life.

If Hawai‘i is to proceed with some quantifiable measure of success towards reducing contributions to global warming and increasing fuel and food self-sufficiency, it is time to change the dialogue in agriculture and the direction of state resources and supports from biggest revenue generators to smallest footprints and greatest local food production ratios. Taro farming is a successful model from the past that is able to support a sustainable future.

6. LO‘I KALO, CULTURAL CONTINUITY AND LAND DESIGNATIONS

Here is the place where the texture and features of the land must be named in order to understand the physical and ecological ‘structures’ that are required for healthy taro systems to function; and, to understand what has been swept away and disconnected by modern descriptions and delineations of ecosystems, habitat, land use and zoning. The health and stability of each of these parts is critical to renewing the food production systems they represent. The “system” does not begin at the māno, the point in the stream where water is drawn to the lo‘i, but with the ao, the place in the heavens where the winds, the clouds and the rain are formed and water comes to earth. The maka‘āinana, konohiki, ali‘i and kāhuna tended to the needs of the land and the heavens so that the whole of the system supported life.³²

The names which follow proceed not in alphabetical order but in the order of the “system” in which the features sit. The wet and the dry taro fields run parallel in this landscape but both lay along the lines of water - one following the permanent freshwater flows and the other, the lines of the rains, the wet winds and the mists, and the moisture that is held and moves in the soil.

Ao - light, day, dawn; the clouds; the world, earth, realm.

‘Āina - land, earth, natural resources; inclusive of the whole of the system from peak to reef, from fresh water to ocean and all the elements within it.

Ahupua‘a - a land division, mountain to near shore, usually bordered by ridgelines; a ecological or political district which supported the food and resource management and production systems of Hawaiians.

Wao - inland or upland regions, each with its kapu and resource use and management strategy; mountain regions, the wao akua being the realm of the gods which protected the highest sources of water in the ahupua‘a.

Wai - fresh water.

Kahawai - stream, creek, river or tributary, whether dry or wet.

Pūnāwai - freshwater springs with potable water.

Wai kai; wai ‘awa‘awa - brackish water.

Kai - ocean; salt water.

Māno - dam, stream or water source; headwaters; a place where water is directed for distribution into channels; a channel, diversion or intake; a rock dam or other feature (and its location) that brings water into the ‘auwai from the stream.

‘Auwai - irrigation ditches and channels that transport water from streams to lo‘i and ponds, between lo‘i, and from lo‘i back to streams.

Hā wai - water trough or pipe, aqueduct, flume

Lo‘i kalo - taro ponds or patches; irrigated taro terraces and whole taro patch systems that supported wet taro cultivation.

Māla; māla ‘ai - dryland garden(s); upland garden(s); upland agricultural field(s), including for taro.

Kula - dryland taro gardens; upland or open fields.

²⁹ Leung P.S. and M. Loke, 2008; Page, C, L Bony and L. Schewel, Rocky Mountain Institute (RMI), 2007.

³⁰ Pers. com. September 2009, J. Cain, K. Mock-Chew, and J. A‘ana, poi millers. Estimates based on poi mill outputs.

³¹ NASS, February 2009.

³² Pōhaku, ko‘a, and heiau across the land were located at key points in the system like the knots in the net of a fisherman to facilitate that care.

Pāpōhaku; paepae pōhaku - *stone wall(s)*

Kuāuna - *bank or border of a taro patch.*

Pukawai; makawai - *individual taro patch inlet or outlet for water*

Loko i‘a; loko i‘a kalo; loko wai - *fishponds, often found at the bottom of the ahupua‘a and within lo‘i kalo systems and which derive their nutrients from the upper parts of the system and feed the nearshore reefs with their output; inland or coastal fishponds.*

Papa pa‘akai; lo‘i pa‘akai - *salt pans, often a component of brackish water fishpond and lo‘i kalo landscapes.*³³

Mākāhā; makawai - *fish pond gates; sometimes lo‘i gates.*

Papa - *coral reef.*

The places where the physical features of the system are found are critically important wahi pana (legendary places) to Hawaiians. The practical information behind the names and stories of these sites describe the prolific food systems Hawaiians developed throughout the islands and the way in which they were managed. Many bore famous names and were connected to the chiefly lines of each island. The taro patches of ‘Iole, Hawai‘i, were said to belong to Kamehameha; the legend of Hi‘iakaikapoliopole references them to a much earlier time when they provided the tender lau (leaves) that fed Hi‘iaka during her journey to retrieve Lohi‘au for her sister Pele.³⁴ The taro patches of Ke‘anae, Maui, were said to have been built at the urgings of a chief by carrying baskets of soil from the uplands to cover the entire lava peninsula that now boasts the famous landscape captured by Ansel Adams in *The Islands of Hawaii* in 1958. The legend informs the taro farmers of the peninsula of the underlying lava substrate that can break through the fields and pose a danger there. KīkīāOla (known today as the Menehune Ditch) of Kaua‘i is one of the finest standing examples of a lo‘i kalo infrastructure system, said to have been built in ancient times in one night by the menehune. In the first half of the 20th century, the taro patches of maka‘āinana and ali‘i on all the islands, including those belonging to Princess Victoria Kamāmalu, King Lunalilo and Queen Emma, were still in working order.

The histories of these systems date back as long as Hawaiians have been in these islands; their proliferation on the land is well-documented by archaeologists and historians, as well as the Hawai‘i State Historic Preservation Division. But, just as with heiau and ko‘a (shrines), the records are full of epitaphs of the physical demise of lo‘i kalo – “utterly destroyed,” “now planted in [cane or] pineapples,” “stones removed,” “now the place of [a subdivision],” “no longer planted because the stream now flows only after rains” and “nothing remains.”³⁵

A second and less obvious manner of demise is equally distressing. In the failure to either remember the names and stories or recognize the still viable use of those sites that remain; in the changing of a name, they become lost in the minds of current land managers, local residents and decision makers.

There are limited official designations within state or federal agencies in Hawai‘i that recognize these wahi pana. Zoning specific to wahi pana or traditional cultural properties (TCPs) that supports their protection is missing; although cultural easements have been placed on lands, they are after the fact mitigation strategies rather than pro-active protections. Generally, taro lands are a very low priority for state protection and zoning laws. State and federal agencies also struggle to recognize the viable rehabilitation capabilities inherent in these sites under existing rules. This is particularly true of fishponds in Maui and Moloka‘i and coastal lo‘i systems on all islands. One can trace the demise of such sites on old maps where fishpond and lo‘i walls disappear as water was cut off and the structures were filled in by the erosion of soils from upland ranching and plantation agriculture; the names change to pond, marsh, wetland or wasteland and are thereafter misinterpreted as ecosystems devoid of Hawaiian development or interaction by decision makers who lack the experience to know the longer histories of such places.³⁶

Functioning and fallow taro lo‘i, fishponds and their supporting infrastructure fall under the definition of “wetland” and “waterbird habitat” for agencies such as the U.S. Army Corps of Engineers (US-ACE), U.S. Fish and Wildlife Service (USFWS), the Environmental Protection Agency (EPA) and the state Department of Land and Natural Resources (DLNR).³⁷ Federal rules now catch

33 Such as those at Hanapēpē, Kaua‘i or formerly known to Keālia, Maui. The salt pans at Pu‘olo, Hanapēpē, are referred to as lo‘i pa‘akai and the three main components of making the salt are lo‘i, waiku, and puna.

34 Nogelmeier, P. 2006.

35 This litany of loss runs throughout the descriptions of wahi pana in such reference works as Sterling and Summers (1978), Sterling (1998), and Handy and Handy (1990).

36 A number of the major fishponds and wet taro field systems of Maui have been designated as wasteland or marginal agricultural lands (and therefore suitable for development) or endangered waterbird habitat which disallows original use. Examples include the extensive taro lands of Waikapū, the twin fishponds of Mao‘oni and Kanahā of which the military attempted to drain and built a station on in the 1940s, and Keālia fishpond and its surrounding lo‘i, whose flows were impacted by stream diversions and interrupted by highways and is now a federally protected wetland where pickleweed is the dominant vegetation. Each island has its own examples.

37 Long term staff of these agencies typically understand the rights of cultural use and economic benefits for lo‘i kalo and try to avoid oversight; however current

up lo‘i kalo and ancient fishponds in the latest definitions of “waters of the US” which determine all permitable land use actions on lands that meet US-ACE definitions for wetland characteristics based on set soil, water and vegetation standards.³⁸

Taro patches and fishponds are not inanimate artifacts to be incorporated into park or reserve attractions but rather dynamic, living systems that only recently fell out of use through a complexity of circumstances that included radical changes in land tenure and water use, which effectively removed the families who farmed and cared for these wahi pana from the land. Recognition of cultural use and inclusion of culturally appropriate management strategies are frequently an after the fact decision by federal and state agencies after much protest in the Hawaiian community.³⁹

Biologist definitions of “wetland” do not appear to have a direct counterpart in traditional Hawaiian language – no directly translatable word is found in the Hawaiian dictionary.⁴⁰ Indeed, the words, marsh or bog, its closest facsimile suggest, in the Hawaiian view, a distinction between those places appropriate and used for lo‘i kalo and other sites.

A marsh was lepo pohō, ‘unelunelu, ‘alē, nakele, napele, naele. The first, lepo pohō, marshy earth, suggests soils that were not worth cultivating. Pohō is translated as loss, damage; out of luck; useless, in vain; bog, swamp, mire, slough; sunken, sinking; to settle as earth. Onepohō was quicksand.⁴¹

The last four terms indicated water absorbing, disagreeable, slippery, messy or muddy (kele) places, a characteristic of a marsh but not necessarily a lo‘i system which was well maintained. Only ‘unelunelu alludes somewhat to good soils with one meaning of nenelu (also mehelu) being “soft, as fine, worked-up soil.” Of the hundreds of words associated with and describing taro, lo‘i soils and taro patch lands in the Pukui and Elbert Hawaiian Dictionary or Lorrin Andrews’ earlier work of 1865, an association with lo‘i and lepo pohō does not occur.⁴² Taro was grown in spring-watered marshland by heaping up the soil into mounds that stayed above the surface of the water or by the creation of floating mats on which soil was piled and on which to grow the taro, but this was not part of a typical lo‘i system, and produced good taro only if the water in the marsh had some flow, such as a spring or active seep.⁴³

In similar fashion, a bog was pohō, naele, nenelu, ‘olokele. Boggy or boggy soils were mā‘olu (quagmire), nolu, nakele, hāwali (a place where vegetation grows around a salt pond), nenelu, mō‘olu. On rare occasion, a bog such as Luakini on the summit of Ka‘ala, Wai‘anae, or estuary marshes such as Kawainui, O‘ahu and numerous loko i‘a (inland ponds) which took advantage of natural water formations with minimal formal structure⁴⁴ were recognized and managed as fishponds or retained lo‘i but without evidence of the large rock structures known to more conventional sites.

Taro patches and fishponds are wetlands and visa versa. A serious reconciliation and understanding of the language and definitions that may impact taro systems is needed at the federal level⁴⁵ and subsequent zoning to protect them as living sites is necessary at the state level.

Responding to the real need for viable wetland waterbird habitat, present day taro farmers and historic record clearly show that waterbirds and taro farmers have lived with each other in abundance for centuries and that taro farmers are highly knowledgeable about wetland fauna.⁴⁶ The majority of lowland and coastal wetlands were significantly altered by Hawaiians as long ago as 1,200 years. By the time that Captain Cook arrived in 1778, or later when scientists began to systematically document the biodiversity and ecosystems

rules do not always provide them with the best options.

38 40 CRF 230; 33 CRF 332; US-ACE Wetland Delineation Manual 1987. A simple taro lands permit under the Corps which recognized cultural use and local agriculture practice specific to Hawai‘i has lapsed as of 2006.

39 The eviction of the Pai ‘Ohana from the Koloko-Honokōhau National Park on Hawai‘i after more than seven generations of documented use is a classic example of misunderstandings and cross purposes. The USFWS Hanalei Wildlife Refuge continues to struggle with the 1,200 year history of lo‘i kalo management prior to its 1970s acquisition of the property for waterbird habitat.

40 Pukui, M. and S. Elbert. 1986.

41 Pukui and Elbert, *Hawaiian Dictionary* 1986.

42 Levin, P. 2009 from review of the entirety of both dictionaries as part of research for revision of Bulletin 84.

43 Handy (1940:11) writes: “Kona people, accustomed to the fragrant humus-grown upland taro, dislike swamp-grown taro because they say that it and its poi smell swampy. But fine taro can be grown in swampy soil if the swamp is ditched so that the water circulates, or if the swamp is due to spring water or active seepage. Taro rots in stagnant swamps or upland bogs.”

44 Sterling and Summers’ *Sites of Oahu* (1978) is a source of descriptions that references primary documentation of these sites.

45 In the state’s Ocean Resource Management Plan – CZM – the courts made sure this issue was considered.

46 Greer, N. 2005.

of the islands in the 1800s, examples of what would have been pristine wetland habitat had already been lost. Yet, “wilderness” and “wildlands” preservation are a fundamental ideology of present day conservation efforts.⁴⁷ The question of what plant communities and water management strategies to return to needs renewed dialogue within the Hawaiian and scientific community. Current conflicts between land use purposes and between birds and taro farmers lie in the severely reduced numbers of both endemic waterbirds *and* taro farms and farmers.

The most important understanding to grasp is that these features were cared for by Hawaiians and are meant to be so. Protecting wahi pana, wetlands, punawai, kahawai, ‘auwai, lo‘i kalo and loko i‘a – and the waterbirds they support – in the Hawaiian islands context isn’t accomplished by keeping people out but by letting people restore and take care of those places which are connected to their identity, survival and wellbeing. Opening up more taro patches on all islands replaces the missing connecting wetland landscapes between currently designated waterbird set asides and provides increased waterbird habitat.

Federal, state and private monies are allocated and donated to preserve parks as precious open space resources but in Hawai‘i, lo‘i kalo are precious to preserve as well.

⁴⁷ Paleobotanical studies of wetland soil cores from Kaua‘i and Maui support this, showing the makeup of plant communities and their associated fauna differed greatly from descriptions by botanists in the 1800s.

IV. GOALS AND OBJECTIVES OF THE TARO SECURITY AND PURITY TASK FORCE

Act 211 called for the Taro Security and Purity Task Force to prioritize and make recommendations on nine objectives (Section 2) and to achieve six actionable objectives (Section 3) outlined in the legislation (see Appendix A), as well as any other issues or objectives that might arise during the course of the task force's fact finding within the taro farming communities of the state.

When the original budget to the task force was cut in 2008 effectively preventing the group from implementing programmatic objectives (Act 211 Section 3) related to conducting archival and ethnographic research in support of a revision of *Bulletin 84: Taro Varieties in Hawai'i*, (Section 3-3), protecting the Moloka'i taro varieties collection (Section 3-4) and conducting apple snail research (Section 3-5), pursuit of some of these objectives continued through individual efforts outside of the Task Force. They remain, however, without funding.

Given the lack of resources to direct toward specific high priority projects, the body found that its capabilities were best focused on illuminating and supporting the needs of the taro farming community. In the course of the task force's tenure this translated into three efforts; 1) prioritized recommendations for the report to the Legislature; 2) a number of time-sensitive action requests related to letters of support and task force position statements;⁴⁸ and 3) efforts to engage stakeholders in dialogues that build relationships for the future.

1. PROCESS

The 18 members of the Taro Security and Purity Task Force began with a draft list of issues from past experience.⁴⁹ The Task Force then traveled to many taro growing areas around the state to listen to the communities as they expressed their concerns, challenges and solutions to taro issues. Over the course of a year, the group met with taro growers on each island, agency representatives and experts to gather information, describe, focus and prioritize objectives and recommendations. With input from across the state, the group formed issue groups to further rank and refine priorities, then reviewed proposed recommendations as a whole. The recommendations are meant to honor long time growers and cultural practitioners who provide poi for Hawai'i's tables, and support opportunities for a new generation of taro farmers.

The report was reviewed in draft three times by the Task Force and by members of the taro farming community prior to completion. During the final review process the report also received public input from several individuals, Waipā Foundation, and the Waikīkī Hawaiian Civic Club. The final document was presented to OHA for submittal to the 2010 Legislature on November 20, 2009.

We note that in every community we visited, on each island, taro growers brought up serious concerns regarding gmo taro and voiced frustration that the Task Force did not address this matter; we acknowledge that vitally important voice. Act 211 understood that this one issue would have overshadowed the many other crucial problems that taro farmers face (land, water, economic viability, etc) and needed to be addressed through this report with the state and its agencies. It remains, however, an important issue for the Legislature that should not be ignored.

2. PRIORITIES

The Task Force found that each of the nine objectives in Act 211 Section 2 was of some degree of importance to taro farmers but not necessarily in the form they were described. Rather, each has been addressed through seven interrelated and equally important topics which members felt better described the breadth of issues taro farmers are faced with in Hawai'i, as follows: LAND, WATER, ECONOMIC VIABILITY, BIOSECURITY, RESEARCH, AND EDUCATION. The issue of HAWAIIAN TARO VARIETIES was added to capture the specific tasks outlined in Act 211 focusing on preservation and perpetuation. The sections of this report follow these topics. Page 29, under the heading Ho'ī, begins with an overarching recommendation to facilitate future action.

Within each issue section, recommendations include policy, programs, projects and necessary actions. A suggested list of key partners has been provided for groups of, or individual, recommendations to guide and coordinate actions but is only a beginning point at this time.

All actions within this report are considered to be of high priority. A numeric ranking by degree of importance across stakeholders does make sense where an issue or recommendation was common to all or some communities, but a single community might have one pressing issue that was unique to that place. However, in order to aid decision-makers, policy advocates and potential partners in the work ahead, the Executive Summary highlights those actions the Task Force determined were most pressing for the current Legislature to consider.

⁴⁸ Copies of these letters can be found in Appendix B.

⁴⁹ Taro Security and Purity Task Force minutes, December 10, 2008.

Recognizing the severe budgetary constraints of the state Legislature and agencies in 2010, this report emphasizes first year efforts in the Legislature and among stakeholders that focus on policy and rule changes, building relationships, and setting in motion the foundations for future project efforts and collaborations. As budgets recover, resources should be directed to specific objectives outlined in the report; however, there are some projects that require more urgent response. The Task Force encourages out-of-the-box thinking in the search for resources to support the recommendations of this report.

----- **IMPORTANT NOTE** -----

Act 211 and the Taro Security and Purity Task Force (TSPTF) will sunset June 30, 2010. Throughout this report, recommendations may refer to the TSPTF as a partner, facilitating, initiating or reviewing body for actions.

During the fact-finding and recommendation development phase of the TSPTF it was found that this legislative task force was filling an important gap in communication for the taro farming communities of the state and has provided a place of trust for taro farmers to share their concerns; however, there is also an expectation of follow through by the Task Force. There is a clear need for continuation of the TSPTF in some form. It is the recommendation of this report that the Legislature support continuation of the Task Force. In the absence of a TSPTF, in all instances where referenced, consultation should occur with all taro farming communities and organizations across the state.

Ho‘i

The Taro Security and Purity Task Force was established under Act 211 for only two years, ending June 30, 2010. The members of the Task Force and taro farmers that we met with were encouraged for the first time that such a group consisted of so many farmers who understood the dilemmas and challenges they faced, as well as the kinds of solutions they sought. Additionally, this body has carefully listened to taro farmers as they described their relationship with taro and what was important to preserve in their communities. A level of trust built on that understanding has been created that suggests the value of continuing this body on a more permanent basis.

RECOMMENDATIONS

- A. Create a permanent TSPTF body to continue to represent taro farmer concerns at the Legislature and with agencies, to continue the work outlined in Act 211 and this report and provide a point of contact for researchers and agencies interested in working with taro farmers (also see ECONOMIC VIABILITY A1; pg 53).**

Necessary action:

- a) Request that the Legislature extend the life of the Task Force to allow it to continue to work beyond the life of Act 211.
- b) Develop new sources of funding and alternative strategies for gathering for meetings.
- c) Develop a strategic plan for accomplishing the specific projects outlined in Act 211 and in this report.

Partners:

All current partners in the TSPTF, taro growers

V. LAND

Taro farmers have a particularly compelling interest in the health and preservation of the land. They represent a model of natural resource conservation and resource self-sufficiency articulated in the Hawai‘i’s State Constitution, Article XI, Section 1 Conservation and Development Resources which mandates that “for the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawai‘i’s natural beauty and all natural resources, including land, water [...] and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State.”

While Article XI, Section 3 Agriculture Lands and HRS 205-41 promote the protection of agricultural lands, the Hawai‘i Supreme Court in 94 Hawaii 97 Waiāhole Water Case 1, has clarified that such public purposes do not receive the same level of protection as the rights of taro farmers, traditional and customary rights and appurtenant rights, nor other public trust purposes such as environmental protection and leaving water in its natural state.⁵⁰

Furthermore, Article XII, Section 7 Traditional and Customary Rights “reaffirms and shall protect the rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.”

The burden to uphold, execute and enforce these laws falls to state and county agencies and executive law makers to promote and protect public trust uses of Hawai‘i’s agriculture lands in accordance with these highest public trust purposes. The Task Force asks that the Legislature, agency chairs, boards and commissions uphold these constitutional foundations that protect taro farmers and taro farming lands, traditional and customary practice and appurtenant rights in their work.



In Hawai‘i, thousands of acres currently covered in overgrowth, such as these lands the task force visited in Kahana Valley, O‘ahu, could be returned to taro production.



50 Article XI, Section 3 mandates that “the State shall conserve and protect agricultural lands, promote diversified agriculture, increase agricultural self-sufficiency and assure the availability of agriculturally suitable lands.” HRS 205-41 states there is a compelling state interest to conserve the State’s agricultural land resource base and requires the state to assure the long-term availability of agricultural lands to achieve the purposes of conserving and protecting them.

Lo'ī and dryland kalo terraces were a prominent feature in the pre-contact Hawaiian landscape. No comprehensive field and archival research has been done to provide a more accurate picture of the expanse of taro lands in the islands prior to 1778. Despite the almost catastrophic decline of active taro producing lands in Hawai'i (from more than 20,000 acres to perhaps 500 acres today), there remains hundreds, if not thousands, of acres of taro-growing lands that lay fallow with the potential for rehabilitation and productivity. Under dense mats of California grass in the lowlands and the roots of non-native trees, hau and bamboo forests in the uplands rest miles of ancient Hawaiian taro walls and their supporting 'auwai (irrigation channels) that once fed a nation – and have the potential to do so again.

There is no shortage of suitable taro growing land in Hawai'i, but, access to these lands is severely limited physically and economically. The Department of Land and Natural Resources, Department of Agriculture, Kamehameha Schools, Office of Hawaiian Affairs, Department of Hawaiian Homelands, Bishop Museum, U.S. Fish and Wildlife Service and the U.S. National Park Service among others, manage lands that could be brought into production. These agencies, working with historic maps and records and with communities and taro farmers advocacy groups such as the Taro Security and Purity Task Force and 'Onipa'a Nā Hui Kalo could help identify taro lands and infrastructure that could be made available to those who wish to farm.

Federal agencies who manage lands in Hawai'i have found striking a balance with taro farming a challenge to national park and reserve status and purposes, particularly where wetland waterbirds are concerned. Taro systems, fishponds and the infrastructure that connects and supports them are not inanimate artifacts but rather dynamic systems that were only recently abandoned through circumstances beyond the control of the generations of families who farmed and cared for them. An absence of federal and state agency language to allow recognition for long-standing traditional use where lo'ī kalo (and fishponds) have reverted to an unmanaged wetland state during the last century diminishes the opportunity to revitalize traditional Hawaiian use and practices and our ability to feed ourselves. The impact of increasing populations of native waterbird species and taro farmer livelihoods is real but not unsolvable when considered from a local knowledge and culture perspective (see LO'Ī KALO, CULTURAL CONTINUITY AND LAND DESIGNATIONS). Two potential solutions include planning with communities on a landscape and island-wide level *prior* to the designation initiation process; and, providing support for access and resources to taro lands in adjacent areas when reservations for parks or waterbird habitat occur.⁵¹ The residents of Moloka'i have invested a significant amount of time and thought in considering what areas and resources should be protected and how; Wai'anae, O'ahu, Hā'ena and Waipā, Kaua'i and other rural communities have done the same.⁵²

Cooperation between all stakeholders is integral to the success of renewed taro lands and increased wetland habitat.

Kamehameha Schools Land Assets Division presents a model for the future. They have moved from thinking about land and water solely as the means by which to fund education, to land and water, in connection with people, as a place where education occurs. This shift has changed the definition of productivity for their assets and land use decisions. As they look to diversify agricultural initiatives, they are also looking at how to 'grow farmers' and to support farm success.⁵³ For the state, this model can also be applied. How do we move from land solely as a source of revenue (and its produce solely as a commodity) to land, and the food that is grown there, as a place to develop self-sufficiency; and where traditional crops such as taro play an important role in future land use decisions?

Access to good taro growing lands is hindered by several other challenges.

Taro lands have been marginalized by the assignment of low value agricultural land use designations. HDOA definitions for prime and marginal agricultural lands use outdated criteria whose baseline is productivity for sugar and pineapple.⁵⁴ While some taro-growing areas receive the designation of "unique", many more are considered "prime D, E" or "marginal." The distinction between prime A, B, C, D, E or marginal lands is sometimes determined only by access to or lack of water. This prejudices taro farming lands that have been cut off from traditional water sources to receive low value designations. The result is two-fold; marginal lands are more likely to be sold, rezoned and built on for lack of protections,⁵⁵ and taro lands or taro farmers do not often qualify for prime agriculture land

51 Too often, communities find out about park or conservation district designations after a decision has already made and the agencies are vetting the management plan.

52 The community of Hā'ena, with the help of Limahuli Gardens, completed a community-based mapping project to rediscover and restore local place names and knowledge of the landscape and to guide future land management decisions in the area.

53 Neil Hannahs, Land Assets Division, Kamehameha Schools, presentation to the Taro Security and Purity Task Force, June 2009.

54 USDA SSC 1972; C. Smith, NRCS State Soil Specialist pers.com. 2007; NRCS and USGS Soil Surveys are being redone to more accurately describe soils and land use potentials but are not likely to be completed for several more years. HDOA designations and definitions are created independent of these assessments. Several attempts at re-categorizing agricultural lands (i.e. LESA) have failed to include community perspectives on what constitutes important and useful lands for local, county and state self-sufficiency. Taro farmers and local communities have not been consulted on what lands should be targeted for preservation.

55 HB612 (2009 Legislature) attempted to amend HRS 205-50 Standards and criteria for the reclassification and rezoning of important agriculture lands, to increase protections for large contiguous parcels where agriculture related annual income produced from the land was at least \$1,000,000, further risking smaller but

economic incentives. Increased protections for agriculture lands outlined in bills such as HB1008 (2009 Legislature) were restricted to only A and B class lands but not other classes that could support numerous small-scale farmers and ensure more agricultural lands are used for their intended purpose.

