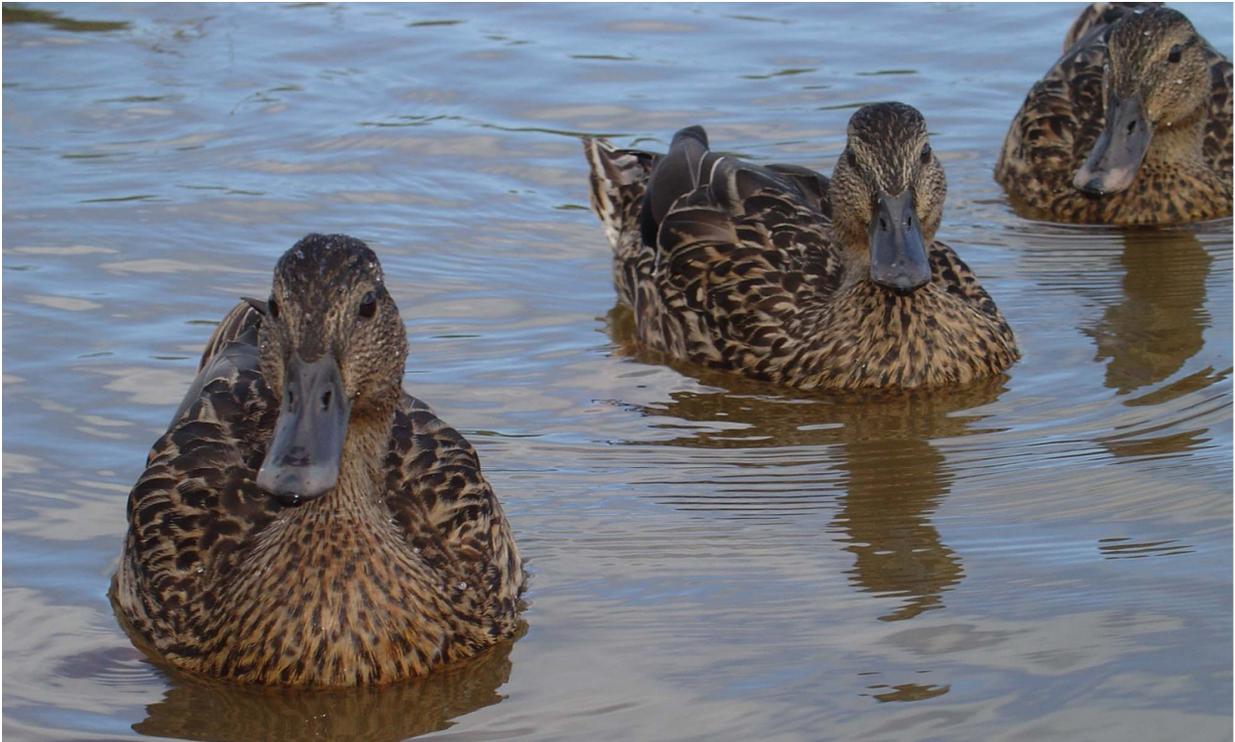


November 2009



# KOLOA MAOLI COMMUNICATION AND OUTREACH PLAN

Prepared for Pacific Coast Joint Venture | Mālama Hawai'i  
and US Fish & Wildlife Service

## Koloa Maoli Communication and Outreach Plan

Cover photo of three Koloa Maoli ducklings at 91 days old by Brenda Zaun, USFWS.



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Pauline Sato  
Mālama Hawai'i

## Executive Summary

Hawai'i was once home to more than 13 endemic waterfowl species, descendants of migratory waterfowl that remained here in the islands for hundreds of thousands to millions of years. The Koloa Maoli (Hawaiian Duck, *Anas wyvilliana*) is one of only two endemic duck species found in Hawai'i and is the only native duck that remains in the main Hawaiian Islands. The Koloa Maoli is an endangered species with an estimated total population of about 2,200 birds, mainly located on Kaua'i, Ni'ihau, and parts of Hawai'i Island.

While the Koloa Maoli, like other waterbirds, is confronted with many threats such as habitat loss and predation by cats, dogs, and mongooses, it is the only native Hawaiian bird facing extinction from hybridization with an invasive species, the feral Mallard (*A. platyrhynchos domesticus*). Hybridization occurs when two closely-related species mate and produce fertile hybrid offspring. On O'ahu and Maui, nearly all resident ducks are feral Mallards or Mallard-Koloa hybrids. Recent genetic studies show that hybrids now occur on Kaua'i and Hawai'i Island.

The good news is that the Koloa Maoli has high genetic diversity, appears to be an adaptable species, responds favorably to wetlands management, and has the potential to make a full comeback provided that feral Mallard and Mallard-Koloa hybrid populations are controlled. Therefore, scientists believe that the Koloa Maoli has a high potential for recovering but only if we act today.

Eliminating the threat of hybridization will be controversial unless the public becomes aware of the plight of this unique species, understands its cultural and biological importance, knows what must be done to save it, and is assisted in making behavioral changes. People must first care and want to help. To that end, an effective educational campaign is critical.

This Koloa Maoli communication and outreach plan provides a framework for localized (Kaua'i/Ni'ihau) and statewide educational campaigns to build public support for removing the threat of feral Mallards and Mallard-Koloa hybrids, strengthening public policies, and restoring/managing primary habitats to benefit a suite of native Hawaiian and migratory waterbirds. The timeframe for this plan is five years, with some on-going activities.

The budgets for the statewide and Kaua'i campaigns will vary depending on their scope and level of in-kind contributions received. A rough estimate of the cost of the Kaua'i campaign is \$120,000 - \$220,000 per year. For the statewide campaign, the estimate is \$175,000 - \$350,000 per year. The higher end numbers reflect increased levels of professional support in social marketing. The recommended timeframe for each of the campaigns is a minimum of three years, with the Kaua'i campaign starting first.

Substantial support exists for implementation of this plan from wildlife conservation agencies, and enormous potential for new partnerships abounds – both of these assets would lead to collaboration that is essential to saving the Koloa Maoli and the habitats in which it lives.

## Table of Contents

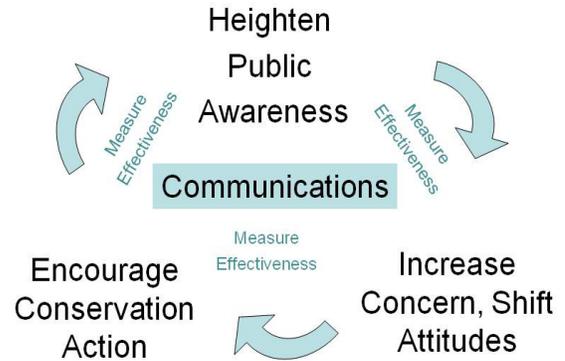
<b>Acknowledgments</b> .....	<b>iii</b>
<b>Executive Summary</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>1</b>
<b>Overview</b> .....	<b>2</b>
<b>Analysis of Problem</b> .....	<b>4</b>
Situation Analysis .....	4
SWOT Analysis.....	6
<b>Key Objectives</b> .....	<b>9</b>
<b>Target Audiences</b> .....	<b>11</b>
<b>Strategy</b> .....	<b>12</b>
Phase One: Actions Steps for a Kaua’i-based Campaign.....	13
Phase Two: Actions Steps for a Statewide Campaign .....	17
<b>Other Recommendations</b> .....	<b>21</b>
<b>Overall Success Measures</b> .....	<b>23</b>
<b>Resource Needs</b> .....	<b>25</b>
Timeline and Budget .....	25
Funding Opportunities .....	26
<b>References</b> .....	<b>27</b>

## Table of Contents, continued

<b>Appendices .....</b>	<b>29</b>
Primary Guiding Document.....	30
Threats to Koloa Maoli .....	31
Comparing Koloa Maoli and Mallards.....	32
Early Hawaiian Stories Referencing Koloa Maoli .....	33
Rare Pride Campaigns .....	34
Potential Tag Lines for Koloa Maoli Campaign .....	35
Glossary .....	36

## Introduction

This plan provides a framework for localized and statewide educational campaigns about restoring true Koloa Maoli (Hawaiian Duck, *Anas wyvilliana*) populations on multiple islands. The aim of the campaigns is to build public support for removing the threat of feral Mallards (*A. platyrhynchos domesticus*) and Mallard-Koloa hybrids, strengthening public policies, and restoring/managing primary habitats to benefit a suite of native Hawaiian and migratory waterbirds. Special emphasis will be placed on Kaua'i and Ni'ihau, home to 90% of the remaining Koloa Maoli population. The timeframe for this plan is five years, with some on-going activities.



This Koloa Maoli communication and outreach plan is the result of the consensus among concerned biologists that without coordinated protection and management the Koloa Maoli will soon go extinct, and that implementing these efforts will hinge on public support. In 2008-09, a pilot educational campaign was implemented by Mālama Hawai'i with funding from the Hawai'i Invasive Species Council under the State Department of Land and Natural Resources (DLNR). The pilot campaign, which involved the creation of educational materials (lesson plans and videos), led to the need for a larger integrated campaign based on social marketing techniques.

Planning for the larger campaign was also spearheaded by Mālama Hawai'i with funding from the Pacific Coast Joint Venture and U.S. Fish & Wildlife Service (USFWS), and help from dozens of biologists, resource managers, agriculturalists and educators who provided their expertise and valuable insights. This plan outlines steps that can be taken immediately to build public awareness of, and support for, public and private efforts to prevent the Koloa Maoli's extinction. Understanding that implementation of many aspects of this plan will require additional resources, this plan may be helpful in developing funding requests.

