

Waipi'o Valley:
*TOWARDS COMMUNITY PLANNING AND
AHUPUA'A MANAGEMENT*



DEPARTMENT OF URBAN AND REGIONAL PLANNING
UNIVERSITY OF HAWAII AT MĀNOA
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Waipi‘o Valley:

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AHUPUA ‘A MANAGEMENT*

Planning Practicum Fall 1999

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TABLE OF CONTENTS

<i>ACKNOWLEDGEMENTS</i>	iii
1. <i>EXECUTIVE SUMMARY</i>	1
2. <i>INTRODUCTION</i>	3
3. <i>WAIPI‘O VALLEY HISTORY</i>	5
3.1 Population and Land use	
3.2 Royal and Religious Center	
3.3 Archaeology	
3.4 Mythology and Legends	
4. <i>CULTURAL VALUES</i>	11
4.1 Indigenous Perspective of Natural Resources	
4.2 Kinolau of the Akua: Their Role in Traditional Society	
4.3 Influence of Oral Tradition Upon Land Use Practices	
5. <i>LOWER HĀMĀKUA DITCH</i>	17
5.1 Lower Hāmākua Ditch Background	
5.2 Ditch Repair and Diversified Agriculture	
5.3 Water Needs and Water Diversion	
6. <i>WATER MANAGEMENT</i>	25
6.1 Planning Considerations	
6.1.1. River Systems	
6.1.2. Stream Biota	
6.1.3. Traditional Native Hawaiian Water Management	
6.1.4. Water Rights	
6.2 Community Views on Water Management	
6.2.1. Lower Hāmākua Ditch	
6.2.2. Hakalaoa Falls	
6.2.3. Stream Maintenance	
6.3 Permit Process	
6.4 NRCS Technical Assistance Roles	
6.5 Proposal for a Stream Maintenance Council	
6.5.1. Planning a Stream Maintenance Council	
6.5.2. Council Duties	
6.5.3. Council Challenges	
6.5.4. Case Study: Mānoa Stream Maintenance Plan	

7	<i>PUBLIC ACCESS AND TOURISM IN WAIFI‘O VALLEY</i>	59
7.1	Background of Issues	
7.1.1.	Past Initiatives	
7.2	Issues and Positions	
7.2.1.	Legal Issues	
7.2.2.	Cultural Issues	
7.2.3.	Community Views	
7.2.4.	Views from Tourism/Bed and Breakfast Operators	
7.2.5.	The Role of Bishop Museum in Relation to Access & Tourism	
7.3	Alternatives for Community Consideration	
7.3.1.	Eco-cultural Approach to Tourism	
7.3.2.	Establishing a Cultural Learning Center	
7.4	Toward a Resolution	
7.5	Considering Limitations	
7.6	Resolving Differences	
8	<i>CONCLUSION: COMMUNITY ASSETS AND SOCIAL CAPITAL</i>	78
9	<i>BIBLIOGRAPHY</i>	82

APPENDIX

- A. Glossary
- B. Map Reference List/Maps of Waipi‘o Valley
- C. Mythological Reference: Legends Associated with Waipi‘o
- D. Taro Festival Survey Results
- E. Waipi‘o Historical Timelines
- F. Clarifications and Corrections

1. Executive Summary

This plan has been prepared to explore community planning and ahupua‘a management in Waipi‘o Valley, on the Big Island of Hawai‘i. This report is a culmination of a six-month long inclusive planning process that contains input from community organizations, resource management experts, government agencies, major landowners in the area, and Native Hawaiian cultural practitioners. Additionally, site visits were conducted to assess the existing condition in Waipi‘o Valley and to identify key issues and concerns related to government plans being prepared.

The Final Environmental Impact Statement for the Lower Hāmākua Ditch Watershed Plan characterizes the planning practicum activity as follows: “The community organization process in Waipi‘o Valley to identify issues, develop and obtain data, evaluate alternatives, and identify and pursue actions to resolve problems will be facilitated by members of the University of Hawai‘i, Department of Urban and Regional Planning Practicum. The members of the practicum will work with the communities in Waipi‘o Valley to develop, as much as possible, a shared vision of the future and strategies for concerned action to achieve identified objectives. While the DOA [United States Department of Agriculture] and NRCS [Natural Resource Conservation Service] will provide the necessary funds for travel and subsistence to the UH group, the project proponents will not attempt to influence the community organization process” (USDA-NRCS, 1999, September, p. 148).

Waipi‘o Valley History

The Valley of Waipi‘o has a rich historical background. Waipi‘o supported large numbers of Native Hawaiians. In the prehistoric era at least 800 acres of taro were cultivated in the lower Valley. Concomitant with a declining population, taro acreage suffered a decrease after Western contact. During the mid nineteenth century period, rice was introduced into Waipi‘o Valley as a new crop. Chinese immigrants cultivated rice in the Valley after completing their plantation contracts.

Following the Great Mahele in 1848, Charles Kana‘ina assumed ownership of 5,800 acres in Waipi‘o. After several transitions, Charles Reed Bishop purchased the land. In 1896, this land was conveyed to Bishop Museum. The Museum continues to lease its land to taro farmers in Waipi‘o Valley.

Waipi‘o Valley was also an important royal and religious center in ancient times. The Valley served as a base for nine successive Pili line rulers, the most noted being Līloa and his son Umi-a-Līloa (Cordy, 1994). The Valley continued to play an important role as one of many royal residences until the era of Kamehameha (Cordy, 1994).

Many heiau and archaeological sites, including some royal features, are located throughout the Valley. Numerous mythological associations are also indicative of Waipi‘o Valley’s importance in Hawaiian history and culture.

Cultural Values

Native Hawaiian culture stresses the importance of natural elements. The environment possesses mana, a spiritual power that can be associated with mythological beings. Hawaiians' relationship with the natural elements demonstrates how physical and spiritual connections impact community success and survival. Water was and continues to be an important resource in society. Hawaiian values are readily found in chants or oli. These oral traditions seek to illustrate the relationship between Native Hawaiians and the 'āina. It is from this indigenous perspective that traditional water allocation management and practices can be understood. Ahupua'a management practices of the past can serve as guidelines for planning in Waipi'o Valley today.

Lower Hāmākua Ditch

The Lower Hāmākua Ditch has served as a catalyst of Waipi'o Valley planning. The impacts of the ditch redevelopment plans have great implications for the future of the Valley. While the Big Island works toward economic sustainability, diversified agriculture farmers need a reliable source of water. Currently, agriculture in the Hāmākua area is suffering due to the poor condition of the ditch. Hāmākua's water demands directly affect waters in Waipi'o Valley. Diversified agriculture operations receive water that originates above the Valley. The influx or reduction of water flows can cause harm to taro production through flooding or drought. The management of the Lower Hāmākua Ditch thus has strong implications for ahupua'a planning in Waipi'o Valley.

Water Management

Wailoa River is a lifeline of Waipi'o Valley and the activities that sustain its important place in Hawai'i. Managing this resource effectively is imperative to the survival of taro cultivation and traditional Hawaiian ways of life. Community planning serves an important role in working with government agencies to assure that water resources are managed properly. Many important considerations, including social and environmental aspects must be part of this process.

Taro cultivation and stream biota can only survive with environmental protection and proper water management. The goal is to conduct necessary stream maintenance using a combination of traditional and modern techniques. In this way, maintenance can be implemented without causing detrimental affects to Wailoa River. A community council, with assistance from the government, will establish "best management practices" to guide future maintenance and preservation endeavors. The complicated permit process will require community consensus and cooperation with various agencies. NRCS has proposed three phases of in stream maintenance: 1) emergency cleanup, 2) one time cleanup, and 3) long term maintenance. Bulleted information in section 6, pages 52-54, provides detailed explanations of NRCS' role in Waipi'o Valley as well as practicum recommendations.

Public Access and Tourism

Public access and tour operations are also of major concern to those who live and work in Waipi'o Valley. The complexity of the issues demands highly skilled leadership to initiate community dialog and work towards resolutions. Public and private agencies, such as the

County of Hawai'i and Bishop Museum, have an important role in Waipi'o Valley. Stakeholders need a safe venue to express interests and work towards resolution plans. Alternatives for community consideration include ways to encourage respect and reestablish cultural values. A cultural learning center could also help to educate visitors as a proactive measure to protecting the Valley. While there are many limitations in Waipi'o, resolution can include mediation and planning for the benefit of future generations. The community must move together to recognize their equal roles in continued maintenance, preservation, protection, and perpetuation of Waipi'o Valley.

2. Introduction

2.1. Problem Statement

Waipi'o Valley has long-been a place of great contention. In ancient times, many chiefs based themselves in Waipi'o, and it therefore became a target of savage attacks by opposing chiefs. Today, the Valley continues to be a place of struggle. Differing perspectives in the Valley on such issues as water management, stream maintenance, public access, and tourism, combined with the absence of government intervention have progressed to a point where many have likened the atmosphere to that of a lawless frontier.

The issue of stream maintenance, in particular, has become an acute problem. There is an established history of differing and conflicting philosophies on how, or even whether, to engage in stream maintenance. Individuals and groups that have conducted stream maintenance on a regular basis in the past were halted several years ago from continuing these activities by the Army Corps of Engineers (ACE). No stream maintenance has been conducted since that time and the conditions of Wailoa River are at the point where the potential for flooding, unnecessary erosion, and crop damage have increased to unacceptable levels. This issue has come to a head with the proposed restoration of the Lower Hāmākua Ditch (LHD). The Ditch project proposes to release excess water (water not diverted into the ditch system) back into the Valley. This excess water will increase instream flows of waterways within Waipi'o Valley. With the current condition of Wailoa Stream, there are concerns that this action could exacerbate the potential for flooding and the resultant damage to property and crops. Nevertheless, environmentalists want to assure adequate stream flows to support stream ecosystems and provide habitat for endangered species. They fear that other interests will improperly manage the water, adversely affecting the survival of stream biota and taro cultivation.

Other conflicts that have been brewing and which also need to be addressed are those revolving around public access and tourist-related operations in the Valley. Residents and farmers in the Valley are naturally very protective of this special place. Tour operators, their guests, and other visitors, whether knowingly or unknowingly, have disregarded private property rights. Compounding this problem are the unclear boundaries between County and/or State owned and maintained access routes and private roads. There are also concerns over the proper portrayal of the Valley's history and culture and the protection of its valuable cultural resources.

2.2. Rationale & Objectives

The University of Hawai‘i at Mānoa, Department of Urban and Regional Planning, Fall 1999 Practicum, with the partial support of the U.S. Department of Agriculture - Natural Resource Conservation Service (NRCS), endeavored to provide technical assistance to the community of Waipi‘o Valley. Ahupua‘a and community planning focused on the Lower Hāmākua Ditch, stream maintenance, and access issues. The practicum worked to facilitate dialog, identify area concerns, and increase cooperative relations. This study applied essential cultural and environmental ideologies to the evaluation of Waipi‘o issues.