An offshoot of this perceived low-value agriculture status for taro lands is poor protections for traditional taro growing infrastructure such as rock walled terraces and ‘auwai that remain on the land. A significant portion of surviving taro systems are recoverable for food production. Many are wahi pana (legendary places), or belonged to well-known ali‘i. Numerous sites have been bulldozed in the last 50 years. State and County planning divisions have permitted the construction of new homes on top of taro patches in the middle of active taro systems, disrupting the ability of water to flow from one patch to the next, a fundamental element of a working system. On all islands, existing taro lands have also been cut off from access to water by changes in landownership, private property boundaries and the installation of fences by new owners. The end result is that farmers can no longer walk along ‘auwai or reach stream intakes to maintain them or portions of the system are allowed to be destroyed (i.e. during grubbing and grading) because of a lack of understanding of the system and/or protections on the part of permitting agencies and existing or prospective landowners.

Both the Hawai‘i State Historic Preservation Division and state and county planning department staff have little ability to prevent the destruction or interruption of ancient taro-growing systems due to limitations in existing cultural resources protection and land use laws and lack of staff. Taro patch walls do not have the status of unique cultural features such as heiau. A landowner may be required to document a cultural site and file a record with SHPD but still receive permission to destroy it. There is no clear picture of how much taro-growing infrastructure has been lost in this way, or how much remains. A taro and taro lands recognition bill (HB1736 and SB1854) that would have begun the process of increasing protections for traditional taro growing places from inappropriate development was introduced in the 2007 Legislature but failed to pass.

Additionally, the price of lands no longer valuable as prime agriculture land along with land taxes have become cost prohibitive for taro growers, particularly when high-valued homes begin to encroach on the landscape. The constant attempts to whittle away good agricultural lands for development through legislation neglects to protect a range of lands for diversified food production, including wet and dryland taro, and fails to recognize the ability of some lands to become productive under alternative management strategies, particularly organic soil restoration practices. While agriculture lands frequently sell and lease for considerably less than non-agriculture lands in the private sector, lease rents for some taro lands owned by the state are significantly higher than others under state jurisdiction.⁵⁶ No farmer can afford to purchase taro land at \$40,000 to \$100,000 per acre and be a full time taro farmer; more so if they can not live where they farm. Reduced lease rents directly impact local food production capabilities.

Pursuant to Act 211, Section 2 (c)(8), the Task Force discussed the feasibility and impact of requiring DLNR and HDOA to provide reduced rent rates for taro farmers on state-leased land and believes that it would be beneficial to taro farmers and feasible for DLNR and HDOA to establish a long-term lease program (minimum 20 years) that would make state agriculture lands available at rates that are affordable and advantageous to taro farmers and which include attached farm dwelling permits. The Task Force also felt that such leases should be revocable if a lessee failed to actively grow taro (exclusive of true fallow rotations as part of a growing system), so that new taro farmers would have the opportunity for a lease.

Tax rates for farmers based on the value of adjacent parcels are disproportionate to the current income generating ability of taro. The passage of exemptions for kuleana lands in the City and County of Honolulu, and the counties of Kaua‘i, Maui and Hawai‘i provide an example of one type of support to ease the cost burden for taro farms; exemptions for landowners or lessees who protect remnant taro systems or bring them back into production may be another. A second example, an amendment to the Maui County Code (1994; Section 3-48-175) allows for an exemption from minimum tax assessments for farmers whose lands are valued at less than \$33,000 annually and are actively growing taro.

For taro lands to become viable again, access must be coupled with training that will enable farmers to be successful - taro skills, business skills, knowledge about available state lands and land use programs, criteria for tax credits and loan programs, and mentoring programs for new growers will help the land to thrive (see EDUCATION). Reversing soil impoverishment on available lands will also require attention to soil quality not just available nutrients, as well as programs that assist taro farmers to understand and improve existing soil conditions, particularly organic and traditional Hawaiian cultural practices specific to wet and dryland taro production (see EDUCATION and ECONOMIC VIABILITY).⁵⁷

equally important parcels of agriculture lands in the state which can not produce such revenues.

⁵⁶ Prime agriculture lands and “highest and best use” values for state leases makes creating affordable leases for taro farming difficult.

⁵⁷ The dominant practice of chemical fertilizer use in taro production practices for the last 70 years has left soil quality on many taro farms in poor condition. Agricultural lands under state jurisdiction may also be contaminated with pesticides, plastics, heavily eroded or leached of organic matter.

As the face of agriculture changes in Hawai‘i, and competition over future uses heats up, retaining lands for taro production is an urgent issue in need of immediate attention.

Above the lights of urban Honolulu,⁵⁸ among the folding mountains of rural communities, along the low reaches of streams throughout the islands, on the edges of the kula forest line and on the windswept slopes of Kohala sits the potential for Hawai‘i’s food self-sufficiency.

RECOMMENDATIONS

A. Improve access to taro-growing lands.

1. Support a comprehensive study to research existing maps and records, survey state lands on the ground, identify parcels, stream, elevation, location within parcels, site condition, water and infrastructure (access, utilities, terraces, ‘auwai, etc.) availability and agency jurisdiction to determine the extent of traditional taro lands still present (wetland and dryland) and potential for rehabilitation, as well as new lands that would be suitable and available for taro production.

Necessary action:

- a) Investigate the status of the DLNR- Land Use Division survey of state lands, HDOA survey of agricultural lands, and review data from the DLNR- State Historic Preservation Division, and other archival map and written sources as a starting point for the taro lands survey. Develop a clear Scope of Work for agency and/or outside providers in consultation with the TSPTF and support community-based mapping efforts in partnership with this survey. Require a degree of familiarity with and ability to recognize and identify such lands in the field, as well as an understanding of traditional taro lands in the state that will ensure a high degree of success and accuracy.
- b) Ensure that documentation of taro lands becomes an information layer in existing State lands inventories and GIS maps for all relevant agencies that will be updated and maintained over the long term.
- c) Determine which lands under federal, state or county jurisdiction still retain recoverable taro systems and a process for making those lands available to taro growers.
- d) Develop a policy to ensure that county, state and federal agencies with the ability to issue permits that effect land use and development will also take into consideration the presence of and access to traditional taro patch systems, including ‘auwai, in determinations where a landowner may require permits to build. Work with the TSPTF to develop recommendations for an appropriate balance in the need for taro farmers to live on their lands and the protection of the traditional systems.⁵⁹

Partners:

HDOA, DLNR-Land Use/OCCL/SHPD, OHA, DHHL, DBEDT – Office of Planning and all County Planning Offices, ahupua‘a and community groups, watershed partnerships and landowners, TSPTF, ONHK, taro growers.

2. Develop long-term, reduced lease rent rates for taro farmers on state-leased lands under jurisdiction of DLNR, HDOA and DHHL.

Necessary action:

- a) Consult with the TSPTF and taro growers to define the best parameters for long-term leases and conditions under which a lease would be given or revoked and research the legal implications of those conditions.
- b) Investigate the costs and impacts of implementation to their respective agencies and the State and Counties; develop taro lands lease program language and legislation to support it, in consultation with the TSPTF and taro growers.
- c) Educate implementing agency(s) staff about taro farming and what is reasonable to expect from new and established farmers in dry and wetland taro cultivation, including fallow practices, so that leases are not revoked due to lack of understanding about the challenges and needs of growing taro.
- d) Develop a multi-tiered mechanism to reach the taro-farming communities of the state and potential new growers to inform them of the program and lease vacancies as they become available.

Potential Partners:

HDOA, DLNR-Land Use/OCCL/SHPD, OHA, DHHL, DBEDT – Office of Planning and all County Planning Offices, TSPTF,

58 There are extensive remnants of taro systems in all of the valleys above the residential homes of Honolulu and many urban and rural districts on O‘ahu. Most are on state lands under dense stands of non-native trees.

59 Particularly where it concerns the interruption of taro system water flows and the issue of septic systems and potential leeching impacts to lo‘i soils and waters.

ONHK, taro growers

3. Encourage partnership efforts on private and county lands, including Kamehameha Schools, Bishop Museum, Board of Water Supply and other private land holders that support access to long term lease agreements for taro farmers.

Necessary action:

- a) Open and improve lines of communication with agencies, organizations and private landowners that possess lands that taro can be grown on.
- b) Develop incentives for private landowners to lease taro-growing lands with water to taro farmers (see C1).
- c) Develop a mechanism for private landowners who have the desire to rehabilitate taro patches on their lands to connect with taro growers and information that will help inform them about the resources on their property, taro farming, and provide examples of lease agreements.

Partners:

KS, BM, Counties, other private landowners, OHA, TSPTF, ONHK, taro growers

B. Improve protections to taro-growing lands

1. Reconsider the state’s agriculture land capability class designations to better protect viable taro-growing lands.

Necessary action:

- a) Develop more appropriate definitions and recommendations for classes of prime and marginal agriculture lands based on a broader range of agricultural crops, practices and perspectives that are more supportive of taro lands protection and revitalization; apply those recommendations to revising the current prime agricultural lands grading system to better support and protect taro growing land and opportunities for taro growers and community-centered food production self-sufficiency.
- b) Consider the potential for taro farming on county lands using these new definitions, consult with local communities to determine those lands, and work with state and county agencies to reduce zoning conflicts.

Potential Partners:

HDOA, NRCS, County land divisions, county level ahupua‘a groups, local communities, taro advocacy groups, and taro growers

2. Tighten land conversion laws (zoning) to better protect known taro growing lands.

Necessary action:

- a) Establish a taro advocacy group to advise DLNR in the review and refinement of existing law and to work with state and county agencies to preserve known taro lands.
- b) Provide information to DLNR and HDOA and develop draft language for rule-making where needed.
- c) Add and recognize a wahi pana designation to land use zoning rules statewide.
- d) Provide information and language for the current review of Chapter 343 Environmental Review Law - Cultural Assessment and Traditional Cultural Properties (TCPs) being conducted by UH to increase safeguards against land reclassification and development for taro lands.
- e) Provide information to the Counties with draft language for ordinances where needed to increase triggers for protection of traditional taro lands and features.

Partners:

DBEBT – State Planning Office, DLNR-OCCL, BLNR, County planning offices and commissions, local communities, taro advocacy groups, and taro growers

3. Work with state and federal agencies to improve understanding of the historic presence of traditional food production sites such as lo‘i kalo and fishponds on their lands.

Necessary action:

- a) Review and compare existing Hawaiian, state and federal wetland definitions, uses, and premises to illuminate commonalities, differences and challenges in Hawai‘i.

- b) Develop a white paper documenting the history of wetland character and use for the past 1,500 years in Hawai‘i, inclusive of the influence of wetland protection perspectives on land use status during the last century.
- c) Develop recommendations with the TSPTF, state and federal agencies based on the above information for acknowledging and balancing protections for Traditional Cultural Properties (TCPs) and management strategies for such sites that incorporate traditional cultural use.

Partners:

USFWS, EPA, US-ACE, DLNR-OCCL, DOFAW, DBEDT- State Office of Planning, County planning offices, TSPTF, taro advocacy groups, and taro growers

- d) Work with state and federal agencies to propose an agreement between the US National Park Service as part of the soon to be established Kalaupapa National Park to provide access to Waikolu for taro farmers to rehabilitate lo‘i kalo, remove invasive species, and manage that valley as a means of balancing out the expansion of Park Service jurisdiction at Kalaupapa.

Partners:

USNPS, DLNR, OHA, taro advocacy groups, private and state land owners in Waikolu, and Moloka‘i taro growers

C. Create incentives for active rehabilitation of taro-growing lands that result in taro lands protection

- 1. Provide a tax credit at the county level for landowners for the perpetual conservation of taro systems on private land (i.e. agricultural, conservation or cultural easements) and further for owners and lessees who enter into long term agreements (20 years) to rehabilitate taro systems to active use.

Necessary action:

- a) Research the potential impacts of a proposed taro lands tax credit to county revenues on all islands.⁶⁰
- b) Consult with the appropriate County offices, councils and mayors to determine feasibility and facilitate implementation capabilities on each island.
- c) Coordinate taro lands tax credits with existing county ordinances and develop new ordinances in consultation with taro advocacy groups and taro farmers for referral to County Councils and mayors as needed to support this initiative.
- d) Adopt a special definition of “highest and best use” for lands known to contain lo‘i kalo to be “preservation and rehabilitation of taro patches and taro production” by county and state zoning and land use planning divisions.

Partners:

County and state planning officials, real property divisions, county councils, mayors, local communities, taro advocacy groups, and taro growers

- 2. Allow lands in conservation districts dedicated to growing taro to receive tax rates equal to or less than agriculture dedication rates.

Necessary action:

- a) Review state and county rules which set the criteria for valuation of conservation lands to determine what triggers higher tax assessments for such lands.
- b) Evaluate how agriculture dedication tax values could be applied to conservation lands in taro cultivation.
- c) Work with the TSPTF, county and state agencies and taro farmers to draft language and develop options that support affordable tax assessments for growers on conservation zoned lands.

- 3. Reconsider existing and proposed state agriculture incentive programs aimed at agricultural lands protection where they exclude small growers due to size, income, education or location.

Necessary action:

- a) Review HRS 205, HDOA HAR 4 which aims to protect and promote the proper use of Hawai‘i’s agricultural lands and draft recommended amendments to the proposed language to better support, encourage, and protect active small, family taro farms and new taro farmers with a view towards state food self-sufficiency.
- b) Review HRS 205, HDOA HAR 4 and related HAR where they define by statute or rule the criteria for being recognized as

⁶⁰ Similar to work done for the adoption of the kuleana land tax waiver for the counties of Kaua‘i, O‘ahu, Maui and Hawai‘i which is likely to be adopted statewide.

a farmer by the State. Draft recommendations for amendments to definitions to make it possible for taro farmers to qualify for “farmer” status for use of state agricultural lands and the incentives tied to those lands.

- c) Create language guidance for HDOA and lawmakers for future bills that may arise in the Legislature to ensure taro farms become an acceptable option for state agriculture leases and incentives.
- d) Convene stakeholders to review and consider the use of “agribusiness” vs. “agriculture” and “agriculture sustainability” vs. “food self-sufficiency” in existing state policy and proposed law and develop a white paper and language guidance for HDOA, lawmakers and other decision-makers to address the challenges presented to Hawai‘i in producing local food for local tables.

Partners:

HDOA, TSPTF, state and county land and real property divisions, county level ahupua‘a groups, local communities, taro advocacy groups, and taro growers

VI. WATER

The Taro Security and Purity Task Force strongly supports the existing legal framework for managing Hawai‘i’s precious freshwater resources, and recognizes the importance of stewarding these resources as a Public Trust for the benefit of present and future generations. Article XI sections 1 and 7 of the State Constitution and the State Water Code, Hawai‘i Revised Statutes chapter 174C, should be enforced and implemented and must also be protected from attempts to dilute the Public Trust in Hawai‘i’s water resources.

The Commission on Water Resource Management has the authority to condition permits on the payment of appropriate fees. In re Waiāhole Combined Contested Case, 94 Haw. 97, 185 (2000), the Hawai‘i Supreme Court held that in order to be valid, the fee need only bear a reasonable relationship to the cost of the services rendered by the agency. *Id.* at 186. In that case, the Court recognized the power of the Water Commission to charge water users fees to be applied to stream studies. The Taro Security and Purity Task Force acknowledges the Commission’s ability to determine what fees are needed and urges the Commission to apply appropriate fees to fund interim instream flow standard studies as well as stream gauges to monitor water flow and temperature in streams that have been diverted.

In Waiāhole, the court justified the fee that the Water Commission charged permittees to fund biological and other studies because the lack of such studies precluded the permittees from proving, and the Commission from determining, the actual extent to which the diversions would impact public values in the stream and estuary ecosystem. *Id.* at 185.



The life-giving waters of Kāne are a vital foundation for our streams and communities throughout Hawai‘i nei. Their formation in the clouds of the high forests and up-welling in the streams, springs and ocean depends heavily on how we care for mauka lands. Cool, clean, free-flowing water is necessary for the cultivation of healthy taro, in the form of both the streams that feed the wetland systems and the cycle of rains and mists that feed the dryland mala (fields).

The Taro Security and Purity Task Force and every taro farmer recognizes that it is impossible to achieve taro security and purity (as defined in this report) without free-flowing streams that not only run continuously from mauka to makai, but that have enough flowing water to support the lo‘i kalo that depend on them.

These mauka to makai connections for water are essential for the cultivation of taro and to support other beneficial instream uses that depend on healthy stream systems, such as native stream life, productive estuaries and fisheries, traditional agriculture and aquaculture, small family farming, and traditional and customary Native Hawaiian rights and practices.

Lo‘i kalo are integrated into the watershed ecosystem, carefully engineered to fit the conditions and character of each stream and valley. This system of growing taro has a proven track record for maintaining healthy stream water flows that is centuries old. Taro farming supports these beneficial instream uses by returning the majority of the water to the streams once it has flowed through the lo‘i. The Taro Security and Purity Task Force recognizes the opportunity to restore diverted stream flows especially with the decline of plantation agriculture, and the need and obligation to restore adequate flows notwithstanding existing diversions, and urges the Commission on

Water Resource Management to take the initiative to restore continuous mauka to makai flows wherever practicable.

The Task Force believes that the existing regulatory framework; including the Water Commission and Water Code, can best manage our resources if more funding and staff are provided to better implement fundamental mandates, including but not limited to: updating the Hawai'i Water Plan, particularly the Water Resources Protection Plan, to identify and account for the existing and future needs of kalo farmers and exercised and unexercised traditional and customary Native Hawaiian and appurtenant water rights; recognizing traditional and customary Native Hawaiian and appurtenant water rights to assure their protection; establishing scientifically-based interim instream flow standards (IIFS) for all streams in Hawai'i; and supporting and expanding existing data on stream flows, especially stream gauges managed by the United States Geological Survey.

Although Hawai'i's laws strongly protect the rights of taro farmers, especially those with appurtenant and traditional and customary Native Hawaiian rights, the State must do more to ensure that these laws are actually being enforced on the ground in the lo'i and that taro farmers are receiving the protection that our Constitution and laws require. The Taro Security and Purity Task Force recognizes that ultimately, the burden is on the Water Commission and any offstream diverter to establish that taking water from a stream will not adversely affect current or future trust purposes, including taro cultivation. The Water Commission must ensure that offstream uses are held to that burden. In addition, the Water Commission must fulfill its mandate of investigating and upholding appurtenant and traditional and customary rights to ensure that current and future taro farmers have a sufficient source of water to support their needs.

In short, the Commission must fulfill its Public Trust duty and take the initiative to uphold and advance water uses and rights for taro farming at every stage of the planning and decision-making process. The Task Force also recognizes the funding constraints occurring at this time. Based on the reasoning of the above cited laws, the Taro Security and Purity Task Force believes that it is just and fair to require the permittees of any offstream diversions to pay a reasonable share of the costs of IIFS studies and stream gauges to monitor the stream diversions, as well as ensure that public values, traditional and customary Native Hawaiian, and appurtenant rights, both exercised and unexercised, are adequately protected. Exemptions for such fees should be made for taro growers exercising their riparian rights or constitutionally protected traditional and customary Native Hawaiian or kuleana (appurtenant) rights.

Additionally, the Commission and the courts, must uphold enforcement responsibilities where a landowner or water user has repeatedly failed to comply with an agency decision or court order.

Kamehameha Schools has recently repaired the Punalu'u ditch system on its lands and were able to not only recover more water above its needed 6mgd through this undertaking but also returned the excess water to the stream. We find this approach pro-active and responsible, and strongly urge the state and counties to follow this example.

In community meetings, the Task Force found that in addition to the above concerns on water resources and water law that taro farmers strongly supported keeping the Water Code as is, enforcing the mandates of the water code, and that each wetland taro-growing place had unique instream flow issues and conditions that needed to be addressed to support existing or prospective taro farming. Additionally, dryland taro farmers on Moloka'i were challenged by severely degraded and unattended watersheds and soil erosion conditions on a large scale and the poor conditions and management of water transfer systems. The Task Force did not have the time or resources to investigate conditions in every taro-growing community and urges agencies to work closely with taro farmers at each site to support solutions that fit site-specific needs. The following is not meant to be a comprehensive list of taro farmer water issues around the state but reflects the sites that were visited and the issues that were brought to our attention during site visits.

Waipi'o, Hawai'i

The culturally significant and historically renowned valley of Waipi'o is the major taro growing area on Hawai'i Island. Most of the poi consumed on the big island comes from this valley. There is renewed interest in producing more taro and re-opening fallow sections of the lo'i kalo system. Several family run poi shops are connected to this community.

There are two irrigation ditches that divert water away from Waipi'o for agricultural purposes; however, at this time, Waipi'o is one of very few places blessed with an abundant water supply. The water issues that impact this community are centered around flooding concerns. Taro farmers and community members, working in conjunction with the Natural Resources Conservation Service (NRCS), developed a stream management plan that seeks to address flooding impacts. The earthquake of 2006 added to long standing flood problems and created new ones. The Waipi'o community is currently working with County officials and State Civil Defense to access

funding appropriated for earthquake repair in Act 78 (2008 Legislature) but support from other agencies and the Governor are needed to facilitate the release of those funds.

Ke‘anae/Wailuanui, East Maui

The entire East Maui watershed is severely impacted by the extensive diversion of water from Mālika gulch (Ha‘ikū-Makawao district) to Makapipi stream (Nāhiku district) by the East Maui Irrigation (EMI) company. Ke‘anae-Wailuanui is one of the largest taro-growing areas in Maui with a rich cultural history and remains an important source for taro, lū‘au and poi for the county. Removal of water out of the streams that feed these two taro areas has reduced the capacity of the system to support healthy taro cultivation. Diminished flows result in increased taro disease and apple snail populations and prevent the opening of more lo‘i that could contribute to Maui’s and O‘ahu’s food self-sufficiency. The community has spent decades trying to restore water to their lo‘i. A 2008 decision by the Board of Land and Natural Resources (BLNR) sought to establish interim instream standards and included appointment of a water monitor and the installation of temperature gauges to ensure adequate stream flow. This has yet to occur and taro farmers are seeking enforcement of the BLNR decision.

Nā Wai ‘Ehā and West Maui

Historic records indicate Central Maui’s Nā Wai ‘Ehā region was formerly the largest contiguous producer of taro in the state.⁶¹ While some taro lands are still intact, and some are actively cultivated, little or no water is available in the streams, to rehabilitate most of these ancient systems. The four streams are either entirely or mostly diverted. Taro farmers have been forced to rely on the plantation ditch systems for the water in their ‘auwai for nearly 150 years. Waikapū valley can access water directly from Waikapū Stream, but it currently has so little water that the traditional ‘auwai system still in use is unable to support more than a few lo‘i.

West Maui streams are also diverted, even though large scale agriculture in the area has declined. Permanent access to enough water to support healthy taro production in each valley is not yet available. As land conversion and development ramps up on agricultural lands throughout Maui new pressures on Nā Wai ‘Ehā and West Maui waters are occurring.

Moloka‘i

The Moloka‘i Irrigation System (MIS) is the lifeline of the Hawaiian Homes farming community of Moloka‘i. Taro is one of the main subsistence crops in Ho‘olehua, and also a commercial crop. Poor management and a failure to make vital repairs in a timely manner have put the MIS in jeopardy of running out of water each year. Of the five state irrigation systems, the MIS generates 60 percent of all revenues derived from the sales of water. The MIS has been self-sufficient for decades, and funds generated by the MIS have been used to repair other state systems. Breakdowns continue to have a major impact on farm operations that jeopardize the long term security of agriculture on Moloka‘i.

New MIS water rate increases, triggered by the inability of the other state irrigation systems to cover their costs of operation, have fallen on cash-strapped homesteaders who depend on the MIS for water, and adversely impact their subsistence and customary rights and ability to farm on either a commercial or subsistence scale.

The MIS needs to be managed in such a way that proactive maintenance and repairs can take place instead of only fixing things after they break. Homestead farmers need to hold two-thirds of the decision-making power reflecting their proportional two-thirds prior rights to this water. They also have a vested interest in ensuring the successful management of the MIS. The State Legislature has appropriated approximately \$350,000 annually to the State Irrigation System Special Fund. For decades, the MIS has not benefited from these funds, yet has consistently added to these funds due to its self-sufficiency. This resource should be directed towards repairs of the MIS. Through the Department of Hawaiian Home Lands long-range strategy to defer to community-based management, farmer-users of this vital agricultural resource will assure accountability, sound management, and implementation of proactive improvements to the system.

Kahana, O‘ahu

Kahana Valley was once a major taro-producing district whose lo‘i extending to the shore and connected to a fishpond, in a traditional

61 Historic records indicate that it was Maui, rather than Kaua‘i, that formerly had the capacity to produce the greatest amount of food in the island chain into the early 1900s. Sterling (1998) notes from Handy (1940) several records alluding to this fact. “From Waihee to Wailuku Valley, in ancient times, was the largest continuous area of wet taro cultivation in the islands” (pg65). Of Wailua, Maui is recorded that “Beyond Koali the deep little valley of Wailua, plenteously watered by three converging streams falling from the slopes of Kaumakani, harbors the most extensive wet plantations on the eastern end of Maui. Altogether there are about as many old terraces as at Keanae, though fewer are now under cultivation” (pg154). Dryland taro planting extended “formerly [in] great quantities...in the lower forest belt from one end of the [Kaupo] district to the other” prior to the ranching era (pg174) as well as other districts. Moloka‘i was also known as an ‘āina momona during Kamehameha’s time.

integrated system. The valley is currently managed by the State of Hawai‘i under DLNR as a “living park” where families contribute time to the perpetuation of traditional Hawaiian cultural landscapes and practices. Only a small portion of the extensive lo‘i system has been re-opened. Further revitalization is hindered by the growth of invasive species in the lo‘i and the stream; hau and other trees, along with fallen branches and organic debris impede its flow to the ocean. There are concerns about flooding beyond the banks of the stream because of this blockage. The educational and subsistence lo‘i could be expanded if the overgrowth along the river were cleared.

The once extensive taro systems of the Windward side are impacted by the diversion of water from streams and dikes in the Ko‘olau Mountains, as are the reef systems that depend on the freshwater plumes that extend from those streams. Taro growers here, particularly in Waiāhole, are now threatened by the requests of new users beyond original claimants on the ditch system that will further remove the water from its originating streams to the other side of the island when IIFS have yet to be established for these streams.

Kaua‘i

Kaua‘i taro growers in Waimea and Hanalei districts face problems of significant water impacts during flood events that result in major damage to taro farms, including rivers changing course away from historic and traditional ‘auwai systems on which numerous farmers depend, as well as inundation with mud which destroys the taro and the patches. In 1995, the Hanalei River experienced a massive flood event that resulted in a partial change in the course of the river at a critical juncture in the stream that feeds taro farms in the USFWS Hanalei Wildlife Refuge. On November 14, 2009, heavy rains caused the river to completely change course at this same point, resulting in a total loss of water to this critical segment of the stream for taro growers whose crops are now both heavily damaged by the floods and at risk of complete failure because of the lack of water. It is urgent that the USFWS Wildlife Refuge, US-ACE, DLNR, County officials and State Civil Defense work to repair this damage. A long-lasting solution to this situation is needed that brings USFWS, NRCS, DLNR, taro growers, private landowners, and the community together. Funding should be appropriated for earthquake repair under Act 78 and federal emergency funds that may be available through USFWS or US-ACE.

