LAWA‘I KAI
SPECIAL SUBZONE

Master Plan & Management Plan for 2013-2033

August 2012

Submitted to:
Department of Land & Natural Resources

Submitted by:
National Tropical Botanical Garden

Preface

The National Tropical Botanical Garden (NTBG) stands as an important institution dedicated to the conservation of the biological and cultural heritage that exists in Hawai‘i and the Pacific. Over the past 45 years we have found that effective conservation relies on public understanding and participation. It is our goal to engage and teach individuals of all ages that by investing in the preservation of our planet’s biodiversity and cultural heritage they are investing in their children’s future.

There are precious few valleys left in Hawai‘i that are not only dedicated in perpetuity to conservation but are also being actively managed and used as educational resources. The NTBG’s Limahuli and Lāwa‘i valleys on Kaua‘i are two of the state’s best examples of this and demonstrate how our active management programs have created safe refugia for hundreds of Hawai‘i’s threatened and endangered plant species and educated hundreds of thousands about the importance of this work.

Over the past 20 years the NTBG, utilizing the holistic ahupua‘a approach to resource management, has become steadily more involved in conserving and protecting the aquatic and marine environments associated with its properties. The Limahuli Ahupua‘a Program in Hā‘ena, Kaua‘i has long been recognized as a leader in culturally based resource management and helped to champion the idea of the near-shore fishery in Hā‘ena becoming a community-based marine managed area (MMA) – a process that is currently underway.

During this same time, the NTBG recognized that the Lāwa‘i Kai Bay, which is a coastal and marine area that has had limited public access for the past 70 years, could be seriously impacted by future population growth. Approved and proposed residential and resort developments will increase the Po’ipū-Kōloa population by thousands of people in the years ahead.

Since statehood, the United States public domain policy has resulted in several public-use and access laws being enacted by both state and county governments. These have resulted in the extinguishing of the *konohiki* ownership of the “sea fishery of Lāwa‘i” and the statutory basis for the establishment of future public access over the private lands that surround Lāwa‘i Kai Beach and Bay. Concurrent with the enactment of these public-access policies the public demand for recreational access to Lāwa‘i Kai Bay has increased dramatically as the population and demographics of the Kōloa and Po’ipū area have changed.

While Lāwa‘i Kai Beach and Bay are not pristine ecosystems rich in marine biodiversity, they are very important as a documented green sea turtle nesting site, a refugia for monk seals who haul out regularly, a seldom used fishery, a productive estuary, and a protected habitat for rare coastal plant species. This area is steeped in cultural traditions and its sands and cliffs hold both *iwi kupuna* (ancient bones) and

historic burials associated with native Hawaiians who have lived in the valley for centuries. Since the time of the *Mahele* in 1848 when this valley was awarded to Kanehoa who in turn gave it to Queen Emma, Lāwaʻi Kai has been owned and cared for by individuals who were acutely aware of the sacred site that they were responsible for as the owners of the valley. This is no different today, and the NTBG takes very seriously its charge to protect the natural and cultural resources of this unique area.

It is with this as a context that the NTBG has developed this proposal to create a special subzone within the Conservation District of the State of Hawaiʻi. Foundational to this proposal is a management structure that will create a partnership with the private landowner (NTBG), the State of Hawaiʻi (Department of Land and Natural Resources (DLNR) and the community (via the Lāwaʻi Kai Resource Advisory Committee).

We believe this proactive approach will create a true ahupuaʻa-based management strategy that effectively integrates the management of the cultural, terrestrial, aquatic and marine resources and balances the management of these resources with the desires to see this area used for conservation, research, education, and limited recreation. If we are successful in this visionary approach, Lāwaʻi Kai will become a *puʻuhonua* – a place of refuge – for future generations to love and enjoy just as we have.

ʻO wau iho no me kaha haʻa,

Chipper Wichman, Director and CEO
National Tropical Botanical Garden

"For in the end
we will conserve only what we love,
we will love only what we understand,
we will understand only what we have been taught."

— Baba Dioum, 1968

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1.0 INTRODUCTION

The National Tropical Botanical Garden (NTBG) was founded by an act of Congress in 1964 as a not-for-profit organization and given a mandate to become a leading conservation organization. NTBG has grown over the years and currently encompasses nearly 2,000 acres of land that include five different ecosystems within the context of five botanical gardens and three preserves. With the exception of one garden in south Florida all of these properties are located in the state of Hawai‘i. The Allerton Garden, part of the Lāwa‘i Kai Project Area (see below), is owned by the Allerton Gardens Trust and managed by the NTBG as one of the five gardens in their network of gardens.

The National Tropical Botanical Garden’s (NTBG) mission is “to enrich life through discovery, scientific research, conservation, and education by perpetuating the survival of plants, ecosystems, and cultural knowledge of tropical regions."

Today, the NTBG is a recognized leader in holistic *ahupua‘a*-based conservation and restoration programs. These programs are community-based and culturally grounded and are designed to benefit native Hawaiians as well as the larger community.

In 1992, the NTBG completed a multi-year process to create the Limahuli Valley Special Subzone (LVSS) within the State Conservation District. The creation of the LVSS has been a great success as it has allowed the NTBG to implement a culturally based ahupua‘a management plan for that area. Likewise, the proposed creation of the Lāwa‘i Kai Special Subzone and adoption of this master plan will establish an *ahupua‘a*-based management strategy for Lāwa‘i Kai and preserve it in perpetuity for future generations of people as well as the biological and cultural resources that call this place their home.

1.1 Lāwa`i Kai Project Area

Lāwa`i Kai is located on the south shore of Kaua`i, as shown in **Exhibit A.** The name Lāwa‘i Kai has been used historically from the time of the Hawaiian monarchy to refer to this special area. For the purposes of this holistic plan, the term Lāwa`i Kai encompasses Allerton Garden, the lower reaches of Lāwa`i Stream, Lāwa`i Beach, and Lāwa`i Bay. The project area is shown in **Exhibit B**.

1.2 Lāwa`i Kai Special Subzone Master and Management Plan

The ***Lāwa`i Kai Special Subzone Master Plan & Management Plan (Plan***) is the product and culmination of five years of work involving the community, environmental consultants, government, NTBG staff, board, and trustees. NTBG conducted studies of existing resources, facilitated community discussions to develop a vision and plan for the use of Lāwa`i Kai, met with key State and County government officials, and explored future resource management options.

This master plan includes guiding principles, a summary of community values, and a vision for Lāwa`i Kai. The management plans includes goals and objectives for seven critical areas:

- History
- Landscape
- Infrastructure
- Archaeology
- Estuary and Stream
- Coastal and Marine
- Recreation and Commercial

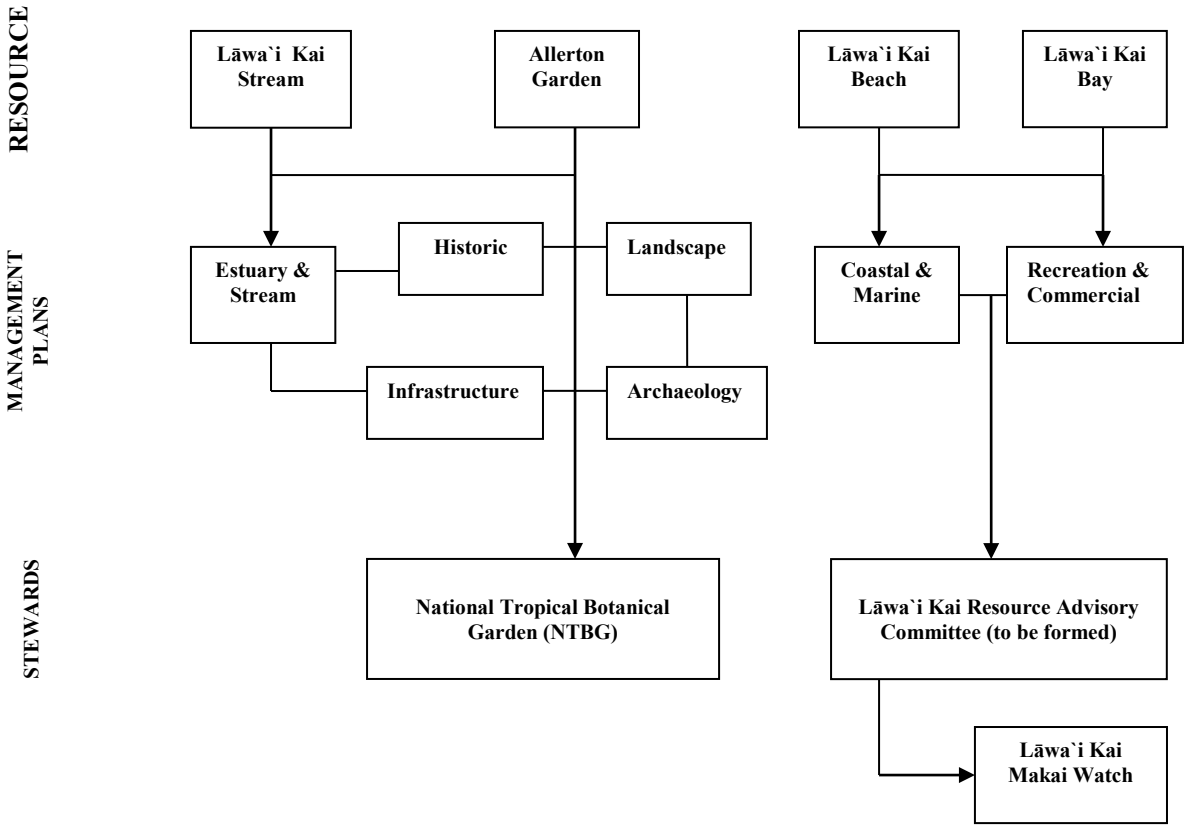
1.3 Planning Horizon

Implementation of the Lāwa`i Kai Special Subzone Master Plan & Management Plan will take place over the next 20 years, between 2013 and 2033.

1.4 Integrated Resource Planning Framework

This plan integrates management of the land, coastal, and ocean areas. As shown in Figure 1-1, the key resources include the lower reaches of Lāwa`i Kai Estuary and Stream, Allerton Garden, Lāwa`i Kai Beach, and Lāwa`i Kai Bay. As discussed above, there are seven management plans that identify critical issues, goals, and objectives. Stewards of the resources, who oversee implementation of the seven management plans, include the NTBG and the Lāwa`i Kai Resource Advisory Committee (LKRAC), which has yet to be formed.

Figure 1-1: Integrated Resource Planning Framework



1.5 Planning Process

Data Gathering: In 2006, the NTBG initiated a series of studies to gather information about the resources within Lāwa`i Kai. NTBG conducted in-house studies and hired outside contractors to study the area's archaeology, culture, history, aquatic resources of the stream and bay, flora, and fauna.

Community Involvement: In January 2007, NTBG invited a diverse group of business, government, and community representatives to participate in the Lāwa'i Kai Community Advisory Group (LKCAG). The group met in over 17 facilitated meetings from January 2007 through July 2012. The LKCAG developed a draft vision for Lāwa`i Kai, reviewed existing studies described above, participated in field and boat trips, and developed draft rules.

Draft Rules: Between November 2007 and November 2008, members of the LKCAG participated in a series of large and small group meetings to develop draft rules for the use of the beach and bay. LKCAG members reached a general agreement on these rules, found in **Appendix C and D**. The draft rules reflect the LKCAG's desire to strike a careful balance between resource preservation and public enjoyment. The proposed draft rules cover the recreational and commercial uses of the Lāwa`i Kai Beach and Bay.

Management Plans: From January to July 2009, NTBG staff, with the assistance of NKN Project Planning, developed seven management plans. Critical issues, goals, and objectives were identified and prioritized. Activities to implement objectives and timeframes were also identified.

Community Review: In August and September 2009, the Lāwaʻi Kai Community Advisory Group (LKCAG) reviewed and commented on the August 4, 2009 draft of the Master Plan and Management Plan. They met twice during this period of time to discuss various aspects of the plan including the proposed levels of public access. Their comments were incorporated into the draft of the Master Plan and Management Plan that was used for the initial public review and comment period.

Presentations of the Draft Plan were made to Mayor Bernard Carvalho, Kōloa Community Association the Po'ipu Beach Resort Association, County Open Space Commission, and the Kauaʻi Historic Preservation Review Commission.

A public information meeting was held in October 2009 to present the draft plan to the general public and receive feedback. A written survey was conducted at the meeting. Twenty of the attendees who participated in the survey supported the Lāwaʻi Kai Special Subzone Master Plan and Management Plan, and one attendee was opposed.

In October 2009, NTBG submitted a Petition to the State of Hawaiʻi, Department of Land and Natural Resources (DLNR) to create the Lāwaʻi Kai Special Subzone. The DLNR's Board of Land and Natural Resources (BLNR) met on September 23, 2011 and approved sending the Petition out to public hearing. The public hearing on the Petition was held in Kōloa on May 24, 2012.

1.6 Future Actions

This Plan sets the stage for the following actions that will be requested by NTBG before the DLNR:

1.6.1 Petition to Amend Hawai‘i’s Administrative Rule 13-5 (HAR) to create the **Lāwa‘i Kai Special Subzone** which would include the Allerton Garden, Lāwa‘i Kai Estuary and Stream, Beach and Bay. The current Conservation District designation for the Allerton Garden, the Lāwa‘i Kai Estuary and Stream, and the Lāwa‘i Kai Beach areas are in the **Limited** subzone. The Lāwa‘i Kai Bay is in the **Resource** subzone.

1.6.2 Obtain Conservation District Use Permit once Special Subzone is approved.

1.6.3 Amend Hawai‘i Administrative Rules, Title 13, Department of Land and Natural Resources, Sub-title 10, Land Management, Chapter 221, Unencumbered Public Lands, and add a new subchapter §13- 221entitled, **Lāwa‘i Kai Unencumbered Public Lands**. See **Appendix D.**

1.6.4 Amend Hawai‘i Administrative Rules, Title 13, Department of Land and Natural Resources, Subtitle 11, Ocean Recreation and Coastal Areas, Part 3, Ocean Waters, Navigable Streams and Beaches, Chapter 256, Ocean Recreation Management rules, and amend Subchapter 3, **South Shore Kaua‘i Ocean Recreation Management Area** rules by adding a new subsection to §13-256. See **Appendix C.**

1.6.4 In addition, once the Division of Aquatic Resources rules are amended to create a Marine Management Area (MMA), designate Lāwa‘i Kai as a MMA.

2.0 PRINCIPLES, VALUES, AND VISION

2.1 Guiding Principles

Six key principles have guided the development of the Lāwa`i Kai Special Subzone Master Plan & Management Plan. These include:

- The natural environment and unique experience of Lāwa`i Kai should be protected and conserved.
- Cultural, historic, and sacred sites, including burial sites, should be respected, protected, and preserved.
- The masterpiece of Allerton Garden's landscape design should be preserved and maintained in the style and manner of Robert and John Allerton.
- The land, beach, stream, and ocean are interconnected resources that should be planned for and managed holistically based on Hawaiian *ahupua'a* principles.
- Current levels of use of the beach and bay are appropriate and should be continued.
- The creation and implementation of the plan must involve a working partnership with representation from key stakeholders.

2.2 Community Values

What makes Lāwa`i Kai special? The community appreciates:

- The natural ***beauty*** and ***ambiance*** of the land, stream, beach, and bay
- Many fond childhood ***memories*** and connections to the area
- The rich ***history, burials, and culture***
- The unique ***tropical garden***
- The special place to ***surf and fish***
- The ***green sea turtles*** that nest and ***monk seals*** that haul out on the beach
- The ***hospitality*** of former owner John Allerton

2.3 Vision

The Lāwa`i Kai Community Advisory Committee developed a 20-year vision for Lāwa`i Kai.

The most important result is that Lāwa`i Kai is a pristine ecosystem that is protected and perpetuated. There is a deep sense of *mālama* and respect by all for the beach, the shoreline, the bay, the river mouth, and the ocean. Management systems are in place for both residents and visitors to experience Lāwa`i Kai. We have established a statewide model for preserving unique and special areas for future generations.

The beach is clean and has limited access. The beach continues to be a habitat for green sea turtles, monk seals, and native plants. The beach is a safe repository for the *iwi kūpuna*[1].

The bay is a sanctuary and nursery for marine life. The water is blue and clean.

Burial, cultural, and historic sites are safe and honored as a key element of this *pu`uhonua*[2]. Descendants have access to burial sites. Residents and visitors are educated to respect these resources.

Aquatic resources continue to rest and breed at Lāwa`i Kai. As a result of limited fishing, aquatic resources are abundant and flourishing. Residents and visitors respect and care for aquatic resources.

Surfers, body boarders, fishermen, and beachgoers have limited access and are respectful of the area and its resources. Commercial uses of this area for surfing, fishing, swimming, and sunbathing are not permitted.

Ocean recreation users maintain current levels of usage.

Public access is limited. There are no public amenities such as restrooms and showers.

[1] Iwi Kupuna means "the bones of ancestors." *Hawaiian Dictionary*, Mary Kawena Pukui and Samuel H. Elbert, University of Hawai`i Press, 1986.

[2] Pu`uhonua means "place of refuge, sanctuary." *Hawaiian Dictionary*, Mary Kawena Pukui and Samuel H. Elbert, University of Hawai`i Press, 1986.

Protection and enforcement is lead by the community, who are trained and empowered to patrol the beach and bay. Residents and visitors are educated about the history and natural resources of Lāwa`i Kai. As a result, they gain a better understanding of how to experience the Lāwa`i Kai in an appropriate way.

The community has a shared vision to protect Lāwa`i Kai. They are knowledgeable and cooperate to protect the special resources at Lāwa`i Kai. There is an organization of Kōloa, ʻŌmaʻo, Lāwa`i, Kalāheo, Eleʻele, Hanapēpē community residents, seniors, schools who guide and support implementation of the Lāwa`i Kai management plan, as it relates to the beach and bay.

The keys to our success are strong community, business, and government leaders who have a shared vision and who are committed to developing and implementing a management plan for Lāwa`i Kai. They have formed a partnership, based on mutual respect and collaboration. Residents and visitors have been educated about the history and resources of this area and as a result, there is a strong sense of community ownership and stewardship for Lāwa`i Kai. The community believes "this is <u>our</u> resource and we want to preserve and protect it."