While the NRCS worked to complete the Final Environmental Impact Statement for the Lower Hāmākua Ditch Watershed Project, the practicum’s project provided venues for community dialog. This report does not suppose to resolve all issues in Waipi‘o Valley. Instead, tasks focused on researching various Waipi‘o Valley interests, facilitating discourse, evaluating planning strategies, and promoting community ownership of planning. The practicum promoted progress in consensus-based decision-making and governance. This report may be used as a tool for Waipi‘o residents as well as government agencies.

2.3. Methodology

Project methodology included the collection and evaluation of primary and secondary data sources. Community input was essential in all aspects of research. The practicum conducted several site visits in an effort to better understand the Waipi‘o community. Such visits involved interaction with the Waipi‘o Valley Community Association, the Waipi‘o Taro Farmers Association, and various other individuals. Visitations included experiencing taro cultivation, viewing stream and ‘auwai conditions and observing the access of roadways in Waipi‘o Valley. In addition, students attended community and government meetings. Members of the practicum attended the Annual Taro Festival to conduct community concept mapping and a mini-survey. These methods were used to survey community visions for Waipi‘o Valley of the future. Collaboration with Kanu O Ka ‘Āina Hawaiian Academy of Honoka‘a High School provided unique perspectives and research of Waipi‘o Valley with area youth.

Personal interviews supplied this study with concise and current issues affecting Waipi‘o Valley. Various governmental agencies such as the Department of Land and Natural Resources (DLNR), the United States Geological Services (USGS), the NRCS and the ACE provided the practicum with technical insight. Additional interviews were conducted with private agencies and individuals to equip the practicum with necessary information. This research included interviews with several cultural practitioners, thus assuring that Native Hawaiian issues were identified and addressed.

Secondary research involved the evaluation of various government and community group documents. This area of research studied plans, reports, laws, regulations, correspondence, etcetera, related to Waipi‘o Valley. The study of ancient Hawaiian oli, or chants, presented the practicum with valid oral history and legends of Waipi‘o Valley. A literary review of Waipi‘o Valley’s history, cultural values, and lo‘i cultivation supplied background information. This addressed the importance of Native Hawaiian perspectives in community

planning. Research also involved evaluation of stream hydrology, stream biota, and ecotourism as applicable to Waipi‘o Valley.

Finally, the practicum studied both current and historical maps of the Valley. Map evaluation presented the opportunity to learn more about the geography, topography, and other land characteristics of past and present Waipi‘o Valley. In an effort to identify the Waipi‘o community, students inventoried the County of Hawai‘i Tax Map Key (TMK) Maps and created a database.

3. Waipi'o Valley History

Waipi'o Valley is extremely important in Hawaiian history and culture, an importance that cannot be over-emphasized. The Valley was a major population and agricultural center. The primary crop cultivated in the Valley was taro, the most important agricultural product in Hawaiian culture. The Valley was also a royal and religious center throughout much of the prehistoric period. Many royal personages lived in Waipi'o and made it their seat of power. Tangible remnants of this past exist in the Valley today in the form of various archaeological sites which include heiau, fishponds, lo'i, and 'auwai. The legacy of Waipi'o Valley continues through the cultivation of taro and the perpetuation of Hawaiian cultural traditions.

3.1. Population and Land Use

Historically, Waipi'o Valley housed and supported a significant population base as compared to the typical ahupua'a (Cordy, personal communication, October 18, 1999). The Valley may even have been one of the first settlements in Hawai'i (c. 0 - 600 A.D.). At its peak, approximately 10,000 people may have lived in the Valley and some oral traditions place the population supported as high as 40,000 ("From Ancient Times to Today," 1995). It is estimated though, that at the time of western contact in 1778, Waipi'o had a resident population of approximately 2,600 persons. In 1823, the Reverend William Ellis, during a visit to Waipi'o, recorded seeing 265 houses, 8 heiau and 14 major ponds in the Valley which he estimated to support approximately 1,325 residents (Ellis, 1969, p. 364).

By the time of the Māhele in 1848, the Native Hawaiian population was decimated by diseases for which they had no resistance, diseases that were introduced by foreigners. Missionaries that visited the Valley in the 1820s reported seeing houses all the way to the back of the Valley. The fact that there were no Māhele claims in the back of the Valley only 30 years after these observations were made are indicative of the large decrease in population. The assumed scenario is that as the population thinned, the remaining people relocated to more fertile areas in the Valley. The more fertile areas are located in the front of the Valley where there was an abundance of Māhele claims (Cordy, personal communication, October 18, 1999). By the late 1800s it is estimated that only 200 Native Hawaiians were left in the Valley; it's population reduced by disease and emigration.

In the prehistoric era, it is estimated that 800 acres of taro were cultivated in the lower Valley. Altogether, including the upper Valley and the slopes, at least 2 square miles (1,280 acres) were being cultivated in taro, enough to support 30,000 persons ("From Ancient Times to Today," 1995). Wetland taro fields covered the entire Valley floor (side to side, front to back). Houses and dry land fields were located on the dryer, lower slopes of the Valley walls. Coupled with the declining population, the cultivated taro acreage also decreased during the post-contact period.

During the second half of the 19th century, a major new crop was introduced to the Valley – rice. Chinese immigrants, after termination of their contracts with the sugar companies, came to Waipi'o and cultivated rice. By 1880, only 580 acres were cultivated in the Valley with both taro and rice. Rice became an increasingly important crop and according to an Environment Hawai'i article ("From Ancient Times to Today," 1995), "The cultivation of

taro never completely vanished in Waipi'o, but for a time, rice seemed to eclipse taro – and the Chinese planters outnumbered the native Hawaiians” (p. 4).

Following the Māhele in 1848, Charles Kana'ina assumed ownership of approximately 5,800 acres in Waipi'o Valley. After Kana'ina died, Colonel Sam Parker purchased this land at auction in 1881. Parker in turn, sold this land to Charles Reed Bishop who conveyed it to Bishop Museum in 1896. Bishop Museum has and continues to lease out much of its land in Waipi'o Valley (“From Ancient Times to Today,” 1995).

For most of the 20th century, Waipi'o Valley was marked by continued decline. At the dawn of the new century, Waipi'o maintained a semblance of a community. In addition to its residents, the Valley was home to several churches, stores, and even a school. By mid century, these institutions were gone. The school closed in 1945 and the others closed shortly thereafter. Waipi'o's last rice crop was harvested in 1927 because it was not economically competitive with cheap California-grown rice. The 1946 tidal wave inundated the Valley and destroyed many homes and taro patches. A series of waves hammered the shore and sent water surges up the Valley. Eyewitness accounts recall “55-foot waves ... hitting the Waimanu side of the pali, deflecting up the flat, and then circling down the Wailoa River in torrents” (Salmoiraghi & Yoshinaga, 1974). The tidal wave proved to be extremely devastating, not only physically, but socially as well. Many of the farmers who lived in the Valley could not, or would not start over again and left Waipi'o never to return. “From Ancient Times to Today” (1995) states that a 1954 Bishop Museum study reported approximately 300 acres total were utilized for taro cultivation, but only 150 acres were actively cultivated at any one time, the rest being fallow. Resident population at the time was reported to be around 30 - 40 people. A Land Study Bureau report completed in 1960, only 6 years later, indicated continued deterioration. This report estimated approximately 100 acres of taro being cultivated along with 11 acres of macadamia nut trees, 5 acres of lotus root and an orchard of coffee. The report also indicated that a permanent resident population was virtually non-existent. Farmers typically resided outside of the Valley and commuted in to work their taro patches.

Waipi'o Valley's history is also marked by periodic flooding caused by two phenomena, tidal waves or tsunamis, and overflowing rivers resulting from heavy rains. Tidal waves are infrequent but can be extremely destructive as evidenced by the 1946 event. Overflowing rivers, on the other hand, are much more frequent and are nearly as devastating, often washing away and destroying crops. The last major flood occurred in 1979 and many taro farms were destroyed. The destruction required a huge cooperative repair effort in which various County and State agencies, private businesses and Valley residents participated.

3.2. A Royal and Religious Center

In ancient times, Waipi'o Valley was extremely important as a royal and religious center. The Valley served as home base to a succession of nine Pili line rulers (Cordy, 1994), the most noted being Līloa and his son 'Umi-a-Līloa. 'Umi-a-Līloa, the favored son of Līloa, united the island of Hawai'i under a single chiefdom. He was known as a kind and benevolent ruler, unlike his brother Hakau. 'Umi relocated the royal residence and power

center to Kona after his unification of the island of Hawai'i. The exact reasons are unknown, but according to legends as recounted by Fornander (1996), "... it was in order to check the rapacity of the nobles and retainers attending his court while held in that rich and densely peopled Valley of Waipi'o" (p. 100). Another legend tells "Perhaps also another reason for 'Umi's removal from Waipi'o was the desire to live conveniently near to the rich fishing-grounds of the smooth sea off the Kona coast" (p. 101), an area that was coveted by many and caused great conflict between chiefs who wanted to control it. Despite relocation of the power center away from Waipi'o, the Valley continued to be important as one of many royal residences up until the time of Kamehameha (Cordy, 1994).

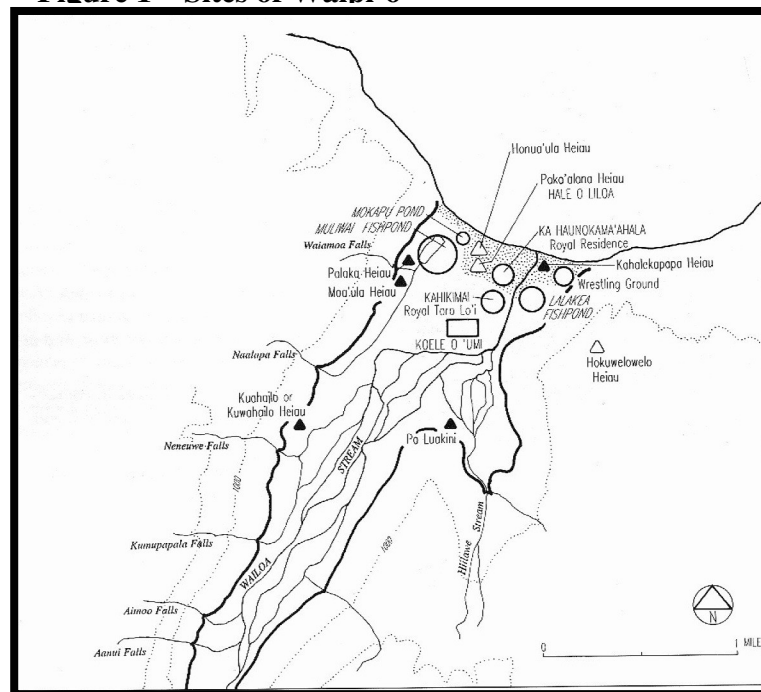
A pair of savage attacks on Waipi'o was indicative of its great importance. Keoua Kuahu'ula, ruler of the Ka'ū kingdom, initiated the first attack. In a preemptive measure against Keawema'uhili and Kamehameha, he waged war on Waipi'o. As described by Kamakau (1992a) "He descended into Waipi'o, broke down the fishponds, drying up Lalakea, Muliwai, and all the other ponds. He pulled up the taro of Waipi'o, broke down the banks of the taro patches, and robbed the people from Waipi'o to Waimea" (p. 151). The second attack occurred around 1790 by Kahekili of Maui and Ka'eo of Kaua'i. The two chiefs joined forces, overtook Moloka'i and Maui and made way to attack Waipi'o. Ka'eokulani savagely attacked Waipi'o, "He overthrew the sacred places and the taboo threshold of Līloa; he set fire to Kahoukapu's sacred threshold of nīoi wood and utterly destroyed all the places held sacred for years by the people of Hawai'i. No one before him, not even Keoua who had passed through there the year before and destroyed the land and the food, had made such wanton destruction" (Kamakau, 1992a, p. 160). In response, Kamehameha assembled "a large fleet, well manned, including double canoes armed with cannons, and the sloop Fair American" (Kuykendall, 1938, p. 36) and engaged the invading forces in the bay outside Waimanu.