## Overview

Hawai'i was once home to more than 13 endemic waterfowl species, descendants of migratory waterfowl that remained here in the islands for hundreds of thousands to millions of years. The Koloa Maoli (Hawaiian Duck) is one of only two endemic duck species found in Hawai'i (the other is the Laysan Duck, *A. laysanensis*, that currently lives on Midway Atoll and Laysan Island in the Northwestern Hawaiian Islands) and is the only native duck that remains in the main Hawaiian Islands. The Koloa Maoli is listed as a state and federal endangered species with an estimated total population of only about 2,200 birds.

Koloa Maoli historically inhabited all of the main Hawaiian Islands except the dry islands of Kaho'olawe and Lāna'i. They appeared to live in a wide range of habitats. In 1903, Perkins, a naturalist, reported seeing Koloa Maoli as high as 8,000 feet above sea level (Perkins, p. 460). Woodhouse of Kekaha Sugar Company reported about 400 ducks per square mile for the Mānā Marsh area of Kaua'i prior to its drainage in 1923 and subsequent development into irrigated sugarcane land. This could have meant approximately 2,400 ducks residing in the Mānā Plains alone (covering nearly six square miles), representing one of the best habitats of Koloa Maoli (Schwartz and Schwartz, p. 18)

In the mid-1800s, the Koloa Maoli was considered common and hunted for sport. Koloa Maoli was legally shot, with a bag limit of 25 ducks per day, until hunting for it was curtailed in 1925. Hunting of migratory wild ducks was still permitted until 1939. Duck hunting on public land was closed for all species in the Hawaiian Islands from 1942-1946 (during World War II) and was never reopened. However, private hunt clubs were able to hunt imported Mallards in the 1950s and 1960s.

A brief review of Hawaiian literature provides a glimpse into the relationship between the Koloa Maoli and native Hawaiian people. (See the Appendix for more references.)

In the "Story of Umi," it is told that Imaikalani, the fierce fighting blind king of Ka'ū, was aided by two "wild ducks" (Koloa). Imaikalani could throw 10 spears in a single throw, five from the right hand and five from the left; the spears would fly in a group like lightning from which no man could dodge. It was believed that the ducks were the source of his skill and daring bravery. 'He had two wild duck watchers which reported to him the appearance of any one either from the front or from the rear, or from the sides, whichever way the voices of the birds indicated.' The birds would hover above and make a noise from the direction of the opponent to warn and prepare Imaikalani to make a crushing blow.

From Selections from Fornander's Hawaiian Antiquities and Folk-lore, p. 168

A more contemporary look at the relationship between Koloa Maoli and Hawaiian people is reflected by the following excerpt from a 1953 paper, "Notes on the Hawaiian Duck" by Schwartz and Schwartz.

Following breeding the adults molt and years ago it was the custom for the Hawaiians to make annual trips to the mountains where the flightless ducks were easily captured, killed, and salted for future use. According to Mr. Eric Knudsen, a long-time resident of Kauai, two favorite spots for collecting ducks were the Kokee and Waialae regions of Kauai. Forays did not occur frequently into the marshy areas presumably because of the difficulty of catching the birds there.

## Koloa Maoli Communication and Outreach Plan

From these stories, one can imagine the abundance of Koloa Maoli in the islands. However, by the early 1900s, the population of Koloa Maoli declined markedly and by 1962, there were fewer than 500 individuals in total, restricted to the islands of Kaua'i and Ni'ihau. The combined effects of habitat loss, introduced predators, and over-hunting took a major toll. Through protection and captive propagation/reintroduction from 1968-1990, their numbers improved, however, because there was no attempt to remove introduced Mallards from the wild, a new problem ensued – hybridization.

The Koloa Maoli is the only native Hawaiian bird facing extinction from hybridization with an invasive species, the feral Mallard. Mallards were brought to Hawai'i starting in the late 1800s for stocking ornamental ponds and farming. "Feral" animals are those that have escaped or been released from domestication and are breeding in the wild. Hybridization occurs when two closely-related species mate and produce fertile hybrid offspring, further exacerbating the problem.

Most of Hawaii's remaining Koloa Maoli are now primarily found on the islands of Kaua'i, Ni'ihau, and parts of Hawai'i Island. On O'ahu and Maui, nearly all resident ducks are feral Mallards or Mallard-Koloa hybrids. Oahu's 20-year trend shows a sharp increase in Mallard-hybrid observations and an equally rapid decrease in Koloa Maoli observations. Recent genetic studies show that hybrids now occur on Kaua'i and Hawai'i Island. (More information on Mallard-Koloa hybridization and other threats to the Koloa Maoli is in the Appendix.)

The USFWS Draft Revised Recovery Plan for Endangered Hawaiian Waterbirds (2005) outlines the removal of all feral Mallards and Mallard-Koloa hybrids from the islands where they occur as a high priority action towards recovery of the Koloa Maoli.

The good news is that the Koloa Maoli has high genetic diversity, appears to be an adaptable species, responds favorably to wetlands management, and has the potential to make a full comeback provided that feral Mallard and Mallard-Koloa hybrid populations are controlled. Therefore, scientists believe that the Koloa Maoli has a high potential for recovering but only if we act today.

Managed wetlands free of feral Mallards will benefit a diversity of Hawaiian and migratory waterbirds and make restoring true Koloa Maoli populations a realistic goal. Eliminating the threat of hybridization will be controversial unless the public becomes aware of the plight of this unique species, understands its cultural and biological importance, knows what must be done to save it, and is assisted in making behavioral changes. People must first care and want to help. To that end, an effective educational campaign is critical.

## Analysis of Problem

### Situation Analysis

#### Public awareness

- While market research has not yet been conducted, judging from informal observations made during the pilot education campaign, the average person is generally not aware of even the existence of the Koloa Maoli, let alone the challenges it faces with hybridization. In simple terms, the plight of the Koloa Maoli is not on the general public's radar screen.
- It is apparent that some Hawai'i residents like to feed ducks, especially as an activity with children. They seem to be undeterred, even in front of "no feeding" signs.
- While recent news stories have highlighted incidents with feral Mallard control at Hāmākua Marsh, they failed to adequately convey all aspects involving this issue, with hybridization barely mentioned and not explained. In 2008, DLNR, following standard procedures for bird sanctuaries, hired a sharpshooter from USDA-APHIS-Wildlife Services to humanely control feral ducks. A member of the public inadvertently found out, became upset, and called the press. The incident was inflamed by the media. The State defended and explained the reasons for their management policies, and took a strong stand for the endangered birds. The news stories ended quietly in this example but a later story about the death of a feral peacock caused by a private citizen led to great interest especially with the intervention of the City's lead prosecutor who vowed to imprison the offender.
- Some people want to remove feral Mallards from their property, not necessarily because of the hybridization issue but more likely because of the birds being a nuisance. The callers usually end up reaching DLNR for assistance after trying a number of other organizations but there is little that DLNR can do to provide immediate assistance. They can issue a permit to remove the bird if it is feral and if the person cites that the bird is causing crop damage, is a nuisance, or is a threat to human health and safety.

#### New science and data gaps

- The Koloa Maoli is one of the least studied native Hawaiian birds. Thus, limited scientific information is available to guide conservation actions. However, rather than wait for complete information, research is conducted in conjunction with management. In the summer of 2009 a field identification key was developed by researchers at University of California, Davis (U.C. Davis) so that managers can distinguish with a high level of accuracy Koloa Maoli from Mallards and Mallard-Koloa hybrids. This tool is a breakthrough in helping to reduce hybrid populations and restore true Koloa Maoli populations.
- More information is needed on the sources of Mallards and hybrids, movements of Koloa Maoli within and between islands, and the basic ecology of Koloa Maoli. This information would lead to more science-based solutions toward saving the species. It would also be very helpful to understand the status of ducks on Ni'ihau.

#### Current policies and permits

- Hawai'i state law (HRS §4-71) administered by the Hawai'i Department of Agriculture restricts the importation of domestic and non-domestic Mallards from outside of Hawai'i. No varieties

## Koloa Maoli Communication and Outreach Plan

of *A. platyrhynchos* are allowed to be brought into the state as a viable egg, chick, or adult with exceptions for research by universities or government agencies, exhibition in municipal zoos or other institutions for medical or scientific purposes. *A. platyrhynchos* is on the list of “Introduced Wild Birds Other Than Game Birds Which Have Become Established in the Wild” (HRS § 13-124) as administered by the DLNR. As such, it should not be legal to sell or transport Mallards within the islands. The “gray area” is a Mallard that has been domesticated as a farm animal or pet – are they still wild? If Mallards were put on the list of “Species of Injurious Wildlife in Hawai‘i” (also HRS § 13-124), there would be no question that interisland movement, ownership and commercialization is prohibited.

- Somewhat complicating the matter is that all wild birds (including Mallards) are protected by Hawai‘i state law (HRS §195D) under DLNR and therefore cannot be removed without a permit. All species on the Federal migratory bird list are regulated by the Migratory Bird Treaty Act (50 CFR 21).
- Localized control efforts (e.g. culling of Mallards and hybrids) have been conducted primarily by the USFWS, DLNR, and U.S. Dept. of Agriculture Wildlife Services under Migratory Bird Depredation permits for concerns regarding nuisance and threats to human health and safety. An Environmental Assessment or Environmental Impact Statement will likely be required under the NEPA (National Environmental Policy Act) to conduct control efforts on a larger scale for the purpose of recovering the Koloa Maoli.