Continual maintenance and upkeep of the ‘auwai/irrigation systems (both the ones that bring in and take away water) is a challenge for taro farmers in Waimea. Traditional and historic systems in this valley run for miles and were previously kept clean by a large number of users. The small number of taro farmers currently in the valley can not provide the labor or costs to maintain the entire system and need help so that they can focus on growing taro and maintaining their portions of the system.

Lāna‘i

Lāna‘i is a semi-arid island and the cultivation of taro, sweet potato and yams was primarily dryland in the past. The island’s water is dike impounded rather than aquifer based and the dikes are the main source of water today. Irrigated taro was known historically to small wetland patches in Maunalei Gulch where the only perennial stream that reached the ocean is located; dryland taro grew at the seaward end of the valley.

Maunalei stream, which is permanent at the upper end, was utilized by Hawaiian families on kuleana lands prior to the water development work done by the Lāna‘i Ranch Co. Currently, Maunalei stream runs through to the sea only after heavy rains, as those experienced in 2008, but not for very long. A right of access agreement with landowner Castle and Cooke is allowing for the rehabilitation of some of these ancient taro patches under both wet and dry cultivation methods and the development of a Hawaiian food plants collection but resources are limited. The long term goal of the project is to restore this sole remaining lo‘i system to food production once more and to provide huli (seedlings) to Lāna‘i residents for home cultivation and consumption under dryland practices. As the only wetland taro system in Lāna‘i, it is also an important resource for Lāna‘i School where integration of a hands-on Environmental Watershed Cultural Education program is happening.

RECOMMENDATIONS

A. Support and enforce the State Constitution and the State Water Code.

1. Support the full implementation of the existing legal framework for managing Hawai‘i’s precious freshwater resources and stewardship of these resources as a Public Trust per the State Constitution, Articles XI Sections 1 and 7 and the State Water Code, HRS 174C.

Necessary action:

- a) Support the existing legal framework without amendments.
 - b) Enforce and implement the existing framework, including more detailed recommendations provided below (2).
 - c) Enforce existing legal decisions restoring stream flow.
2. Provide more funding and staff to better implement fundamental mandates, including but not limited to: updating the Hawai‘i

Water Plan, particularly the Water Resources Protection Plan, identifying and accounting for the existing and future needs of taro farmers and exercised and unexercised traditional and customary Native Hawaiian and appurtenant water rights; recognizing traditional and customary Native Hawaiian and appurtenant water rights to assure their protection; establishing scientifically-based interim instream flow standards (IIFS) for all streams in Hawai‘i; and supporting and expanding existing data on stream flows, especially stream gauges managed by the United States Geological Survey.

Necessary Action:

- a) Consult with CWRM to identify necessary staffing and other resource needs to implement unfulfilled mandates.
- b) Increase state funding for such work (including the specific issues identified above).
- c) Implement fines for property owners who fail to restore water to stream flows as determined by CWRM and case law; use this funding to support CWRM work for the issues identified above.
- d) Direct CWRM’s Chair to verify and ensure that CWRM’s Deputy Director works on Water Commission business only, and is no longer required to assist with other DLNR mandates.
- e) Support and expand existing data on stream flows, especially stream gauges managed by the United States Geological Survey.

Partners:

TSPTF, NHLHC, Earthjustice, OHA, DHHL, DLNR, CWRM, USGS, taro growers advocacy groups, taro farmers

3. Hold DLNR and CWRM responsible for fulfilling their obligation to conduct appropriate water studies, such as baseline and interim instream flow standards studies and environmental assessments, to ensure that all stream diversions do not adversely affect the rights of traditional and customary Native Hawaiian and appurtenant water right holders as well as any other public trust purpose.

Necessary Action:

- a) CWRM must fulfill its responsibility of holding itself, as well as any offstream diverter to their burden of demonstrating that any offstream use will have no adverse impact on Public Trust purposes.
- b) DLNR and CWRM must do the appropriate water studies, such as baseline and IIFS studies, to ensure that all stream diversions do not adversely affect the rights of traditional and customary Native Hawaiian and appurtenant water right holders as well as any other public trust purpose.
- c) Require proper stream, ditch, and diversion maintenance and access for such action.
- d) Condition water use permits on the payment of appropriate fees, with exemptions for small water users exercising constitutionally protected traditional and customary Native Hawaiian or kuleana rights and taro farmers exercising riparian rights.

Partners:

NHLHC, Earthjustice, OHA, DHHL, DLNR, CWRM, USGS, taro growers advocacy groups, taro farmers

4. Implement all court and other administrative orders regarding stream flows and restoration.

Necessary Action:

- a) Appoint appropriate monitors for stream flow and temperature in accordance with the East Maui Water Case and 2007 DLNR order.
- b) Support the appointment of a taro farmer as the East Maui Monitor.
- c) Request and support access to taro farmers to clean and maintain the stream above the ditch in Wailuanui to help resolve inadequate stream flows due to natural blockage.

Partners:

NHLHC, Earthjustice, OHA, DHHL, DLNR, CWRM, USGS, taro growers advocacy groups, taro farmers

5. Per the State Water Code, fulfill the intent of the Water Resources Commission membership to include at least one member with traditional water management knowledge, by appointing an experienced wetland taro farmer to the Commission.

Necessary action:

- a) Continue to advocate to the Governor that a taro farmer fill a seat on the Water Commission to fulfill the intent of the Water Code.
- b) Request that OHA, DHHL and HDOA support the placement of a taro farmer on the Water Commission by writing to the

Governor and the Water Commission selection committee and voicing an opinion in support of taro farmers per the intent of the Water Code at Senate selection hearings.

- c) Provide training on the Water Code for interested taro farmers who choose to apply for positions on the Commission, and for all Commission members to assist them in upholding their duty to the law.
- d) Encourage taro farmer organizations to advocate for a taro farmer seat on the Commission with letters of support for taro farmer candidates and testimony at Senate selection hearings.
- e) Advocate with County Councils and mayors to place a taro farmer on the Water Boards of each island.

Partners:

TSPTF, NHLHC, Earthjustice, OHA, DHHL, HDOA, County Councils, taro advocacy groups, taro farmers

- 6. Assist taro farmers with CWRM water permitting process.

Necessary Action:

- a) Create a process within CWRM to assist taro farmers in understanding, applying for and receiving any necessary permitting.

Partners:

NHLC, Earthjustice, OHA, DHHL, DLNR, CWRM, taro growers advocacy groups, taro farmers

B. Improve and fund, through enforcement and other measures, stream maintenance capacity in taro-growing communities

- 1. Encourage the Governor to release allocated disaster funding to help taro farmers and residents of Waipi'o Valley avoid future flood damage.

Necessary Action:

- a) Draft a letter to the Governor from the TSPTF in support of the release of funding.

Partners:

BM, DLNR, Hawai'i County Council, Waipi'o project partners, taro farmers

- 2. Provide guidance and support to taro-farming communities with flooding and stream blockage issues on how to interface with federal and state agencies and the permitting process.

Necessary Action:

- a) Identify a group to develop guidance documents and outreach materials for communities and agencies based on the Waipi'o River Management Plan template and other successful cases, including a list of federal, state, and county agencies and other relevant contacts.
- b) Identify potential federal and state funding sources, such as stimulus funds and Act 78, Session Laws of Hawai'i 2007 for flood repair and system maintenance (flood prevention) assistance.
- c) Identify groups eligible for funding, and provide contract and other professional support to help realize and manage such projects, including facilitation resources.
- d) Identify and develop collaborative labor resources for regular whole system maintenance (flood prevention and system health) that result in consistent and effective long term maintenance by all stakeholders.
- e) Develop recommendations with county, state and federal agencies, including Civil Defense, based on a range of stream maintenance actions from hand clearance and machine removal of overgrowth to major engineering efforts such as those at Waipi'o and develop working relationships.
- f) Provide facilitation resources for communities to work with each other and agencies to find appropriate solutions to flooding and system repair and the maintenance issues of each site.

Partners:

US-ACE, NRCS, HDOA, DLNR, CWRM, DOH, Hawai'i State and County Civil Defense, County Public Works, UH DURP, taro farmers, community residents, landowners

VII. ECONOMIC VIABILITY

Everything is connected; land, water, food, health and wellbeing, culture, and economic viability. When you break or weaken any one of the links, it impacts all the rest.

In 1935, well after the Native Hawaiian population had been decimated by disease and they had lost much of their lands, it is clear that there were still thousands of acres in production though no accurate estimates are found.⁶² From thousands of growers at the turn of the century, the HDOA documented as few as 105 taro farmers were growing commercially in 2008.⁶³ While the number of self-reporting taro farms declined from 130 to 105 between 2004 and 2008, there was a small increase in area from 370 to 390 acres.⁶⁴ These statistics also indicate that 78 percent of reported commercial wet and dryland taro production currently occurs on Kaua‘i and that 65 percent of the acreage in commercial taro production (wet and dry) is located on Kaua‘i.⁶⁵ An estimated 500 acres are in taro cultivation across the state. This represents less than one percent of active agricultural lands in Hawai‘i.⁶⁶ The majority of taro farms are under 3 to 5 acres, with medium-sized growers averaging 10 acres and a rare few large growers 20 to 50 acres or more (less than 10 percent). The 2009 Hawai‘i Agriculture Statistics Survey (HASS) documented self-reported commercial acres producing 4.4 million pounds of raw taro; 4.3 million pounds going to make poi. Given the acreage of fallow taro-growing lands (wet and dry), each island holds the potential to expand taro-production (and increase state revenues) exponentially. Moloka‘i is uniquely situated to be a primary source of clean huli for all the islands because of their lack of the apple snail, *Pomacea canaliculata*.

The farmgate price of taro rose from \$0.57/lb in 2006 to \$0.62/lb in 2008, but poi rose from \$4/lb to a range of \$5 to \$7.99/lb at grocery stores and occasionally higher.⁶⁷ The 4.3 million pounds of raw taro for poi had a value of \$2.7 million farmgate; none of which receive federal or state subsidies.⁶⁸ At the consumer end, this poi was worth an estimated \$16.12 to more than \$25.77 million in sales (or from 0.67 to \$1.07 million in tax revenues).⁶⁹ Taro farmers who sell directly to consumers receive from \$1 to \$2/lb for raw taro; those who mill their own poi receive an average of \$5/lb. Lū‘au leaf has risen from \$1.25/lb to \$2/lb farmgate and to almost \$4/lb in the store. Profit margins, if they exist at all, are small for taro farmers and the labor is intensive. Little of the taro growing process lends itself to mechanization.⁷⁰ Most growers either have another job or depend on their partners or family members to supplement income to meet family needs and provide health insurance coverage.

A recent student study that considered how many acres we would need to become food self-sufficient for our 1.3 million population, determined that approximately 29,000 acres would be sufficient to provide 2.5 cup of taro per day per person for a year; approximately one third more than the lands in production in the 1930s; perhaps 10 percent of currently producing agricultural lands in the state. The group suggested that approximately 1.2 million acres would meet all of Hawai‘i’s food needs for a year.⁷¹ In 2006, statistics indicated that more than 1.8 million pounds of taro were imported to Hawai‘i, despite the fact that we have both the land and the ability to grow all the taro we need right here. The HDOA report to the Legislature stated that USDA indicated “nearly all direct foreign imports to Hawai‘i were from Fiji with sporadic shipments from China, Cook Islands, Western Samoa and Tonga.” Taro beetle is a serious pest of taro in Fiji and imports from this country should be restricted. Pacific Island taro varieties are present and growing on all islands in Hawai‘i and could easily meet the needs of the Pacific Island community here. *The Taro Security and Purity Task Force finds no logical reason why we should continue to import any type of taro to meet local needs.*

In order to increase the commercial supply of taro, farmers need to be able to make a living.

62 Based on the descriptions of E.S. Craighill Handy and many other writers.

63 National Agricultural Statistics Service, February 2009. This does not include many commercial taro farmers or other types of growers who do not report agricultural statistics to HDOA.

64 Ibid, February 2009.

65 According to February 2009 HASS/NASS statistics Kaua‘i produced 3.42 million pounds of taro (raw and processed) on 255 acres (wet and dry). As described in footnote 44 and in footnote 49 below, these statistics are potentially skewed by underreporting from all islands.

66 Levin, ed. 2006

67 Prices of \$8.99/lb were observed for one brand on Hawai‘i in 2009.

68 HDOA statistics indicate taro represents only three percent of the market share of fruits and vegetables in Hawai‘i. In the Hawai‘i Island Whole System Report, Page, Bony and Schewel of the Rocky Mountain Institute noted “this is an example of potential statistical error resulting from inability to factor in cash markets” (2007:61).

69 Not including taxes GET paid by farmers. At the simple rate of .0416 percent on product sold

70 Attempts by UH CTAHR to develop and adapt existing farm equipment to increase mechanization in the lo‘i and mala following recommendations from the 1990 Taro Industry Report were not successful.

71 Reppun et al, 2009. Students researched fruits, vegetables, grains/starches, meats and nuts.

This means reducing the costs of inputs, creating a committed labor force, and increasing returns for products. Young farmers are looking at the future and self-sufficient farms; fuel and food independent, more small, family run poi processing facilities and community kitchens, everything local and within reach. And, they are clear that to entice long term commitment to the hard work of taro farming you have to start when kids are young and keep them in it all the way through. That has to be part of the viability – the ability to continue the work passed down from each generation.

Increases in fossil-fuel based fertilizers have pushed taro farmers to search for local and organic alternatives. At least one taro farmer has reduced their dependency on chemical inputs by half through the use of cover cropping strategies. Taro farmers on every island encouraged the development of locally sustainable and organic fertilizer resource production. This represents a new value-added enterprise opportunity in agriculture for the state.

On the income side, helping local buyers pay farmers more quickly can make it easier for taro growers to enter into relationships with distributors and grocers who may have a grace period during which farmers don’t get paid. During that time, small growers often struggle financially. Buyer flexibility, such as purchasing “bulk orders” of poi but allowing farmers to meet the order with 2lb or 5lb bags of poi to meet a quota allows small producers the ability to service local distributor and grocer needs from small certified kitchens or poi mills. Taro is a long-term crop that requires better coordination between food buyers and growers to meet demands. Last minute orders or cancellations impact both growers and buyers. Across the islands, it is generally understood that the winter season slows crop growth and taro and poi can be scarce. Shortages during summer months are the result of the high demand for poi for graduation parties and suggests an opportunity for taro farmers if more lands and water become available. Restaurants and chefs that create flexible menus that match growers produce availability are one example of how seasonal changes in crop availability can be handled and understood by consumers without resorting to imports.

In addition to conventional economic approaches to increasing economic viability for taro farmers, the state and its partners are strongly encouraged to support models, programs and efforts targeted towards small-scale family farms to balance the disproportionate focus of resources and assistance for large-scale production that is typical of agriculture industry.



The task force toured a number of poi mills around the state, including the King Lualau Brand Poi poi mill in Honoka‘a, Hawai‘i, which is operated by Waipi‘o Valley farmer and task force chair Jim Cain (far right).

Numerous small farms produce more food and more diversity of food than a single, large acreage farm for the simple reason that they have more labor available and a greater capacity and interest in growing more types of food.⁷² Collectively, Hawai‘i’s taro growers fit well into this model; many taro farms provide a surplus of vegetables, fruits, flowers and other produce in addition to taro, poi, lū‘au, and kūlolo (a desert) that goes to the family table, is traded, shared and frequently enters the vibrant economy of the islands’ network of farmers markets, agricultural fairs, community ho‘olaule‘a (celebrations) and local grocery stores.

One business model that is enjoying success is the return to small family run and cooperative poi mills. By adding value to their crop through processing, farmers are able to make a living. This business model has the additional benefit of enhancing food security as taro and

poi production is spread amongst all the islands, instead of being concentrated on one island, lessening the chance of disruption of supply. Self-sufficiency on each island also makes outside threats such as sky-rocketing fuel prices more manageable. Small poi mills increase economic diversity for rural communities. Community kitchens provide opportunity for taro farmers or other community residents to create value-added products from local taro. It is important that resources be allocated to support the establishment of these entrepreneurial ventures as well as build the skills that farmers need to be successful in them.

⁷² ILEIA Foundation (Center for Information on Low External Input and Sustainable Agriculture) a major global network for small scale sustainable agriculture that has been tracking small farm sustainability for 25 years reported recently that small farms in Brazil supplied 70-87 percent of staple starch and vegetable crops and 58 percent of milk needs on less than 25 percent of agricultural lands in 2006. This is just one of hundreds of examples. These findings are also supported by the 2004 Ford Foundation report, *Diversity on the Farm*.

The taro industry is unique to Hawai‘i because it is part of the foundation of Hawaiian culture. It is also the oldest and first “agriculture industry” in the state. Taro growers and state agencies have an exceptional opportunity to prioritize taro and promote it from this perspective. It provides the perfect symbol for the future of food security and should lead the effort towards state self-sufficiency. In order to do so, however, resources must be allocated and commitments made to truly support the economic revitalization of the taro industry and all levels of taro farming. Taro-specific “Buy Local,” “Grown Local,” “[Island] Made,” “Seal of Quality” and “Low Fuel Miles” labeling campaigns are part of this effort.

During these difficult economic times, state resources are limited. One viable alternative for raising the necessary funding to implement programs that will increase local food production was HB1271, the so-called “barrel tax” that was proposed but vetoed in the 2009 Legislature. *The Task Force strongly recommends that another attempt be made to pass this legislation.*

Viability is to be “capable of growing and developing; of having a reasonable chance of success”; it can also mean to be “capable of success or continuing effectiveness.”⁷³ Economic viability should not be measured solely in dollars. Taro farms contribute to economic vitality in many sectors, not the least of which is environmental health (soil, land, water), community health (feeding families and sharing food through all the celebrations of life), and cultural identity and continuity for future generations.

RECOMMENDATIONS

A. Establish a taro advocacy group to represent the voice and interests of all taro growers throughout the state.

1. Establish a taro advocacy group to represent the voice and interests of all taro growers, using the TSPTF to serve as the POC as a starting point for initial dialogues and the development of a long term entity (see Ho‘i, pg 29).

Necessary action:

- a) Determine mission, goals, and objectives of the taro advocacy group.
- b) Establish decision-making policies and develop by-laws.
- c) Determine sources of funding, if necessary to conduct the work of the group, including membership dues.
- d) Encourage all taro growers to participate in the process.

Partners:

TSPTF, taro advocacy groups, ONHK, KTGA, all taro growers throughout the state

2. Adopt and implement a regular holistic analysis of the state of taro in Hawai‘i, in coordination with the TSPTF, HDOA and UH CTAHR.

Necessary action:

- a) Develop a vision to guide the analysis model.
- b) Develop a survey model that captures a holistic understanding of the state of taro, reflective of the discussions presented in the CONCEPTS OF IMPORTANCE section of this report.
- c) Search out funding to implement, evaluate and interpret the analysis and disseminate information to taro growers, agencies and lawmakers.
- d) Conduct a taro analysis on a regular basis to adapt objectives to meet changing needs in the taro farming community

Partners:

TSPTF, HDOA, UH CTAHR, UHERO, ONHK, KTGA, and other taro growers organizations

B. Improve taro markets and identify ways to advocate for taro farmers

1. Research the demand, preference for, and seasonal availability of locally grown taro.

Necessary action:

- a) Conduct a marketing study to better understand demand for taro, including import markets, value-added products, and direct-to-consumer markets.
- b) Determine what taro is being imported and why, and distinguish between dasheen, Pacific Island taro types, Chinese (Bunlong), frozen, dried and fresh imports and their users.
- c) Determine if the source of any imports presents a pest or disease risk for local taro growers and implement biosecurity measures to increase protections (see Biosecurity).

⁷³ Definitions from Merriam-Webster and freedictionary.com

- d) Resolve issue of tracking country of origin issues with federal agencies to assist market analysis and import product safety (see BIOSECURITY).
- e) Allocate funding to support market analysis.

Partners:

TSPTF, HDOA, UH CTAHR, UHERO

2. Develop a program to facilitate and encourage distributors, wholesalers and other buyers to purchase local taro and taro products before considering importing taro from outside Hawai‘i.

Necessary action:

- a) Bring taro importers (distributors and end receivers) into the discussion for a better understanding of what they need and to increase the awareness of the risk of imports (i.e. diseases and pests) to local growers.
- b) Create a list of taro growers and their contact information and make available to taro buyers including those that import from outside the state.
- c) Work with HDOA to develop subsidies and incentives to assist buyers and consumers in selecting local grown taro producers to meet their product needs.
- d) Research the feasibility of a tax incentive for wholesalers who “buy local” and consider options such as specific to taro or all local farm products, or linked to a minimum percentage of local product purchases.
- e) Support and fund the development of small scale family and cooperative poi mills and community kitchens to increase the ability of local farmers to meet buyer demand.
- f) Assist grocers in developing a revolving fund that would cover payments to farmers during initial grace periods.
- g) Support and fund training programs to help build entrepreneurial skills in the taro farming community.

Partners:

TSPTF, HDOA, UH CTAHR, SBA, UH Pacific Business School, UHERO, taro growers, state lawmakers, revolving loan funders

3. Promote “Buy Local” for locally-grown taro products and improve the existing “Local Grown” and “Seal of Quality” food labeling programs as a model for the future and to provide opportunity for taro farmers to indicate “miles traveled” and “point of origin” information to help concerned consumers make environmentally healthy purchasing decisions.

Necessary action:

- a) Evaluate existing local produce promotion labeling programs in the state in relation to local taro products.
- b) Develop a “fuel miles indicator label” (distance traveled to market) and make available to local taro growers (island or ahupua‘a point of origin), in conjunction with “Local Grown”, “[Island] Grown” and “Seal of Quality” labels, to assist consumers in environmentally healthy purchasing decisions.
- c) Support a product branding program for “Hawai‘i Grown Taro” that includes variety and producer name and expand end markets to create consumer preference for local grown taro, encourage appreciation for a more diverse selection of taro varieties and consumer connections to individual growers.
- d) Determine sources of funding for labeling development, printing and distribution costs.
- e) Work with HDOA to add a “fuel miles indicator label” and country “point of origin” label on all out-of-state produce.

Partners:

TSPTF, HDOA Marketing Division, UH CTAHR, KTGA and other taro growers organizations, HFBF, HFU, HOFA, HICOF, MEO and counterparts on other islands.

4. Work with HDOA, HUD, and DOH to explore federal initiatives that could improve access to taro and taro products for low-income families.

Necessary action:

- a) Expand awareness among local WIC qualifying consumers and social services organizations that taro and poi can be purchased through the WIC program in Hawai‘i; work to include lū‘au and raw taro in the program.
- b) Pursue federal supports and the listing of taro, poi and lū‘au as healthy indigenous foods for DOE school lunch programs in Hawai‘i, most especially in communities where taro farming occurs and in communities with large Hawaiian populations.

Allow students to have a choice of eating taro, poi and lū‘au at least four times per month.

Partners:

HDOA, UH CTAHR, DOH, USDA Food and Nutrition Service program

C. Improve access to farming resources

1. Develop a supply of local, sustainable input resources such as organic fertilizers, bonemeal, bloodmeal, ground coral and invasive or beached seaweed with no net negative impacts or losses to the environment.

Necessary action:

- a) Identify local sources of sustainable, no net negative environmental impact inputs, including source, quality, and quantity.
- b) Consult with experts on the feasibility of developing local, quality input sources, including recycling of invasive plant species and limu and rapid coral regeneration to replenish ancient coral resources⁷⁴
- c) Assist local producers to develop self-sufficient production capability to meet the demands of local growers.
- d) Assist in making existing sources of information on organic inputs used in tropical climates available to growers. Determine and recommend application timing and quantities for organic inputs where gaps in information exist; avoid duplication of well-documented studies and cases (see Research).
- e) Document local examples of working farms whose source inputs locally for taro farmers to learn from and assist taro farmers in making the conversion from imported chemical and organic inputs to local inputs.

Partners:

HDOA, DLNR-DAR, UH CTAHR, HOFA, HFU, MEO and comparable programs on all islands, DBEDT, SBA and federal small business incentives program, Maui Aloha ‘Āina, Body and Soil Conference experts, organic amendments and compost specialists with experience in large scale production of resources.

2. Encourage and assist local groups of taro growers to develop a farm equipment bank that taro farmers can access for on-farm work with the goal of becoming self-supporting.

Necessary action:

- a) Survey taro farmers to determine the types and quantities of equipment that might be needed to meet on-farm needs and farmer-owned poi mills.
- b) Establish or identify a nonprofit that can access state, federal, and county surplus heavy equipment, accept gifts of equipment as charitable donation, and coordinate distribution for all islands.
- c) Establish funding sources and/or cooperative no-fee agreements of transfer from federal, state and county surplus equipment sources.
- d) Write grants to support the purchase or no-fee transfer of private farm and farmer-owned mill equipment.
- e) Partner with or contract a qualified farm equipment mechanic to assess the condition of equipment prior to purchase or acceptance and to assist in the maintenance of “banked” equipment.
- f) Access the USDA Disadvantaged Farmers and Ranchers Program and the Beginning Farmers and Ranchers Program grants to develop a business plan and implement programs to encourage taro farming through shared farm equipment banks.
- g) Partner with taro farmers skilled in equipment use where taro farmers in need of i.e. tilling, may not have the skills, agility or strength to use equipment (i.e. kūpuna who continue to farm taro or young farmers opening patches for the first time).

Partners:

USDA, HDOA, HFU, DAGS, private businesses, recycled building materials centers, nonprofit agriculture organizations, insurance providers, farm machinery mechanics, taro farmers.

⁷⁴ In order for recycling of invasive plant species to be feasible, 100 percent kill rate must be developed for seed and plant part regeneration in order to prevent further spread of alien species. The concept of sustainable sources of ground coral for agriculture is not realistic without consideration of source material long term. This includes careful management of coral sources. Quarries from raised ancient reefs that are now part of coastal lands represent unique ecological habitats in Hawai‘i. Rapid and cost-effective technologies for nearshore coral reef recovery have been developed and implemented in Southeast Asia using simple frames and weak electric currents generated by waves to recruit coral to damaged sites (http://www.globalcoral.org/observations_from_tom_goreau.htm).

3. Support the ability of taro farmers to live where they farm to reduce the cost of farming and provide greater protection for farm assets and crops.

Necessary action:

- a) Support and participate in the development of appropriate language in county ordinances and state legislation that allows taro farmers to live with reasonable dignity on their farms while being mindful of the potential for abuse of such allowance.

Partners:

TSPTF, HDOA, DLNR-OCCL, DHHL, KS, DBEDT-Office of Planning, County planning offices, County councils and state lawmakers

4. Develop a taro farming grant program to assist taro farmers in need to preserve the cultural legacy of taro farming for future generations.

Necessary action:

- a) Increase awareness of available USDA administered Farm Bill programs, state and county agriculture and economic development programs.
- b) Access the Legacy Lands program to assist in the set aside and protection of viable taro growing lands.

Partners:

TSPTF, USDA, FSA, NRCS, UH CTAHR, HDOA, DLNR, DBEDT, DHHL, OHA, County councils and state lawmakers

5. Develop local Pekin duck breeding programs on each island to assist farmers in daily field control of established populations of apple snails through local Agriculture Extension Services and NRCS partnerships.