3.3. Archaeology

Many of the royal archaeological features in Waipi'o Valley are attributable to the time of 'Umi or earlier. The front of the Valley, behind the sandy dunes were located several important heiau, including Honua'ula and Moa'ula, both luakini heiau. The construction of Honua'ula is generally attributed to Līloa. Paka'alana another luakini heiau and pu'uhonua was considered one of the most important and sacred heiau on the island. Paka'alana originally may have been constructed as early as 1200 -1300s (Cordy, 1994) and underwent several renovations in the succeeding centuries. In 1780, Kalaniopu'u repaired and reconsecrated Moa'ula heiau and dedicated it to Kūkā'ilimoku. It was here that Kalaniopu'u summoned the chiefs to Waipi'o to announce that his son Kiwalo would be heir to the kingdom and that Kamehameha I would be guardian of Kūkā'ilimoku, the war god to the house of Keawe. With guardianship came the responsibility of tending to heiau dedicated to this god (Kuykendall, 1938; Feher, 1969). All three heiau were still being utilized when 'Umi assumed power (c. 1600 - 1620) and continued to be used until the abolition of the kapu system in 1819 (Cordy, 1994). Within Paka'alana heiau was Hale O Līloa, a royal mausoleum built by Hakau at the time of Līloa's death. Hale O Līloa is said to have held the remains of several rulers (Cordy, 1994).

Other heiau and archaeological features are located throughout the Valley. Hōkūwelowelo was located along a cliff on the eastern side of the Valley. A second heiau, Kuahailo was located along the opposite Valley wall about 1.3 miles inland, near Neneuwe Falls (Cordy, 1994). Yet another heiau, Palaka, was located closer to the mouth of the Valley near Moa'ula heiau and Waimoa Falls. Other archaeological features in the area include Mokapu, Muliwai and Lalakea fishponds, Kahikimaiaea (the royal taro patch), and a wrestling ground. "From Ancient Times to Today" (1995) states that Charles Reed Bishop in a letter written in 1897, a year after he conveyed his Valley acreage to the Bishop Museum, wrote "There is a matter that should not be lost sight of. I mean the acquisition and control of the heiaus and pu'u honuas, say those of Mo'okini in Kahala [sic], of Pu'ukoholā at Kawaihae, of Paka'alana in Waipi'o, of Honaunau in Kona, and perhaps one on the islet of Mokuola in Hilo Bay, and

Figure 1 – Sites of Waipi'o



any other of interest and worth preserving ... [O]nce in the control of the Museum they should be protected perpetually [emphasis added]" (p. 4).

3.4. Mythology and Legends

Numerous mythological associations and legends also are indicative of Waipi'o Valley's importance in Hawaiian history and culture. The gods Kāne and Kanaloa were believed to have lived in Waipi'o at Alakahi with other lesser gods. Wākea, who is attributed to be the ancestor of all Hawaiian people was said to have retired to Waipi'o. Lono's wife Kaikilani was said to be found by his brothers beside Hi'ilawe Falls.

One well-known legend serves as a creation story for Hi'ilawe Falls. As the legend tells it, a beautiful young woman named Hi'ilawe lived in Waipi'o Valley. One night a young man named Kakalaoa comes to Hi'ilawe to romance her. After spending the night together

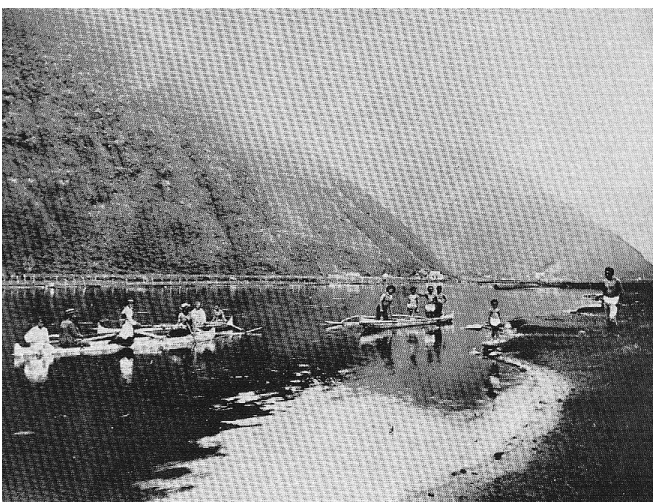
walking and exchanging words of love, the pair comes across a 'elepaio bird, a bad luck omen. The young couple vow never to be separated and Hi'ilawe transforms herself into a waterfall and Kakalaoa's body becomes the large boulder at the base of the cascading waterfall. (Salmoiraghi & Yoshinaga, 1974; "Legends of Waipi'o Valley", 1959).

Another prominent legend is the story of 'Umi, son of Līloa. It is said that Līloa, on a journey to Pau'uilo, meets a beautiful woman, Akahi. They spend the night together and conceive a child. Līloa tells Akahi that if she has a son, to name him 'Umi. Before departing, he leaves behind his malo, a whale tooth necklace and his war club as tokens to the unborn child. Umi is born and when he becomes a young man, Akahi tells him of his true heritage and tells him to go to his father in Waipi'o Valley. She gives 'Umi the gifts Līloa left and instructs him that upon meeting his father, to sit on his father's lap and tell him who he is. 'Umi becomes the favored son and Hakau, Līloa's other son is enraged with jealousy. Upon Līloa's death, Hakau inherits the land, but 'Umi is placed in charge of the gods and the temples. Hakau poorly treats 'Umi which drives him to leave Waipi'o Valley. Hakau extends this mistreatment to the people of Waipi'o, and 'Umi, upon hearing this, returns to attack Hakau and kills him. Umi then assumes Hakau's position as chief.

(Refer to Appendix C for a comprehensive list with brief descriptions of mythological, legendary and historical references to Waipi'o Valley.)



Source: Stearns, H. and Macdonald, G. (1946). *Geology and Groundwater Resources of the Island of Hawaii*.



Source: Salmoiraghi & Yoshinaga. (1974). *Waipi'o: An Exhibition at the Wailoa Center*.

4. Cultural Values

The ancestors of Nā Kānaka Maoli had an innate respect for all things in their universe, recognizing that all things, both animate and inanimate, possessed a spiritual essence. From this recognition, arose a respect for nature that is a core value in Native Hawaiian beliefs. It is these kinds of values that provide the guiding principles for land use and water use management in the traditional lifestyle of Nā Kānaka Maoli. For example, plants were meticulously attended to because of the recognition that these natural elements were manifestations of the spiritual elements. In plant cultivation, Hawaiians developed an intensive understanding of not just the anatomical development of certain plants, but also experimented with various terrain and soil conditions to analyze the growth and sustainability of these plant types. Each plant was ingeniously nurtured to maximize its survivability through knowledge of terrain, soil, and climate conditions. The understanding and application of Native Hawaiian values can play a vital role in the future planning of Waipi‘o Valley.

4.1. Indigenous Perspective of Natural Resources

In Hawaiian thought, natural areas possess mana, a spiritual power that exists because these areas either possess the elements of the gods or are manifestations of the gods themselves. The presence of the akua and ‘aumakua are personified through the natural elements of rain, wind, sun, earth, cloud formations, and ocean forms that are significant to a particular place (Kamakau, 1992a). The Hawaiians’ relationship with the natural elements illustrates how the success and survivability of the community is defined by understanding the integral connection between the physical and the spiritual. The roles that both man and the natural elements assume are critical in creating a sustainable environment.

In defining this relationship with the land and natural environment, one key concept is the significance of place names. The name of an area usually reveals some information that describes the natural elements and/or cultural resources that exist in that area. David Malo, a noted Hawaiian historian, in his text Hawaiian Antiquities (1951), illustrates the significance of names given to rain and the relationship to a particular area:

“There are many names used by the ancients to designate appropriately the varieties of rain peculiar to each part of the island coast; the people of each region naming the varieties of rains they deemed fitting” (p. 14).

In Pukui and Elberts’ text, The Hawaiian Dictionary (1986), there are several hundred different names for rain that are named for the region it comes from, the manner in which the rain falls, the intensity of the rainfall, and other qualifiers. In Hawaiian poetry and song, rain often signifies joy, life, growth, and greenery. It can also refer to elements of good fortune (light rains and mists) or grief, sorrows, and tears (heavy rains). Rain can also signify the presence of gods or royalty, sexual relations, beauty, or even hardship (Pukui & Elbert, 1986, p. 509). The primary lesson is that these natural forms are some physical manifestation of the akua. The Native Hawaiians’ perception and ability to give hundreds of names to one element illustrate how intricately woven their relationship was to their environment.

4.2. Kinolau Forms of the Akua: Their Role in Traditional Society

The akua reveal themselves through their different kinolau, various body forms manifested through the natural elements. In traditional practice, the origins of taro stem from the god Kāne, the primordial god of life, whose “embodiment of procreative energy” included fresh spring water, rain, streams and sunlight (Handy, 1972). All of these elements are the life-nurturing forms that nourish the development of taro. Culturally, the importance of water manifests itself in the embodiment of Kāne, the giver of all sustainable life.