3.0 ALLERTON GARDEN & NTBG

3.1 Land Ownership Chronology

A brief chronology of land ownership of Allerton Garden, historically referred to as the *ahupua`a* of Lāwa`i, follows:

- In 1848, James Young Kanehoa was awarded Mahele Award 43, the *ahupua`a* of Lāwa‘i in the *moku* of Kona.
- In 1871, Kanehoa’s wife and heir, Hikoni, deeded the *ahupua`a* of Lāwa`i to Queen Emma.
- In 1876, Queen Emma leased the *ahupua`a* to Duncan McBryde for a term of 15 years, reserving her house lot and several acres of taro *lo`i*.
- In 1886, following the death of Queen Emma, Elizabeth McBryde purchased the *ahupua`a* of Lāwa`i.
- In 1899, Alexander McBryde purchased the lower Lāwa`i valley, together with the *konohiki* fishing rights in the bay from his mother Elizabeth.
- In 1938, Robert Allerton and his adopted son John Gregg purchased the lower portion of the *ahupua`a* of Lāwa`i from the estate of the late Alexander McBryde.
- In 1964, the konohiki rights to the “sea fishery of Lāwa‘i” were condemned by the State of Hawai‘i.
- 1986, John Gregg Allerton passed away and placed Allerton Garden in trust to the First National Bank of Chicago, now known as JP Morgan (“trustee”) with NTBG as the managers of the property.

A more detailed history of Allerton Garden is found in Chapter 7.0 Historic Resources Management Plan.

3.2 Allerton Garden

Robert and John Allerton began the design and layout of the garden in 1938. The course of Lāwa`i Kai Stream became the

spine of the garden and a series of garden rooms and vistas unfolded between the river bank and valley cliffs.

World travelers, connoisseurs of art, garden lovers, talented landscape designers and plantsmen, they introduced a cosmopolitan view of the garden arts to Hawai`i. In their work one can find in the walled rooms a reminder of Hidcote in Gloucestershire; in the lattice pavilion of the Diana Fountain there is the reference to the Palladian Bridge at Wilton; the three pools recall the magnificent pools of the French Courances; while the Mermaid Fountain echoes the Villa Caprarola of Italy. In time the Allertons would create an exceptional landscape, borrowing ideas from abroad, using local materials, and employing highly skilled local craftsmen. Over the years, the Allertons created what is today a world renowned garden considered by experts to be a masterpiece of landscape design.

3.3 Allerton Gardens Trust

John Gregg Allerton passed away in 1986, and left Lāwa`i Kai in trust to the First National Bank of Chicago, now known as JP Morgan ("trustee"). Mr. Allerton wanted Lāwa`i Kai to remain a distinct entity with independent funding and management. Mr. Allerton made the trust subject to two key conditions:

"…2. *Allerton Gardens shall be maintained by the Trustee as a garden for the education of the public and for botanical research. Allerton Gardens shall not be used as a public park or recreation area but shall be open to the public (at such time as the Trustee shall determine) for the enjoyment and education of those of the public who shall be interested in botanical gardens."*

"…3. I direct that the Trustee shall maintain the Garden with as high a degree of care as they have been maintained by my father and me. I desire that neither the public use of the Gardens or its use for botanical research shall be allowed to interfere with or detract from the appearance of the Gardens as presently established."

3.4 National Tropical Botanical Garden

In the last year of his life, Robert saw the realization of one of his dreams, the establishment of a national botanical garden focused on plants of the tropics. Robert was one of the five men named by

Congress in a charter to create a non-profit tropical botanical garden, enacted in the early 1960s. As a result of these efforts, the National Tropical Botanical Garden (NTBG) was chartered by an Act of Congress in August 1964. On December 22, 1964, Robert died at the age of 91, and his ashes were scattered over Lāwa`i Kai Bay.

In late 1964, the Allertons donated one million dollars to the newly created organization, which included funds for land acquisition. It was with the Allertons' generous donation that over 170 acres of land in the Lāwa`i Valley, adjacent to and mauka of Allerton Garden, were purchased in 1970. This land is referred to as McBryde Garden. NTBG's headquarters is located on a parcel donated by Alexander and Baldwin in the 1970s that overlooks this beautiful property.

From 1964, until his death in 1986, John Gregg Allerton preserved as a memorial to his father the style of the garden plantings and landscape architecture. John Allerton also served on the NTBG's Board of Trustees and recognized the benefits of the symbiotic relationship between the Allerton Garden and McBryde Garden and in his will provided for NTBG to be the manager of this historic property.

As a result, since 1986, NTBG has managed Allerton Garden under an agreement with the Allerton Gardens Trust. NTBG's management agreement requires that the Garden be used as an educational and scientific research area and maintain the garden in the manner directed by the will.

4.0 PROPERTY DESCRIPTION & LAND USES

Chapters 4.0 and 5.0 generally follow Hawai`i Administrative Rules, Title 13, Department of Land and Natural Resources, Subtitle 1 Administration, Chapter 5 Conservation District, Exhibit 3 Management Plan Requirements: August 12, 2011. The proposed Lāwa`i Kai Special Subzone includes Allerton Garden, the Lāwa`i Kai Stream, Beach, and Bay.

4.1 Name of Applicant

Privately owned portion
National Tropical Botanical Garden (NTBG)
3530 Papalina Road
Kalāheo, HI 96741

4.2 Landowner[3]

Privately owned portion
Allerton Gardens Trust (AGT)
c/o 3530 Papalina Road
Kalāheo, HI 96741

Publicly owned portion
State of Hawai`i
Department of Land and Natural Resources (for beach and ocean properties)
1151 Punchbowl
Honolulu, HI 96813

[3] See **Appendix A** for letter of authorization from Allerton Gardens Trust to NTBG.

4.3 Property Description

There are seven tax map key parcels in the proposed Lāwa`i Kai Special Subzone that are under the management of the National Tropical Botanical Garden. The affected tax map key parcels are shown in **Exhibit C** and are listed below.

▪ (4) 2-6-002:001	71.91 acres
▪ (4) 2-6-002:004	1.60 acres
▪ (4) 2-6-002:005	1.88 acres
▪ (4) 2-6-002:006	2.13 acres
▪ (4) 2-6-002:007	.55 acres
▪ (4) 2-6-002:008	1.25 acres
▪ (4) 2-6-002:009	8.19 acres
Total	87.51 acres

In addition, there are shoreline areas and part of the bay that are under the jurisdiction of the State of Hawai`i.

▪ Lāwa`i Kai Beach	2.0 acres (approximately)
▪ Lāwa‘i Kai Bay	20.0 acres (approximately)
Total Special Subzone area	**109.51 acres**

4.4 Surrounding Land Uses

The Allerton Garden is located at Lāwa‘i Kai in the *moku* of Kona and the *ahupua‘a* of Lāwa‘i on the south shore of Kaua‘i. To the north of the Garden area is NTBG’s McBryde Garden, to east is Kukui‘ula Development Company Hawaii (KDCH) property, to the south is Lāwa‘i Kai Bay, and to the west is A&B’s Kaua'i Coffee property which is the first property designated as Important Agricultural Lands by the State Land Use Commission under HRS 205-44 & 45.

4.5 Existing and Proposed Subzone Classification

The existing State Land Use District for the land and beach areas are in the *Conservation District: **Limited** Subzone* and the submerged lands of the bay are in the *Conservation District: **Resource** Subzone* as shown in **Exhibit D**. The Petition proposes to redesignate the area and include the bay in the *Conservation District: Lāwa‘i Kai **Special** Subzone* and is shown in **Exhibit E**.

4.6 Proposed Land Use

The applicant is proposing to continue using the privately owned portions of the proposed special subzone as a botanical garden dedicated to conservation, research, and education and the publicly owned portions of the proposed special subzone for conservation with managed public recreational use.

No new development is planned within the proposed Special Subzone although existing infrastructure will need to be maintained and replaced during the planning horizon of 20 years. Public access to the Lāwaʻi Kai Beach and Bay areas are described in the Recreation and Commercial Management Plan (Chapter 13.0). The recommendation is to maintain current level of public use of the beach and bay and to effectively preserve the natural and cultural resources found in the coastal zone.

NTBG is a non-profit charitable organization with limited financial resources. The applicant wishes to make it clear that this visionary long-term Master Plan and Management Plan contains all of the potential improvements and repairs that could be needed in the planning horizon. However due to the fiscal constraints of the current economy and the need to balance physical repairs and improvements of the infrastructure with actual garden maintenance, there is no commitment that these physical improvements will be made either in the short term or long term. Because of this, the Applicant requests that the BLNR waive its standard condition that physical improvements and repairs approved under a Conservation District Use Application (CDUA) "start within one year and are completed within three years."

Instead, should this Special Subzone request and a master Conservation District Use Permit (CDUP) be approved by the BLNR, the applicant would like the flexibility to bring specific proposed improvements contained in the Master Plan to State of Hawaiʻi, Office of Conservation and Coastal Lands (OCCL) staff for processing as the funding for these improvements becomes available in the future. This same request was approved when the Limahuli Valley Special Subzone was created.

If the Lāwaʻi Kai Special Subzone is approved, this will give the NTBG and the community the opportunity to implement a unified culturally based management strategy that will ensure the protection and health of this area for future generations.

4.7 Consistency with the purpose of the conservation district and subzone

Under §13-5-15 of the DLNR's Administrative Rules, a Special (S) Subzone is an "area possessing unique developmental qualities which complement the natural resources of the area." There are a multitude of natural, cultural, and historic resources within the proposed Lāwa`i Kai Special Subzone that complement the estuary, stream, beach, and bay. The unique features and natural resources found in this area are described in Chapter 6.0 Management Plans.

The limitations of the current Conservation District subzones (Limited and Resource), and the inability to efficiently link the active long-term management of the land with the stream, beach, and bay have motivated the NTBG to develop this holistic ahupua'a-based master plan. Underpinning this master plan is the first-ever special subzone proposal that includes both private lands and public resource areas (estuary stream, beach and bay).

4.8 State and County Land Use

The existing State Land Use District for this area is *Conservation*. The State Land Use District for surrounding property to the west and north are classified as *Agricultural*, and to the east is *Urban.*

The County of Kaua'i's General Plan land use designation for the subject area is *Open. T*he surrounding properties to the west are *Agriculture,* to the north is *Open,* and to the east are *Open* and *Residential Community*. The County General Plan map is shown in **Exhibit F**.

Since the subject area is in a State Conservation District, the area is not zoned by the County of Kaua`i. As shown in **Exhibit G**, the County Zoning Districts for the surrounding properties are *Agriculture* on the west, *Open* to the north, and *Agriculture* and *Open* to the east.

The County's Special Management Area (SMA), is shown in **Exhibit H.** Since no development is proposed or changes in the density or intensity of use, no SMA permits are needed at this time. Any proposed improvement in excess of $500,000 could trigger an application for an SMA permit from the County of Kaua`i. However, routine maintenance and repair work would not be

considered a "development" and may be exempt from a SMA permit or require a SMA minor permit only.

4.9 Existing Conservation District Use Permits

In 1964, the Allertons approached the State Land Use Commission to request the inclusion of the Garden property within the Conservation District as a way to perpetuate the cultural, archaeological, and natural resources of the Allertons' Lāwaʻi Kai estate. This request was approved.

In the mid-1990s, NTBG applied for a Conservation District Use Permit to conduct educational and research activities within Allerton Garden. A total of three Conservation District Use Permits (KA-2783, KA-2796, and KA-2743) have been approved for the subject parcel (2-6-002:001).

4.10 Existing Programs

NTBG's three core programs - conservation, research, and education - all take place within Allerton Garden. The following are examples of these programs and how they are implemented in the project area.

4.10.1 Conservation

The NTBG's Conservation Department conducts a wide-range of programs in the project area, including:

- Coastal plant restoration project with support of the U. S. Fish and Wildlife Service. One important goal is to improve the nesting habitat for threatened green sea turtles.
- Demonstration plot for coastal forest community restoration, based on results from paleoecological research, has been implemented.
- In 2008, the Conservation Department developed protocols for monitoring, protecting, researching and documenting the nesting sites of green sea turtles on the beach at Lāwaʻi Kai. The program involves discovering the sites, notifying the proper entities, securing the sites, documenting specifics of each nesting site, observing and monitoring sites, and with the proper authority, uncovering the site after hatching has occurred and recording the appropriate data. Such data include date eggs are laid, date hatched,

date the nests are uncovered, number of shells, unhatched embryos and number of hatchlings still in the nest.

- The Conservation Department is also the lead department in conducting riparian restoration and stream studies in conjunction with the Hawai‘i Stream Research Center at the University of Hawai‘i.

4.10.2 Research

The NTBG's Plant Science Department utilizes the project area as a location for important botanical research collections. These are: the Pandanus Collection, the Palmetum, and the Micronesian Riparian Habitat, and is taking place in Lāwa‘i Valley on the west side of the stream. All three research collections contain plant material collected by the Allertons during trips through the Pacific and Southeast Asia. The goal for these programs is to expand these collections while maintaining the "Allerton style" of horticulture and landscape design.

The Pandanaceae Collection

Pandanus is a large shrub or small tree of immense cultural, health, and economic importance in the Pacific. All parts of the plant are used; the nutritious fruits of edible varieties, the branches in construction, and the leaves for weaving and garlands. *Pandanus* diversity is declining due to deforestation and rapid population growth and the NTBG plans to collect and propagate threatened and endangered species from the Pandanus family as a collection in the Allerton Garden.

The Palmetum

The Palmetum is a small collection of palm species whose greatest diversity is in the tropics and subtropics, and where palms are of immense ecological and economic importance. Palms are recognized as an increasingly threatened family, with over 225 species identified as highly threatened with extinction. An important component of their Palm Action Plan is the ex situ conservation of palms using botanical garden collections.

Island palm species are unique and merit a concentrated research program because of the intense human population pressures, threats posed by plant and animal introductions and the need to

manage the remaining forested habitats on oceanic islands. Endemic island palm species are very important for the maintenance of biodiversity.

The Micronesian Riparian Habitat

Almost all of the species represented in the Micronesian collections are useful or important as ethnobotanical plants and are used by the indigenous Micronesian people. For example, kukui (*Aleurites moluccana*) is one of the great domesticated multipurpose trees of the world. The traditional uses are extensive: seeds, and oil were burned for illumination; the seeds, leaves, flowers, and bark are used medicinally; and dyes were extracted from various plant parts to color tapa cloth and canoes.

The ultimate goal is the creation a self-sustaining "Micronesian" forest in this section of the Allerton Garden. Many of the original collections have become quite well established and several species are now producing seed for the future expansion of the area. Future growth of this collection will target additional species currently not represented. This collection offers the opportunity to create an outdoor classroom where visiting researchers, students, and staff can immerse themselves in a Micronesian forest without ever leaving Hawai'i. It also serves to compliment on-going, collaborative research projects in Micronesia that are seeking to document the floras of the islands as well as ethnobotanical information before it is lost.

4.10.3 Education

The Education Department takes the lead in developing the interpretive programs that educate over 30,000 visitors each year. These programs train both paid and volunteer docents and provide historical and environmental information about the area. Educational programs conducted by NTBG cover a wide range of audiences and levels of interests. In addition to public tour programs, NTBG publishes reports and scientific papers, conducts workshops, seminars and lectures, provides internships, hosts visiting scientists, and trains students of all ages.

Recent examples of educational programs include:

- From 2009 - 2011, NTBG in their ongoing partnership with the University of Hawai'i annually conducted a six-credit course on "Archaeological Field Techniques" that took place on the property. In addition, three other four-credit

courses were regularly taught at NTBG, all of which utilize this area for parts of their curriculum.

- Junior and Senior High School students assisted the Lāwa`i Kai and Lāwa`i Stream restoration projects.

- Elementary school students participated in NTBG's Garden As Classroom School Program.

- Undergraduate students from the United States and Pacific island nations participate in the NTBG Horticultural Internship Program.

- College biology professors, high-school science teachers, and environmental journalists receive on-site training and education.

5.0 EXISTING CONDITIONS

5.1 Topography and Slope

Kaua'i is one of the oldest of the Hawaiian Islands and consists of a single shield volcano built up from the sea floor by thousands of thin flows of basaltic lava. Following the volcanic period, long periods of erosion, waves cutting high sea cliffs, and streams cut deep canyons and valleys.

The topography of the proposed Lāwa‘i Kai Special Subzone area includes open meadows, jungle ravines, and rugged cliff faces.

5.2 Soils

Due to the topography of the valley, there are many different types of soil in the project area. Small amounts of Jaucas Loamy Fine Sand (JfB) is found in the central area of the project area on the east side of Lāwa‘i Stream. The soil is single grained, pale brown to a very pale brown in color and sandy in texture and is typically found near old beaches. The expected mean annual rainfall for this soil type is between 10-14 inches.

The soils around the stream mouth and fishpond area are classified as Marsh (MZ) soils. The areas are wet and flood periodically.

Rough Broken Land (rRR) soil is found along the steep valley walls whose gullies serve as drainage channels. Elevations range from 25 to 500 feet for this soil. rRR varies with 20 to over 60 incles in depth over soft, weathered rock. Runoff in the in the area consists of weathered rocks and/or rock fragments, as well as soil, and is very rapid.

Kaena Clay, Brown Variant (KavC) is also found on the subject property**.** It is comprised of alluvial deposits from the Lāwa‘i Stream and has a brown surface layer. Kaena Clay has poor drainage with slow to moderately slow permeability.

On the southern end of the project area, at the mouth of the stream and bordering the ocean, are Beach sands (BS) interspersed with areas covered with stones, cobbly coral, and seashells.

5.3 Agricultural Productivity Rating (ALISH, LESA)

The Agricultural Lands of Importance to the State of Hawai‘i (ALISH) productivity rating for the project area is unclassified on the ALISH maps. The Land Study Bureau’s Land Evaluation and Site Assessment (LESA) classifications are C and E, according to the State Office of Planning.

5.4 Climate, Rainfall & Wind

The average rainfall is about 40-50 inches of rain per year according to the *Atlas of Hawai'i*. The closest rain gauge is located in nearby Kalāheo (HI43) which is significantly wetter than Lāwa‘i Kai.

Annual temperatures range from the mid-60s to mid-80s. Winds generally originate from the northeast (trade winds), although between October and April, the area may come under the influence of the southerly or southwesterly Kona storms.

5.5 Hydrological Characteristics

Lāwa‘i Valley is a drainage system for a bowl-shaped geologic feature about 2.4 miles wide below Mt. Kahili inside of which sits Kanaele Swamp. Lāwa‘i Valley is approximately 8,200 acres in total size with Lāwa‘i Stream descending from its headwaters at about 1,800 foot elevation to the ocean at Lāwa‘i Bay. Five unnamed tributaries drain Lāwa‘i’s upper watershed joining its main channel by the time the stream reaches about 600 feet.

The Lāwa`i Stream originates in the Līhu'e Kōloa Forest Reserve in its headwater reaches, passes through low-density residential subdivisions and agricultural lands in its middle reaches before entering an increasingly incised lowland valley feature 200 feet deep in sections which begins about one mile downstream of its intersection with Kaumuali'i Highway. This incised segment of the stream is surrounded by agricultural lands which are elevated above the stream channel. Lāwa‘i Stream is one of a relatively small group of Hawai'i streams that supports a deep estuarine reach and associated wetland features before entering into the ocean at Lāwa‘i Kai Bay.