Necessary action:

- a) Identify a group to educate and outreach with landowners of infested areas
- b) Provide guidance in duck management needs and protocols to taro farmers who have snails but have not previously used ducks in snail control (see Appendix to the *2006 Statewide Strategic Control Plan for Apple Snail in Hawai‘i* <http://www.hear.org/articles/pdfs/applesnailcontrolplanlevin2006.pdf>).
- c) Provide taro farmers with access to information about the NRCS EQIP shallow water practice for cost-share funds that support reimbursements for wire fencing to keep ducks on -farm and protect them from dogs
- d) Establish a pilot breeding program on Hawai‘i Island; expand to other islands after success is shown.
- e) Taro farmer-to-taro farmer training.

Partners:

Experienced taro farmers, NRCS, HDOA, UH CTAHR-CES, DHHL Educational Program

D. Support and increase new taro farmers and labor resources

1. “Grow” new farmers within the local community.

Necessary action:

- a) Identify ways to make taro farming more appealing to young people in partnership with Hawaiian studies programs at universities, colleges, high schools, charter schools, and taro farmers organizations.
- b) Develop a career or study track in Hawaiian agriculture within the university system; establish programs that focus on taro farming, Hawaiian taro varieties identification, lo‘i re-establishment, traditional farming and soil care practices, poi making and other applicable topics.
- c) Work with schools to establish youth education programs, including revitalizing farm programs and school garden programs in rural schools.
- d) Create incentives for students to enroll in taro farming educational opportunities, including scholarships, internships and apprenticeships within the taro farming community.
- e) Develop a tuition reimbursement program for students refundable if they take up taro farming or whole food production (for

- local consumers) for a minimum of three years after graduation.
- f) Provide start-up resources such as access to land, huli, and farm equipment.
 - g) Identify and/or develop new local labor sources for commercial growers.
 - h) Support the ability of taro farmers to house farm labor on-farm.
 - i) Support connections for farmers with work-stay programs such as the international WWOOF program and provide additional screening to improve the match between candidates for taro farms and rural conditions (i.e. minimum requirements and skills).⁷⁵ Develop a Hawai‘i based counterparts to WWOOF for local residents.
 - j) Develop a screening process with taro farmers for work-stay exchanges to improve the quality of candidates for taro farms (i.e. a minimum requirements and skills).

Partners:

DOE, UH systems of schools, HDOA, TSPTF, ONHK, Kōkua Foundation, private businesses, public and private funders

E. Develop taro farmer business skills and farm-to-consumer capabilities

1. Conduct training and education programs with a focus on small business management for taro farmers and poi makers to include information on new business models for farming, milling, cooperatives and other innovative approaches.

Necessary action:

- a) Outreach with other farmers to share skills and models of what they are doing.
 - b) Assist small-scale taro farmers to develop cooperatives.
2. Improve supports and resources for farmers to process their own poi for their communities

Necessary action:

- a) Examine the permitting process for DOH and State and County building permits and regulations to determine taro farmer experience with the system, bottlenecks in the process, and potential for improving the process.
- b) Work with DOH and State and County building departments to simplify the permitting process for poi factories and community kitchens.

Partners:

USDA-RC&D, UH systems of schools, HDOA, DOH, state and county building departments, HFU, HOFA, HFBF, SBA, MEO and other island counterparts, private business mentors, public and private funders

F. Improve taro farmer access to quality health insurance

1. Provide low-cost health and farm insurance options for taro farmers

Necessary action:

- a) Research existing options and gaps in taro farmer medical coverage.
- b) Convene a group of partners to consider better options for taro farmers as a unique group of farmers found nowhere else in the country
- c) Provide information to farmers on available and new options through community networks, taro farmer organizations, TSPTF, health organizations and the media.
- d) Provide a tax credit for health insurance for self-employed farmers.

Partners:

USDA-FSA, HFU, HFBF, DBEDT, SBA, HMSA, Kaiser, HMAA, Hui No Ke Ola Pono (Maui), E Ola Mau (Statewide), Alu Like, OHA, SBA, TSPTF, state lawmakers

2. Provide information and education on health and ailments related issues specific to taro farming

Necessary action:

⁷⁵ WWOOF is the Worldwide Opportunities in Organic Farms program; participants are called “woofers.” Housing and some food, sometimes transportation are provided in exchange for work on the farm several days a week. Participants represent a wide range of experiences, knowledge and capabilities from around the world. Taro farmers who have used these programs in the past recommend local screening with more in-depth questionnaires and interviews to create better matches for the isolated lifestyle of most taro farming communities and physical labor that taro farming requires.

- a) Partner with DOH to disseminate accurate information to taro growers
- b) Interface with DOH to help agencies understand how they can help farmers with issues such as contaminated water sources where cattle, pigs, and other farm animals are raised near streams. Increase awareness about lower back injuries, flesh-eating bacteria, staphylococcus (staph infection), MRSA, leptospirosis, dengue fever, heat exhaustion and rat lung worm.
- c) Provide refresher information to health providers to increase awareness of and response to the need to test and treat taro farmers for leptospirosis and dengue fever immediately when flu-like symptoms occur.

Partners:

DOH, HMSA, Kaiser, HMAA, Hui No Ke Ola Pono (Maui), E Ola Mau (Statewide), Alu Like and other private health care providers, taro farmers organizations

G. Heighten awareness of food security issues in Hawai‘i

- 1. Conduct a Food Security Disaster Response Assessment involving all state agencies, farmers and the Governor to assess what needs to be implemented now in order to feed Hawai‘i from local sources in the case of a natural disaster or fuel crisis (see Appendix D for an example scenario and questions to guide the food disaster response adapted from the SCR206 Taro Farmers Report to the Legislature).

Partners:

All state agencies involved in emergency response and civil defense, including military and the governor’s office, farmers⁷⁶

⁷⁶ Farmers are an essential part of this dialogue in addition to agriculture industry organizations because the focus is to feed ourselves not to export for revenues. Practicing farmers will best be able to provide realistic information on response, lead time, production capabilities etc. necessary to an honestly informed food security plan, particularly where one island may be devastated from a natural disaster but another island may be able to respond with local food resources.

VIII. BIOSECURITY

“Bio” refers to life, and “security” indicates protection. Biosecurity is the key to keeping our islands natural resources (terrestrial and aquatic), people and food crops healthy. This section of the report specifically focuses on reducing the chances of invasive pest species and infectious diseases entering the state, being transported to farms or escaping into open areas, watersheds, coastal waters, and on being transported farm-to-farm (prevention), and on eradication and control etc. by means of people, animals, equipment, boats or vehicles, either accidentally or on purpose.⁷⁷

Crop biosecurity is specific to protection of our food resources from existing and potential threats through a series of pro-active prevention measures and practices at borders, in urban and rural areas, coupled with rapid response for new infestations and IPM (integrated pest management practices) for established pests, including the use of biological controls to counter fast-establishing populations of invasive pests and diseases.

At the federal level, Homeland Security and USDA-APHIS (Animal and Plant Health Inspection Service) Plant Protection and Quarantine Branch (PPQ) are tasked with safeguarding U.S. agriculture and natural resources from the introduction, establishment, and spread of plant pests and noxious weeds. They are the first tier agencies that conduct inspections at the state’s border. Since September 11, 2001, Homeland Security has authority over inspection of all incoming cargo, reporting directly to the USDA at the federal level. The Hawai‘i Department of Agriculture now handles second tier inspections, once produce arrives in the state or for produce in need of certification to leave the state. Security issues seriously hinder rapid information exchange between federal and state authorities regarding potential threats found in cargo. For critical food crops such as taro, this is a challenge for local protection efforts.

HDOA’s Plant Quarantine Branch (PQB) targets domestic imports and pest interceptions are made at the port-of-entry (upon arrival) with inspection of regulated articles of foreign origin inspected upon referral from a Federal agency. In addition, PQB Biosecurity program includes rapid response to pest calls (such as snake sightings response teams), early detection and survey (such as survey/control efforts during the initial discovery of varroa mite). DLNR’s Invasive Species Committees (ISC) on each island are also part of the early detection and rapid response team on the ground, dealing with new and incipient (small) populations of pests. HDOA, supported by UH CTAHR-Cooperative Extension Services staff and UH researchers, respond to crop pests and diseases.

Currently, import permits and export certifications can be revoked for violations to compliance agreements, but lack of agency resources make it difficult to fully implement compliance reviews. The 2009 and expected 2010 budget and personnel cuts across state agencies and institutions directly impacts the ability of HDOA to monitor crop pest and disease threats, inspect and certify outgoing produce; currently Moloka‘i has no agriculture inspectors.

There are two ways to pro-actively reduce or eliminate new pest and disease threats to taro production in Hawai‘i. The first is through border protection and biosecurity protocols - preventing the arrival of an organism, improving rapid response and eradication efforts and implementing grower-to-grower best practices (this section). The second is by assisting local growers to meet local demands - eliminating the need for taro imports - and to maintain healthy farms and clean planting materials (see ECONOMIC VIABILITY, EDUCATION AND HAWAIIAN TARO VARIETIES).

Economic analysis has shown that the most cost-effective invasive species protection efforts are pro-active inspections; stopping threats before they reach Hawai‘i’s shores either by air or ocean transport, at ports of entry first.⁷⁸ Well-coordinated, staffed and funded early detection and rapid response systems are second. Education outreach is the critical third arm of this effort.

One clear problem is the current outdated laws affecting taro imports. Hawai‘i import rules (HAR 4-70-51) currently define plant parts capable of propagation as prohibited from pest or disease infested regions. However, federal import definitions are what define which agency inspects imported goods – USDA or Homelands Security. Taro corms are interpreted as food and are not viewed as propagative material and therefore are not inspected by USDA where food inspections may not be as thorough as if they were recognized as propagatable material. A raw taro corm can readily produce ‘ohā (young plants) by simply returning it to field or lab conditions that support plant growth. Under this rule, dried, cooked and frozen taro may be accepted as treatment for specific pests from specific origins, yet drying or freezing may not kill all pests or diseases; i.e., taro beetle (*Papauna* spp.) which burrows deep into the corm or fungal and viral infections such as *alomae-bobone*.⁷⁹

⁷⁷ Adapted from APHIS Biosecurity definitions for birds. http://www.aphis.usda.gov/animal_health/birdbiosecurity/biosecurity/basics.htm

⁷⁸ K. Burnett, pers. com. 2009. UH Economic Research Organization (UHERO); Burnett, K and B. Kaiser, 2007. *Models of Spatial and Intertemporal Invasive Species Management*. Prepared for the NCEE Valuation for Environmental Policy: Ecological Benefits Conference, April 23-24, 2007

⁷⁹ Protocols for the Bishop Museum herbarium suggest freezing plant specimens for 7 days to kill all insects, but this is only for flattened specimens. A large taro

Not all taro pest and disease threats come from outside the state. Hawai‘i and O‘ahu islands are sources of taro root aphids (*Patchiella reaumurii*). Hawai‘i has a ban on exporting taro planting material because of this pest, but O‘ahu does not. Moloka‘i is the only taro-growing island without the aggressive apple snail, *Pomacea canaliculata*, the number one pest for taro farmers in Hawai‘i which accounts for 18 to 25 percent of taro crop losses and 50 percent increase in labor annually.⁸⁰ Coqui frogs (*Eleutherodactylus coqui*) are now entrenched in Waipi‘o Valley, Hawai‘i but have not yet invaded taro-growing communities on other islands. Little fire ants (*Wasmannia auropunctata*) now found on Hawai‘i, Maui and Kaua‘i are a serious threat to dry and wetland taro farm on all islands.⁸¹

The Statewide Strategic Control Plan for Apple Snail in Hawai‘i points to other gaps in biosecurity efforts for taro. “While the release of [*Pomacea canaliculata*] in the wild is illegal in the state, ironically, the raising and sale of the species is not.” The continued presence of permitted apple snail enterprises and apple snail products in local stores sends a conflicting message to taro farmers who have battled this pest for the 25 years.⁸² While it is difficult to restrict an invasive species that is already well-established in Hawai‘i, a case for doing so has been made with several plant species in the landscape industry.⁸³ The key is collaboration and consistent education, such as the public service ads for the State’s Pest Hotline and invasive species awareness facilitated and implemented under CGAPS. In the case of the snail, consistent cross-cultural education about invasive species in multiple languages and formats are needed to change understanding and support for reducing spread of this species.

Almost 11,000 acres of wetlands and other water bodies have been documented as infested or at risk for infestation by apple snails within the state of Hawai‘i; of those perhaps 500 acres are actively growing taro. The bulk of the remaining lands (approximately 8,500 acres) are designated as Core and Supporting Waterbird Habitat by state and federal agencies. There is an urgent need to positively address issues related to apple snail populations in state and federal wetlands, waterbodies, and wildlife refuges, and private wetlands and waterbodies such as reservoirs and ponds that continue to pose a risk to or re-infest taro farms on adjoining or downstream lands.⁸⁴

RECOMMENDATIONS

A. Improve and expand inspection facilities for imports at national and international arrival points (harbors and airports).

1. Support improved inspection facilities on each island, such as the new facility on Maui.

Necessary action:

- a) Initiate planning to develop a joint-use plant quarantine inspection facility at the Honolulu International Airport
- b) Initiate planning to develop joint-use plant quarantine inspection facilities at harbors and airport where plant import and exports occur on all islands, with particular attention to Hawai‘i Island.
- c) Develop budget support for positions to staff inspection facilities and agencies.

Partners:

HDOA, HDOT, DLNR, HISC, CGAPS, and federal agencies (USDA, HS-CBP)

B. Improve and expand inter-island inspection capacity

1. Support improved inspection facilities for outgoing produce and non-agriculture cargo at barges, harbors and cargo flights on Hawai‘i Island.

corm may require longer exposure to freezing temperatures. HAR4-70-52 which prohibits the importation of taro from the Solomon Islands where taro beetle is known to occur was written almost 30 years ago and lists the Solomon Islands as a British colony. It does not prevent taro from these islands from arriving in Hawai‘i by passing through other ports, nor taro imports from other countries that may now have the beetle. Alomae-bobone viral complex, known to Papua New Guinea, Solomon Islands and possibly Fiji, arises from the confluence of two species of insects carrying separate components of this complicated virus, the planthopper *Tarophagus proserpina* and the mealybug *Planococcus citri*. A taro plant can become infected by one or both components of the virus by these insect carriers. To date, neither species is found in Hawai‘i; a relative in the *Tarophagus* genus is present (FAO nd; Jackson 2005).

80 Levin, P. 2006.

81 Fire ant species are documented in taro in Southeast Asia and Florida, including red-imported fire ant (RIFA) (*Solenopsis invicta*). Little fire ant infestations impact crop yields and retention of farm labor. This ant was reported for the first time on Maui on October 15, 2009 <http://www.issg.org/database/species/ecology.asp?si=58&fr=1&sts=http://www.issg.org/database/species/ecology.asp?si=77&fr=1&sts=sss&lang=EN>

82 P. Levin, ed. *Statewide Strategic Control Plan for Apple Snail in Hawai‘i*. produced for DLNR-DAR Sept 30, 2006; pg 111.

83 Australian tree fern is one example.

84 Ibid. 2006: pg 110. On an acreage scale, miconia and coqui infest far more land in the state and receive millions of dollars in state and federal funds for crews specifically dedicated to control of these invasive species. The suggestion that apple snails are solely an agricultural problem put forth by some agencies has been shown to be invalid based on field survey and existing agency information.

Necessary action:

- a) Initiate planning to develop or improve plant quarantine inspection facilities at harbors and airports where plant exports occur on Hawai‘i Island.
- b) Develop budget support for positions to staff inspection facilities and agencies.

Partners:

Legislators, Governor, HDOA, HISC, CGAPS, and federal agencies

2. Support improved joint inspection facilities for incoming produce and non-agriculture cargo on barges, at harbors and airports on all islands.

Necessary action:

- a) HDOA and federal agencies initiate planning to develop or improve joint plant quarantine inspection facilities at harbors on Maui, Kaua‘i, and Moloka‘i.
- b) Create and fill an agriculture inspection position located on Moloka‘i.
- c) Budget support for positions to staff inspection facilities and agencies.

Partners:

Legislators, Governor, HDOA, HISC, CGAPS, and federal agencies

C. Improve and expand HDOA authority to conduct agricultural and non-agriculture commodity inspections

1. Improve HDOA capabilities to track, and access to, cargo manifests

Necessary action:

- a) Continue efforts to access information from the Invicta Manifest System through federal avenues.
- b) Support and identify federal funding to bring the Invicta Manifest System onboard at HDOA.
- c) Improve and encourage increased collaboration and exchange of information between USDA, the Department of Homeland Security (DHS) and HDOA.
- d) Support congressional delegation efforts to work through federal preemption issues that currently hinder the ability of the state to protect itself from incoming invasive species and develop cooperative relationships with USDA and DHS through legislative resolutions.
- e) Examine loopholes in federal regulations that may be useful to HDOA in improving inspection access, such as what constitutes “in foreign commerce.”

Partners:

Congressional delegation, HDOA, HISC, CGAPS, and federal agencies, TSPTF

2. Support HDOA’s request to expand its authority to allow for inspection of non-ag commodities and to require more specific manifest information.

Partners:

HDOA, HISC, CGAPS, TSPTF

D. Improve USDA and HDOA risk management capacity for taro in Hawai‘i.

1. Support efforts to adopt and implement the USDA-HDOA Pathway Risk Analysis, Maritime Risk Assessment and HDOA Biosecurity Program.

Partners:

HDOA, HISC, CGAPS, and federal agencies, TSPTF

2. Request that USDA designate the alomae-bobone virus complex and taro beetle (*Papauana spp.*) as “actionable pests” in the findings of the USDA and HDOA report to prevent the entry of these pests into Hawai‘i from foreign countries.

Necessary action:

- a) Document threats, known and potential countries of origin, and risks to taro in Hawai‘i.
- b) HDOA submit findings and initiate “actionable pest” listing process with USDA.
- c) Draft rules in consultation with taro growers, taro farming industry and manufacturers.

Partners:

HDOA, HISC, CGAPS, and federal agencies, TSPTF

3. Research additional pests and diseases specific to taro for further petition to the USDA “actionable pest” list and revise HDOA regulations accordingly.

Necessary action:

- a) Document the pest and disease threats, known and potential countries of origin, and risks to taro in Hawai‘i.
- b) Submit findings and initiate the “actionable pest” listing process with USDA.
- c) Draft rules in consultation with taro growers and manufacturers.

Partners:

HDOA, USDA, TSPTF, taro growers and manufacturers

4. Change the definition of taro to a propagatable material under HAR4-70 importation rules for the State of Hawai‘i.

Necessary action:

- a) Develop a white paper documenting existing gaps in the law, inconsistencies and justifications for defining raw taro as a propagatable material.
- b) Propose updates to the law in consultation with taro growers and manufacturers and submit documentation to appropriate federal and state agencies to initiate the rule change processes.

Partners:

Congressional delegation, HDOA, USDA, TSPTF, taro growers and manufacturers

5. Make mandatory the limitations on importation of taro to only dried, cooked or frozen taro products to protect local taro crops from new pests and diseases and subject to a fine for violation; maintain a complete ban of taro products from countries known to host alomae-bobone virus and taro beetle.

Necessary action:

- a) Request an amendment to the BLNR species list to prevent further high risk incoming pests/diseases (HAR 71A & 72A).
- b) Amend HDOA Administrative Rules (HAR 4-70) in consultation with taro growers and manufacturers to limit importation of taro from infested areas unless dried, cooked or frozen to a satisfactory level where no live pest or disease material can survive.

Partners:

HDOA, DLNR, HISC, CGAPS, USDA, TSPTF

E. Develop funding mechanisms to improve biosecurity measures for taro pest and disease risks in Hawai‘i and to fund strategic apple snail control and controls research.

1. Support passage of the proposed changes to the proposed cargo fee law which increases HDOA’s ability to enforce and impose penalties for non-payment (Pest Inspection Quarantine and Eradication (PIQE) fund) and the “barrel tax” as funding sources for biosecurity measures recommended in this report.

Necessary action:

- a) Support the cargo fee and barrel tax bills in the 2010 legislation.

2. Explore the feasibility of a “taro tax” on all taro and taro products imported into the state whose revenues go directly to HDOA inspection funds.

Necessary action:

- a) Work with HDOA to research the feasibility and legal authority of implementing a “taro tax” and draft appropriate rules and legislation to support this.

Partners:

Congressional delegation, HDOA, DLNR, HISC, CGAPS, TSPTF and other partners

F. Increase incentives and dis-incentives to improve pest and disease-free product and cargo shipments in and out of the state.

1. Support increased resources to HDOA to implement compliance reviews and revoke import permits and export certifications and/or fine offenders who introduce and/or import invasive species.

Necessary action:

- a) Require importers of taro and taro products to declare point of origin and amounts both on bills of lading (federal) and directly to HDOA (state) and require HDOA to track this data and provide a list of points of origins, import totals per location, and total taro imports to the TSPTF and taro grower advocacy organizations twice a year.
- b) Develop a simple online reporting form that importers of taro and taro products and local recipients of imported taro and taro products can log onto to comply with reporting regulations.
- c) Make it a fineable offense for failure to report taro and taro product imports by local distributors.

Partners:

USDA, HDOT, HDOA, DLNR, HISC, CGAPS, TSPTF

2. Develop a robust system of screening and risk assessment tools, including global searches for documented invasiveness information, pests and diseases and a balanced set of parameters, including environmental and economic impacts in Hawai‘i (not just point of origin), that aid the Board of Agriculture in decision making for importers of plant products prior to permit approval.

Necessary action:

- a) Build on existing efforts by CGAPS partners and HDOA to develop and implement a screening and risk assessment program that includes environmental and economic factors for taro farmers.⁸⁵

Partners:

HDOT, HDOA, HISC, CGAPS, Bishop Museum, USDA-APHIS, USFWS, TSPTF

3. Require an EA/EIS prior to a request for importation of potentially invasive or harmful pests, diseases, animal or plant organisms for private, public or research entities or individuals where the potential for environmental and/or economic damage to taro or taro farming is evident or is known to exist outside the state for the same or closely related species.

Necessary action:

- a) Research existing EA/EIS case law and other documentation to build a body of supporting documents for development of proposed policy changes.
- b) Draft appropriate legislation to amend Chapter 3 in consultation with taro farmers and other stakeholders.

Partners:

HDOA, DLNR, CGAPS, USFWS, EPA, OEQC, TSPTF, Earthjustice, Hawai‘i Conservation Alliance

4. Require researchers, research institutions and any others requesting a permit to import taro and taro pest or disease organisms for study to be bonded to cover the costs of potential escapes and cleanup costs.

Necessary action:

- a) Research examples of bond requirements, the cost of cleanup of escapes or after-the-fact invasiveness of study organisms released to the field, and the process for implementing a bond requirement.
- b) Draft appropriate legislative amendments to HAR 4-70 in consultation with taro farmers, agencies and other stakeholders

⁸⁵ Taro farmers are particularly vulnerable to a wide range of invasive species from aggressive plants to fresh and brackish water aquatics, insects to bacteria and viruses, because they are both land and water based. No other farmers in the state must protect their crops from aquatic, terrestrial and airborne pests and diseases on a single farm. Taro growing lands are also frequently the buffer to important watersheds.

- c) Prohibit the importation of any portion or carrier of the alomae-bobone virus complex for any reason; require the study of this virus be conducted outside the State of Hawai‘i.⁸⁶

Partners:

HDOA, DLNR, CGAPS, EPA, UH, TSPTF

G. Improve pro-active prevention of pest and disease movement between islands and intra-island from valley to valley by taro farmers and partners.

1. Develop practical, affordable, efficient and effective ‘best practices’ for existing and future pest and disease control using the best knowledge of taro farmers, researchers, and agencies.

Necessary action:

- a) Develop and translate collaborative education materials in multiple languages to increase awareness about pest and disease prevention issues and protocols among all cultural groups growing or consuming taro in Hawai‘i, including those who consume apple snails.

Partners:

HDOA, UH CTAHR, TSPTF, ONHK, taro growers

2. Increase education outreach among taro growers on all islands in appropriate settings (i.e. in taro farming communities) to prevent transport of invasive species, including apple snails and California bulrush (*Schoenoplectus californicus*) and *Malachra alceifolia*, two aggressive wetland weeds found in taro patches on Kaua‘i.

Necessary action:

- a) Establish and test best management practices relating to sharing huli to close this vector of apple snail transfer, based on the recommendations of the Apple Snail Control Plan and taro-farmer experience.
 b) Distribute information and conduct workshops with taro farmers on all islands in appropriate settings (i.e. in taro farming communities).
 c) Support opportunities for one-on-one taro farmer sharing of information and practices.

Partners:

HDOA, UH CTAHR, ISCs, TSPTF, ONHK, taro growers

3. Implement pro-active protocols for taro going to Moloka‘i to prevent introduction of apple snails.

Necessary action:

- a) Assist in designing and implementing a rapid response plan for apple snails on Moloka‘i in conjunction with taro farmers.

Partners:

HDOA, DLNR-DAR and MISC, MoMISC, TSPTF, ONHK, taro growers

4. Update existing HDOA rules to close loopholes that support invasive species enterprise development and marketing.

Necessary action:

- a) Update language of HAR 4-9-5 and 4-54-2 relating to the Aquaculture Loan Program and Marketing and Consumer Services Eligibility for Product Promotion Assistance respectively to prevent or restrict assistance to enterprises based on the production or promotion of a product whose sole source is an invasive species defined by HDOA as a pest, including apple snail.
 b) Review and update the language of HAR 4-72-8 Plant Intrastate Rules Restrictions on Harboring, Rearing or Breeding

⁸⁶ This disease complex does not occur in Hawai‘i. It presents too high of a risk to allow any of the associated organisms to enter the state. Current law allows for a permit for research purposes only. There is no logical reason to import this disease to the state and risk the chance of contamination of taro in Hawai‘i. According to HDOA, to date, no permit requests for this disease have been implemented; however, live taro material enters the state for breeding research and as food. A pathogen lab of the caliber required to screen for the presence of this virus on incoming material does not exist in Hawai‘i (pers. com. CGAPS members 2007). University of Hawai‘i, HARC and USDA PBARC researchers frequently collaborate with and use the facilities of institutions outside the state. Such partnerships provide researchers with greater opportunities for funding without placing the state at risk.

of Pests to include invasive and prohibited pests lists from DLNR and DOA; develop consistency between all pest and prohibited organism lists found under HAR 4.⁸⁷

- c) Until such time as the legality of raising and selling apple snails can be properly addressed, HDOA Plant Quarantine is requested to find and inspect registered and unregistered apple snail farms/sellers (formal and informal) for poorly designed enclosures and adherence to recommendations for improved containment, along with DOH inspections of processors and sellers to monitor for disease vectors (rat lung worm).

H. Control apple snails in infested areas not used for taro-growing, with a high priority on those areas adjoining, up, or down stream from taro farms, or which are water sources for taro-growing systems.

1. Collaborate with state, federal and private landowner controlled wetlands and waterbodies where *Pomacea canaliculata* is already present to implement strategic and regular apple snail control measures.

