

NEIL ABERCROMBIE



FILE COPY

APR 23 2013

WILLIAM J. AILA, JR. CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT ESTHER KIA'AINA FIRST DEPUTY WILLIAM M. TAM DEPUTY DIRECTOR - WATER AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONVEYANCES COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS CONSERVATION AND RESOURCES ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAHOOLOAWE ISLAND RESERVE COMMISSION LAND STATE PARKS

STATE OF HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES Office of Conservation and Coastal Lands POST OFFICE BOX 621 HONOLULU, HAWAII 96809

APR 10 2013

Gary Gill, Acting Director Office of Environmental Quality Control Department of Health, State of Hawai'i 235 S. Beretania Street, Room 702 Honolulu, Hawai'i 96813

Dear Mr. Gill,

SUBJECT: Draft Programmatic Environmental Assessment and Anticipated Finding of No Significant Impact for a Statewide Programmatic General Permit and Programmatic Agreement that facilitates the restoration, repair, maintenance and reconstruction of traditional Hawaiian fishpond systems across Hawai'i

RECEIVED APR 10 2013 13 APR 10 2013 OEQC OF ENVIRONMENTAL QUALITY CONTROL

With this letter the Office of Conservation and Coastal Lands hereby transmits the draft Programmatic Environmental Assessment and anticipated Finding of No Significant Impact for the above Statewide project for publication in the April 23, 2013 issue of the Environmental Notice.

Enclosed is a completed OEQC Publication Form, two copies of the draft document, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word.

Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Dr. Trisha Kēhaulani Watson at (808) 392-1617 or admin@honuaconsulting.com.

Sincerely, Samuel J. Lemmo, Administrator Office of Conservation and Coastal Lands

**AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (FEBRUARY 2013 REVISION)**

Project Name

Draft Programmatic Environmental Assessment (DPEA-AFONSI) for a Statewide Programmatic General Permit and Programmatic Agreement that facilitates the restoration, repair, maintenance and reconstruction of traditional Hawaiian fishpond systems across Hawai`i

Island: Statewide

Proposing/Determination Agency:

Office of Conservation and Coastal Lands;
Department of Land and Natural Resources;
1151 Punchbowl Street, Room 131, Honolulu, HI 96813
Sam J. Lemmo, Administrator (808) 587-0377

Consultant:

Trisha Kēhaulani Watson, JD, PhD
Honua Consulting
4348 Wai`alae Ave #254, Honolulu, HI 96816
(808) 392-1617

Status (check one only):

DEA-AFNSI

Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of DEA, a completed OEQC publication form, along with an electronic word processing summary and a PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day comment period ensues upon publication in the periodic bulletin.

FEA-FONSI

Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and a PDF copy (send both summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

FEA-EISPN

Submit the proposing agency notice of determination/transmittal on agency letterhead, a hard copy of the FEA, an OEQC publication form, along with an electronic word processing summary and PDF copy (you may send both summary and PDF to oeqchawaii@doh.hawaii.gov); a 30-day consultation period ensues upon publication in the periodic bulletin.

Act 172-12 EISPN

Submit the proposing agency notice of determination on agency letterhead, an OEQC publication form, and an electronic word processing summary (you may send the summary to oeqchawaii@doh.hawaii.gov). NO environmental assessment is

required and a 30-day consultation period upon publication in the periodic bulletin.

__DEIS

The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the DEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the DEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); a 45-day comment period ensues upon publication in the periodic bulletin.

__FEIS

The proposing agency simultaneously transmits to both the OEQC and the accepting authority, a hard copy of the FEIS, a completed OEQC publication form, a distribution list, along with an electronic word processing summary and PDF copy of the FEIS (you may send both the summary and PDF to oeqchawaii@doh.hawaii.gov); no comment period ensues upon publication in the periodic bulletin.

__ Section 11-200-23
Determination

The accepting authority simultaneously transmits its determination of acceptance or nonacceptance (pursuant to Section 11-200-23, HAR) of the FEIS to both OEQC and the proposing agency. No comment period ensues upon publication in the periodic bulletin.

__Section 11-200-27
Determination

The accepting authority simultaneously transmits its notice to both the proposing agency and the OEQC that it has reviewed (pursuant to Section 11-200-27, HAR) the previously accepted FEIS and determines that a supplemental EIS is not required. No EA is required and no comment period ensues upon publication in the periodic bulletin.

__Withdrawal (explain)

Summary

The objective of the Proposed Action is the restoration, repair, maintenance and reconstruction of loko i`a (traditional Hawaiian fishpond systems) across the pae`āina of Hawai`i (Hawaiian archipelago). The Department of Land and Natural Resources (DLNR) is currently pursuing a State Programmatic General Permit (SPGP) from the federal government that will allow the State to streamline the permitting process by utilizing a single application process for the above activities. This action will stimulate traditional Hawaiian cultural activities, the restoration of fishpond systems and their related ecosystem services. Fishpond systems were a vital component of Hawai`i's pre-contact native Hawaiian communities; their degradation was caused by the urbanization and colonization brought and fostered by foreign contact. Fishponds are identified as valuable cultural and ecological resources that positively impact coastal ecosystems and their adjacent communities. The potential impacts on the environment of the Proposed Action, and a range of reasonable alternatives, are discussed and analyzed in this dPEA. The direct and indirect impacts of nutrient enrichment, turbidity, and invasive species resulting from the proposed action and alternatives are negligible. The long-term cumulative impacts will be the simulation of traditional Hawaiian cultural activities, the restoration of fishpond systems and their related ecosystem services.

Draft Environmental Assessment

Statewide Programmatic General Permit and Programmatic Agreement
for the restoration, repair, maintenance and reconstruction of traditional
Hawaiian fishpond systems across Hawai`i

April 2013



Prepared for:

Department of Land and Natural Resources
1151 Punchbowl St.
Honolulu, HI 96809



Prepared by:

Honua Consulting
4348 Wai`alae Avenue #254
Honolulu, Hawai`i 96816



With the support of:

Conservation International
Hawai`i Fish Trust
7192 Kalaniana`ole Hwy Ste G-230
Honolulu, HI 96825

NEIL ABERCROMBIE



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
Office of Conservation and Coastal Lands
POST OFFICE BOX 621
HONOLULU, HAWAII 96809

WILLIAM J. AILA, JR.
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

ESTHER KIA'AINA
FIRST DEPUTY

WILLIAM M. TAM
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

Gary Gill, Acting Director
Office of Environmental Quality Control
Department of Health, State of Hawai'i
235 S. Beretania Street, Room 702
Honolulu, Hawai'i 96813

Dear Mr. Gill,

SUBJECT: Draft Programmatic Environmental Assessment and Anticipated Finding of No Significant Impact for a Statewide Programmatic General Permit and Programmatic Agreement that facilitates the restoration, repair, maintenance and reconstruction of traditional Hawaiian fishpond systems across Hawai'i

With this letter the Office of Conservation and Coastal Lands hereby transmits the draft Programmatic Environmental Assessment and anticipated Finding of No Significant Impact for the above Statewide project for publication in the April 23, 2013 issue of the *Environmental Notice*.

Enclosed is a completed OEQC Publication Form, two copies of the draft document, an Adobe Acrobat PDF file of the same, and an electronic copy of the publication form in MS Word.

Simultaneous with this letter, we have submitted the summary of the action in a text file by electronic mail to your office.

If there are any questions, please contact Dr. Trisha Kēhaulani Watson at (808) 392-1617 or admin@honuaconsulting.com.

Sincerely,

A handwritten signature in black ink, appearing to read "Samuel J. Lemmo".

Samuel J. Lemmo, Administrator
Office of Conservation and Coastal Lands

AGENCY ACTIONS
SECTION 343-5(B), HRS
PUBLICATION FORM (JULY 2012 REVISION)

Project Name (Include type of document; EA-FONSI, DEIS, FEIS)

Draft Programmatic Environmental Assessment (DPEA-AFONSI) for a Statewide Programmatic General Permit and Programmatic Agreement that facilitates the restoration, repair, maintenance and reconstruction of traditional Hawaiian fishpond systems across Hawai`i

Island: Statewide

Proposing/Determination Agency:

Office of Conservation and Coastal Lands;
Department of Land and Natural Resources;
1151 Punchbowl Street, Room 131, Honolulu, HI 96813
Sam J. Lemmo, Administrator (808) 587-0377

Consultant: Trisha Kēhaulani Watson, JD, PhD

Honua Consulting
4348 Wai`alae Ave #254, Honolulu, HI 96816
(808) 392-1617

Summary

The objective of the Proposed Action is the restoration, repair, maintenance and reconstruction of loko i`a (traditional Hawaiian fishpond systems) across the pae`āina of Hawai`i (Hawaiian archipelago). The Department of Land and Natural Resources (DLNR) is currently pursuing a State Programmatic General Permit (SPGP) from the federal government that will allow the State to streamline the permitting process by utilizing a single application process for the above activities. This action will stimulate traditional Hawaiian cultural activities, the restoration of fishpond systems and their related ecosystem services. Fishpond systems were a vital component of Hawai`i's pre-contact native Hawaiian communities; their degradation was caused by the urbanization and colonization brought and fostered by foreign contact. Fishponds are identified as valuable cultural and ecological resources that positively impact coastal ecosystems and their adjacent communities. The potential impacts on the environment of the Proposed Action, and a range of reasonable alternatives, are discussed and analyzed in this dPEA. The direct and indirect impacts of nutrient enrichment, turbidity, and invasive species resulting from the proposed action and alternatives are negligible. The long-term cumulative impacts will be the simulation of traditional Hawaiian cultural activities, the restoration of fishpond systems and their related ecosystem services.

OEQC Publication Form (Revised February 2012)

DRAFT PROGRAMMATIC ENVIRONMENTAL ASSESSMENT

MARCH 2013

Lead Agency:

Office of Coastal and Conservation Lands, Department of Land and Natural Resources

Responsible Agency:

Office of Coastal and Conservation Lands, Department of Lands and Natural Resources

Prepared by: Honua Consulting

Point of Contact: Trisha Kēhaulani Watson, J.D., Ph.D.
Senior Consultant, Honua Consulting
4348 Wai`alae Avenue #254
Honolulu, Hawai`i 96816
admin@honuaconsulting.com
(808) 392-1617

Summary

Hawaiian fishpond systems, loko i`a, are some of Hawai`i's most significant traditional cultural resources. They are biocultural articulations of Hawaiian innovation in the areas of engineering, education, hydrology, aquaculture and biology. Further, they demonstrate traditional Hawai`i's excellence in sustainability, food sovereignty and natural resource management.

The objective of the Proposed Action is the restoration, repair, maintenance and reconstruction of loko i`a (traditional Hawaiian fishpond systems) across the pae`āina of Hawai`i (Hawaiian archipelago). This action will stimulate traditional Hawaiian cultural activities, the restoration of fishpond systems and their related ecosystem services.

Fishpond systems were a vital component of Hawai`i's pre-contact native Hawaiian communities; their degradation was exacerbated by a range of factors, including urbanization, modernization, and other activities that led to their lack of use and disrepair. Fishponds have been identified as valuable cultural and ecological resources that positively impact coastal ecosystems and their adjacent communities.

The potential impacts on the environment of the Proposed Action, and a range of reasonable alternatives, are discussed and analyzed in this dPEA. The direct and indirect impacts of nutrient enrichment, turbidity, and invasive species resulting from the proposed action and alternatives are negligible. The long-term cumulative impacts will be the stimulation of traditional Hawaiian cultural activities, the restoration of fishpond systems and their related ecosystem services.

Note on the use of Hawaiian language

Hawaiian is both the native language of Hawai`i and, per the Hawai`i State Constitution, an official language of the State of Hawai`i. As such, Hawaiian language is used liberally throughout the document, and as a native language, not italicized.

Diacritical markings are used by the authors of this document, but where Hawaiian language appears in cited sources, the use or non-use of diacritical markings is used in a manner true and consistent to the original text.

Table of Contents

1.0 Purpose of and Need for Action	9
1.1 Status of Traditional Hawaiian Fishpond Systems in Hawai`i	11
1.2 Background on the Statewide Programmatic General Permit and Programmatic Agreement that facilitates the restoration, repair, maintenance and reconstruction of traditional Hawaiian fishpond systems across Hawai`i	13
1.2.1 Regulatory impediments to restoration, repair, maintenance and reconstruction	14
1.2.2 Scope and Authority of Environmental Assessment	14
1.3 Geographic Scope of Analysis	15
1.3.1 Relevant Resource Issues within the Geographic Scope of Analysis	16
Figure 4. Selected Loko I`a of Hawai`i County	17
Figure 5. Selected Loko I`a of Maui County	18
Figure 6. Selected Loko I`a of O`ahu	19
Figure 7. Selected Loko I`a of Kauai County	20
2.0 Proposed Action and Alternatives	21
2.1 Alternative A: Status Quo (No Action)	21
2.2 Alternative B: Limited Site Program	22
2.3 Alternative C: Statewide Programmatic General Permit (Proposed Action and Preferred Alternative)	22
2.3.1 Systems Eligible for Application Under the Program	23
2.3.2 Activities Eligible for Application Under the Program	23
2.3.3 Activities Categorically Excluded from the Program	24
2.3.4 Explanation of Program	24
3.0 Description of the Environmental Setting Without the Project	27
3.1 Physical Setting	27
3.2 Water Quality	28
3.3 Biological Setting	29
3.3.1 Introduced and Invasive Species	29
3.3.2 Endangered Species	30

3.3.3	Wetland Birds	30
3.3.4	Fish Species	32
3.3.5	Essential Fish Habitat	33
3.3.6	Coral Species	33
3.3.7	Habitats and Other Physical Environment Elements	34
3.4	Socioeconomic Setting	37
3.5	Cultural Setting	37
3.6	Natural Hazards	39
4.0	Potential Environmental and Cultural Impacts of the Proposed Program	40
4.1	Physical Effects	40
4.2	Water Effects	41
4.2.1	Best Management Practices Relating to Water Quality	42
4.3	Biological Effects	44
4.3.1	Best Management Practices Relating to Biological Resources	45
4.4	Socioeconomic Effects	48
4.5	Cultural Effects	48
4.5.1	Best Management Practices Relating to Cultural Resources	48
4.6	Effects on Natural Hazards	49
4.7	Effects on Other Environmental Elements	49
5.0	Environmental Regulations and Permits	50
5.1	Environmental Regulations	50
5.1.1	Clean Water Act	50
5.1.2	Endangered Species Act	51
5.1.3	Rivers and Harbors Act	51
5.1.4	Migratory Bird Treaty Act	52
5.1.5	Fish and Wildlife Coordination Act	52
5.1.6	Federal Coastal Zone Management Act	52
5.1.7	National Historical Preservation Act	53
5.1.8	Magnuson-Stevens Fishery Conservation and Management Act	54
5.1.9	Marine Mammal Protection Act	54

5.1.10 National Marine Sanctuaries Act	54
5.2 Permits	54
5.2.1 U.S. Army Corps of Engineers Regional General Permit	55
5.2.2 Conservation District Use Permit	58
5.2.3 Coastal Zone Management Consistency Statement	58
5.2.4 National Environmental Policy Act Compliance	59
6.0 Conclusion	60
7.0 List of Agencies Consulted	61
7.1 Federal Agencies	61
7.1.1 National Marine Fisheries Services, Pacific Islands Regional Office, Aquaculture Program	61
7.1.2 National Ocean Service, Hawaiian Islands Humpback Whale National Marine Sanctuaries	61
7.1.3 U.S. Army Corps of Engineers, Honolulu District Office	61
7.1.4 U.S. Fish and Wildlife Service	61
7.2 State Agencies	61
7.2.1 Department of Health, Clean Water Branch	61
7.2.2 Office of Planning, Coastal Zone Management	61
7.2.3 Office of Hawaiian Affairs	61
7.3 Community Organizations	61
7.3.1 Hui Loko I'a Kuapā	61
8.0 List of Preparers	62
9.0 References	63

Appendix A: Documented Hawaiian Fishponds Across the Archipelago

Appendix B: Declaration of Hui Mālama Loko I'a

Appendix C: OHA Support of Hui Mālama Loko I'a Declaration

Appendix D: Coastal Zone Management Federal Consistency General Concurrence

1.0 Purpose of and Need for Action

Hawai‘i Revised Statutes Section 183B-1 defines “Hawaiian fishponds” as:

The unique, traditional system and methodology of aquaculture practiced by the aboriginal people of Hawaii, and found nowhere else in the world. Generally referred to as "loko i`a", the system mastered by ancient Hawaiians includes but is not limited to loko kuapa, loko umeiki, and loko pu`uone. Loko i`a are natural or artificial enclosures; loko kuapa are enclosures built upon a reef, loko umeiki are a type of permanent fish-trap structure, and loko pu`uone are enclosed by sand. The term does not include any fishpond designed in a manner or constructed for purposes other than those associated with traditional loko i`a management and culture.

Hawaiian fishpond systems, loko i`a, are some of Hawai`i’s most significant traditional cultural resources. They are biocultural articulations of Hawaiian innovation in the areas of engineering, education, hydrology, aquaculture and biology. Further, they demonstrate traditional Hawai`i’s excellence in sustainability, food sovereignty and natural resource management.

The history of loko i`a is rich and extensive. According to oral histories, Hinapukui`a, whose name translates to “Hina gathering seafood,” is the goddess of fisherman. She is the wahine (wife or mate) of Kū`ulakai, sister of Hinapuku`ai, Hina gathering vegetative foods, and mother to `Ai`ai. Hinapukui`a’s kane (husband or mate), Kū`ulakai, is the god and kupuna of fisherman and is said to have built the first fishpond at Leho`ula. Of Kū`ulakai it has been written:

While Kū`ula and his wife were living Leho`ula, he devote all his time to be chosen vocation of fishing. His first work was to construct a fishpond handy to his house, but near the shore where the surf breaks, and he stocked his pond with all kinds of fish. Upon a rocky platform, he also built a house, which he called by his own name, Kū`ula, to be sacred for the fishing kapu. Here he offered the first fish caught to the fish god, and because of his observations, fish were obedient (laka loa) to him; all he had to do was to say the word, and fish would appear. This was reported all over Hāna (Manu 2006).

Kū`ula, as he was also known, was said to be kino lua, dual bodied. He was said to be empowered with mana kupua, supernatural powers. He could control all the fish in the sea.

Kū`ulakai and Hinapukui`a lived in Alea-mai on East Maui. They made their residence near Kaiwiopole, the cinder hill names for “the bones of Pele”, named for the place where Pele left some of her iwi after a battle with her sister, Nā-maka-o-Kaha`i. It was near Kaiwiopole that Kū`ulakai built the first traditional Hawaiian fishpond in Hāna. Kū`ulakai would share his knowledge of fishing and fishing practices with maka`āinānā across Hawai`i through his son, `Ai`ai, identified also as a god of fisherman. Written sources and oral traditions tell of `Ai`ai’s extensive travels throughout Hawai`i during which he established fishing alters, called kū`ula after his father, and fishing areas, known as ko`a.

Loko i`a were an important part of Hawai`i’s complex and sustainable natural resource management system.

The full-scale development of loko i`a (fishponds) from mauka (the mountains) to makai (the ocean) dates back over half a millennium. Cultivation and propagation centered on many

different fresh and salt-water plants and animals, with the primary species being the prized ‘ama‘ama (mullet) and ‘awa (milkfish). An inventory in the early 1900s found 360 loko i‘a in the islands and identified 99 active ponds with an estimated annual production total of about 680,000 pounds, including 486,000 pounds of ‘ama‘ama and 194,000 pounds of ‘awa. Loko i‘a were extensive operating systems that produced an average of 400–600 pounds per acre per year, a significant amount considering the minimal amount of fishpond “input” and maintenance effort apparent by that time (Keala 2007).

Increasing immigration and western influences during the 19th and 20th centuries, coupled with industrialization and urbanization would have a devastating impact on the traditional Hawaiian resource management systems in Hawai‘i. Most of Hawaiian fishponds fell into disrepair.

There is a renewed interest in the repair and operation of traditional Hawaiian fishponds, for their cultural, economic and ecological value. However, community organizations and traditional fishpond practitioners have struggled for decades to maintain and restore fishpond systems due to the abundance of government regulations that control uses within the shoreline area making it difficult to obtain all of the necessary approvals to revitalize these important resources. The difficulty of Hawaiian fishpond revitalization is compounded by the unique, fragile, and sometimes rugged environments in which they exist. Due to their geographic locations, unique ecosystems, engineering and complex biological functioning, Hawaiian fishponds are subject to a myriad of regulations and oversight by a host of different agencies (Hlawati 2002). The end result is that obtaining the necessary permits and approvals to restore, repair, maintain and reconstruction fishponds is both costly and time-consuming. Many restoration efforts have been stymied by this permitting process.

In an effort to address this obstacle to the cultural practices that can take place within traditional fishpond systems, Hawai‘i State Senate Resolution 86 (2012) called urged the Department of Land and Natural Resources, the Office of Planning and the Department of Health to streamline the permitting process for the restoration of Hawaiian fishponds. This strengthened decades of on-going efforts to address permitting and regulatory complexities that hampered fishpond restoration, as outlined in Section 1.2.

The objective of the proposed action is to create a Statewide Program under the Department of Land and Natural Resources, Office of Coastal and Conservation Lands, which helps to facilitate the permitting process for actions that contribute to the restoration, repair, maintenance, operation and reconstruction of loko i‘a (traditional Hawaiian fishpond systems) across the pae`āina of Hawai‘i (Hawaiian archipelago).

It will accomplish this objective through the development of a statewide programmatic general permit (SPGP) application for use by organizations and practitioners that streamlines the permitting processes of numerous government agencies by utilizing a single application process administered through the Office of Conservation and Coastal Lands (Department of Land and Natural Resources). One of the purposes of this DEA is to support state and federal regulatory processes to authorize the SPGP. It is envisioned that the process will include the SPGP and a Programmatic Agreement between state and federal agencies that authorize the use of a single authorization process for loko i‘a restoration, repair, maintenance and reconstruction activities.

This programmatic action will stimulate traditional Hawaiian cultural activities, the restoration of fishpond systems and their related ecosystem services. Fishpond systems were a vital component of Hawai'i's pre-contact native Hawaiian communities; their degradation not only had an adverse impact on the ponds themselves, but also on their stewards who relied on this sustainable resource for subsistence. Fishponds are identified as valuable cultural and ecological resources (also collectively known and referred to herein as biocultural resources) that positively impact coastal ecosystems and their adjacent communities. Their restoration would significantly and positively impact coastal ecosystems and communities across Hawai'i.

Loko i'a were known to be in operation on at least six islands in the main Hawaiian islands: Hawai'i Island, Maui, O'ahu, Moloka'i, Lāna'i and Kaua'i. Efforts to maintain and restore these systems continue today on all six of these islands. Visible structural remains of the pond walls are also visible on all six of these islands (Wyban 1992).

Restoring functional integrity to ponds, through restoration of historic wall structures and removal of invasive vegetation encroaching on the pond ecosystem, could have significant cumulative benefits to Hawai'i's environment and coastal resources. The program could help restore valuable ecosystem services and human capital to coastal areas, which have been degraded due to overpopulation and urbanization.

1.1 Status of Traditional Hawaiian Fishpond Systems in Hawai'i

Traditionally, fishponds were economically, culturally and environmentally critical to the sustainability of Hawai'i's unique and fragile ecosystems. (Madden 1977). The traditional ahupua'a system, created by the Ali'i Mā'ilikūkahi, mindfully delineated a system that extended from the top of the watershed (where the water source is located) out to the reef or near shore waters. The near shore fisheries were essential to providing fish and food to the surrounding communities.