5.6 Biological Resources

The proposed Master Plan and Management Plans encompasses the land area of Allerton Garden, the aquatic resources of Lāwa‘i Kai Stream, the

Lāwa‘i Kai coastal zone, and the marine waters of Lāwa‘i Kai Bay. As a result of land use changes and invasive plants, few native Hawaiian plants survived in the lower region of Lāwa‘i Valley except along the coastal beach area and on the inaccessible rocky slopes and cliffs unsuitable for cultivation. The biological characteristics for each area are summarized below.

5.6.1 Botanical Resources

A botanical inventory of the Allerton Garden was conducted in June 2007.[4] The inventory identified approximately 858 different species, varieties, and cultivars of flowering plants and ferns, including cultivated, native, and naturalized weedy species.[5]

In spite of the fact the area is dominated by introduced plant species, there are still a number of native plants found growing on the cliffs in the project area. These cliff plants include *‘akoko, a‘alii, ‘ala‘ala wai nui, ko‘oko‘olau, ‘uhaloa,* and *‘akia.* There are also several native species growing along the coastal areas. These include: *naupaka kahakai*, *pohuehue*, *hunakai*, *pa‘uohi‘iaka*, *‘aki‘aki*, and *mohihihi*.

Further information regarding botanical resources is found in the Landscape Resources Management Plan (Chapter 8.0).

5.6.2 Aquatic Resources

A biological and habitat assessment of the lower Lāwa‘i Kai Stream was conducted in June 2007.[6] Native aquatic species presence in the estuary area were found to be relatively robust. Native *'o'opu* and *'opae* species were consistently present although not at abundance levels comparable to that found in high-quality streams.

Of ecological concern was the presence of a large population of the alien cichlid in the estuary and a growing population of the alien grass shrimp, which appeared to be gaining a foothold in lower Lāwa‘i Kai Stream. Further information is found in the Lāwa‘i Kai Estuary and Stream Management Plan Chapter 11.0).

[4] Lorence and Flynn, “Botanical Inventory of the Allerton Garden” available at lawaikai.ntbg.org.

[5] In addition to the species introduced within the historical context of Queen Emma (1848-1886) and the Allertons (1938 – 1986), the Garden holds a great diversity of plants with important conservation, research, and educational potential.

[6] Kido, “A Biological and Habitat Assessment of Lower Lāwa‘i Stream” available at lawaikai.ntbg.org.

5.6.3 Coastal Resources

The sandy coastal area is approximately two acres in size and consists of a white sand beach and small dune system that transitions into the lawn fronting the Allerton house. This area is an important habitat for green sea turtles and monk seals.

A project underway since 2005 has been to restore native vegetation along the Lāwa‘i Kai coastal zone.[7] This restoration project provides natural protection to the coastline in the face of extreme events such as hurricanes and tsunamis, provides a habitat matrix for rare and endangered coastal plants, and preserves one of two nesting sites for the federally threatened *honu,* or green sea turtles. The improved coastal native habitat has provided increasing nesting opportunities for the green sea turtle.

5.6.4 Marine Resources

Lāwa‘i Kai Bay is approximately 20 acres of mostly sandy bottom with coral reef communities colonizing the basalt rock perimeter. The bay is a high wave energy environment, particularly in summer months, receiving intermittent freshwater and terrestrial sediment/debris input from Lāwa‘i Stream.

A marine resource survey conducted in May 2007 found that the biological community exhibited relatively healthy herbivore populations (both sea urchins and fish).[8] No alien or invasive algae species were observed, and turf algae were dominant. Overall coral abundance was low (typical of high energy environments), and dominated by lobe coral and cauliflower coral. Forty benthic taxa and 90 fish species were found within the survey sites.

Fish species diversity was low, owning to the small size of the bay and its limited habitat complexity. *Akule*, *weke 'ula* were the most important fishery resources utilizing the bay. *Uhu* and *opihi* were low in abundance and size reflecting high harvest pressures in the bay.

Natural stressors to the health of Lāwa‘i Kai Bay include high wave energy and periodic stream flooding. The latter is exacerbated by upstream land use, with increased sedimentation, nutrients from fertilizers, and organic debris deposited into the bay.

[7] During 2004-2005, Dr. David Burney, Director of Conservation (and Living Collections) at NTBG, received funding from the U.S. Fish and Wildlife Service for a project to restore native vegetation along the Lāwa‘i Kai beach. All necessary permits were obtained before proceeding.
[8] Friedlander, “Survey of the Marine Resources of Lāwa‘i Bay” available at lawaikai.ntbg.org.

Anthropogenic stressors on the marine ecosystem are fishing activities that lead to over-harvesting, as well as a proliferation of derelict fishing gear in the bay. Further information is found in the Coastal and Marine Resources Management Plan (Chapter 12.0).

5.6.5 Threatened or Endangered Flora

Ecologically Lāwa‘i Kai was once a part of the lowland dry forest and coastal ecosystems. Due to the land use changes over time, the terrestrial ecosystems found on the subject property today are dominated by introduced plant species. A botanical survey of the Garden found very few native species, and no threatened or endangered flora.

5.6.6 Threatened or Endangered Fauna

Endemic, endangered Hawaiian birds, in the vicinity of Lāwa`i estuary and stream, include: *Anas wyvilliana* (Hawaiian duck), *Fulica americana alai* (American coot), and *Gallinula chloropus sandvicensis* (Common moorhen).

The coastal area of Lāwa‘i Kai is an identified hauling-out and resting area for the endangered Hawaiian Monk Seal, and a nesting site for threatened green sea turtles.

Green sea turtle nesting and monk seal activity is being monitored in collaboration with researchers from the State’s Department of Land and Natural Resources, Aquatic Resources Division, and National Oceanic and Atmospheric Administration’s Pacific Islands Fisheries Science Center, Marine Turtle Research Program.

There are no endangered or threatened seabirds that nest in Lāwa`i Kai.

5.7 Constraints: Hurricanes, Flooding, Tsunami

The project area is subject to hurricane impacts and flooding from Lāwa‘i Stream. Lāwa‘i Kai is one of the areas studied in the Federal Management Agency (FEMA), Flood Insurance Study, County of Kaua'i. The Federal Emergency Management Flood Insurance Rate Map, Panel 15002-0292E (September 16, 2005), shows numerous flood zones, including Zone A, AE, VE, X, and XS. **Exhibit I** indicates the various flood hazard zones

within the subject parcel including the descriptions in the applicable zones.

5.8 Historic Properties in the Project Area

At the present time there are no properties listed on the State or National Register of Historic Places. Within Allerton Garden there are structures and other features over 50 years old that may qualify for placement on the State or National Register of Historic Places. Following the death of her husband King Kamehameha IV, Hawai'i's Queen Emma came to Lāwa‘i Valley in 1870 where she lived for a short while before returning to her official duties in Honolulu. Queen Emma's Cottage remains in the Garden today.

An archaeological survey identified six new sites.[9] These sites are in addition to the 13 previously identified sites by Pila Kikuchi and Wendell Bennett.[10] Additional information can be found in the Historic Resources Management Plan and the Archaeological Resources Management Plan (Chapter 10.0).

5.9 Cultural Resources

Act 50 requires state agencies and other developers to assess the effects of proposed land use or shore line developments on the "cultural practices of the community and State" as part of the HRS Chapter 343 environmental review process (2001).

A *Cultural Impact Assessment of Allerton Garden* was prepared by Scientific Consultant Services in February 2008. The Assessment contains archival and documentary research, as well as communication with organizations and individuals having knowledge of the project area, its cultural resources, and its practices and beliefs.

As described in the Archaeological Resources Management Plan, there is a need to maintain the legal rights of Land Commission Awardees and lineal descendants and to provide access to the archaeological sites for traditional and cultural uses by lineal descendants. NTBG will continue to maintain and preserve the sites at Lāwa‘i Kai.

[9] Hoerman and Spear, "An Archaeological Inventory Survey of Lāwa‘i Ahupua‘a" available at lawaikai.ntbg.org.
[10] See Archaeological Resouces Management Plan for complete listing of sites.

5.10 Scenic and Visual Resources

The scenic resources of the project area are varied and dramatic. The *mauka* to *makai* scenic resources include lush tropical vegetation with cliffs rising steeply from the valley floor.

Lāwa‘i Kai Stream is the spine of the Allerton Garden where a series of garden rooms and vistas unfold between the streambank and the cliffs that rise behind. The sound of abundant water is everywhere – in the pools, waterfalls, fountains, and cascades.

Lāwa‘i Kai Stream meanders through the Garden, coastal area, and into Lāwa‘i Kai Bay. The absence of human impacts contribute to the natural beauty and relatively pristine scenic and visual qualities of the small beach and bay area.

5.11 Vehicular Access to Allerton Garden

The cliffside portions of the historic Allerton driveway that connected Allerton Garden to Lāwa`i Road, were undermined by Hurricane ‘Iniki in 1992, making it impassable by vehicles.

As a result, there is no longer any direct vehicular access to Allerton Garden from a public road. The two existing vehicular access routes that are currently used cross over the adjoining property before gaining access to the lower parts of Allerton Garden.

The first access route starts at the end of Papalina Road in Kalāheo where the NTBG main entrance is located. From here vehicles are able to drive down into the Lāwa‘i Valley and through the McBryde Garden where internal roads connect directly to Allerton Garden access roads.

The second access is from NTBG’s Visitors Center on Lāwa‘i Road where guided tours of the Garden originate. NTBG has an agreement with Alexander & Baldwin (A&B) and subsidiary Kukui`ula Development Co. Hawaii (KDCH) to allow tour vehicles to cross over their property and gain access to an old railroad easement that runs over the upper cliffside portion of the Allerton Garden property. The railroad easement leads to NTBG’s McBryde Garden where tour vehicles either park and unload visitors or proceed over internal Allerton Garden roads to the Lotus Pond area.

5.12 Public Access to Allerton Garden

Aside from guided tours, there are many other opportunities for the public to visit Allerton Garden. While visitors enjoy the views of Lāwa'i Kai Beach and Bay from the premises of Allerton Garden, the beach area is not accessible via NTBG shuttle services. Table 5-1 describes activities available to the public and the frequency of these activities.

Table 5-1: Public Access Options to Allerton Garden

Activity	Description	Frequency/cost
Ohana Day- Allerton Garden	Residents meet at NTBG Visitor Center and depart by tram for a guided tour of Allerton Garden. From the lawn, visitors view the beach and bay.	▪ Once a month, 4 tours/day, by reservation. ▪ Free for residents (80 people max./day).
Education: Junior Restoration Team	Targeted to 13-16 yr. olds. Restore stream and coastal area, work in plant nursery.	▪ Once a month
Education: Garden as Classroom	Pre- and Post-visits to classrooms. Targeted to Kindergarten to 6th graders. Curriculum developed to meet DOE standards.	▪ Grants to subsidize bus fare ▪ 1,600-2,000 student/year. ▪ Free admission.
Lineal descendants	Access to historic graves	▪ Visits throughout the year ▪ (20 times/year). ▪ Annual July meeting ▪ (20-40 family members).
Cultural practitioners	Hula Halau pay homage to Queen Emma.	▪ Hula Halau (3/4 halau per year). ▪ Queen Emma pilgrimage ▪ (October, annual)
Community groups	Access to Allerton Garden by special arrangement	▪ (2-3 times per year)
NTBG Employee Appreciation Event	Annual employee appreciation picnic on Allerton lawn.	▪ Once a year

5.13 Public Access by Land to Shoreline Area

Shoreline access to the area has always been limited by the topography of the basaltic cliffs on both the east and west sides of Lāwaʻi Bay. A detailed discussion of public access to the shoreline area is found in the Recreation and Commercial Management Plan (Chapter 13.0).

5.14 Beach and Bay User Survey

Between November 2007 and October 2008, NTBG conducted a user survey of the beach and bay. The average number of surfers, swimmers and beach goers was 246 per month. The average number of pole and net fishermen was 28 per month. The average number of kayaks and motorized vessels in Lāwa`i Kai Bay was 36 per month. Further information can be found in the Recreation and Commercial Management Plan and in **Appendix E**.

6.0 MANAGEMENT PLANS

Management Plans have been developed for seven areas:

- History
- Landscape
- Infrastructure
- Archaeology
- Lāwa`i Kai Estuary and Stream
- Coastal and Marine
- Recreation and Commercial

Each Management Plan provides background information about the specific resource, an overview of current programs, and critical issues relevant to the resource. Goals, objectives, activities, and actions are described for each of the seven areas. Also identified in the Plans is the responsible department within the NTBG or outside agency, and a timeline for carrying out the Management Plans goals and objectives.

The Lāwaʻi Kai Master Plan and Management Plan has a 20-year planning horizon, from 2013 to 2033. Implementation of the plan has been divided into four categories and is dependent on securing adequate resources:

- On-going (currently under way, continuing)
- Short Term (1 – 3 years)
- Medium Term (4 – 10 years)
- Long Term (10 – 20 years)

The following are the goals included in the Management Plans. A summary of goals and objectives are found in **Appendix B.**

Historic Resources

- Protect and preserve the historic resources of the Lāwaʻi Kai Special Subzone.

Landscape Resources

- Preserve garden resources consistent with the historic Allerton Garden design.
- Preserve the integrity of the historic landscape by controlling alien animals.

Infrastructure

- Stabilize and improve the infrastructure to preserve the historic Allerton Garden.

Archaeological Resources

- Protect and Preserve the Archaeological Sites within Allerton Garden.

Lāwa‘i Kai Estuary and Stream Resources

- Improve water quality & ecological health of Lāwa‘i Kai Estuary, Stream, and coastal waters.
- Restore and protect population of native aquatic species in Lāwa`i Kai Estuary and Stream.

Coastal and Marine Resources

- Restore native coastal ecosystem on Lāwa‘i Kai Beach.
- Educate the public about the unique resources and ecosystem of Lāwa‘i Kai Beach and Bay.
- Improve the marine resources of Lāwa‘i Kai Bay.

Recreation and Commercial

- Manage recreational and commercial activities on Lāwa‘i Kai Beach and in Lāwa‘i Kai Bay.

7.0 HISTORIC[1] RESOURCES MANAGEMENT PLAN

7.1 Background[2]

Hawaiians probably settled in what is now the Allerton Garden more than 10 centuries ago. The abundant archaeological sites on the property, and local ethnographic sources, indicate that the area was utilized in a variety of ways. In recent centuries at least, the lower part of the valley was held by persons of high status.

The post-contact period in the Hawaiian Islands began in 1778 with the arrival of Europeans. This period marked the beginning of changes in settlement and land tenure patterns that continued throughout the 19th and 20th centuries. In southern Kaua'i traditional Hawaiian land management systems were replaced by private land ownership. The extensive planting of sugar-cane disrupted traditional agricultural practices in Lāwa‘i Valley, and the infrastructure to support these sugar plantations modified the valley and bluff landscape and diverted stream flows.

Post-contact or historical settlement in Lāwa‘i Valley is documented in the 1820s when the name of Lāwa‘i appears on a map by Hiram Bingham. In 1848 James Young Kanehoa was awarded Mahele Award 43, the *ahupua‘a* of Lāwa‘i in the *moku* of Kona, and in 1871, his wife and heir, Hikoni, deeded the ahupua‘a of Lāwa‘i to Queen Emma. The oldest building on the property, the Queen Emma Cottage, was built sometime before 1870 by James Young Kanehoa, Queen Emma’s uncle, or his wife Hikoni.

Following the death of her son in 1862, and her husband King Kamehameha IV in 1863, Emma came to Lāwa‘i in late 1870 for a period of mourning. The valley was her farm, where she grew Hawaiian staples such as kalo (taro), sugar cane, banana, noni, ‘ōhia ‘ai, and breadfruit. She also began the planting of exotics such as bougainvillea, mango, and rice. In April 1871, Kamehameha V requested that she return to Honolulu for official duties and she left Lāwa‘i never to return.

In 1876, Emma leased the ahupua‘a to Duncan McBryde for a term of 15 years, reserving her house lot (Mauna Kilohana) and several acres of lo'i kalo. After her death in 1886, Mrs. Elizabeth McBryde purchased the *ahupua‘a* of Lāwa‘i. The *mauka* lands were used to raise cattle, and the lower lands at Lāwa‘i Kai were leased to Chinese farmers for rice and taro cultivation. The Chinese built irrigation ditches and water flumes on the west side of the valley and repaired existing Hawaiian ditches to water the

[1] Post-contact historic resources dating after 1778.
[2] Richard Hanna, “History of Lāwa‘i Kai.”

rice. They also used the water to maintain the existing Hawaiian fishpond.

In 1899, Alexander McBryde was granted the land of Lāwa‘i in the lower valley, together with the *konohiki* fishing rights in the bay. Several years later, when it was decided to plant cane in the area where Mauna Kilohana stood on the eastern rim of the valley, Alexander rescued Queen Emma’s cottage. It was lowered over the cliff to the valley floor. He lived in the cottage until a larger bungalow, Hale Pua, was built in 1915.

Alexander McBryde continued to develop the valley botanically in cooperation with Dr. Wilder, an early plant collector on Kaua'i. Visitors could stroll through the grounds planted with palms, gingers, plumerias, and ferns.

The beginning of the 1900s marked a dramatic change in settlement and land use in Lāwa‘i Valley. Mechanization of the McBryde Plantation, railroad construction, and large irrigation projects transformed the landscape. A steam pump station located in Lāwa‘i Valley, designated Pump 6, appears on the 1903 Annual Report map and together with a series of ditches and flumes was used to irrigate cane lands on the eastern and western sides of the valley. Originally this pump was powered with coal but in 1906 the company began to use electric power from the Wainiha Hydroelectric Power Plant to power electric pumps in Hanapēpē Valley and at Pump 6 in Lāwa`i Valley. The Pump 6 structure exists today, although the pumping equipment and piping were removed in the late 1960s when McBryde Plantation decommissioned the pump.

Sugar cane was cultivated far into the valley. In the early days of the plantations it was more expedient to locate workers closer to the sugar cane and this lead to the development of camps or clusters of homes dotting the plantation. Several such camps were located in Lāwa‘i Valley, one was close to Pump 6 with 15 structures according to an early map, and another was located further north.

In 1899 over 1,000 Japanese contract workers arrived and began working for McBryde Plantation. The Japanese immigrants, like the Chinese before them, farmed rice. Three rice mills operated in Lāwa‘i Valley during the 1920s but they ceased production in the early 1930s when export from Hawai'i declined sharply. By 1930 there was a decrease in small-scale agriculture and a decline in population for the District. On the flats there were a few terraces still cultivated in *kalo*.

Until Alexander McBryde’s death in 1935, a great deal of Lāwa‘i Kai was planted in economic crops. Tenant farmers raised watercress, taro, rice, lotus root, and sweet potato, as well as household vegetables and animals. Fruit trees such as longan, citrus, mango, and guava were there as well as

banana and wine grapes.

In 1938 Lāwa‘i Kai was sold to Robert Allerton and his adopted son John Gregg. The McBryde bungalow was torn down and replaced by a house designed by John Gregg. After the Allertons moved into their new home they immediately began designing and laying out the garden.