Necessary action:

- a) Educate and work with land owners and managers (decision-makers and field staff) to improve understanding of apple snail populations on their lands and subsequent impacts to adjacent taro farmers.
- b) Develop a prioritized list of infested sites for control efforts based on snail population densities and frequency of infestation to taro growing areas.
- c) Identify a party to work with HDOA, DLNR-DAR, DOFAW, ISCs, USFWS – Wildlife Refuges and taro farmers to gain commitments and agreements, pool resources, design strategic approaches appropriate to each site and monitor, evaluate and adapt control actions, based on recommendations of the 2006 Apple Snail Control Plan.
- d) Encourage taro farmers to implement holistic, strategic system-wide apple snail controls through education outreach, partnerships and assisted project coordination, based on the recommendations of the 2006 Apple Snail Control Plan.
- e) Develop realistic, cost-effective control methods for dense populations of apple snails in open wetlands (see RESEARCH).

Partners:

HDOA, DLNR-DAR, ISCs, USFWS – Wildlife Refuge Division, USDA, TSPTF, taro growers

⁸⁷ These laws are currently tied to only those pests defined under HRS 150A-2 which is an importation and transport rule and does not include such established pests as apple snails.

IX. RESEARCH

Research is an important component that needs to be addressed to insure the security and purity and the future of taro. The book, *Taro: Mauka to Makai: A Taro Production and Business Guide for Hawai‘i Growers*⁸⁸ provides a good review of the historical and current university research information available about taro and how to grow it. This book is an example of a long history of collaboration between taro practitioners and CTAHR faculty and staff, which in recent years has reached a broken place over differences on genetic engineering, patenting, hybridization and their subsequent release, and bioprospecting, and a lack of understanding and communication. It is imperative that the rift that has developed between the research community and many in the taro farming community be set right. The Taro Security and Purity Task Force and UH CTAHR acknowledge there is a need for healing, so that meaningful, rigorous, collaborative research can move forward.

From the 1980s to the 1990, the Governor’s Agriculture Coordinating Committee (GACC) tasked CTAHR with a systematic review of the major and minor agricultural commodities through an Industry Analysis process (IA). This effort produced a report and set of priorities for taro which were developed by taro growers, processors, agency and researcher participants.⁸⁹ Many of those priorities remain valid; verification lies in the fact that those same concerns are found in this report as well. It also suggests, we may need to take different approaches than the past to achieve the research goals outlined by today’s taro farmers.⁹⁰ The growing of taro must be viewed and understood as more than just an industry; it is a cultural foundation for Hawai‘i, and has been so since the first taro plants arrived in these islands. Taro and the unique Hawaiian varieties of taro, are a cultural treasure and must be treated as such.

Taro farmers make decisions based on many variables as described in the CONCEPTS OF IMPORTANCE section of this report; this includes the selection of appropriate research methods and what is most important to them to research. While the needs of commercial taro farmers and other taro growers might differ, the underlying values on how taro is viewed remain the same. As described in the TARO FARMING LIFESTYLE and TARO IN AGRICULTURE section; what happens to the water, the soil, and the taro on one farm can happen on any other, irregardless of scale. The TSPTF strongly advises the establishment of an advisory group made up of Hawaiian practitioners and taro farmers from all sectors to work with UH Systems, UH CTAHR, PBARC and HARC to help address taro related issues, set policy on taro research, and educate researchers towards a more holistic and appropriate approach to research projects.

Taro research focus and funding has been primarily directed in the last 60 years by the assumption that modern technologies are the sole answer and the sole expert in taro research. As with medicine, we are learning again that sometimes older wisdoms hold the answer and that together modern and indigenous science in proper balance can be potent partners in restoring the health of the land, the taro and our bodies.⁹¹ The long history of Hawaiian indigenous science, research and development is as viable and important today as it was prior to the advent of the modern research methodologies and thinking most are familiar with today. UH Mānoa Hawai‘i inuiākea School of Hawaiian Knowledge, Hawai‘i Community College, Kamehameha Schools and many other schools are now encouraging, challenging and supporting Hawaiians students to investigate their own traditional knowledge in partnership with good modern scientific standards and practices. This effort should be considered by all of UH systems. Research partnerships beyond UH also strengthen and diversify critical thinking, research and problem solving for all stakeholders

The apple snail, *Pomacea canaliculata*, introduced to taro systems around 1983, is by far the worst pest facing taro farmers today. The 2006 Apple Snail Control Plan is a comprehensive review of the apple snail problem in Hawai‘i including their impact on taro production, historical and existing snail control methods, on-farm best management practices, strategic regional control approaches, and research needs. Since 2006, little has been done to fulfill the recommendations of this report; funding in the 2008 Legislature towards a promising research partnership was eliminated in last minute budget cuts. The Task Force strongly recommends that state and federal funding/resources be found and directed towards research for control of this pest with direction from the Control Plan and taro farmers.

Taro farmers in Moloka‘i have no information on the risks of invasive species such as yellow oleander (be-still), a deadly poisonous tree, near taro patches in Hālawā and need to know whether the fruits, flowers and leaves of this escaped ornamental falling into the water system and taro patches is contaminating lo‘i soils, taro plants, and water or poses a health risk to taro farmers and their children

88 Hollyer et al. 1997 and 2008

89 Hollyer et al. 1990.

90 Taro Analysis Report No. 4 listed 55 participants, of which only 15 were growers, the remainder were agency, UH CTAHR members and taro product processors (3). Under the Task Force, the majority of participants at community meetings have been a broad range of taro farmers (a number of whom contributed to the original IA report) which was the intended purpose of the legislated mandate of Act 211, to reach and provide a voice for the whole of the taro farming community.

91 Addressing diabetes within the Native Hawaiian community through an ‘ai pono diet of traditional cultural foods along with modern medical monitoring and coaching, the management of reef health using traditional Hawaiian indicators and comparative tracking and analysis, and the Hōkūle‘a training future generations and connected to the world by the internet as it sails under the hands of traditional navigators are just a few examples.

if exposed to such decomposing material.⁹²

The biggest problems in dryland taro production are weed control and insect pest management.⁹³ New cultural strategies to minimize weed and pest problems and improve soil health (for both wet and dry systems) are needed. Integrated pest management (IPM) strategies specific to taro production will benefit growers.

To be sustainable we need to rely on the best use of our resources, including re-evaluating our dependence on fossil-fuel based inputs such as chemical fertilizers. The addition of an organic research and teaching focus at CTAHR provides new opportunities to conduct comparative research on organic and conventional best management practices, on the development of sustainable, local sources of organic inputs. The study of pre-1940s lo‘i soils and soil culture practices are a missing piece in our understanding of how to best maintain the health of taro farms. The development of new hybrid taros does not resolve the underlying responsibilities we have to take care of the soil. The Task Force encourages a focus on improving taro yields, and pest and disease resistance and reduction through the improvement of soil and water conditions and the study of the preferred conditions (elevations, soils, temperatures, light, etc) of traditional Hawaiian taro varieties in the search for the most robust matches between taro varieties, farm practices and locations.

RECOMMENDATIONS

A. Establish policy to guide and encourage taro research that supports taro farmer needs and concerns.

1. Develop a comprehensive document (a white paper) that establishes taro growers’ vision on research and research protocols

Necessary action:

- a) Develop a formal, prioritized wish list of research projects, thereby ensuring that research is proactive and addresses taro grower needs.
- b) Incorporate themes from TSPTF letter sent to UH President McClain (5/28/2009).
- c) Identify a group to take the lead and responsibility in developing the white paper.
- d) Prioritize and coordinate all efforts to relieve bottlenecks and research efforts.
- e) Meet with university and researcher representatives to facilitate improved relations and respect for taro farmer concerns relating to taro research at UH. Strive for a formal agreement among all entities. The 2003 Palapala Paoakalani document should be considered as a guidance and reference for such an agreement, particularly in any discussion of research protocols and ownership of outcomes.⁹⁴ Researchers should partner with taro farmers to determine research projects.

Partners:

UH Systems, PBARC, HARC, Botanical gardens, OHA, TSPTF

B. Apple snail control research

1. Develop taro research and outreach for the control and eradication of apple snails using the guidance of the 2006 Apple Snail Control Plan.

Necessary action:

- a) Support and seek funding for lab and field research on the organic soil conditioner cited in the Control Plan which shows promise as a snail control.

Partners:

Pacific Biodiesel, Oceanic Institute, EKKA, HDOA, taro farmers

2. Research, document and refine fallow techniques, including cover crop rotations demonstrated on Kaua‘i, that reduce snail populations over time.

Partners:

Kobayashi and Rivera family, KCC agriculture program, Organic program at UH CTAHR, HICOF, HOFA, Nā Maka O Ka ‘Āina videographers

⁹² Ingesting plant parts or inhaling smoke from burned material can cause death. It is known as the suicide tree in India.

⁹³ A long list of insect pests plague dryland taro fields.

⁹⁴ This document was an outcome of the October 2003 Ka ‘Ahu Pono – Native Hawaiian Intellectual Property Rights Conference and can be downloaded at <http://www.kaahapono.com/resources.html>

3. Research environmentally safe, organic snail control methods for infested locations.

Necessary action:

- a) Investigate the potential of large-scale, intensive bait trapping for snail removal to reduce major snail populations in wetlands adjacent to active taro fields.
- b) Continue to explore locally-sourced organic compounds with potential for snail control; consult and collaborate with taro farmers to eliminate unresponsive, impractical or unfeasible pursuits early in research.⁹⁵
- c) Investigate the feasibility of using the sterile snail technique and release program that has been used successfully with fruit flies, with attention to realistic projected timelines and costs for population declines in heavily infested sites.
- d) Study the impact of water temperature and water flows (amount and speed) on snail reproductive and feeding cycles.

Partners:

UH CTAHR, USFWS, BM, taro farmers

C. Research how to rebuild taro soils quality and fertility

1. Research traditional Hawaiian agricultural practices in wet and dryland taro systems.

Necessary action:

- a) Survey and catalogue existing historic and current literature describing traditional Hawaiian taro growing practices and compile into an accessible format for taro growers, students and researchers. Evaluate the need for a traditional mulching systems and practices manual.

Partners:

UH CTAHR, UH Hawai‘iniūiākea School of Hawaiian Knowledge, UH Hilo and UH Hilo Hawaiian Studies Department, community colleges, BM, taro farmers

2. Research the viability of traditional and non-traditional mulching resources and green manure cover crops and their feasibility under current farm conditions as an alternative to chemical fertilizer application on small, medium and large scale wet and dry taro farms.

Necessary action:

- a) Research the fungal control properties of kukui, hao and other traditional and non-traditional mulches in lo‘i soils.
- b) Research organic taro farming methods currently in practice or potentially available, including green manure cover crop rotations with a caution towards potential invasiveness of many cover crop species.⁹⁶ All potential cover crops should be screened under the Weed Risk Assessment.⁹⁷
- c) Conduct comparative research on traditional Hawaiian, organic and conventional best management practices for wet and dryland taro farms for small, medium and larger scale growers and under a variety of resource and climactic conditions, and time frames, inclusive of residual, indirect and downstream impacts.
- f) Research the effects of improved soil health (organic matter content, micorhizae, analog organisms, nutrients, texture, water content, etc.) on plant resistance to phytophthora leaf blight and corm rots, pocket rot and other fungal diseases.
- g) Develop comprehensive best management practice recommendations for healthy wet and dryland farm conditions that rebuild soils and improve soil capacity to reduce fungal disease and pest populations and strengthen pest and disease resistance in plants based on long term comparative research of traditional Hawaiian, organic and conventional practices. Include considerations of long term input costs and environmental impacts⁹⁸

Partners:

USDA, UH CTAHR, UHM system of schools, community colleges, HICOF, HOFA, Body and Soil Conference resource partners, taro farmers

⁹⁵ This will reduce the attrition of scarce resource dollars into research or programs tracts that are disconnected from realistic farm conditions and costs and snail population behaviors.

⁹⁶ Numerous cover crops, nitrogen-fixing, and grass crops introduced to Hawai‘i over the last century through research and extension efforts have become aggressive invasives in wetlands and upland watersheds throughout the state. Upland range grasses, such as California grass and rice grass, moved into streams areas where cattle graze and are now entrenched in downstream lo‘i kalo adding more time and labor to weed control management for taro farmers.

⁹⁷ WRA is a project of the DLNR-HISC. The Council provides a free service of screening proposed species for potential weediness.

⁹⁸ Organic practices may take longer to show results but may also produce stronger results in the long term as well as reducing input costs over time.

3. Reduce impacts of fungal disease in wetland taro soils.

Necessary action:

- a) Research the effect of water temperature and flows (amounts and speeds) on fungal disease populations in lo‘i soils.
- b) Research the effects of harvesting taro plants at younger stages to maximize corm quality and reduce disease.

Partners:

USDA, UH CTAHR, UHM system of schools, community colleges, USGS, Body and Soil Conference resource partners taro farmers

D. Integrated pest management (IPM)

1. Develop and test comprehensive integrated pest management strategies for wet and dryland taro production, incorporating soil and water quality improvement recommendations as outlined in this report (B2d; C2a-g).

Necessary action:

- a) Research preventative, pro-active practices to control pests and disease from above ground and through soil management practices, including consideration of efficacy, costs and labor inputs for wet and dryland cultivation.
- b) Evaluate those pro-active practices that appear to be efficient, effective and environmentally safe through field trials and disseminate results to taro growers.

Partners:

UH CTAHR, HDOA, UH system of schools, community colleges, BM, taro growers

2. Research the potential risks of be-still tree (*Thevetia peruviana*) to taro patches and water ways in Moloka‘i.

Necessary action:

- a) Work with UH researchers and DOH to evaluate the level of toxicity found in the be-still tree and in taro patch soils, water and plants as well as exposure risks to families in Hālawa from this species.

Partners:

UH CTAHR, DOH, Hālawa residents and taro farmers

E. Cultivar research

1. Improve the integrity of taro descriptors for all taro varieties currently found in Hawai‘i.

Necessary action:

- a) Properly characterize all taro hybrids and enter descriptors into a taro variety database to distinguish them from other existing varieties, prior to release. Disseminate information to taro farmers (see HAWAIIAN TARO VARIETIES).
- b) Properly characterize all taro varieties from other countries growing in the state of Hawai‘i, particularly Samoa, Palau and Indonesia.

Partners:

UH CTAHR, UH system of schools, community colleges, BM, EKKA, taro identification experts.

2. Develop a network of taro growers at numerous locations, soils, elevations and aspects (sun exposures) throughout the state that are observing, recording and sharing observations on the characteristics and behavior of the Hawaiian varieties over successive generations and varying locations.

Necessary action:

- a) Investigate the disease and pest resistance of the traditional Hawaiian varieties

Partners:

UH CTAHR, UH system of schools, community colleges, BM, taro identification experts, taro growers, ONHK, EKKA

X. COMMUNICATION, EDUCATION AND PUBLIC AWARENESS

It is critical that we educate our next generation to ensure that taro culture will survive. Our Hawaiian varieties of taro are cultural treasures that need to be grown in backyards all around the state in order to perpetuate them for generations to come, to expand taro farmers options, public awareness and food choices. Equally important, is a need to develop more taro farmers actively farming and contributing to taro production in the state.

Existing education programs that include or focus on taro are increasing throughout the University of Hawai‘i System. At UH Mānoa there are two mahi‘ai kalo (taro farmer) classes offered within the newly created Hawai‘i inuiākea School of Hawaiian Knowledge via the Kamakakūokalani Center for Hawaiian Studies. The Hawai‘i Community College and the community college system provide a variety of classes that bring students into contact with taro, including ethobotany and Hawaiian studies classes. The community college system provides a number of adult education courses that also bring taro into the classroom. Hawaiian enrichment programs, scholarship programs and various student support organizations encourage students to actively participate in lo‘i and mālama‘āina service learning projects. Classes from various departments throughout the UH system also take part in activities centered around the lo‘i, including coursework in Hawaiian studies, Hawaiian language, ethnic studies, geography, political science, medicine, botany and other departments. Increasingly, the lo‘i is used as a venue to deliver lessons on Hawaiian culture and the Hawaiian holistic approach to the environment. The John A. Burns School of Medicine includes curriculum on the traditional Hawaiian diet and the benefits of “working the ‘āina” for a healthy lifestyle.



Task force members visited CTAHR's Moloka'i Research and Demonstration Farm, which maintains one of the most comprehensive traditional Hawaiian taro variety collections in the state.

UH CTAHR provides coursework in foundational skills for farmers, including soils and agronomy, and conventional and organic agricultural practices. A newly developing focus on organic agriculture is encouraging and needs further staff, resources and funding. More in-depth courses and experiences are needed, including internships and apprenticeships. Linking them to upper level studies will help to build a new body of potential farmers with a greater level of skills. In 10 years, as more and more students leave the system, there will be more who want to plant taro on the land.

Kamehameha Schools Interim and Summer Enrichment programs (Kūlia I Ka Pono, Explorations and Ho‘olauna) are building curriculum that bring students into the lo‘i and in contact with Hawaiian cultural sites and practices while teaching critical thinking skills. These programs reach both KS and non-KS students, and are

important resources on the neighbor islands. An example of an effective food self-sufficiency study curriculum was implemented by the Punahou School Summer Program (Where Do Things Come From) in partnership with local community organizations, taro farmers, and resource people in 2009.

The Kanu O Ka ‘Āina Charter School has developed comprehensive and integrated classroom learning around taro and the taro fields of Waipi‘o Valley, Hawai‘i. Students not only learn in the taro patch but also partner with scientists on stream studies and cultural practitioners to learn the chants and mana‘o of their kūpuna, as well as practice the fundamental values that underline the taro farming lifestyle daily. Other charter school programs around the islands include taro and lo‘i kalo experiences in their curriculum and use the lo‘i as the central theme for learning science, math, English and other subjects.

Various nonprofits, community organizations, individual farmers and community cultural centers, such as Ka‘ala Farm in Wai‘anae, have working lo‘i kalo or are rehabilitating old sites around the state and host thousands of students annually as a resource for DOE

and private schools; several projects also develop curriculum around taro and local food production and teach in the schools. Visiting students, local residents, community health programs and the larger public also benefit.

A taro farmer is not created in a single semester or class. We encourage linking these classroom and field opportunities so that students can carry credits from one program or school to another; and, that the UH mahi‘ai kalo courses be elevated to a full track of study throughout the system.

School garden programs are growing and a number of them include taro and food self-sufficiency as part of their gardens and as an education tool. The Hawai‘i Island Whole Systems Project Report showed that school garden programs “create lifelong consumers from locally produced food...by giving them a relationship with local foods such as taro.”⁹⁹ The report states that “the biggest threat to the sustainability of the local food economy is the homogenization of American eating habits...school gardens are a crucial tool to ensure the long term success of any local food and agriculture movement.”¹⁰⁰ Community college food industry programs such as those at Kapi‘olani campus, O‘ahu, Maui and Kaua‘i campuses provide exciting links for farmers to young and inspired chefs-in-training, many of whom will work locally at a range of low to high-end eateries or bring the unique food and flavors of Hawai‘i to mainland restaurants and hotels as they seek jobs further afield. These programs are strongly supported by the many well-known prized chefs in the state.

MA‘O (Māla ‘Ai ‘Ōpio), an award-winning nonprofit program in Wai‘anae, O‘ahu, links high school, undergraduate and graduate students to critical business and farm management skills and is training new farmers to meet local consumption needs in Wai‘anae.

A great many taro farmers and cultural practitioners give of their time, knowledge and skills on a pro bono basis to work with students, the UH and community colleges system, museums, botanical gardens and cultural centers, nonprofits, and local communities, as well as mentor potential and beginning taro farmers.

Each of these efforts provides an introduction to the thinking and practice of a taro farmer and to the taro. Agricultural and cultural apprenticeships and mentorships for nontraditional students and beginning taro farmers that place them in the lo‘i and with a more experienced farmer for a minimum of a year will contribute towards the development of a new generation of skilled taro farmers.¹⁰¹

Once students leave the system, taro farmers have access to general business skills training but no programs exist shaped specifically around the values that taro farmers articulate in the taro-farming lifestyle. Business classes and workshops to assist in the establishment of community-based poi mills are strongly encouraged.

RECOMMENDATIONS

A. Increase public awareness of the designation of taro as the State Plant, the value of taro and its role culturally, socially, in health and well-being, environmentally, and economically in the state.

1. Document the full value of taro to the State of Hawai‘i economically, environmentally, educationally, socially, culturally, and in health and well-being.

Necessary action:

- a) Develop a team and conduct an in-depth economic study on the full economic value of taro to the state of Hawai‘i and disseminate findings to lawmakers, agencies, business groups, media, schools, cultural groups, Hawaiian Civic Clubs, and the taro farming community.
- b) Provide agencies and legislators with documentation which indicates the benefits of small grower use of agriculture lands for local economies and food supplies (see section on ECONOMIC VIABILITY).

Partners:

UHERO, HDOA, DBEDT, HTA, UH system of schools, community colleges, ‘Olelo, Akaku, HVLT and other nonprofits, taro growers

⁹⁹ Page, Bony and Schewel, 2007:82.

¹⁰⁰ Ibid, 2007:37-38.

¹⁰¹ Short term apprenticeships of a few months (i.e. a semester) are difficult for taro farmers because of the time and attention required to train them. In order to make it worth a taro farmer’s time to participate in an apprenticeship program, a student must be willing to commit to a long term learning experience. This type of program should be accessible to high school graduates and perhaps be a requirement of college students graduating in mahi‘ai kalo programs.

2. Report on the status and history of taro as an industry.

Partners:

DBEDT, UH Shidler College of Business – Pacific Business Center Program, UH CTAHR, HDOA, UH system of schools, community colleges, BM, taro growers

3. Raise the cultural awareness of the general public about taro

Necessary action:

- a) Create and disseminate education materials to schools, alternative learning centers, home schoolers, adult education and community projects based on the ONHK *Guidelines for Grassroots Lo‘i Kalo Rehabilitation*.¹⁰²

Partners:

UH system of schools, KS, OHA, QLCC, ONHK, HCCs and other native Hawaiian organizations, HLVT and other nonprofits, public television stations

4. Raise food security and self-sufficiency awareness of the general public, students, teachers, researchers and lawmakers in relation to taro through multiple educational events, presentations and publications.

Necessary action:

- a) Support and fund school garden programs that include taro and other traditional Hawaiian food crops and food self-sufficiency in their curriculum.
- b) Support the continuation and expansion of taro festivals and taro tastings on all islands through funding and resources. Encourage creative culinary endeavors using taro.
- c) Encourage the continuation of programs such as the “Where Do Things Come From” curriculum developed with taro farmers and teachers at the Punahou Summer School program that raise awareness of food capability and self-sufficiency in Hawai‘i.
- d) Provide presentations to community groups, neighborhood boards, county councils, the Legislature, business groups, Hawaiian Civic Clubs, schools and other groups, culinary institutions and chefs.

Partners:

HDOA, HTA, UH system of schools, DOE, KS, OHA, QLCC, HCCs and other native Hawaiian organizations, public, private, charter, home school resource people and programs, nonprofits, community organizations, taro farmers, TSPTF

B. Develop a program to provide taro education and training opportunities.

1. Develop taro education and training opportunities for students, adults, communities, agencies, decision-makers and taro farmers

Necessary action:

- a) Evaluate the full range of existing taro education and training opportunities in schools, non-traditional learning programs, for agency staff, decision-makers, taro farmers and the general public, and identify the gaps in existing programs and materials.
- b) Create and distribute education materials designed to meet the needs of each target group.
- c) Create opportunity for classes centered around taro and other traditional Hawaiian crop plants and that provide farming skills across disciplines to be offered at each college campus. Develop an agreement to accept credits across disciplines and colleges towards mahi‘ai kalo and other related degree programs.
- d) Evaluate and improve communication and dissemination of education materials, information, resources and programs.
- e) Elevate mahi‘ai kalo courses to a full tract of study throughout UH systems.

Partners:

HDOA, HTA, Kindergarten-to-College schools, UH systems, DOE, KS, OHA, QLCC, public, private, charter, home school resource people and programs, nonprofits, community organizations, taro taro farmers, TSPTF

2. Improve communication among taro growers, and between agencies and taro growers, with an emphasis on transparency.

Necessary action:

¹⁰² ONHK, 2003.

- a) Follow up on the letter sent to UH and agencies with concrete meetings and facilitated discussions towards achieving the goals outlined in this communication.
3. Establish a protocol for communication between agencies and taro growers.

Necessary action:

- a) Establish a long term taro advocacy and growers group to facilitate balanced communication between taro growers and agencies (see Ho‘i and ECONOMIC VIABILITY)
- b) Improve relationship between taro growers, institutions and agencies, including HDOA, DLNR, UH, the Agribusiness Development Corp and the Hawai‘i Farm Bureau Federation
- c) Work with the Hawai‘i Farmers Union to develop a taro farmer specific advisory subgroup within HFU.
- d) Improve the communication of research projects, progress and results to taro growers and identify a POC within the UH system and a taro growers advocacy group to assist in the dissemination of information.
- e) Educate researchers about culturally appropriate names for new hybrids.

Partners:

UH CTAHR, UH Systems, HDOA, DLNR, HFBF, HFU, KS, OHA, TSPTF, taro growers organizations, taro farmers

4. Establish a multi-partnered and linked website managed to share taro growing wisdom with other farmers.

Necessary action:

- a) Convene a team of partners to design the website, select a means of uploading content, determine a policy for the types of materials to be hosted on the site and access, and determine an appropriate hosting entity and manager.¹⁰³
- b) Develop funding as necessary to support the maintenance and management of the website.

Partners:

UH system of schools, HDOA, KS, BM, OHA TSPTF, EKKA, Kupunakalo website project, taro specialists, growers organizations, native Hawaiian organizations and nonprofits

5. Provide taro farmers information on invasive species that have the potential to threaten taro production; infestation locations; decontamination, eradication and control protocols and where new threats might come from.

Necessary action:

- a) Educate taro farmers about where they can get information concerning newly introduced species and who they can contact for further information and assistance for control.
- b) Develop a mechanism for disseminating invasive species information to taro farmers linked to existing invasive species websites for CGAPS and ISCs.

Partners:

HDOA, DLNR, CGAPS, HISC, ISCS, UH CTAHR, other taro websites and groups

6. Increase taro grower understanding of technical and scientific terms, such as ‘hybrid’ and ‘gmo’ in relation to taro.

Necessary action:

- a) Develop materials using the NSF criteria for unbiased data and internationally recognized standards for definitions.
- b) Select an organization or individual(s) who is (are) neutral to the GMO issue to compile, evaluate and develop education materials.

Partners:

UH, TSPTF, DOH, Hawai‘i-SEED, NAS, NFS

7. Educate the general public, taro farmers and legislators of taro farmer water rights.

¹⁰³ In the late 1990s, the Zunni nation developed a system for bringing together local knowledge about their lands which used varying levels of access to protect sensitive indigenous knowledge and information about cultural sites and also based on the skill level of the user.

Necessary action:

- a) Conduct educational classes on water rights for taro growers and new and standing Water Commission members.
- b) Identify a resource person from DLNR to attend local taro growers association meetings, provide presentations and educational talks.
- c) Support local taro groups to hold educational sessions and invite resource people knowledgeable about water rights to talk with taro farmers.
- d) Make available to taro farmers, agencies and decision-makers key water rights documents and Hawaiian rights handbooks, including the *Ola i ka Wai: A Legal Primer for Water Use and Management in Hawai‘i* currently being developed specialists in Hawai‘i water law.