Aia i hea ka wai a Kāne

He ui, he nīnau

E ui aku au iā ‘oe

Aia i hea ka wai a Kāne

Aia i ka hikina a ka Lā

Puka i Ha‘eha‘e

Aia i laila ka wai a Kāne

E ui aku au iā ‘oe

Aia i hea ka wai a Kāne

Aia i Kaulanakalā

I ka pae ‘opua i ke kai

Ea mai ana ma Nihoa

Ma ka mole mai o Lehua

Aia i laila ka wai a Kāne

E ui aku au iā ‘oe

Aia i hea ka wai a Kāne

Aia i ke kuahiwi, i ke kualono

I ke awāwa, I ke kahawai

Aia i laila ka wai a Kāne

E ui aku au iā ‘oe

Aia i hea ka wai a Kāne

Aia i kai, i ka moana

I ke Kualau, i ke ānuenuē

I ka punohu, i ka ua koko

I ka ālewalewa

Aia i laila ka wai a Kāne

E ui aku au iā ‘oe

Aia i hea ka wai a Kāne

Aia i luna ka wai a Kāne

I ke ouli, i ke ao ‘ele‘ele

I ke ao panopano

I ke ao pōpolohua me a Kāne la, e

Aia i laila ka wai a Kāne

E ui aku au iā ‘oe

Aia i hea ka wai a Kāne

Aia i lalo, i ka honua, i ka wai hū

I ka wai kau a Kāne me Kanaloa

He waipuna, he wai e inu



He wai e mana, he wai e ola

E ola nō, ea

(Edith Kanaka‘ole Foundation, 1999)

(Translation by Kāwika McKeague)

Where is the Water of Kāne?

A query, a question, that I put forth to you

Where is the water of Kāne?

There at the rising of the sun

Emerging at Haehae

There lies the water of Kāne

A question that I put forth to you

Where is the water of Kāne?

There at Kaulanakala

The sea billows resting upon the ocean,

Out on the horizon

Arising upwards at Nihoa

At the tap-root of Lehua

There is the water of Kāne

A question that I put forth to you

Where is the water of Kāne?

There upon the peaks of the mountains

The steep ridges

In the Valleys, and the river flowing therein

There lies the water of Kāne

A question that I put forth to you

Where is the water of Kāne?

There in the sea, in the ocean,

In the slanting rain, in the rainbow

In the luminous red cloud, in the blood-red rainfall

In the translucent cloud form

There is the water of Kāne

A question that I put forth to you

Where is the water of Kāne?

There in the region that lies above is the water of Kāne

In the midst of the blue sky

In the dark cloud, the deep black hued cloud

In the black-mottled cloud of Kāne

There is the water of Kāne

A question that I put forth to you
 Where is the water of Kāne?
 There in the region below, deep in the earth, in the
 gushing spring

In the waterways of Kāne and Kanaloa
 A bursting spring, water to quench one's thirst
 Water that provides strength
 Water that gives life
 Life indeed.

In the cited oli, *Aia i hea ka wai a Kāne*, the author weaves an intricate and elaborate riddle that poses a simple question, Where are the waters of Kāne? The author divides the oli into six sections, each depicting a particular land or water spatial unit: east (the rising of the sun), west (the setting of the sun), *ma uka* (uplands), *ma kai* (coastal), *i luna* (upper atmosphere), and *i lalo* (sub-terrain). The beauty of this mele is that it never gives an exact answer, but alludes to one central theme: the waters of Kāne either exist in every natural element or influence the ability for the natural element to exist. The waters of Kāne are in the clouds, the rainbows, the morning dew, the mountain peaks, Valleys, streams, etc. The waters of Kāne bring life and sustainability to the 'āina and are inherent in all elements. Metaphorically, the oli illustrates the procreative force that water, as a natural element, possesses and brings to the land. In Hawaiian thought, it is the god Kāne that embodies this natural element and provides Nā Kānaka Maoli with life (Emerson, 1915; 'Ilio'ulaokalani, 1999).

All things of the universe possess a spiritual essence, *mana*, that is representative of a particular *akua*. Nā Kānaka Maoli were aware of their place in the environment and realized that their *akua*, in one form or another, were always near. Respect and humility were shown for all things because of the omniscient power of the *akua*. Traditional Hawaiian foods like taro also possess the *mana* of the *akua*, which enters the human form and strengthens the body. It is the spiritual essence, the *mana* that transmits health, builds strong bodies and heals illness. In addition, these elemental forms also provided a connection of Nā Kānaka Maoli to their spiritual world, realizing that the food they ate were representations of their *akua*. Each of the four major *akua* had several *kinolau*, body forms. The following is an abbreviated list of some of these *kinolau* forms:

Kāne, giver of life: taro (*kalo*), sugarcane (*kō*), and bamboo ('*ohe*)

Kanaloa, keeper of the ocean: banana (*mai'a*), octopus (*he'e*), large fish and marine mammals

Ku, god of war and building: coconut (*niu*), breadfruit ('*ulu*), and several varieties of fish

Lono, god of agriculture, fertility, and peace: sweet potato ('*uala*), '*ipu*, āholehole, and the pig (*pua'a*)

The understanding and application of this perspective brings to focus the role of Native Hawaiian thought in land use management. Nā Kānaka Maoli imbued all their cultivation efforts with ingenuity and respect. The results of their labor were foods that helped strengthen and repair the physical form as well as nurtured the spirit with traditional cultural teachings and values. While the *kinolau* forms provided spiritual nourishment, strength, and protection, food also played a role in spiritual ceremonies when the gods were called upon for either spiritual protection or guidance. In water use management and practice, the *akua*

were present in all matters: construction and consecration of a new ‘auwai, preparation of the lo‘i, planting and harvesting of food plants, and asking for a blessing from the akua to bring rain for productive growth and development.

4.3. Influence of Oral Traditions Upon Land Use Practices

In one of the cosmogenic traditions of Nā Kānaka Maoli, known as the Kumulipo, the creatures of the water are first born. The Pule Ho‘ola‘a Ali‘i was first chanted at the birth of Kalaninui‘iamamamo, as a prayer that sanctified the chief by reciting his genealogical line back to elements of creation. The concept of mo‘okū‘auhau, of knowing the genealogical line of an ali‘i was of primary importance in establishing the social order of Nā Kānaka Maoli. The Kumulipo is a 2000 line chant that is divided into sixteen time periods. Elemental creatures of the water world are born into the first time period. The elements of water, sun, and darkness are primordial and are the life-givers to all that has been born since the beginning of time. The mo‘okupuna, or ancestral genealogy of the Kumulipo illustrates the point that we, as human beings are connected to everything around us. The stratification of elements and creatures being born into these time periods illustrate that humans are the youngest of all creations. Therefore, everything that came before are characterized as elder siblings. The creation of all things comes from the same source, “ ‘O ka walewale ho‘okumu honua ‘ia”- it is the slime that establishes the earth; the element of water that brings forth life to the world that we know (Kame‘eleihiwa, 1999a, b).

In another creation tradition, the earth and sky unite to bring forth the birth of the Hawaiian islands. Papahānaumoku, Earth Mother and Wākea, Sky Father, mate to create the islands of Hawai‘i and Maui. The two join in union from which a daughter, Ho‘ohōkūkalani, is born and with whom Wākea desires for his own (Edith Kanaka‘ole Foundation, 1996). Wākea, with the assistance of his kahuna, establishes a new social code, the ‘aikapu, that separates men and women from eating together, as well as prohibiting women from eating particular male kinolau, body forms of the gods. ‘Aikapu literally translates to “sacred eating” (Kame‘eleihiwa, 1996). The establishment of the ‘aikapu gives an opportunity for Wākea to mate with Ho‘ohōkūkalani (Kame‘eleihiwa, 1992), which results in a stillborn child, named Hāloanakalaukapalili, the long quivering stalk. From the burial site of this child, it is said the first taro plant begins to grow. Wākea and Ho‘ohōkūkalani mate again, bearing a second child with the same name, Hāloa. It is believed that Hāloa is the progenitor of all Kānaka Maoli (Beckwith, 1970). One of the primary lessons derived from this mo‘olelo is the concept of malama ‘āina, which literally means to “care for the land” because it is the ‘āina that is an elder sibling to Nā Kānaka Maoli, the indigenous Hawaiian race.

These oral traditions illustrate a primary point in defining the relationship between Native Hawaiians and the ‘āina. The ‘āina is viewed as the kua‘ana, the older sibling, whose responsibilities in the ‘ohana structure, a distinctive social and familial unit, is to ho‘omalū (protect), hānai (feed), and to kauoha (command). The role of Nā Kānaka Maoli was that of the ka‘ika‘ina, the younger sibling, whose responsibilities was to mālama (nurture), aloha (love), mahalo (respect), and to ho‘olohe (listen) (Handy, 1972). Therefore, although there was a distinct social division that provided order to traditional society, all Nā Kānaka Maoli belong to one genealogical lineage that connects them to the ‘āina, the land and all of its

natural resources. More importantly, the cultural associations between Nā Kānaka and the ‘āina are strengthened by the definitive spiritual connection of the akua, with their various kinolau forms, to both man and the environment. It is from this indigenous perspective that traditional water allocation management and practices can be understood as well as applied in Waipi‘o Valley.



Kanu O Ka
‘Āina and UH
Mānoa
Practicum
students in
Waipi‘o Valley
(Oct. 1999).



Source: Varez, Dietrich. Collector's Portfolio. Volcano Art Center.

Practicum
members work in a
resident's lo'i
(October 1999).





Harvesting
kalo in
Waipi'o
Valley
(October
1999).



Cultural Practitioner, Kia
Frona speaks about kalo
and Hawaiian culture
(November 1999).



5. The Lower Hāmākua Ditch and Diversified Agriculture

Decisions currently being made about the future operation of the Lower Hāmākua Ditch will have implications for Waipi‘o Valley. Those decisions cannot be made without considering their impacts to the Valley. Waters that flow through the ditch and allow for large-scale agriculture along the Hāmākua coast are the same waters that would naturally flow into Waipi‘o Valley in they were not diverted. Like ancient times, Waipi‘o, through its water continues to nurture life, both inside and outside the Valley. Its water provides the foundation for economic sustenance and growth in the Hāmākua region. A clearer understanding of the continued need for ditch operation and water diversion is critical to developing equitable and justifiable planning options for Waipi‘o Valley and water allocation. The following discussion summarizes the history of the LHD, the need for repair and its relationship to diversified agriculture and economic sustainability of the Hāmākua region.

5.1. The Lower Hāmākua Ditch

The early 20th century brought changes to the Hāmākua coast and Waipi‘o Valley, changes which effects are still being felt today. In 1904, the Hāmākua Ditch Company (later the Hawaiian Irrigation Co.) offered a deal to the Bishop Museum to remove surplus water from Waipi‘o Valley. They paid the Museum \$5,000 a year for the water rights (“From Ancient Times to Today”, 1995, August). In 1907, the Upper Hāmākua Ditch began diverting water from Kawainui, Alakahi and Ko‘iawe streams above the Valley. The upper ditch, at its completion, was capable of delivering 15 million gallons per day (MGD) to various sugar mills along the coast. The Hawaiian Irrigation Company also began construction of the LHD during the early 1900s. Work on the 25-mile ditch was completed in 1910 (“Lower Hāmākua Ditch was Part of Grandiose Design for Valley,” 1995, August). The LHD diverted on average, 30 MGD of water from four of the five streams that fed the Valley. It supplied water for cane fluming, mill operations, and community systems. It also ensured a steady and reliable water supply for the irrigation of thousands of acres of sugar being cultivated along the Hāmākua coast. The diverted streams – Kawainui, Alakahi, Ko‘iawe and Waimā – are the primary sources of water for Waipi‘o Valley (“From Ancient Times To Today,” 1995, August). Today, only three of the four LHD stream intakes are functioning. The Waima stream intake is currently blocked by rubble (USDA-NRCS, 1999, September, p. 19). As a result, its intake and pumps have been abandoned and are no longer in use.