### Current level of communication/marketing

- Outreach has been initiated to educate the public about the Koloa Maoli and feral Mallard hybridization issue but it has not been widespread or in-depth. Biologists at the U.S. Geological Survey and U.C. Davis have written and distributed fact sheets and presented papers, primarily through the conservation and agricultural communities (2007-2009). The Hawai‘i Conservation Alliance published a position paper on the issue (2008). In 2008-2009, Mālama Hawai‘i led a pilot educational campaign involving the development of resources including five lesson plans and three short videos for teachers along with a public service announcement. These videos were aired repeatedly on statewide cable television. All of these educational materials were distributed to DLNR offices statewide to give to educators free of charge upon request, and are available through Mālama Hawaii’s website ([www.malahawaii.org/koloa.html](http://www.malahawaii.org/koloa.html)).

## SWOT Analysis

The following section is what is known as a “SWOT” analysis. SWOT stands for:

- **Strengths** – from an internal, organizational perspective
- **Weaknesses** – from an internal, organizational perspective
- **Opportunities** – from an external environmental, socio-political, cultural and economic perspective
- **Threats** – from an external environmental, socio-political, cultural and economic perspective

SWOT analyses are usually used by businesses for strategic planning and marketing but are useful for other types of organizations as well. By understanding the four levels of analysis, a group can work toward leveraging strengths, correcting weaknesses, capitalizing on opportunities, and deterring threats.

### Strengths

- The Koloa Maoli is an endemic, endangered species and the only native duck in the main Hawaiian Islands.
- It is a priority species under the State and Federal endangered species recovery programs.
- A viable population of true Koloa Maoli still remains on Kaua’i/Ni’ihau.
- It occupies the entire watershed or ahupua’a (mauka to makai); protecting its habitat would result in broad habitat protection and multi-species benefits.
- It could serve as an “ambassador” for watershed and wetland protection.
- Scientific papers supporting removal of the feral Mallard threat have already been published.
- A new tool has been created to differentiate true Koloa, Mallards and hybrids.
- Initial educational information about the Koloa Maoli and the hybridization issue has been developed (e.g., lesson plans, photos, video stories, fact sheets, website).
- The USFWS, DLNR, and many other agencies and organizations are already working cooperatively to solve the hybridization problem based on the best available science.
- The Koloa Maoli population is recoverable within our lifetime if we act today.

### Weaknesses

- Koloa Maoli is under threat of extinction. Time is not on our side.
- Agency personnel have multiple priorities and limited time to dedicate to Koloa Maoli. There is no individual dedicated to Koloa Maoli recovery on a full-time basis.
- There is a lack of information on the sources of Mallards and hybrids, movements of Koloa Maoli within and between islands, status of ducks on Ni’ihau, and the basic ecology of Koloa Maoli.
- The Koloa Maoli is not easily seen – a secretive and quiet duck that lives in remote areas – and is thus unfamiliar to the general public.
- The feral Mallards are easily visible to the public and males in breeding plumage are more showy.
- It is often difficult to distinguish between a Koloa Maoli and hybrid by sight, leading some people to wonder, “Why does it matter?”

### Opportunities

- Strategic plans are in progress (e.g., Partners in Flight, Hawai’i Wetland Joint Venture) with the intent to gain greater protections for native birds.

## Koloa Maoli Communication and Outreach Plan

- There are many interested and dedicated scientists, resource managers, educators and media members who want to take action to help the Koloa Maoli.
- Local students are interested in being involved in Koloa Maoli research; local involvement and research are press opportunities.
- Wetland sites across the state such as the Mānā Plain Wetland Conservation Reserve project on Kauaʻi could be focal areas for education about restoring true Koloa Maoli (see below).
- Many private landowners enjoy having Hawaiian waterbirds on their land; native wildlife on taro farms are an integral part of the ahupuaʻa and are indicators of ecosystem health.
- Some duck owners may want to remove feral Mallards and Mallard-Koloa hybrids and have Koloa Maoli instead.
- There are fascinating stories about the Koloa Maoli (Hawaiian traditional stories and more recent observations). There are kūpuna who can tell stories of the days when Koloa Maoli were abundant.
- Several businesses use ducks as their mascot/logo and could be encouraged to support Koloa Maoli conservation.
- The Koloa Maoli could be a natural fit for awareness-raising and action programs that utilize a mascot such as Rare's Pride campaign.
- There may be opportunities to involve local chefs in finding ways to utilize feral Mallards removed from the wild in their menus and link into the sustainability and "slow food" movements. However, thorough research will be needed prior to implementation.

Current and Future Wetland Sites to Highlight as important habitat for Koloa Maoli (\*indicates best public visibility):

### Kauaʻi –

- Hanalei National Wildlife Refuge\*
- Hulēʻia National Wildlife Refuge \*
- Mānā Plain Wetland Conservation Reserve (in development)\*
- National Tropical Botanical Gardens (Lāwaʻi and Limahuli Gardens)

### Oʻahu –

- James Campbell National Wildlife Refuge\*
- Kaʻelepulu Wetland (privately managed)\*
- Kawainui and Hāmākua Marsh Wildlife Sanctuaries\*
- Marine Corps Base Hawaiʻi (Nuʻupia Ponds Wildlife Management Area)
- Pearl Harbor National Wildlife Refuge (Honouliuli unit)
- Pouhala Marsh Wildlife Sanctuary
- Waimea Valley

### Maui –

- Kanahā Pond Wildlife Sanctuary \*
- Keālia Pond National Wildlife Refuge
- Mākena State Park
- Waiheʻe Refuge

### Molokaʻi –

- Kakahaiʻa National Wildlife Refuge

### Hawaiʻi -

- Kohala Watershed wetlands and streams
- Waipiʻo Valley
- Hāmākua stock ponds

## Threats

### Environmental

- There are other threats to the Koloa Maoli (e.g. wetlands loss, cats, rats, mongooses, avian botulism, environmental contamination).

### Socio-political

- Although importation of domestic Mallards is not allowed by law, it is apparently legal to propagate, buy, sell, and transport domestic Mallards within islands.
- There is some concern that pressure is increasing from farmers to take Mallards off the “Restricted A” list, which would allow importation of domestic Mallards.
- Currently, it is difficult for the public to have feral Mallards removed from their properties.

### Cultural

- People like to feed ducks; they mistakenly think they are doing a good thing.
- Most people do not know what a Koloa Maoli is and may not know Hawai'i has native ducks, and therefore they may not grasp the gravity of the problem with hybridization. Feral Mallards are probably not considered threats other than casual nuisances.
- Euthanizing feral Mallards and Mallard-Koloa hybrids will not be acceptable to certain segments of the public. For example, the idea of euthanizing a mixed breed of bird may also be a sensitive topic in Hawaii's “hapa” (mixed race) environment.
- The concept of wasted meat (of euthanized ducks) may stir people to speak against euthanization of feral Mallards and hybrids.

### Economic

- Some farmers want domestic Mallard breeds for food and some taro farmers use Mallards for pest control (e.g. apple snails, *Pomacea canaliculata*, are ruining taro patches and making it very difficult to farm taro). Many farmers are not aware of the Mallard hybridization issue and reasons for restrictions on Mallard importation.
- Some businesses like to have ducks, including Mallards, on their property as an attractive part of their landscape, which could increase the population of feral Mallards.
- Funding for Koloa Maoli recovery is highly competitive with other endangered species; therefore raising the necessary funds to restore the species will also be competitive.

## Key Objectives

It is of utmost importance that this plan addresses the key threats regarding the Koloa Maoli hybridization issue otherwise significant resources (e.g. time and money) could be spent on a campaign that ultimately has little impact. The threats as listed above were prioritized by biologists most familiar with the issue and reframed as objectives to abate the threats.

There are three levels of objectives for this plan: Policy, Management, and Communication. The following diagram depicts how the objectives are separate yet related to each other. Communication objectives should work toward achieving key policy and management objectives.

(See diagram on next page.)

**Communication Objectives**

**Conduct an educational campaign that increases public support and engenders action to protect and restore true Koloa Maoli populations.** An informed and concerned public will support and assist with removing extinction threats and implementing conservation actions leading to recovery of Koloa Maoli and other native Hawaiian waterbirds.

- Build pride for the Koloa Maoli – Hawaii’s special native duck
- Inform the public about threats to the Koloa Maoli and how people can help.
- Be proactive in managing potentially controversial projects, especially the euthanization of feral Mallards and Mallard-Koloa hybrids
- Build acceptance and support for policy and management objectives



**Policy Objectives**

**Make it illegal to propagate, buy, sell and transport domestic Mallards within the islands.**

Add Mallards to State’s list of Injurious Wildlife in Hawai’i\*

- Require a permit to own Mallards and closely-related ducks in Hawai’i and make requirements for responsible ownership (e.g. preventing escape)
- Obtain NEPA clearance through completion and acceptance of Environmental Impact Statement to humanely remove feral Mallards and hybrids on a large scale for conservation purposes
- Establish the Koloa Maoli as the official State Waterbird

\*Prohibits release into the wild and transporting them to locations where they are not already living in a wild state, and lifts protective regulations that apply to other wildlife under State law.

**Management Objectives**

**Protect and restore true Koloa Maoli populations to multiple islands** by eliminating the threat of hybridization with feral Mallards and restoring and managing primary wetlands.