The course of the stream became the spine of the garden and a series of garden rooms and vistas unfolded between the stream bank and the cliffs that rise behind. Water in abundance meant pools, water falls, fountains, cascades, and the sound of water everywhere.

The genius of the place – the dramatic topography, water in its varied forms, the potential for lush tropical growth – was discovered and brought forth over the years by the Allertons. World travelers, connoisseurs of art, garden lovers, talented landscape designers and plantsmen they introduced a cosmopolitan view of the garden arts to Hawai'i. These garden arts reflect the influences of England, Italy and France. The location of the historic structures, pools and fountains are shown in **Exhibit J**.

Today, visitors to Allerton Garden may only see the lush vegetation and beautiful garden settings. But a look beneath the surface reveals the many layers of history – the cultural resources and ethnographic landscapes associated with the early Hawaiian habitation of the Valley; the historic vernacular landscapes with traces of plantation life and many its ethnic groups; the Valley’s association with Hawai'i’s Queen Emma; and the artistry of the historic designed landscape by Robert and John Allerton. This unique place illustrates through its remaining features what may now be identified as a cultural landscape.

Cultural Landscapes[3] are defined as "a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person or exhibiting other cultural or aesthetic values."

There are four general types of Cultural Landscapes[4], not mutually exclusive*: historic sites, historic designed landscapes, historic vernacular landscapes, and ethnographic landscapes.* The four landscape types within Allerton Garden evolved over time, and illustrate the interconnected systems of land, water, vegetation and wildlife of the Lāwa‘i Valley. The Lāwa‘i Kai Special Subzone area, including Allerton Garden, and Lāwa‘i Kai Beach and Bay, is comprised of all four Cultural Landscape types, whose definitions are described in **Table 7-1**.

[3] U.S. Department of the Interior, National Park Service, Preservation Brief 36.
[4] Also known as Historic Landscape.

TABLE 7-1: Cultural Landscape Descriptions

Cultural Landscape Type[5]	National Park Service Definitions
Historic Sites	A landscape significant for its association with a historic event, activity, or person.
Historic Designed Landscape	A landscape that was consciously designed or laid out by a landscape architect, master gardener, architect, or horticulturist according to design principles, or an amateur gardener working in a recognized style or tradition. The landscape may be associated with a significant person(s), trend, or event in landscape architecture; or illustrate an important development in the theory and practice of landscape architecture. Aesthetic values play a significant role in designed landscapes.
Historic Vernacular Landscapes	A landscape that evolved through use by the people whose activities or occupancy shaped that landscape. Through social or cultural attitudes of an individual, family or a community, the landscape reflects the physical, biological, and cultural character of those everyday lives. Function plays a significant role in vernacular landscapes. They can be a single property such as a farm or a collection of properties such as a district of historic farms along a river valley.
Ethnographic Landscape	A landscape containing a variety of natural and cultural resources that associated people define as heritage resources. Examples are contemporary settlements, religious sacred sites and massive geological structures. Small plant communities, animals, subsistence and ceremonial grounds are often components. See Archaeology Management Plan.

Robert and John Allerton's vision was to keep the interconnected components of land, beach and bay in as natural a condition as possible. In an interview John Allerton discussed his father's approach to the land. "*He always adapted himself to his natural surroundings. For example, he made the paths go where the trees were, or where the rocks were. He never came in with a bulldozer and made it fit his desire*."[6] The Allertons utilized what today is recognized as the *ahupua'a* approach to resource management.

As a condition of the will of John Allerton, NTBG is obligated to maintain and improve the gardens to the level of highest quality at which they existed during the lifetimes of the Allertons. The future treatment and maintenance of the landscape elements will be considered in the overall

[5] National Park Service, Preservation Brief 36.
[6] John Allerton transcript recorded June 23 and August 16, 1978.

framework of managing the entire historic property/landscape and will require a comprehensive, multi-disciplinary approach.

7.2 Current Historic Programs

The NTBG conducts many programs related to its core mission of conservation, research, and education. A summary of these is listed in Section 4.10. In addition to the programs listed in that summary, the NTBG operates an extensive educational visitor program for the Allerton Garden.

The NTBG Visitors Center for McBryde and Allerton Gardens is located outside of the project area on a 10-acre parcel across from Spouting Horn on Lāwa‘i Road. The program is housed in a restored 1920s sugar plantation home. The Center houses a gift shop and is the check-in point for transportation to Allerton Garden. Experienced tour guides take visitors in an open-air tram on a narrow dirt road lined with vegetation, with periodic glimpses of the cliffs, valleys, and the ocean below. The tram continues down into Lāwa‘i Valley, with the guide explaining the culture and history of the area, describing the structures associated with Hawai'i’s Queen Emma, and pointing out the various Garden Rooms and historic buildings, water features, and statuary associated with the creation of the Garden by the Allertons.

TABLE 7-2: Historic Resources Management Plan

Goal 1: Protect and preserve the historic resources of the Lāwa‘i Kai Special Subzone.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**[7]
♦ Lack of information and educational tools that can be used consistently by staff and volunteers.	**1.1** Create Interpretation Plan for historical resources of Lāwa‘i Kai Special Subzone.	A. Develop interpretive program, signage, and materials for staff, volunteers, interns, schools, and visitors.	Administration Education Visitor Services	Short Term
♦ It is not conclusive whether state and federal recognition would be beneficial to Allerton Garden.	**1.2** Evaluate the possible nomination of the Lāwa‘i Kai Special Subzone to the State and National Registers of Historic Places.	A. Evaluate the benefits of a nomination to the State and National Registers. B. Determine if the Allerton Garden Trustees will approve the nomination to the State and National Registers. C. Evaluate the historic context of the property. D. Create a preservation and/or restoration plan for historic structures present on the property.	Administration	Short Term
♦ There is inadequate information to assess the benefits of designating Allerton Garden to as a Cultural Landscape.	**1.3** Consider feasibility of designating the Lāwa‘i Kai Special Subzone as a Cultural Landscape.	A. Evaluate the cultural landscape elements of the property. B. Develop a guide for maintenance of the cultural landscape including regular maintenance, tree and plant replacement, etc.	Administration	Short Term
♦ No comprehensive inventory of historic resources.	**1.4** Develop Historic Preservation Plan for Allerton Garden (see **Appendix F)**.	A. Research standards for preservation plans such as those provided by the National Park Service. B. Produce historic structures report for buildings and structures, including documentation of existing conditions (site plans, maps, photos, etc.).	Administration	Medium Term

[7] On-going (currently under way), Short Term (1-3 years), Medium Term (4-10 years), and Long Term (10 – 20 years).

Goal 1: continued				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
See above.	See above.	C. Create landscape treatment plans for designed, vernacular and ethnographic landscapes to include preservation and/or restoration guidelines for: ▪ Repair/replacement/restoration and maintenance of historic landscape and structures. ▪ Recreating known historic landscapes. ▪ Maintaining existing historic plantings and arrangements. ▪ Creating appropriate contemporary landscaping to help interpret the landscape aspects of the property. Also see Landscape Mgmt. Plan	Administration	Medium Term
♦ Project area is vulnerable to flooding, hurricanes and tsunami.	**1.5** Once Preservation Plan is completed, update NTBG's Disaster Management Plan to include a preservation component.	A. Establish procedures for before, during and after an event by researching FEMA publications and other resources on disaster preparedness, including historic preservation resources. B. Pre and post-event, document historic properties with drawings and photographs.	Administration	Medium Term
♦ Due to their age, the historic structures within the Garden require on-going maintenance and repairs. ♦ Some structures require major repairs/maintenance such as re-roofing. Other needed repairs include dry rot, termites, shingles, flood damage, etc. ♦ The Orchid House was destroyed by a landslide and has not yet been removed.	**1.6** Maintain and repair historic structures. Repurpose the current uses of the structures as needed.	A. Survey and prioritize needed major and minor repairs. B. Determine funding requirements for each repair. C. Budget for, or seek funding for each needed repair (Allerton House, Guest House, Queen Emma Cottage, Tea House, Phoenix House, and Tool Sheds.). D. Photograph and document the Orchid House structure prior to removal.	Administration Facilities	Medium Term

8.0 LANDSCAPE RESOURCES MANAGEMENT PLAN

8.1 Background

The topography of the proposed Lāwa‘i Kai Special Subzone area includes open meadows, jungle ravines, and rugged cliff faces. With an intermediate amount of rainfall and wide range of habitats, the area is suitable for growing a diverse array of plant life, although soils are generally infertile and eroded as a result of decades of poor farming practices associated with the Plantation Era.

The Will of John Allerton has clear requirements as to the management and maintenance of the Garden. These requirements are particularly relevant to this Landscape Resources Management Plan.

From the late 1930s to the early 1960s[8] the Allertons created a series of garden rooms that unfold between the banks of Lāwa‘i Kai Stream on the west and the cliffs on the east. In creating the layout for the Garden, the Allertons used the basic rules of design – harmony and balance, proportion, rhythm and emphasis. Today, the Garden holds a great diversity of plants with important conservation, research, and educational potential.

Within the Garden, plantings are not only a vegetative feature, but have cultural and historical significance. Robert and John Gregg Allerton continued to develop the gardens that were first started by Queen Emma in the 1870s and by Alexander McBryde in the early 1900s.[9] In addition, there are remnants of the past residency of other ethnic groups: the lotus pond and old fruit trees such as longans are evidence of Chinese influence, and even the weeds represent successive waves that accompanied Japanese, Portuguese, Filipino, and American immigrants to the Valley.

Most of the historical plant materials are still in existence today, and the Garden reflects the historical relationship between the past landscape designs and the botanical elements.

[8] The late 1950s is the selected period of interpretation for the landscape design.
[9] See Historic Resources Management Plan for further details.

Within the Garden property, there are two distinct areas, each containing their own historical character-defining[10] features: the Garden Rooms and the Informal Garden Areas. These two areas are described below and are shown on **Exhibit K**.

Garden Rooms

The Garden Rooms are formal in design and use tropical plants as a palette with shades of green and splashes of bright color. All of the plants in the Garden Rooms are non-native tropical plants which were obtained locally, or from world-wide sources. The original plantings selected included heavy, tangled undergrowth; lush, big-leaved exotic plants; creepers clinging to the trunks of trees; and a lacy canopy of palms to filter the sunlight overhead. The restrained use of color using brilliant blossoms, heavy and waxen, completes the tropical garden effect.

The Garden Rooms are delineated and shaded by monkey pod and other flowering trees, rows of palms or hedge plants, and other plantings that provide form, color and fragrance to the Garden. In the past, the formerly abundant water from the valley walls and stream provided flows to the pools, water falls, fountains, and cascades. Today, water is pumped to holding tanks located on a hillside above the Garden Rooms to provide a continuous flow to the water features. The overall landscape is enhanced by the careful placement of statues, decorative objects, and small garden structures.

A botanical inventory of the Allerton Garden was conducted in June 2007 [11] and reflects the Allertons' living collection of plant materials. Approximately 858 different species and varieties of trees and flowering plants are found in Allerton Garden today, including cultivated, native, and naturalized weedy species.

Informal Garden Areas

The east and west walls of the Lāwaʻi Valley, the westside valley floor, and beach restoration sites form the Informal Areas of the Garden. These informal areas are indicated by the Bougainvillea and unlabeled areas on **Exhibit K** as shown above. Woody invasive plants have densely colonized the steep eroded slopes and clothed them in a varied backdrop of contrasting textures and

[10] National Park Service definition: Character-defining feature - a prominent or distinctive aspect, quality, or characteristic of a cultural landscape that contributes significantly to its physical character. Land use patterns, vegetation, furnishings, decorative details and materials may be such features.
[11] Lorence, David H. Ph.D. and Tim Flynn, "Botanical Inventory of the Allerton Garden," June 14, 2007.

shades of green. The remnant species of native plants are usually confined to rock outcrops and drier slopes that have yet to be overrun by invasives. While few in number, they do provide a glimpse of the original vegetation of the lower valley all the while giving hope that restoration of that ecosystem might be possible.

To the west of the formal Garden Rooms and across from Lāwaʻi Kai Stream are three research areas which serve as a backdrop to the formal garden area: the Pandanus Collection, the Palmetum, and the Micronesian Riparian Habitat. All three research collections contain plant material collected by the Allertons during trips through the Pacific and Southeast Asia. The goal of the program is to expand these collections while maintaining the "Allerton style" of horticulture and landscape design.

Pandanus is a large shrub or small tree of immense cultural, health, and economic importance in the Pacific. Pandanus diversity is declining due to deforestation and rapid population growth and the NTBG plans to collect and propagate threatened and endangered species from the Pandanus family as a collection in the Allerton Garden.

The Palmetum is a small collection of palm species that highlights the morphological diversity of the group. Due to space restrictions in the Palmetum, NTBG researchers will focus their efforts on Indian and Pacific Ocean island palms. Island palm species are unique and merit a concentrated research program because of the intense human population pressures, threats posed by plant and animal introductions and the need to manage the remaining forested habitats on oceanic islands.

The ultimate goal of NTBG's Micronesian collection is the creation a self-sustaining "Micronesian" forest in this section of the Allerton Garden. This collection offers the opportunity to create an outdoor classroom where visiting researchers, students, and staff can immerse themselves in a Micronesian forest without ever leaving Hawai'i. It also serves to compliment on-going, collaborative research projects in Micronesia that are seeking to document the floras of the islands as well as ethnobotanical information before it is lost.

Restoration areas featuring plants native to Kaua'i are located on approximately three acres at Lāwaʻi Kai and in strips and patches along Lāwaʻi Kai Stream. Outside Allerton Garden but contributing to the historical landscape are three additional acres on the cliff above Allerton Garden and McBryde Garden, and

along the road leading down from the Administrative entrance through McBryde Garden on the way to Allerton Garden which provide a varied palette of recovering native landscapes. Restoration programs have resulted in a diversification of native Hawaiian coastal, riparian, and dry forest habitats, which now provide a matrix for conserving a diversity of rare and endangered species and provide a wealth of opportunities for scientific research and educational programs.

An avifauna survey conducted in February 2009 found only three endemic species of avifauna within the project area along the Lāwaʻi Kai Stream: *Anas wyvilliana* (Hawaiian Duck), *Fulica Americana alai* (American coot), and *Gallinula chloropus sandvicensis* (Common Moorhen). These three endemics forage in the riparian areas of the Garden.

8.2 Current Landscape Programs

NTBG's three core programs - conservation, research and education - all take place within Allerton Garden. Currently underway by NTBG's Conservation Department is a program at the southeast portion of Lāwaʻi Valley to re-establish a Hawaiian lowland dry forest is adjacent to the Allerton "Jungle Garden."

A lowland dry forest likely existed behind the coastal vegetation over a layer of soil, and abundant ground water. Formerly, this approximately 1.5 acre plot had been planted with a variety of exotic palms, broad-leaved ornamentals, and ferns. It is fronted on the ocean side by invasive ironwoods and a thicket of hau, with scattered milo, kou, and other small trees and an understory of naupaka and exotic grasses.

The Micronesian riparian forest and Pandanus collection are primarily composed of accessioned, documented plants grown form seed of known origin, often wild-collected. For this reason they are particularly valuable as research and conservation collections. Although less origin information is available for the palm collection, all the plants have been accessioned and names provided by experts. As such, it is a diverse synoptic collection of many palm genera and species which is very useful for teaching and scientific research purposes. All three of these collections have and continue to provide an important living resource for scientific studies including breeding systems, reproductive biology, molecular studies, taxonomic studies, and also provide a seed source for propagating these rare species.

An additional 1.5 acres of adjacent coastal strand has also been returned to native vegetation. This coastal program is further described in the Coastal and Marine Management Plan (Chapter 12.0), under Current Programs.

One of the challenges of the project was to remove the exotic vegetation in the area abutting the shoreline, particularly the large and medium-sized ironwoods, without opening up the interior of the plot to increased wind shear, salt spray, and dryness. The hau, milo, and larger ironwoods were temporarily left in place to provide a vegetative screen for the newly planted mesic forest species. These new plantings include federally listed endangered and threatened species.

In 2004, with a 10-year grant from the U.S. Fish and Wildlife Service, NTBG undertook an alien animal control project for pigs, cats and dogs, chickens, and rats. All these animals have had a negative impact on endangered species within the Lāwaʻi Kai Special Subzone. This project is aimed at fully integrating endangered species management with the concerns of the community, while addressing the considerable challenges posed by alien animals. Approved control methods in the Allerton Garden and at NTBG are on-going and will continue beyond the end of the grant period in 2014.