Other major problems continued to occur as time took its toll on the LHD. In 1989, the cliff face behind Hakalaoa Falls collapsed exposing one of the water intake tunnels. In an emergency repair effort, Hāmākua Sugar Company constructed a temporary flume across the breached section to ensure continued water flow to the Hāmākua coast. As part of the repair effort, Hāmākua Sugar Company constructed a diversion above the Valley to redirect the water that would flow into Hakalaoa Falls into Hi‘ilawe Falls. The diversion was left in place after completion of the repair work as a precautionary measure to prevent Hakalaoa’s cascading water from destroying the temporary flume constructed on the cliff face. This has, in effect, reduced the twin falls of Hi‘ilawe to a single waterfall. In recent years, a breach has developed in the temporary flume which allows water to leak out. The result is a waterfall that appears at midpoint on the cliff face. The flume leak also is releasing

additional water into Hi‘ilawe Valley, water which is normally diverted from Waipi‘o Valley via the Lower Hāmākua Ditch.

When the Hāmākua Sugar Company went out of business in 1994, much of the problems associated with the ditch’s deterioration were left unaddressed. The infrastructure it had built and used, including the LHD, was left idle. A considerable amount of confusion as to whose responsibility it was to operate and maintain the ditch was evident. Although other parties, including Bishop Estate – which purchased nearly all of the 31,000 acres formerly owned by the Hāmākua Sugar Company – had interests in the LHD, none of them were willing to step forward and help with ditch maintenance. In the end, State Department of Agriculture (DOA) officials decided that the responsibility of ditch operation and maintenance would be handled by the State of Hawai‘i (“The State Pays Dearly to Maintain Ditch, But No One Pays For Water,” 1995, September). Such a task would prove to be a difficult and costly endeavor for the State to manage on its own.

The LHD was in serious disrepair by the time Hāmākua Sugar Company went out of business. A great deal of the water in the system was being lost as a result of system leakage associated with ditch deterioration. Without repair, the condition of the ditch continues to worsen. “According to the DOA maintenance contractor, when 25 to 30 MGD presently enter[s] the open ditch at the Main Weir, on the average, only five to seven MGD flows into the terminus reservoir at Pa‘auilo, 14.5 miles distant” (USDA-NRCS, 1999, September, p. 22). A two-volume report issued by Wai Engineering states that only three of the four stream intakes are operational. The fourth intake is blocked by rubble. In the ditch system itself, “20 wooden flumes show ‘signs of saturation, wet rot, and dry rot. Many are leaking along the entire length with vegetation growing in the cracks and seams” (“Draft EIS Is Expected to Propose Curbs on Water From Waipi‘o Valley”, 1995, September). It is estimated that almost 4 MGD is lost from the ditch due to leakage.

Because the State was not in a position to pay for the costly ditch repairs that would “secure a stable, consistent supply of agricultural water”, the DOA enlisted the help of the United States Department of Agriculture (USDA) in April of 1995 (USDA-NRCS, 1999, September, p. 1). Beginning in May of 1995, scoping meetings were held to collect public input on the matter of ditch improvements, (“Draft EIS Is Expected to Propose Curbs on Water From Waipi‘o Valley,” 1995, September). On June 1, 1995, the NRCS issued a “formal notice of intent” in the *Federal Register* to produce an Environmental Impact Statement (“Draft EIS Is Expected to Propose Curbs on Water From Waipi‘o Valley,” 1995, September). Planning assistance – which was to be provided by the NRCS for the LHD project – was authorized a few days later on June 8, 1995. By October 1995, a Draft Environmental Impact Statement was issued by the NRCS (USDA-NRCS, 1999, September, p. 1). Several drafts followed, with the Final Environmental Impact Statement (FEIS) being issued in September 1999.

The FEIS proposes several different alternatives to address the problems associated with the uncertainty of agricultural water and water shortages in the 11,000-acre project area – which extends from Kukuihaele to Pa‘auilo. The first alternative is a no-action alternative in which the ditch is left in its present condition with minimal maintenance being provided by the

DOA. The second alternative is a well alternative in which existing wells would be upgraded and new wells created in order to provide adequate water supplies for farmers in the project area. The third alternative involves the rehabilitation and repair of the LHD. The final alternative suggests replacing portions of the open ditch with pipeline (USDA-NRCS, 1999, September, p. xii).

Various costs and benefits are associated with each alternative. However, the third alternative has been selected for implementation. The first alternative – no action – was not selected because it would perpetuate the uncertainty of ditch water delivery. It would not help economic revitalization of the region, nor would it address environmental and social concerns. The second and fourth alternatives were also not selected. They would have water benefits similar to the third alternative, but their costs far exceeded the cost of ditch restoration. According to the FEIS, the third alternative – ditch restoration – would “meet the objective of [providing a] stable, adequate, and reasonably priced agricultural water supply to maintain and expand the diversified agriculture base in Hāmākua and to promote economic revitalization of the Hāmākua coast,” with maximized “net economic benefits to the nation” (USDA-NRCS, 1999, September, p. 55).

Four agencies have played and will continue to play a major role in the planning and implementation of the ditch repair process. These agencies are the NRCS, the DOA, the Hāmākua Soil and Water Conservation District (HSWCD), and the Mauna Kea Soil and Water Conservation District (MKSWCD). The NRCS is responsible for acquiring designated funding for ditch repair; providing technical assistance to design and develop conservation plans and measures; performing construction inspections, developing performance requirements for improvements; assisting with Waipi‘o Valley stream flow measurement; and ensuring federal policies and laws are complied with (USDA-NRCS, 1999, September, p. 70).

The DOA also has several responsibilities. These responsibilities include the contracting of design and construction activities; performing inspection of construction improvements; and acquiring designated funding to fix and maintain the ditch. It is also responsible for acquiring the land rights for right-of-way access to the LHD, its “lateral systems”, and reservoirs, as well as performing land rights related tasks; ensuring State and County policies and laws are complied with; acquiring necessary permits; and “accepting, operating, and maintaining all the works of improvement and implementing a managed agricultural water system under HRS 167 authority.” Finally, it will fund the operation, maintenance, and replacement of the ditch over the course of the project’s 25-year life and design a LHD water system operational policy (USDA-NRCS, 1999, September, pp. 70-71).

The other two entities involved – the HSWCD and the MKSWCD – will also participate in the design of a LHD water system operational policy. In addition, they will also be responsible for informing the public of opportunities to participate in the design and installation phases through meetings and distribution of information and articles and “developing and approving conservation plans” for Hāmākua and Waipi‘o Valley producers (USDA-NRCS, 1999, September, p. 71).

5.2. Ditch Repair and Diversified Agriculture

Much of the agricultural activity that is currently taking place in the Hāmākua region is a result of LHD repair assurances. In general, there is agreement that in order for diversified agricultural crop acreage to expand and an increase in investment to occur, the LHD must be repaired and rehabilitated (USDA-NRCS, 1999, September, p. 13). It is believed that doing so will ensure a steady, adequate, and affordable water supply for Hāmākua farmers, thus enabling them to expand their farming activities. Ditch improvements will address problems associated with system failures, thus reducing cropland damage resulting from ditch breakdowns.

In total, the project to repair the LHD is expected to have an average annual economic benefit of \$3,498,200. Any benefits from ditch repair would be a result of “increased farm income generated by the additional irrigated cropland and...reduced income losses due to water shortages on existing cropland” (USDA-NRCS, 1999, September, p. 117). However, if no ditch repairs are made, it is believed that the type of farming activity that could be handled by current and future ditch conditions would not provide the area with adequate economic development. Activities that require minimal irrigation, such as forestry and pasture-based ventures, would be implemented (“Draft EIS Is Expected to Propose Curbs on Water From Waipi‘o Valley,” 1995, September). In effect, farming activity would probably decline. Larger farmers may cultivate orchard crops that are less drought-sensitive in place of higher value crops. Crops of higher value, such as vegetable, flower, and ornamental crops, will not be grown unless expensive wells are implemented or municipal water supplies are used (USDA-NRCS, 1999, September, p. 12). More importantly, periodic ditch shutdowns could prove to be costly. It is estimated that the ditch will be closed between 3-14 days a year. Major failures, which periodically occur, may shut down the ditch anywhere between 2 weeks to 2 months every other year (USDA-NRCS, 1999, September, p. 14).

Ditch repair would enable diversified agricultural activity to expand in the region due to the certainty and stabilization of water delivery. It is expected that this increased agricultural activity will provide the push that is needed to stimulate economic activity. This increased economic activity includes the creation of additional agriculture-related job opportunities on farms and in the agriculture processing and support industries. Furthermore, job creation and economic activity will help to stabilize the tax base (USDA-NRCS, 1999, September, p. 178). Overall, it is believed that repair of the ditch will help the region’s communities to recover from economic hardship. Most of the communities contained within the project area would benefit from such an action. These communities include Kukuihaele, Honoka‘a, Waipi‘o Valley, Kapulena, Haina, Pa‘auhau, and Pa‘auilo (USDA-NRCS, 1999, September, p. 85).

In total, ditch improvements could enable the delivery of water within as much as an 11,000-acre project area (USDA-NRCS, 1999, September, p. 85). It is projected that dependable irrigation and water supply will be provided to as much as 2,500 acres of cropland when built-out conditions are achieved in 5 to 10 years (USDA-NRCS, 1999, September, p. 14). Consistent and adequate water amounts will not only provide the necessary conditions for

suitable crop growth, but it will also raise the quality of lands. With irrigation, the number of acres that are considered good or fair for various crop types – including banana, coffee, macadamia nut, papaya, flowers and foliage, and truck crops – will increase.

Currently, agriculture in the area is suffering due to the poor condition of the ditch. Farmers are hesitant to begin agricultural production because of inconsistent water delivery. Others who have the financial means for infrastructure improvement and back-up well identification are pursuing such efforts in order to expand and develop their farms (USDA-NRCS, 1999, September, p. xv). However, many of the smaller farmers cannot afford to do so. Many farmers struggle to pay for their leases alone. Only government leases, which started at around \$70 per acre per year in 1998, are cheap enough for those farmers just beginning farm operations. These farmers cannot afford to lease from private landowners such as Bishop Estate, whose 1998 leases started at \$160 per acre per year plus 3 percent of the farmer's gross income (Thompson, 1998, August 19).