Historically, fishponds provided important ecosystem services to their moku (traditional Hawaiian districts). As studies have shown, urbanization and development negatively altered the once healthy shoreline of Waikīkī, which in part resulted in the complete destruction of the fishpond systems that once existed in the area and serviced its community and near shore fishery (Miller and Fletcher 2003). These images show the dramatic change in the Waikīkī shoreline from 1909 to 2000. It is an example of how coastal degradation and its related water impairment were the result of urbanization and industrialization, activities not associated with fishpond system activities.

While this program would not allow for the restoration of systems that have been destroyed, it would allow for the restoration of potentially functional ponds that have fallen into disrepair and/or the protection of ponds that remain functional.

In addition to the biological functions they provide, the monitoring and maintenance fostered by pond activities provides opportunity for much needed public participation in the management of Hawai'i's natural resources. Active fishponds not only promote economics and food production, but it offers opportunities for communities to actively help keep their coastal resources healthy and productive.

1.2 Background on the Statewide Programmatic General Permit and Programmatic Agreement that facilitates the restoration, repair, maintenance and reconstruction of traditional Hawaiian fishpond systems across Hawai'i

The teachings of Kū`ulakai continue to flourish on Moloka`i, where fishpond practitioners played a major role in the revitalization and rebuilding of several Moloka`i fishponds in the 1990s. Recognizing the importance of traditional Hawaiian fishponds as cultural and ecological treasures left by our kūpuna to use today, practitioners from Moloka`i approached Paepae o He`eia, a 501(c)(3) based at He`eia Fishpond dedicated to perpetuating traditional fishpond activities and practices, with the idea of starting a statewide hui of fishpond practitioners. Its purpose would be to create a network of fishpond practitioners that would facilitate the communication and sharing of resources among fishponds statewide.

Paepae o He`eia partnered with the Hawaiian Learning Center to put on the first statewide fishpond conference in August 2004. Other statewide meetings would follow. This past November, on the shores of Halulu Fishpond in Waipā, the fifth statewide meeting was held, hosted by the Waipā Foundation.

The meeting brought together over 100 practitioners, supporters and community leaders. The goal of the meeting was to enhance collective efforts to improve the ability of fishpond practitioners to do their jobs at their respective ponds. The conference was an opportunity to visit the diverse fishpond systems across Kaua`i, in addition to giving this group opportunities to learn about and conduct service projects at some of Kaua`i's wahi pana, famed or storied places. Huaka`i, day trips, included visits to Hō`ai, Lawa`i Kai, Alekoko, the loko i`a at Kauikeolani Estates and Hā`ena State Park.

Experts were invited to help generate discussion on a variety of topics, including capacity building and sustainability planning, aquaculture and permitting. Permitting issues have proven to be a challenge for fishponds for decades; concern over this ongoing issue was extensively discussed at the conference.

Led by practitioners from Kaloko pond (Hawai`i Island), the hui drafted and passed a declaration to express support for the development of an interagency programmatic agreement and related documents for the purpose of obtaining a state programmatic general permit and streamlining the permitting process (Appendix A). The declaration emphasizes the many values of traditional Hawaiian fishpond systems. The document points to the historic and cultural values of

fishponds, but also emphasizes that fishponds provide important ecosystem services and play a role in mitigating local impacts of climate change. Support for the effort was subsequently obtained from the Office of Hawaiian Affairs (Appendix B).

An effort to streamline the permitting process is underway at the State. Led by the Department of Land and Natural Resources Office of Coastal and Conservation Lands, Hawaiian Islands Humpback Whale National Marine Sanctuary, National Marine Fisheries Service and Conservation International, the goal is to work with other agencies such as the US Army Corps of Engineers and Department of Health to develop a state programmatic general permit that allows a range of activities to occur at traditional Hawaiian fishpond systems under a simplified permitting process. The goal is to have the SPGP in place by fall 2013.

1.2.1 Regulatory impediments to restoration, repair, maintenance and reconstruction

From 1999 - 2003, with the support of the late Senator Daniel K. Inouye, the Pacific American Foundation completed a project on fishpond restoration on Molokaʻi, funded by the Environmental Protection Agency. Their final report stated:

It has been noted that to restore a fishpond there are potentially 17 permits and processing could easily cost \$50-\$80,000 and take several years to complete. The complexity lies in the fact that there are multiple regulatory agencies with often times overlapping regulatory purpose but no established guiding process nor lead agency to help navigate one through the labyrinth of permits. What a community is up against is a process that by default favors those with the resources necessary to hire experts to navigate through this regulatory process—leaving those who wish to restore fishponds for traditional purposes at a disadvantage (Pacific American Foundation).

Organizations have advocated for years to improve this situation and process.

1.2.2 Scope and Authority of Environmental Assessment

This draft Programmatic Environmental Assessment (PEA) has been prepared pursuant to Hawaiʻi Revised Statutes (HRS), Chapter 343 and Hawaiʻi Administrative Rules (HAR) § 11-200. This Environmental Assessment is meant to provide the public, government agencies and stakeholders, with an opportunity to review and consider potential impacts of proposed programmatic actions and their alternatives on natural and cultural resources. This document serves as an environmental disclosure document, including identification of the purpose of and need for the proposed action (Section 1.1), proposed actions and alternatives (Section 2.0), existing environmental conditions (Section 3.0), potential environmental impacts (Section 4.0), including mitigation measures to avoid or minimize such impacts. The information provided in this document shall provide the basis for determining whether or not a Finding of No Significant Impact (FONSI) is appropriate.

It should be noted that HRS §183B-2 exempts Hawaiian fishponds from Chapter 343 provided that it complies with the conditions of §183B-2, which are:

- (1) The fishpond is not adjacent to a sandy beach;
- (2) The fishpond stocks only native aquatic organisms;
- (3) The fishpond does not operate as an intensive culture system in which cultured organisms require frequent or periodic artificial feeding, artificial aeration of water, or artificial pumping of water through the fishponds for their growth and survival;
- (4) Bulk chemical are not added to the water for the control of pathogens or parasites;
- (5) Coastal access is allowed to any person mauka of the fishpond and makai of walls;
- (6) The fishpond and its operations do not harm any threatened or endangered species; and
- (7) The fishpond is not used for water recreational purposes except those recreational activities customarily and traditionally practiced in Hawaiian fishponds prior to 1778.

The proposed action under this project meets all the conditions set forth under HRS §183B-2 except Section (1), as some of the fishponds covered under this dPEA and the SPGP may be adjacent to a sandy beach. Therefore, this dPEA is being prepared.

1.3 Geographic Scope of Analysis

The proposed project areas include the coastal land areas, shoreline areas and nearshore ocean waters within the State of Hawai`i where existing Hawaiian fishponds are located. The specific geographic area of each individual fishpond system is defined by the type of fishpond. This geographic area was selected purposefully to be consistent with the State of Hawai`i Coastal Zone Management Act (CZMA) Federal Consistency General Concurrence for Minor Federal Permit Activities for Hawaiian Fishpond Restoration, Repair, Maintenance and Reconstruction dated November 15, 2012 (Appendix C).

Fishponds are categorized into six main types according to the “Hawaiian Fishpond Study” (DHM Planners, Inc. and Public Archaeology Section, Applied Research Group, Bernice Pauahi Bishop Museum, June 1989; based on information by William K. Kikuchi, 1973, Hawaiian Aquacultural System). Each fishpond type is specific to a particular geographic area.

Type I – Loko I`a Kuapā: A fishpond of littoral water whose side or sides facing the sea consist of a stone or coral wall usually containing one or more sluice gates.

Type II – Loko I`a Pu`uone: An isolated shore fishpond usually formed by the development of barrier beaches building a single, elongated sand ridge parallel to the coast and containing one or more ditches and sluice gates.

Type III – Loko I`a Wai: An inland freshwater fishpond which is usually either a natural lake or swamp, which can contain ditches connected to a river, stream, or the sea, and which contain sluice gates.

Type IV - Loko I`a Kalo: An inland fishpond utilizing irrigated taro plots.

Type V – Loko I'a `Ume`iki: A fishtrap which is similar to a Type I – loko i`a kuapā and has various combinations of inward and outward leading lanes.

Type VI – Kaheka and Hapunapuna: A natural pool or holding pond.

Maps of ponds identified by the State of Hawai`i Office of Planning are provided on the following pages.

1.3.1 Relevant Resource Issues within the Geographic Scope of Analysis

The proposed action does not include constructing any new permanent infrastructure in submerged lands, significant discharges of fill material, significant dredging, or using any hazardous materials that could be released into the environment, therefore it has been determined that the potential impacts to noise, vegetation, aesthetics, traffic, utilities, population and demographics, public access to the coastline, and air quality, are negligible. Therefore, impacts to these resources have been considered, but will not be discussed in detail.

Figure 4. Selected Loko Iʻa of Hawaiʻi County

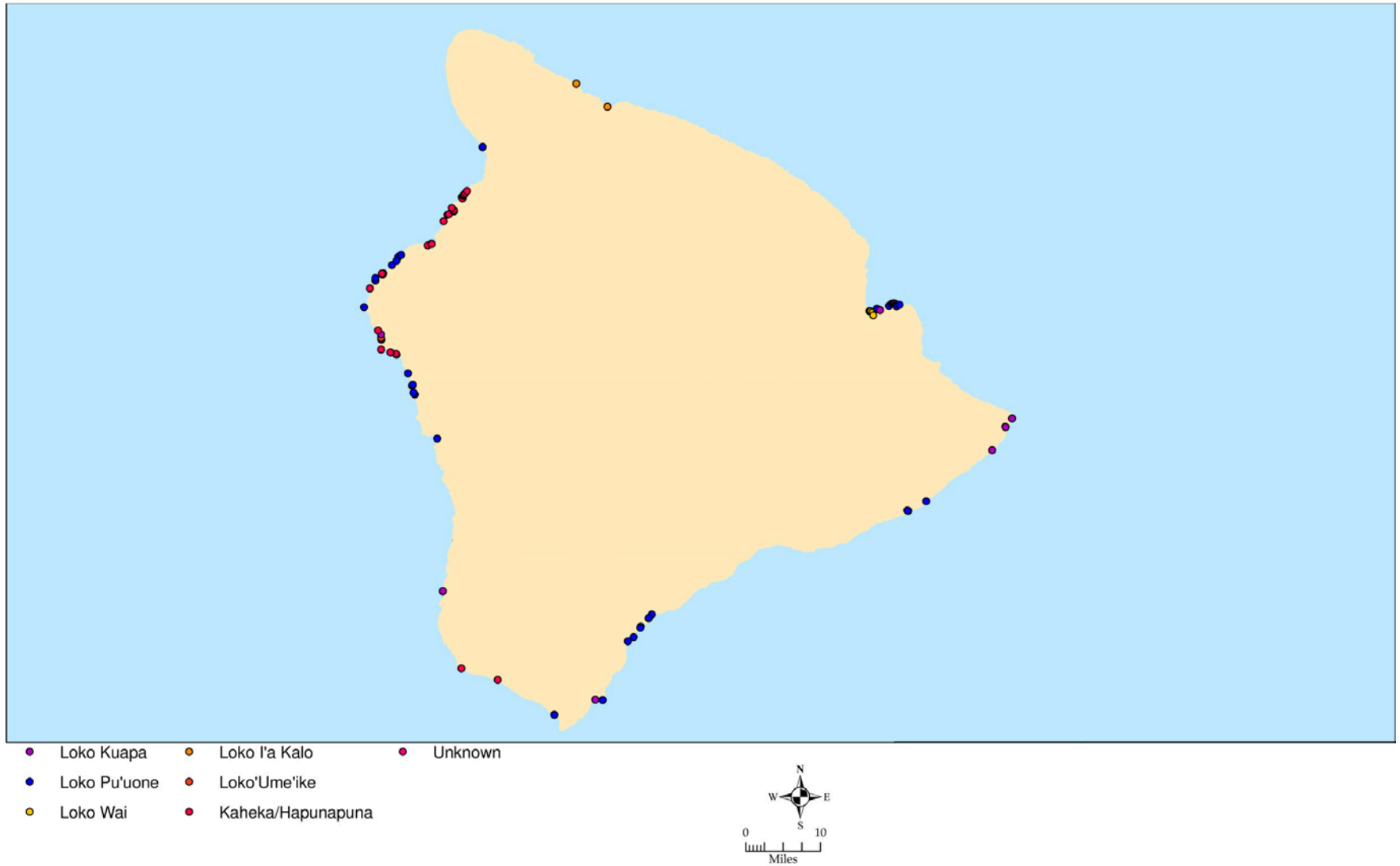


Figure 5. Selected Loko I`a of Maui County

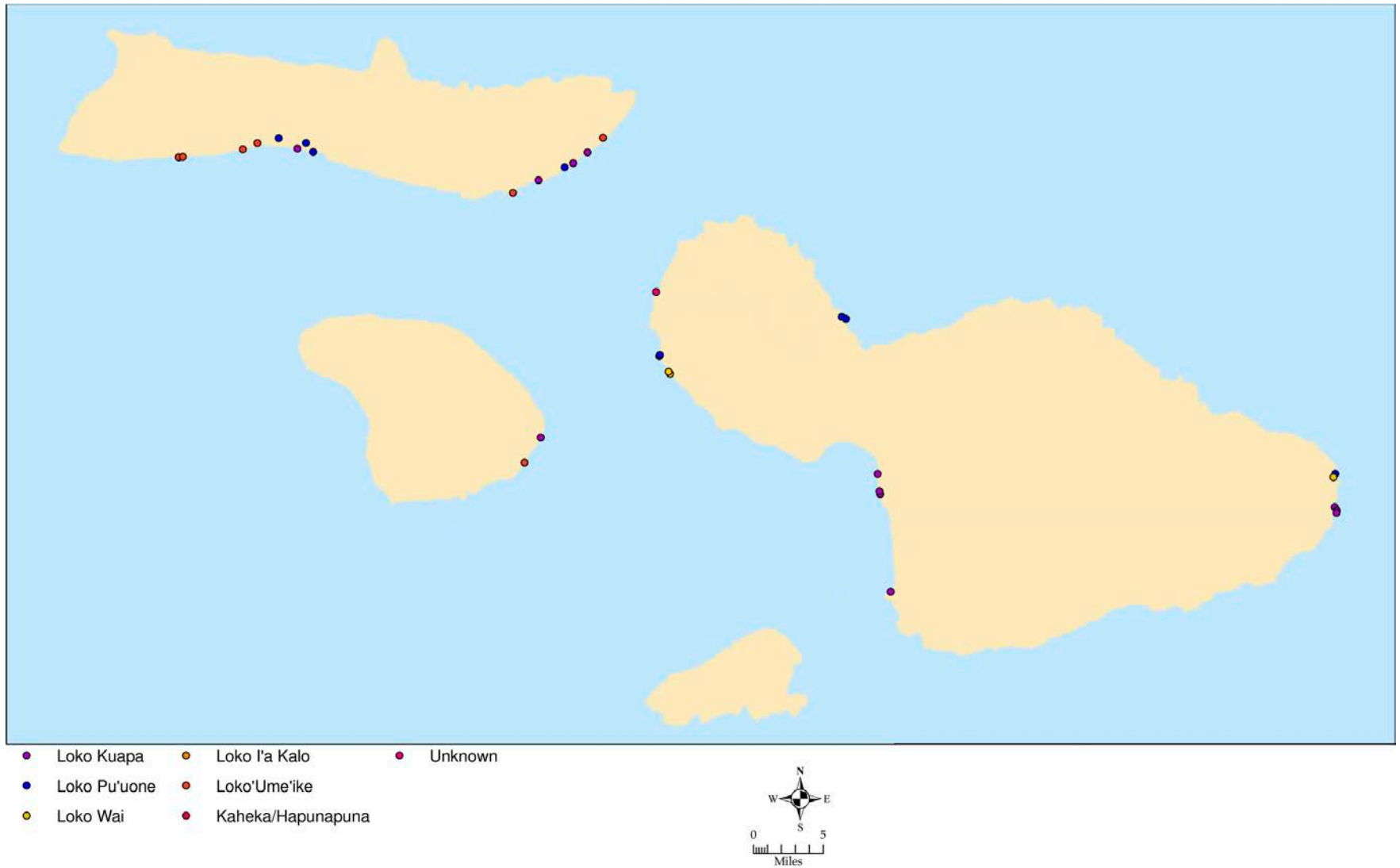


Figure 6. Selected Loko I`a of O`ahu

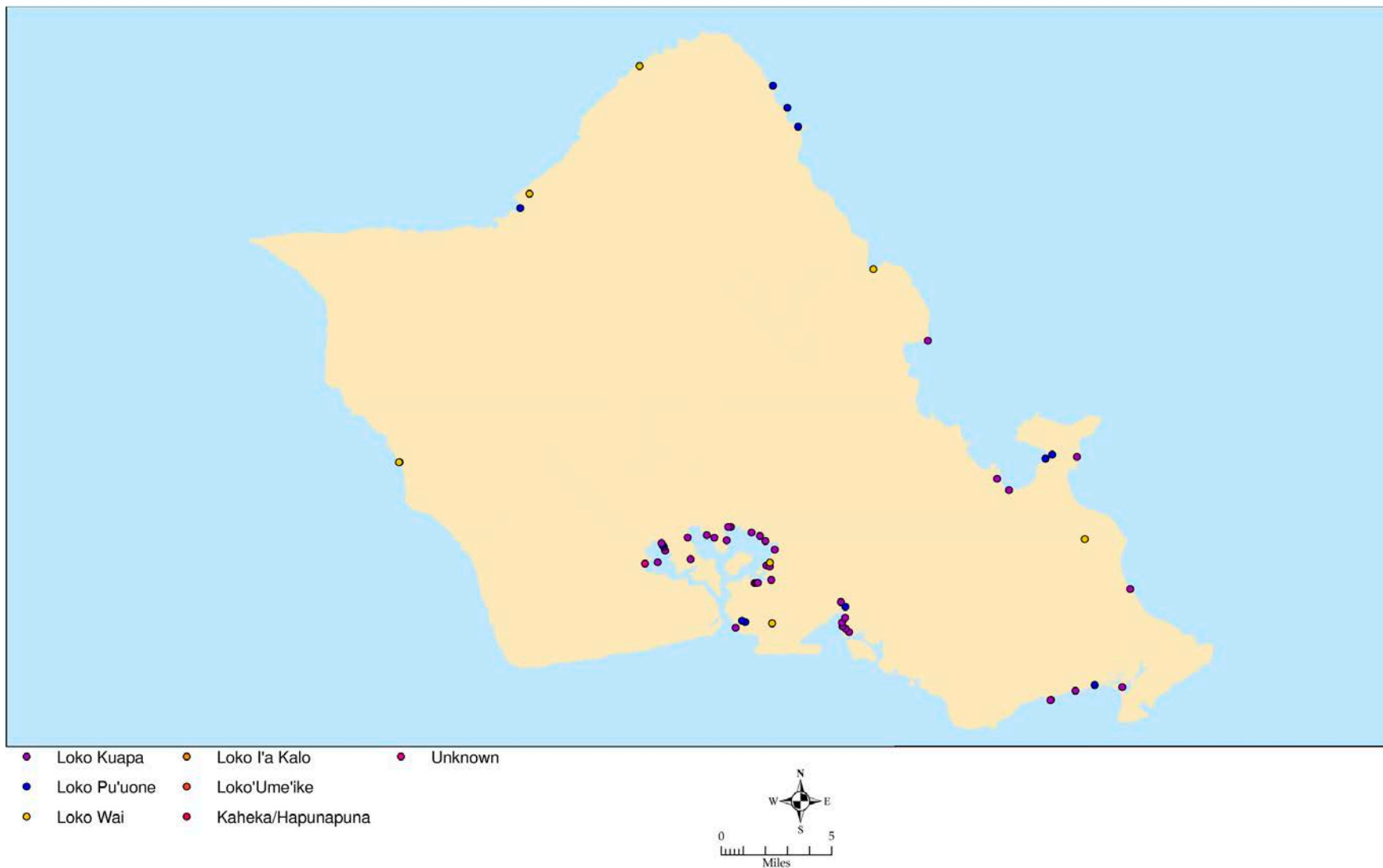
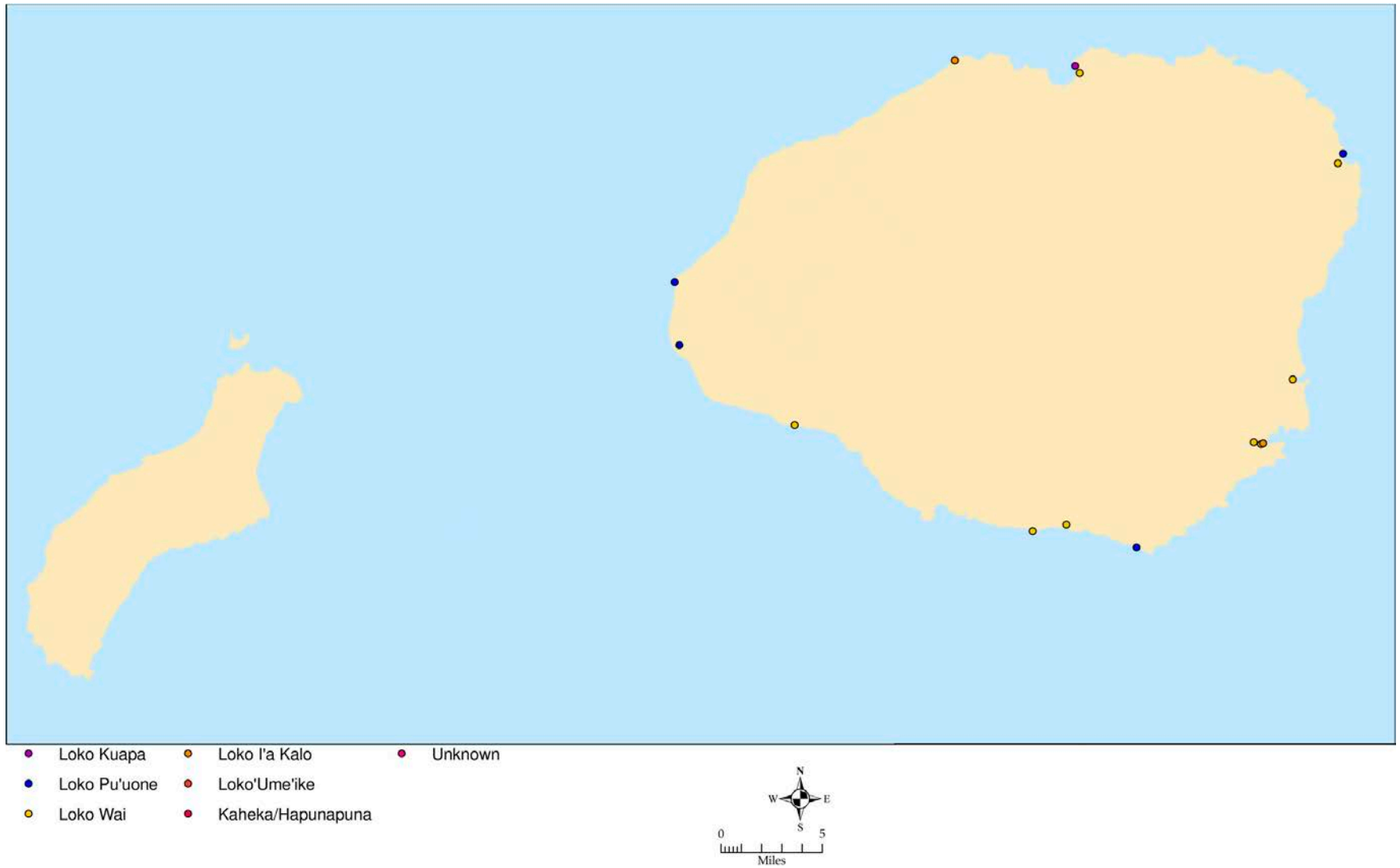


Figure 7. Selected Loko Iʻa of Kauai County



2.0 Proposed Action and Alternatives

Loko i`a (traditional Hawaiian fishpond systems) are rich and critical biocultural ecosystems that provide important ecosystem services to their surrounding and adjacent environments. Hawaiian fishponds also have the potential to provide nutritious food for local consumption.