TABLE 8-1: Landscape Resources Management Plan

Goal 1: Preserve garden resources consistent with the historic Allerton Garden design.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline[12]**
1.0 Safety Issues				
♦ There is no written safety plan to ensure the safety of visitors to the Allerton Garden (e.g., falling coconuts, roots on pathways, irritating plant materials, surfaces of paths, medical emergencies, etc.).	**1.1** Develop a written safety plan and communicate procedures to appropriate staff and volunteers.	A. Produce a written safety plan based on recommendations by the Safety Committee. B. Identify potentially unsafe plantings and infrastructure, and map their location for tour guide use. C. Provide list to tour guides and maintenance staff to identify plant materials and infrastructure that may present safety issues within the Garden.	Safety Committee	Short Term
2.0 Historical Plantings				
♦ Current maintenance program should include a component that addresses the historic plantings in the Garden, in order to stabilize the valuable plant materials and to preserve the historic landscape. ♦ The traditional historical methods and specialized techniques of maintaining the garden areas are being lost due to the retirement and/or passing of long-time employees.	**2.1** Maintain an adequately sized, trained and knowledgeable workforce to maintain the historic integrity of the Garden landscapes.	A. Identify plantings which require special maintenance procedures. B. Train grounds personnel to use historic horticultural practices to preserve the historic character of the vegetation. C. Train staff on the importance of using traditional methods for pruning, weeding, and other related tasks and specialized techniques. D. Prepare a garden-wide maintenance schedule of all areas and assign priorities to each. E. Coordinate maintenance program to meet the overall goals of the garden: interpretation, education, resource protection, and visitor safety. F. Maintain plant collections in a healthy condition for maximum	Horticulture	On-going Short Term

[12] On-going (currently under way), Short Term (1-3 years), Medium Term (4-10 years), and Long Term (10 – 20 years).

		longevity.		
2.0 Continued				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
		G. Monitor use of the landscape to identify areas of overuse by visitors and staff. H. Develop a grounds maintenance team with varied experiences in horticulture, arboriculture and landscape architecture.		
♦ Decisions to replace or substitute historic plant materials must be made in the context of the original design and the historic integrity of the Garden.	**2.2** Maintain historic integrity and plant materials within the Garden.	A. Evaluate and update as necessary, NTBG's *Living Collections Policy* to aid in decisions to maintain or replace historical plant materials. B. Follow evaluation criteria (i.e., historical significance, availability of plants, etc.) C. Rejuvenate, retain and perpetuate vegetation through propagation using methods such as seed collection and genetic stock cuttings from existing plants to preserve the gene pool.	Administration Horticulture	Short Term
♦ Erosion and runoff have a negative impact on the integrity of the natural and historical resources of the Garden.	**2.3** Stabilize and protect topography in areas prone to soil erosion and runoff using Best Management Practices (BMP's).	A. Monitor and identify areas of erosion and runoff. B. Work with landowners to control runoff from their adjacent properties. C. Develop and implement solutions to address erosion and runoff in critical areas using BMP's and as funding permits.	Facilities Horticulture Conservation Department	On-going Short Term

CRITICAL ISSUES:	OBJECTIVES:	ACTIVITIES/ACTIONS:	Responsibility	Timeline
3.0 Inventory & Mapping				
♦ Incomplete digital mapping, inventory and documentation of garden resources within Allerton Garden.	**3.1** Map, inventory and document existing resources.	A. Establish work plan to expand and complete digital mapping, inventory and documentation of existing botanical resources. B. Record landscape/vegetative plans, photographs, aerial photographs, narratives, and videos. C. Continue to maintain database. D. Continue updates of documentation at regular intervals.	Living Collections & Conservation Department Horticulture	On-going Short Term
♦ There is no evaluation/inventory of historical and existing vegetative schemes, existing conditions, historic context, etc. ♦ The relationship between the use of plants in the landscape and the social, cultural and economic history is not clearly understood.	**3.2** Inventory and document vegetative features and their historic context.	A. Research and document any historic plans of the Garden. B. Analyze the existing appearance of the vegetation in relation to the historic documentation.	Science Department	Short Term
4.0 Visual Impacts				
♦ The impacts of development on the eastern and western plateaus may negatively impact the historic and aesthetic values of the beach, bay and the Garden.	**4.1** Minimize the visual impacts from adjacent developments.	A. Monitor development plans on adjacent properties. B. Work with adjacent landowners to minimize visual impacts on the Garden, beach and bay.	Administration	Medium-Long Term

TABLE 8-2: Landscape Resources Management Plan

Goal 2: Preserve the integrity of the historic landscape by controlling alien animals.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
5.0 Control of Alien Animals				
♦ Pigs and other ungulates cause plant and soil disturbance, and impact ground-nesting birds and turtle nests.	**5.1** Exclude the pig population and other ungulates within the Lāwa‘i Kai Special Subzone.	A. Use control methods such as hunting, box traps and fences. B. Continue working with hunters and community to reduce number of pigs outside in the Lāwa‘i Kai Special Subzone.	Administration Conservation Department	On-going Short Term
♦ Cats and dogs disturb seabird colonies and other native vertebrates. Dogs are a threat to green sea turtles in the beach area and are extremely incompatible with monk seals at any time.	**5.2** Reduce or remove feral cat and dog populations.	A. Continue with control methods such as box traps, interception. B. Continue with staff training and volunteers to monitor and control cats and dogs. C. Work with Kaua'i Humane Society to humanely remove feral cats. D. Prohibit the release of feral animals into the Garden. E. Educate the staff about the negative impacts of feral animals in the Garden.	Conservation Department	On-going
♦ Chickens disturb seedlings and other historic plant materials.	**5.3** Reduce or remove number of chickens within the Garden area.	A. Continue with control methods such as box traps, nets, exclusion devices, and other licensed control methods. B. Continue to work with appropriate agencies on approved control methods (e.g., DOFAW).	Conservation Department Facilities	On-going
♦ Rats disrupt seabird colonies, are a major source of undesirable seed predation, and spread disease and pathogens harmful to humans.	**5.4** Reduce or eliminate rat population.	A. Continue with trapping and approved poisoning methods. B. Continue to enlist community volunteers in assisting with traps and monitoring.	Conservation Department	Short Term

9.0 INFRASTRUCTURE MANAGEMENT PLAN

9.1 Background

Vehicular Access and Circulation

Vehicular access to Allerton Garden is available through two routes both of which require crossing private property: the historic eastern access and the northern access through the NTBG property. These two routes, along with other infrastructure elements are shown on **Exhibit L**.

The historic eastern access to the Garden began at the end of the County's Lāwaʻi Road, then continued on a private Allerton roadway down the east side of the cliffs into Lāwaʻi Valley. In 1992, Hurricane Iniki destroyed the cliffside portion of the eastern access making it impassible by vehicles. NTBG currently has an easement agreement with Kukui'ula Development Company Hawaii (KDCH) which allows vehicular access through their property along the eastern rim of the valley. This easement connects with the Allerton and McBryde Gardens tour road which enters the valley along the historical McBryde Plantation railway grade. This current vehicular access then crosses onto NTBG property near Pump 6,[13] and then loops back along the valley floor to the Allerton property to its *mauka* boundary. The second access to the Garden begins north of the property at Papalina Road in Kalāheo, through the NTBG property and into the Garden.

There are lockable gates at each access point to prevent vehicular trespassing but there is no fencing to prevent pedestrian trespassing and feral animals from accessing the Garden and causing damage. Further information about the control of feral animals is found in the Landscape Management Plan.

Internal Roads, Culverts, Bridges and Paths

Within the Garden property, there are a number of single-lane, graveled roadways that follow the historic circulation patterns created by the Allertons. Narrow walking paths meander throughout the Garden, connecting the various landscape features.

The main roadway on the west side of Lāwaʻi Kai Stream is large enough for small multi-passenger tour vehicles to travel and reach

[13] Pump 6 is located on the NTBG property just *mauka* of the Garden's northern boundary.

the Lotus Pond, which is located at the *makai* portion of the property.

On the east side of the Lāwa‘i Kai Stream the primary roadway is only wide enough for standard size vehicles. Several covered drainage-ways and culverts are crossed along the way; the road terminates at the Garden’s historic Allerton House.

There is one footbridge that crosses the Lāwa‘i Kai Stream at the mouth of the stream. The bridge is made of stainless steel with wood decking. A second stream crossing was located at the Palmetum area (a collection of palm trees). This bridge was large enough to accommodate maintenance utility carts, but was washed away in a flood, and has not been replaced. Although the bridge is gone, the reinforced columns at each side of the stream still exist. In order to maintain the historical integrity of the Garden, this bridge should be reconstructed. In order for vehicles to traverse the stream they must now backtrack and cross NTBG property.

Included in the internal circulation system on the property are multiple small cart and gravel walking paths; most are graveled. Many of the paths climb up and down the sides of the valley by way of steps made of cut stone. In addition to the walking paths providing access to the various areas of the Garden, they are important components of the historic landscape design. The paths connect the Garden Rooms with one another, and wind along the boundaries of the water features and the nearby stream.

Potable Water System

Historically and prior to about 1995, the residences used spring water for their potable water needs. Since then the springs have dried up and a new potable water source needs to be developed. The McBryde section of the water system is an aging one, and is often subject to leakage and loss of pressure. Delivery of potable water is through a 2-inch pipe, and the water is primarily used for the work shed and residences. Because the County’s water transmission lines are a considerable distance from the Allerton Garden property, NTBG developed a transmission system to bring water to the Garden.

Irrigation Systems

The water and irrigation systems within Allerton Garden are separate and not connected to the County's potable water system. The historic sources of freshwater used for irrigation, water features, and consumption we were taken from local groundwater that surfaced as springs in several locations throughout the valley. When plantation era irrigation practices changed to a drip irrigation system the springs began to dry up. NTBG later developed alternative sources of water to meet the Gardens water needs. Currently, there are three sources of water available for the Garden: the Luawai Reservoir, the Pump 6 Well (Pump 6), and the Kaua'i County Water Department.

The water source for the Luawai Reservoir is the Hanapēpē River. The Reservoir is controlled by Kauai Coffee Company, and is not always a reliable source for irrigation uses within the Garden. The water is often muddy, and its future is uncertain. Allerton Garden is billed quarterly for this water. NTBG and Allerton Garden have limited access to this water.

Pump 6 is located on the NTBG property just *mauka* of the Garden. The water supply to the Garden is dependant on an electric pump that pumps the water to aboveground storage tanks located at one of the highest areas in the Allerton Garden, and is then distributed throughout the Garden to irrigation points and the water features. The current output is about 120 gallons per minute. The clarity and quality of the water is excellent but is limited by the well capacity, pump size and operability, and the storage capacity. NTBG charges for the electricity needed to pump water to the Garden, but does not charge for the water itself.

The Luawai Reservoir and Pump 6 sources are interconnected on NTBG property making the switching back and forth of these sources possible when either of the systems is disabled. The Luawai Reservoir water is directly connected to the main 2-inch supply lines and is primarily used for irrigation on the west side of the Lāwa‘i Kai Stream.

NTBG's Pump 6 water is pumped up to two above-ground steel storage tanks. When the demand is greater than the storage tank supply, the water is fed directly into the 2-inch main supply line. This system is mainly used to irrigate the Eastside of the Lāwa‘i Kai Stream and the water features within the Garden.

The irrigation system is a combination of above-ground and in-ground PVC, HDPE,[14] and galvanized pipes. There are a few fixed sprinkler systems, some having electric controllers. Currently the majority of irrigation is done with movable hoses and sprinklers due to the fiscal constraints necessary to improve the overall water and irrigation system.

Garden Water Features

The water features were originally created by diverting and using the surface spring water into a series of manmade fountains and waterfalls, many of which are still interconnected. The water delivery system is an open system that historically and at the present time terminates into the Lāwaʻi Kai Stream. Since the water features are open systems, there is no recirculation or treatment of the water. Algae growth is an on-going problem, and the water features need to be drained and scrubbed once a week. In addition, several of the concrete features leak and continually need to be patched because of the poor construction methods used in the original structures.

Pump 6 is the primary source of irrigation to the gardens, and water for the fountains and other water features. When the Pump 6 water is under repair, Luawai Reservoir water is used in the water features, but because of the poor clarity of the Reservoir water it is not preferred source. Several of the water features are controlled by an automatic valve that shuts the water off in the evening to conserve water and electricity.

Rock Walls and Steps

In creating the Garden, the Allerton's incorporated the remaining pre-contact rock wall terraces along the valley walls. They also constructed rock walls that contributed to the landscape features of the garden, and also served a practical purpose such as retaining walls to prevent erosion and to stabilize slopes. Recent archaeological work which sought to identify the ancient walls and those constructed by the Allerton's found it difficult to distinguish between those constructed in ancient times and those constructed during the historic period of the Garden's creation.

Within the Garden area, there are several different styles and heights of rock walls. Freestanding walls separate the various garden areas and there are many retaining walls located along the

[14] High Density Polyethylene pipe.

valley walls and stream banks. Stone masonry techniques include dry stacking or the use of mortar.

Electrical, Telephone, Cable and Wastewater Treatment Systems

The source of electrical and telephone lines for the Allerton House and Guest House are above-ground lines located on KDCH property. The lines drop down from the eastside plateau, over the cliff and along the hillside, to a pole sited behind the main house. When the eastern plateau is developed, there may be changes in the source-location of these utilities. The electrical and telephone lines for the tool sheds located with the Garden grounds are provided by utility lines that service the Pump 6 area, on the *mauka* boundary of the Garden. Internet access is provided by a wireless network system.

As previously mentioned, potable water is supplied by the County of Kaua'i with a 2-inch water line originating at Papalina Road. The wastewater treatment for the Allerton House was upgraded to a septic system after Hurricane Iniki in 1992. The Guest House and tool sheds currently have cesspools.

Over the past five years NTBG has been in discussions with Kukui'ula Development Corporation Hawaii (KDCH). When the infrastructure on the eastern plateau is fully developed as part of their development, NTBG anticipates being able to obtain access to upgraded utilities (electrical, telephone, cable) and potable water.

9.2 Current Infrastructure Projects

At the present time, no major infrastructure projects are underway primarily due to the lack of funding. NTBG's Facilities Department provides employees to carry out routine maintenance on the infrastructure.

TABLE 9-1: Infrastructure Management Plan

Goal 1: Stabilize and improve the infrastructure to preserve the historic Allerton Garden.				
CRITICAL ISSUES:	**OBJECTIVE:**	**ACTIVITY/ACTIONS**	**Responsibility**	**Timeline**[15]
1.0 Wastewater System				
♦ Cesspool that serves the tool sheds is over 50 years old and could fail in the near future.	**1.1** Upgrade tool sheds wastewater system.	A. Develop plan to replace cesspool with a new septic system for the tool sheds. B. Obtain funding. C. Install improvements as funding permits.	Facilities	Short Term
♦ Cesspool that serves the Guest House is over 50 years old and could fail in the near future.	**1.2** Upgrade Guest House wastewater system.	A. Develop plan to install a new septic system or connect with the existing septic system on the main house. B. Obtain funding. C. Install improvements as funding permits.	Facilities	Medium Term
2.0 Internal Roads, Bridges, and Paths				
♦ All roads and paths are dirt and gravel, are susceptible to erosion, and can become impassable during heavy rains.	**2.1** Maintain roadway surfaces and paths as funding permits.	A. Conduct periodic maintenance to regravel the paths and road surfaces.	Facilities	On-going & Immediate Implementation
♦ See above.	**2.2** Improve roadway surfaces and paths as funding permits.	A. Consider installing an environmental-friendly road surface.	Facilities	Long Term
♦ Steps in the Garden can be slippery.	**2.3** Make steps and paths safe with handrails.	A. Evaluate areas where handrails would be appropriate. B. Install handrails where appropriate & make path safer.	Facilities	Medium

[15] On-going (currently under way) Short Term (1-3 years, Medium Term (4-10 years) and Long Term (10-20 years).

CRITICAL ISSUES:	OBJECTIVES:	ACTIVITIES/ACTIONS:	Responsibility	Timeline
♦ Garden paths can be difficult to navigate during twilight and evening hours.	**2.4** Install lighting to make paths safe.	A. Evaluate areas where lighting would be appropriate. B. Install lighting as needed.	Facilities	Medium
♦ The historic stream crossing was destroyed by flooding in 2005. Vehicles must backtrack within the Garden, cross over the NTBG property, and then return to the Garden which is an inefficient use of time and resources.	**2.5** Consider feasibility of rebuilding stream crossing/bridge in historical or alternate location to accommodate maintenance vehicles and pedestrians.	A. Evaluate alternative stream crossing sites. B. Obtain funding. C. Obtain necessary permits.	Facilities	Long Term
3.0 Water Features				
♦ The open system used by the features make them dependant on a constant flow of new water, not circulated water. A closed system could reduce costs, bring greater efficiency and conserve water.	**3.1** Explore feasibility and advantages/disadvantages of changing water features to a closed loop system.	A. Develop an engineering design for a pumping and recirculation pump plant. B. Obtain funding. C. Implement as funding permits.	Facilities	Medium to Long Term
♦ High maintenance costs to control clarity of the water and algae in the water features. ♦ During dry conditions there is an inadequate water to irrigate and supply the water features at the same time. ♦ Some water features run 24 hours due to the complexity and interconnection of the current system, resulting in increased energy costs.	**3.2** Determine ways to improve the system for water features.	A. Study and analyze needs, alternatives, and estimate costs to upgrade. B. Obtain funding. C. Implement as funding permits.	Facilities	Medium to Long Term
♦ Chronic cracking and leaking of the concrete water features, reflecting pools, and fountains occurs due to poor construction methods used in the original structures. ♦ Failures from age-related problems contribute to the overall stability of the water features. The water features may need to be reconstructed in the future.	**3.3** Explore ways to prevent leakage while preserving the historical integrity of the water features.	A. Monitor condition of water features. B. Analyze needs and estimate costs to stabilize and repair. C. Obtain funding. D. Repair and/or reconstruct as funding permits.	Facilities	Medium to Long Term

CRITICAL ISSUES:	OBJECTIVES:	ACTIVITIES/ACTIONS:	Responsibility	Timeline
4.0 Potable Water System				
♦ There are no potable water sources immediately adjacent to Allerton Garden.	**4.1** Examine alternative sources of potable water from the east and west sides of the Lāwa‘i Valley.	A. Explore with Kukui’ula Development Company Hawaii (KDCH) & Department of Water potential potable water sources.	Administration	Short Term
♦ The original spring-fed system installed by the Allertons is aging, subject to leakage, and loss of pressure and supply.	**4.2** Upgrade existing water system if no alternatives are available.	A. Estimate costs to upgrade system. B. Upgrade as funding permits.	Facilities	Long Term
5.0 Irrigation System				
♦ The former water sources (historic springs) for the Garden are no longer reliable. ♦ Irrigation water from Luawai Reservoir carries sediment which interferes with the irrigation system. ♦ The future existence of the Reservoir system is uncertain. ♦ Pump 6 needs improvements as it has undersized transmission lines from the pump to the holding tanks. ♦ Water storage tanks may need to be repaired, enlarged and/or decentralized.	**5.1** Improve the Pump 6 water system.	A. Determine proper size for pump, storage, and transmission lines to meet Garden’s needs. B. Consider strategic locations for new tank locations.	Facilities	Medium Term
♦ There is competition for water between the Garden’s irrigation systems and the flow to the water features. ♦ Water features decrease water capacity to irrigation system.	**5.2** Consider ways to separate the irrigation system from the water features system.	A. Analyze needs and deficiencies. B. Develop plan to improve efficiency, reliability and stability. C. Estimate costs to upgrade. D. Implement plan.	Facilities	Medium Term

CRITICAL ISSUES:	OBJECTIVES:	ACTIVITIES/ACTIONS:	Responsibility	Timeline
♦ Water distribution lines are inadequate.	**5.3** Design and install a more efficient water distribution system.	A. Analyze needs and deficiencies. B. Develop plan to improve efficiency, reliability and stability. C. Estimate costs to upgrade. D. Implement plan.	Facilities	Medium to Long Term
♦ Cost of pumping water from Pump 6 is increasing due to rising electrical rates.	**5.4** Analyze ways to become more energy efficient and explore use of renewable energy for powering Pump 6.	A. Study feasibility of alternative energy sources.	Facilities	Long Term
6.0 Access and Circulation				
♦ The permanent access from the Visitor Center to the Allerton Garden is not yet finalized.	**6.1** Finalize a permanent vehicular access from the Visitor Center over KDCH property.	A. Continue negotiations with KDCH. B. Sign a long-term access agreement.	Administration	Short Term
♦ Some portions of the access road have steep cliff-sides below.	**6.2** Install guardrails or support structures to make access road safer.	A. Evaluate the need for guardrails or other barriers in locations where needed. B. Install improvements.	Facilities	Long Term
♦ Changing demographics and development of adjacent properties will result in increased unauthorized entry into the Garden property. Also see Landscape Management Plan.	**6.3** Minimize unauthorized entry into the Garden	A. Develop and implement fencing plan. B. Develop and implement gate improvement plan including security shelter if needed in the future.	Facilities	Medium
♦ The rock-filled "prism" structure that provides access to the valley is over 100 years old and may need repairs and improvements.	**6.4** Provide for the stability and safety of the crossing and minimize erosion.	A. Evaluate the crossing by engineers. B. Work with engineers to develop a plan for stability and safety. C. Implement plan.	Facilities	Medium

CRITICAL ISSUES:	OBJECTIVES:	ACTIVITIES/ACTIONS:	Responsibility	Timeline
7.0 Rock Walls & Steps				
♦ Walls often need repair due to impacts of tree roots and other vegetation growing in and near walls, earth movement, etc. ♦ Availability of skilled craftsmen to work on walls is limited (e.g., training on preservation techniques, aesthetic talents as well as masonry skills) ♦ Additional walls may be needed to stabilize slopes.	**7.1** Maintain and preserve rock walls and steps as funding permits.	A. Photograph and document various rock wall styles B. Identify and prioritize needs. C. Obtain funding. D. Hire skilled craftsmen to make repairs consistent with existing styles.	Facilities	On-going
8.0 Electrical, Telephone & Cable				
♦ As a result of KDCH's undergrounding of utility transmission lines, the existing transmission lines will be relocated.	**8.1** Study new routing of electrical and telephone lines.	A. Continue communication with KDCH, KIUC, Hawaiian Telcom, Oceanic Time Warner and the County of Kaua'i on construction plans.	Administration Facilities	Medium

10.0 ARCHAEOLOGICAL[16] RESOURCES MANAGEMENT PLAN

10.1 Background

Scientific Consultant Services, Inc. (SCS) conducted an Archaeological Reconnaissance Survey from April 28 to May 11, 2007, and an Archaeological Inventory Survey from May 12 to June 15, 2007 at Allerton Garden. The project area was comprised of approximately 87 acres located in Lāwaʻi *ahupuaʻa*, Kōloa District, Kaua'i. The survey work included the following parcels:

▪ (4) 2-6-002:001	71.91 acres
▪ (4) 2-6-002:004	1.60 acres
▪ (4) 2-6-002:005	1.88 acres
▪ (4) 2-6-002:006	2.13 acres
▪ (4) 2-6-002:007	.55 acres
▪ (4) 2-6-002:008	1.25 acres
▪ (4) 2-6-002:009	8.19 acres
Total	87.51 acres

During the two surveys, six new sites were identified, and two previously identified sites were located and documented. [17] The eight identified sites in the project area were found to be significant for their information content, under the criteria established by the Hawai'i State Register of Historic Places. The sites identified in the SCS survey are found in **Exhibit M**.