Partners:

UH Richardson School of Law, Earthjustice, Native Hawaiian Legal Corp, CWRM, ONHK, taro farmers groups

XI. TRADITIONAL HAWAIIAN TARO VARIETIES

From a small number of taro starts that arrived with the first Polynesians to the Hawaiian Islands and with a limited gene pool, an estimated 300 to 400 cultivars were developed prior to Captain Cook’s arrival in 1778.

What made this proliferation of taro varieties unique in Hawai‘i was not so much the fine-tuned adaptation to a range of elevations, soil conditions and climates; this occurred in many places under the skilled hands of local farmers throughout the Pacific and Asia. In Hawai‘i, it was the development of cultivars that favored fresh or brackish water, cool or warm water systems; varieties that could shift between complex dry and wetland systems and thrive in both conditions; along with their colors, leaf shapes, fragrances, and tastes, that distinguished them from all others.¹⁰⁴

By the early 1900’s many of the ancient varieties had disappeared, along with the taro-growing lands and water that supported them. Researchers at the Bishop Museum including Gerrit Wilder, the E.S. Craighill and Elizabeth Geen Handy and Mary Kawena Pukui, working with numerous Hawaiian taro farmers, conducted extensive survey and collection of what remained at that time. Both Handy and Wilder provided this material to the researchers at Agriculture Experiment Stations on O‘ahu to establish taro varieties collection that was the primary source of information for *Bulletin 84: Taro Varieties in Hawaii*.¹⁰⁵ This book is still the principal reference for identifying Hawaiian taro varieties but remains incomplete.¹⁰⁶

The revision of the Bulletin has been a focus of taro farmers for more than 20 years. UH College of Tropical Agriculture and Human Resources (CTAHR) does not have the resources, staff, expertise or funding to marshal such an effort, which requires extensive archival and field study along with knowledge in visual taro varieties identification. In 2007, a group of taro farmers, taro variety experts, cultural practitioners and others who have been individually and collectively gathering and sharing archival materials, photographs and kalo plants in the field over the years, formed a partnership with E kūpaku ka ‘āina, a 501(c)(3) nonprofit organization, to systematically address the work of updating Bulletin 84. A work plan was developed and partnerships with potential supporting entities have been initiated. Grant proposals submitted in 2008 and 2009 have hindered by funding cuts to many agencies and public institutions. This is a substantial effort that has been to date, all voluntary. To move the project to the next level requires significant dedicated time on the part of the group and funding to support that.

The taro varieties collection grew and declined numerous times and almost disappeared in the 1960s, with botanists and taro farmers such as Harry Masashi “Cowboy” Otsuka of Moloka‘i contributing rediscoveries from old taro growing places of Hawai‘i. Through the efforts of many people both inside and outside the University of Hawai‘i Agriculture Research Stations, including taro farmers and botanical gardens, much of the original collection was rescued. UH CTAHR researchers assembled what was in the 1970s “one of the world’s largest taro collections with over 300 varieties at the Kaua‘i Agriculture Research Station.¹⁰⁷ After damage from Hurricane ‘Iniki in 1992 and wild pigs in 1993, the Kaua‘i collection was recovered to the island of Moloka‘i under the care of Alton Arakaki, UH CTAHR County Agricultural Agent where an extensive taro collection had already been established in 1984 with the help of Uncle Cowboy.¹⁰⁸ The Moloka‘i collection has been the most important link in maintaining and sharing the collection and information about the varieties with other botanical gardens, taro farmers, researchers and cultural practitioners since the 1980s. CTAHR’s focus as a research college makes directing funding towards proper maintenance and care of these arboretum-type collections difficult. Support to improve this situation is critically important to taro farmers.

Hybrids and new cultivars from the Pacific were added to UH and arboretum taro collections in Hawai‘i through researchers at the University of Hawai‘i, and agricultural and ethnobotanical collectors surveying the Pacific and Asia. These new additions lack accurate descriptions and character identification. The result is that many taro farmers inexperienced in the identification of the traditional Hawaiian varieties have found these new taros, particularly Palauan and Samoan varieties in their patches under the mistaken impression they are Hawaiian varieties. Taro identification workshops conducted by Jerry Konanui and hosted by many of the botanical gardens help to increase awareness but resources and funding to expand that effort are needed.

There are an estimated 11 formal collections of traditional Hawaiian taro varieties around the state. The more significant of those

104 Excerpt from Konanui and Levin 2009 in *Ka Wai Ola*, August 2009.

105 *Restoring Hāloa* in the Maui Botanical Garden Newsletter, January 2007; Handy and Handy 1940 and 1991, Wilder, unpublished manuscript nd [1935?]

106 While early researchers such as MacCaughey and Emerson (1913 and 1914) and the authors of Bulletin 84 suggested there was a great deal of overlap in varietal names, and hence, fewer varieties; Handy (1940) notes after observing and collecting in the field for so many years that “On the whole, I am inclined to think there is far less duplication of names than might be expected.”

107 Hollyer, J. et al. 2008

108 A similar collection was also held at the Waimea Arboretum on O‘ahu but befell the same fate as the Kaua‘i collection in those years.

collections maintain varying degrees of records and field plantings. Hawaiian taro cultivars are housed at UH CTAHR Moloka‘i, Kaua‘i and Kula Agriculture Research Stations (additional collections have been recently established in 2008 to the Waimānalo and Poamoho stations on O‘ahu and at the Kona Research Station on Hawai‘i); National Tropical Botanical Garden at Kahanu and Limahuli; Maui Nui Botanical Gardens; Waimea Arboretum; and Lyon Arboretum, O‘ahu, which also houses the only public tissue culture preservation lab in the state. As recently as seven years ago, the DLNR-Parks and Recreation Ke‘anae Arboretum had a diverse taro collection but this was lost to feral pigs and lack of caretakers and never recovered. Ka Papa Lo‘i o Kānewai, at UH, has also joined this group and now hosts a collection at its facility as well.

The value of the collections reaches beyond revitalizing taro farming. Both NTBG and Lyon Arboretum were recently recognized as two of the top ten “Best Botanical Gardens Across the U.S.”¹⁰⁹

The managers and directors of each of the taro cultivar collections were surveyed in February 2009 by the botanical collections representative of the Task Force to determine what resources and assistance were needed to improve protection, education and distribution efforts. Resources, staff, funding, protection from feral pigs, improved collection data management and education materials were listed as needs. Their survival is a critical piece in efforts to protect and perpetuate the Hawaiian taro cultivars. The Task Force expressed strong interest in supporting the establishment a new tissue culture facility at Lyon Arboretum dedicated to traditional Hawaiian use plants, especially the taro, along with multiple isolated huli banks in protected landscapes on each island to create a network of distribution and protection against single disaster losses from feral animals, disease, theft, and storms. This is a key element in shifting from merely protection to perpetuation.

There are an expanding number of taro farmers on each island who focus their growing efforts on perpetuation by increasing the availability of the Hawaiian taro huli for farmers and to back up botanical collections; the majority on Maui. Not every grower will be able to maintain a complete collection. “Adopting out” single taro varieties to families and the places they were known to is a simple way to both to expand and perpetuate their growth and to revive the mo‘olelo and knowledge connected to each variety. This is an important component in recovering the old varieties. Taro identification workshops and sharing of huli between growers and by the Moloka‘i collection have increased interest on all islands, however, many of the varieties are extremely rare and few huli are available. Taro farmers interested in growing the traditional varieties on a larger scale have limited options expect to start with a few huli and expand in the field over time. The creation of dedicated huli banks and a tissue culture lab would significantly reduce the time frame for expanding availability to growers.

E ‘ai ana ‘oe i ka poi paua o Keaīwa.

Now you are eating poi made from the paua taro of Keaīwa.

The paua was the best taro in Ka‘ū and the only variety that grew on the plains.

¹⁰⁹ http://naturehills.com/gardening/blogs/growing_wise/archive/2009/07/27/best-botanical-gardens-across-the-usa.aspx#n3 July 27, 2009

RECOMMENDATIONS

A. Support the recovery of traditional Hawaiian taro cultivars throughout the state.

1. Create a network of farmers, researchers, and botanical gardens to document cultivar characteristics, best growing conditions, preferred growing sites, pest and disease resistance, and productivity (corm and huli) under a range of conditions, sites, and growing practices.

Necessary action:

- a) Implement the photographic standards and identification descriptors developed by the taro variety experts group in documenting and recording information for each variety.
- b) Seek and gather traditional knowledge about each variety, mindful of the gift of shared knowledge from kupuna.
- c) Develop a standard protocol for and conduct DNA mapping¹¹⁰ of taro cultivars to document cultivar identity (purity), relationships between varieties and to further our understanding of potential sources of origin. Designate a repository for this information and protocols for its use.
- d) Share findings among the network and with taro farmers throughout the state through a revised Bulletin 84, taro varieties workshops (Jerry Konanui and participating collections and gardens), taro farmer gatherings, classrooms and education outreach programs.

Partners:

BM, NTBG, MNBG and other botanical gardens, Lyon Arboretum tissue culture lab, UH CTAHR, UH Hawaiian Studies, EKKA, taro farmers and cultural practitioners, taro identification specialists

2. Protect and support the Moloka‘i taro varieties collection.

Necessary action:

- a) Identify public and private funding sources and apply for and receive funding; determine a mechanism for funding to be assigned directly to the Moloka‘i collection.
- b) Provide resources to hire a grant writer to work with Moloka‘i staff to pursue consistent and appropriate funding for long term protection of the collection.
- c) Consider affiliating the collection with UH Lyon Arboretum whose purpose is directly aligned with maintaining and sharing plant collections in order to improve potential funding support.

Partners:

Maui County legislators, Maui County Council members, Botanical gardens, Lyon Arboretum, UH CTAHR, HVLTL, taro farmers and cultural practitioners, taro identification specialists, Hawai‘i Community Foundation, grant writers

3. Establish huli banks with clean (disease-free), pure plant stock on each island to revitalize taro field diversity.

Necessary action:

- a) Create a huli bank program, using Hawaiian varieties grown in tissue culture and dryland fields to help increase the availability of clean, disease-free huli
- b) Establish a partnership agreement with HDOA, UH CTAHR, Bishop Museum, the National Tropical Botanical Gardens, Lyon Arboretum (UH), Maui Nui Botanical Gardens, Waimea Arboretum (OHA), Ka Papa Lo‘i o Kānewai, and taro growers who are maintaining Hawaiian taro variety collections with the goal of multiplying the availability of cultivar stock for taro farmers.
- c) Establish a common understanding of resource ownership and purpose, project capabilities, resource needs and costs.¹¹¹
- d) Investigate potential locations for huli banks on each island that are isolated from contamination by nearby taro fields and evaluate the quality of each site prior to establishment. Test soils for chemical and fungal contamination that might compromise huli bank resources. Establish a common on-site protocol for reducing and preventing opportunities for future

110 DNA fingerprinting (mapping) techniques uses laboratory equipment and techniques applied in all manner of research in molecular biology and takes small tissue samples from a plant to study and identify the unique genetic attributes in the DNA of each taro variety. This method does not alter (engineer) the genetic makeup of the taro plant from which the tissue sample came; it only documents existing gene sequences. An MOA with researchers and research facilities will maintain strict control over the ownership, use, distribution and disposal of any sampled materials to ensure that materials are not subsequently applied to purposes that may violate Hawai‘i and Maui County ordinances.

111 To protect Hawaiian IPRs to the cultivars, honor appropriate uses and purposes of the huli material and the traditional cultural practice of sharing of huli that has supported taro farmers for generations.

contamination from outside sources.

- e) Use tissue culture from verified taro collections to create disease-free huli for each bank established.
- f) Develop recommendations for lowering disease rates on farm and make the information available to taro growers through multiple partners.
- g) Develop funding sources to support affordable tissue culture of varieties for farm stock; couple with practices to break soil-disease cycles prior to receipt of clean huli.
- h) Support the establishment of additional taro collections on each island and different districts on each island to create a network of duplicate collections where observation, learning, exchange and huli distribution can occur; and to strengthen existing backup resources.¹¹²

Partners:

HDOA, UH CTAHR, NTBG, MNBG, Waimea Arboretum/OHA, Ka Papa Lo‘i o Kānewai, Lyon Arboretum tissue culture lab, EKKA, taro farmers and cultural practitioners, taro identification specialists, grant writers, nonprofits, community groups

4. Support local germplasm and tissue culture preservation of tradition Hawaiian taro varieties for use statewide and as a second tier of conservation.

Necessary action:

- a) Support development of a second tissue culture and germplasm storage facility dedicated to traditional Hawaiian crops, to protect and preserve traditional Hawaiian varieties of taro and other plants, at Lyon Arboretum¹¹³.
- b) Develop a project proposal outlining clear goals and objectives for the facility that build strong partnerships with farmers and cultural practitioners interested in revitalizing traditional food resources.
- c) Conduct a feasibility study to determine the costs and needs of a new facility.
- d) Create a partnership group with Lyon Arboretum that can provide letters of support and search for and direct funding and other resources to project efforts.
- e) Develop laboratory specifications and architect plans.
- f) Apply for required permits and implement construction.

Partners:

HDOA, UH CTAHR, NTBG, MNBG, Waimea Arboretum/OHA, Ka Papa Lo‘i o Kānewai, Lyon Arboretum, taro farmers and cultural practitioners, taro identification specialists, grant writers, nonprofits, community groups, public and private sector funders.

5. Identify and characterize all existing taro varieties, including hybrids, and develop a policy for improving future distribution and monitoring practices, including preventing the release of undocumented uncharacterized hybrids and new varieties of taro for distribution (see RESEARCH).

Partners:

BM, UH CTAHR, NTBG, MNBG, Waimea Arboretum, Lyon Arboretum, taro identification specialists

B. Establish a project through school and alternative education programs that will seek to educate families on how to grow taro for home use and partner with existing collections to provide huli for those families who wish to grow taro for subsistence.

1. Conduct archival and ethnographic research of the history of taro and taro practices in Hawai‘i and the traditional Hawaiian cultivars to aid in [taro’s] revival and revision of Bulletin 84. Revise Bulletin 84: Taro Varieties in Hawaii (1939) which is the key reference for taro growers and researchers.

Necessary action:

- a) Assist in locating and directing funding, resources, support and encouragement towards the taro farmers (and partners) group under the umbrella of EKKA currently working on revision efforts.
- b) Assist with and continue to develop grant proposals for the revision effort.
- c) Support and conduct archival research, kupuna interviews, and field documentation of the traditional Hawaiian taro cultivars.

¹¹² Huli banks will require limited access to prevent the introduction of soil diseases or pests, i.e. on the bottom of shoes, on backpacks and vehicles. Variety collections are to provide more accessible learning places for all those interested in the traditional Hawaiian varieties and taro in general.

¹¹³ Other Hawaiian crops would include ‘uala (sweet potato), kō (sugarcane), mai‘a (banana), ipu (gourds), ‘awa (kava), ‘ulu (breadfruit), weaving, cordage and kapa plants, among others.

- d) Compile information, observations and photographs for inclusion in the revised Bulletin.
- e) Develop a writing and editorial team to produce a print ready revision for publication.¹¹⁴
- f) Work with KS, BM, UH, OHA and other potential partners to fund and otherwise support publication of a revised Bulletin 84.

Partners:

EKKA, UH School of Hawaiian Knowledge, UH CTAHR, OHA, KS, BM, Awaiaulu: Hawaiian Literature Project, ‘Ai Pōhaku Press, TSPTF, taro farmers and cultural practitioners, taro identification specialists, students, grant writers, nonprofits, community groups, public and private sector funders.

C. Expand existing taro identification and verification outreach

- 1. Continue regular verification of all taro varieties collections.
Continue to support and expand the taro identification workshops and partnerships that facilitate and support these workshops.

Necessary action:

- a) Support and allocate resources for taro variety collection workshops and one-on-one field identification; particularly travel and lodging expenses.

Partners:

HDOA, UH CTAHR, NTBG, MNBG, Amy Greenwell BG, Waimea Arboretum, OHA, airlines, nonprofits, public and private sector funders, taro identification specialists.

¹¹⁴ The expertise of the Awaiaulu: Hawaiian Language Project and ‘Ai Pōhaku Press provide an excellent model and guidance for this effort.

XIII. REFERENCES

- Adams, A. and E. Joesting. 1958. *The Islands of Hawaii*. Bishop National Bank of Hawai‘i. Honolulu, HI.
Anthropology Department, B.P. Bishop Museum. Honolulu, HI.
- Athens, J. S. 1995. “Hawaiian Lowland Vegetation in Prehistory” in Kirch, P. and T. Hunt, eds. 1995. *Historical Ecology in the Pacific: Prehistoric Environmental and Landscape Change*. Yale University Press. New Haven, CT.
- Beckwith, M. 1951. *The Kumulipo: A Hawaiian Creation Chant*. University of Chicago Press. Chicago, IL.
- Carmichael, R. et al. 2008. *Taro Pests: An Illustrated Guide to Pests and Diseases in the South Pacific*. ACIAR Monograph No. 132. Australian Centre for International Agricultural Research. Canberra, Australia.
- Cordy, R. 2000. *Exalted Sits the Chief: The Ancient History of Hawai‘i Island*. Mutual Publishing. Honolulu, HI.
- Diamond, J. 1997. *Guns, Germs and Steel: The Fates of Human Societies*. W.W. Norton and Co. New York, NY.
- Greer, N. 2005. *Ethnoecology of Taro Farmers and Their Management of Hawaiian Wetlands and Endangered Waterbirds in Taro Ecosystems*. PhD dissertation. University of Washington Department of Anthropology.
- Handy, E.S.C. 1940. *The Hawaiian Planter: Volume I*. Bernice P. Bishop Museum Bulletin 161. Bishop Museum Press. Honolulu, HI.
- Hollyer, J. et al. 2008. “Championing a Traditional Crop” in *Hawai‘i’s College of Tropical Agriculture and Human Resources, Celebrating the First 100 Years*. University of Hawai‘i. Honolulu, HI.
- Hollyer, J. ed. Revised edition, 2007. *Taro Mauka to Makai: A Taro Production and Business Guide for Hawai‘i Growers*. University of Hawai‘i at Mānoa, College of Tropical Agriculture and Human Resources. Honolulu, HI.
- Hollyer, J et al. eds. 1990. *Agricultural Industry Analysis: The Status, Potential, and Problems of Hawaiian Crops: Taro Industry Analysis Number 4*. submitted to the Governor’s Agriculture Coordinating Committee, August 29, 1990. UH CTAHR
- Kepelino; M. Beckwith trans. 1932. *Kepelino’s Traditions of Hawaii*. Bernice P. Bishop Museum Bulletin 95. Revised Edition 2007. Bishop Museum Press. Honolulu, HI.
- Kimura, Larry. 1983. “Native Hawaiian Culture” in the Language section of the *Native Hawaiians Study Commission Report*. Office of Hawaiian Affairs. February 1983; pp173-190; 214-215.
- Kirch, P. and T. Hunt, eds. 1995. *Historical Ecology in the Pacific: Prehistoric Environmental and Landscape Change*. Yale University Press. New Haven, CT.
- Kirch, P. 1994. *The Wet and the Dry: Irrigation and Agricultural Intensification in Polynesia*. University of Chicago Press. Chicago, IL.
- Leung, P.S. and M. Loke. 2008. *Economic Impacts of Increasing Hawai‘i’s Food Self-Sufficiency*. Economic Issues Series EI-16. College of Tropical Agriculture and Human Resources, University of Hawai‘i. Honolulu, HI. December, 2008.
- Levin, P. 2006. *Statewide Strategic Control Plan for Apple Snail, Pomacea canaliculata, in Hawai‘i*. Report produced for the DLNR-Department of Aquatic Resources. September 30, 2006. Honolulu, HI.
- Malo, D.; N. Emerson trans. 1904. *Hawaiian Antiquities (Mo‘olelo Hawai‘i)*. Bernice P. Bishop Museum Special Publication 2. Bishop Museum Press. Honolulu, HI.
- NASS. 2009. *Hawaii Taro*. National Agriculture Statistics Service, U.S. Department of Agriculture. in cooperation with the Hawai‘i Department of Agriculture. February 2, 2009.

- Nogelmeier, P. trans. 2006. *The Epic Tale of Hi‘iakaikapoliopele*. Awaiaulu Press. Honolulu, HI.
- ‘Onipa‘a Nā Hui Kalo. 2003. *Guidelines for Grassroots Lo‘i Kalo Rehabilitation: Pono, Practical Procedures for Lo‘i Kalo Restoration*. Queen Lili‘uokalani Children’s Center. Punalu‘u Office.
- Osborn, A. 2007. *Principles of Cultural Geography: Agriculture*. Geography Department. San Diego State University. http://www-rohan.sdsu.edu/~arosborn/cultpdfs/09_ag.pdf
- Page, C, L. Bony and L. Schewel. 2007. *Island of Hawai‘i: Whole System Project: Phase I Report*. on behalf of the Omidyar family. Rocky Mountain Institute. March 2007.
- Pukui, M. K and S. Elbert. 1981. “Appendix B. Glossary of Hawaiian gods, demigods, family gods, and a few heroes” in *Hawaiian Dictionary*. University of Hawai‘i Press, Honolulu HI.
- Pukui, M.K., E.W. Haertig and C.A. Lee. 1979. *Nānā I Ke Kumu (Look to the Source): Volume I*. Hui Hānai Publishing, an auxiliary of the Queen Lili‘uokalani Children’s Center. Honolulu, HI.
- Reppun, C et al. 2009. *Food, Glorious Food*. Results of the “Where Do Things Come From” Punahou Summer School program. Bob Tam and Emery Mitchum, teachers, Mae Isonaga, nutritionist, Cancer Research Center of Hawai‘i.
- Stannard, D. E. 1989. *Before the Horror: The Population of Hawai‘i on the Eve of Western Contact*. University of Hawai‘i, Social Science Research Institute, Honolulu, HI.
- Sterling, E. and C. Summers. 1978. *Sites of Oahu*. Bishop Museum Press. Honolulu, HI.
- Sterling, E. 1998. *Sites of Maui*. Bishop Museum Press. Honolulu, HI.
- Summers, C. 1971. *Molokai: A Site Survey*. Pacific Anthropological Records, Number 14. Handy, E.S.C. and E.G. Handy with collaboration of M.K. Pukui. Revised edition 1991. Native Planters in Old Hawai‘i: Their Life, Lore and Environment. Bernice P. Bishop Museum Bulletin 233. Bishop Museum Press. Honolulu, HI.
- USDA Soil Conservation Service (NRCS). 1972. *Soil Survey Interpretations*. USDA and Hawai‘i Department of Land and Natural Resources. State of Hawai‘i.
- Gingerich, S et al. 2007. *Water Use in Wetland Kalo Cultivation in Hawai‘i*, prepared in cooperation with the Office of Hawaiian Affairs, State of Hawai‘i. Open File Report 2007-1157. US Department of the Interior, US Geological Survey. Reston, VI.
- Vitousek, P. et al. 2004. “Soils, Agriculture, and Society in Precontact Hawai‘i” in *Science*. Vol. 304: 1665-1669. 11 June 2004
- Waters, T. 2007. *The Persistence of Subsistence Agriculture: life beneath the level of the marketplace*. Lexington Books, Lanham, MD.
- Wilcox, C. 1996. *Sugar Water: Hawaii’s Plantation Ditches*. A Kolowalu Book; University of Hawai‘i Press. Honolulu, HI.

APPENDIX A
FULL TEXT OF ACT 211 (L. 2008, C. 211)

Approved by the Governor

on JUL 3 2008

THE SENATE
TWENTY-FOURTH LEGISLATURE, 2008
STATE OF HAWAII

ACT 211
S.B. NO. 2915
S.D. 2
H.D. 1
C.D. 1

A BILL FOR AN ACT

RELATING TO TARO.

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF HAWAII:

1 SECTION 1. The legislature recognizes the need to develop
2 non-genetic modification based solutions to protect taro from
3 disease and insects on a statewide basis. In Senate Concurrent
4 Resolution No. 206 (2007), the legislature requested the
5 department of agriculture to develop a taro security and purity
6 research program to save and protect taro from natural attack.

7 In 2007, 1,800,000 pounds of taro were imported to Hawaii.
8 Under existing biosecurity rules, the department of agriculture
9 was unable to inspect much of the imported taro to protect
10 existing taro crops in the State.

11 At the same time, taro farmers are struggling with high
12 rates of pest and disease infestation, rising crop and land
13 costs, lack of access to quality water and land resources, a
14 decline in crop cultivar biodiversity, and a decrease in the
15 number of families continuing the taro farming lifestyle. Taro
16 and taro farms are important in helping to promote Hawaii's
17 economic vitality in agriculture, tourism, health and wellness,

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BOOK 6
S.B. NO. 2915
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1 and education and the arts. Taro and taro farms help to sell
2 Hawaii to the world.

3 Senate Concurrent Resolution No. 206 (2007) requested the
4 department of agriculture (DOA) to collaborate with taro growers
5 and various native Hawaiian groups to develop and adopt a
6 program that would:

- 7 (1) Allow DOA's biosecurity program to protect crops in
8 Hawaii by inspecting foreign crops upon entrance to
9 the state, thereby preventing any viruses or insects
10 from entering the State;
- 11 (2) Allow alternative forms of research on taro other than
12 genetic modification;
- 13 (3) Provide public outreach, engagement, and education on
14 taro research and protection; and
- 15 (4) Request the United States Department of Agriculture to
16 have the Alomae/Bobone virus disease complex and taro
17 beetles designated as "actionable pests" in the
18 findings of the United States Department of
19 Agriculture and DOA report to prevent the entry of
20 these pests into Hawaii from foreign countries.

21 DOA initiated a dialogue with taro farmers from each
22 island, researchers and representatives from the University of

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1 Hawaii, the Hawaii Farm Bureau, and the office of Hawaiian
2 affairs to produce a joint report describing the outcomes and
3 recommendations of the participants. The joint report,
4 including proposed legislation, was forwarded to the
5 legislature.

6 One of the primary recommendations of that report was to
7 form a taro security and purity task force to guide policy and
8 prioritize research for the protection of taro in Hawaii.

9 To ensure that the task force would have the full
10 participation of taro farmers who have faced crop hardships for
11 many years without financial assistance and whose resources are
12 limited, the participants recommended that funds be appropriated
13 for the task force for fiscal year 2008-2009.

14 The purpose of this Act is to establish the taro security
15 and purity task force and appropriate funds for the formation
16 and operation of the task force with full participation of taro
17 farmers from all islands.

18 SECTION 2. (a) There is established the taro security and
19 purity task force that shall be placed within the office of
20 Hawaiian affairs for administrative purposes.

21 (b) The task force shall include one representative from
22 each of the following:

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- 1 (1) The office of Hawaiian affairs;
- 2 (2) The department of agriculture;
- 3 (3) The department of land and natural resources;
- 4 (4) The University of Hawaii;
- 5 (5) Onipa'a Na Hui Kalo; and
- 6 (6) The Hawaii Farm Bureau Federation.

7 The task force shall also include a minimum of two
8 representatives from the taro farming communities of each of the
9 islands of Kauai, Oahu, Maui, Molokai, and Hawaii, and one
10 representative of botanical gardens or taro collections in the
11 State.

12 At no time shall less than fifty per cent of the task force
13 be comprised of taro farmers.

14 The members of the task force shall select a chairperson
15 from among its members.

16 The task force members shall serve without compensation but
17 shall be reimbursed for expenses, including travel expenses,
18 incurred in the performance of their official duties.