Surveys were sent to numerous fishpond owners, organizations and practitioners and thereafter the information from those surveys was collected online and through oral interviews. The information collected provided a representative sample of the activities currently underway at fishpond systems across the state and helped to establish the range of traditional activities covered under this program. Through historical and archeological studies, there are over 400 identified fishponds across the state. Today, there are less than one hundred (100) that have community groups or landowners who have expressed interest in the future use of the pond or currently make use of the pond. Survey information and other information was successfully collected from approximately twenty (20) fishponds through the statewide network known as Hui Mālama Loko I`a. Additional information about other ponds that do not participate with the hui was collected through research and community inquiries to ensure an accurate and representative sampling of information was gathered and utilized to inform the development of this program.

The majority of activities reported are restoration, maintenance and educational activities. These activities include: 1) manual replacement of wall stones dislodged as a result of heavy surf action or natural disrepair, 2) manual removal of wave-deposited sand and rock from the fishpond basin to maintain pond depths, 3) manual removal of mangrove and other invasive species from the fishpond wall and basin to prevent damage to wall, and 4) educational and research activities. It is anticipated that these are the types of activities that will be covered under the SPGP. In some cases, contemporary construction methods may be utilized to repair, maintain and restore Hawaiian fishponds.

To the extent possible, fishpond use and management will follow traditional practices and methods, subject to existing State-regulated fishing methods, seasons, and catch limits. Marine organisms cultured or harvested within the pond will be used for either subsistence purposes or as stocking materials for other fishponds.

2.1 Alternative A: Status Quo (No Action)

There are existing efforts to repair, reconstruct and/or restore traditional Hawaiian fishponds across Hawai`i. These efforts currently take place on a case by case basis. The process of acquiring the necessary studies and permits is laborious, time-consuming, and expensive. It has become the leading impediment to the repair and reconstruction of fishponds.

Most current fishpond system activities are focused on repair, reconstruction and restoration (of both structural and ecosystem services). These repair activities currently include the following:

- Repair and reconstruction of fishpond walls, known as kuapā;

- Repair and reconstruction of sluice gates, known as mākāhā;
- Restoration of the pond area;
- Restoration of `auwai, or traditional waterways, for the purpose of restoring water sources into the system which enable functionality to the system;
- Removal of invasive species, including, but not limited to, mangroves, *Gracilaria salicornia*, for the purpose of restoring use and functionality to the system.

Potential environmental impacts stem largely from repair and reconstruction activities focusing on the system structures. Repair and reconstruction involves: 1) the physical movement, alignment, and retrieval of wall foundation boulders from within the pond basin using a tracked backhoe or loader/dozer; 2) the manual movement, manipulation, and temporary stockpiling of smaller `ili`ili (stones, pebbles or rubble) within the fishpond basin; and 3) reconstruction of the pond wall using existing onsite rock, mechanized equipment, and manual labor.

Additional potential environmental impacts derive from activities that aim at restoring system functionality. Restoration of `auwai and other water sources is essential to the functioning of loko i`a.

Periodic post-construction maintenance activities are required to facilitate the long-term use and management of the fishpond. These activities will include manual replacement of wall stones dislodged as a result of storm surges, and removal of wave-deposited sand and rock from the fishpond basin to maintain pond depths.

2.2 Alternative B: Limited Site Program

One alternative would only select a limited number of sites and fishpond systems for program eligibility. A variation of this alternative occurred on the island of Moloka`i. The program saw limited success.

This alternative may be exclusive of fishpond systems and groups that may not have been a part of the collective community effort to advocate for system restoration. Additionally, as a significant percentage of the individuals engaged in fishpond restoration are Native Hawaiian, it is important to enable and facilitate to the extent possible under this program customary and traditional rights of Native Hawaiians as affirmed under the Hawai`i State Constitution.

A limited site program would enable traditional and customary rights of some practitioners while potentially and arbitrarily denying that opportunity to other practitioners, therefore this alternative was not selected as the preferred alternative.

2.3 Alternative C: Statewide Programmatic General Permit (Proposed Action and Preferred Alternative)

The proposed action includes the development of a Statewide Programmatic General Permit that facilitates the restoration, repair, maintenance and reconstruction of traditional Hawaiian fishpond systems across Hawai`i. This program would create a discretionary streamlined and

simplified permitting process for obtaining approval to undertake activities related to the repair, reconstruction and maintenance of traditional Hawaiian fishpond systems. This process would provide fishpond owners and operators the option to obtain the necessary federal and state approvals for reconstruction, restoration, repair, maintenance and operation through submittal of a single application to the Department of Land and Natural Resources (DLNR) Office of Coastal and Conservation Lands (OCCL). The application would then undergo review by an advisory panel consisting of member representatives from the following federal and state agencies:

- DLNR OCCL
- DLNR SHPD
- DOH CWB
- NMFS PIRO
- USACE
- Traditional Fishpond Practitioner-
- Additional members as necessary, appropriate and/or practicable

2.3.1 Systems Eligible for Application Under the Program

Any traditional Hawaiian fishpond system built prior to 1968 is eligible for application under this program. Although numerous ponds would be eligible, it is estimated that less than 50 ponds are in a condition eligible for program activity. DLNR OCCL estimates that no less than ten (10) and no more than thirty (30) loko i`a would participate in the program over a five (5) year period.

2.3.2 Activities Eligible for Application Under the Program

The following range of activities would be eligible for application under this program:

- (a) Reconstruction, restoration, repair and maintenance of fishpond walls and sluice gates, including but not limited to the placement, movement, manipulation and temporary stockpiling of necessary materials.
- (b) Placement, movement, manipulation and temporary stockpiling of small stones or rubble for interior wall fill (ili`ili).
- (c) Silt removal by hand and/or mechanized equipment from within fishponds to restore original fishpond depth.
- (d) Vegetation removal by hand and/or mechanized equipment from within fishponds and from fishpond walls.
- (e) Periodic post-restoration maintenance activities required to facilitate the long-term use, management and operation of fishponds.
- (f) Use of hand and/or operation of fishponds.
- (g) Use of hand and/or mechanized equipment to conduct fishpond restoration activities.
- (h) Placement and use of aquaculture pens, nets and/or cages within fishponds.
- (i) Use of harvesting equipment within fishponds.

2.3.3 Activities Categorically Excluded from the Program

Activities that are explicitly excluded from authorization or consideration under the dPEA, its related permit applications and authorizations, and as such require individual assessments and applications, are those projects that utilize any of the following:

- 1) Blasting
- 2) Pile-driving, pre-drilling for pile-driving
- 3) New construction or dredging or in-water trenching not related to original fishpond structure/function.
- 4) Construction of new or expanded effluent discharge systems
- 5) Construction of new bank stabilization structures
- 6) Exploration or construction within estuaries or the marine environment that cannot be conducted from a work vessel or an existing bridge, dock, or wharf
- 7) Any use of treated wood in marine or aquatic habitats (other than pressure-treated)
- 8) Actions determined to have a significant environmental impact
- 9) Use of artificial feeds?

2.3.4 Explanation of Program

The objective of the proposed action is to help facilitate the process under which actions that contribute to the restoration, repair, maintenance and reconstruction of loko i`a (traditional Hawaiian fishpond systems) across the pae`āina of Hawai`i (Hawaiian archipelago) are authorized.

The strategy is to develop an interagency programmatic agreement which allows a wide range of common fishpond restoration activities to be authorized through a single program administered by the DLNR OCCL. Once complete, the State Programmatic General Permit will be published in the Environmental Notice for public review.

When implemented, the program will create a process whereby organizations and practitioners can utilize a single applicable to obtain authorization under a series of laws and regulations to conduct fishpond system restoration work. The program will be managed through the DLNR OCCL.

Once an applicant submits a completed application, the application will be reviewed by OCCL. Activities eligible for authorization under the program will be sorted into Tiers, Tier I representing the lowest level of authorized activity (minor activities) and Tier III representing the highest level (moderate activities).

All authorized activities will be subject to conditions set forth in the State Programmatic General Permit and conditions proposed in this dPEA and potentially additional site specific conditions based on the information provided during the application process.

TABLE 1: FISHPOND RESTORATION ACTIVITIES

<p>Activities with potential significant environmental impacts not covered under this EA</p>	<p>Fishpond reconstruction or repair requiring expansion of footprint and/or height (e.g., more than 50 percent expansion over existing footprint/height) New fishpond construction</p>
<p>Tier III Section 10 and Section 404 Permit Additional and Site Specific Conditions; General Conditions, Monitoring and BMPs</p>	<p>Fishpond reconstruction or repair within the original fishpond footprint, but involving reconstruction or repairs to more than 50 percent of the original fishpond structure Major fishpond dredging involving the use of mechanized equipment. Commercial use Moderate expansion of the height, width, and length of fishponds with original or new materials (less than 50 percent expansion over original fishpond footprint/height) Any activities that take place in areas where endangered species and/or protected resources (including, but not limited to, wetland birds) are present or activities that take place in “special aquatic sites” (wetlands, coral reefs, sea grass beds) Any activity that may significantly impact sandy beaches or sediment deposition.</p>
<p>Tier II Section 10 and Section 404 Permit General Conditions, Monitoring and BMPs</p>	<p>Emergency repair Fishpond reconstruction or repair within the original fishpond footprint, involving reconstruction or repairs of more than 10 percent, but less than 50 percent of the original fishpond structure Major dredging involving the use of mechanized equipment. Moderate expansion of the height, width, and length of fishponds with original or new materials (less than 10 percent expansion over the original fishpond)</p>
<p>Tier I Section 10 General Conditions, Monitoring and BMPs</p>	<p>Minor repair of existing fishponds (e.g., replacement of small wall sections, replacement of individual rocks or other wall materials, repair of gates, ‘auwai, minor dredging by non-mechanized means and non-routine maintenance of vegetation, such as clearing old growth). Construction or placement of structures in the Conservation District accessory to the maintenance and operation of a loko i`a</p>
<p>Activities not subject to regulation</p>	<p>Routine maintenance of existing fishpond by hand or with hand-tools and utilizing existing traditional materials</p>

TABLE 2: DESCRIPTION OF THE REVIEW PROCESS

<p>Activities with potential significant environmental impacts not covered under this EA</p>	<p>Upon review of completed application, applicant is notified that activities are outside the scope of the environmental assessment and/or SPGP and advised to pursue individual permits</p> <p>No notice provided to cooperating agencies</p>
<p>Tier III Section 10 and Section 404 Permit Additional and Site Specific Conditions; General Conditions, Monitoring and BMPs</p>	<p>Upon review of completed application, applicant is notified that activities require additional information and review.</p> <p>Upon receipt and review of additional information, OCCL forwards application to advisory group for review. Review committee can respond with one or multiple of the following:</p> <ul style="list-style-type: none"> • Second request for additional information; • Seek additional review / consultation from cooperating agencies or subject matter area experts; and/or • Identification of additional and/or site specific conditions, monitoring and BMPs. <p>Once review (included additional reviews) is complete, notice is provided to cooperating agencies of findings and/or issuance of authorization to proceed.</p>
<p>Tier II Section 10 and Section 404 Permit General Conditions, Monitoring and BMPs</p>	<p>Upon review of completed application, OCCL forwards application to advisory group for review.</p> <p>Upon receipt and review of application, review committee can response with one or multiple of the following:</p> <ul style="list-style-type: none"> • Request for additional information; • Seek additional review / consultation from cooperating agencies or subject matter area experts; and/or • Identification of additional and/or site specific conditions, monitoring and BMPs. <p>Once review (included additional reviews) is complete, notice is provided to cooperating agencies of findings and/or issuance of authorization to proceed.</p>
<p>Tier I Section 10 General Conditions, Monitoring and BMPs</p>	<p>Upon review of completed application, OCCL issues authorization to proceed to applicant.</p> <p>OCCL provides notice to cooperating agencies.</p>
<p>Activities not subject to regulation</p>	<p>Upon review of completed application, OCCL notifies applicant that activities are not regulated, but provides language to applicant regarding BMPs.</p>

3.0 Description of the Environmental Setting Without the Project

For hundreds of years, Native Hawaiians managed the natural resources of Hawai'i by developing complex and innovative political systems that gave maka`āinanānā (commoners) rich opportunities to operate the lands and resources under their stewardship. The most successful of these political systems was the ahupua'a, the ecosystem based management regime developed and implemented by Mā`ilikūkahī on the island of O`ahu in the 15th century. The ahupua'a system combined numerous farming techniques by integrating agriculture with freshwater and marine aquaculture into a complete system. These systems were built to be self-sufficient, with nutrients and food passing through them from high watersheds ultimately to extensive marine fishponds. This ingenuity allowed the cultivation of a variety of crops, which included kalo, banana, shrimp, crabs, and fish providing a localized source of food that was cared for by selected families over generations.

Although the integration of various farming techniques was in itself novel, the true engineering feat was the management of ocean and coastal resources through loko kuapā or coastal fishponds. These ponds were site specific and considered the unique features of the area, which included coastal topography, wave energy, and biodiversity. This essentially led to the cultivation of marine species while allowing the integration of each community's cultural beliefs and traditions thereby providing a unique and invaluable cultural resource.

Loko i`a (traditional Hawaiian fishpond systems) are considered "open coastal waters" by the Hawai'i State Department of Health, however, the term loko i`a represents six (6) different types of fishponds: loko kalo and loko i`a kalo (upland agriculture pond), loko wai (freshwater pond), loko pu'uone (wetlands), loko kuapā (coastal fishponds), and loko ume'iki (coastal fishtraps). This section provides a description of program sites based on selected studies and accounts of loko kuapās.

3.1 Physical Setting

The underwater topography of fishponds and adjacent nearshore areas typically consist of five physiographic zones:

- 1) Intertidal and nearshore subtidal zones consisting of sandy and silt;
- 2) A pond basin characterized by basalt rock, ranging in size from larger boulders to smaller cobble stones;
- 3) A zone comprised of small stones, known as `ili`ili, which were used traditionally for a variety of traditionally cultural purposes;
- 4) The structural remains of the fishpond wall, known as the kuapā;
- 5) Seaward facing limestone reef flats.

Fishpond systems typically include two major subdivisions of marine benthic habitats: intertidal and subtidal. The intertidal region characterized as "the shore bordered on the seaward side by the reach of ebbing (falling) tides and landward by the reach of flooding (rising) tides" (Huisman et al. 2007). It is essentially the part of the shore that is intermittently awash or exposed as a result of tidal exchange. Since the boundaries of the intertidal vary with the phase of the moon

and the intensity of wave action, the unique geographic location of the Hawaiian Islands provides less than 20 centimeters of tidal exchange. Although this would be of major concern for many parts of the Eastern and Western Pacific, Hawai`i is primarily surrounded by shallow fringing reefs providing an ideal topography for the distribution of marine organisms under these environmental conditions. With the availability of light throughout much of the coastal intertidal zone, fish and plant life can flourish leading to what many have termed biodiversity “hotspots”. In contrast, regions with larger tidal ranges tend to have light limitations, reducing the abundance and growth of marine plants, which in turn limits the number of herbivorous fish and other complementary species.

By comparison, the constantly immersed subtidal zone is usually teeming with species of marine algae, fishes, invertebrates such as polychaetes, sea urchins, sea cucumbers and crabs. With space at a premium, species must constantly take advantage of changes in the physical environment, such as fluctuations in salinity due to rainfall or flooding, and/or newly available substrate caused by a physical disturbance such as herbivory or storm surge. Some of these changes can occur within seconds while others are on a timescale of hundreds of years. Overtime, many organisms have taken advantage of these changes by synchronizing their reproductive cycle in order to give their offspring the best chance of survival. Similar to other marine environments the subtidal zone can be very dynamic offering an ever-changing environment that till today is not fully understood.

The traditional ahupua`a system, in particular loko kuapā, provided both intertidal and subtidal species a refuge and food-rich environment to live and reproduce. These ponds offered a complete trophic cycle; sunlight would promote algal growth, herbivorous fish would consume and regulate the algae, predatory fish would regulate the herbivores, crustaceans and filter feeders would filter the water providing ideal conditions for plant and animal life, and bacteria would consume any remaining organic matter. In order to maximize productivity and yield, Native Hawaiians took into consideration instantaneous and seasonal changes of coastal topography, wave energy, depth, and biodiversity when designing and erecting each individual pond.

3.2 Water Quality

While water quality in fishponds vary across the state, in some cases fishponds can demonstrate physical and chemical characteristics encountered in typical nearshore coastal waters with slight groundwater inputs from punawai (fresh water springs) or kahawai (streams or surface water inputs). In these cases, water quality in fishponds is generally high with no physical or chemical parameters likely to be limiting to marine organisms. Fishponds with inputs from streams may be subject to moderate siltation associated with discharges from those attached streams. These discharges may have minor influence on coral growth or other conditions that may affect marine life in the pond. In other cases, existing water quality in fishponds is “impaired” in that it fails to meet Hawai`i State Department of Health Water Quality Standards. Pursuant to Section 303(d) of the Clean Water Act, the State of Hawai`i DOH has identified Water Quality Limited Segments (WQLS) around the State. WQLS are defined as water bodies within the State, which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain State Water Quality Standards. Fishponds with significant inputs from

streams, near highly urbanized areas, or in areas severely impacted by drought are likely to have “impaired” waters due to conditions unrelated to the activities or operations of the fishpond system. Moreover, the current state of the pond, such as the condition of the kuapā (wall) and mākāhā (sluice gate) may also lead to “impaired” conditions by severely effecting the internal circulation of the pond.

3.3 Biological Setting

Native or naturalized vegetation, wildlife, and the habitats in which they occur are collectively referred to as biological resources. There is a range of flora and fauna that can be found in the programmatic geographic area. The degradation of fishponds systems through the alienation of Native Hawaiian control, management and use led to the diminishment of the quality of the ecosystem services and biological functioning that were also part of the systems.

3.3.1 Introduced and Invasive Species

There are a range of invasive species found in loko kuapā. A common and highly problematic invasive species is the red mangrove (*Rhizophora mangle*). The rapid and invasive growth of mangroves across fishpond systems have resulted in widespread negative impacts to their cultural and archeological resources. Mangroves, known for their thick and extensive root systems, have proven destructive to the kuapā. They enhance sediment deposition and decrease oxygen circulation in the ponds.

Various introduced bird species associated with fishpond systems include common (Indian) mynah, zebra dove, spotted dove, northern cardinal, mannikins, and the Japanese white-eye. Various species of wading birds are likely to use areas abutting the shoreline. Wetland birds and migratory birds are discussed in more detail in Section 3.3.3 Wetland Birds.

The Indian mongoose, various rats and mice, and occasional feral goats and pigs, in addition to various other introduced species, are common in fishpond systems.

3.3.2 Endangered Species

There are various endangered species that may be found in fishponds across the state.

Common Name	Hawaiian Name	Scientific Name
Hawaiian Stilt	`ae`o	<i>Himantopus mexicanus</i>
Hawaiian Coot	`alae ke`oke`o	<i>Fulicia alai</i>
Hawaiian Gallinula	`alae `ula	<i>Gallinula chloropus</i>
Hawaiian Monk Seal	Ilioholoikauaua	<i>Monachus schauinslandi</i>
Hawaiian Sea Turtle	Honu	<i>Chelonia mydas</i>
Hawksbill Sea Turtle	Ea	<i>Eretmochelys imbricata</i>
Hawaiian Hoary Bat	`Ōpe`ape`a	<i>Lasiurus cinereus semotus</i>

There is no designated critical habitat within the action area. Although there is a proposed rule to revise the critical habitat for Hawaiian Monk Seals to include areas in the Main Hawaiian Islands, fishponds are specifically excluded from the proposed designation area (Fed. Reg. Vol. 76, No. 106. June 2, 2011).

3.3.3 Wetland Birds

Hawai`i's wetlands are acknowledged environments for wetland birds. There are five (5) species of wetland waterbirds that breed in Hawai`i's wetlands within the geographic area.

Common Name	Hawaiian Name	Scientific Name	Status
Hawaiian Stilt	`ae`o	<i>Himantopus mexicanus</i>	Endangered
Hawaiian Coot	`alae ke`oke`o	<i>Fulicia alai</i>	Endangered
Hawaiian Gallinula	`alae `ula	<i>Gallinula chloropus</i>	Endangered
Hawaiian Duck	koloa	<i>Anas wyvilliana</i>	Endangered
Black-Crowned Night-Heron	`auku`u	<i>Nycticorax nycticorax hoactli</i>	Common

There are thirty-seven (37) known species of migratory waterfowl that have been recorded in the Hawaiian Archipelago (including the Northwestern Hawaiian Islands). Those most often seen or encountered are listed below. These migratory waterfowl may be found in the programmatic geographic area.

Common Name	Hawaiian Name	Scientific Name	Status
Fulvous tree-Duck	None	<i>Dendrocygna bicolor</i>	Indigenous
Pied-billed Grebe	None	<i>Podilymbus podiceps</i>	Indigenous
Canada Goose	None	<i>Branta canadensis</i>	Visitor
Mallard	None	<i>Anas platyrhynchos</i>	Alien / Visitor
Northern Pintail	koloa mapu	<i>Anas acuta</i>	Visitor
Northern Shoveler	koloa moha	<i>Anas clypeata</i>	Visitor
Lesser Scaup	None	<i>Aythya affinis</i>	Visitor
Brant	None	<i>Branta bernicula</i>	Visitor
Greater Scaup	None	<i>A. marila</i>	Visitor
Ring-necked Duck	None	<i>Aythya collaris</i>	Visitor
American Wigeon	None	<i>Anas Americana</i>	Visitor
Eurasian Wigeon	None	<i>A. Penelope</i>	Visitor
Green-winged Teal	None	<i>A. crecca</i>	Visitor
Blue-winger Teal	None	<i>A. discors</i>	Visitor
Hawaiian Coot	`alae ke`oke`o	<i>Fulica alai</i>	Endangered / Endemic
Common Moorhen	`alae `ula	<i>Gallinula chloropus sandvicensis</i>	Endangered / Endemic
Black-necked Stilt	ae`o	<i>Himantopus mexicanus knudseni</i>	Endangered / Endemic
Bristle-thighed curlew	Kioea	<i>Numenius tahitiensis</i>	Visitor
Whimbrel	None	<i>Numenius phaeopus</i>	Visitor

Long-billed Dowitcher	None		<i>Limnodromus scolopaceus</i>	Visitor
Short-billed Dowitcher	None		<i>L. griseus</i>	Visitor
Pacific Golden Plover	kolea		<i>Pluvialis fulva</i>	Visitor
Ruddy Turnstone	`akekeke		<i>Arenaria interpres</i>	Visitor
Sanderling	hunakai		<i>Calidris alba</i>	Visitor
Wandering Tattler	`ulili		<i>Heteroscelus incanus</i>	Visitor
Gray-tailer Tattler	None		<i>Heteroscelus brevipes</i>	Visitor

There are forty-four (44) species of recorded migratory shorebirds in the Hawaiian Archipelago. They appear rarely and in small numbers. They are not listed here. Gulls are also rarely seen in very small numbers. They are also not listed herein. Wetland birds endemic to the Northwestern Hawaiian Islands are also not listed, as they are not within the programmatic geographic area.