- Make and keep Kaua’i and Ni’ihau “feral-Mallard-free”
- Develop and implement a plan for humane removal of feral Mallards and hybrids.
- Develop a free and streamlined permit system for feral Mallard removal
- Encourage voluntary removal of feral Mallards from private and public property
- Restore and manage wetlands within three priority focus areas on Kaua’i (e.g. Hanalei River Valley, Hule’ia River Valley, Mānā Plain)
- Phase out use of Mallards for pest control, especially with taro farmers, and provide them with viable alternatives
- Address other threats to Koloa Maoli (e.g. wetlands loss, cats, rats, mongooses, avian botulism, environmental conditions)
- Develop funding aimed at supporting research, and management of the Koloa Maoli

Sources: USFWS Draft Revised Recovery Plan for Hawaiian Waterbirds (2005), State Comprehensive Wildlife Conservation Strategy (2005), State Aquatic Invasive Species Management Plan (2003), PCJV Strategic Plan for Wetland Conservation in Hawai’i (2006), and Koloa Maoli communication and outreach plan committee (2009).

## Target Audiences

The following have been identified as audiences for outreach, ranked roughly along a time scale (immediate to later).

### Immediate

- Managers of natural resources, hotels, and golf courses; farmers and duck enthusiasts on Kaua'i
- All residents of Kaua'i and Ni'ihau (first targeting communities where there are ducks)
- Public and private landowners/managers throughout the state where Mallards and Koloa Maoli may live (including natural areas, golf courses, and hotels)
- Farmers
- Feed stores
- Pet stores
- Duck breeders, collectors, and caretakers
- Legislators and government officials involved in changes to related laws
- Teachers
- Environmental organizations focused on native wildlife
- Humane societies
- Zoos
- Landscaping industry, landscape architects
- Bird-watchers and other nature enthusiasts
- ▼ Local chefs and food advocates (e.g. Slow Foods Hawai'i)

### Later

## Strategy

The overall strategy is to implement a two-phased campaign – first, a targeted campaign on Kauaʻi (reaching out to Niʻihau) to provide immediate protection to the core population of Koloa Maoli as well as minimize opposition to Mallard and hybrid management efforts. This campaign would build pride among residents about “their” special bird and Kauai’s success could persuade other islands to do their part to save the Koloa Maoli.

Phase one would be followed by a broad statewide campaign to restore true Koloa Maoli populations through stricter laws, Mallard-hybrid population control, and personal behavior changes (e.g., shifting people’s good intentions from feeding/releasing ducks to helping restore native ducks). This should be done PRIOR to engaging in large scale Mallard and Mallard-hybrid control (euthanization). The statewide campaign will emphasize the broader benefits of invasive species control and wetlands restoration to native ecosystems and people. Products developed for the Kauaʻi campaign would feed into the statewide campaign.

In developing more specific strategies for the campaigns, it will be instructive to adhere to the “Theory of Change” methodology developed by Rare, a U.S. based multinational non-profit conservation organization specializing in social marketing. In short, the theory is based on a rough equation (provided by Paul Butler of Rare):

**K** (knowledge) + **A** (attitude) + **IC** (interpersonal communication) + **BR** (barrier removal)  
→ **BC** (behavior change) → **TR** (threat reduction) → **CR** (conservation result).

To use this model, start from the right side of the equation, with the conservation result and work to the left. To reach the end conservation result, what are the key threats that need to be reduced, and what human behavior changes would be needed? What knowledge, attitude, interpersonal communication, and removal of barriers would lead to the behavior change? Barrier removal is paramount. It is about providing practical alternatives as without that, an informed person may still be unable or unwilling to make a behavior change for economic or other social reasons.

With the situation before us, the conservation result is the recovery of the species on multiple islands, starting first on Kauaʻi. Threat reduction focuses on hybridization with Mallards, predation by invasive species, habitat degradation and loss, and disease. Behavior changes include stopping the activities of human-caused movement of Mallards to new places, breeding and sale of Mallards, and duck feeding. The removal of barriers include providing alternatives to having Mallards as pets or tools to control apple snails, providing resources to Mallard owners on how to properly keep their ducks so that their populations do not expand, and having new activities at restored wetlands that replace the public’s urge to feed ducks. It could also mean changes in policy that make it illegal to move, breed, or sell Mallards. Finally, it will be necessary to understand what are the target audiences’ current knowledge and attitudes about Koloa Maoli and the hybridization issue and determine how best to communicate with them to lead to the behavior changes. It will be important to engage people they listen to (e.g. family members, community leaders, kūpuna, and experts) as communicators.

## Phase One: Action Steps for a Kaua'i based Campaign

### 1. Engage primary stakeholders

Based on a planning meeting held on Kaua'i in early 2009, it became clear that a high priority action is to educate stakeholders such as natural resources managers, farmers, hotel managers, and domestic duck enthusiasts about the hybridization issue and the urgency to address it to save the Koloa Maoli. Many people are not aware of the issue and know little about Mallards in all their forms. Conduct an educational forum for potential spokespeople to inform them of the issue of Koloa Maoli hybridization and engage them in a dialogue about solutions. With this group, agree on high leverage management and policy objectives for the campaign (e.g. making Kaua'i and Ni'ihau feral-Mallard-free, restoring key wetlands, sterilizing Mallards).

### 2. Assess feasibility of conducting a Rare campaign on Kaua'i

Pursue a partnership with the non-profit organization Rare, which has a very specialized and extremely successful campaign formula, and provides in-depth training of campaign managers at one of their training centers. (see Appendix)

Such a campaign would include:

- Hiring and training a full-time campaign coordinator for two years
- Conducting market research among Kaua'i residents to gauge their knowledge of the issues and opinions via phone survey and/or focus groups
- Creation of a campaign name, mascot, logo, tag line, etc.
- Creation of targeted print and radio ads
- In-depth school outreach to all local schools (utilize existing lesson plans and develop new ones)
- Outreach to various audiences including government decision-makers, businesses, churches, bird-watching enthusiasts, hotels, golf courses, taro farmers, natural resources managers
- Measuring impact of the campaign

Note: While contact with Rare has been made about this potential campaign, a more in-depth discussion is needed. Rare primarily works in developing countries and may not be able or willing to work in Hawai'i. If a Rare campaign is feasible, immediately take steps in working closely with Rare to implement the campaign that they design. Otherwise, explore working with Rare as a consultant and go on to step 3.

### 3. Conduct market research

Assess island residents' level of awareness about the Koloa Maoli, Mallards, and the hybridization issue as well as attitudes about feral Mallard management through a pre-campaign market survey. Identify areas of sensitivity and common misconceptions and test potential messages and taglines. Consider working with the University of Hawaii's Natural Resources and Environment Management program, and/or hire a professional research firm. Also consult with the Florida Wildlife Commission to learn from its experiences.

### 4. Refine messages based on the market survey

Based on the results of the market survey, refine messages and audiences. The survey will give a good idea of how the public perceives the issue and that is where you must start. This is also the time to come up with a slogan or "catch phrase" for the campaign.

**5. Write/refine scientific paper specifically for this campaign**

A campaign of this type must be science-based. One or two key papers will need to be used as the backbone of this campaign. White papers exist but will need to be updated with current research. Researchers at the U.C. Davis, Oregon State University, and USGS Biological Resources Division have spearheaded research on the Koloa Maoli in recent years.

**6. Develop materials**

Written and audiovisual materials will be needed to deliver effective messages. The following is a preliminary list of useful materials.

- Talking points
- Fact sheets (refine existing)
- Frequently Answered Questions sheet (refine existing)
- General brochure with a clear call to action
- Brochure geared for farmers with best management practices
- Brochure on controlling feral Mallards on your property
- Power Point presentations for specific types of audiences
- Photos and videos (refine existing, gather more)
- Posters (children and adults) for schools and feed stores
- Traveling display
- Materials featuring the Hawaiian cultural connection to Koloa Maoli

**7. Recruit and train spokespeople**

It will be important to have credible spokespeople from Kaua'i (or having strong Kaua'i connections) speak on behalf of the campaign, reaching different target audiences. Conduct interviews, gather stories, and ask people to help in the way they feel most comfortable.

Potential spokespeople suggested by Kaua'i island residents include:

- Kekoa Ana - DOFAW, taro farming family
- Ilei Benamina – Ni'ihau Aha Kiole representative, Kaua'i Community College instructor
- Sue Boynton – Kilauea Point Natural History Association
- Rodney Haraguchi – Hanalei taro farmer
- Mark Jeffers - puppets storyteller
- Maka'ala Ka'auomoana – Hanalei Watershed Hui
- Thomas Kaiakapu – Hawai'i Department of Land and Natural Resources
- Sabra Kauka – Island School teacher
- Ke Kula Ni'ihau o Kekaha students and teachers - West Kaua'i radio station, public service announcements, cultural research, creation of new 'oli (chants)
- Gary Koga - taro farmer
- Rhoda Libre - kupuna
- John Lydgate – orator, kupuna
- Mike Mitchell – U.S. Fish and Wildlife Service
- Native Hawaiian Hotel Association representative
- Lelan Nishik – Kaua'i Nursery and Landscaping
- Jerry Ornellas – Kaua'i County Farm Bureau
- Sharon Pomeroy – Kaua'i Aha Kiole representative, farmer
- Stacy Sproat-Beck – Waipā Foundation
- Kawika Winter – National Tropical Botanical Gardens
- Carol Yotsuda – Garden Island Arts Council

**8. Conduct media training for spokespeople**

Conduct a half- to full-day training on how to effectively deliver key messages in print, radio or television interview situations as well as for presentations. Also review how to handle tough questions regarding controversial issues.