19 (c) The task force shall prioritize its objectives, which
20 shall include, but not be limited to the following, in order to
21 ensure that it is able to sufficiently address and render
22 conclusions:

- 1 (1) Develop guidelines, protocols, and recommendations for
2 taro policy, non-genetic modification based taro
3 research, and the allocation of resources to ensure
4 that taro is saved and protected in Hawaii;
- 5 (2) Develop a program of incentives and projects that have
6 the support of a broad spectrum of taro growers that
7 will enhance taro security, protect taro purity,
8 provide support to taro farms and farmers, and improve
9 taro markets for the long-term;
- 10 (3) Support the recovery of traditional Hawaiian taro
11 cultivars throughout the State;
- 12 (4) Increase public awareness of the value of taro and its
13 role culturally, socially, in health and well-being,
14 environmentally, and economically in the State;
- 15 (5) Develop a program to provide taro education and
16 training opportunities;
- 17 (6) Develop a program for commercial taro growers to
18 maximize business viability and success;
- 19 (7) Develop a taro farming grant program to assist taro
20 farmers in need to preserve the cultural legacy of
21 taro farming for future generations;

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1 (8) Discuss the feasibility and impact of requiring the
2 department of land and natural resources to provide
3 reduced lease rent rates for taro farmers on state-
4 leased land; and

5 (9) Develop taro research and outreach for the control and
6 eradication of apple snails.

7 (d) The task force shall meet at times and locations to be
8 determined by its members; provided that the first meeting of
9 the task force shall be no later than three months after the
10 effective date of this Act.

11 (e) The task force shall submit a preliminary report to
12 the legislature documenting the status of its progress no later
13 than twenty days prior to the convening of the regular session
14 of 2009. The task force shall submit a final report to the
15 legislature summarizing its program, the results achieved,
16 actual expenditures, and recommended legislation no later than
17 twenty days prior to the convening of the regular session of
18 2010.

19 SECTION 3. There is appropriated out of the general
20 revenues of the State of Hawaii the sum of ~~\$325,000~~ ^{22 \$0} or so much
21 thereof as may be necessary for fiscal year 2008-2009 to achieve

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C.D. 1

1 the objectives of the taro security and purity task force, which
2 may include:

- 3 (1) Convening and operating the task force, including
4 conducting discussions on all islands;
- 5 (2) Contracting at least one person to facilitate,
6 coordinate, communicate, and record the work of the
7 task force;
- 8 (3) Conducting archival and ethnographic research of the
9 history of taro and taro practices in Hawaii and the
10 traditional Hawaiian cultivars to aid in its revival
11 and to revise Bulletin 84: Taro Varieties in Hawaii
12 (1939) which is the key reference for taro growers and
13 researchers;
- 14 (4) Protecting the Molokai taro varieties collection, the
15 oldest and most complete collection and source of taro
16 varieties in Hawaii;
- 17 (5) Conducting taro research and outreach for the control
18 and eradication of the apple snail; and
- 19 (6) Preparing the preliminary and final reports to be
20 submitted to the legislature.

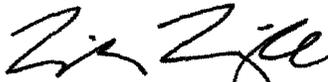
21 The sum appropriated shall be expended by the office of
22 Hawaiian affairs for the purposes of this Act; provided that no

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- 1 funds shall be expended unless matched on a dollar for dollar
- 2 basis by the office of Hawaiian affairs.
- 3 SECTION 4. This Act shall take effect on July 1, 2008.

APPROVED this 3 day of JUL, 2008



GOVERNOR OF THE STATE OF HAWAII

APPENDIX B

LETTERS CONVEYING TASK FORCE POSITIONS AND TIME-SENSITIVE REQUESTS, BY DATE

PHONE (808) 594-1888

FAX (808) 594-1865



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

For the Taro Security and Purity Task Force

December 23, 2008

Laura Thielen, Director
Department of Land and Natural Resources
Kalanimoku Building
1151 Punchbowl Street
Honolulu, HI 96813

Sandra Lee Kunimoto, Chairperson
Department of Agriculture
1428 S. King Street
Honolulu, HI 96814

Clyde Nāmu'ō, Administrator
Office of Hawaiian Affairs
711 Kapi'olani Boulevard, Suite 500
Honolulu, HI 96813

RE: The Taro Security and Purity Task Force urges support for the appointment of two taro farmers to fill the vacant seats on the Commission on Water Resource Management.

Aloha e Laura Thielen, Sandra Lee Kunimoto a me Clyde Nāmu'ō,

Act 211, Regular Session Laws 2008, created the Taro Security and Purity Task Force, an 18-member group of taro farmers and state agency representatives, to help protect taro. As the administrator of the Taro Security and Purity Task Force, the Office of Hawaiian Affairs (OHA) serves as the agency responsible for relaying the official communications of the task force, such as the one found immediately below.

Laura Thielen, Sandra Lee Kunimoto and Clyde Nāmu‘o
December 23, 2008
Page 2

The Taro Security and Purity Task Force has submitted recommendations to Governor Linda Lingle and the Commission on Water Resource Management (CWRM) Nominating Committee that the two vacant seats on the commission should be filled with taro farmers.

Please refer to the enclosed letter outlining our reasoning that CWRM and Hawai‘i’s water resources would benefit greatly from the addition of taro farmers to the commission. The task force asks that, as the heads of your respective agencies, you express your support of our recommendation to the governor.

Thank you for your kind attention to this matter. If you have further questions, please contact us via Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

‘O mākou iho nō me ka ‘oia‘i‘o,

The Taro Security and Purity Task Force

PHONE (808) 594-1888

FAX (808) 594-1865



STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

For the Taro Security and Purity Task Force

December 23, 2008

Governor Linda Lingle
State Capitol, Room 415
Honolulu, Hawaii 96813

RE: Taro Security and Purity Task Force's recommendation for the two open seats on the Commission on Water Resource Management.

Aloha e Governor Linda Lingle,

Act 211, Regular Session Laws 2008, created the Taro Security and Purity Task Force, an 18-member group of taro farmers and governmental representatives, to help protect taro. As the administrator of the Taro Security and Purity Task Force, the Office of Hawaiian Affairs (OHA) serves as the agency responsible for relaying the official communications of the task force, such as the one found immediately below.

The Taro Security and Purity Task Force recommends that the governor appoint two taro farmers to fill the vacant seats on the Commission on Water Resource Management (CWRM). The task force has sent a letter to the CWRM Nominating Committee recommending that the committee include the names of at least one taro farmer in each of the two nomination lists that will be forwarded to you.

For hundreds of years, Native Hawaiians have grown taro (kalo) in paddies (lo'i) fed by the abundant waters flowing through Hawai'i's streams. Taro has been the staple food for Native Hawaiians for generations, and today, taro farming represents one the most cherished elements of the state's multi-cultural heritage. In recognition of its importance, taro was recently named the official plant of the state.

Taro farmers have a unique relationship with the water resources of Hawai'i: they interact with the resource every day and their livelihood depends on its protection. Therefore, the very nature of their practice necessitates that taro farmers have "substantial experience in the

Governor Linda Lingle
December 23, 2008
Page 2

area of water resource management,” which is the main requirement for members of CWRM, according to HRS §174C-7. Taro farmers are experts in watershed management, water quality, biological resources, stream flow and hydrology. They would offer a unique perspective on water resource management and provide valuable input into the permitting and regulatory processes that CWRM administers.

Water in Hawai‘i is a public trust resource. As such, water cannot be privately owned, but is instead held in trust by the state for present and future generations. Despite this important designation, for many years, water in Hawai‘i has been and often continues to be managed as a commodity, to the detriment of the rights and interests of taro farmers. In some areas, water diversions have simply not left enough water in streams to allow for taro farming.

CWRM is the agency responsible for administering the State Water Code, and the decisions rendered by the commission have direct, long-term impacts on taro farmers. The controversial water issues relating to the taro-growing communities of Waiāhole, O‘ahu, Ke‘anae and Wailuanui and other East Maui areas, as well as the region known as Nā Wai ‘Ehā of Central Maui, highlight the importance of CWRM to taro farmers.

The riparian doctrine in Hawai‘i affords a shield protecting taro farmers’ right to water. This doctrine entitles each riparian landowner to “‘reasonable use’ of the waters of a natural watercourse” without injuring the rights of others. Reppun v. Board of Water Supply, 65 Haw. 531, 553, 656 P.2d 57, 72 (1982). The purpose of this law “was to enable tenants of ahupuaas to make productive use of their lands.” Id. As such, any attempts to sever, extinguish, or reserve such rights are “ineffective.” Id. at 550-51, 656 P.2d at 70.

Moreover, as taro farming is an ancient Native Hawaiian tradition and many of today’s taro farmers are Native Hawaiian, the portions of the Hawai‘i State Constitution and state laws that relate to traditional and customary Native Hawaiian rights are significant. For example, Article XII, Section 7, of the Hawai‘i State Constitution reads:

The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.

The State Water Code, which CRWM administers, purposefully codifies this language. Hawaii Revised Statutes (HRS) Section 174C-101 provides in relevant part:

(c) Traditional and customary rights of ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778 shall not be abridged or denied by this chapter. Such traditional and customary rights shall include, but

Governor Linda Lingle
 December 23, 2008
 Page 3

not be limited to, the cultivation or propagation of taro on one’s own kuleana and the gathering of hihiwai, opae, o‘opu, limu, thatch, ti leaf, aho cord, and medicinal plants for subsistence, cultural, and religious purposes.

(d) The appurtenant water rights of kuleana and taro lands, along with those traditional and customary rights assured in this section, shall not be diminished or extinguished by a failure to apply for or to receive a permit under this chapter.

HRS §174C-63 further declares that “[a]ppurtenant rights are preserved. Nothing in this part shall be construed to deny the exercise of an appurtenant right by the holder at any time. A permit for water use based on an existing appurtenant right shall be issued upon application.”

HRS §174C-7 also states that CWRM shall have at least one member who has “substantial experience or expertise in traditional Hawaiian water resource management techniques and in traditional Hawaiian riparian usage such as those preserved by section 174C-101.” While we understand that the seat designated to satisfy this requirement is filled, the Water Code does not prevent more than one individual who possesses these important qualifications from sitting on the commission.

Furthermore, the Hawai‘i Supreme Court ruled that the state has “a public trust duty to protect Native Hawaiian rights to water.” Waiahole, 94 Haw. 97, 176, 9 P.3d 409, 488.

In closing, the Taro Security and Purity Task Force believes that the addition of two taro farmers to CWRM would provide a much-needed voice to the agency responsible for managing our state’s water resources.

Thank you for your kind attention to this matter. If you have further questions, please contact us via Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

‘O mākou iho nō me ka ‘oia‘i‘o,

The Taro Security and Purity Task Force

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STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

For the Taro Security and Purity Task Force

December 23, 2008

Nominating Committee
Commission on Water Resource Management
P.O. Box 621
Honolulu, HI 96809

RE: Taro Security and Purity Task Force's recommendation to the Nominating Committee for the two open seats of the Commission on Water Resource Management.

Aloha e Nominating Committee,

Act 211, Regular Session Laws 2008, created the Taro Security and Purity Task Force, an 18-member group of taro farmers and state agency representatives, to help protect taro. As the administrator of the Taro Security and Purity Task Force, the Office of Hawaiian Affairs (OHA) serves as the agency responsible for relaying the official communications of the task force, such as the one found immediately below.

The Taro Security and Purity Task Force believes that the two open seats on the Commission on Water Resource Management (CWRM) should be filled with taro farmers. As such, the task force recommends that the Nominating Committee include the name of at least one taro farmer in each list of nominations for the two vacant seats on CWRM that will be forwarded to the Governor.

For hundreds of years, Native Hawaiians have grown taro (kalo) in paddies (lo'i) fed by the abundant waters flowing through Hawai'i's streams. Taro has been the staple food for Native Hawaiians for generations, and today, taro farming represents one the most cherished elements of the state's multi-cultural heritage. In recognition of its importance, taro was recently named the official plant of the state.

Nominating Committee
 December 23, 2008
 Page 2

Taro farmers have a unique relationship with the water resources of Hawai‘i: they interact with the resource every day and their livelihood depends on its protection. Therefore, the very nature of their practice necessitates that taro farmers have “substantial experience in the area of water resource management,” which is the main requirement for members of CWRM, according to HRS §174C-7. Taro farmers are experts in watershed management, water quality, biological resources, stream flow and hydrology. They would offer a unique perspective on water resource management and provide valuable input into the permitting and regulatory processes that CWRM administers.

Water in Hawai‘i is a public trust resource. As such, water cannot be privately owned, but is instead held in trust by the state for present and future generations. Despite this important designation, for many years, water in Hawai‘i has been and often continues to be managed as a commodity, to the detriment of the rights and interests of taro farmers. In some areas, water diversions have simply not left enough water in streams to allow for taro farming.

CWRM is the agency responsible for administering the State Water Code, and the decisions rendered by the commission have direct, long-term impacts on taro farmers. The controversial water issues relating to the taro-growing communities of Waiāhole, O‘ahu, Ke‘anae and Wailuanui and other East Maui areas, as well as the region known as Nā Wai ‘Ehā of Central Maui, highlight the importance of CWRM to taro farmers.

The riparian doctrine in Hawai‘i affords a shield protecting taro farmers’ right to water. This doctrine entitles each riparian landowner to “‘reasonable use’ of the waters of a natural watercourse” without injuring the rights of others. Reppun v. Board of Water Supply, 65 Haw. 531, 553, 656 P.2d 57, 72 (1982). The purpose of this law “was to enable tenants of ahupuaas to make productive use of their lands.” Id. As such, any attempts to sever, extinguish, or reserve such rights are “ineffective.” Id. at 550-51, 656 P.2d at 70.

Moreover, as taro farming is an ancient Native Hawaiian tradition and many of today’s taro farmers are Native Hawaiian, the portions of the Hawai‘i State Constitution and state laws that relate to traditional and customary Native Hawaiian rights are significant. For example, Article XII, Section 7, of the Hawai‘i State Constitution reads:

The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.

The State Water Code, which CRWM administers, purposefully codifies this language. Hawaii Revised Statutes (HRS) Section 174C-101 provides in relevant part:

Nominating Committee
December 23, 2008
Page 3

(c) Traditional and customary rights of ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778 shall not be abridged or denied by this chapter. Such traditional and customary rights shall include, but not be limited to, the cultivation or propagation of taro on one’s own kuleana and the gathering of hihiwai, opae, o‘opu, limu, thatch, ti leaf, aho cord, and medicinal plants for subsistence, cultural, and religious purposes.

(d) The appurtenant water rights of kuleana and taro lands, along with those traditional and customary rights assured in this section, shall not be diminished or extinguished by a failure to apply for or to receive a permit under this chapter.

HRS §174C-63 further declares that “[a]ppurtenant rights are preserved. Nothing in this part shall be construed to deny the exercise of an appurtenant right by the holder at any time. A permit for water use based on an existing appurtenant right shall be issued upon application.”

HRS §174C-7 also states that CWRM shall have at least one member who has “substantial experience or expertise in traditional Hawaiian water resource management techniques and in traditional Hawaiian riparian usage such as those preserved by section 174C-101.” While we understand that the seat designated to satisfy this requirement is filled, the Water Code does not prevent more than one individual who possesses these important qualifications from sitting on the commission.

Furthermore, the Hawai‘i Supreme Court ruled that the state has “a public trust duty to protect Native Hawaiian rights to water.” Waiahole, 94 Haw. 97, 176, 9 P.3d 409, 488.

In closing, the Taro Security and Purity Task Force believes that the addition of two taro farmers to CWRM would provide a much-needed voice to the agency responsible for managing our state’s water resources.

Thank you for your kind attention to this matter. If you have further questions, please contact us via Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

‘O mākou iho nō me ka ‘oia‘i‘o,

The Taro Security and Purity Task Force

Taro Security and Purity Task Force
Legislative Testimony

HB975 HD1 Relating to Agricultural Water Systems

House Committee on Water, Land, Agriculture and Hawaiian Affairs

March 23, 2009 4:15 p.m. Room 229

Aloha Honorable Committee members,

The Taro Security and Purity Task Force **opposes** HB975 HD1 because of the bill's proposed amendments to Chapter 163D, Hawaii Revised Statutes.

Established by Act 211, Regular Session Laws 2008, the Taro Security and Purity Task Force is an 18-member group of taro farmers and state agency representatives. The task force was created to help protect kalo, which was recently the named the official plant of the state.

The task force finds that the Agribusiness Development Corporation (ADC) and the Department of Agriculture (DOA) have failed to enforce and manage the water systems in its current care in a fair and equitable manner that includes all farmers. Instead, ADC and DOA have managed these water systems consistently in favor of large agribusinesses, to the exclusion of small farmers and kuleana farmers.

The task force believes that the governance of the ADC is too top-heavy and does not provide for community decisions that support agriculture in all sectors.

The task force also has concerns with the provision of the bill that exempts the conveyance of an agricultural water system property to ADC from county subdivision requirements. The county subdivision requirements provide for a democratic means by which communities would have a say in what ADC does with the water systems it acquires. Exempting ADC from county subdivision requirements would effectively silence the voices of those farmers who are not being supported through the current top-down decision making of the ADC.

The Taro Security and Purity Task Force strongly recommends that the governance of ADC be revisited and that a more equitable balance of access and decision-making regarding water system management be established.

For the above-mentioned reasons, the Taro Security and Purity Task Force **opposes** HB975 HD1, and asks that the committee HOLD the measure. Mahalo for the opportunity to testify.

Respectfully,

Jim Cain, Chair
Glenn Teves, Vice Chair
Taro Security and Purity Task Force

[transmitted by email 23 March 2009]

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STATE OF HAWAII
OFFICE OF HAWAIIAN AFFAIRS
711 KAPI'OLANI BOULEVARD, SUITE 500
HONOLULU, HAWAII 96813

For the Taro Security and Purity Task Force

May 28, 2009

President David McClain
University of Hawai'i
Bachman Hall, Room 204
2444 Dole Street
Honolulu, HI 96822

RE: Rebuilding bridges between taro farmers, agencies and institutions.

Aloha mai,

Act 211, Regular Session Laws 2008, created the Taro Security and Purity Task Force, an 18-member group of taro farmers and governmental representatives, to help protect taro. (Please find enclosed a copy of Act 211). As the administrator of the Taro Security and Purity Task Force, the Office of Hawaiian Affairs serves as the agency responsible for relaying the official communications of the task force, such as the one found immediately below.

For the past 20 years, there has been an absence of a formally-recognized taro industry group in Hawai'i to represent and communicate the broad interests of the several hundred taro growers and millers in the state. One of the task force's specific goals is to re-establish such a group permanently to ensure inclusive communication between agencies, institutions, researchers and all types of taro growers throughout the state.

In addition, the task force wants to help rebuild the bridges among all the taro stakeholder groups through continued dialogue, and invites the University of Hawai'i, the state Department of Agriculture and the U.S. Department of Agriculture to join the task force in these first steps. To begin this new initiative and to guide future research related to taro, the task force recommends the following researcher and extension protocols:

- Collaborate and consult in a proactive manner with the broad taro farming community prior to and throughout various research projects;

President David McClain
May 28, 2009
Page 2

- Evaluate the social, economic, environmental and cultural impacts of possible outcomes of research projects before pursuing funding;
- Establish a communication mechanism that is readily accessible to the taro growing community to help share information on what research is occurring, where research projects are located (in what communities) and with which agencies and researchers, as well as community initiatives;
- Share useful information, research results, and extension purposes in an open and timely manner, and encourage the dissemination of information and findings together; and
- Develop a policy to prevent the release of undocumented, uncharacterized, undesirable and inadequately tested hybrids and new varieties of kalo.

Thank you for your attention to this matter. We look forward to healing the rifts of the past with positive steps for the future. If you have further questions, please contact us via Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

‘O mākou iho nō me ka ‘oia‘i‘o,

The Taro Security and Purity Task Force

Enc: Copy of Act 211

C: Sandra Kunimoto, Chair, HDOA
Vernon Harrington, Hawai‘i State Plant Health Director, USDA-APHIS
Dennis Gonsalves, Director, USDA Pacific Basin Agriculture Research Center
Stephani Whalen, Hawai‘i Agriculture Research Center
Kathleen Merrigan, Deputy Secretary of Agriculture, USDA

Taro Security and Purity Task Force
Legislative Testimony

HB1351 HD 2 Relating to Private Agriculture Parks
Senate Committee on Water, Land, Agriculture and Hawaiian Affairs
April 6, 2009 2:45 p.m. Room 229

Aloha Honorable Committee members,

The Taro Security and Purity Task Force **strongly opposes** HB1351 HD 2 because of the measure’s possible adverse impacts on agricultural lands and the public’s water resources.

Established by Act 211, Regular Session Laws 2008, the Taro Security and Purity Task Force is an 18-member group of taro farmers and state agency representatives. The task force was created to help protect kalo, which was recently the named the official plant of the state.

The Taro Security and Purity Task Force finds that HB 1351 HD 2 lacks clarity in its purpose and intent. We believe this bill may result in unintended and undesirable uses of agriculture lands under Article XI of the Hawai‘i State Constitution and Chapter 205 Hawai‘i Revised Statutes. Agriculture parks are not a necessary mechanism to promote cooperation between and among adjoining and neighboring agriculture lands and owners. Moreover, existing laws and incentives under a variety of federal, state and county level programs already support the type of collaborations contemplated in this bill.

However, the larger concern for the Task Force is the provisions of Section 2 (2) and (3) (lines 15-21 on page 3 of the HB1351 HD 2), which relate to the collection and distribution of water. The language of this bill relating to the collection, storage, sale and redistribution of water by a private entity may not be clear enough to ensure compliance with the Hawai‘i Supreme Court’s landmark ruling in the Waiāhole Water Rights Case (Waiāhole Ditch Combined Contested Case, 94 Haw. 97, 9 P.3d 409 (2000)). In this ruling, the court affirmed that water is a public trust resource and that it must be used in such a way that supports native stream life and community uses, such as taro farming. The court also noted that private commercial use of water was not a protected “trust purpose.” HB1351 HD2 implies a commercial use of water while making no mention of water being a highly-protected public trust resource. We believe this omission may lead to the misuse and mismanagement of our precious water resources.

Therefore, the Taro Security and Purity Task Force **strongly opposes** HB1351 HD 2, and we humbly ask that the Committee hold this bill. Mahalo for the opportunity to testify.

Respectfully,

Jim Cain, Chair
Glenn Teves, Vice Chair
Taro Security and Purity Task Force

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COPY

STATE OF HAWAII
 OFFICE OF HAWAIIAN AFFAIRS
 711 KAPI'OLANI BOULEVARD, SUITE 500
 HONOLULU, HAWAII 96813

For the Taro Security and Purity Task Force

September 3, 2009

Laura Thielen, Director
 Department of Land and Natural Resources
 Kalanimoku Building
 1151 Punchbowl Street
 Honolulu, HI 96813

RE: Taro farmer concerns regarding stream flow issues in East Maui.

Aloha e Laura Thielen,

Act 211, Regular Session Laws 2008, created the Taro Security and Purity Task Force, an 18-member group of taro farmers and state agency representatives, to help protect taro. As the administrator of the Taro Security and Purity Task Force, the Office of Hawaiian Affairs (OHA) serves as the agency responsible for relaying the official communications of the task force, such as the one found immediately below.

The Taro Security and Purity Task Force held a community meeting in Ke'anae, Maui, on May 23, 2009. A number of taro farmers attended this meeting, including several from the group Nā Moku Aupuni O Ko'olau Hui. These taro farmers expressed concern that the agricultural diversions of Alexander & Baldwin's (A&B) East Maui Irrigation (EMI) reduce stream flow in certain East Maui streams to the extent that it both threatens the health of current taro crops and prevents farmers from increasing the amount of lo'i (taro patches) in production.

Clean, cool water continuously flowing through streams is critical to the health of taro. Diminished stream flow raises water temperature, which in turn heightens the susceptibility of taro to diseases such as pythium rot, which can ruin taro crops. The task force notes that there are a number of ways for you and your agency to help address these concerns.

A March 2007 Board of Land and Natural Resources (BLNR) order from the contested case involving A&B's application for a long-term lease requires the Department of Land and

Laura Thielen
September 3, 2009
Page 2

Natural Resources (DLNR) to appoint a monitor to systematically gauge stream flow and water temperature to guard against diseases such as pythium rot. The task force understands that these stream gauges have not yet been installed in compliance with the BLNR order.

The task force also understands that the Commission on Water Resource Management (CWRM) has suffered an approximate \$100,000 loss in annual funding and may not, as a result, be able to install additional gauges. Without these stream gauges, the state will have insufficient data to make informed decisions about stream releases now and in the future. Taro farmers expressed concern that they will be harmed by uninformed decisions. To avoid this potential scenario, the task force requests that the state release sufficient funding for the gaugework called for by the BLNR order. Alternatively, we urge the state to seek funding from EMI to cover the cost of these gauges. As the primary diverter, EMI should be held responsible for ensuring that its water diversions do not negatively impact public trust purposes, such as taro cultivation.

Furthermore, the taro farmers are concerned that the state does not have clear data to determine what water flow is required to provide for a healthy taro crop. The task force notes that to make this determination, the state must objectively monitor both steam diversions and water temperature in affected lo‘i. However, the East Maui taro farmers indicated that there are no temperature gauges installed in the Wailuanui Valley taro fields and that the state is not currently investigating or monitoring stream diversions. Therefore, the task force requests the state to conduct the proper monitoring to ensure that downstream taro farmers are not injured by current stream diversions.

The East Maui taro farmers are also worried that the interim instream flow standards (IIFS) already established by CWRM for certain East Maui streams may not allow for sufficient water flow during dry summer weather conditions. As we pointed out earlier, insufficient water flow leads to increased water temperature which increases the susceptibility of taro to diseases. However, IIFS are not CWRM’s only water management tool. CWRM has also adopted an “adaptive management strategy” that recognizes that adjustments to stream flow must be made to offset adverse effects, such as overflowing streams that pose a safety hazard to life and property. The task force asks that CWRM employ this “adaptive management strategy” to make adjustments to stream flow to ensure that the livelihoods of taro farmers are not adversely affected by rising water temperatures. For example, if stream monitoring indicates that water flow is harming taro farmers, the state should use its “adaptive management strategy” to release more water into streams.

The task force was also told that in the ahupua‘a of Honopou, EMI diverts Honopou stream a total of four times along its course mauka to makai. We were advised that EMI has built diversions at different elevations on this stream to capture the water gained from spring sources at lower elevations. The task force was also told that Auntie Beatrice Kekahuna and Auntie Marjorie Wallet – parties to the BLNR contested case proceeding – rely on stream flow at the lower elevations of this ahupua‘a to feed their lo‘i. Both Kekahuna and Wallett have appurtenant, riparian, and traditional and customary rights, and they need additional water to satisfy these

Laura Thielen
 September 3, 2009
 Page 3

rights. These women and their 'ohana have taken steps to open up additional lo'i in anticipation that the BLNR will be implement its March 23, 2007 Interim Order and provide them with the additional water to which they are entitled. However, in recent weeks, the USGS has documented a steady 3-4 degree rise in temperature to near critical levels of the stream water entering the Kekahuna/Wallett 'auwai. This data is available for analysis. The task force urges the BLNR to order additional releases of water to accommodate the rights of Kekahuna and Wallett. Without administrative action, these taro farmers face the prospect of losing their current crops to pythium rot.