5.3. Water Needs and Water Diversion

Much of the need for ditch repairs is based upon the water demands of the Hāmākua farming community. Water shortages annually occur and are a prevalent problem in the area. Although the 60 to 100 inches of rain that the area between Kukuihaele and Pa'auilo receives annually appears adequate, the project area tends to suffer during the dry spring, summer, and fall months. Because the maximization of crop yield and quality requires adequate and consistent moisture, seasonal crop irrigation is necessary for the project area. Also, although trees can survive summer droughts, fruit production and quality will decrease without adequate water (USDA-NRCS, 1999, September, pp. 89, 100).

The Hāmākua region's water demands will vary depending upon wet and dry seasons and years. It is projected that farmers and other users will need 4 MGD under normal conditions and 13.5 MGD under drought conditions (USDA-NRCS, 1999, September, p. 118). However, irrigation is most critically needed during times when little or no rainfall is received over a period of days or months. It is estimated that 17 MGD will be needed in order to irrigate 2,500 acres of crops during prolonged drought periods (USDA-NRCS, 1999, September, p. 194). Current daily average diversion rates measure 25 to 30 MGD, with the minimum baseflow intake averaging 19 MGD (USDA-NRCS, 1999, September, p. 119). This current average diversion rate accounts for nearly all of the streams' baseflow. However, due to a complaint filed with the Commission on Water Resource Management, diversion amounts must be reduced in order to restore "streamflow to 'support taro cultivation, appurtenant and riparian water rights, traditional and customary Hawaiian practices, native species and ecosystems, [and] any other beneficial instream uses in Waipi'o Valley" (USDA-NRCS, 1999, September, p. xvii). The originally proposed peak diversion rate of 17 MGD was not accepted. This water diversion estimate was based upon the projected buildout of 2,500 acres of irrigated cropland. Ditch leakage – which is expected to continue to occur at a rate of 3 MGD after ditch repairs are made – was also factored into the estimated diversion rates (USDA-NRCS, 1999, September, p. 153). In order to address the complaint, stream diversion rates have been further modified. Diversion rates were altered in

order to provide a significant flow across the diversion structure at all times, including during dry periods (USDA-NRCS, 1999, September, p. 153).

At baseflow, an average of 6 MGD will be captured. During peak periods, a maximum of 13 MGD will be allowed to flow through the LHD. When water demands for agriculture are at its peak in Hāmākua, the diversions will capture 70 percent of the baseflow of the 3 streams, or 13 MGD. Thirty percent of the baseflow will be allowed to pass over the dams at Kawainui, Alakahi, and Ko‘iawe streams (USDA-NRCS, 1999, September, p. 129). The gate at the Kawainui diversion, which is used to regulate the amount of water diverted to Hāmākua users, will ensure that any flow that is not needed in Hāmākua during average flow periods will be returned to the stream (USDA-NRCS, 1999, September, p. 153).

The proposed diversion rate of 13 MGD will only be “marginally enough to supply the 2,500 acres of irrigated cropland.... The Hāmākua Farm Bureau and the HNHAC feel that the supply from the LHD will be exceeded in the future” (Kubo, personal communication December 1, 1999). Until the irrigation district is in operation and an actual mix of crops and farm operations are established, the number of acres that can be served will not be known. Any future management decisions about the expansion of system capacity through increased diversion, development of wells, or water limits for new users will be made once the point at which no additional irrigation capacity can be handled by the system without harming existing users (USDA-NRCS, 1999, September, p. 194). In order to address future water needs, the DOA will explore the development of wells “or procedurally increasing the diversion rates in Waipi‘o Valley to supply the additional water requirement” (Kubo, personal communication, December 1, 1999).

It is hoped that the repair and rehabilitation of the LHD will provide the economic boost that is necessary to resuscitate the depressed economy of the Hāmākua region. Much of these hopes lie in the continuation of an agricultural legacy that the region has upheld for decades. Although Hāmākua communities can no longer rely upon sugar to provide the economic support that it needs, they are looking towards diversified agriculture to continue to support their root values, culture, and lifestyle. With the help of the various government agencies, farmers in the region will have an adequate, stable, reliable and affordable water supply that they need in order to ensure the success of diversified agriculture. Through such efforts, it is hoped the economy will be revitalized, and once again, the community will be able to support and be supported by a new agricultural legacy. In doing so, such revitalization efforts must be coordinated with other important concerns and needs. One of the major issues that has caused a great deal of concern is the issue of stream diversion. The LHD diverts much of the water from the major streams that feed the Valley. Although farmers above the Valley have demonstrated a need for this water, parties in the Valley have also illustrated such a need as well.



The Lower Hāmākua Ditch: wooden flume section overgrown with vegetation (October 1998).



The entrance of the Lower Hāmākua Ditch. Source: David [Name], (2002). Courtesy of [Name], [Organization].



The Lower Hāmākua Ditch (October 1998).

6. Water Management

The issue of water management within Waipi‘o Valley has been, and continues to be very contentious. It may very well be the most critical issue facing Waipi‘o Valley residents, farmers and involved government agencies. Various groups and individuals hold many different philosophies and perspectives on how to manage this valuable resource. Encompassed within this umbrella concept of water management are several, more specific issues including providing and maintaining adequate aquatic habitat for stream biota, regulating and managing stream water for taro cultivation, and lessening the probability and damage from flooding.

6.1. Planning Considerations

In developing planning options for water management in Waipi‘o Valley, several criteria for consideration have emerged through the Practicum’s research and discussions with community members, government agencies, and other experts. An understanding of these criteria – river systems, stream biota, traditional Native Hawaiian water management and taro cultivation, and water rights – is necessary to develop acceptable water management options that will address the concerns of all relevant entities. The following discussion provides general background information on the various criteria for consideration. This discussion is not meant to be comprehensive or authoritative, but rather, it is to provide the community and other interested parties with a foundation upon which to base future discussions regarding water management.

6.1.1. River Systems

A river system is composed of a river or rivers, their tributaries, and their source. The land area that drains into and feeds a particular river system is considered its watershed. The source of a river system’s water, also known as the headwater(s), is the highest point in the system. Underground spring, rainfall, and/or melting snow and ice supply headwaters. As the water starts its journey downward to lower elevations, it begins as small flows called rills. The flows progress and merge together to form increasingly larger and deeper flows called brooks, streams, and rivers. The various rills, brooks, and streams that flow into the river comprise the river’s tributaries. Besides the headwaters, surface runoff and groundwater within the watershed contribute to the volume of water flowing through a river system.

As water travels through the system, its velocity and direction change. Water flows fastest in the upper reaches of its river system. In the higher elevations, the river’s force and energy cut deep V-shaped valleys through a process called vertical erosion. As the river reaches its middle and lower elevations, it slows down and meanders. The land surrounding the river eventually flattens out and becomes its floodplain. Rivers ultimately flow into larger bodies of water such as lakes and oceans. At the mouth of the river, where the river meets the larger body of water, the speed of water flow slows significantly.

River systems are dynamic and constantly evolving. “It is constantly changing its flow, its depth, even its bed, ... It scours, shifts channels, meanders, floods, erodes, carries and deposits silt. Squeeze a stream in one place, and like a water balloon, it bulges in another. Where it is restricted, the stream speeds up to compensate, eroding downstream banks or

spreading out to flood adjacent property” (Gulf of Maine Aquarium, 1999). Streams undergo what is known as an erosion cycle that defines its developmental and evolutionary stages. As summarized by Morisawa (1968), Davis’ conception of the erosion cycle consists of three stages – youth, maturity, and old age. When a stream is young, it carries a torrential flow of water. During this stage, water will flow down an irregular slope and is usually enclosed within steep valley walls that have not yet eroded. The sediment load – the particulate matter carried by water – is small, but large in particle size. Streams in the youth stage have excess energy that can cut into the channel bed. As the stream cuts deeper into the channel bed, the gradient decreases. The total amount of energy also decreases in proportion to the load that it has to carry. Thus, the stream reaches the maturity stage that is characterized by a smooth gradient and a widened valley. The stream fills the valley with sediment deposits that cause it to meander and erode the stream banks. Wailoa River exhibits many characteristics of the maturity stage. In the old age stage, the rate of stream flow slows down due to sediment buildup. The stream will then meander on a wide, open floodplain where fine debris is transported. The streams maintain great energy transporting sediment and depositing it downstream.

According to Morisawa (1968), rivers and streams can be categorized into one of 3 varieties depending on the constancy of its water flow. Ephemeral streams predominately appear as dry beds and have running surface water only after rainfall. Intermittent streams, like ephemeral streams, are dry during certain portions of the year. In addition to rainfall, intermittent streams are also fed by groundwater when the groundwater table rises high enough, therefore, intermittent streams tend to show surface flow more often than an ephemeral stream. Perennial streams flow year-round and are supplied by a stable water source(s).

On the Big Island, perennial streams are found predominately in the Kohala Mountains and on the northeastern slopes of Mauna Kea. Several perennial streams comprise the Waipi’o Valley watershed, which is defined by the formation of the Kohala Mountains and Mauna Kea. Within the watershed, above Waipi’o Valley, are located the headwaters of the Kawainui, Alakahi, Ko’iawe, and Waimā streams. These streams have cut deeply into the Kohala Mountains creating streambeds.

Flooding occurs when the river overflows its banks and submerges the surrounding land, its floodplain. Waipi’o Valley is especially prone to flooding because of its geomorphic and hydrological conditions. Major flooding has been recorded during the rainy, winter season, generally between the months of October through April. In addition, the potential for flooding is exacerbated by stream conditions. Reppun (1995) of The Makawai Stream Restoration Alliance, noted that the condition of the streambed is the paramount causal factor in flooding, rather than water volume. He states, “A low flow stream tends to be choked by vegetation, which is torn loose by flood waters and causes blockages that divert the flood water in new directions, causing erosion. A stream with high daily flow maintains it’s [sic] bed in a more unobstructed state, resulting in less damage from flood events.” In addition, Kinzie (1995) states “In channels that have reduced flows for extended periods, the efficiency of the channel is often degraded because of incursion or riparian vegetation and

the inability of the reduced flow to transport potentially damming debris down stream. This accumulation of materials, rooted or deposited in the stream bed, actually increases the potential for flooding in high flow conditions.”



Residents and farmers have to travel through flowing waterways to reach their homes and farms in Waipi'o Valley (October 1999).