3.3.4 Fish Species

Many fish species can be found in loko kuapā today, but traditionally this was not the case. When in regular operation, loko kuapā were controlled aquaculture environments reserved for herbivores, as this was the most efficient use of the space. The species most often cultivated are listed below.

Common Name	Hawaiian Name	Scientific Name
Hawaiian Flagtail	`āholehole	<i>Kuhlia xenura</i>
Zebra-head Flagtail	`āholehole	<i>Kuhlia sandvicensis</i>
Milkfish	awa	<i>Chanos chanos</i>
Stripped Mullet	`ama`ama or `anae	<i>Mugil cephalus</i>
Pacific Threadfin	moi	<i>Polydactylus sexfillis</i>

3.3.5 Essential Fish Habitat

In 1996, the Magnuson-Stevens Fishery Conservation and Management Act (MSA) was reauthorized and amended by the Sustainable Fisheries Act (Public Law 104-267). The reauthorized MSA mandated numerous changes to the existing legislation designed to prevent overfishing, rebuild depleted fish stocks, minimize bycatch, enhance research, improve monitoring, and protect fish habitat. One of the most significant mandates in the MSA that came out of the reauthorization was the EFH provision, which provides the means to conserve fish habitat.

The EFH mandate requires that the regional Fishery Management Councils, through federal fishery management plans, describe and identify EFH for each federally managed species; minimize, to the extent practicable, adverse effects on such habitat caused by fishing; and identify other actions to encourage the conservation and enhancement of such habitats. Congress defines EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 United States Code (U.S.C.) §1802(10)). The term “fish” is defined in the MSA as “finfish, mollusks, crustaceans, and all other forms of marine animals and plant life other than marine mammals and birds.” The regulations for implementing EFH clarify that “waters” include all aquatic areas and their biological, chemical, and physical properties, while “substrate” includes the associated biological communities that make these areas suitable fish habitats (50 C.F.R. §600.10). Habitats used at any time during a species’ life cycle (i.e., during at least one of its life stages) must be accounted for when describing and identifying EFH (National Marine Fisheries Service 2002).

Authority to implement the MSA is given to the Secretary of Commerce through NMFS. The MSA requires that EFH be identified and described for each federally managed species. The MSA also requires federal agencies to consult with NMFS on activities that may adversely affect EFH or when the NMFS independently learns of a federal activity that may adversely affect EFH. The MSA defines an adverse effect as “any impact that reduces quality and/or quantity of EFH. Adverse effects may include direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to, benthic organisms, prey species and their habitat, and other ecosystem components, if such modifications reduce the quality and/or quantity of EFH. Adverse effects to EFH may result from actions occurring within EFH or outside of EFH and may include site-specific or habitat-wide impacts, including individual, cumulative, or synergistic consequences of actions” (50 C.F.R. §600.810).

Traditional Hawaiian fishponds exist exclusively in waters located within the jurisdiction of the State of Hawai`i. There are some identified shallow water complexes (0-240m) designated as EFH in the Main Hawaiian Islands (MHI) for some fish species and life stages.

3.3.6 Coral Species

Corals and coral reefs are found around the Hawaiian Islands. While marine biodiversity is relatively low in the Hawaiian Islands, including corals, many of its marine species are endemic. There are numerous species of coral found in the program geographic area (Brainard et al. 2011). While coral was known to be a component of pond systems, either inside the pond systems or

outside the pond structures. The current status of coral species in fishpond systems is unclear due to the severely degraded status of most loko i'a ecosystems, which resulted from urbanization, over-development and the acute pollution of near shore aquatic environments. Some research is currently emerging from past system restoration efforts that given reason to believe that coral regeneration may result from restoration of fishpond systems.

Studies have documented 59 reef-building coral species in the main Hawaiian islands (Maragos et al. 2004). Of these 59 species, three have been proposed for listing under the Endangered Species Act. These three species are identified and described below, along with their range (U.S. Department of Commerce, 2012).

1. *Acropora panciulata* (fuzzy table coral) – proposed as threatened.

This species grows on upper reef slopes, just subtidal (i.e., below the low tide mark but still shallow and close to shore), reef edges, and sheltered lagoons (Carpenter et al., 2008).

2. *Montipora flabellata* / *M. dilatata* / *M. turgescens* (blue rice coral) – proposed as threatened.

This “species complex” grows in most reef environments (Veron, 2000).

3. *Montipora patula* / *M. verrilli* (spreading or sandpaper rice coral) – proposed as threatened.

These species, being evaluated as a single unit because of their genetic and physical similarities (Forsman et al., 2010) has a very restricted range, centered in the main and Northwestern Hawaiian Islands. *Montipora patula* grows in shallow reef environments and reef flats (Veron, 2000); it is also common in environmental with considerable wave action, but less common where pollution and sedimentation have impacted the water quality (Jokiel et al., 2007).

3.3.7 Habitats and Other Physical Environment Elements

Due to lack of maintenance, drought, run off and other sources of environmental degradation, siltation build up can be a serious issue for some fishponds systems, particularly systems in areas with severe drought or excess sedimentation run off. Sedimentation run off has significantly contributed to the degradation of fishpond systems. Sedimentation build up, of reportedly up to three or four feet in ponds on the islands of Lāna`i, Moloka`i and possibly other islands, decreases circulation, oxygen levels and operation space in the fishpond systems.

There are numerous species of flora than can be found in fishpond systems, either in the kuapā or in the low-lying areas in the immediate adjacent inland areas. They are listed below.

Common Name	Hawaiian Name	Scientific Name
Soapberry	a'e or mānele	<i>Sapindus saponaria</i>
‘Ahakea	‘ahakea	<i>Bobea spp.</i>
Hawaiian goosefoot	‘āheahea	<i>Chenopodium oahuense</i>
Java sedge	‘ahu’awa	<i>Mariscus javanicus</i>
Great bulrush	‘aka’akai	<i>Schoenoplectus lacustris</i>
‘Alahe’e	‘alahe’e, walahe’e	<i>Psydrax odorata</i>
Native hibiscus	aloalo	<i>Hibiscus</i>
‘Ape	‘ape	<i>Alocasia macrorrhiza</i>
‘Awa	‘awa	<i>Piper methysticum</i>
Shampoo ginger	‘awapuhi	<i>Zingiber zerumbet</i>
Lavafield jackbean	‘āwikiwiki or puakauhi	<i>Canavalia</i>
Pandanus	hala	<i>Pandanus tectorius</i>
Hau	hau	<i>Hibiscus tiliaceus</i>
Hinahina	hinahina kū kahakai	<i>Heliotropium anomalum</i>
Bitter yam	hoi	<i>Dioscorea bulbifera</i>
Ilima	‘ilima	<i>Sida fallax</i>
Taro	kale	<i>Colocasia esculenta</i>
Kamani	kamani	<i>Calophyllum inophyllum</i>
Kauna’oa	kauna’oa	<i>Cuscuta sandwichiana</i>
Ti	Ki	<i>Cordyline fruticosa</i>
Sugar cane	kō	<i>Saccharum officinarum</i>
Morning glory	koali’awa or koali’awahia	<i>Ipomoea indica</i>
Gaudichaud's senna	kolomona or kalamona	<i>Senna gaudichaudii</i>
Kou	kou	<i>Cordia subcordata</i>
Candlenut	kukui	<i>Aleurites moluccana</i>

Kūpaoa	kūpaoa	<i>Peperomia blanda</i>
Laua'e	laua'e	<i>Phymatosorus scolopendria</i>
Banana	mai'a	<i>Musa</i>
Caper bush	maiapilo or pua pilo	<i>Capparis sandwichiana</i>
Smooth flatsedge	makaloa	<i>Cyperus laevigatus</i>
Hawaiian cotton	ma'o	<i>Gossypium tomentosum</i>
Pacific rosewood	milo	<i>Thespesia populnea</i>
Beach naupaka	naupaka kahakai	<i>Scaevola sericea</i>
Sharp-toothed lipochaeta	nehe	<i>Lipochaeta</i>
Coconut	niu	<i>Cocos nucifera</i>
Indian Mulberry	noni	<i>Morinda citrifolia</i>
Oahu riverhemp	'ohai	<i>Sesbania tomentosa</i>
Bamboo	'ohe	<i>Schizostachym glaucifolium</i>
Mountain apple	ōhia 'ai	<i>Syzygium Malaccense</i>
Turmeric	'ōlena	<i>Curcuma longa</i>
Ōlona	ōlona	<i>Touchardia latifolia</i>
Lace fern	palapalai	<i>Microlepia strigosa</i>
Pili grass	pili	<i>Heteropogon contortus</i>
Beach vitex	pōhinahina	<i>Vitex rotundifolia</i>
Beach morning glory	pōhuehue	<i>Ipomoea pes-caprae</i>
Sweet potato	'uala	<i>Ipomoea batatas</i>
Hawaiian hawthorn	'ūlei	<i>Osteomeles anthyllidifolia</i>
Breadfruit	'ulu	<i>Artocarpus altilis</i>
Hawaiian coral tree	wiliwili	<i>Erythrina sandwicensis</i>

3.4 Socioeconomic Setting

Over the past century, the collapse of marine fisheries has become a far too common occurrence. With the global human population continuing to increase at an exponential rate and the demand for fish at an all-time high, it is presently believed that 30% of world marine resources are exploited beyond sustainability (Duarte 2007). In part, to circumvent harvesting diminishing wild populations, commercial aquaculture has been developed at unprecedented levels, providing in excess of 40 million tons of products annually (FAO 2007). However, the majority of aquaculture is focused on freshwater organisms, with only an estimated 10% from marine species. Moreover, within the past decade, techniques for establishing and maintaining aquaculture have been consistently criticized for their environmental impacts, including erosion, coastal degradation, and increased occurrence of harmful algal blooms (Maso & Garces 2006, Jayappa et al. 2006, Pergent-Martini et al. 2006). These environmental conditions have caused numerous ecological (i.e. fish die-offs, marine mammal strandings) as well as human health concerns, namely the consumption of infected fish and crustaceans and the ingestion of contaminated water (Sapkota et al. 2007, Vasas et al. 2007, Lopez-Rodas et al. 2006, Maso & Garces 2006).

3.5 Cultural Setting

Cultural resources include material remains of past human activities, both from historic and Pre-European contact. In addition, cultural resources include traditional cultural properties, such as areas used for ceremonies or other cultural activities that may leave no material traces, and may have on-going use important to the maintenance of cultural practices. Cultural resources management seeks to identify and protect all of these types of cultural resources with the goals of enhancing understanding of human behavior and protecting cultural practices. For cultural resources qualifying as historic properties, protection is afforded under the National Historic Preservation Act (NHPA). Traditional Hawaiian fishponds are important cultural resources. They are archaeological sites, historic structures and cultural resources. As articulated throughout the document, they are closely associated with traditional Hawaiian knowledge, innovation and history. They are integral to traditional Hawaiian pedagogy, specifically the ability to transmit island and moku (district) based Hawaiian indigenous knowledges intergenerationally. They help maintain and perpetuate traditional concepts of biodiversity, sustainability and biocultural knowledge. They also serve as central foci for Hawaiian communities and practitioners.

Cultural resources include prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings and structures, and traditional resources (such as Native American and Native Hawaiian religious sites). Cultural resources of particular concern include properties listed in or eligible for inclusion in the National Register of Historic Places (National Register). All traditional fishponds potentially qualify as cultural resources. Many are already listed on the National Register of Historic Places.

As determined by DLNR OCCL, the geographic area for this project encompasses the geographic area where fishpond systems are found throughout the inhabited Hawaiian Islands. More specifically, the area of study includes portions of the open ocean and near shore

environment where fishponds systems are located. Some aquaculture ponds date back to A.D. 1000, and some are still in use. Extant fishponds could be visible along the shoreline, or could be submerged. A comprehensive listing of ponds is included herein in Section 10.0.

Traditional fishpond systems have been the subject of study for over 100 years. They have been studied for both their archeological and biological significance.

Archeological and historical evidence suggests that Hawaiian fishponds were constructed as early as AD 1000 and continued to be built until the 1820's. Fishpond construction intensified beginning in the late 1500's and early 1600's when the Hawaiian population was rapidly expanding and sociopolitical systems became more complex. Various estimates place the number of fishponds at one time from 300 to 500, ranging in size from less than an acre to over 100 acres (Fleming et al. 1995).

Additional historic and cultural sites found within the geographic area of the program include historic structures, burials, fishing shrines, heiau (religious structures), leina (cultural sites from which spirits leapt into the next world), cultural structures related to Hawai'i's traditional navigation and other seafaring traditions.

Over 400 fishponds have been documented (Cobb 1904, Tinker 1939, Kikuchi 1973, Cleghorn et al 1989). Currently, approximately 10% of those documented fishponds are listed on the Hawaii State Register of Historic Places and/or the National Register of Historic Places. Five are on Kauai: Alekoko in Nawiliwili, SHPD site 30-11-0501; Esetera Pond in Hā'ena, SHPD site 30-02-1600; an unnamed fishpond in Hā'ena, SHPD site 30-02-1600; and two unnamed fishponds in Wailua, SHPD site 30-03-9052. Seven are on Oahu: He'e`ia Fishpond in Hakipu`u, SHPD site 80-10-0327; Huilua Fishpond in Kahana, SHPD site 80-06-0301; Kahouna Fishpond in Kahalu`u, SHPD site 80-10-0319; Kaloukai Fishpond in Kahuku, SHPD site 80-01-0257; Mōli`i Fishpond in Kualoa, SHPD site 80-06-0313; Okiokilepo Fishpond in the West Loch area of Pearl Harbor, SHPD site 80-13-0143; and Pāhonu Fishpond in Waimanalo, SHPD site 80-15-1037. Nineteen named fishponds and numerous additional unnamed fishponds on Moloka`i have been listed on the Hawaii State Historic Registry and/or the National Historic Registry: Ali`i in Makakupaia, SHPD site 60-03-135; Halemahana Fishpond and `Ualapu`e of the `Ualapu`e Archaeological Complex, SHPD site 60-04-185; an unnamed trap in Honouliwai, SHPD site 60-05-233; `Ipuka`iole Fishpond in Kainalu, SHPD site 60-05-219; Kahinapohaku in Moanui, SHPD site 60-05-228; Kainalu's nameless fishpond, SHPD site 60-05-220; Koloko`eli in Kaimaloloa, SHPD site 60-03-133; Kalua`aha Fishpond in Kalua`aha, SHPD site 60-04-188; Keawanui Fishpond of Kalaeloa, SHPD site 60-04-163; Kipapa Fishpond and Pahiomu Fishpond of the Keonoku`ino complex, SHPD sites 60-04-150 and 60-04-149; Mahilika in Kalua`aha, SHPD site 60-05-189; the two fishponds named Panahana in Makolelau and Puko`o, SHPD site 60-05-202; and Waiakea Fishpond in Kahanui I, SHPD site 60-02-101. Ko`ie`ie Fishpond in Kalepolepo-Kihei on Maui is the only fishpond on the National Historic Register, SHPD site 50-09-1288. Eleven fishponds on Hawai`i island have been listed on the Hawaii State and/or National Historic Registry: `Aimakapa`a, `Aiopi`o, Kaloko, and an unnamed fishpond of the Honokohau Archaeological Complex, SHPD site 10-27-4138; Haleipalala Fishpond of Honaunau Archaeological Complex, SHPD site 10-27-4137; Nino`ole Fishpond, the "Hilea Ponds" of Ka`ū, and three unnamed fishponds in the Honu`apo-Ka`ū Archaeological Complex, SHPD site 10-62-5503; and Keawa`iki of the Keawa`iki Complex, SHPD site 10-72-2161.

Several fishponds on Oʻahu are listed on the NRHP, including Heʻeia (Kāneʻohe, Koʻolaupoko), Huilua (Kahana Bay, Koʻolauloa), Kahaluʻu (Koʻolaupoko), and Moliʻi (Koʻolaupoko). In addition, on March 14, 1973, Loko Okiokiolepe, also on Oʻahu, was officially listed in the NRHP (Hawaiʻi State Historic Preservation Office, 2006; U.S. Department of the Navy, Commander Navy Region Hawaiʻi, 2002, as cited in U.S. Navy 2008a). Most of the interior of Loko Okiokiolepe has been filled, but the seaward coral wall still remains intact (Naval Facilities Engineering Command, 2006, as cited in U.S. Navy 2008a). Menehune fishpond, also known as Alekoko, in Kauaʻi County is another NRHP-listed fishpond. The island of Molokaʻi has numerous NRHP-listed fishponds, including Molokaʻi Fishponds Multiple Property. The islands of Hawaiʻi, Maui, and Lanaʻi also include fishponds located adjacent to the shoreline.

A table of Hawaiian fishponds is provided in Appendix A.

3.6 Natural Hazards

Natural hazards have always posed a threat to fishponds, yet practitioners report an increased frequency with which fishponds have suffered damaged from tsunamis, storm surges or coastal inundation. It is believed that this may be caused by compounding factors, such as the degradation of the kuapā and makahā over time weakening the overall pond structure, neglect of sedimentary conditions leading to changes in localized oceanographic conditions (i.e. intertidal zone), and the improper restoration of the ponds using techniques not suitable. Moreover, an increase in terrestrial hazards from droughts and/or flooding has also been recorded.

4.0 Potential Environmental and Cultural Impacts of the Proposed Program

While most environmental assessments only review the harmful impacts of programs and projects, this assessment recognizes that restoration projects can have significant benefits that should be weighed in the planning process. This Section reviews both positive and adverse impacts of the proposed program and thereby identifies the many benefits that may potentially develop from this programmatic activity.

The proposed action and alternatives involve primarily short-term restoration, repair, maintenance and reconstruction activities. As described in Section 2, fishpond practitioners have developed and refined many BMPs and monitoring measures for carrying out their activities. As described in Section 3, the existing baseline conditions within the geographic scope of analysis vary with the level of human activity and presence (i.e., from minimally populated rural areas to heavily developed beachfront communities). This section will discuss the impacts of the Proposed Action and Alternatives on each relevant resource component. Each aspect of the environment that may be affected by the Proposed Action is discussed to the level of detail commensurate with the potential effect. Those aspects of the environment that would not be affected are discussed briefly. These impacts will be compared to the existing baseline conditions by rating them as negligible, minor, moderate and major. These ratings are made by taking into consideration the content, intensity, and likelihood of the impact.

4.1 Physical Effects

None of the alternatives presented in this dPEA would significantly affect the soils within the area of potential effect, nor would the topography be significantly impacted. Activities are expected to include fishpond wall reconstruction, some grading and grubbing actions, possibly including minor to moderate excavation of sediment from loko i`a and removal of vegetation, both of which compromise the functional integrity of the system. Potential effects of coastal littoral sediment processes will be assessed in the review process.

Any grading and/or grubbing activities would utilize standard and appropriate site specific best management practices (BMPs) to prevent discharge and protect soil resources.

The proposed action does not anticipate including county grading and grubbing permits in the program at this time. Therefore, additional grading and grubbing permits may be required by the respective counties prior to any actions taking place.

Physical Effects: Minor or negligible adverse effects

4.2 Water Effects

Hawaiian fishpond systems are considered open coastal waters. The Proposed Action would not have a significant negative environmental impact on water quality or water resources, individually or cumulatively. Conversely, it is likely that the actions, which will restore functional integrity and ecosystem services to the fishpond systems, will result in individual and cumulative benefits to both the individual ponds' water resources and to the receiving waters.

Activities related to water resources would include, but not be limited to, the following:

- Clearing of `auwai, or traditional waterways, to allow for restoration of fresh water flow into the loko i`a, thus restoring functional integrity and ecosystem services;
- Removal of invasive species from loko i`a that diminish oxygen and other ecosystem services to the pond system;
- Restoration of pūnāwai, wai hū, waipuna, kele, `ele, kahawai and/or other fresh water sources for the purpose of restoring functional integrity to the system and ecosystem services; and/or
- Stocking and breeding native species of flora and fauna using traditional methods for the purpose of restoring functional integrity and ecosystem services to the system.

All activities will adhere to standard and additional site specific BMPs as appropriate to minimize, mitigate, monitor and manage any short-term impacts during restoration actions.

The programmatic activities are limited to traditional Hawaiian fishpond activities and have no potential to be a significant source of pollutants or toxins, and therefore would not significantly increase the potential for pollutants or toxins to impact the water quality in the affected geographic area. Additionally, fishpond systems would maintain activities associated with traditional aquaculture, which also have no potential to be a significant source of pollutants or toxins.

Salinity is unlikely to be an issue, considering fishponds open coastal waters status, yet maintaining and restoring fresh water resources may reduce salinity in ponds, thus restoring functional integrity and ecosystems services to ponds currently not suitable for traditional aquaculture. Fresh water input is critical to pond function, as it helps foster an attractive and healthy breeding environment for young fish, known to practitioners as pua.

Restoration activities are likely to have minor, short-term impacts to turbidity, which is a measure of water clarity. Turbidity can be a natural occurrence in ponds, but it can be exacerbated by erosion and other land-based factors. Turbidity can be successfully mitigated and minimized through BMPs. Managing turbidity is a necessity of the program, as any factors that would reduce storage capacity of the ponds or impair the environment for cultivation defeats the purpose of restoration and function. Managing and minimizing turbidity in the pond environment results in managing and minimization of turbidity in the receiving waters. The program, through its BMPs, thereby facilitates enhancement of important and needed community stewardship of these coastal resources.

Increased nutrients may also be an issue of concern, but again, activities that have a cumulative negative impact on water quality or otherwise impair water quality are counterproductive

towards the purpose of the program, which is to restore functional integrity and ecosystem services. High nutrient levels can cause a series of problems, including odor, inhibitory environmental factors, and/or algal blooms. Recognizing that phosphorous, nitrogen and other elements can enter pond systems via soil or other sedimentation, BMPs will be instituted to minimize adverse impacts to water quality in the pond, which thereby minimizes adverse impacts to water quality in the receiving waters outside the pond wall structures. BMPs are effective in controlling erosion and run-off, including reducing nutrients in waterways. Again, this will have a cumulative positive impact on water quality in active program areas.

Section 101(a) of the Clean Water Act defined the national goal of restoring and maintaining the chemical, physical and biological integrity of the Nation's waters. Section 303(a)(4) of the Clean Water Act explicitly refers to satisfaction of the antidegradation requirements of 40 CFR 131.21 prior to taking various actions which would lower water quality. The EPA Region 9 antidegradation guidance specifies: "The first step in any antidegradation analysis is to determine whether or not the proposed action will lower water quality... If the action will not lower water quality, no further analysis is needed and EPA considers 40 CFR 131.12 to be satisfied."

Loko i`a restoration activities have been shown to have a long term and cumulative benefit to water quality. Therefore, the proposed action will not, nor does it have the potential, to lower water quality. Any incremental changes to nutrient levels, dissolved oxygen or turbidity that may result from the restoration of structures or removal of invasive species for the purpose of restoring functional integrity and ecosystem services will be short-term and have negligible impact on the cumulative water quality of the pond systems.

In addition to the Best Management Practices set forth in Section 4.2.1, additional conditions, BMPs and monitoring are likely to be developed in consultation with USACE, USFWS, NOAA, DLNR and/or additional agencies and fishpond practitioners in the course developing the Programmatic Agreement.

Water Effects: Minor or negligible adverse effects

4.2.1 Best Management Practices Relating to Water Quality

Prior to commencing with any programmatic activities that may potentially impact water quality, the following BMPs shall be implemented, adopted and adapted from the U.S. Army Corps of Engineers, 2012 Nationwide Permit Honolulu District Regional Conditions.