As described in the SCS report, a 100 percent survey was conducted of the Lāwaʻi Valley floor. The valley walls were not surveyed due to the dense vegetative growth, and additional survey work is recommended for these areas.

The sites surveyed by SCS were evaluated for significance using the established criteria for the Hawai'i State Register of Historic Places (Register) §13-275-6. All sites were found to be significant under Criterion D, information content. Previous sites identified by William "Pila" Kikuchi and Wendell Clark Bennett have not been evaluated under the Register's criteria. SCS recommends the entire project area be preserved under its current use as a portion of the existing Allerton Garden. The 19 sites are described in **Table 10-1**.

[16] Pre-contact archaeological resources dating prior to 1778.
[17] In 1963 Pila Kikuchi identified an additional 12 archaeological sites. Wendell Bennett (1931) bases most of his descriptions on his own field observations and those descriptions given by Thrum (1906).

TABLE 10-1: Identified Archaeological Resources

State Site Number	Archaeologist Site Number	Description
50-30-10-893	SCS TS-1	Agricultural Terraces on the slope along the east side of the Allerton House.
50-30-10-894	SCS TS-2	Multi-feature habitation site at the southeast corner of the property.
50-30-10-895	SCS TS-3	Two terraces located west of Lāwa‘i Kai Stream.
50-30-10-896	SCS TS-4	A *lo'i* complex in a *hau* patch just west of Lāwa‘i Kai Stream.
50-30-10-897	SCS TS-5	A Habitation terrace located behind the Diana Fountain.
50-30-10-898	SCS TS-6	A wall which was part of the Allerton modifications.
50-30-10-3069	Kikuchi 53 (Located by CSC 2007)	Kikuchi site was located and documented by CSC. The site consists of a stone wall located at the southwest end of the project area.
50-30-10-3067c	Kikuchi 50c (Located by CSC 2007)	Feature C of Kikuchi site was located and documented by CSC. Consists of a series of *lo'i* terraces located along the east and west sides of Lāwa‘i Kai Stream which were initially identified by Kikuchi in 1963.
50-30-10-3067a	Kikuchi 50a	Opihi Rock: A large boulder which has a sharp right angle corner at one end. Numerous opihi shells found strewn about it gave the rock its name.
50-30-10-3067b	Kikuchi 50b	Springs: A large number of springs flow from crevices in the rock strata which, during the days of Queen Emma were diverted to feed the taro patches of Lāwa‘i Kai.
50-30-10-3067d	Kikuchi 50d	Hina Rock: A large boulder in the middle of Lāwa‘i stream is said to be the body of Hina.
50-30-10-3067e	Kikuchi 50e	Path: An old path which once connected Lāwa‘i Kai and Kukuiolono.
50-30-10-3067f	Kikuchi 50f	Fishpond: Located near the mouth of the Lāwa‘i Kai, includes stone walls. The 1946 tidal wave filled the pond with mud and debris. Further filling of the fishpond occurred in 1982 with Hurricane Iwa and in 1992 with Hurricane Iniki.
50-30-10-3068	Kikuchi 51	Cave: Located on western side of valley, used by Hawaiians.
50-30-10-0070	Kikuchi 52 (Bennett Site 70 and Thrum)	Mamalu Heiau: The heiau, of which nothing now remains, was said to exist at the mouth of Lāwa‘i Kai valley. Thrum described the site as destroyed except for a small paved platform on the beach.
50-30-10-3069	Kikuchi 53	Walled Area: Located on the western corner of the mouth of Lāwa‘i Kai.
50-30-10-3070	Kikuchi 54	Shelter Cave: At the mouth of Lāwa‘i Kai valley.
50-30-10-0072	Kikuchi 55 (Bennett Site 72)	Niukapukapu Heiau: Located on the east bluff of Lāwa‘i Valley, not on Garden property.
50-30-10-0069	Bennett Site 69	Kalohiokapua Heiau: Previously described by Thrum. Located on the east bluff. Nothing now remains. Not on Garden property.

10.2 Current Archaeological Programs

According to Pila Kikuchi in his 1963 archaeological survey,

> "*A fishpond located back of the large rock hill at the mouth of Lāwa'i kai was once very productive. The stone walls are still in very good condition. The limits of the pond however are very vague because of overgrowth of weeds and shrubs. The tidal wave of 1946 swept through the pond and filled it with mud and debris. The mullet raised at this pond were said to be very popular and considered a delicacy."*

In 1992, Hurricane Iniki deposited additional sediment and debris inside the historic fishpond. The associate ditches and walls are distinct and well-preserved. Any restoration of the site to a working fishpond would require additional studies, consultation, and permits. In principle, the pond could be dredged out and restored suitably to be managed as a working fishpond, but a great deal of sediment would have to be transported from the site and disposed of by approved methods. A further possible complication is that sea level has risen significantly since the time of fish pond operation. Research on fishponds at NTBG is ongoing. Two publications[18] provide information on the sedimentary layers, dating, construction, and history of the pond at Lawai Kai. A book by David Burney, Ph.D. provides additional information on this and other Kaua'i fishponds.

In 2008-2011 NTBG in partnership with the University of Hawai'i conducted a six-credit course in "Archaeological Field Techniques" that utilizes Lāwa'i Kai and the fishpond in its education exercises. Three other for-credit courses are also taught and include Lāwa'i Kai. This use of the property is anticipated to continue and expand.

[18] Burney, 2002; Burney and Burney, 2003.

TABLE 10-2: Archaeological Resources Management Plan

Goal 1: Protect and Preserve the Archaeological Sites within Allerton Garden.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**[19]
1.0 Traditional Access to Sites				
♦ There is a need to maintain the legal rights of Land Commission Awardees and lineal descendants with Mahele Awards.	**1.1** Continue to provide access to the sites for traditional and cultural uses by lineal descendants.	A. Develop a written policy addressing access to the sites. B. Maintain communications with individuals, families, and groups with ties to the sites.	Administration	Short Term
2.0 Maintenance & Preservation of Sites				
♦ There are on-going impacts to the archaeological sites such as vegetative growth on or within sites, erosion, landslides, falling trees, etc.	**2.1** Continue with Maintenance Plan for Allerton Garden.	A. Establish maintenance procedures for identified archaeological resources.	Living Collections & Horticulture, Facilities	On-going
♦ Beach users have defaced cultural sites with graffiti.	**2.2** Manage human activity on the beach through adoption of rules.	A. See Recreation and Commercial Management Plan.		
3.0 Preservation Planning				
♦ According to the recent survey, archaeological resources located in project area have been found to be significant under the criteria established for State and National Registers. ♦ It is not conclusive whether state and federal recognition would be beneficial to Allerton Garden.	**3.1** Include identified archaeological resources if Allerton Garden is nominated to the State and National Registers of Historic Places. See Historic Resources Management Plan.	A. Determine if the Allerton Garden Trustees will approve the nomination to the State and National Registers. B. Compile inventory of sites to nominate to the Register. C. Consult with the Department of Land and Natural Resources, State Historic Preservation Division about the nomination process. D. Research and prepare nomination form.	Administration	Short Term
♦ There is a lack of funding to pursue further research & survey work. Additional archaeological investigations would likely yield valuable cultural information.	**3.2** Explore funding opportunities and collaborations with independent researchers, graduate students, and cultural preservation groups.	A. Research funding possibilities. B. Submit grant applications. C. Continue Archaeological Field School program and develop other links to research institutions and cultural groups.	Development	Short Term

[19] On-going (currently under way), Short Term (1-3 years), Medium Term (4-10 years), and Long Term (10 – 20 years).

Goal 1: continued				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
♦ A number of archaeological resources have been identified. Every effort should be made to protect and preserve those sites. ♦ Archaeological resources with the project area represent more than just physical elements; Native Hawaiians with ties to Lāwa‘i Valley view these resources as *living* sites with present cultural value. ♦ The State Historic Preservation Division typically requires a Preservation Plan.	**3.3** Develop an Archaeological Preservation Plan for identified archaeological sites.	A. Research standards for preservation plans such as those provided by the State Historic Preservation Division. B. Document and record existing conditions using existing data (site plans, maps, photos, etc.).	Administration	Medium Term
♦ Pre-contact archaeological resources in Lāwa‘i Valley are not well-known.	**3.4** Develop interpretive plan and materials on the pre-contact history of Lāwa‘i Valley that are consistent with State Historic Preservation Office guidelines.	A. Draft a scope of work and determine if interpretive materials can be developed in-house or require an outside consultant. B. Explore interpretive options which are consistent with the conditions of the Allerton will. C. Inform staff concerning the importance of the archaeological resources within project area.	Administration Education Visitor Services	Medium Term

11.0 LĀWAʻI KAI ESTUARY AND STREAM MANAGEMENT PLAN

11.1 Background

Located on the southern portion of Kaua'i, Lāwaʻi Valley is a drainage system for an elevated wetland (Kanaele Swamp) located in a bowl-shaped geologic feature below Mt. Kahili. The perennial Lāwaʻi Stream originates in the Līhu'e Kōloa Forest Reserve in its headwater reaches, passes through low-density subdivisions and agricultural lands in its middle reaches before entering an increasingly incised lowland valley feature on its way to its deep estuary and Lāwaʻi Kai Bay. The Valley encompasses about 8,200 acres with Lāwaʻi Kai Stream descending from headwaters at about a 1,800-foot elevation to the ocean at Lāwaʻi Kai Bay – a straight line distance of about 5.3 miles.

This lowland segment of Lāwaʻi Kai Stream is surrounded by agricultural lands that are elevated above the stream channel. Irrigation systems, first constructed by McBryde Sugar Company in 1899, rely on groundwater resources that feed Lāwaʻi Kai Stream. The long-term effect of these systems of ditches and reservoirs on Lāwaʻi Kai Stream hydrology are not known.

The Lāwaʻi Kai Estuary and Stream Management Plan encompasses the estuarine area of Lāwaʻi Kai Stream within the Allerton Garden as shown on **Exhibit N**. Estuaries are defined by the Department of Health as "deep, characteristically brackish coastal waters in well-defined basins with a continuous or seasonal surface connection to the ocean that allows entry of marine fauna. Estuaries may either be natural, occurring mainly at stream or river mouths; or developed, artificially, or strongly modified from the natural state such as a dredged or revetted stream termini." [20] A 1978 survey by the Department of the Interior, U.S. Fish and Wildlife Service identified an area of wetlands at Lāwaʻi Kai.

The Hawai'i Stream Assessment (HSA) describes estuaries as providing important habitat for terrestrial, marine and aquatic species; their importance to the life cycle of various species may be critical to the life cycle of some species. HSA's ranking for the entire stream is *Moderate*[21] with identified native aquatic species, *'o'opu nakea* and *'o'opu nopili*. The streams overall riparian resources include detrimental plants such as California Grass and *hau*. Using the National Register of Historic Places criteria, HSA describes the cultural resources in the entire stream valley as

[20] HAR, Chapter 11-54
[21] Ranking Categories: Outstanding, Substantial, Moderate, and Limited.

containing excellent examples of site types and important information, with culturally noteworthy sites. Recreational resources identified in the HSA that are relevant to the project area include fishing, swimming, nature study, and scenic views.

An avifauna survey conducted in February 2009 found only three endemic species of avifauna within the project area along the Lāwa‘i Stream: the *Anas wyvilliana* (Hawaiian duck), *Fulica americana alai* (American coot), and *Gallinula chloropus sandvicensis* (Common moorhen). Further information is found in the Landscape Resources Management Plan (Chapter 8.0).

A *Biological and Habitat Assessment of Lower Lāwa‘i Stream* was conducted in February 2007 by Michael H. Kido, of the Hawai'i Stream Research Center, University of Hawai'i. The study established two stream study sites within the lower Lāwa‘i Kai Stream where a standardized stream assessment methodology was applied. The purpose of the study was to evaluate the “health” or “biological integrity” of the stream as well as the condition of the habitat.

Sites were sampled in March 2005 and August 2006. The survey of two sites sampled at lower Lāwa‘i Kai Stream showed that both the overall habitat condition and biotic integrity were rated as “Poor.” Stream habitat quality in both sites related to the presence of high sediment levels in the stream channel, chronic stream bank instability/erosion, and extreme variability in water levels/flow regimes. Despite the “Poor” habitat, overall biological integrity was determined to range from “Poor-to-Fair”. Native aquatic species presence in this estuarine-influenced reach was found to be relatively robust with all expected native *'o'opu* and *'opae* species consistently present although not at abundance levels comparable to that found in high-quality streams.

Of ecological concern was the presence of a large population of alien tilapia in the estuary and a growing population of the alien grass shrimp.

Included in the project area is a pre-contact Hawaiian fishpond. According to Pila Kikuchi in his 1963 archaeological survey,

> “*A fishpond located back of the large rock hill at the mouth of Lāwa‘i kai was once very productive. The stone walls are still in very good condition. The limits of the pond however are very vague because of overgrowth of weeds and shrubs. The tidal wave of 1946 swept through the pond and filled it with mud and debris. The mullet raised at this pond were said to be very popular and considered a delicacy.”*

Further siltation of the fishpond occurred in 1992 when Hurricane ʻIniki deposited additional amounts of debris and sediment in the area.

11.2 Lāwaʻi Stream Mauka Impacts on Allerton Garden

A majority of the negative impacts on the stream and estuary are initiated by actions *mauka* of the project area. Directly *mauka* from the project area of Allerton Garden is the McBryde Garden, owned and managed by NTBG. This area is being actively managed to reduce non-point source pollution, and NTBG is implementing other landscape practices that affect the Lāwaʻi Kai Estuary and Stream. Unfortunately, properties in the watershed outside the boundaries of NTBG continue to have negative impacts on the estuary and stream. These offsite impacts and current and possible future actions are described in the table below.

TABLE 11-1: Watershed Issues and Strategies

Critical Issues	Possible Actions by NTBG and Others
♦ Stream flow alterations and diversions, the realigning and straightening channels, have created high levels of siltation, soil erosion, decreased natural stream flows, degraded water quality, and increased sedimentation are degrading the ecological integrity of Lāwaʻi Kai estuary and stream and should be further studied.	♦ Explore with the State Commission on Water Resources Management permanent in-stream flow standards for Lāwaʻi Kai Stream.
♦ Soil disturbances associated with agriculture in the watershed which generates surface runoff carrying fine-grained clay particles, a major source of pollution in the estuary and stream. ♦ Lack of bank management within the entire stream corridor (i.e., inside and outside the project area). ♦ The removal of large boulders has produced wide, shallow, unshaded reaches in the stream resulting in an unsuitable habitat for some native species.	♦ Partner with other landowners in the watershed to reduce upland nonpoint source pollution (e.g., Kauai Coffee Co.), NRCS, Hawaii state agencies, the Watershed Council, and researchers from the Hawaii Stream Research Center and the Water Resources Research Center at the University of Hawaii.
♦ Agricultural runoff, removal of riparian vegetation, and the introduction of non-native species, which have created habitats that are more suitable for introduced fish and invertebrate species than for native species.	♦ Meet with Kaua'i Coffee Co. to discuss non-point source pollution issues taking place on lands leased from NTBG.

As described above, the diversions *mauka* of the project area have created changes in the historic in-stream flows. A study to gather current and historic in-stream flow data, identify current diversions and/or users, and

identify agricultural infrastructure associated with the stream (e.g., ditches, reservoirs, etc.) would yield valuable baseline information for future discussions but is outside the scope of this Plan.

11.2 Recent and Current Estuary and Stream Programs

In September 2008, NTBG completed a grant from the National Fish and Wildlife Foundation to monitor and develop baseline data for evaluating the effects of conservation measures on the health of the stream, estuary, and nearshore environments (e.g., stream impacts on beach and bay). As a result of this project, current and future programs within NTBG include:

- Establishment of native riparian vegetation in two plots along the stream corridor.
- Control of invasive non-native plants.
- Development of improved management protocols to address erosion, excessive run-off, and chemical pollutants from gardening and agricultural activities.
- Initiation of Best Management Practices (BMP) at major stream crossings, including bank stabilization, bridge modification, and substrate improvements.
- Initiation or enhancement of on-going scientific research that includes stream surveys for vertebrates and invertebrates, repeat measurement of stream characteristics, automated measurement devices for meteorological and limnological parameters, flood gage installation, wetland sedimentology, reef health assessment, green sea turtle nest monitoring, and monk seal observation.
- Continuation of education programs for staff, the public, and students including hands-on teaching opportunities, lectures, and audiovisuals.

A summary of these recent program objectives and activities is found in **Table 11-2**.