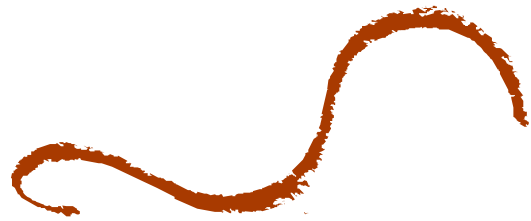
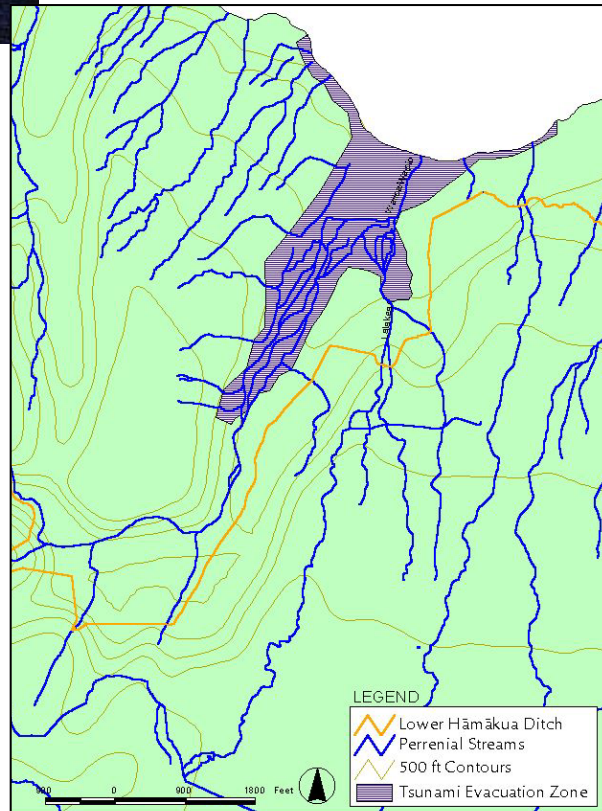


Figure 2 - Waipi'o Valley Water Ways



6.1.2. Stream Biota

Hawai‘i is the most isolated island archipelago in the world, located 4,000 km from the nearest continent. This extreme isolation has resulted in an aquatic macrofauna that is low in diversity, but high in endemism (Hawai‘i Stream Assessment, 1990; Kinzie, 1988, 1990; Maciolek, 1975, 1977a,b). Native stream fishes (gobies) and the larger crustaceans and mollusks in Hawai‘i are of marine origin and have retained an oceanic larval life stage. This amphidromous life cycle and the apparently random recruitment back to the streams can affect both species composition and abundance. Furthermore, Hawaiian streams are subject to periodic freshets (high flow spates) which are predicted to play an important role in regulating community structure (Kinzie & Ford, 1982).

The natural variability in distribution and abundance of native species is accentuated by the fact that the majority of streams in Hawai‘i have been severely altered by humans through diversions, channel modification, siltation and introduced species (Kinzie, 1988; Maciolek, 1975, 1977a,b). In 1978, at least 53 percent of the estimated 366 perennial streams had some type of water diversion and 15 percent of the streams in the State had been channelized (Parrish et al., 1978). In fact, only 14 percent of Hawaiian streams today may be considered physically pristine, and there appear to be no biologically pristine streams. At least one introduced species has been found in every stream surveyed (Hawai‘i Stream Assessment, 1990; Timbol & Maciolek, 1978).

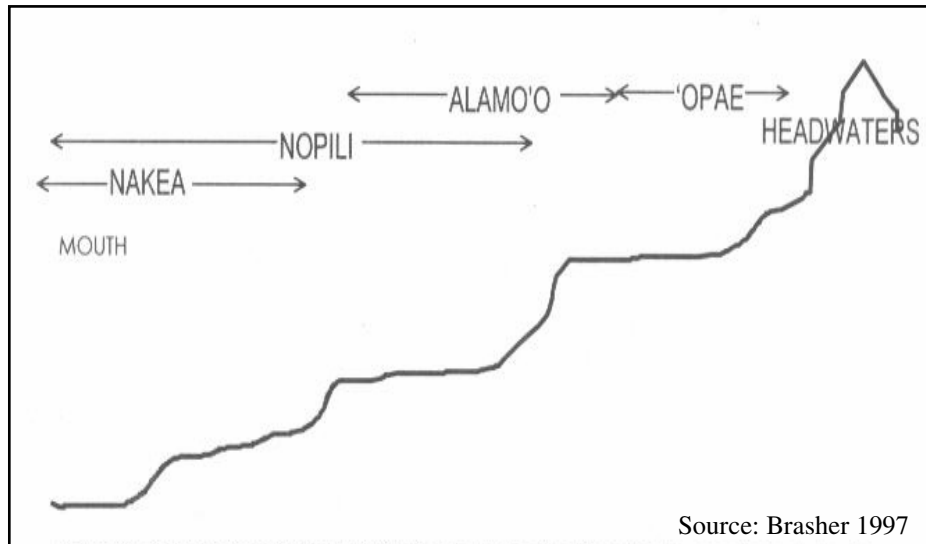
The primary threat to native stream organisms throughout the state is the continuing loss and degradation of available stream habitats (Maciolek, 1977a, b). To properly manage these stream systems and to evaluate the impact of water diversions on stream fauna, a better understanding is required of the baseline conditions, microhabitat use and community structure.

According to Brasher (1997), the native Hawaiian freshwater fish fauna consists of three endemic gobies, *Lentipes concolor* (‘o‘opu alamo‘o); *Sicyopterus stimpsoni* (‘o‘opu nōpili); and, *Stenogobius Hawaiiensis* (‘o‘opu naniha); an indigenous goby, *Awaous guamensis* (‘o‘opu nākea); and, an endemic eleotrid, *Eleotris sandwicensis* (‘o‘opu ‘akupa). Native crustaceans found in Hawaiian streams include the mountain shrimp *Atvoida bisulcata* (‘opae kuahiwi) and an estuarine species, *Macrobrachium grandimanus* (‘opae ‘oeha‘a). Also present throughout the state is the introduced *Macrobrachium Iar* (Tahitian prawn), which was first released in Hawai‘i in 1956. Native gastropods found in Hawaiian streams include the limpet-like *Neritina granosa* (hīhīwai) and the more estuarine *Theodoxus vesperinus* (hapawai). Snails in the families Thiaridae and Lymnaeidae are also present in some streams, and more frequently along the bank and in seeps.

6.1.2.1. Longitudinal distribution

Hawaiian stream species are known to separate out along the gradient from mouth to headwaters (see figure 3). The eleotrid (‘akupa), a goby (naniha), the native prawn (‘opae‘oeha‘a) and a neuitid snail (hapawai) are found in estuaries or below the first

Figure 3 – Longitudinal Distribution Pattern of Native Stream Species.



waterfall. ‘O‘opu nākea tends to be found in lower reaches, especially in streams with precipitous waterfalls. The same is true for hīhīwai and the introduced Tahitian prawn. ‘O‘opu nōpili often overlaps with nākea, but may be found further upstream as well. ‘O‘opu alamo‘o is found at the highest elevation of all the gobies. The native mountain shrimp, ‘opae, may overlap the upper distribution of alamo‘o, and also occurs further upstream. The number, and relative gradient, of waterfalls appears to play an important role in the overall distribution of species (Brasher, 1997).

6.1.2.2. Amphidromous life cycle

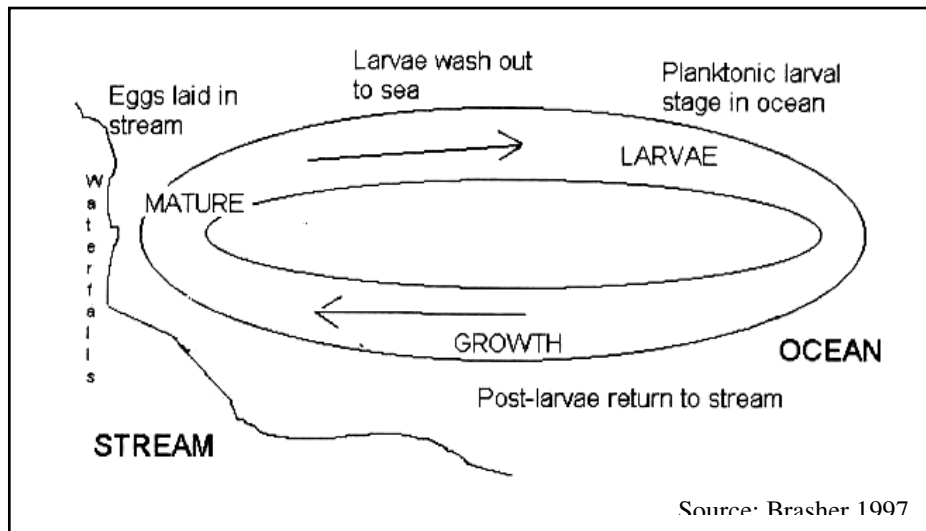
The native stream fauna of Hawai‘i is primarily diadromous. To complete their life cycle, the animals must migrate between the stream and ocean. However, as is typical of freshwater species on oceanic islands, the native gobies, shrimp, and snails, have an amphidromous life cycle (McDowall, 1988) (see figure 4). Eggs are laid in the stream, the eggs hatch and the larvae wash out to the sea. After spending a larval phase of four to seven months as marine plankton, gobies return to the streams as transparent post larvae (hinana) (Ego, 1956; Kinzie, 1988; Radtke, Kinzie & Folsom, 1988). The snail larvae spend an undetermined amount of time in the ocean and then return to a stream where they spend the remainder of their life. Spates (high flood events) have been hypothesized as a cue for both reproduction and recruitment back to the stream (Kinzie, 1988).

The factors responsible for stream identification and recruitment (post-larvae returning from the ocean to the stream) are not well understood, but there is no indication that larvae must return to natal streams (Ford & Yuen 1988). Genetic studies on gobies (Fitzsimons, Zink &

Nishimoto, 1990) and hīhīwai (Hodges, 1992) suggest that a large proportion of new recruits originated from the same stream. However, adequate mixing occurs between streams so that all are considered to be one population.

Erdman (1986) found upstream migration of the goby *Sicydium Dlumieri* in Puerto Rico to be triggered by moon phase, but this does not appear to be the case for Hawaiian gobies. It has been suggested that gobies may be timing such activities as spawning and return migrations from the sea by cueing on the high flows that occur during spates (Erdman, 1986; Kinzie & Ford, 1982; Manacop, 1953).