4.2.1.1 Site Identification

Prior to commencing with activities that may affect water quality, project limits of authorized sites must be clearly identified in the field (e.g., by staking, flagging, silt fencing, buoys, existing footprint for maintenance activities, etc.) to ensure that impacts to waters of the United States (including wetlands) beyond project footprints are avoided. Such identification of protect limits must be properly maintained until activities are completed and the any displaced soils have been stabilized.

4.2.1.2 Standard Best Management Practices

To the extent applicable, the following BMPs must be implemented to minimize the degradation of water quality:

- a. Turbidity and sediment from project-related work, including work relating to system structures, must be minimized and contained to the immediate vicinity of the authorized activity through the appropriate use of effective sediment containment devices.
- b. To the extent practicable, the work must be conducted in the dry season or when any affected stream has minimal to no flow. The site must be stabilized to prevent erosion and runoff and work must stop during flooding, intense rainfall, storm surge, or high surf conditions. To the extent practicable, work must be done during low tides.
- c. No project-related materials (fill, revetment rock, pipe, etc.) shall be stockpiled in the aquatic environment (intertidal zones, reef flats, stream channels, wetlands, etc.) or in close proximity such that materials could be carried into waters by wind, rain, or high surf.
- d. All debris and material removed from the marine/aquatic environment shall be disposed of at an approved upland or alternative disposal site.
- e. No contamination (by trash, debris sediment, non-native species introductions, attractions of non-native pests, etc.) of adjacent waters of the United States, including special aquatic sites, shall result from project-related activities. Special attention must be paid to the fouling level on barges, vessels, and equipment whereas to minimize the transport and potential introduction and spread of aquatic non-native species. In addition, if dredged or excavated material or structural members are removed from the water or placed in the water, measures must be taken to prevent the spread or introduction of any aquatic non-native species. Additional conditions may be utilized to help meet this condition or related conditions.
- f. Silt fences, silt curtains, or other appropriate containment structures shall be installed to contain sediment and turbidity at the work site (a) parallel to, and within 10 feet of, the toe of any fill or exposed soil which may introduce sediment to an adjacent aquatic site; and (b) adjacent to any fill placed or soil exposed within an aquatic site. All silt fences, curtains, and other structures shall be installed properly and permanently stabilized, be self-sustaining, and remain in place until any turbidity levels elevated due to construction have returned to ambient levels.
- g. When the discharge of fill material results in the replacement of wetlands or waters of the US with impervious surfaces, the authorized activities must not result in more than minimal degradation of water quality. To ensure the proposed activity does not cumulatively degrade water quality from increasing impervious area, projects should incorporate low impact development stormwater practices (e.g., native landscaping, bioretention and infiltration techniques, buffers, green roofs and green spaces) to the extent practical to retain stormflows and pollutants on-site.

4.3 Biological Effects

This assessment of biological effects addresses potential impacts of implementing the fishpond system restoration program as required under Hawai‘i Revised Statutes Section 343 et seq. on biological resources, including species that are listed as endangered or threatened under the Endangered Species Act (ESA), on their designated critical habitat and other species. This section is adapted from the Biological Evaluation of Effects of Implementing Standard Local Operating Procedures for Endangered Species in the Central and Western Pacific Region (Pac-SLOPES) on ESA-Listed Sea Turtles and Marine Mammals (U.S. Army Corps of Engineers Honolulu District, July 2010). A more comprehensive biological evaluation will be prepared by the USACE, Regulatory Branch, in compliance with Section 7(c) of the ESA of 1973 upon submission of a USACE general permit application.

The activities identified and authorized under the Proposed Action and program are likely to trigger the need for authorization by the U.S. Army Corps of Engineers Honolulu District, which is responsible for overseeing and permitting certain activities regulated under Section 10 of the Rivers and Harbors Act of 1899 (Section 10) and/or Section 404 of the Clean Water Act (Section 404). Structures or work in, above, or beneath navigable waters of the United States require a Department of the Army (DA) permit under Section 10 prior to the commencement of work. The law applies to any dredging or disposal of dredged materials, excavation, filling, rechannelization, or any other modification of a navigable water of the United States, and applied to all structures, from the smallest floating dock to the largest commercial undertaking.

Section 404 requires a DA permit, issued by the Corps on behalf of the Office of the Secretary of the Army, prior to the discharge of dredged or fill material into any waters of the United States, including wetlands. Discharged of fill material generally include, but are not limited to: placement of fill necessary for the construction of any structure, or impoundment requiring rock, sand, dirt, or other material for its construction; site development fills for recreational, industrial, commercial, residential, and other uses; causeways or road fills; dams and dikes; artificial islands; property protection or reclamation devices such as riprap, groins, sea walls, breakwaters, and revetments; beach nourishment; levees, fill for intake and outfall pipes and subaqueous utility lines; fill associated with the creation of ponds; and other work involving the discharge of dredged or fill material. A DA permit is required irrespective of whether the work is permanent or temporary.

Nearly all marine waters, as well as the lower reaches of many freshwater streams, within the Corps’ jurisdiction are occupied by ESA-listed marine species. Because the Proposed Action will occur within, near, or upstream of the marine environment, they have the potential to impact ESA-listed marine animals and their habitats across the Program’s geographic area.

Additionally, it has been determined that “[m]any of the old fishponds provide important habitat for Hawaii’s non-migratory waterbirds and shorebirds. Some of the fishponds best known for their waterbird habitat include: Kahana Pond on Maui; Loko-Waka (Loko-aka) Pond, Makalawena Fishpond (Opaepala), And `Aimakapa Fishpond on Hawaii Island; Nuupia Ponds, Kawai nui Marsh, and (prior to development) Ka`elepulu Pond on Oahu” (Morin 1994). Despite the presence of waterbirds and shorebirds in some ponds, organizations and practitioners have successfully worked with USFWS through the development of BMPs and other conditions to minimize any impact on protected species and their habitats (e.g., Ku`u Ali`i Fishpond and

Aimakapa Fishpond). It is also recognized that “[s]alinity modifications, siltation removal, alteration of water depth, the introduction of nutrients, human activities, and other practices that may optimize aquaculture are potential sources of disturbance or habitat degradation for waterbirds” (Morin 1994). Yet, it has also need recognized that there are also net benefits from system restoration, like the positive impacts from pest and rodent control and monitoring activities (Morin 1994).

In addition to the Best Management Practices set forth in Section 4.3.1, additional conditions, BMPs and monitoring are likely to be developed in consultation with USACE, USFWS, NOAA, DLNR and/or additional agencies and fishpond practitioners in the course developing the Programmatic Agreement.

Biological Effects: Minor or negligible adverse effects

4.3.1 Best Management Practices Relating to Biological Resources

Prior to commencing with any programmatic activities that may potentially biological resources, the following BMPs shall be implemented, adopted and adapted from the U.S. Army Corps of Engineers, 2012 Nationwide Permit Honolulu District Regional Conditions and other similar projects.

4.3.1.1 Review and Evaluation

As part of the Program’s application review and/or operational planning process:

- 1) The Corps will confirm whether or not a proposed project is within the present or historic range of an ESA-listed marine species or designated critical habitat, and make an effects determination;
- 2) If the Corps determines that the project may affect an ESA-listed marine species or critical habitat, the Corps will review the project for applicability under Pac-SLOPES based on the following criteria: a) The proposed project conforms with all applicable requirements and limitations described herein; b) that the general conditions below can be applied to the project; and c) all potential effects on ESA-listed marine species or critical habitats are within the range of effects considered in the programmatic consultation with NMFS PRD for the implementation of Pac-SLOPES. Actions that do not initially comply with Pac-SLOPES may be brought into compliance through technical assistance between the applicant, the Corps, NMFS, FWS and/or DLNR OCCL; and
- 3) NMFS PRD and FWS will confirm with DLNR OCCL and the Corps that the given action complied with Pac-SLOPES or other application authorization.

4.3.1.2 Standard Best Management Practices (General Conditions)

The Program's administrating agency (DLNR OCCL) will work with the Corps as deemed necessary and appropriate to apply the following set of general conditions to each action authorized under Pac-SLOPES or other applicable authorization.

- a. Each applicable condition, BMP, and conservation measure will be included as an enforceable part of the authorization document.
- b. State and/or federal agencies, including but not limited to the Corps will retain the right of reasonable access to projects authorized under the program to monitor compliance with and effectiveness of authorization conditions.
- c. All on-site personnel shall be apprised that they are working in an environmentally sensitive area and that endangered Hawaiian waterbirds may be in the vicinity of the project. Note: It may prudent to assist the applicants by providing a qualified biologist on site for one day to identify any birds in the area and/or to train the applicants to recognize birds of concern. DLNR OCCL may be able to coordinate with FWS to be able to assist in this effort.
- d. Each authorization will contain the requirement that the authorized entity document and report to DLNR OCCL (and thereby the Corps, NMFS and FWS) all interactions with listed species, including the disposition of any listed species that are injured or killed. Should an ESA-listed species be adversely affective, all work must stop pending reinitiation and completion of consultation between DLNR OCCL, the Corps, NMFS PRD and/or FWS for that action.
- e. Constant vigilance shall be kept for the presence of ESA-list species during all aspects of the permitted and/or authorized action(s)
 1. A responsible party, i.e., site manager / project supervisor, shall designate a competent observer to survey work sites and the areas adjacent to the authorized work area for ESA-listed marine species;
 2. Surveys shall be made prior to the start of the work each day, including prior to resumption of work following any break of more than one-half hour. Periodic additional surveys throughout the work day are strongly recommended;
 3. If any federally protected waterbird species appears within 100 feet (30.5 meters) of ongoing, in-water work, work activity shall be temporarily suspended until bird leaves the area of its own accord.
 4. If a waterbird nest is discovered, all work shall cease and DLNR OCCL should be contacted immediately, who shall then notify FWS immediately.
 5. All in-water work will be postponed or halted when ESA-listed marine species are within 50 yards of the proposed work, and will only begin/resume after the animal(s) have voluntarily departed the area, within the following exemption: if ESA-listed marine species are noticed within 50 yards after work after already begun, that work may continue only if, in the best

judgment of the responsible party, the activity is unlikely disturb or harm the animal(s); and

6. No one shall attempt to feed, touch, ride, or otherwise intentionally interact with any protected species.
- f. Project footprints must be limited to the minimum area necessary to complete the project.
- g. The project area must be flagged to identify sensitive resource areas, such as seagrass beds, coral resources, listed terrestrial plants, and turtle nets.
- h. Work located makai of the Mean Higher High Tide Line of a navigable water or makai of the upward limits of adjacent wetlands must be timed to minimize effects on ESA-listed species and their habitats.
- i. Project operations must cease under unusual conditions, such as large tidal events and high surf conditions, except for efforts to avoid or minimize resource damage.
- j. A stormwater management plan, commensurate to the size of the project, must be prepared and carried out for any project that will produce any new impervious surface or a land cover conversion that will slow the entry of water into the soil to ensure that effects to water quality and hydrology are minimized.
- k. A pollution and erosion control plan for the individual project site(s) and adjacent areas must be prepared and carried out. As a minimum, this plan shall include:
 1. Proper installation and maintenance of silt fences, saudades, equipment diapers, and/or drippans;
 2. A contingency plan to control and clean spilled petroleum products and other toxic materials;
 3. Appropriate materials to contain and clean potential spills will be stored at the work site, and be readily available;
 4. All project-related materials and equipment placed in the water will be free of pollutants;
 5. Daily pre-work inspections of heavy equipment for cleanliness and leaks, with all heavy equipment operations postponed or halted until leaks are repaired and equipment is cleaned;
 6. Fueling of project-related vehicles and equipment will take place at least 50 feet away from the water, preferably over an impervious surface;
 7. A plan will be developed to prevent trash and debris from entertain the marine environment during the project; and
 8. All construction discharge water must be treated before discharge.
- l. Erosion controls must be properly installed before any alteration of the area may take place.

- m. All disturbed areas must be immediately stabilized following cessation of activities for any break in work longer than 4 days.
- n. Additional conditions may be required based on a site specific analysis of potential biological resources in the area and potential impacts.

4.4 Socioeconomic Effects

It has been noted that “[f]ishponds in a high state of disrepair may never become profitable if the capital required for restoration, including the extraordinary complex permitting process, is excessive” (Fleming et al., 1995). This program has the potential to substantially improve “the extraordinary complex permitting process” and thereby significantly reduce the expenses required for restoring traditional fishpond systems in Hawai`i.

Once this issue is resolved through this program, startup costs of fishpond activities will be considerable reduced. Economic studies on the value of traditional fishponds have concluded, “Functioning traditional Hawaiian fishponds have cultural, environmental, educational, aesthetic, and economic benefits. ...Fishpond production provides a highly desirable food source for the community and offers an income for the fishpond operator” (Fleming et al., 1995).

The Proposed Action would enhance the productivity and efficiency of the existing aquaculture operations and would support the longevity of the fishpond system operations across the state.

Socioeconomic Effects: Negligible adverse effects

4.5 Cultural Effects

The Proposed Action would not be expected to have significant adverse impacts on cultural, historical and archaeological resources. Conversely, the program would yield tremendous educational and cultural benefits to affected communities and organizations, as it aims to restore the structural integrity and functional integrity of these historic and cultural properties. BMPs would help to ensure all restoration occurred in a manner consistent with state and federal law.

Cultural Effects: Minor or negligible adverse effects

4.5.1 Best Management Practices Relating to Cultural Resources

DLNR OCCL has already been in contact with the State Historic Preservation District in regards to the proposed program. The restoration and maintenance resulting from the program will have a positive effect on the environmental, cultural, and archaeological resources of the area. In order to ensure that the known archaeological and cultural sites are not adversely impacted by program activities specific concerns related to the preservation of the sites will be discussed prior to the start of any authorized activities. Additionally, stone movements and structural work shall be strictly confined to the subject area as to not impact undocumented cultural features.

Should any concerns regarding specific sites or activities arise, site specific conditions may be developed and a qualified archaeological monitor will meet with the applicant and program staff to discuss the procedures for monitoring. It will be explained that the monitoring archaeologist has the authority to halt activities in the event that cultural resources are in danger of being adversely impacted. If program activities may damage, or appear to have the potential to damage, a known archaeological feature, or if previously unidentified cultural resources are discovered during monitoring, and are deemed significant (and thus Historic Properties), the monitoring archaeologist will immediately notify the SHPO and coordinate consultation as appropriate with any groups or organizations. Additionally, the SHPO will be notified in writing upon the on-set and completion of the monitoring activities.

Additional conditions, BMPs and monitoring are likely to be developed in consultation with USACE, SHPD, DLNR OCCL and/or additional agencies and fishpond practitioners in the course developing the Programmatic Agreement.

4.6 Effects on Natural Hazards

A study by the Coastal Geology Group at the University of Hawaii has identified that natural hazards, specifically coastal hazards including, but not limited to erosion, waves from large swell, hurricanes, tsunamis and sea-level rise threaten pose a threat to fishponds and other cultural resources. This program would significantly improve the ability to maintain and restore cultural resources impacted by natural and coastal hazards by allowing for practitioners to immediately restore structures impacted by natural disasters.

Effects on Natural Hazards: Negligible Effects

4.7 Effects on Other Environmental Elements

The Proposed Action would not result in significant long-term impacts to noise, vegetation, aesthetics, traffic, utilities, population and demographics, public access to the coastline, and/or air quality.

5.0 Environmental Regulations and Permits

5.1 Environmental Regulations

As mentioned in Section 1.2.1, there are many different permits and regulatory requirements involved in restoration actions. The intent of this section is to articulate regulations that may be applicable to the program.

5.1.1 Clean Water Act

Section 301(a) of the Clean Water Act prohibits the discharge of pollutants into “navigable waters” except in compliance with sections 402, 404, and certain other provisions. Navigable waters are defined in section 502(7) as “waters of the United States, including the territorial seas.” “Waters of the United States” are in turn defined as regulation to include wetlands which are adjacent to water bodies which are themselves waters of the United States (e.g., wetlands adjacent to tidal waters, wetlands adjacent to traditionally navigable waters, wetlands adjacent to tributaries of those waters, etc.) and isolated wetlands whose use, destruction, or degradation could affect interstate commerce (40 CFR §230.3(s)). The term “wetlands” is defined by regulation to mean “those areas which are inundated or saturated at a sufficiency and duration to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions” (40 CFR §230.3(t)).

In addition to the prohibition of section 301(a), other Clean Water Act requirements application to “navigable waters,” like the development of water quality standards under section 303, water quality management planning under sections 208 and 303(e), enforcement under section 309, etc., also apply to those wetlands which are “waters of the United States.”

5.1.1.1 Section 401

The purpose of § 401 of the Clean Water Act (CWA) is for states to use its process to ensure that no federal license or permit authorizes an activity that would violate the state's water quality standards or become a future source of pollution. A § 401 Water Quality Certification (WQC) covers construction, operation, maintenance and decommissioning of a proposed project, and conditions of the WQC become conditions of the federal license or permit.

5.1.1.2 Section 404

CWA Section 404 establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Responsibility for administering and enforcing Section 404 is shared by the U.S. Army Corps of Engineers (USACE) and EPA. USACE administers the day-to-day program, including individual permit decisions and jurisdictional determinations; develops policy and guidance; and enforces Section 404 provisions. EPA develops and interprets environmental criteria used in evaluating permit

applications, identifies activities that are exempt from permitting, reviews/comments on individual permit applications, enforces Section 404 provisions, and has authority to veto USACE permit decisions.

5.1.2 Endangered Species Act

The Endangered Species Act of 1973 (ESA) (16 U.S.C. 1531-1544, 87 Stat. 884, as amended) requires the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) to identify plant and animal species that are threatened or endangered since “...various species of fish, wildlife, and plants in the United States have been rendered extinct as a consequence of economic growth and development untempered by adequate concern and conservation; other species of fish, wildlife, and plants have been so depleted in numbers that they are in danger of or threatened with extinction; these species of fish, wildlife, and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people; the United States has pledged itself as a sovereign state in the international community to conserve to the extent practicable the various species of fish or wildlife and plants facing extinction...” Federal agencies are required to assess the effect of any project on threatened and endangered species under Section 7 of the ESA.

5.1.2.1 Section 7

Section 7 of the Endangered Species Act (ESA) requires Federal agencies to ensure that actions they authorize, fund, or carry out do not jeopardize the existence of any species listed under the ESA, or destroy or adversely modify designated critical habitat of any listed species. Thus, Section 7 requires consultation by the Federal 'action agency' (the agency authorizing, funding, or carrying out the action) with the appropriate regulatory agency, either the National Marine Fisheries Service (NMFS) for marine species, or the U.S. Fish & Wildlife Service (USFWS) for terrestrial and freshwater species.

5.1.3 Rivers and Harbors Act

The Rivers and Harbors Act address projects and activities in navigable waters and harbor and river improvements. Several of these Acts provided a number of regulatory authorities, the implementation of which has evolved over time. This profile addresses only those sections that relate to the Corps Regulatory program.

5.1.3.1 Section 10

Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403) prohibits the unauthorized obstruction or alteration of any navigable water of the United States. This section provides that the construction of any structure in or over any navigable water of the United States, or the accomplishment of any other work affecting the course, location, condition, or physical capacity

of such waters is unlawful unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army. The Secretary's approval authority has since been delegated to the Chief of Engineers.

5.1.4 Migratory Bird Treaty Act

The Migratory Bird Treaty Act (16 U.S.C. 703-712) protects many species of migratory birds. Specifically, the act prohibits the pursuit, hunting, taking, capture, possession, or killing of such species or their nests and eggs. An activity will be determined to have a significant adverse effect when it is found within a reasonable period of time to diminish the capacity of a population of a migratory bird species to maintain genetic diversity, to reproduce, and to function effectively in its native ecosystem.

5.1.5 Fish and Wildlife Coordination Act

The purpose of the Act is to recognize the contribution of wildlife resources to the Nation, the increasing public interest and significance thereof due to expansion of our national economy and other factors, and to provide that wildlife conservation receives equal consideration and be coordinated with other features of water-resources development programs (16 U.S.C. 661). The terms "wildlife" and "wildlife resources", as used in this Act, "include birds, fishes, mammals and all other classes of wild animals and all types of aquatic and land vegetation upon which wildlife is dependent" (16 U.S.C. 666(b)). The Secretary of the Interior, through the U.S. Fish and Wildlife Service (USFWS) is authorized to assist and cooperate with Federal, state and public or private agencies and organizations in the conservation and rehabilitation of wildlife. (The National Marine Fisheries Service (NMFS) provides similar assistance and cooperation for wildlife species under the management responsibilities of the Department of Commerce). 16 U.S.C. 662(a) provides that whenever the waters of any stream or other body of water are proposed to be impounded, diverted, the channel deepened or otherwise controlled or modified, the Corps shall consult with the U.S. Fish and Wildlife Service (FWS), the National Marine Fisheries Service (NMFS) as appropriate, and the agency administering the wildlife resources of the state. The consultation shall consider conservation of wildlife resources with the view of preventing loss of and damages to such resources as well as providing for development and improvement in connection with such water resources development.

5.1.6 Federal Coastal Zone Management Act

The Federal Coastal Zone Management Act of 1972 (as amended 16 U.S.C. 1451, et seq.) excludes Federal lands from the coastal zone. However, Federal agencies that conduct activities directly affecting the zone must ensure that the activity is consistent with the State's Coastal Zone Management Program. The Hawaii Coastal Zone Management Program (HRS Chapter 205A), which is administered by the Department of Land and Natural Resources, regulates public and private uses in the coastal zone. The objectives and policies of the program consist of providing recreational resources; protecting historic and scenic resources and the coastal

ecosystem; providing economic uses; reducing coastal hazards; and managing development in the coastal zone. The Hawaii Coastal Zone Management Program designates special management areas in the coastal zone which are subject to special controls on development. These areas extend inland from the shoreline and are established by the county.

5.1.7 National Historical Preservation Act

The Act establishes preservation as a national policy and directs the Federal government to provide leadership in preserving, restoring and maintaining the historic and cultural environment of the Nation. Preservation is defined as the protection, rehabilitation, restoration, and reconstruction of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, or engineering. The Act authorizes the Secretary of the Interior to expand and maintain a national register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology and culture, referred to as the National Register.

Federal agencies having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking shall take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. Federal agencies shall afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on each undertaking (Section 106 (16 U.S.C. 470f)). In addition, federal agencies shall assume responsibility for the preservation of historic properties that are owned or controlled by the agencies. They also shall establish a program to locate, inventory and nominate all properties under the agency's ownership or control that are eligible for inclusion on the National Register (Section 110(16 U.S.C. 470h-2)).

Cultural resources include prehistoric and historic artifacts, archaeological sites (including underwater sites), historic buildings and structures, and traditional resources (such as Native American and Native Hawaiian religious sites). Cultural resources of particular concern include properties listed in or eligible for inclusion in the National Register of Historic Places (National Register). Section 106 of the National Historic Preservation Act (16 U.S.C. 470 et seq.) requires Federal agencies to take into consideration the effects of their actions on significant cultural properties. Implementing regulations (36 CFR 800) specify a process of consultation to assist in satisfying this requirement. To be considered significant, cultural resources must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the National Register. The term “eligible for inclusion in the

National Register” includes all properties that meet the National Register listing criteria specified in Department of Interior regulations at 36 CFR 60.4. Resources not formally evaluated may also be considered potentially eligible and, as such, are afforded the same regulatory consideration as listed properties. Whether prehistoric, historic, or traditional, significant cultural resources are referred to as historic properties.

5.1.8 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265) (16 U.S.C. 1801-1882, April 13, 1976, as amended) requires that Federal agencies consult with NMFS on activities that could harm Essential Fish Habitat (EFH) areas. EFH refers to “those waters and substrate (sediment, hard bottom) necessary to fish for spawning, breeding, feeding or growth to maturity.”