**9. Develop a media strategy**

Be proactive. A media strategy will be important to provide the press with information we want them to know and to ensure fair, balanced coverage. Focus on Kaua'i media outlets but also include O'ahu (in preparation for the statewide campaign). A general press kit will be needed as well as story ideas and press releases for local and possibly national news. Gather good photos and video B-roll (footage provided free to news organizations). Consider holding a press conference that is live-streamed to launch the campaign. Confirmation of hybrids on Kaua'i using DNA analysis may be a good hook for a story, especially from a well-known scientist. Also consider holding a half- to one-day workshop for journalists on the hybridization issue to give them solid background information based on science, leads for stories, and resource people to contact for follow-up information.

**10. Internet presence**

The Internet will be an important method to get information out quickly and relatively inexpensively. It is a valuable tool but we must recognize that it does not reach all audiences.

- Make a stand-alone website (transfer existing information from Mālama Hawai'i site)
- Make it interactive. Challenge web audiences to discover more about Hawaii's unique environment.
- Provide the latest information on Koloa Maoli, feral Mallards and Mallard-Koloa hybrids, including answers on "frequently asked questions."
- Include a "blog" component to allow for information to be shared more interactively.
- Add an on-line permit system to control mallards (after it is made legal to do so)
- Use other social networking technology (e.g. Facebook, Twitter, YouTube) if someone can manage this on a daily basis.

**11. Reach out to taro farmers**

Taro farmers comprise a focal audience on Kaua'i due to the high concentration of both taro farmers and true Koloa Maoli on the island. Taro farms provide habitat for the Koloa Maoli but they also could be opportunities for hybridization or sources of new Mallards if domestic Mallards are used to control the invasive apple snail. Special attention will be needed to reach taro farmers and educate them about the problem, including the threat of avian botulism, and provide guidance on and support for apple snail control alternatives. Farmers can also be instructed on how to properly manage Mallards if they are being used for apple snail control, such as keeping the Mallards in pens with roofs when they are not at "work" and practicing some method of sterilization. The number of taro farmers on Kaua'i is small enough to be able to reach just about every farmer individually to provide information and support. The goal would be to phase out the use of Mallards, replaced by better alternatives.

**12. Reach out to other farmers and hotels and golf course managers who have Mallards**

Other farms, hotels, and golf courses on Kaua'i have ducks, including Mallards, on their properties. As with taro farmers, it is important to reach out to property owners with ducks to educate them about the problem and provide guidance for solutions.

**13. Reaching decision-makers**

A team will need to focus on educating and lobbying decision-makers at the Legislature, DLNR, Department of Agriculture, and other agencies to make desired changes to public policies. The schedule for decision-making will dictate the timing for many of the action steps. Spokespeople from the community will be important advocates.

**14. Teacher and student outreach**

Actively distribute recently developed lesson plans (grades K-7) to teachers throughout the island and consider making more lessons. Connect to existing teacher training workshops and to existing teacher curriculum planning groups. Work with teachers to have students create their own localized awareness campaigns or even a public art contest featuring the Koloa Maoli. Collaborate extensively with other wetland/waterbird educational programs. Invite Hawaiian cultural specialists to work with students to develop plays based on legends that can be performed for school and public audiences. Contact curriculum specialists in the Hawai'i Department of Education for assistance.

**15. Focus on key wetland habitat restoration sites**

Direct attention to tangible projects on different parts of the island where people can take part in actual conservation. Habitat restoration projects at Mānā (west), Hanalei/Limahuli (north), Lāwa'ia or Hule'ia (south) that engage volunteers would support protection of multiple species of wetland birds. Ideally, select sites managed by different partners (e.g. State DLNR, USFWS and National Tropical Botanical gardens). Identify schools and kūpuna from each of these sites to assist with outreach.

**16. Strengthen and build new partnerships**

Partner with organizations on Kaua'i that are concerned about Koloa Maoli and utilize these relationships for outreach on campaign initiatives. Also build partnerships with groups that could have a significant impact on reaching target audiences but may not yet be aware of the issue. Provide background information and communications materials.

Government/University:

- Hawai'i Dept. of Agriculture
- Hawai'i Dept. of Land and Natural Resources
- Kaua'i Invasive Species Committee
- Koloa Recovery Implementation Group
- U.S. Fish and Wildlife Service
- USDA Garden Island Resource Conservation

Community/Non-profit

- Hanalei Watershed Hui
- Kaua'i Conservation Alliance
- Kaua'i Humane Society
- Kīlauea Point Natural History Association
- Mālama Kaua'i
- Mālama Māhā'ulepū
- National Tropical Botanical Gardens
- Sierra Club, Kaua'i Group

- The Nature Conservancy , Kaua'i program
- Waipā Foundation

Business/Non-profit

- Kaua'i Agricultural Initiative
- Kaua'i County Farm Bureau
- Kaua'i Taro Growers Association
- PAHIO Development, Inc.

**17. Conduct follow-up market research**

Conduct a post-campaign survey to assess changes in public awareness, attitudes, and behaviors. Ideally, the survey would follow the same structure as the pre-campaign survey to be comparable.

**Phase Two: Action Steps for a Statewide Campaign**

**1. Conduct market research**

Similarly to efforts on Kaua'i, it will be important to assess the public's level of awareness about the Koloa Maoli, Mallards, and the hybridization issue as well as attitudes about feral Mallard management on a statewide level. Perceptions may be heightened with the success of the Kaua'i campaign.

**2. Refine messages based on the market survey**

Based on the results of the market survey, refine messages and audiences. Consider using the same slogan for Kaua'i or modifying it to reflect a statewide/global effort.

**3. Recruit spokespeople who can reach various audiences statewide and conduct media training**

Look for local, credible and respected spokespeople on each island who can reach different audiences such as:

- Farmers (e.g. Reppuns of Wai'ahole)
- Native Hawaiian kūpuna (e.g. Chuck Burrows, Les Kuloloio)
- Biologists (e.g. Mike Mitchell, Norma Bustos)
- Artists and writers (e.g. Patrick Ching, Michael Furuya, Kathy Valier, Jack Johnson)
- Children (via Hawai'i Nature Center, Kōkua Hawai'i Foundation)
- Chefs (e.g. Ed Kenney, Alan Wong, Sam Choy)

**4. Develop/refine materials**

Use materials made for the Kaua'i campaign and modify as needed to deliver a statewide message.

**5. Develop a statewide media strategy**

Determine how best to engage the media, especially on O'ahu, where it has the largest reach. Again, use whatever is applicable from the Kaua'i campaign regarding photos, B-roll, etc. but be prepared to get new footage. Especially in the case of crisis scenarios (e.g. outcry over euthanization), provide the press with information we want them to know to ensure fair, balanced coverage. A potentially interesting piece that could be pitched to the media is a Koloa Maoli/Mallard identification and education guide (newspaper insert) geared for families.

**6. Internet presence**

Continue to use and improve upon the website made for the Kaua'i campaign. Refine the use of social networking technology to reach new audiences. Ensure that the website is kept up to date and shares success stories.

**7. Reaching decision-makers**

Emphasis should be made on obtaining approval for large-scale removal of Mallards (NEPA process). This will involve reaching out to decision-makers and constituents, and utilizing spokespeople. Also, seek support to make the Koloa Maoli the official State Waterbird.

**8. Reaching farmers statewide**

Farmers tend not to have the time to read newspapers, watch television, or surf the Internet regularly so direct outreach will be necessary. Work with the Hawai'i Farm Bureau Federation and Agricultural Leadership Foundation of Hawai'i to educate farmers of the problem and help them control Mallards properly on their properties.

**9. Teacher and student outreach**

Build on teacher and student outreach on Kaua'i. Connect with teacher curriculum planning groups throughout the state, including the Mokuapapa Discovery Center on Hawai'i Island and Pacific American Foundation, to make teaching about Koloa Maoli relevant to their islands. Engage classes in making the Koloa Maoli the State Waterbird. A poster, essay, and poetry contest may provide a great venue for this type of outreach. Work with local artists and writers to develop children's books and other media on conservation of Koloa Maoli.

**10. Chef outreach**

Other successful social marketing campaigns (e.g. SeaWeb's "Give Swordfish a Break") have involved popular chefs as effective spokespeople. Consider reaching out to local chefs and discuss the possibility of marketing "island duck," Mallards and hybrids, as a way to utilize birds that need to be culled from the wild population. Part of proceeds could go to conservation of the Koloa Maoli and its habitat. "Slow foods" and sustainability advocates could become partners (see [www.slowfoodusa.org](http://www.slowfoodusa.org) and [www.slowfoodhawaii.org](http://www.slowfoodhawaii.org)). This strategy could strengthen the connection between food and the health of our environment. Prior to doing this, research carefully the possible "backfiring" of this approach by creating a demand for Mallards, leading people to breed them for sale, or perhaps the illegal poaching of Koloa Maoli. Look into pre-emptive measures, such as strictly controlling the supply of birds to restaurants. Health considerations will also be needed.

**11. Strengthen and build new partnerships**

Expand the partnership base to build support for this campaign while continuing partnerships established on Kaua'i.