TABLE 11-2: NTBG's Recently Completed and Current Estuary and Stream Programs and Activities (includes Allerton and McBryde Gardens)

Critical Issues:	Program Objectives:	Program and Activities:
♦ Severe flood events in 2005 and 2006 denuded the stream corridor banks.	**1.1** Stabilize stream banks using riparian vegetation within the NTBG properties.	A. Identified which native plants would be suitable for replacing the invasive non-natives along the corridor (completed) B. Established plots with native plants along the stream corridor (completed). C. Planted native riparian vegetation corridor from stream to estuary to strand (continuing).
♦ Off-site pollution and sedimentation from with the watershed has degraded water quality in the stream and estuary. ♦ Pollution and sedimentation from sources with NTBG owned/managed properties have degraded water quality in the stream and estuary.	**1.2** Identify sources of sedimentation and pollution.	A. Formed ad hoc committee of aquatic biologists, hydrologists, and soil scientists from state and federal agencies, NTBG scientists, and conservation organizations (completed). B. Committee identified the cane-haul road and the unpaved roads with the Garden as sedimentation problems that needed addressing (continuing). C. Designated a pesticide-free corridor along the stream and its tributaries (completed). D. Halted the long-standing practice of artificially opening the stream channel (continuing). E. Secured funding to assist with paving and drainage improvements to roads in vicinity of stream (recently completed). F. A hydrological study of the lower Lāwa'i Valley is currently underway.
♦ Flood damage on road crossings and subsequent erosion into stream impacted stream quality.	**1.3** Stop erosion on road crossings.	A. Initiated improvements to road crossings on McBryde leased lands, and on road crossings within NTBG (completed). B. Constructed two new bridges to allow flood-stage waters to move through unimpeded (completed). C. Modified existing bridge crossings to allow less restricted stream flow (completed).
♦ Sheet erosion from McBryde Garden flowing directly into stream negatively affects water quality.	**1.4** Stop water from flowing directly over an area with limited vegetation directly into stream.	A. Implemented a berm and ditch system to halt the flow of water directly into the stream (completed).
♦ Lack of baseline data on water quality, weather and flooding.	**1.5** Establish baseline data by installing monitoring systems for weather and water conditions.	A. Initiated monitoring of stream to provide baseline for follow-up and evaluation over subsequent years (completed). B. Installed monitoring systems (continuing).

TABLE 11-3: Lāwaʻi Kai Estuary and Stream Management Plan

Goal 1*: *Improve water quality & ecological health of Lāwaʻi Kai Estuary, Stream, and coastal waters.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**[22]
1.0 Water Quality				
♦ Lower Lāwaʻi Kai Stream is moderately degraded in habitat and biological integrity which are early signs of the chronic effects of urbanization on stream health.	**1.1** Develop baseline data and monitor water quality in stream and estuary (e.g., turbidity, salinity, and sediment concentration).	A. Continue monitoring program that includes data collection criteria, measurable performance criteria, and estuary conditions. B. Visually monitor and photograph stream during heavy rainfall and flood events. C. Enlist garden employees, interns, and volunteers (including high school and college students) in the monitoring activities. D. Implement the water quality monitoring program. E. See Coastal & Marine Resources Management Plan for water quality monitoring activities.	Conservation Department	On-going
♦ Current maintenance practices within the project area contribute to increased bank erosion and surface runoff which contributes to degraded water quality in the stream and estuary.	**1.2** Develop Best Management Practices (BMP's) for bank management within the project area along stream corridor.	A. Implement BMP's within project area. B. Continue to address soil erosion and sedimentation that results from current horticultural and maintenance procedures within the project area.	Facilities Horticulture	On-going & Short Term
♦ Stream acts as a transmission corridor for non-native vegetation species cultivated within the project area; propagules flow into the marine waters of Lāwaʻi Kai Bay and beyond to other beaches.	**1.3** Contain and control non-native vegetation within the Garden area. Monitor for invasive trends and remove invasives.	A. Provide staff with information on impacts of planting of invasive vegetation along banks and procedures for spotting and addressing new invasive species problems.	Horticulture	On-going
♦ The public is not aware of off-site impacts and individual actions impact a wide range of ecological resources, and of NTBG's efforts to address these issues. Opportunities exist for greater public education.	**1.4** Educate the public about the benefits of using BMP's for the ecological restoration of estuary and bay.	A. Continue and expand the educational component and interpretative opportunities and include participation by school and college groups. B. Continue with tour guide education program including training on the environment and ecology of the estuary, and incorporate information in the interpretive program for the 30,000 annual visitors to McBryde and Allerton Gardens.	Visitor Services Education Horticulture	On-going & Short Term

[22] On-going (currently under way), Short Term (1-3 years), Medium Term (4-10 years), and Long Term (10 – 20 years).

1.0 Continued				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
♦ Conflicts between the natural resources of the sandbar, artificially opening the entrance, flooding on the land, and balancing the conditions mandated by the Allerton Will with respect to maintaining the property.	**1.5** Maintain the natural connection (sandbar) between the estuary and stream.	A. Develop policy and procedure for sandbar management that considers balancing the interests of natural processes vs. Garden management practices.	Administration	Short Term
♦ Two hurricanes have changed estuary configuration. There is a lack of survey data to determine the current wetland areas within the estuary.	**1.6** Delineate wetland areas.	A. Contact Natural Resource Conservation Service to evaluate and make determination. B. Provide determination data to the U.S. Army Corps of Engineers to update wetland map. C. Update map of wetland areas.	Conservation Department	Short Term
♦ Unimproved surfaces within the project area contribute to increased bank erosion and surface runoff which contributes to degraded water quality.	**1.7** Consider feasibility of hardening earthen roads with permeable surfaces within the project area.	A. Seek funding for road improvements. B. Revisit terms of the Will of John Allerton and evaluate consistency with historic nature of the property.	Facilities	Medium Term
♦ The historic fishpond was silted over by tsunami and hurricane events. Is restoration feasible (i.e., cost, is it a wetland)?	**1.8** Explore feasibility of fishpond restoration.	A. Determine costs and impacts of a restoration project. B. Evaluate and select option and/or alternative (e.g., remove siltation, leave in current condition, etc.) C. Implement selected option.	Administration Conservation Department	Long Term

Goal 2: Restore and protect populations of native aquatic species in Lāwa‘i Kai Estuary and Stream.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
♦ The numbers of alien species have increased due to the changes in the physical environment in the stream and estuary.	**2.1** Manage and reduce the numbers of any alien aquatic species such as guppies, tilapia, Tahitian prawn, Samoan crab.	A. Trap, or use other appropriate methods to reduce the populations of alien species. B. Enlist schools in projects/programs to reduce the number of alien species (e.g., “Catch a Tilapia Day”, etc.)	Conservation Department	Medium Term
♦ Water diversions *mauka* of the project area have reduced the flow and turbidity, and increased the salinity and temperatures, which has resulted in a degraded habitat for native species. Native species require sufficient stream flow to provide clean, cool, fresh water.	**2.2** Improve natural habitat in stream and estuary to allow for the recruitment and return of native species. Explore the establishment of permanent in-stream flow minima to maintain aquatic habitats through drought conditions, in cooperation with other landowners in the watershed.	A. See Goal 1, Objectives 1.2 and 1.7 above. B. Continue to conduct habitat and biological assessment studies. C. Work with State Commission on Water Resources Management to establish permanent in-stream flow standards for Lāwa‘i Kai Stream. D. Apply for necessary permits.	Administration	Medium & Long Term

12.0 COASTAL AND MARINE RESOURCES MANAGEMENT PLAN

12.1 Background

Lāwa‘i Kai Beach and Bay are a documented threatened green sea turtle nesting site, [23] a refugium for the endangered Hawaiian monk seals, a seldom-used fishery, and a protected habitat for rare coastal plant species. The surrounding area is steeped in cultural traditions and its sands and cliffs hold both *iwi kupuna* (ancient bones) and historic burials[24] associated with the kuleana tenants who lived in the Lāwa‘i Valley.

Since the time of the Māhele in 1848 when the lands of Lāwa‘i Kai became privately owned, the land, beach and bay have been cared for by owners and individuals who accepted responsibility to care for the sacred sites within the area. Due to the cliffs fronting the bay, public access has been very limited. These are the primary reasons that today this area is considered a nearly pristine coastal and marine ecosystem.

The coastal area of Lāwa‘i Kai Beach consists of fine beach sand relatively free of rocks and vegetation. The small shoreline area of about two acres is surrounded by a basalt rock perimeter that forms Lāwa‘i Kai Bay. The high beach platform is not inundated by high tides or flooded by the water table below. The absence of human impacts such as artificial lighting, beach cleaning or man-made structures in the coastal area contributes to the relatively natural environment of the coastal area. The Coastal and Marine Resources areas are delineated in **Exhibit O**.

The marine environment of Lāwa‘i Kai Bay consists of approximately 20 acres of mostly sandy bottom with coral reef communities colonizing the basalt rock perimeter. The Bay is a high wave energy environment, particularly in summer months, receiving intermittent freshwater and terrestrial sediment/debris input from Lāwa‘i Kai Stream.

Research indicates this interconnection between coastal and marine areas for the proposed Lāwa‘i Kai Special Subzone provides an

[23] Hanna, Richard, “Restoration of Green sea turtle Nesting Area of Lāwa‘i Beach and Foraging Habitats in Lāwa‘i Bay.”

[24] A wall of the burial area, located on the western end of the beach, is occasionally overwashed by high wave action.

important natural habitat for the threatened[25] *honu* or green sea turtle (*Chelonia mydas*) on Kauaʻi.[26] Lāwaʻi Kai Beach is one of the two primary nesting sites on the island of Kauaʻi.[27] The nesting and hatching season is approximately between May 1st and September 30th. Sandy offshore approaches and a foreshore relatively free of rock clutter provides easy access to the beach for nesting turtles. The beach sand is fine enough and moist enough to prevent excessive slippage during nest construction.

Females turtles deposit egg clutches on the nesting beaches, digging a 60-70 centimeter-deep cavity above the high water line. Eggs incubate for approximately 60 days before hatching. After hatching, the turtles take a number of days to dig their way out of the nest. As the hatchlings dig upwards, the sand above them is scratched away and shifts down through the mass of wiggling hatchlings to the bottom of the chamber. In this way the hatchlings dig their chamber to the surface of the sand. Once out of the nest, the hatchlings find their way to the ocean by heading towards the brightest horizon. The absence of artificial lighting in this area is an important contribution to the suitability of the nesting areas for turtles and for the flight paths of pelagic seabirds.

Young green sea turtles occupy open ocean pelagic habitats after leaving the nesting beach. Food sources could include invertebrates, such as jellyfish, ctenophores, pelagic snails, and juvenile squid that occur at or near the surface. This indiscriminate feeding strategy leaves young green sea turtles susceptible to the clogging of their stomachs and intestines with marine debris. Besides predation by sharks and large pelagic fish, feeding on marine plastics is the main threat in this life stage.

When green sea turtles shift to benthic feeding grounds, they feed on seagrasses and algae. In Hawai'i, there are two species of seagrass, but this small angiosperm is not a major food source on Kaua'i. Green sea turtles eat over 130 species of algae, of which 10 have been identified as the primary forage. Tagging has indicated that most green sea turtles settle at a specific foraging ground and leave only to reproduce. A serious threat to the population is the on-going deterioration of these foraging sites in and adjacent to the Bay.

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[25] In 1974, the State of Hawaii passed a regulation providing some protection, and in 1978 the Hawaiian population of green sea turtle was listed as threatened under the U.S. Endangered Species Act.

[26] Over 90% of nesting activity for the Hawaiian green sea turtle population occurs at the French Frigate Shoals.[26] Hawaiian green sea turtles that nest outside the French Frigate Shoals face a serious threat from the destruction and loss of nesting habitat. French Frigate Shoals is inside the National Wildlife Refuge System administered by the U.S. Fish and Wildlife Service.

[27] The other nesting site on Kauaʻi is at Kīpū Kai.

Endangered Hawaiian monk seals regularly haul out on Lāwaʻi Kai Beach, but are more frequently seen on beach areas to the east and west of Lāwaʻi Kai Bay.

A marine resource survey was conducted in Lāwaʻi Kai Bay in February 9-11, 2007 by the Oceanic Institute, Waimanālo, Hawai'i. The survey found that the marine waters of Lāwaʻi Kai Bay contain a biological community of relatively healthy herbivore populations (both sea urchins and fish). No alien or invasive algae species were observed, and turf algae were dominant, covering 77% of the hardbottom habitat. Overall coral abundance was low (15% cover or less) as is typical of high energy environments, dominated by lobe coral and cauliflower coral. Forty benthic taxa and 90 fish species were counted within the 17 sites surveyed.

The diversity of fish species found is typical of bays which are small in size and with limited habitat complexity. The non-native taʻape (bluelined snapper), akule (big-eyed scad), and wekeʻula (yellowfin goatfish) were the most important fisheries resources utilizing the bay. Uhu (parrotfish, Scaridae) and ʻopihi were low in abundance and size, reflecting high harvest pressures in the bay.

Natural limits to the marine taxon diversity in Lāwaʻi Kai Bay are high wave energy events in the summer months and periodic stream flooding in the winter. As described in the Lāwaʻi Kai Estuary and Stream Management Plan, the latter is exacerbated by upstream land use, with increased sedimentation, nutrients from fertilizers, and organic debris deposited into the bay. The survey also observed derelict fishing gear (lines, weights, and nets) throughout the bay, which further stresses the marine ecosystem.

12.2 Current Coastal and Marine Programs

Coastal Ecosystems

In 2008 the Conservation Department at NTBG developed a protocol for monitoring, protecting, researching and documenting the nesting sites of green sea turtles on the beach at Lāwaʻi Kai. The program involves discovering the sites, notifying the proper entities, securing the sites, documenting specifics of each nesting site, observing and monitoring sites, and with the proper authority, uncovering the site after hatching has occurred, and recording the appropriate data. Such data include date eggs are laid, date hatched, date the nests are uncovered, number of shells, unhatched embryos and number of hatchlings still in the nest.

A second program component includes the removal of invasive trees such as ironwoods and alien grasses in the beach area. Their dense root systems make it difficult for turtles to dig nests in the beach sand. NTBG is replacing the invasives with native coastal plants with loose root systems that hold the nest in place while the turtle is digging rather than hindering her efforts. These natives include: *naupaka*, *pāʻu ohiʻaka*, and *pōhuehue.*

After a seven-year hiatus, turtles nested again at Lāwaʻi Kai. During the full moon over the weekend of June 2-3, 2007, three female turtles deposited four egg clutches after digging cavities above the high water line.[28] In the 2008 nesting season, five nests were located and monitored.

The Hawaiian monk seal is the only pinniped species endemic to the Hawaiian Islands. They are one of the most endangered marine mammal species in the world. Hawaiian monk seals hauled out on sandy beaches are sensitive to human presence. In the ocean, seals may exhibit inquisitive behavior. On Lāwaʻi Kai Beach and in the Bay, monk seals have been recently been observed. The relatively limited access by the public has apparently made the area a desirable location for the monk seals to haul out and nap, and due to the current level of use, the State has not found it necessary to rope off the area.

Green sea turtle nesting and monk seal activity is being monitored in collaboration with researchers from the State's Department of Land and Natural Resources, Aquatic Resources Division, and National Oceanic and Atmospheric Administration's Pacific Islands Fisheries Science Center, Marine Turtle Research Program.

User Surveys

User Surveys were conducted over a period of one year between November 2007 and October 2008. Further details are found in the Recreation and Commercial Management Plan and in **Appendix E**.

Management of Coastal and Marine Resources

As noted in Chapter 1, NTBG gathered representatives of business, government and the community and established the Lāwaʻi Kai Community Advisory Group (LKCAG) in January 2007. The group developed a draft vision for the protection and preservation of the resources, learned about existing resources, and develop

[28] Richard Hanna, NTBG, personal observation, June 2007.

draft rules manage the recreational and commercial uses of the coastal and marine resources of Lāwa‘i Kai.

Consistent with the Department of Land and Natural Resources hierarchy of uses, the purposes of the proposed rules are to:

A. Protect and preserve the natural environment and unique experience of Lāwa‘i Kai Beach and Bay.
B. Continue existing levels of public recreational uses of Lāwa`i Kai Beach and Bay.
C. Continue existing levels of commercial uses of Lāwa‘i Kai Beach and Bay.

Many members of the LKCAG expressed an interest in continuing their participation in future activities to protect and preserve the resources within the Lāwa‘i Kai Beach and Bay. Some of these activities are described in the Recreation and Commercial Management Plan (Chapter 13.0).

TABLE 12-2: Coastal & Marine Resources Management Plan

Goal 1: Restore native coastal ecosystem on Lāwa'i Kai Beach.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**[29]
1.0 Green sea turtles & Seabirds				
♦ There is a lack of historical data and coordination with government agencies in monitoring green sea turtle activities, habitat and populations.	**1.1** Assist State and Federal agencies in tracking and monitoring green sea turtle activities, habitat and populations.	A. Use NTBG's GIS system/protocols to annually document the existing and changing habitat area. B. Monitor turtle nesting and reef conditions to ensure the optimum habitat. C. Communicate, and provide access and data to State & Federal agencies.	Administration	Short Term
♦ A primary threat to the nesting habitat of green sea turtles on Lāwa'i Kai Beach is invasive plant species. ♦ Introduced trees and grasses with dense root structures, such as coconut palms, ironwood trees, and zoysia grass, constitute an obstacle to digging by nesting turtles. ♦ Introduced trees shade the beach, lowering the nest temperatures and altering the natural sex ratio of the hatchlings. ♦ Dense vegetation interferes with the ability of green sea turtle hatchlings to orient their movement toward the ocean. ♦ In the past, turtles have attempted to nest in unsuitable areas; there is a need to expand the suitable turtle nesting area. ♦ Female turtles generally lay eggs in the vicinity of the beach where they were born. Improving and maintaining their original nesting area will promote their return and could increase turtle populations.	**1.2** Improve and maintain nesting habitat for green sea turtles.	A. Remove invasive species from the beach to improve the available nesting habitat. B. Establish native species compatible with green sea turtle habitat. C. Maintain existing nesting habitat for green sea turtles and expand into the additional approximately 50% of the beach not currently utilized due to invasive plants. D. Identify and mark nesting sites to prevent disturbance to eggs and hatchlings.	Conservation Department	Short Term

[29] On-going (currently under way), Short Term (1-3 years), Medium Term (4-10 years), and Long Term (10 – 20 years).