5.1.9 Marine Mammal Protection Act

The Marine Mammal Protection Act (16 U.S.C. 1361, et seq.) gives the USFWS and NMFS co-authority and outlines prohibitions for the taking of marine mammals. A take means to attempt as well as to actually harass, hunt, capture, or kill any marine mammal. Subject to certain exceptions, the Act establishes a moratorium on the taking and importation of marine mammals. Exceptions to the taking prohibition allow USFWS and NMFS to authorize the incidental taking of small numbers of marine mammals in certain instances.

5.1.10 National Marine Sanctuaries Act

The National Marine Sanctuaries Act (NMSA) 16 U.S.C. § 1431 et seq. authorizes the Secretary of Commerce to designate as National Marine Sanctuaries areas of the marine environment that possess conservation, recreational, ecological, historical, research, and educational, or aesthetic resources and qualities of national significance, and to provide a comprehensive management and protection of these areas. To protect the area designated, any Federal action that is likely to destroy, cause the loss of, or injure a sanctuary resource must consult with the Secretary of Commerce prior to commencement of the action and adhere to reasonable and prudent alternatives set by the Secretary of Commerce. To the extent practicable, consultation may be consolidated with other consultation efforts under other Federal laws, such as the Endangered Species Act.

The NMSA allows the Secretary to issue regulations for each sanctuary designated and the system as a whole that, among other things, specify the types of activities that can and cannot occur within the sanctuary. The Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) was signed into law in November 1992. The Final EIS/Management Plan was released in March 1997, and the final rule was published in November 1999. The sanctuary includes specific areas from the coast of the Hawaiian Islands seaward to the 100-fathom isobath.

5.2 Permits

The State Programmatic General Permit will seek to include a range of permitting requirements into a single program, thereby helping to facilitate program activities for communities and

practitioners who may otherwise lack the financial resources necessary to complete the extensive permitting process.

5.2.1 U.S. Army Corps of Engineers Regional General Permit

Regional General Permits are used to authorize similar activities that cause only minimal individual and cumulative environmental impacts. Regional general permits are developed by individual districts to streamline project review by minimizing duplication of other federal, state and local review processes, while still protecting aquatic resources. Regional general permits may be restricted for use in areas as small as a single residential development, a county, a region of the state or the entire district.

5.2.1.1 State of Hawai'i, Department of Health, Clean Water Branch (DOH) Requirements

The State of Hawai'i Department of Health's (DOH) Clean Water Branch (CWB) administers the Clean Water Act § 401 Water Quality Certification program. The State of Hawai'i § 401 Water Quality Certification program is further administered by Hawai'i Administrative Rules § 11-54. Under these administrative rules, activities like those proposed under this program that are minor and non-controversial are eligible for a waiver from water quality certification requirements. Specifically, HAR § 11-54-9.1.04 (b) states: "If the discharge resulting from an activity receives a determination to be covered under a nationwide permit authorization, thereby fulfilling specific conditions of that permit pursuant to 33 CFR Sections 330.4, 330.5, and 330.6 then the [State of Hawai'i] [D]irector [of Health] will determine, on a case-by-case basis, which projects are considered minor and non-controversial. Certification requirements of section 11-54-9.1 shall be waived for minor and non-controversial activities within one year of receipt of a complete water quality certification application."

5.2.1.2 National Historic Preservation Act (NHPA) Compliance

Section 106 of the National Historical Preservation Act addresses the need for federal agencies to take into account impacts, if any, undertakings have on historic properties. Protection of Historic Properties and Section 106 analysis are regulated under 36 CFR Part 800. This part provides guidelines as to conducting an analysis in assessing when and how to undergo Section 106 review.

The first step in initiating the Section 106 process constitutes determining whether or not a proposed Federal action is an undertaking as defined in 36 CFR §800.16(y), which states: "*Undertaking* means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those required a Federal permit, license or approval."

It is like to be determined that this proposed action is an undertaking as defined in §800.16(y).

The proposed project areas include the coastal land areas, shoreline areas and nearshore ocean waters within the State of Hawai'i where existing Hawaiian fishponds are located. The specific geographic area of each individual fishpond system is defined by the type of fishpond.

NHPA Section 106 requires the agency to “take into account the effect of (an) undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register (of Historic Places.)” 16 U.S.C. § 470f. NHPA section 101(d)(6)(B) requires agency officials to consult with any Native Hawaiian organization that attaches religious and cultural significance to historic properties that may be affected by an undertaking, regardless of the location of the property. 36 CFR §800.16 provides the following definition of a “historic property”:

(1)(1) *Historic property* means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.

There may be sites within the geographic area that would meet this definition of historic properties, including, but not limited to: sites related to traditional Hawaiian navigation and other seafaring traditions, traditional Hawaiian fishponds, ko`a (traditional Hawaiian fishing shrines typically consisting of piles of coral or stone), Hawaiian heiau (religious structures), Native Hawaiian burial sites, leina (places from which spirits leapt into the spirit world), and other cultural heritage properties. NHPA section 106 requires an agency to make a reasonable and good faith effort to identify historic properties, determine whether identified properties are eligible for listing on the National Register, assess the effects of the undertaking on any eligible historic properties found, determine whether the effect will be adverse; and avoid or mitigate any adverse effects. To this end, NHPA regulations require an agency to provide Native Hawaiian organizations, as consulting parties, with “a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of historic properties, including those of traditional religious and cultural importance, articulate its views on the undertaking’s effects on such properties, and participate in the resolution of adverse effects.” 36 CFR § 800.2(c)(2)(ii)(A).

Section 106 of the National Historic Preservation Act (16 U.S.C. 470 et seq.) requires Federal agencies to take into consideration the effects of their actions on significant cultural properties. Implementing regulations (36 CFR 800) specify a process of consultation to assist in satisfying this requirement. To be considered significant, cultural resources must meet one or more of the criteria established by the National Park Service that would make that resource eligible for inclusion in the National Register. The term “eligible for inclusion in the National Register” includes all properties that meet the National Register listing criteria specified in Department of Interior regulations at 36 CFR 60.4. Resources not formally evaluated may also be considered potentially eligible and, as such, are afforded the same regulatory consideration as listed

properties. Whether prehistoric, historic, or traditional, significant cultural resources are referred to as historic properties.

NHPA defines an historic property as follows:

...any Pre-European contact or historic district, site, building, structure, or object included in, or eligible for listing on the National Register, including artifacts, records, and material remains related to such a property or resource (46 CFR 800, as amended 2006, Title III, Section 301, #5).

The term “historic property” is used in the sense defined here throughout this document.

The criteria for evaluating eligibility for listing on the National Register of Historic Places (NRHP) are as follows:

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling and association, and:

- A. That are associated with events that have made a significant contribution to the broad patterns of our history; or
- B. That are associated with the lives of persons significant in our past; or
- C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. That have yielded, or may be likely to yield, information important in prehistory or history (National Parks Service [NPS] 1997).

To qualify for protection under NHPA, a cultural resource must meet the rigorous criteria for National Register eligibility, thereby qualifying as an historic property.

If a cultural resource can be demonstrated to meet the criteria for listing on the NRHP, it qualifies as an historic property, and impacts to that historic property must be avoided or mitigated appropriately. Historic properties are protected from both indirect and direct effects. Indirect effects diminish some significant aspect of the historic property, but do not physically alter it. Direct effects physically alter the historic property in some way. The Area of Potential Effect (APE) is the area within which the proposed undertaking has the potential to either directly or indirectly impact historic properties that may be present. If an effect on an historic property is identified within the APE, consulting parties must agree on whether the effect is adverse. If an effect is adverse, either avoidance of the effect or mitigation for the effect is required under NHPA.

5.2.1.3 Endangered Species Act, Section 7 Consultation

Federally funded programs at the state and local level, such as some habitat restoration projects, require a Section 7 consultation process, which includes a biological assessment. Each federal agency must ensure that any action they authorize, fund, or carry out is not likely to jeopardize

the continued existence of a listed species in the wild, or destroy or adversely modify its critical habitat.

5.2.1.4 Essential Fish Habitat

Consultation requirements for both federal and state agencies are required under the Magnuson-Stevens Fishery Conservation and Management Act. USACE will undergo these consultations after DLNR OCCL submits a permit to cover these programmatic activities. An essential fish habitat assessment will be prepared as part of the Corps permit requirement for this project, which includes consultation with NMFS regarding potential impacts to EFH.

5.2.1.5 Fish and Wildlife Coordination Act

Under the Fish and Wildlife Coordination Act, USACE would be required to first consult with the U.S. Fish and Wildlife Service (USFWS) and, the National Oceanic and Atmospheric Administration (NOAA) National Marine Fisheries Service, as well as with state fish and wildlife agencies regarding the impacts on fish and wildlife resources and measures to mitigate these impacts.

5.2.2 Conservation District Use Permit

Conservation District Use Permits (CDUP) are required for all land uses taking place in the State Land Use Conservation District. This includes all submerged lands out to three miles. Conservation regulations and permitting procedures are covered in HAR § 13-5, as authorized under HRS § 183C-3. Pursuant to HAR § 13-5, Land Use means:

1. The placement or erection of any solid material on land if that material remains on the land more than thirty days, or which causes a permanent change in the land area on which it occurs;
2. The grading, removing, harvesting, dredging, mining, or extraction of any material or natural resource on land;
3. The subdivision of land; or
4. The construction, reconstruction, demolition, or alteration of any structure, building, or facility on land.

5.2.3 Coastal Zone Management Consistency Statement

The Hawai`i Coastal Zone Management (CZM) Program intends to issue a CZMA federal consistency general concurrence for minor federal permit activities for Hawaiian fishpond restoration, repair, maintenance and reconstruction in the State of Hawai`i. The general concurrence is being established in response to Senate Resolution No. 86, adopted by the Hawai`i State Legislature on April 10, 2012, which urges the Department of Land and Natural Resources, Department of Health, and Office of Planning to streamline the permitting process for

the restoration of Hawaiian fishponds. The resolution also requests the Office of Planning to consider “a coastal zone management program consistency statement for Hawaiian fishponds.”

Coastal Zone Management Act (CZMA) federal consistency regulations (15 CFR Part 930) establish procedures for States to issue general concurrences (15 CFR §930.53(b)) allowing similar minor work in the same geographic area to avoid repeated review of minor federal license or permit activities which, while individually inconsequential, cumulatively affect any coastal use or resource. Federal permit activities which satisfy the conditions of the general concurrence are not subject to the consistency certification and review requirements of 15 CFR Part 930, Subpart D - Consistency for Activities Requiring a Federal License or Permit.

5.2.4 National Environmental Policy Act Compliance

The Corps’ permit regulation (33 CFR 320-330) provides that general permits can be issued only for activities that are substantially similar in nature, and that cause only minimal individual or cumulative adverse environmental impact. Based on a preliminary assessment of the impacts of the general permit, the District Engineer may make a determination that issuance of the general permit would not result individually or cumulatively in a significant effect on the natural or human environment. Therefore, under the provisions of the National Environmental Policy Act of 1969 (42 U.S.C. 4321-4347) a Federal Environmental Impact Statement would not be prepared.

6.0 Conclusion

This program offers an extraordinary opportunity for the restoration and support of a critical traditional practice that would have significant benefit to Hawaiian biocultural resources and the public as a whole.

While there are likely to be minimal short-term impacts to water quality, the long-term cumulative benefits to coastal ecosystems far and the State's responsibility to manage its natural resources, as set forth in Article XI of the Hawai'i State Constitution, far outweigh any possible short-term negligible impacts.

The agency, in consideration of the sum effects on the quality of the environment and significant criteria set forth in HAR §11-200-12, therefore anticipates the issuance of a Finding of No Significant Impact for the proposed action.

7.0 List of Agencies Consulted

7.1 Federal Agencies

7.1.1 National Marine Fisheries Services, Pacific Islands Regional Office, Aquaculture Program

7.1.2 National Ocean Service, Hawaiian Islands Humpback Whale National Marine Sanctuaries

7.1.3 U.S. Army Corps of Engineers, Honolulu District Office

7.1.4 U.S. Fish and Wildlife Service

7.2 State Agencies

7.2.1 Department of Health, Clean Water Branch

7.2.2 Office of Planning, Coastal Zone Management

7.2.3 Office of Hawaiian Affairs

7.3 Community Organizations

7.3.1 Hui Loko ʻa Kuapā

8.0 List of Preparers

Trisha Kēhaulani Watson, JD, PhD
Owner and Senior Consultant, Honua Consulting

Matthew Kawaiola Sproat
Consultant, Honua Consulting

Jamaica Osorio
Consultant, Honua Consulting

Damien Kahekili Cie, PhD
Consultant, Honua Consulting

Regina Hilo
Consultant, Honua Consulting

9.0 References

Anonymous. 1989. Hawaiian fishpond: Islands of Oahu, Molokai, and Hawaii. By DHM, Inc. with Bishop Museum Applied Research Group, for Hawaii Coastal Zone Management Program, Office of State Planning, Office of the Governor, Honolulu, HI.

Anonymous. 1993. Hawaii's Birds. Fourth Edition. Hawaii Audubon Society, Honolulu, HI. 112pp.

Apple, Russell Anderson and William Kenji Kikuchi. Ancient Hawai'i Shore Zone Fishponds: An Evaluation of Survivors for Historical Preservation. Honolulu: Office of the State Director, National Park Service, United States Department of the Interior, 1975.

Beckley, Emma Metcalf. Hawaiian Fisheries and Methods of Fishing with an Account of the Fishing Implements Used by The Natives of the Hawaiian Islands. Honolulu: Advertiser Steam Print, 1883.

Bigelow, Keith A. and others. Assessment of the Mangrove Ecosystem of West Moloka'i, Hawai'i, with Additional Site Surveys of Moanui Beach Park and Ualapu'e Fishpond. Honolulu: University of Hawai'i, Marine Option Program, 1989.

Bond, Jr., Stanley and Richard Gmirkin. "Restoring a Part of Hawaii's Past: Kaloko Fishpond Restoration." *Ecological Restoration* 21, no. 4 (December 2003): 285-289. [Available online from Academic Search Premier](#)

Brainard RE, Birkeland C, Eakin CM, McElhany P, Miller MW, Patterson M, Piniak GA 2011. Status review report of 82 candidate coral species petitioned under the U.S. Endangered Species Act U.S. Dept. of Commerce, NOAA Technical Memorandum NOAA-TM-NMFS-PIFSC-27, 530 p. + 1 Appendix

Brainard, R.E., C. Birkeland, C.M. Eakin, P. McElhany, M.W. Miller, M. Patterson, and G.A. Piniak. 2011. Status review report of 82 candidate coral species petitioned under the U.S. Endangered Species Act. U.S. Dep. Commer., NOAA Tech. Memo., NOAA-TM-NMFS-PIFSC-27, 530 p. + 1 Appendix.

Carlson, Norman K. Palaaau and the Saltwater Fishponds of Moloka'i. Honolulu: 1952.

Carpenter, K. E., Abrar M., Aeby G., Aronson R. B., Banks S., Bruckner A., Chiriboga A., Cortes J., Delbeek J. C., DeVantier L., Edgar G. J., Edwards A. J., Fenner D., Guzman H. M., Hoeksema B. W., Hodgson G., Johan O., Licuanan W. Y., Livingstone S. R., Lovell E. R., Moore J. A., Obura D. O., Ochavillo D., Polidoro B. A., Precht W. F., Quibilan M. C., Reboton C., Richards Z. T., Rogers A. D., Sanciangco J., Sheppard A., Sheppard C., Smith J., Stuart S., Turak E., Veron J. E. N., Wallace C., Weil E., and Wood E. 2008. One-third of reef-building corals face elevated extinction risk from climate change and local impacts. *Science* 321:560-563.

Chopin, T. 2006. Integrated multi-trophic aquaculture. What it is, and why you should care...and don't confuse it with polyculture. *Northern Aquaculture* 12.

Choy, Shelley, Norman K. Nakamura, Dwight H. Kondo, Michael H. Maruyama and Sherwood D. Maynard. "The Mokauea Fishpond Project: A Beginning" The History, the Accomplishments from September 1980 through March 1981. Honolulu: Marine Option Program, University of Hawai'i at Manoa, 1981.

Choy, Shelley, William Piazzie, Brian Atchison and Sherwood Maynard. "The Mokauea Fishpond Project: Phase II" April 1981-March 1982. Honolulu: Marine Option Program, University of Hawai'i, 1982.

Clifford, Diana Malia. Loko I'a O Hawai'i: Ancient Hawaiian Fishponds and Their Changing Role in Society. B.A. thesis, Princeton, 1991.

Coastal Geology Group, 2009, Coastal Hazard Analysis Report, National Park Service, Available at <http://www.soest.hawaii.edu/coasts/nps/>

Cobb, J.N. 1903. The commercial fisheries of the Hawaiian islands. Bulletin U.S. Fish Comm. 23: 717-765.

Cobb, John N. "The Commercial Fisheries." In Section III of The Aquatic Resources of the Hawaiian Islands, eds. David Starr Jordan and Barton Warren Evermann, 746-750. Washington: Government Printing Office, 1905.

Cobb, John N. The Commercial Fisheries of the Hawaiian Islands in 1903. Appendix to the report of the commissioner of fisheries to the secretary of commerce and labor for the year ending June 30, 1904. Washington: Government Printing Office, 1905, 473-478.

Costa-Pierce, B. A. 1987. Aquaculture in Ancient Hawaii. *Bioscience* 37:320-31.

Costa-Pierce, Barry A. "Aquaculture in Ancient Hawai'i." *Bioscience* 37, no. 5 (May 1987): 320-331.

Dahiell, Eugene P. and others. Waikalua Loko Fishpond Preservation Plan: Kane'ohe, O'ahu, Hawai'i. Honolulu: E.P. Dashiell, 1995.

Davis, Bertell D. "In Memory of Pearl Harbor: The Losses Gone Unsung, Environment Hawaii" 2 (6) (December 1991). [Online e-journal](#)

Davis, Bertell D. "In Memory of Pearl Harbor: The Losses Gone Unsung, Environment Hawaii" 2 (6) (December 1991). [Online e-journal](#)

Department of Commerce, National Oceanic and Atmospheric Administration, 50 CFR Part 226 [Docket No. 110207102-1136-01] RIN 0648-BA81 Endangered and Threatened Wildlife and Plants: Proposed Rulemaking To Revise Critical Habitat for Hawaiian Monk Seals, Federal Register, Vol. 76, No. 106. June 2, 2011. Available at http://www.fpir.noaa.gov/Library/PRD/Critical%20Habitat/New_5.31.11/Hawaiian%20Monk%20Seal%20-%20Redesignation%20of%20CH,%20Jun%202,%202011.pdf

Devaney, Dennis M., Marion Kelly, Polly Jae Lee and Lee S. Motteler. Kane'ohe: A History of Change. Honolulu: Bess Press, 1982.

DHM Planners Inc. and Bernice Pauahi Bishop Museum, Applied Research Group, Public Archaeology Section. Hawaiian Fishpond Study: Islands of O‘ahu, Moloka‘i and Hawai‘i. Honolulu: DHM Planners, 1989.

DHM Planners Inc., Bernice Pauahi Bishop Museum, Applied Research Group, Public Archaeology Section and Moon, O'Connor, Tam & Yuen. Hawaiian Fishpond Study: Islands of Hawai‘i, Maui, Lana‘i and Kaua‘i. Honolulu: DHM Planners, 1990.

DHM Planners Inc., Bernice Pauahi Bishop Museum, Applied Research Group, Public Archaeology Section and Moon, O'Connor, Tam & Yuen. Hawai‘i In-Depth Studies: Hawaiian Fishpond Study. Honolulu: DHM Planners, 1990.

DHM Planners Inc., Bernice Pauahi Bishop Museum, Applied Research Group, Public Archaeology Section and Moon, O'Connor, Tam & Yuen. Maui, Lana‘i and Kaua‘i In-Depth Studies: Hawaiian Fishpond Study. Honolulu: DHM Planners, 1990.

Dieudonne, Fran ed. “The Pacific Islands and the Sea: 350 Years of Reporting on Royal Fishponds, Coral Reefs and Ancient Walled Fish Weirs in Oceania.” Encinitas, Calif.: Neptune House, 2002.

Duarte, C. M. 2007. Rapid domestication of marine species. *Science* 316:382-83.

Engilis, A. and T.K. Pratt 1993 Status and population trends of Hawaii’s native waterbirds, 197701987 *Wilson Bulletin* 105: 142-158

Engilis, A., and F.A. Reid, Hawaiian Waterbirds Recovery Plan. 3rd Revision. US FWS, Region 1., 142pp

Estioko-Griffin, Agnes. An Inventory of Fishponds, Island of Moloka‘i. Honolulu : A. Estioko-Griffin, 1987.

FAO 2007. The state of world fisheries and aquaculture. 162.

Farber, Joseph M. “The Historic Fishponds of Moloka‘i, Hawai‘i,” *Coastlines: Information about Estuaries and Near Coastal Waters* 8, no. 2 (Spring 1998).

Farber, Joseph M. Ancient Hawaiian Fishponds: Can Restoration Succeed on Moloka‘i? Encinitas, Calif.: Neptune House, 1997.

Farber, Joseph. Community-Based Planning in the Coastal Zone: The Case of Moloka‘i Fishponds: Problems and Potential. Plan B paper, Master of Urban and Regional Planning, University of Hawai‘i at Manoa, 1996.

Fishpond “Ohana Restoration~Maui, Ko‘ie‘ie Loko I‘a, For Maui. [Available Online](#)

Fishponds of Hawai‘i. Honolulu: State of Hawai‘i, Department of Land and Natural Resources, 1993.

Fleming, Kent, Graydon Keala and William Monahan. “The Economics of Revitalizing Hawaiian Fishpond Production.” *Agribusiness*, February 1995.

- Forsman, Z. H., Concepcion G. T., Haverkort R. D., Shaw R. W., Maragos J. E., and Toonen R. J. 2010. Ecomorph or endangered coral? DNA and microstructure reveal Hawaiian species complexes: *Montipora dilatata/flabellata/turgescens* & *M. patula/verrilli*. *PLoS One* 5: e15021
- Friedlander, A., Aeby G., Brown E., Clark A., Coles S., Dollar S., Hunter C., Jokiel P., Smith J., and Walsh B. 2008. The state of coral reef ecosystems of the main Hawaiian Islands. In *The state of coral reef ecosystems of the United States and Pacific Freely Associated States: 2008* (J. E. Waddell, and A. M. Clarke, eds.), p. 219–257. NOAA/National Centers for Coastal Ocean Science, Silver Spring, MD.
- Greene, Linda Wedel. *A Cultural History of Three Traditional Hawaiian Sites on the West Coast of Hawai'i Island*. Denver: United States Department of the Interior, National Park Service, Denver Service Center, 1993. Available online
- Hammatt, Hallett H., Gerald Kamalu Ida and William H. Folk. *Archaeological and Ethnohistorical Survey of Kamo'omaika'i Fishponds, Hanalei, Halele'a, Kaua'i Island*. Lawa'i: Archaeological Research Center Hawaii, Inc., 1981.
- Handy, E.S. Craighill and Elizabeth Green Handy. *Native Planters in Old Hawai'i: Their Life, Lore and Environment*. Honolulu: Bishop Museum Press, 1972.
- Hawaiian Fishpond Revitalization Project. *Hawaiian Fishpond Revitalization: Proceedings of Hana Symposium II September 22-24, 1993*. Hawaiian Fishpond Revitalization Project, 1993.
- Hawaiian Fishpond Revitalization Project. *Hawaiian Fishpond Revitalization: A Manual*. Hawaiian Fishpond Revitalization Project, 1993.
- Henry, Bud. *An Inventory and Status of Recognizable Fishponds Along the Kane'ohe Bay Shoreline or "Where Have All the Fishponds Gone?"* Lanikai, Hawai'i: 1975.
- Henry, Lehman L. (Bud). *He'eia Fishpond: Loko I'a O He'eia: An Interpretive Guide for the He'eia State Park Visitor*. Kane'ohe, HI: Friends of He'eia State Park, 1993.
- Henshaw, H.W. *1902 Birds of the Hawaiian Islands*, Thrum, Honolulu, HI.
- Hiatt, Robert W. "Food Chains and the Food Cycle in Hawaiian Fish Ponds." *Transactions of the American Fisheries Society* 74 (1944): 250-280.
- Hlawati, Ian H., 2002. *Loko I'a: a Legal Guide to the Restoration of Native Hawaiian Fishponds within the Western Paradigm*, 24 *University of Hawaii Law Review* 657-692.
- Huber, Dale R. *Ancient Hawaiian Fishponds of O'ahu: A Bibliography of Map Resources*. Honolulu: 1986.
- Jayappa, K. S., Mitra, D. & Mishra, A. K. 2006. Coastal geomorphological and land-use and land-cover study of Sagar Island, Bay of Bengal (India) using remotely sensed data. *International Journal of Remote Sensing* 27:3671-82.
- Jokiel, P. L., Brown E. K., Friedlander A., Rodgers S. K., and Smith W. R. 2004. Hawai'i coral reef assessment and monitoring program: spatial patterns and temporal dynamics in reef coral

communities. *Pac. Sci.* 58:159-174.