Government/University:

- Hawai'i Dept. of Agriculture
- Hawai'i Dept. of Land and Natural Resources (all islands)
- Hawai'i Invasive Species Council
- Honolulu Zoo
- Island Invasive Species Committees
- Koloa Recovery Implementation Group

## Koloa Maoli Communication and Outreach Plan

- Oregon State University (Fisheries & Wildlife department)
- Pacific Coast Joint Venture
- University of Hawai'i at Mānoa (Natural Resources and Environmental Management, Zoology, Center for Conservation Research and Training departments)
- University of California, Davis (Wildlife, Fish and Conservation Biology department)
- USDA Natural Resources Conservation Service
- USDA-APHIS-Wildlife Services
- U.S. Fish and Wildlife Service
- U.S. Geological Survey, BRD
- U.S. Geological Survey, National Wildlife Health Center
- Waimea Valley (Office of Hawaiian Affairs – O'ahu)

### Community/Non-profit

- 'Ahahui Mālama I ka Lōkahi
- Agricultural Leadership Foundation of Hawai'i
- American Bird Conservancy
- Bernice Pauahi Bishop Museum
- Conservation Council for Hawai'i
- Hawai'i Association of Watershed Partnerships
- Hawai'i Audubon Society
- Hawai'i Conservation Alliance
- Hawai'i Nature Center (O'ahu, Maui)
- Hawai'i Wildlife Center (Hawai'i Island)
- Hawaiian Civic Clubs
- Humane societies and major animal shelters
- Kamehameha Schools
- Mālama Hawai'i
- National Tropical Botanical Gardens
- New Moon Foundation (Hawai'i Island)
- O'ahu Resource Conservation and Development Council
- Pacific American Foundation
- Paepae o He'eia
- The Nature Conservancy (all islands)
- The Wildlife Society, Hawai'i Chapter
- Waipi'o Community Circle (Hawai'i Island)

### Business/Non-profit

- Landscape Industry Council of Hawai'i
- Hawai'i Farm Bureau Federation
- Hawai'i Hotel & Lodging Association
- Hawai'i State Golf Association
- Honolulu Weekly
- Restaurants that feature locally grown cuisine (e.g. Town, Alan Wong's, Roy's, Sam Choy's)

## 12. Other public outreach events

Consider participating in events such as fairs and service projects that involve families, such as:

- Earth Day fairs

## Koloa Maoli Communication and Outreach Plan

- Endangered species day at Honolulu Zoo
- Farm Fairs
- Student forums/arts projects
- Community service projects (habitat restoration at wetland sites)
- “Slow Foods” events
- Kōkua Festival
- Kailua Town Party
- USFWS Service Jr. Duck Stamp Contest

### **13. Conduct follow-up market research**

Conduct a post-campaign survey to assess changes in public awareness and attitudes. The survey should follow the same structure as the pre-campaign survey to be comparable.

## Other Recommendations

In the process of developing this plan, significant gaps became apparent that, if filled, would greatly enhance the recovery of the Koloa Maoli. It is beyond the scope of a communications and outreach plan to devise solutions for these gaps, however the following recommendations are provided to hasten discussions among people who can make decisions. Immediate attention to these gaps will increase the chances of success of this plan. A working group for each of the bullets below could be assigned to find solutions.

- **Leadership**  
Perhaps most imperative is the need to have strong leadership to focus on Koloa Maoli recovery and commitment from state and federal agencies to implement solutions. The Koloa Recovery Implementation Group, formed informally in 2004, is comprised of biologists and resource managers critical to the planning and success of recovery. However, the group does not meet often and there is no single leader who can dedicate all or at least the majority of his or her attention to this matter. With Mallard-Koloa hybridization on the rise, time is of the essence. A dedicated coordinator is needed for at least two or three years, which would require additional funding.
- **NEPA and timing of Mallard control**  
With the ability to now identify Mallards and Mallard-Koloa hybrids, the opportunity exists to safely and responsibly conduct population control on a large scale basis. However, an Environmental Assessment or Impact Statement will be required. Questions arise regarding who will lead this process and whether the communication campaign should focus on obtaining public approval first and foremost.
- **Training**  
The completion of the field identification key to distinguish between Mallards and Mallard-Koloa hybrids is a major step forward. It will now be important to provide training to resource managers across the islands as well as to others who can be authorized to remove Mallards. Questions arise related to who should receive the training, when, and where will funding come from to conduct training.
- **Alternative apple snail control methods**  
Protecting the stronghold population of Koloa Maoli on the island of Kaua'i is critical to the survival of the species. If taro farmers on Kaua'i who may be raising Mallards for apple snail control are not engaged in the process, the goal of making Kaua'i feral-Mallard-free may be greatly compromised. Taro farmers need relief from the apple snails that destroy their crops and make the already difficult work even more challenging. They need alternative control methods that work and will not cause new problems. Snail experts have yet to find feasible, environmentally safe, and effective solutions for this problem in Hawai'i (as well as elsewhere), however some management methods such as long-term fallow of taro fields and periodic lowering and raising water levels can help (Cowie, personal communication). The conservation community should consider this a priority, as apple snails are threats to all wetlands.
- **Alternative feral Mallard control methods**  
A perhaps less controversial method of feral Mallard control to explore is adding the eggs, or

shaking them to destroy the embryo. This works best with young eggs, which would need to remain in the nest rather than removed so that the parent duck would not lay more eggs. This method would reduce the population over time. Another similar technique is oiling the eggs with vegetable oil. While some may still disagree with these methods, it could be more acceptable to the general public and volunteers could be trained to do this. Florida allows people to addle Mallard eggs by permit. Hawai'i could look into utilizing this method.

- **Animal control on private lands**  
Private landowners or residents that have feral Mallards on their properties may seek assistance to remove the birds, and they end up calling DLNR for assistance. A relationship with a state-sanctioned group, like a pest control company, could be developed to address those situations. Such a group would need to be properly trained.
- **Tackling the behavior of feeding wildlife**  
Ducks represent just one type of animal that some people enjoy feeding. Other birds, cats, fish, etc. are recipients of people's generosity who mistakenly think they are helping. A larger campaign around the theme of "do not feed wildlife," or from another angle – "wild animals need wild food" – may be what Hawai'i needs. Koloa Maoli supporters may want to lend their efforts to build such a campaign.

## Overall Success Measures

The success of the Kaua'i and statewide campaigns will be measured over three to five years based on the following objectives and outcomes. An outcome is defined as how the audience and issue changes because of what you do and produce.

### Communication

#### **Primary Objective**

Conduct an educational campaign that gains public support and engenders action to protect and restore true Koloa Maoli populations.

#### **Outcomes**

- Market research will show a statistically significant positive change in public knowledge about the Koloa Maoli, Mallards, the hybridization issue, and hybrids. There will be substantial support for efforts to solve the problem of hybridization through new policies and resources management.
- There will be sufficient public support to allow DLNR to change its rules as stated in the policy objectives.
- The observation of public feeding of wild ducks at key sites will be reduced by at least 50%.
- Requests to import Mallards will be reduced to zero.
- Public outcry against Mallard and hybrid euthanasia will be minimal.

### Policy

#### **Primary Objective**

Make it illegal to sell, trade, transport interisland, or otherwise commercialize Mallards in Hawai'i. Strengthen laws to protect the Koloa Maoli.

#### **Outcomes**

- All owners of Mallards and closely related ducks will have permits and demonstrate responsible Mallard ownership and good animal husbandry (i.e. no escapes or releases into the wild, minimal contagious disease outbreaks, controls on reproduction)
- State and federal wildlife officials, private contractors, and trained individuals will be allowed to remove feral Mallards and Mallard-Koloa hybrids across the islands in a humane manner.
- The NEPA process will be successfully completed, allowing feral Mallard and Mallard-Koloa hybrid control for conservation purposes
- A law designating the Koloa Maoli as the State's native waterbird will build greater public recognition for the species and support for its protection.

### Management

#### **Primary Objectives**

Protect and restore true Koloa Maoli populations to multiple islands by eliminating the threat of hybridization with feral Mallards and restoring and managing primary wetlands.

**Outcomes**

- Kaua'i and Ni'ihau are free of feral Mallards including Mallard-Koloa hybrids
- Private landowners on Kaua'i and Ni'ihau voluntarily allow the removal of feral Mallards on their property
- Private landowners on other Hawaiian Islands have permits for domesticated Mallards and Mallard-Koloa hybrids and do not allow them to expand to other sites
- Wetlands within three priority focus areas on Kaua'i are managed to provide native habitat for Koloa Maoli and other native wetland birds
- Funding for removal and monitoring of feral Mallards and Mallard-Koloa hybrids is sufficient

## Resource Needs

### Timeline

2009 – on-going

- Build support for the campaigns through partners
- Begin to raise funds for Kaua’i and statewide campaigns
- Implement parts of the plans through partners that do not require additional funding

2010

- Phase One: Begin three-year Kaua’i campaign (see action steps)

2012

- Phase Two: Begin three-year statewide campaign (see action steps)

### Budget

The budgets for the statewide and Kaua’i campaigns will vary depending on the scope of the campaigns and level of in-kind contributions received. A rough estimate of the cost of the Kaua’i campaign is \$120,000 - \$220,000 (with Rare) per year, assuming moderate in-kind contributions. For the statewide campaign, the estimate is \$175,000 - \$350,000 per year. The bulk of the estimated costs will be for trained personnel to run the campaigns. Costs do not include significant media buys of air time or habitat improvement projects.

Estimated Annual Average Budget  
(excluding in-kind contributions)

Category	Kaua’i (mid-level)	Statewide (mid-level)
Labor/contract	90,000	125,000
Market research	20,000	45,000
Materials and supplies	10,000	30,000
Internet	5,000	5,000
Media	10,000	15,000
Travel	2,000	5,000
Other	10,000	15,000
Indirect costs ~15%	23,000	35,000
<b>TOTAL</b>	<b>\$170,000</b>	<b>\$275,000</b>

If the Kaua’i and Statewide campaigns were run for three years each, the total is estimated to be \$1.3 million.