Goal 1: continued				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
♦ Lights are a hazard to nesting turtles and to pelagic seabirds such as shearwaters, because they confuse their night-navigation systems. Care should be taken to avoid leaving lights on near the beach and surrounding areas. This is especially critical between May and October, when the turtles and seabirds are active. ♦ Lights may also interfere with nesting and flight paths of endangered birds who use Lāwa‘i Valley as a flyway.	**1.3** Ban nighttime lighting on beach and coastal area.	A. Restrict nighttime lighting during turtle nesting season through rulemaking process. B. Manage nighttime lighting during periods of seabird activity. C. Negotiate with adjacent landowners to eliminate nighttime lights.	Administration DLNR Fish & Wildlife Service	On-going
♦ Vehicle tracks left on beach by NTBG debris clean-up activities can guide young hatchlings away from the water.	**1.4** Eliminate maintenance vehicle tracks on beach.	A. Require staff to rake out/cover any vehicle tracks left on beach.	Administration	On-going
2.0 Monk Seals				
♦ Hawaiian monk seals are one of the most endangered species of seals in the world. Seals regularly haul out and nap on the beach at Lāwa‘i Kai, and are very sensitive to human presence. ♦ To protect the monk seals, the activities and behavior of humans and animals on the small sandy beach area must be closely monitored. ♦ Dogs on the beach harass the seals. ♦ Seals are at risk to diseases carried by dogs.	**2.1** Maintain the Lāwa‘i Kai area as a safe haven for monk seals.	A. Keep all dogs off the beach. B. Continue to work with state and Federal agencies such as NOAA to monitor and manage human and animal activity.	Conservation Department	On-going
3.0 Feral Animals				
♦ Feral cats are a hazard to sea turtle hatchlings and ground-nesting seabirds such as the Wedge-tailed Shearwaters and White-tailed Tropicbirds that nest on the adjacent valley walls.	**3.1** Reduce or remove feral cat populations.	A. Continue to work with the Kaua'i Humane Society to humanely remove feral cats.	Conservation Department	On-going

TABLE 12-3: Coastal & Marine Resources Management Plan

Goal 2: Educate the public about the unique resources and ecosystem of Lāwa‘i Kai Beach and Bay.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
4.0 Community and Education				
♦ The broader education of the community is critical in order to appreciate and help protect this special resource.	**4.1** Train staff, tour guides, and volunteers to educate the broader community and Makai Watch volunteers. Also see Recreation and Commercial Management Plan.	A. Work with NTBG's educational programs to encourage public awareness on the importance of the restoration of native ecosystems.	Administration Education Visitor Services	On-going

TABLE 12-4: Coastal and Marine Resources Management Plan

Goal 3: Improve the marine resources of Lāwa‘i Kai Bay.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
5.0 Use of Bay				
♦ Marine surveys found large amounts of marine debris (derelict fishing line, weights, and nets on corals), and terrestrial vegetation in the bay (palm fronds, tree branches, decaying leaves, and other organic debris). ♦ The small size of the bay and the limited habitat make the bay unsuitable for large-scale commercial harvest. Several species are in low abundance and small in size reflecting possible overfishing conditions. ♦ Also see Lāwa‘i Kai Estuary and Stream Management Plan: Critical Issues.	**5.1** Improve the marine habitats in Lāwa‘i Kai Bay for feeding, resting, and reproduction of resource species.	A. Continue monitoring and research program. B. Conduct fish catch surveys and bay user surveys. C. Conduct cleanup of fishing gear and other marine debris. D. Continue to allow traditional fishing within the bay. E. Adopt rules restricting commercial fishing.	Conservation Department DLNR	Short Term – Medium Term Short Term
♦ Loss of traditional information about the cultural practices of the beach and bay.	**5.2** Gather and record traditional knowledge of cultural practices of the area.	A. Continue to survey kūpuna and other local visitors and gather their knowledge of the cultural traditions of the ahupua‘a. B. Continue to record oral histories of cultural knowledge and traditions.	Education Department	On-going

13.0 RECREATION AND COMMERCIAL MANAGEMENT PLAN

13.1 Background

Lāwa‘i Kai is an isolated beach and bay on the south shore of Kaua‘i, where Lāwa‘i Kai Stream meets the ocean. Lāwa‘i Kai Beach consists of a sandy beach at the mouth of the stream. The beach has a basalt rock perimeter that begins on the west end and east end of the beach and runs along the cliffs on both sides of the Lāwa‘i Kai Bay. This coastal area is quiet, peaceful, serene, and comparatively free of human activity and use. The marine environment of the bay encompasses approximately 20 acres of mostly sandy bottom with coral reef communities colonizing the basalt rock perimeter.

Lāwa‘i Kai Beach and Bay is a documented nesting site for the threatened green sea turtles, a refugium for endangered Hawaiian monk seals, a seldom-used fishery, and a protected habitat for rare coastal plant species. In addition, the absence of human impacts such as artificial lighting, beach cleaning or man-made structures in the coastal area contributes to the natural environment of the coastal area.

Recreational access to the area has increased over the past 20 years. Today, beach users include boogie boarders, surfers, beach combers, swimmers and kayakers. A year-long user survey conducted by NTBG shows that the existing level of use is relatively low. There is general agreement among members of the Lāwa‘i Kai Citizens Advisory Group (LKCAG) that the existing level of use is acceptable and should be continued into the future. There is also general agreement that expanding the use of Lāwa`i Kai would irrevocably change the character of the area.

The guiding principles of this management plan are to preserve the existing level of recreational use while protecting the unique nature of this special area.

13.2 Access to Lāwa‘i Kai Beach

The narrow, rocky shoreline access on both sides of the bay and the private property ownership of the surrounding area has resulted in limited but regular public recreational use of the beach and bay area for over the past 70 years. As a result, natural resources have remained a relatively intact and pristine. However, as the

population of both residents and visitors increases, there will be additional pressure to provide more public recreational access to Lāwa`i Kai Beach and Bay. There are very few coastal and marine areas on Kauaʻi that are relatively undisturbed like Lāwaʻi Kai, and there is a need to protect these unique resources.

After meeting, studying and discussing this access issue for the past several years, the LKCAG has concluded that managing the future access to Lāwaʻi Kai is critical to realizing the goals of this Master Plan. Finding the right solution to this important issue has not been easy and only after extensive debate and discussion has the LKCAG come up with the following Recreation and Commercial Use Management Plan.

Historic Access

Historically, access and use of Lāwaʻi Kai Beach and Bay has been very limited. This reflects the Hawaiian cultural practice of respecting the *konohiki* fishing rights of the bay which were the owned by the Allertons, assisted by the narrow, rough, basalt headlands that make access along the rocky coastline difficult.

During the time the Allertons lived at Lāwaʻi Kai (1938 – 1986), beach access was primarily limited to members of the public who contacted the Allertons and asked permission walk across private property to access the beach or bay, or to those individuals who chose to walk along the historic trail that followed the rocky shoreline and connected Spouting Horn with Lāwaʻi Kai Beach.

In the 1960s John Allerton made improvements to the rocky shoreline trail which he used to walk from his home eastward along the shoreline towards Spouting Horn. In 1982, Hurricane Iwa destroyed nearly all of his trail improvements, and in 1992, Hurricane Iniki completely wiped out any remnant that that was left. The removal of these improvements increased the difficulty of the using the rocky coast along the eastern side of the bay to reach the beach. As a result, since 1992 more and more members of the public have been trespassing over Allerton Garden property to gain access to the beach in ever increasing numbers. In spite of the very hazardous conditions, and the posted no trespassing signs, they use the old Allerton driveway which is severely undermined to access the beach.

Current Access

As shown in **Exhibit Q**, there are currently four access routes used by the public to enter the Lāwa‘i Kai coastal areas including the beach and bay. As described below, only two of these access ways are legal for use by the general public.

Current Access: Eastern Side of Lāwa‘i Valley

A. Legal access over public lands:[30] Beach users park their cars along Lāwa‘i Road between Spouting Horn and the Allerton Gate, walk down to an unmaintained, historic shoreline trail, and traverse the challenging rocky coastline which in one location is difficult to traverse during high tide.

B. Illegal access over private property: Beach users park their cars along Lāwa`i Road between Spouting Horn and the Allerton Gate, trespass through Kukui`ula Development Company Hawaii (KDCH) and Allerton Garden properties, and hike down the undermined remnant of the old Allerton driveway to reach Lāwa‘i Kai Beach. This is not only illegal but it is unsafe due to the undermined condition of the driveway, cliffside erosion, and falling boulders. In addition, trespassing has created a significant liability risk for the landowner.[31]

Current Access: Western Side of Lāwa‘i Valley

A. Legal access over public lands: Beach users who get to the western coastal area can walk along the rocky shoreline to access the Lāwa‘i Kai Beach. Steep cliffs, coastal erosion, and breaks along the rocky cliffs make this public access difficult to traverse although fishermen have been consistently using it for many years and have built ladders to help them access the rocky shoreline.

[30] Public lands are lands in the general public domain. In this case, these public lands are owned by the State of Hawaii.

[31] Both the NTBG and LKCAG believe that the old Allerton driveway is dangerous, unsafe for the public, and that its use must cease. While improvements to the old Allerton driveway are theoretically possible, both the NTBG and the majority of members on the LKCAG believe that an improved eastern access would exponentially increase the number of beach users and significantly degrade both the resource and the unique setting of Lāwa‘i Kai.

B. Access over private property: The agricultural lands on the western side of Lāwaʻi Kai Beach and Bay, abutting Allerton Garden property, are owned by Alexander & Baldwin (A&B) and are leased to the owners of Kauaʻi Coffee. While fishermen have traditionally used homemade ladders to access the rocky shoreline just west of Allerton property from the coffee fields, over the past 15 years younger surfers and beach users have begun illegally trespassing over Allerton Garden property by making a steep trail that descends down the cliff and onto Lāwaʻi Kai Beach. This illegal trail was even featured in the LA Times Online as a way to access the beach.

Recommendation

In order to address public access proactively, NTBG and LKCAG have expended an extensive amount of time and resources (including field trips, discussion, interviews, etc.) studying these issues. After years of working on this it was determined that the most prudent means of maintaining the goals and objectives of the Lāwaʻi Kai Special Subzone is to keep the *status quo* as it pertains to legal public access. Therefore, no new public access ways to Lāwaʻi Kai Beach and Bay are recommended in this Plan.

13.3 Current Activities

Recreation

The existing recreational beach uses include sun bathing, beach combing, recreational swimming, boarding activities, pole fishing, throw-net fishing, diving, spear-fishing and other water-based activities.

Access to Lāwaʻi Kai Bay via the ocean waters generally originates from vessels departing the nearby Port Allen or Kikuiula boat harbors. Occasionally, recreational kayaks land on the beach, and recreational vessels pass through the bay. A small amount of fishing takes place in the bay. Vessels occasionally anchor overnight in the bay. Recreation areas are delineated on **Exhibit O**.

Commercial

Commercial activities at Lāwaʻi Kai take place on both the beach and bay. Commercial boat tours transit, offer sight-seeing cruises, and snorkeling tours in Lāwa`i Kai Bay. These tours are infrequent and irregular, are dependent on weather and ocean

conditions, and take place primarily in the winter when conditions are calmest in the bay.

Currently, there is one unpermitted[32] commercial kayak company that enters the waters of Lāwa‘i Kai Bay, and regularly lands on the beach. Unpermitted landings typically occur twice a week, during the September through May season, and involves 10 kayakers.

User Surveys

Between November 2007 and October 2008, NTBG conducted a user survey of the beach and bay. The average number of surfers, swimmers and beach goers was 246 per month. The average number of pole and net fishermen was 28 per month. The average number of kayaks and motorized vessels in Lāwa`i Kai Bay was 36 per month. Further information can be found in **Appendix E**.

The survey was conducted in three user categories, and recorded the number of:

- Surfers, Swimmers, and Beach-goers
- Pole and Net Fishermen
- Kayaks and Motorized Vessels

Table 13.1: Lāwa`i Kai Beach and Bay User Survey

User Category	Total Annual Users	Average Monthly Users	Highest No. of Monthly Users	Lowest No. of Monthly Users
Surfers, Swimmers, Beach-goers	2954	246	359 June	154 December
Pole & Net Fishermen	333	28	48 January	16 June
Kayaks & Motorized Vessels	428	36	73 January	8 June

[32] As required by law, the commercial kayak company does not currently have a permit from the State of Hawaii, Department of Land and Natural Resources, Division of Boating and Ocean Recreation to land on Lāwa‘i Kai Beach.

13.4 Management of Recreation and Commercial Activities

Lāwa`i Kai Resource Advisory Committee (LKRAC)

Since Lāwa`i Kai Beach and Bay are public resources, it is recommended that a community-based entity be created to oversee its management. The Lāwa`i Kai Resource Advisory Committee (LKRAC) will be formed to:

1. Serve as the lead group in the management of Lāwa`i Kai Beach and Lāwa`i Kai Bay; and
2. Act as a bridge between NTBG, DLNR, and the larger community.

LKRAC's objectives will be to:

- Help implement the Lāwa`i Kai Ocean Recreation rules.
- Serve as a resource to the South Shore Ocean Recreation. Management Area Committee (SORMA) as needed.
- Educate the community about how to safely and legally access Lāwa'i Kai Beach.
- Recruit members and promote a Makai Watch program.
- Keep the community apprised of activities.
- Evaluate the rules and recommend changes over time.
- Prepare an annual report to the DLNR and NTBG.

The LKRAC will be comprised of 11 members, representing a cross-section of the community (residents, cultural, commercial, recreational users, landowners, NTBG representatives). The DLNR will be invited to participate as an *ex officio* member.

The following organizations and groups will select one member to serve on the LKRAC:

- Kōloa Community Association
- Kukuiolono Community Association
- Po'ipū Beach Resort Association
- Kaua`i Coffee
- Kukui'ula Development Company/Homeowner's Association
- Groups doing restoration work in Po'ipū and Kōloa
- National Tropical Botanical Garden
- Royal Order of Kamehameha
- Kukui'ula Small Boat Harbor permittees

Representatives from these organizations will then select two additional members to serve on the LKRAC who represent the following categories: fisherman, boater, surfer, beach user, or diver. Criteria for membership includes those with relationship and/or knowledge of Lāwa‘i Kai, a commitment to attend meetings, and a willingness to learn about the resources of Lāwa‘i Kai.

NTBG is willing to host and facilitate meetings of the LKRAC.

Makai Watch

To further engage the community and promote local stewardship of Lāwa`i Kai Beach and Bay, it is recommended that the LKRAC help to implement a Makai Watch program. The purpose of Makai Watch is to:

1. Build awareness and outreach**.** Trained volunteers provide ocean and beach users with information about marine ecology, culture, history, regulations, safety, and appropriate behavior.

2. Biological and human use monitoring**.** Trained volunteers collect information on the human use of ocean and beach resources and on the biological condition of those resources.

3. Observation and compliance**.** Trained volunteers observe the area, encourage users to learn and obey area regulations, and identify and report illegal activities to state enforcement officers.

TABLE 13.2: Recreation and Commercial Management Plan

Goal 1: Manage recreational and commercial activities at Lāwa‘i Kai Beach and Bay.				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**[33]
1.0 Human Activity				
♦ A growing population and changing demographics of Kōloa and Po'ipū may increase the intensity of use on the beach and sand (e.g., large numbers of people accessing the coastal area could compact the sand, which could impede the ability of green sea turtle hatchlings to successfully dig out of nests). ♦ Increasing levels of public recreational and commercial uses could negatively impact the coastal and marine resources of the Lāwa‘i Kai Beach and Bay. ♦ Currently, DLNR’s management of resources is segmented between numerous divisions and statutes that prevent an integrated management approach.	**1.1** Create the Lāwa‘i Kai Special Subzone and DBOR Rules and Unencumbered Lands Rules to encourage an integrated resource management approach.	A. Adopt Rules for permitted uses of Lāwa‘i Kai Beach and Bay developed by the Lāwa‘i Kai Citizens Advisory Group. B. Present draft Rules to Community. C. Submit draft Rules to the Board of Land and Natural Resources for action. D. Implement Rules developed by the LKCAG. E. Submit petition/application to downzone to the Board of Land and Natural Resources. F. Create the Lāwa‘i Kai Special Subzone for Conservation District lands.	Administration	Short Term

[33] On-going (currently under way), Short Term (1-3 years), Medium Term (4-10 years), and Long Term (10 – 20 years).

1.0 Continued				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
♦ Increased human activity and non-motorized vessels on the beach could degrade the green sea turtle nesting areas. ♦ Seasonal dangerous surf conditions make it difficult for ingress and egress the beach unless people are familiar with the area. ♦ Cultural sites have been defaced by graffiti. Increasing public access will lead to more desecration of cultural and archaeological sites.	**1.2** Manage human activity on the beach through adoption of rules.	A. Identify ingress and egress vessel access to the beach/coastal area. B. Adopt rules limiting and/or restricting recreational and commercial use of the beach and bay. See **Appendix C** for Draft DBOR Rules and **Appendix D** for Draft Unencumbered Lands Rules.	DLNR	Short Term
2.0 Green sea turtles & Seabirds				
♦ Lights are a hazard to nesting turtles and to pelagic seabirds such as shearwaters, because they confuse their night-navigation systems. See Coastal and Marine Management Plan.	**2.1** Ban the use of lights on at night on the beach and coastal areas.	A. Restrict nighttime lighting during turtle nesting season through rulemaking process. B. Manage nighttime lighting during periods of seabird activity.	Administration DLNR Fish & Wildlife Service	On-going
3.0 Community and Education				
♦ Long term protection of the area must involve the community. ♦ The public and community may not be aware of their impact on the resources at Lāwa‘i Kai Beach and Bay.	3.1 Form the Lāwa‘i Kai Resource Advisory Committee to create a strong relationship between the community and the DLNR.	A. Implement the Lāwa‘i Kai Beach and Bay Rules. B. Evaluate and recommend periodic changes and revisions to the Lāwa‘i Kai Beach and Bay Rules. C. Work with NTBG’s educational programs to encourage public awareness on the importance of the restoration of native ecosystems.	Administration LKRAC	Short Term

3.0 Continued				
CRITICAL ISSUES:	**OBJECTIVES:**	**ACTIVITIES/ACTIONS:**	**Responsibility**	**Timeline**
♦ Following the adoption of rules, residents and visitors may not be aware of their impacts on the resources, or of the rules and regulations that govern the Lāwa‘i Kai Special Subzone and the Rules for Lāwa‘i Kai Beach and Bay. ♦ Lack of funds for enforcement personnel and resources will make it difficult for the State/DLNR to regulate the Lāwa‘i Kai Special Subzone and Rules for Lāwa‘i Kai Beach and Bay.	**3.2** Establish a “Makai Watch” program for coastal and marine resources.	A. Recruit members to promote and oversee a Makai Watch program with NTBG. B. Train volunteers to build awareness and outreach. C. Train volunteers to collect information on the human use of ocean and beach resources and on the biological condition of those resources. D. Train volunteers to observe the area, encourage users to learn and follow area regulations, and identify and report illegal activities to state enforcement officers.	Administration	Short Term
4.0 Use of Bay				
♦ Proliferation of motorized and non-motorized vessels will alter the pristine character of the beach and bay. Increased levels of activity will impact the resources.	**4.1** Maintain numbers motorized and non-motorized activity at existing levels.	A. Adopt rules limiting and/or restricting recreational and commercial use of the beach and bay.	DLNR/ DBOR	Short Term