Jokiel, P. L., Brown E., Rodgers K., and Smith W. 2007. Reef corals and the coral reefs of south Moloka'i. In *The coral reef of south Moloka'i, Hawai'i--portrait of a sediment-threatened fringing reef* (M. Field, S. Cochran, J. Logan, and C. Storlazzi, eds.), p. 43-50. US Geological Survey, Reston, VA.

Kam, Lotus E., Francisco J. Martinez-Cordero, Pingsun Leung and Anthony C. Ostrowski. "Economics of Milkfish (*Chanos Chanos*) Production in Hawai'i." In *Aquaculture Economics & Management* 7 (1-2) (2003): 95-123.

Kamakau, Samuel Manaiakalani. *The Works of the People of Old: Na Hana a ka Po'e Kahiko*. Honolulu: Bishop Museum Press, 1976.

Kane, Herb Kawainui. *Ancient Hawai'i. Captain Cook, HI: The Kawainui Press, 1997.*

Kelly, Marion. "Dynamics of Production Intensification in Precontact Hawai'i.: In *What's New? A Closer Look at the Process of Innovation*, ed." Sander van der Leeuw and Robin Torrence, 82-106. London ; Boston : Unwin Hyman, 1989.

Kelly, Marion. *Background History of Huilua Fishpond, Kahana Bay, Ko'olauloa*. Honolulu: Bernice Pauahi Bishop Museum, Department of Anthropology, 1979.

Kelly, Marion. *Brief History of Kawainui Fishpond and Associated Sites*. Honolulu: Bishop Museum, Dept. of Anthropology, 1979.

Kelly, Marion. *He'eia Fishpond, a Testament to Hawaiian Fish-Farming Technology*. Honolulu: Bernice P. Bishop Museum, Dept. of Anthropology, 1976.

Kelly, Marion. *Loko I'a O He'eia: He'eia Fishpond*, 2nd ed. Honolulu: Bernice Pauahi Bishop Museum, Department of Anthropology, 2000.

Kelly, Marion. *Some Legendary and Historical Aspects of He'eia Fishpond, Ko'olau, O'ahu*. Honolulu: Bernice P. Bishop Museum, Dept. of Anthropology, 1973.

Kikuchi, W. K. 1976. Prehistoric Hawaiian fishponds. *Science* 193:295-99.

Kikuchi, W.K. 1976. Prehistoric Hawaiian fishponds. *Science* 193: 295-299.

Kikuchi, William K. "Prehistoric Hawaiian Fishponds." *Science* 193, no. 4250 (23 July 1976): 295-299.

Kikuchi, William K. and John C. Belshe. *Examination and Evaluation of Fishponds on the Leeward Coast of the Island of Hawai'i*. Honolulu: 1971.

Kikuchi, William K. *The Chronology and Palynology of Kamo'omaika'i Fishpond: Ahupua'a of Hanalei, Halele'a District, Island of Kaua'i. Oma'o, Kaua'i: ARCHAIOS, 1991.*

Kikuchi, William. "Hawaiian Aquacultural System." Ph.D. dissertation., University of Arizona, 1973.

- Leber, Kenneth M., Robert Nishimoto and Mark Brooks. Investigation of Mullet Net Pen Stocking Densities in Coastal Fishponds For a Stock Enhancement Nursery Program: Final Report. Waimanalo: The Oceanic Institute, 1994.
- Lopez-Rodas, V., Maneiro, E., Martinez, J., Navarro, M. & Costas, E. 2006. Harmful algal blooms, red tides and human health: Diarrhetic shellfish poisoning and colorectal cancer. *Anales de la Real Academia Nacional de Farmacia* 72:391-408.
- Maciolek, John A. and Richard E. Brock. Aquatic Survey of the Kona Coast Ponds, Hawai'i Island. Honolulu: University of Hawai'i Sea Grant Program, 1974.
- Madden, William D. and Craig L. Paulsen. The Potential for Mullet and Milkfish Culture in Hawaiian Fishponds. Honolulu: Department of Planning and Economic Development, 1977.
- Malone, Thomas C. "Community Metabolism in a Hawaiian Fishpond and Its Relationship to Selected Environmental Factors." Master's Thesis, University of Hawai'i, 1968.
- Manu, Moke and others. Hawaiian Fishing Traditions. Edited by Dennis Kawaharada. Honolulu: Kalamaku Press, 1992.
- Maragos, J. E. 1993. Impact of coastal construction on coral reefs in the US-affiliated Pacific islands. *Coast. Manage.* 21:235-269.
- Maragos, J. E., Potts D. C., Aeby G., Gulko D., Kenyon J., Siciliano D., and VanRavenswaay D. 2004. 2000-2002 Rapid ecological assessment of corals (Anthozoa) on shallow reefs of the Northwestern Hawaiian Islands. Part 1: Species and distribution. *Pac. Sci.* 58:211-230.
- Martinez-Cordero, Francisco J., Pingsun Leung, Anthony C. Ostrowski and Michael D. Chambers. "Profitability Analysis of the Commercial Growout of Pacific Threadfin (*Polydactylus sexfilis*) in Hawai'i Under Different Production Systems." *Journal of Aquaculture in the Tropics* 16 (1) (February 2001): 101-112.
- Maso, M. & Garces, E. 2006. Harmful microalgae blooms (HAB); problematic and conditions that induce them. *Mar. Pollut. Bull.* 53:620-30.
- McAllister, J. Gilbert. Archaeology of O'ahu. Honolulu: Bernice P. Bishop Museum, 1933.
- Miller, Grace M. "America, Hawai'i and the Sea: The Impact of America on the Hawaiian Maritime Mode of Production 1778-1850." Ph.D. dissertation, University of Hawai'i, 1986.
- Miller, Tara L. and Charles H. Fletcher. Fall 2003. Waikiki: A Historical Analysis of an Engineered Shoreline. *Journal of Coastal Research* 19:4, 1026-1043
- Moloka'i: Fishponds. Honolulu: Dept. of Education, Office of Instructional Services/General Education Branch, 1986.
- Monroe, B.L., Jr. R.C. Banks, J.W. Fitzpatrick, T.R. Howell, N.K. Johnson, H. Ouellet, J.V. Remsen, and R.W. Storer. 1993 39th Supplement to the American Ornithologists' Union Checklist of North American Birds. *Auk* 110: 675-682.

Morin, M.P. 1994. Hawaiian Fishponds and Endangered Waterbirds on the Kona Coast, Transactions of the Western Section of the Wildlife Society 30: 66-71.

Newman, T. Stell. "Man in the Prehistoric Hawaiian Ecosystem." In A Natural History of the Hawaiian Islands: Selected Readings, ed. E. Alison Kay, 559-603. Honolulu: University Press of Hawai'i, 1972.

Oceanic Institute. A Proposal for the Establishment of a Brackish-Water Fish Culture Laboratory in Hawai'i. Makapu'u Point, O'ahu: Oceanic Institute, 1965

Pacific American Foundation. Project Kahea Loko: "The Call of the Pond": A Teacher's Guide to Hawaiian Fishponds Grades 4-12. Honolulu: Pacific American Foundation, 2003.

Paton, P.W.C, J.M. Scott and T.A. Burr. 1985. American Coot and Black-necked Stilt on the Island of Hawai'i. Western Birds 16: 175-181.

Paton, P.W.C. and Scott J.M. 1985. Water birds of Hawaii Island. `Elepaio 45: 69-76.

Pergent-Martini, C., Boudouresque, C.-F., Pasqualini, V. & Pergent, G. 2006. Impact of fish farming facilities on Posidonia oceanica meadows: a review. Marine Ecology 27:310-19

Sapkota, A. R., Lefferts, L. Y., McKenzie, S. & Walker, P. 2007. What do we feed to food-production animals? A review of animal feed ingredients and their potential impacts on human health. Environmental Health Perspectives 115:663-70.

Sea Grant College Program. "Hawaiian Fishponds." [Available online](#)

Sinoto, Aki. Archaeological Pre-Stabilization Assessment of Huilua Fishpond, Kahana, O'ahu Island. Honolulu: Bernice Pauahi Bishop Museum, Department of Anthropology, 1979.

Sterling, Elspeth P. and Catherine C. Summers. Sites of O'ahu. Honolulu: Bishop Museum Press, 1978.

Summers, Catherine C. Hawaiian Fishponds. Honolulu: Bishop Museum Press, 1964.

Summers, Catherine C. Moloka'i: A Site Survey. Honolulu: Bernice Pauahi Bishop Museum, Department of Anthropology, 1971.

Sundararagharavan, H. and R.C. Ertekin. Tidal-Jet Redirection and Temporal Gate Opening in a Hawaiian Fishpond. Honolulu: University of Hawai'i Sea Grant College Program, 1997. [Online PDF](#)

Takahashi, Chie. Restoration of Huilua Fishpond. Honolulu: Marine Option Program, University of Hawai'i, 1999.

Tamaru, Clyde S. and Christine Carlstrom-Trick. "Hawaiian Coastal Fishponds, an Ancient System for Sustainable Aquaculture." In Aquaculture Resource Development in Pacific Islands: Cultural and Community Influences, Sustainability, Technological Applications and Commercial

Opportunities, 49-54. Honolulu: University of Hawai'i Sea Grant College Program, 1998.

Tamaru, Clyde S., Christine Carlstrom-Trick and Charles Helsley. "Aquaculture in Hawai'i: Past, Present and Future." In *Open Ocean Aquaculture '97: Charting the Future of Ocean Farming: Proceedings of an International Conference*, edited by Charles E. Helsley, 257-280. Honolulu: University of Hawai'i Sea Grant College Program, 1997.

Titcomb, Margaret. *Native Use of Fish in Hawai'i*. Honolulu: University Press of Hawai'i, 1972.

Troell, M., Halling, C., Neori, A., Chopin, T., Buschmann, A., Kautsky, N. & Yarish, C. 2003. Integrated mariculture: asking the right questions. *Aquaculture* 226:69-90.

U.S. Department of Commerce. 2012. National Oceanic and Atmospheric Administration. NOAA Fisheries. Hawaii Species Identification of the 59 Indo-Pacific coral species being proposed for listing under the Endangered Species Act. Available at www.fpir.noaa.gov/Library/PRD/Coral/Corals_factsheet_Hawaii_species.pdf

Ualapu'e, Moloka'i: Oral Histories from the East End. Honolulu: Center for Oral History, 1991.

University of Hawai'i, Dept. of Urban & Regional Planning, Practicum Class. Moloka'i Fishpond Master CDUA Project. Honolulu: 1993.

Vasas, V., Lancelot, C., Rousseau, V. & Jordan, F. 2007. Eutrophication and overfishing in temperate nearshore pelagic food webs: a network perspective. *Marine Ecology Progress Series* 336:1-14.

Veron, J. E. N. 2000. *Corals of the World*. Australian Institute of Marine Science. Townsville, Australia 3 volumes.

Vockeroth, David. *The Hawaiian Fishpond (Loko Kuapa): Past and Present*. University of Hawai'i at Manoa, 1981.

Walker, R.L. E. Kridler, J.S. Medeiros, R.S. Saito, P. Sekora, G. Swedberg, T.Telfer, D. Woodside, and C.F. Zeillemaker. 1977. *Hawaiian Waterbirds Recovery Plan*. U.S. FWS Endangered Species Program, Portland, OR.

Weidenbach, M.E. "Fishpond Study Reveals Ancient Know-How." *Makai*, July 1997, 2-3.

Wyban, C.A. 1992. *Tide and Current: fishponds of Hawaii*. University of Hawaii Press, Honolulu, HI

Wyban, Carol Araki, ed. *Proceedings of the Governor's Moloka'i Fishpond Restoration Workshop*, September 6, 1991, Mitchell Pauoli (sic) Center, Kaunakakai, Moloka'i. Honolulu: Office of Hawaiian Affairs, 1991. UHM Call No: SH35.H3 .G68 1991

Wyban, Carol Araki. *Interpretive Materials for Huilua Fishpond, Kahana Valley State Park*. Honolulu: State Parks Division, Department of Land and Natural Resources, 1992.

Wyban, Carol Araki. *Master Plan for U'alapu'e Ahupua'a: Blending Tradition & Technology*. Kaunakakai: Department of Business and Economic Development, 1990.

Wyban, Carol Araki. Tide and Current: Fishponds of Hawai'i. Honolulu: University of Hawai'i Press, 1992.

Yang, Liqun, H. Sundararagharavan and R.C. Ertekin. Hawaiian Fishpond Studies: Web Page Development and the Effect of Runoff From the Streams on Tidal Circulation. Honolulu: University of Hawai'i Sea Grant College Program, 1999. [Online PDF](#)

Yang, Liqun. A Circulation Study of Hawaiian Fishponds. Honolulu: 2000. [Online PDF](#)

Yent, Martha. Field Inspection of Eroding Cultural Deposit at Huilua Fishpond, Kahana Valley State Park, Ko'olauloa, O'ahu. Honolulu: State of Hawai'i, Dept. of Land and Natural Resources, Division of State Parks, 1981.

Documented fishponds across the Hawaiian archipelago, including those currently listed on the State Historic Register and the National Historic Register.

Island	Fishpond	Ahupuaa /Area	TMK	SHPD Site #	State Historic Register	National Historic Register	Status	Documentation	Kikuchi typology (if applicable)	Acreage (year)	Additional Info.
Ni'ihau	Nameless pond	Halulu Lake						Kikuchi 1973:233, A1	Type II	400 acres (1973)	
Kaua'i	Nameless pond	Anahola						Kikuchi 1973:233, B1	Type IIIb	unknown (1973)	
	Ahau Pond	Waioli						Kikuchi 1973:233, B1A	Type IV	unknown (1973)	
	Nameless pond	Waioli						Kikuchi 1973:233, B1B	Type IV	unknown (1973)	
	Nameless pond	Waioli						Kikuchi 1973:233, B1C	Type IV	unknown (1973)	
	Alekoko; also Alakoko or Pēpē`awa	Nawiliwili						Kikuchi 1973:233, B2	Type IIIb	32.1 acres (1973)	2 makahā; built by menehune; guardian named Puhi`ula;

																			shark 'aumakua named Alekoko																					
	Esefera Pond	Hā`ena																	0.438 acre (1973)	Type IV																				
	Nameless Pond	Hā`ena																		unknown (1973)	Type II																			
	Kanoa Pond	Hanalei						5-5-01												3.84 acres (1973) Tax map area: 5.84 acres(19 39)	Type Illa																	Owner listed as Mrs. Ethel K. Wilcox (Tinker 1939)		
	Nameless ponds	Hanalei																		12.78 total acreage (1973)	Type Illa																			
	Nameless pond	Hanalei																		51.38 (1939)																		Owner listed as Heirs of Danson		

	Nameless pond	Waimea								Kikuchi 1973:236,B23	Type III	unknown (1973)	
	Waikoko	Waikoko, Hā`ena								Kikuchi 1973:236,B24	Type unknown	unknown (1973)	
	Nameless pond	Waioli								Kikuchi 1973:236,B25A	Type IV	10.3 acres (1973)	Land belonged to Opi`o since 1840
	Nameless pond	Waioli								Kikuchi 1973:237,B25B	Type IV	0.12 acres (1973)	Land belonged to Opi`o since 1840
O`ahu	Ahua	Moanalua								Kikuchi 1973:237,C1	Type Ib	45 acres (1973)	wall 1500'L
	Amana (Loko-Amana or Loko-A-Mano)	South Halawa, Pearl Harbor								Kikuchi 1973:237,C2	Type Ib	1.0+ acres (1973)	
	Ananoho	Kaili								Kikuchi 1973:237,C3	Type Ia2	46 acres (1973)	coral walls 4700'L x 6'W x 3'H
	Apala (Loko Apala)	Waiawa, Pearl								Kikuchi 1973:237,C4	Type Ia1	7.6 acres (1973)	wall 225'L

Appendix A

										images to Ku and Hina; Kane and Kanaloa built it; <i>Pā`Ōhi`a</i> attached to it	
	Nameless pond	Kapālama						Kikuchi 1973:241,C58	Type II	18~ acres (1973)	Adjoins Kuwili II pond and Niuhelewai Stream
	Nameless pond	Kapālama						Kikuchi 1973:241,C59	Type IIIb	1.7 acres (1973)	
	Kapamuku (Pa-moku)	Pu`uloa, Pearl Harbor						Kikuchi 1973:241,C60	Type 1c	3 acres (1973)	wall of loose construction 660'L x 6'W x 3.5'H; no <i>makahā</i>
	Kapaweo I	Kalia, Waikiki						Kikuchi 1973:242,C61A	Type IIIb	1+ acres (1973)	
	Kapaweo II	Kalia, Waikiki						Kikuchi 1973:242,C61B	Type IIIb	1+ acres (1973)	

		Waikiki								1973:243,C70D	IIIb	(1973)	
	Loko Keana	Kailua, Waikalua								Kikuchi 1973:243,C71	Type Ia2	3.5 acres (1973)	wall of waterworn basalt 540'L
	Keanapua`a	Pearl Harbor								Kikuchi 1973:243,C72	Type Vd	4 acres (1973)	wall 800'L; Kane and Kanaloa built trap
	Nameless pond	Keawema tia, Moanalua								Kikuchi 1973:243,C73	Type IIIb	1+ acre (1973)	
	Loko Keaweloko	Moanalua								Kikuchi 1973:243,C74	Type IIIb	4 acres (1973)	
	Kekona (Kukona or Loko Kukona)	Waimano, Pearl Harbor								Kikuchi 1973:243,C75	Type Ic	2.7 acres (1973)	coral and basal walls 4-5'W x 2'H; no makahā
	Ke`oki (Loko Ke`oki)	Halawa, Pearl Harbor								Kikuchi 1973:243,C76	Type II	16~ acres (1973)	coral and sand embankme nts
	Keponokala	Ewa, Pearl								Kikuchi 1973:243,C77	Type Vd	4 acres (1973)	wall 1000'L; Kane and

Appendix A

	Kuwili II	Kalia, Waikiki								Kikuchi 1973:244, C91B	Type IIIb	1 acre (1973)	
	Kuwili I	Kapālama								Kikuchi 1973:244, C92A	Type II	10.5 acres (1973)	
	Kuwili II	Kapālama								Kikuchi 1973:244, C92B	Type II	17.7 acres (1973)	
	Laulaunui	Honouliuli, Pearl Harbor								Kikuchi 1973:244, C93	Type Ic	4-5 acres (1973)	no makahā
	Lelepaua	Moanalua								Kikuchi 1973:244, C94	Type III	332 acres	coral and earth embankments 10'W;Kainikapuamanui a built it
	Loko Luakahaole	Waiau, Pearl Harbor								Kikuchi 1973:245, C95	Type Ib	1 acre (1973)	
	Loko-o-Kaia	Moanalua								Kikuchi 1973:245, C96	Type II	20 acres (1973)	
	Luakini	Mount Ka'ala								Kikuchi 1973:245, C97	Type IIIa	unknown (1973)	mo'opossibly

	Muliwaiolen a	Mōkapu								Kikuchi 1973:246,C115	Type II	unknown (1973)	
	Nu`upia	Mōkapu								Kikuchi 1973:246,C116	Type II	215 acres (1973)	Wall 1500'L x 4-6'W x 5'H (1.5' above water)
	Okiokilepe	West Loch, Pearl Harbor								Kikuchi 1973:246,C117	Type Ic	6 acres (1973)	coral walls 1000'L x 6.5'W x 4'H; no <i>makahā</i>
	Ola (Loko- Ola)	South Halawa, Pearl Harbor								Kikuchi 1973:246,C117 A	Type II	unknown (1973)	
	`Ō`ōhope	He`e`ia								Kikuchi 1973:246,C118	Type Ia	2~ acres (1973)	wall 500'L; 4 <i>makahā</i>
	Opu (Loko- Opu)	Kalauao, Pearl Harbor								Kikuchi 1973:246,C119	Type Ib	10.5 acres (1973)	wall 2700'L; Kalaimanui a built pond circa A.D. 1550
	Opu	Kalia, Waikiki								Kikuchi 1973:246,C120	Type IIIb	1+ acre (1973)	

	Pohaku (Loko-pohaku)	Halawa, Pearl Harbor								Kikuchi 1973:248,C139	Type Ia	2.5 acres (1973)	
	Pōkole	Kahalu`u								Kikuchi 1973:248,C140	Type Ia	4 acres (1973)	coral and basal wall 850'L x 4-5'W; 2 <i>makahā</i>
	Pouhala	Waikele, Pearl Harbor								Kikuchi 1973:248,C141	Type II	22 acres (1973)	
	Puehu	`Ili of Pahoa at Luualalei, Waianae								Kikuchi 1973:248,C142	Type II	3 acres (1973)	
	Puhalahala	Kalia, Waikiki								Kikuchi 1973:248,C143	Type IIIb	1+ acre (1973)	
	Pukoko	Kahana								Kikuchi 1973:248,C144	Type IIIb	1+ acre (1973)	
	Punakou	Wailupe								Kikuchi 1973:248,C145	Type Ia2	0.3 acre (1973)	secondary pond to C160
	Punalu`ulok o; also Punalu`u	Kane`ohe								Kikuchi 1973:248,C146	Type Ia	12.5 acres (1973)	basalt wall 1600'L x 3-5'W

	Wailowai	Halawa, Pearl Harbor							Kikuchi 1973:249,C159	Type Ia1	2~ acres (1973)	
	"Wailupe"	Wailupe							Kikuchi 1973:249,C160	Type Ia	35 acres (1973)	basalt wall with sand and dirt fill 2500'L x 12'W; one side of the pond is a sand embankment 50'W; 4'W x 4'W
	Nameless pond	Waipi'o, Pearl Harbor							Kikuchi 1973:249,C161	Type IIIb	5.7 acres (1973)	
	Waipunaea (Waiapuka)	Malaekahana, Laie							Kikuchi 1973:250,C162	Type IIa1	1+ acre (1973)	
	Weli	Kahauiki, Moanalua							Kikuchi 1973:250,C163	Type II	30 acres (1973)	wall 900'L
Moloka'i	Aipohaku	Kahanui I							Kikuchi 1973:250,D1	Type III	0.24 acre (1973)	
	Ali'i (One Ali'i)	Makakupaia I							Kikuchi 1973:250, D2	Type Ia	27 acres	basalt wall 2700'L x 4'W x 4'W

Appendix A

	Nameless pond	Kaluako`i								Kikuchi 1973:251,D20	Type Ia	3 acres (1973)	3.5'H basalt wall 8-11'W x 2'H; 1 <i>makahā</i> 15'W; 2 entrances 4' and 11'W
	Nameless trap	Kaumana mana, Kaluako`i								Kikuchi 1973:252,D20A	Type V3	unknown (1973)	
	Nameless trap	Hikauhi, Kaluako`i								Kikuchi 1973:252,D20B	Type Ve	unknown (1973)	
	Nameless Pond	Kukuku, Kaluako`i								Kikuchi 1973:252,D21	Type Ia	23 acres	5-7-10; 5-7- 11
	Kamahu`ehu ,e	Kalamo								Kikuchi 1973:252,D22	Type Ia	37 acres	wall 3470'L; 2
Molokai	Waiakea Fishpond		5-2- 11:20	60- 02- 101	7/17/199 3					SHPD Hawaii State and National Register			
	Pahiomu Fishpond		5-5- 01:10	60- 04-	5/18/198 1	1/13/75				SHPD Hawaii State and			

Appendix A

Moloka'i Fishponds, discontiguous properties	Mahilika Fishpond		5-7-10:31	60-05-189	7/17/1993			SHPD Hawaii State and National Register				
	(Un-named fishpond)		5-7-11	60-05-193	7/17/1993		submerged	SHPD Hawaii State and National Register				
	Panahana Fishpond		5-7-07:22	60-05-202	7/17/1993			SHPD Hawaii State and National Register				Also listed in Loko I'a: A Manual on Hawaiian Fishpond Restoration and Management (2007)
	(Un-named fishpond)		5-7-07:	60-05-205	7/17/1993		submerged	SHPD Hawaii State and National Register				
	Ipukaiole		5-7-04	60-05-219	7/17/1993		submerged	SHPD Hawaii State and National Register				Also listed in Loko I'a: A Manual

Appendix A

DECLARATION OF HUI MALAMA LOKO IA

NOVEMBER 2-4, 2012

To express support for the development of an interagency programmatic agreement and related documents for the purpose of obtaining a state programmatic general permit and streamlining the permitting process for the restoration, protection, preservation, perpetuation, traditional and customary use, and/or maintenance of loko i'a (traditional Hawaiian fishpond systems) and their related biocultural resources and habitats across the paeaina o Hawaii.