## Funding Opportunities

A preliminary review of funding opportunities suggests that funding be sought from the following to implement this plan:

- Bird watching enthusiasts (individuals to be identified through networks)
- Hawai'i Community Foundation ([www.hawaiicommunityfoundation.org](http://www.hawaiicommunityfoundation.org))
- Hawai'i Invasive Species Council ([www.hawaiiinvasivespecies.org/hisc](http://www.hawaiiinvasivespecies.org/hisc))
- Hawai'i Tourism Authority, Natural Resources program ([www.hawaiitourismauthority.org](http://www.hawaiitourismauthority.org))
- Local, national, and international private foundations that give to environmental causes
- USFWS, Duck Stamp program (<http://www.fws.gov/duckstamps/>)
- USFWS, Endangered Species program ([www.fws.gov/endangered](http://www.fws.gov/endangered))
- USFWS, National Coastal Wetlands Grant program ([www.fws.gov/coastal/CoastalGrants](http://www.fws.gov/coastal/CoastalGrants))
- National Fish and Wildlife Foundation ([www.nfwf.org](http://www.nfwf.org))
- National Park Service, Rivers, Trails, and Conservation Assistance Program ([www.nps.gov/ncrc/programs/rtca](http://www.nps.gov/ncrc/programs/rtca))
- Pacific Coast Joint Venture ([www.pcvj.org](http://www.pcvj.org))
- State Wildlife Grants
- The Wildlife Society ([www.tws-west.org/hawaii/](http://www.tws-west.org/hawaii/))

Also, some of the bird conservation groups listed below could be, at minimum, in-kind supporters in helping to get out a broader message to its members.

- American Bird Conservancy
- American Birding Association
- American Ornithologists' Union
- Association of Field Ornithologists
- Cooper Ornithological Society
- Cornell Laboratory of Ornithology
- Hawai'i Audubon Society
- National Audubon Society
- Northern Prairie Wildlife Research Center
- Pacific Seabird Group
- Partners in Flight - US
- Raptor Education Foundation
- Raptor Research Foundation
- Smithsonian Migratory Bird Center
- The Waterbird Society
- Western Atlantic Shorebird Association
- Western Field Ornithologists
- Wilson Ornithological Society

Even within the current economic climate, funding can be raised to save the Koloa Maoli if the right strategies are in place, messages are delivered, and contacts are made. This plan lays a solid framework for the important work ahead.

## References

- Cowie, R., Researcher, Center for Conservation Research and Training, Univ. of Hawai'i, Honolulu, HI.
- Elbert, S.H. editor, 1959, Selections from Fornander's Hawaiian Antiquities and Folk-Lore, Honolulu: University Press of Hawai'i.
- Engilis, A., Jr., and Pratt, T.K., 1993, Status and Population Trends of Hawaii's Native Waterbirds, 1977-1987: Wilson Bulletin, v. 105, p. 142-158.
- Engilis, A., Jr., Uyehara, K.J., and Giffin, J.G., 2002, Hawaiian Duck (*Anas wyvilliana*), in Poole, A., and Gill, F., eds., The Birds of North America, No. 694: Philadelphia, The Birds of North America, Inc.
- Engilis, A., Jr., Eadie, J.M., and Uyehara, K. J. In prep. Conservation of the Hawaiian Duck (*Anas wyvilliana*): The development of a hybrid identification key using morphology and genetic markers.
- The Fornander Collection of Hawaiian Antiquities and Folk-lore, published by Bernice P. Bishop Museum in 1917-1919, volumes IV and V.
- Fowler, A.C. , J.M. Eadie and A. Engilis, Jr., 2008, Identification of Endangered Hawaiian Ducks (*Anas wyvilliana*), Introduced North American Mallards (*A. platyrhynchos*) and Their Hybrids Using Multilocus Genotypes, Conserv Genet DOI 10.1007/s10592-008-9778-8.
- Hawai'i Conservation Alliance, 2008, The Feral Mallard Threat to Hawaii's Native Duck: Recommendations for Preventing the Extinction of the Endangered Koloa Maoli Position Paper, Honolulu.
- Hawai'i Department of Land and Natural Resources, 2005, State Comprehensive Wildlife Strategy.
- Hawai'i Department of Land and Natural Resources, 2003, State Aquatic Invasive Species Management Plan.
- Levin, P. and 'Onipa'a Nā Hui Kalo, 2006, Statewide Strategic Control Plan for Apple Snail (*Pomacea canaliculata*) in Hawai'i.
- Mālama Hawai'i, 2009, Koloa Maoli lesson plans.
- Munro, G.C., 1960, Birds of Hawaii, Japan: Charles E. Tuttle Co., Inc.
- Nā Mele Aimoku, Nā Mele Kupuna, a me Nā Mele Ponoī o Ka Moi Kalākaua I (Dynastic chants, ancestral chants, and personal chants of King Kalākaua I), 2001, Book 1 of the Hawaiian Language Reprint Series Ke Kupu Hou.
- Pacific Coast Joint Venture Hawai'i, 2006, Strategic Plan for Wetland Conservation in Hawai'i, First Revision.
- Perkins, R.C.L. 1903. Fauna Hawaiiensis: Vetebrata (Aves). New York: Columbia University Press.

## Koloa Maoli Communication and Outreach Plan

Pukui, M.K., and S.H. Elbert, 1986, Hawaiian Dictionary, revised and enlarged edition, Honolulu: University of Hawai'i Press.

Pukui, M.K., S.H. Elbert, E.T. Mookini, 1974, Place Names of Hawaii, Honolulu: University of Hawai'i Press.

Schwartz C.W. and E.R. Schwartz, 1953, Notes on the Hawaiian Duck, The Wilson Bulletin, Volume 65, No. 1.

Sterling, E.O. and C. C. Summers, Sites of Oahu, 1978, Honolulu: Bishop Museum Press.

US Fish & Wildlife Service, 2005, Draft Revised Recovery Plan for Hawaiian Waterbirds, Second Draft of Second Revision.

Uyehara, K.J., A.E. Engilis, Jr., M. Reynolds, 2007, Hawaiian Duck's Future Threatened by Feral Mallards, USGS Fact Sheet 2007-3047.

## APPENDICES



Brenda Zaun, USFWS

## Primary Guiding Document

### Recovery Actions pertinent to Feral Mallards, Draft Revised Recovery Plan for Hawaiian Waterbirds (USFWS 2005: 86-87)

**2. Remove the threat of Mallard-Hawaiian duck hybridization on all islands where Hawaiian ducks occur...** Hybridization between Hawaiian ducks and mallards has resulted in a large population of hybrids and a scarcity of pure Hawaiian ducks on the island of O'ahu. This threat also occurs on Kaua'i, Maui, and Hawai'i, although to a lesser extent. Hybridization of the Hawaiian duck with mallards or other related waterfowl should be prevented.

**2.1 Conduct a public information and awareness program regarding the Mallard-Hawaiian duck interbreeding problem and the need for a feral and hybrid duck removal program.** Eliminating hybridization will be controversial unless the public becomes aware of its importance. The public may be more supportive of programs to remove mallards, other closely related feral ducks, and mallard-Hawaiian duck hybrids from the islands if the program's role in preserving the native species is better understood.

**2.2 Develop methods for differentiating between Hawaiian ducks and mallard-Hawaiian duck hybrids.** Methods for identifying Mallard-Hawaiian duck hybrids need to be developed to insure that the correct birds are removed from the population. The development of such identification criteria will require the simultaneous collection of genetic and morphological data. Genetic information can be used to confirm field identification of birds, thus protecting Hawaiian ducks. An identification guide outlining physical characteristics unique to pure Hawaiian ducks is currently under development to assist in differentiating between Hawaiian ducks and hybrids (A. Engilis, pers. comm. 2003).

**2.3 Implement a statewide program to humanely remove feral mallards and mallard-Hawaiian duck hybrids.** A Hawaiian duck recovery implementation group that includes various resource agencies and researchers was recently established to address this problem. The group is working on developing a comprehensive statewide approach to the Mallard-Hawaiian duck hybridization problem. Efforts to remove mallards and related waterfowl should be accomplished through approved duck trapping techniques and other humane methods.

**2.4 Ensure new stocks of mallards and closely related ducks are not brought into the state.** Strict control over the entry of additional domesticated mallards or closely related ducks into Hawai'i should be enacted. Coordination with the Hawai'i Department of Agriculture will be necessary to maintain or improve importation controls.

<http://www.fws.gov/pacific/ecoservices/endangered/recovery/documents/HawaiianWaterbirdsDraftRecoveryPlan5-05.pdf>

## Threats to Koloa Maoli

The problem is not simple, as the Koloa Maoli, like other native waterbirds, faces a number of threats.

- **Habitat loss:** In the last century, more than 30 percent of coastal plain wetlands have been lost to draining and filling. Waikīkī is just one example. Most of the wetlands that remain are degraded by altered hydrology, invasive plants and animals, and contaminants and provide marginal to poor habitat for Hawaiian waterbirds. In addition, a shift in land uses has reduced the amount of agricultural wetlands available for such species.
  - **Altered hydrology:** Changes to wetland habitats for flood control or to provide municipal water sources can disturb Hawaiian waterbird habitats.
  - **Non-native invasive species:** Several species of invasive plants, including pickleweed, water hyacinth, and mangrove can reduce or completely cover open water, mudflats, or shallows which are important Hawaiian waterbird microhabitats. Introduced fishes (e.g., mosquito fish, tilapia) degrade water quality and deplete waterbird foraging resources.
  - **Environmental contaminants:** Pesticides, fuel and oil spills are harmful contaminants
- **Introduced predators:** Koloa Maoli eggs and ducklings are especially vulnerable to predation by dogs, rats, cats, mongooses, cattle egrets, bullfrogs and fishes (e.g., bass).
- **Avian Diseases:** The most prevalent disease affecting Hawaiian waterbirds is avian botulism (not contagious to people) however the threat of avian influenza is also present.
- **Hybridization: Non-native, invasive feral Mallards are interbreeding with Koloa Maoli.**

Currently, the most serious threat to the Koloa Maoli is hybridization with feral Mallards. According to biologists who have studied this problem, the Koloa Maoli as a species may cease to exist because of hybridization alone. Island ducks are vulnerable to invasion and/or hybridization by feral Mallards, particularly when already endangered by habitat loss and introduced predators. Because of human activities (e.g. releasing and feeding feral Mallards) this Hawaiian species that has taken hundreds of thousands of years to evolve could become extinct in a fraction of that time.