The farmers also noted that regular stream maintenance may improve stream flow at certain streams. Therefore, the taro farmers request that they be provided with a right of entry to inspect Waiokamilo Stream, Akeke Springs and related hydrological networks above the EMI ditch to evaluate what constraints to stream flow exist. If stream maintenance and clearing above the ditch would help improve stream flow in Waiokamilo Stream, the farmers are ready, willing and able to do, or assist others with, the necessary work.

The task force extends a warm mahalo to you for your attention to this matter, and requests a written response to the OHA address. If you have further questions, please contact us via Sterling Wong by phone at (808) 594-0248 or e-mail him at sterlingw@oha.org.

'O mākou iho nō me ka 'oia'i'o,

The Taro Security and Purity Task Force

C: OHA Trustee Boyd Mossman

Senator Kalani English
 Hawaii State Capitol, Room 205
 415 South Beretania Street
 Honolulu, HI 96813

Representative Mele Carroll
 Hawaii State Capitol, Room 405
 415 South Beretania Street
 Honolulu, HI 96813

Amanda Martin, President
 Nā Moku Aupuni O Ko'olau Hui
 512 Maoli Street
 Wailuku, HI 96793

APPENDIX C

LIST OF ACRONYMS

BLNR	Board of Land and Natural Resources	KTGA	Kaua‘i Taro Growers Association
BM	Bishop Museum	MEO	Maui Economic Opportunities
CGAPS	Coordinating Group on Alien Pest Species	MISC	Maui Invasive Species Committee
CWRM	Commission on Water Resources	MoMISC	Moloka‘i Invasive Species Committee
DAGS	Department of Accounting and General Services	NAS	National Academy of Sciences
DBEDT	Department of Business, Economic Development & Tourism	NHLC	Native Hawaiian Legal Corporation
DHHL	Department of Hawaiian Home Lands	NRCS	Natural Resources Conservation Service
DHS	[US] Department of Homeland Security	NRCS EQIP	Environmental Quality Incentives Program
DLNR	Department of Land and Natural Resources	OEQC	Office of Environmental Quality Control
DLNR-DAR	Department of Aquatic Resources	OHA	Office of Hawaiian Affairs
DLNR-DOFAW	Division of Forestry and Wildlife	ONHK	‘Onipa‘a Nā Hui Kalo
DLNR-OCCL	Office of Conservation and Coastal Lands	POC	Point of Contact
DOE	Department of Education	SBA	Small Business Administration
DOH	Department of Health	SHPD	State Historic Preservation Division
EKKA	E kūpaku ka ‘āina – The Hawai‘i Land Restoration Institute	TSPTF	Taro Security and Purity Task Force
EPA	Environmental Protection Agency	UH	University of Hawai‘i
FSA	[USDA] Farm Service Agency	UH CTAHR	College of Tropical Agriculture and Human Resources
HARC	Hawai‘i Agriculture Research Center	UH CTAHR-CES	Cooperative Extension Services
HCCs	Hawaiian Civic Clubs	UH-DURP	UH Department of Urban and Regional Planning
HDOA	Hawai‘i Department of Agriculture	UHERO	UH Economic Research Organization
HDOA-PQB	Plant Quarantine Branch	UHM	University of Hawai‘i at Mānoa
HDOT	Hawai‘i Department of Transportation	US-ACE	US Army Corps of Engineers
HFBF	Hawai‘i Farm Bureau Federation	USDA	US Department of Agriculture
HFU	Hawai‘i Farmers Union	USDA APHIS	Animal and Plant Health Inspection Service
HICOF	Hawai‘i Cooperative of Organic Farmers	USDA PBARC	Pacific Basin Agriculture Research Center
HISC	Hawai‘i Invasive Species Council	USDA-RC&D	Resource Conservation and Development
HOFA	Hawai‘i Organic Farmers Association	USFWS	US Fish and Wildlife Service
HUD	[US Department of] Housing and Urban Development	USGS	US Geological Services
ISC	[DLNR] Invasive Species Committees	USNPS	US National Park Service
KCC	Kaua‘i Community College	WIC	[USDA] Women, Infants, and Children
KS	Kamehameha Schools		

APPENDIX D

A “BIG PICTURE” APPROACH TO FOOD SECURITY

(the original document has been revised for inclusion in the 2009 Taro Security and Purity Task Force Report to the Legislature)

It has been estimated that Hawai‘i imports up to 90 percent of the food consumed daily in the state and would have approximately 4 days of food available should a natural disaster strike of the type that would prevent delivery of further food supplies. The loss of electricity for five days in Honolulu in the aftermath of an earthquake this past year demonstrated how easily loss of refrigeration and inter-island transport could jeopardize food supplies in Honolulu.

During WWII, it was individual families planting victory gardens, small truck farms, rice paddies and taro patches that kept Hawai‘i fed – not sugar and pineapple – and often from backyard and truck gardens; land not included in agricultural lands assessments. Today, more than 95 percent of active agricultural lands are planted in non-food (experimental seed crops), sugar, pineapple or export crops. Barely one percent is represented by organic, locally-sold crops. Less than five hundred acres (less than one percent) are in taro (wet and dry fields).

The State of Hawai‘i, its agencies, and the Governor have participated in scenarios for natural disasters and disease containment in the state but not for the very real prospect of being cut off long-term from food. In each of the disaster scenarios, the state tapped those with extensive field experience to play a major role in advising, designing and planning improved crisis response – because it was critical that things worked on the ground rather than in the hypothetical world.

A Food Security analysis workshop is proposed based on the following realistic scenario and farmer insight into the realities of local food production. Small farmer participation is critical. Homeland Security funds are proposed to implement this action.

Scenario 1:

The state is cut off from all forms of shipping (boats, air, etc) due to long term war or catastrophic bottoming out of fuel resources. The military can not get shipments here (no fuel) and can not respond to neighbor island emergencies. Electric appliances and backup generators will go out after a short period of time (no more refrigeration for vegetables and fruit, meats and fish). The standard rush occurs on items such as toilet paper, bottled water, canned spam, vienna sausage, tuna and salmon, but this was the last boatload...then what?

What does do this scenarios mean in terms of planning for long term, self-sufficient food supplies in the islands?

Under such a scenario, food security must be defined as being able to feed 100 percent of the people 100 percent of the time.

Some key questions to be answered in the analysis:

1. What would have to be in place to not have to face a “4 day food supply” panic (the projected amount of food available in the State should there be no further shipments)?
2. What could/should we reasonably grow here to increase our self-sufficiency under such a crisis? (ie. wheat for bread/flour probably not realistic - taro, sweet potato, rice, corn - yes)
3. What crops should be supported in addition to staple foods, to keep ourselves healthy (vegetables, fruits and lā‘au) and feed visitors who are stuck here? Are our table food crop seed stocks sufficient to grow enough food for our tables?
4. How much land and what kinds of land (ie. open flat lands; taro lands; well-drained soils; adjacent to communities) would need to be set aside and in production specifically for local consumption? And, how much land dedicated to each kind of crop given current consumption levels?

5. What lands should those be on each island? And, will that be enough on each island for each island to feed itself? (O‘ahu will likely need to sail food over from neighbor islands)
6. Given such a scenario, should the state be acquiring leases or deeds on large ag parcels to fulfill the needed acreage and make affordable long term leases available to small and organic farmers?
7. What ag policy supports/incentives would be needed now to support future needs; ie. tax breaks and financial supports for those who raise food to eat locally and fuel/water consumption taxes for those who export; health insurance for small family farms; subsidies for erosion control, soil- enhancing, organic and non-fossil fuel dependent practices?
8. What is missing in policies to support table food crops specifically; ie. supports for expanding and renewing the original biodiversity of existing food crops in the field and in the market?
9. How far in advance will each crop need to be planted to meet acreage requirements and produce food at a consistent level to meet daily consumption needs and disaster demands? (annuals such as leafy greens may need only three months; others much longer. Taro requires 10-12 months; tree crops 3-7 years or more from seedling to fruit).
10. How many farmers will we need?
11. What kind of soil inputs will we need and use to grow food in place of the chemicals we depend on now that are shipped in to the state?
12. What is missing in our reef management strategies and policies now that we need to improve or enforce in order to increase ocean food resource availability for such a scenario?
13. In what ways might we, as consumers, have to reconsider our thinking and choices about food and food availability to become fully food self-sufficient; ie. is it realistic for us to demand all the kinds of food we want all the time?

These are just a few of the questions that should be considered; there are many more.

APPENDIX E

TARO SECURITY AND PURITY TASK FORCE EXPENDITURE REPORT

Period Name	Amount	Line Description
DEC-08 FY-2009	\$281.90	PPR GOODS/CUTTLERY/FOOD/BEV/REFRSHMNTS-12/10/08,TARO SECURITY & PURITY TASK FORCE MTG/UH CTAHR,PEARL CITY URBAN GARDEN CTR
FEB-09 FY-2009	\$82.60	REFRSHMNTS-02/19/09,TARO TASK FORCE MTG/QLCC,KALIHI;PASTRIES/ZIPPYS,COFFEE/STARBUCKS,ICE/FOODLAND
FEB-09 FY-2009	\$219.48	LUNCHES-02/19/09;TARO & SECURITY TASK FORCE MTG @ QLCC
FEB-09 FY-2009	\$20.50	REFRSHMNTS-02/19/09,TARO TASK FORCE MTG/QLCC,KALIHI;ICE,BEV,APPLES/FOODLAND
FEB-09 FY-2009	\$40.14	FOOD/PPR PLATES-02/19/09,TARO TASK FORCE MTG/QLCC,KALIHI;PLATE,CUTLERY,FOOD/COSTCO
MAR-09 FY-2009	\$172.80	LUNCH-03/23/09,TARO SECURITY & PURITY TASK FORCE MTG/QLCC,HNL
APR-09 FY-2009	\$25.13	REFRSHMNTS-03/23/09,TARO SECURITY & PURITY TASK FORCE MTG/QLCC,HNL;STARBUCKS-COFFEE
APR-09 FY-2009	\$13.04	REFRSHMNTS-03/23/09,TARO SECURITY & PURITY TASK FORCE MTG/QLCC,HNL;SAFEWAY-PASTRIES,APPLES
APR-09 FY-2009	\$7.82	REFRSHMNTS-03/23/09,TARO SECURITY & PURITY TASK FORCE MTG/QLCC,HNL;SAFEWAY-ICE
MAY-09 FY-2009	\$84.02	CC320 STMT TRVL-LUNCHES;05/02/09-05/03/09,TARO SECURITY & PURITY TASK FORCE MTG;H. GUTH/HILO
MAY-09 FY-2009	\$400.00	05/02/09-05/03/09,1 DAY(24HR)FEE;STAY@HALAU O WAIPIO,15 PPL,OHA TARO SECURITY & PURITY TASK FORCE MTG/WAIPIO VALLEY,BIG ISLAND;INCLUDES TRANSPORTATION TO & FROM SITE,USE OF FACILITIES INCLUDING DORMITORY,3 MEALS & SUPPLIES
MAY-09 FY-2010	\$452.00	FACILITY USE 05/23-24/09 TARO SECURITY & PURITY TASK FORCE MTG
JUN-09 FY-2009	\$134.31	REFRSHMNTS 05/23/09-05/24/09,TARO SECURITY & PURITY TASK FORCE MTG/KEANAE,MAUI;BATH TISSUE,WATER,DRINKS,SNACKS,FRUITS,VEG,SANDWICH/FOODLAND

Task Force Totals	
Food & Misc. Total	\$5,530.21
Air - Car Total	\$17,124.25
Contractor Services	\$61,000.00
Task Force Total	\$83,654.46

OHA Staff Time	% of time from Dec. 08 - Dec. 09
Staff	
Sterling Wong - Policy Advocate	70%
Grant Arnold - Policy Advocate	30%
Kale Hannahs - Specialist	50%
Heidi Kai Guth - Lead Advocate	5%

**Taro Security and Purity Task Force
Food, Misc. and Total Expenditure**

JUN-09 FY-2009	\$9.88	REFRSHMNTS 05/23/09-05/24/09,TARO SECURITY & PURITY TASK FORCE MTG/KEANAE,MAUI;SYRUP/FOODLAND
JUN-09 FY-2009	\$350.00	CHK ADVANCE FOR REFRSHMNTS/LUNCH;TARO SECURITY & PURITY TASK FORCE MTG:06/28/09-CAMP KOKOKAHI YWCA,ATHERTON HALL/KANEOHE & 06/29/09-TREETOPS RESTAURANT/HNL
JUN-09 FY-2009	\$227.91	FOOD/WATER;05/23/09-05/24/09,TARO SECURITY & PURITY TASK FORCE MTG/KEANAE,MAUI
JUN-09 FY-2009	\$286.00	22 LUNCHES-06/29/09,TARO SECURITY & PURITY TASK FORCE MTG/NRLC
JUN-09 FY-2010	\$120.00	06/28/09-ATHERTON HALL&KITCHEN,CABINS:10,12,13,14,15,16;TARO SECURITY&PURITY TASK FORCE MTG/CAMP KOKOKAHI YWCA,KANEOHE HI
JUN-09 FY-2010	\$156.00	06/28/09-ATHERTON HALL&KITCHEN,CABINS:10,12,13,14,15,16;TARO SECURITY&PURITY TASK FORCE MTG/CAMP KOKOKAHI YWCA,KANEOHE HI
JUN-09 FY-2010	\$475.00	CHK ADVANCE FOR FOOD/SUPPLIES/MTG SPACE;TARO SECURITY & PURITY TASK FORCE MTG:09/13/09-AANA TARO FARM,MAKAWELI VALLEY,WAIMEA;09/13/09-HANAIEI COMNTY CTR.HANAIEI.KAUAI;09/14/09-OLCC.CONE RM.I.IHUE.KAUAI
JUL-09 FY-2010	\$21.10	LUNCHES-07/21/09,TARO SECURITY&PURITY TASK FORCE MTG/HALAU O HAUMEA,KAMAKAKUOKALANI CTR FOR HAWN STUDIES(UH MANOA)
JUL-09 FY-2010	\$232.65	LUNCHES-07/21/09,TARO SECURITY&PURITY TASK FORCE MTG/HALAU O HAUMEA,KAMAKAKUOKALANI CTR FOR HAWN STUDIES(UH MANOA)
JUL-09 FY-2010	\$118.74	LUNCHES-07/22/09,TARO SECURITY&PURITY TASK FORCE MTG/HALAU O HAUMEA,KAMAKAKUOKALANI CTR FOR HAWN STUDIES(UH MANOA)
JUL-09 FY-2010	\$40.00	REIM:PRKG BULK PERMIT 07/21/09-07/22/09,TARO SECURITY&PURITY TASK FORCE MTG/HALAU O HAUMEA,KAMAKAKUOKALANI CTR OF HAWN STUDIES(UH MANOA);PCH 07/25/09
JUL-09 FY-2010	\$25.13	PASTRIES/COFFEE:07/21/09,TARO SECURITY&PURITY TASK FORCE MTG/HALAU O HAUMEA,KAMAKAKUOKALANI CTR OF HAWN STUDIES(UH MANOA)

**Taro Security and Purity Task Force
Food, Misc. and Total Expenditure**

JUL-09 FY-2010	\$20.90	PASTRIES/COFFEE:07/21/09,TARO SECURITY&PURITY TASK FORCE MTG/HALAU O HAUMEA,KAMAKAKUOKALANI CTR OF HAWN STUDIES(UH MANOA)
JUL-09 FY-2010	\$25.13	PASTRIES/COFFEE:07/22/09,TARO SECURITY&PURITY TASK FORCE MTG/HALAU O HAUMEA,KAMAKAKUOKALANI CTR OF HAWN STUDIES(UH MANOA)
JUL-09 FY-2010	\$19.86	PASTRIES/COFFEE:07/22/09,TARO SECURITY&PURITY TASK FORCE MTG/HALAU O HAUMEA,KAMAKAKUOKALANI CTR OF HAWN STUDIES(UH MANOA)
OCT-09 FY-2010	\$500.00	CHK ADVANCE FOR FOOD/SUPPLIES;TARO SECURITY & PURITY TASK FORCE MTG/KAUNAKAKAI,MOLOKAI:10/18/09-LANIKEHA COMMERCIAL KITCHEN & 10/19/09-KULANA OIWI
OCT-09 FY-2010	\$557.30	1 NITE LODGE RENTAL 10/18/09-10/19/09,TARO SECURITY & PURITY TASK FORCE MTG/KAUNAKAKAI,MKK
DEC-09 FY-2010	\$410.87	40 LUNCHESES, BEVERAGES, ICE 09/09/09 & 09/10/09, TARO TASK FORCE MTG, LANAI
TOTAL	\$5,530.21	

**Taro Security and Purity Task Force
Air and Car Costs - 2009**

Travel		
Period Name	Amount	LineDescription
JAN-09 FY-2009	\$208.00	GLENN TEVES
JAN-09 FY-2009	\$170.00	KAWEHI RYDER
JAN-09 FY-2009	\$169.99	PENNY LEVIN
JAN-09 FY-2009	\$153.30	JIM CAIN
JAN-09 FY-2009	\$153.30	KALAE MOCK CHEW
JAN-09 FY-2009	\$153.30	JERRY KONANUI
JAN-09 FY-2009	\$122.00	JOHN AANA
JAN-09 FY-2009	\$122.00	CHRISTINE KOBAYASHI
JAN-09 FY-2009	\$110.00	HOKUAO PELLEGRINO
JAN-09 FY-2009	\$110.00	RODNEY HARAGUCHI
MAR-09 FY-2009	\$166.30	JERRY KONANUI
MAR-09 FY-2009	\$127.70	FRANK RYDER III
MAR-09 FY-2009	\$111.20	GLENN TEVES
MAR-09 FY-2009	\$110.20	JIM CAIN
MAR-09 FY-2009	\$100.20	KALAE MOCK CHEW
MAR-09 FY-2009	\$88.20	JOHN AANA
MAR-09 FY-2009	\$88.20	PENNY LEVIN
MAR-09 FY-2009	\$44.10	CHRISTINE KOBAYASHI
MAR-09 FY-2009	\$165.30	KYLE NAKANELUA, HOKUAO PELLEGRINO, PENNY LEVIN,
MAR-09 FY-2009	\$141.70	GLENN TEVES
MAR-09 FY-2009	\$141.70	FRANK RYDER III
MAR-09 FY-2009	\$100.20	JAMESCAIN
MAR-09 FY-2009	\$100.20	JERRY KONANUI
MAR-09 FY-2009	\$100.20	KALAE MOCK CHEW
MAR-09 FY-2009	\$66.20	CHRISTINE KOBAYASHI
MAR-09 FY-2009	\$66.20	RODNEY HARAGUCHI
MAR-09 FY-2009	\$55.10	HOKUAO PELLEGRINO
MAR-09 FY-2009	\$55.10	KYLE NAKANELUA
MAR-09 FY-2009	\$55.10	PENNY LEVIN
MAR-09 FY-2009	\$33.10	PENNY LEVIN
MAY-09 FY-2009	\$239.20	FRANK RYDER
MAY-09 FY-2009	\$209.40	GLENN TEVES
MAY-09 FY-2009	\$130.20	HOKUAO PELLEGRINO
MAY-09 FY-2009	\$130.20	CHRISTINE KOBAYASHI
MAY-09 FY-2009	\$130.20	PENNY LEVIN
MAY-09 FY-2009	\$114.10	KYLE NAKANELUA
MAY-09 FY-2009	\$98.00	LESLIE YEE HOY
MAY-09 FY-2009	\$98.00	GEORGE FUKUMITSU
MAY-09 FY-2009	\$120.00	HEDI GUTH
JUN-09 FY-2009	\$70.00	GRANT ARNOLD
JUN-09 FY-2009	\$110.20	HEIDI KAI GUTH
JUN-09 FY-2009	\$110.20	STERLING WONG
JUN-09 FY-2009	\$110.20	GRANT ARNOLD
JUN-09 FY-2009	\$104.10	STERLING WONG

**Taro Security and Purity Task Force
Air and Car Costs - 2009**

JUN-09 FY-2009	\$104.10	HEIDI KAI GUTH
JUN-09 FY-2009	\$204.40	JERRY KONANUI
JUN-09 FY-2009	\$99.20	MOSES HAIA
JUN-09 FY-2009	\$98.40	JOHN AANA
JUN-09 FY-2009	\$75.10	FRANK RYDER III
JUN-09 FY-2009	\$55.10	GEORGE FUKUMITSU
JUN-09 FY-2009	\$55.10	LESLIE YEE HOY
JUN-09 FY-2009	\$55.10	MARK LUKE
JUN-09 FY-2009	-\$130.20	HOKUAO PELLEGRINO
JUN-09 FY-2009	\$214.60	JAMES CAIN
JUN-09 FY-2009	\$104.10	MARK LUKE
JUN-09 FY-2009	\$98.40	CHRISTINE KOBAYASHI
JUN-09 FY-2009	\$55.10	LESLIE YEE HOY
JUN-09 FY-2009	\$55.10	GEORGE FUKUMITSU
JUN-09 FY-2009	\$55.10	MARK LUKE
JUN-09 FY-2009	\$290.00	HEIDI KAI GUTH
JUN-09 FY-2009	\$122.00	STERLING WONG
JUN-09 FY-2009	\$122.00	HEIDI GUTH
JUN-09 FY-2009	\$290.00	STERLING WONG
JUN-09 FY-2009	\$70.00	HEIDI GUTH
JUN-09 FY-2009	\$70.00	STERLING WONG
JUN-09 FY-2009	\$70.00	STERLING WONG
JUN-09 FY-2009	\$20.00	STERLING WONG
JUL-09 FY-2010	\$129.70	GLENN TEVES
JUL-09 FY-2010	\$110.20	JOHN AANA
JUL-09 FY-2010	\$105.10	CHRISTINE KOBAYASHI
JUL-09 FY-2010	\$104.20	KAROL HARAGUCHI
JUL-09 FY-2010	\$104.20	JIM CAIN
JUL-09 FY-2010	\$104.20	KALAE MOCK CHEW
JUL-09 FY-2010	\$104.20	JERRY KONANUI
JUL-09 FY-2010	\$98.20	PENNY LEVIN
JUL-09 FY-2010	\$98.20	HOKUAO PELLEGRINO
JUL-09 FY-2010	\$76.10	FRANK RYDER
AUG-09 FY-2010	\$168.20	GRANT ARNOLD
AUG-09 FY-2010	\$168.20	STERLING WONG
AUG-09 FY-2010	\$232.40	JERRY KONANUI
AUG-09 FY-2010	\$187.70	KALAE MOCK CHEW
AUG-09 FY-2010	\$184.20	JIM CAIN
AUG-09 FY-2010	\$135.70	PENNY LEVIN
AUG-09 FY-2010	\$134.20	JOHN AANA
AUG-09 FY-2010	\$134.20	GEORGE FUKUMITSU
AUG-09 FY-2010	\$134.20	CHRISTINE KOBAYASHI
AUG-09 FY-2010	\$134.20	JIM CAIN
AUG-09 FY-2010	\$134.20	MARK LUKE
AUG-09 FY-2010	\$140.80	FRANK RYDER
AUG-09 FY-2010	\$131.70	GLENN TEVES

**Taro Security and Purity Task Force
Air and Car Costs - 2009**

AUG-09 FY-2010	\$98.20	PENNY LEVIN-
AUG-09 FY-2010	\$98.20	KALAE MOCK CHEW
AUG-09 FY-2010	\$98.20	JAMES CAIN
AUG-09 FY-2010	\$98.20	JERRY KONANUI
AUG-09 FY-2010	\$98.20	CHRISTINE KOBAYASHI
AUG-09 FY-2010	\$98.20	HOKUAO PELLEGRINO
AUG-09 FY-2010	\$98.20	JOHN AANA
AUG-09 FY-2010	\$84.10	FRANK RYDER
OCT-09 FY-2010	\$140.00	GRANT ARNOLD
OCT-09 FY-2010	\$140.00	GRANT ARNOLD
OCT-09 FY-2010	\$40.00	GRANT ARNOLD
OCT-09 FY-2010	\$40.00	STERLING WONG
OCT-09 FY-2010	\$353.40	FRANK RYDER
OCT-09 FY-2010	\$308.40	LURLYN SCOTT
OCT-09 FY-2010	\$254.36	PENNY LEVIN
OCT-09 FY-2010	\$251.18	KALAE MOCK CHEW
OCT-09 FY-2010	\$199.28	JERRY KONANUI
OCT-09 FY-2010	\$142.18	JAMES CAIN
OCT-09 FY-2010	\$50.00	CHRISTINE KOBAYASHI
OCT-09 FY-2010	\$50.00	GEORGE FUKUMITSU
OCT-09 FY-2010	\$50.00	MARK LUKE
OCT-09 FY-2010	\$160.16	JOHN AANA
OCT-09 FY-2010	\$120.00	LAWRENCE ARNOLD
OCT-09 FY-2010	\$120.00	STERLING WONG
OCT-09 FY-2010	\$140.00	Sterling WONG
OCT-09 FY-2010	\$140.00	STERLING WONG
OCT-09 FY-2010	\$62.18	STERLING WONG, LAWRENCE, ARNOLD, LESLIE YEE HOY & MARK LUKE
OCT-09 FY-2010	\$48.10	STERLING WONG
OCT-09 FY-2010	\$48.10	GRANT ARNOLD
OCT-09 FY-2010	\$186.40	JERRY KONANUI
OCT-09 FY-2010	\$186.40	JAMES CAIN
OCT-09 FY-2010	\$186.40	KALAE MOCK CHEW
OCT-09 FY-2010	\$174.40	LURLYN SCOTT
OCT-09 FY-2010	\$172.40	PENNY LEVIN
OCT-09 FY-2010	\$151.84	FRANK RYDER III
OCT-09 FY-2010	\$48.10	MARK LUKE
OCT-09 FY-2010	\$48.10	LESLIE YEE HOY
OCT-09 FY-2010	\$0.58	STERLING WONG, LAWRENCE ARNOLD, LESLIE YEE HOY, MARK LUKE
NOV-09 FY-2010	\$198.20	PATRICK CHEE
NOV-09 FY-2010	\$134.20	GLENN TEVES
NOV-09 FY-2010	\$110.20	JAMES CAIN
NOV-09 FY-2010	\$110.20	PENNY LEVIN
NOV-09 FY-2010	\$60.00	GLENN TEVES
DEC-09 FY-2010	\$202.40	JAMES CAIN
DEC-09 FY-2010	\$198.20	GLEN TEVES
DEC-09 FY-2010	\$140.20	JOHN AANA

**Taro Security and Purity Task Force
Air and Car Costs - 2009**

DEC-09 FY-2010	\$140.20	CHRISTINE KOBAYASHI
DEC-09 FY-2010	\$119.20	KALAE MOCK CHEW
DEC-09 FY-2010	\$119.20	JERRY KONANUI
DEC-09 FY-2010	\$119.20	LURLYN SCOTT
DEC-09 FY-2010	\$110.20	JAMES CAIN
DEC-09 FY-2010	\$110.20	PENNY LEVIN
Total	\$17,124.25	