WHEREAS, loko i'a are wholly unique sustainable aquaculture systems found nowhere else in the world; and

WHEREAS, loko i'a have many important lessons for modern aquaculture; and

WHEREAS, traditional loko i'a are an essential tool in the restoration of depleted coastal fish populations and fisheries;

WHEREAS, loko i'a are essential features of healthy and sustainable ahupuaa based ecosystems throughout Hawaii; and

WHEREAS, loko i'a can significantly contribute to healthy and sustainable food security and food sovereignty in Hawaii; and

WHEREAS, the restoration and reuse of loko i'a provide an opportunity to increase community-based sustainable economic development opportunities; and

WHEREAS, traditional Hawaiian fishponds are critical and essential sites of learning, traditional and ancestral knowledge, STEM (science, technology, engineering and math) education, cultural practice, healthy physical activity, and community fellowship; and

WHEREAS, traditional Hawaiian fishponds offer important opportunities for communities to engage in the sustainable management of cultural and natural resources; and

WHEREAS, traditional Hawaiian fishponds and their surrounding environments are habitats for native species and significantly contribute to biodiversity and natural resource conservation in Hawaii; and

WHEREAS, traditional Hawaiian fishponds provide significant ecological services to coastal and terrestrial environments; and

WHEREAS, traditional Hawaiian fishponds can play a role in mitigating the local impacts of sea level rise and coastal inundation; and

WHEREAS, traditional Hawaiian fishpond practitioners are an active and vibrant community of educators and practitioners; and

WHEREAS, Hui Malama Loko Ia met in Waipa in November 2012 for the 5th gathering of traditional Hawaiian fishpond practitioners across the state; and

WHEREAS, for over 20 years permitting difficulties have been identified by fishpond practitioners as one of the leading obstacles in traditional Hawaiian fishpond restoration and use;

WHEREAS, repair of many Hawaiian fishponds may require permits federal, state and county governments; and

WHEREAS, the process in obtaining a permit for the restoration of loko i'a is time consuming, complicated, costly, and confusing and varies depending upon the circumstances of the party applying for the permit; and

WHEREAS, the existing regulations and permit requirements impede community organizations and Native Hawaiian aquaculturalists from repairing and maintaining loko i'a; and

WHEREAS, Article XII Section 7 of the Hawaii State Constitution states: "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"; and

WHEREAS, the enforcement of state and federal regulations, including but not limited to the Endangered Species Act and the Migratory Bird Act, can hinder traditional and customary use of loko i'a; and

WHEREAS, the State has the ability to streamline the permit process and promote interagency cooperation to facilitate restoration, protection, preservation, perpetuation, traditional and customary use, maintenance, and/or leasing of fishponds to cultural and familial descendants and loko i'a practitioners; and

WHEREAS, the Senate of the Twenty-sixth Legislature of the State of Hawaii, Regular Session of 2012, urged the Department of Land and Natural Resources, Department of Health, and Office of Planning to streamline the permitting process for the restoration of Hawaiian fishponds;

WHEREAS, the Department of Land and Natural Resources Office of Conservation and Coastal Lands with the Hawaiian Islands Humpback Whale National Marine Sanctuary, the National Marine Fisheries Service Pacific Island Regional Office and Conservation International / Hawaii Fish Trust have worked in coordination with fishpond practitioners

to begin a comprehensive initiative to streamline the permit process for restoration of Hawaiian fishponds;

WHEREAS, representatives from these same agencies attended the 5th conference of Hui Malama Loko Ia to obtain support, guidance, data and input from traditional fishpond practitioners for this comprehensive initiative;

NOW, THEREFORE, WE, THE TRADITIONAL HAWAIIAN FISHPOND PRACTITIONERS AND MEMBERS OF HUI MALAMA LOKO I'A, express support for the development of an interagency programmatic agreement and related documents for the purpose of obtaining a state programmatic general permit and streamlining the permitting process for the restoration, protection, preservation, perpetuation, traditional and customary use, and/or maintenance of loko i'a (traditional Hawaiian fishpond systems) and their related biocultural resources and habitats across the paeaina o Hawaii.

DECLARED, in the ahupuaa of Waipa, on the island of Kauai, in the paeaina o Hawaii, this second, third and fourth day of November, 2012.

PHONE (808) 594-1888



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

RECEIVED
FAX (808) 594-1865

12 NOV 36 09:04

DEPT. OF LAND
& NATURAL RESOURCES
STATE OF HAWAII

November 27, 2012

William J. Ailā, Jr.
Chairperson
Department of Land & Natural Resources
1151 Punchbowl Street
Honolulu, Hawai'i 96813

RECEIVED
DEPT. OF CONSERVATION
AND INDUSTRIAL LANDS
2012 DEC -1 A 10:06
DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

Re: OHA Support of Hui Mālama Loko I'a Declaration of November 2-4, 2012

Dear Chairperson Ailā:

I write on behalf of the Office of Hawaiian Affairs (OHA) to express our strong support of the Declaration of Hui Mālama Loko I'a dated November 2-4, 2012 (Declaration), regarding a streamlined, programmatic state permitting process for the restoration, preservation, perpetuation, traditional and customary use, and/or maintenance of loko i'a (Hawaiian fishpond systems) and their associated resources and habitats. OHA affirms the findings contained within the Declaration and likewise urges all appropriate state and federal agencies to facilitate the development of a streamlined permitting process for loko i'a restoration and stewardship activities.

As background, OHA is a unique, quasi-independent state agency established by the Hawai'i State Constitution and state statutes. Our purpose is to better the conditions of all Native Hawaiians, regardless of blood quantum. Guided by nine trustees elected by the voters of Hawai'i, OHA advances the interests of Native Hawaiians and serves as a fiduciary for Native Hawaiian public trust funds and other resources.

Loko i'a contributed substantially to the local food supply prior to Western contact and are recognized as a truly unique accomplishment of the Native Hawaiian people. The variety of loko i'a designs and construction methods reflects an unparalleled understanding of engineering, ecology, and agriculture. Loko i'a required hundreds if not thousands of hands working in unity for their construction and were indications of the great wealth of the ahupua'a in which they were located. Loko i'a also held significant spiritual significance, and were considered places of

Chairperson William J. Ailā
November 27, 2012
Page 2

spiritual power where akua and 'aumakua often gathered. Today, the restoration of loko i'a provides an opportunity to not only perpetuate the cultural beliefs and understandings that enabled their creation, but to also explore the potential for achieving food security and self-sufficiency in Hawai'i nei.

OHA has been and continues to remain committed to supporting the restoration, use, and maintenance of traditional loko i'a as an important component of cultural perpetuation, environmental stewardship, and food self-sufficiency in Hawai'i. OHA has engaged in a number of efforts to support loko i'a practitioners and community groups in recent years. This includes the submission of recommendations for Office of Conservation and Coastal Lands rule revisions to facilitate loko i'a restoration and maintenance; the sponsorship of the Paepae o He'eia executive director's attendance at a U.S. Senate Committee on Indian Affairs oversight hearing in Washington, D.C., to share her mana'o on the challenges loko i'a practitioners face in their work; the submission of testimony in support of Senate Resolution 86 and Senate Concurrent Resolution 151 of the 2012 Hawai'i Legislature, urging the streamlining of state permits for the restoration of loko i'a; and OHA staff meetings and discussions with numerous beneficiaries regarding loko i'a restoration and stewardship activities. Over the past ten years, OHA has also invested more than \$475,000 in community-based restoration, education, and outreach projects for loko i'a throughout the state. OHA will continue to support efforts to restore Hawai'i's loko i'a, and urges our state and federal agencies to do the same.

Please do not hesitate to contact Sterling Wong, Public Policy Manager, at (808)594-1908 or via e-mail at sterlingw@oha.org should you have any questions regarding this matter.

'O au nō, me ka 'oia'i'o,

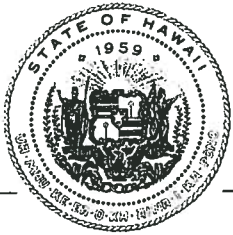


Kamana'opono M. Crabbe, Ph.D.
Ka Pouhana, Chief Executive Officer

KMC;wt

CC:

Department of Agriculture, State of Hawai'i
Department of Health, State of Hawai'i
U.S. Fish & Wildlife Service
U.S. Environmental Protection Agency
U.S. National Oceanic & Atmospheric Administration
U.S. Army Corps of Engineers



DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

NEIL ABERCROMBIE
GOVERNOR
RICHARD C. LIM
DIRECTOR
MARY ALICE EVANS
DEPUTY DIRECTOR
JESSE K. SOUKI
DIRECTOR
OFFICE OF PLANNING

OFFICE OF PLANNING

235 South Beretania Street, 6th Floor, Honolulu, Hawaii 96813
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone: (808) 587-2846
Fax: (808) 587-2824

Ref. No. P-13784

November 15, 2012

Lieutenant Colonel Thomas D. Asbery
District Engineer
U.S. Army Corps of Engineers, Honolulu District
Building 230
Fort Shafter, Hawaii 96858

Attention: Mr. George P. Young, Chief
Regulatory Branch

Dear Lt. Colonel Asbery:

Subject: Coastal Zone Management Act (CZMA) Federal Consistency General
Concurrence for Minor Federal Permit Activities for Hawaiian Fishpond
Restoration, Repair, Maintenance and Reconstruction

The Hawaii Coastal Zone Management (CZM) Program intends to issue a CZMA federal consistency general concurrence for minor federal permit activities for Hawaiian fishpond restoration, repair, maintenance and reconstruction in the State of Hawaii. The general concurrence is being established in response to Senate Resolution No. 86, adopted by the Hawaii State Legislature on April 10, 2012, which urges the Department of Land and Natural Resources, Department of Health, and Office of Planning to streamline the permitting process for the restoration of Hawaiian fishponds. The resolution also requests the Office of Planning to consider "a coastal zone management program consistency statement for Hawaiian fishponds."

Coastal Zone Management Act (CZMA) federal consistency regulations (15 CFR Part 930) establish procedures for States to issue general concurrences (15 CFR §930.53(b)) allowing similar minor work in the same geographic area to avoid repeated review of minor federal license or permit activities which, while individually inconsequential, cumulatively affect any coastal use or resource. Federal permit activities which satisfy the conditions of the general concurrence are not subject to the consistency certification and review requirements of 15 CFR Part 930, Subpart D - Consistency for Activities Requiring a Federal License or Permit.

The U.S. Army Corps of Engineers permit is the relevant federal permit for Hawaiian fishpond restoration activities. The Hawaii federal permit list includes the following U.S. Army Corps of Engineers permit authorities:

DEPT. OF LAND &
NATURAL RESOURCES
STATE OF HAWAII

2012 NOV 20 A 11:10

RECEIVED
OFFICE OF CONSERVATION
AND COASTAL LANDS

Lieutenant Colonel Thomas D. Asbery
Page 2
November 15, 2012

Rivers and Harbors Act of 1899, Sections 9, 10 and 11
Marine Protection, Research and Sanctuaries Act of 1972, Section 103
Federal Water Pollution Control Act of 1972 and amendments, Section 404

Federal consistency general concurrence procedures (15 CFR §930.53(b)) require that the applicable federal permit activities and the relevant conditions be included in the Hawaii list of federal permits subject to federal consistency review. Therefore, we are amending our federal permit list to include the general concurrence provisions for Hawaiian fishponds. The amended Hawaii CZM Program federal permit list is enclosed for your review.

We would appreciate receiving your comments within 30 days of receipt of this letter. If you have any questions, please contact John Nakagawa of our CZM Program at 587-2878.

Sincerely,



Jesse K. Souki
Director

Enclosure

- c: Mr. David Kaiser, OCRM (w/ enclosure)
- Mr. Steve Frano, OCRM (w/ enclosure)
- Department of Health, Clean Water Branch (w/ enclosure)
- Department of Land and Natural Resources
 - ✓ Office of Conservation and Coastal Lands (w/ enclosure)
 - Historic Preservation Division (w/ enclosure)

Hawaii Coastal Zone Management Program
General Concurrence for Minor Federal Permit Activities for
Hawaiian Fishpond Restoration, Repair, Maintenance and Reconstruction

Senate Resolution No. 86 (SR86), which was adopted by the Hawaii State Legislature on April 10, 2012, urges the Department of Land and Natural Resources, Department of Health, and Office of Planning to streamline the permitting process for the restoration of Hawaiian fishponds. The resolution also requests the Office of Planning to consider “a coastal zone management program consistency statement for Hawaiian fishponds.” Hawaiian fishponds are aquaculture structures, which include man-made and natural enclosures of water in which fish and other aquatic organisms are raised and harvested. Hawaiian fishponds have historic, cultural and economic significance for the State of Hawaii.

In response to SR86 and in accordance with federal regulations, the Hawaii Coastal Zone Management (CZM) Program is issuing a general concurrence for minor federal permit activities for Hawaiian fishpond restoration, repair, maintenance and reconstruction. Coastal Zone Management Act federal consistency regulations (15 CFR Part 930) establish procedures for States to issue general concurrences (15 CFR §930.53(b)) allowing similar minor work in the same geographic area to avoid repeated review of minor federal license or permit activities which, while individually inconsequential, cumulatively affect any coastal use or resource. Federal permit activities which satisfy the conditions of the general concurrence are not subject to the consistency certification and review requirements of 15 CFR Part 930, Subpart D - Consistency for Activities Requiring a Federal License or Permit.

The U.S. Army Corps of Engineers permit is the relevant federal permit for Hawaiian fishpond restoration activities. The Hawaii federal permit list includes the following U.S. Army Corps of Engineers permit authorities:

Rivers and Harbors Act of 1899, Sections 9, 10 and 11
Marine Protection, Research and Sanctuaries Act of 1972, Section 103
Federal Water Pollution Control Act of 1972 and amendments, Section 404

Federal consistency general concurrence procedures (15 CFR §930.53(b)) require that the applicable federal permit activities and the relevant conditions be included in the Hawaii list of federal permits subject to federal consistency review. Therefore, the Hawaii CZM Program is amending the federal permit list to include the general concurrence provisions for Hawaiian fishponds.

Hawaii List of Federal Licenses and Permits Subject to Federal Consistency Review

U.S. Army Corps of Engineers permits required under:

Rivers and Harbors Act of 1899, Sections 9, 10 and 11
Marine Protection, Research and Sanctuaries Act of 1972, Section 103
Federal Water Pollution Control Act of 1972 and amendments, Section 404

General Concurrence for Federal Permit Activities for Hawaiian Fishpond Restoration, Repair, Maintenance and Reconstruction

I. Federal Permit Activities

CZM federal consistency general concurrence applies to the following Federal permit activities for the restoration, repair, maintenance and reconstruction of existing Hawaiian fishponds, subject to the applicable geographic area and the relevant conditions listed below. Federal permit activities which satisfy the conditions of the general concurrence are not subject to the consistency certification and review requirements of 15 CFR Part 930, Subpart D - Consistency for Activities Requiring a Federal License or Permit.

- (a) Restoration, reconstruction, repair and maintenance of fishpond walls and sluice gates, including but not limited to the placement, movement, manipulation and temporary stockpiling of necessary materials.
- (b) Placement, movement, manipulation and temporary stockpiling of small stones or rubble for interior wall fill ('ili'ili).
- (c) Silt removal by hand and/or mechanized equipment from within fishponds.
- (d) Vegetation removal by hand and/or mechanized equipment from within fishponds and from fishpond walls.
- (e) Periodic post-restoration maintenance activities required to facilitate the long-term use, management and operation of fishponds.
- (f) Use of hand and/or mechanized equipment to conduct fishpond restoration activities.
- (g) Placement of temporary structures within fishponds which are necessary to conduct restoration activities.
- (h) Placement and use of aquaculture pens, nets, and/or cages within fishponds.
- (i) Use of harvesting equipment within fishponds.

II. Geographic Area

The geographic areas covered by this general concurrence include coastal land areas, shoreline areas, and nearshore ocean waters within the State of Hawaii where existing Hawaiian fishponds are located. The specific geographic area is defined by the type of fishpond.

Fishponds are categorized into six main types according to the "Hawaiian Fishpond Study" (DHM Planners, Inc. and Public Archaeology Section, Applied Research Group, Bernice Pauahi Bishop Museum, June 1989; based on information by William K. Kikuchi, 1973, Hawaiian Aquacultural System). Each fishpond type is specific to a particular geographic area. Refer to Figure 1, which provides a conceptual diagram and geographic area of each type of fishpond.

Type I - Loko Kuapa: A fishpond of littoral water whose side or sides facing the sea consist of a stone or coral wall usually containing one or more sluice gates.

Type II - Loko Pu`uone: An isolated shore fishpond usually formed by the development of barrier beaches building a single, elongated sand ridge parallel to the coast and containing one or more ditches and sluice gates.

Type III - Loko Wai: An inland freshwater fishpond which is usually either a natural lake or swamp, which can contain ditches connected to a river, stream, or the sea, and which contain sluice gates.

Type IV - Loko i`a kalo: An inland fishpond utilizing irrigated taro plots.

Type V - Loko `Ume`iki: A fishtrap which is similar to a Type I - loko kuapa and has various combinations of inward and outward leading lanes.

Type VI - Kaheka and Hapunapuna: A natural pool or holding pond.

III. Conditions

1. Copies of U.S. Army Corps of Engineers permit applications for activities covered by this general concurrence must be sent by the applicant to the Hawaii CZM Program for the purpose of monitoring adherence to the required conditions.
2. Fishpond restoration activities shall be conducted in compliance with applicable State of Hawaii water quality standards and requirements of Hawaii Revised Statutes (HRS) Chapter 342D Water Pollution and Hawaii Administrative Rules (HAR) Chapter 11-54 Water Quality Standards, which are federally approved enforceable policies of the Hawaii CZM Program.

3. Fishpond restoration activities shall be conducted in compliance with applicable State of Hawaii water pollution control requirements of HRS Chapter 342D Water Pollution and HAR Chapter 11-55 Water Pollution Control, which are federally approved enforceable policies of the Hawaii CZM Program.
4. Best management practices, such as silt containment devices and turbidity control measures, shall be implemented during fishpond restoration activities to minimize impacts on surface and ocean water quality. This condition is necessary to ensure consistency with Hawaii CZM Program coastal ecosystems policies established in HRS Chapter 205A Coastal Zone Management (HRS §205A-2(b)(4)(A) and HRS §205A-2(c)(4)), which is a federally approved enforceable policy.
5. Materials used for fishpond restoration, reconstruction and repair may be from on-site and/or off-site, and shall be clean and free of waste products, debris, or any potentially hazardous materials. This condition is necessary to ensure consistency with Hawaii CZM Program coastal ecosystems policies established in HRS Chapter 205A Coastal Zone Management (HRS §205A-2(b)(4)(A) and HRS §205A-2(c)(4)), which is a federally approved enforceable policy.
6. Whenever active fishpond restoration activities are occurring, work areas shall be monitored for endangered, threatened or indigenous species protected by the State of Hawaii under HRS Chapter 195D Conservation of Aquatic Life, Wildlife, and Land Plants, and HAR Chapter 13-24 Indigenous Wildlife, Endangered and Threatened Wildlife, and Introduced Wild Birds, which are federally approved enforceable policies of the Hawaii CZM Program. If any protected endangered, threatened or indigenous species are present in the vicinity of the restoration area, work shall cease until the animal has left the area.
7. Fishpond restoration activities shall be conducted in compliance with applicable State of Hawaii conservation district requirements established in HRS Chapter 183C Conservation District and HAR Chapter 13-5 Conservation District, which are federally approved enforceable policies of the Hawaii CZM Program.
8. The State Historic Preservation Division (SHPD) shall be consulted prior to beginning fishpond restoration and any requirements of SHPD shall be complied with. This condition is necessary to ensure consistency with HRS Chapter 6E - Historic Preservation, which is a federally approved enforceable policy of the Hawaii CZM Program.
9. Fishpond restoration activities shall be conducted in compliance with special management area and shoreline setback area requirements of the respective county in which the fishpond restoration occurs. This condition is necessary to ensure consistency with HRS Chapter 205A Coastal Zone Management (HRS Chapter 205A, Part II and Part III), which is a federally approved enforceable policy of the Hawaii CZM Program.
10. Public access along the shoreline shall not be precluded by any fishpond restoration activities. If restoration work involves an area used for public shoreline access and if safe public access cannot be maintained during restoration, then provisions shall be made to

ensure that public access is provided by alternative routes and/or means. This condition is necessary to ensure consistency with federally approved Hawaii CZM Program enforceable policies for ensuring and managing public access established in HRS Chapter 205A Coastal Zone Management (HRS §205A-2(b)(1)(A) and HRS §205A-2(c)(1)(B)) and HRS Chapter 115 Public Access to Coastal and Inland Recreational Areas.

IV. General Concurrence Procedures

- (a) Federal permit activities which satisfy the conditions of the general concurrence are not subject to the consistency certification and review requirements of 15 CFR 930, Subpart D - Consistency for Activities Requiring a Federal License or Permit.
- (b) Copies of federal license and permit applications for activities subject to the general concurrence must be sent by the applicant to the Hawaii CZM Program for the purpose of monitoring adherence to the required conditions.