Feral Mallards are not only problematic in Hawai'i, they threaten native duck populations around the world (e.g. New Zealand, Africa, Australia, Madagascar, Southeast U.S.). Feral duck control programs in other regions have made significant strides. In Florida, for example, wildlife officials have enforced strict laws prohibiting possession and sale of Mallards as feral Mallards threaten the native and non-migratory Mottled Duck (*A. fulvigula fulvigula*). They have also instituted a process for members of the public to receive free permits on-line to control Mallards. The overall efficacy of such measures is yet to be measured.

In New Zealand, the story for the native duck, the Parera (*A. superciliosa superciliosa*) is similar to the Koloa Maoli. Some biologists fear that it may be too late to save the species.

### Comparing Koloa Maoli and Mallards

The Mallard is closely related to the Koloa Maoli. The male Mallard has the distinctive green head, white neckband, and yellow-green bill during the breeding season. Its chest is chestnut-colored and body is gray with a black rump. Females are mottled drab brown with orange bills. Both sexes have iridescent purple-blue wing feathers (speculum) edged with white. During the late summer and fall, some male Mallards molt and look like female Mallards.

One of the key problems in addressing the issue of hybridization is that because the Koloa Maoli and the Mallard are closely related, to the lay person, they look alike. Male and female Koloa Maoli look similar to the female Mallard except they are about 20-30% smaller. The big difference in appearance is that the male Koloa Maoli does not have the distinctive green-headed breeding plumage of the male Mallard.



Native Koloa Maoli male (left) and female pair. Photo by Brenda Zaun, USFWS



Feral Mallard male (left) and female pair. Photo by Eric VanderWerf

## Early Hawaiian Stories Referencing Koloa Maoli

Kamanuwai, (lit. water bird) is the old name for a part of Honolulu near lower Nu‘uanu Stream. Some say it is named for a duck who flew away with the foster child of the god Kāne. The child was named Kahānaiakeakua (the foster child of the god) and was raised near Waolani in upper Nu‘uanu Valley.

From Place Names of Hawai‘i by Pukui, Elbert, Mookini, page 81.

Kamanuwai is located near the junction of Nu‘uanu and Beretania Streets. Kāne had a novel idea, to take Kamanuwai to transport his and Kanaloa’s foster child wherever he wanted to go. This name, Kamanuwai, was that of a wild duck and the name is given to a place above Kaumakapili.

From Sites of O‘ahu by Sterling and Summers, page 295, referring to Legend of Keaomelemele by Manu, Moses, Ku‘oko‘a, Sept. 20, 1884, HEN: Legend, p 789.

Kaumakapili (lit. perch [with] eyes closed). The favorite bird, Kamanuwai, of the demigod ‘Ai‘ai, son of Kū‘ula perched here. The bird was fed on bonitos caught with a magic lure; when the bird was hungry it closed its eyes.

From Place Names of Hawai‘i by Pukui, Elbert, Mookini, page 94, referring to Fornander’s Hawaiian Antiquities and Folk-lore, Volume 4, page 557.

In a name chant for Kualī‘i, a ruling chief of O‘ahu and Kaua‘i in the late 1600s-early 1700s, the story is told about places that Kualī‘i visited and impacted. The Koloa Maoli is mentioned among other birds. A short section of the chant is written below:

Ke anunu, ka ekekekeiau-e, Awihi ka iole, heo ka pueo, Owa ka auku‘u, aeae Koloa, O Waikoloa ia Keawewaihe, Pohakulepo pae mai ka manu.

Translation:

When pressed, yea, it shrinks. When the mice glance aside the owl is gone, the auku‘u cries, the duck extends its neck. At Waikoloa in Keawewaihe (at the) mudstone the birds cluster.

From Fornander’s Collection of Hawaiian Antiquities and Folk-lore, vol. 4

In a name chant for King Kalākaua, reference is made to a duck that dives in the waters of Kakaē, an old place name on O‘ahu.

O ka hihio lani na la o Maheha, Ke koloa luuwai na o Kakaē, O Iolani ka manu nana e poo ka wai, Nana e hia ke ahi ke kahu la— Kahu kaena i ka imu kaikoo ana, Uwahi no mai Kaena a Waialua, A-o i pili a ka lae o Kahuku.

From Nā Mele Aimoku

Translation by Sam ‘Ohukani‘ōhi‘a Gon:

The days of Maheha are the royal dream-vision, the duck diving in freshwater of Kakaē, the royal hawk is the bird who finds the water source, who starts the fire of the caretaker – Caretaker proud at the oven made bigger, making the air smoky from Ka‘ena to Waialua, extending to reach the point of Kahuku.

## Rare Pride Campaigns

(from [www.rareconservation.org](http://www.rareconservation.org))

**Rare specializes in social marketing** – a method for changing attitudes and behaviors that has been successfully applied by other organizations to such issues as seatbelt use, smoking, pollution, teen drug abuse, and reproductive health.

Rare is the leader in social marketing for biodiversity conservation — with a successful track record in more than 50 countries to date. Rare trains and supports leaders from the world’s top environmental organizations, local grassroots groups, and governments – all of which are increasingly aware that failure to create support at the community level reduces the chance of conservation success.

### What is Rare’s approach?

Rare has a proven model for changing awareness, attitudes, and behaviors toward conservation at the local level. It’s called a “Pride” campaign, and it inspires people to take pride in the natural assets that make their communities valuable and take action to protect them. Pride campaigns are intensive two year-long marketing efforts that borrow private sector tactics and apply them to promoting more *environmentally sustainable practices*.

Many of the world’s largest conservation groups have requested Rare’s services to help build stronger local community support for their work. This includes The Nature Conservancy, World Wildlife Fund, Birdlife International, Audubon, the United Nations Environment Programme, the national governments of China, Mexico, Peru, and Indonesia, and many others.

Pride campaign managers are local conservationists from around the world who make a 2-year commitment to inspiring environmental protection at every level in their communities. Campaign managers are trained by Rare during a university diploma program in ecology, biodiversity, community-based conservation, and social marketing. Rare offers training in English at Georgetown University, in Spanish at the University of Guadalajara, in Bahasa Indonesia at the Bogor Agricultural Institute in Bogor, Indonesia, and in Mandarin Chinese at Southwest Forestry University in Kunming, China. After completing the training, campaign managers head back to their communities to begin implementation.

Pride campaigns utilize a charismatic flagship species, like the Saint Lucia parrot or the Philippine cockatoo, which becomes a symbol of local pride and acts as a messenger to build support for habitat and wildlife protection. Marketing tools – such as billboards, posters, songs, music videos, sermons, comic books, and puppet shows – make conservation messages positive, compelling, relevant, and fun for the community. Campaigns appeal to people on an emotional level, generating an increased sense of pride and public stewardship that goes beyond mere awareness-raising. Pride campaigns involve and engage every segment of the community: teachers, business and religious leaders, elected officials, and the average citizen.

### **Potential Tag Lines for Koloa Maoli Campaign**

The following campaign tag lines (short, memorable slogans or phrases) were developed in a brainstorming process in outreach planning meetings. When campaign planning is underway, a much thorough process will be required to choose a tag line, however these ideas may provide a good starting point.

- Koloa can't wait
- Koloa or Mallards? We can't have both
- Not on my watch
- Don't dump domestic ducks
- Save the Koloa – Save our duck
- Wild birds need wild food -- don't feed ducks
- A feral Mallard-free Kaua'i

## Glossary

**Domestic** – Tamed or domesticated animals

**Domesticated** – Animals tamed and bred for human uses, over many generations

**Dominant** – A species that predominates a community because of its size, abundance, or behavior to the extent that it negatively affects other species

**Endemic** – Unique to an area; occurring naturally nowhere else on Earth

**Feral** – Animals that have escaped or been released from domestication and reverted to a wild state over several generations

**Hybrid** – The offspring of two closely-related species.

**Kupuna** – Grandparent, ancestor, relative or close friend of grandparent's generation (plural is kūpuna)

**Makai** – Towards the ocean

**Mallard-Koloa hybrid** – The offspring of a feral Mallard and Koloa Maoli

**Mauka** – Towards the mountain

**Migratory** – Birds with regular seasonal movements between breeding and non-breeding areas

**Native** – Species that first arrived in an area without the assistance of humans

**Rare Pride Campaign** – Social marketing campaign focused on biodiversity conservation

**Slow Food** – a movement to counteract fast food and fast life, the disappearance of local food traditions, and the disconnect between the food people eat, where it comes from and how our choices affect the rest of the world

**Social Marketing** – the application of commercial marketing concepts and tools to achieve socially desirable goals.

**True Koloa Maoli** – Ducks with a 90-100% probability that they are Koloa Maoli, based on morphometric and genetic research

**Waterbird** – General term for birds that spend a substantial amount of time around water such as waterfowl, shorebirds, and rails

**Waterfowl** – Collective term for birds of the family Anatidae, consisting of ducks, geese, and swans

**Wild** – Animals living in a natural or undomesticated state