Figure 4 - Amphidromous Life Cycle of Hawaiian Stream Macrofauna



6.1.2.3. Waipi‘o/Wailoa River System

According to the Watershed Plan and FEIS for the Lower Hāmākua Ditch Watershed (1999), Wailoa River’s tributaries provide valuable habitat for native aquatic species. The report further states that the Hawai‘i Stream Assessment conducted in 1990 found that “all four of the important native indicator species – ‘o‘opu alamo‘o, ‘o‘opu nākea, ‘o‘opu nōpili, and hīhīwai – are present in the Wailoa/Waipi‘o system” (p. 141). A study conducted for the Lower Hāmākua Ditch Watershed Project found:

“Waipi‘o Stream and three streams [Ko‘iawe, Alakahi, and Kawainui] diverted by the LHD to have low populations of ‘o‘opu below the diversions and no observation of ‘o‘opu above the diversion. Except for one individual of ‘o‘opu nōpili (*Sicyopterus stimpsoni*) observed in Ko‘iawe Stream, all other native fish sightings were ‘o‘opu nakea (*Awaous guamensis*). All five species of ‘o‘opu were observed at the lower reach of Lalakea/Hi‘ilawe Stream. ‘O‘opu alamo‘o (*Lentipes concolor*), a Species of Concern, was found all along Lalakea/Hi‘ilawe Stream, including the transect above the

1,500-foot tall Hi'ilawe Falls. ... 'Opae kala'ole (*Atyoida bisulcata*) population densities were high and essentially the same below and above the diversions for all tributaries. Hihiwai was not found above the 20-foot elevation in Waipi'o Valley, despite apparently good habitat conditions. Factors in the lower reaches of Waipi'o Valley, *such as increased temperature, altered water chemistry, physical habitat modification, and introduced species*, may be responsible for the lack of hihiwai in the system" (pp. 141 - 142).

Generally, the FEIS asserted that the project will improve the aquatic habitat for native species by providing bypass of 30 percent of the stream flow during base flow conditions. The FEIS concluded that with the additional water released into the Valley, the aquatic habitat below all of the LHD diversions will improve. According to Kinzie (1995), "Restoration of a stream to its original flow and temperature regimes might well favor native species and reduce the impacts of exotics."

6.1.2.4. Species Profiles

'O'opu

'O'opu nākea is the most common Hawaiian freshwater goby. This species is found on all the major islands, although in Waipi'o the population size and number of streams inhabited are small (Kinzie, 1990). 'O'opu nākea, which is the largest goby, tends to be found in lower reaches, especially in streams with precipitous waterfalls, and utilizes deeper slower moving waters (Ego, 1956; Kinzie, 1988). Nākea is an omnivore (Ego, 1956; Kido, Ha & Kinzie, 1993). It has been suggested that 'o'opu nakea probably competes with alamo'o for food, and to some extent space (Timbol, Sutter & Parrish, 1980).

'O'opu nōpili typically occurs in the mid reaches and utilizes the more rapid stream velocities (Fitzsimons, Zink & Nishimoto, 1990; Kinzie, 1988). The area where this species is found, overlaps with 'o'opu nākea in the lower parts and 'o'opu alamo'o in the upper sections. 'O'opu nōpili appear to be restricted to relatively undisturbed streams with good water quality and a high rate of discharge (Kinzie, 1990). A tagging study by Kinzie and Ford (1982) showed nōpili to be quite sedentary. 'O'opu nōpili is primarily an algal grazer, feeding on diatoms and blue-green algae (Kinzie & Ford, 1982; Tomihama, 1972).

The least common goby in Hawai'i (Timbol, Sutter & Parrish, 1980), 'o'opu alamo'o has been a candidate for federal listing as an endangered species. 'O'opu alamo'o is known for its remarkable climbing ability and is found in the middle to upper reaches of streams, although it may occur near the stream mouth in streams that end in terminal waterfalls (Maciolek, 1977; Fitzsimons, Zink & Nishimoto, 1990). 'O'opu alamo'o spend more time in mid-water pools than other species, although they can also have a strong affinity for fast riffles (Kinzie & Ford, 1982; Timbol, Sutter & Parrish, 1980). The diet of 'o'opu alamo'o consists of algae, crustaceans, and insect larvae (Lau, 1973). Larger 'o'opu alamo'o eat more animal material while smaller ones eat more algae (Lau, 1973). Mature males are aggressive and show territorial behavior (Nishimoto & Fitzsimons, 1986; Lau, 1973; Maciolek, 1977). Female 'o'opu alamo'o tend to move freely up and down the stream and around pools, while

males are very site specific (Nishimoto & Fitzsimons, 1986). Individuals breed several times throughout an extended reproductive season (Kinzie, 1993; Maciolek, 1977).

‘O‘opu naniha and ‘o‘opu ‘akupa typically occur in lower stream reaches and estuaries. Although it possesses fused pelvic fins, naniha apparently is neither a strong swimmer nor climber, and occurs mainly along stream margins and other low flow areas near the stream mouth (Fitzsimons, Zink & Nishimoto, 1990). ‘Akupa actually lacks the fused pelvic fins characteristic of true gobies and thus is found only in stream reaches below the first precipitous waterfall (Fitzsimons, Zink & Nishimoto, 1990; Kinzie & Ford, 1982).

‘Opae

‘Opae kuahiwi are typically found in the higher reaches along with alamo‘o, or above the limits of fish distribution. ‘Opae are widespread in Hawai‘i and can be found in habitats ranging from quiet pools to high velocity cascades (Couret, 1976; Kinzie, 1990). Typically this species is found in streams with swiftly flowing water (Kinzie, 1990).

Hihīwai

Hihīwai is a limpet-like snail that tends to hide under boulders and in crevices during the day, coming out at night to forage and mate. These snails require clear, cool, well-oxygenated streams and avoid areas with high siltation (Ford, 1979; Kinzie, 1990). Hihīwai tend to be found in lower to mid-stream reaches.

6.1.3. Traditional Native Hawaiian Water Management and Taro Cultivation

In an island environment, one of the most vital elements needed for basic survival is a sufficient allotment of fresh water. Water is the primary life-sustaining component of all things. This idea is compounded when applied to a geographically defined area, such as Waipi‘o Valley, that yields a particular carrying capacity. The abundance of fresh water is synonymous with the abundance of life. The allocation of water in traditional times was derived directly from the land use divisions of the ahupua‘a. In Waipi‘o Valley, the issue of water management and its allocation is a primary topic of debate.

In ancient Hawai‘i, chiefs managed land and water. Chiefs delegated responsibility to lower ranking chiefs, and in turn, the commoners occupied and cultivated land. Ancient Hawaiians used abundant water and irrigation to produce taro. Hawaiians thus had separate names for irrigation water, Wai ho‘okahe; and naturally flowing water, Wai e kahe ana. The cultivation of taro was central to the Hawaiian lifestyle and a prosperous society, and water was essential to successful taro cultivation. As Nahekeapono (1995) states, “Taro cultivation was so extensive and so important that the practices associated with it were an integral part of the fundamental social order” (p. 16). The Hawaiian water management system increased production and reveals the fairness of basic Hawaiian values.

There are two general types of planting methods for taro cultivation: dry land and wetland. Due to the abundance of water in Waipi‘o Valley, the wetland method is more utilized. For wetland cultivation, taro is planted in artificially leveled terraces called lo‘i, in which the

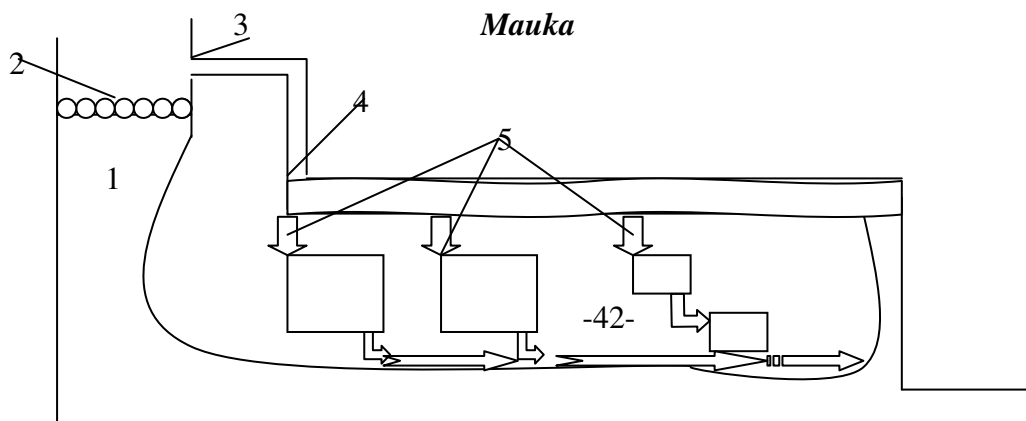
plants are kept flooded under a few inches of water. For taro yields to be productive and efficient, water must constantly flow evenly through the lo‘i system. According to Handy (1972), there are four periods of taro growth requiring proper irrigation maintenance:

- 1) Irrigation: Until the first leaf of the taro plant is unfurled, ample irrigation is required. Care must be taken to prevent the water from washing out the soil around the new plantings.
- 2) Drying: After the first leaf unfurls, the plant cuttings are pressed firmly into the soil. The surface of the lo‘i should not be flooded but kept damp until the first two leaves appear.
- 3) Moderate Flooding: After the first three leaves are unfurled, water should be let into the lo‘i, the degree of flooding regulated at the makawai of each lo‘i. The amount of water inflow increases as the new shoots have grown around the main plants.
- 4) Full Flooding: Until the plants reach full maturity, the lo‘i should be fully flooded with fresh water, the allows for a constant yet regulated flow. The plant reaches full maturity when the leaves are completely unfurled, begin to yellow, and almost resemble a “wilted” appearance. During this time, weeding is performed as needed. However, the traditional planter would leave the lo‘i alone and not disturb the delicate environment of the taro (p. 100).

If water becomes stagnant, the taro plants will eventually rot and die. Thus it is imperative to understand that the protection and assurance of flowing water for any given system becomes the priority issue.

Natural stream water is supplied to the lo‘i through a system of irrigation ditches, the ‘auwai. The po‘owai, the headwaters of the ‘auwai system for a particular lo‘i, is usually located upstream at a point in the kahawai, the main stream flow, where water naturally pools. The manōwai, a dam usually constructed with rocks and mud, redirects stream flow into the ‘auwai. The construction of the ‘auwai, begins at the lower end and continues upstream. Traditional law stipulated that at most, only half of the kahawai water flow could be diverted. Figure 5 illustrates the lo‘i system.

Figure 5 – Native Hawaiian Lo‘i System



6 7 6 7

Makai

- 1) Kahawai: main stream flow
- 2) Manōwai: dam barrier that redirects water flow from the kahawai into the ‘auwai
- 3) Po‘owai: headwaters of the ‘auwai system
- 4) ‘Auwai: irrigation ditch that takes water from the kahawai into the lo‘i
- 5) Makawai: inflow points that regulate water flow from ‘auwai into lo‘i
- 6) Lo‘i: wetland taro patch
- 7) Kuāuna: embankment areas separating the lo‘i

The first Westerners were impressed by the intricate design and development of the lo‘i system. Journal accounts tell of the impressive nature Nā Kānaka displayed in their diligence to maintain and care for such a labor-intensive crop and cultivation system. Dr. Menzies, a surgeon aboard Captain Vancouver’s *HMS Discovery*, described a terraced lo‘i as such:

“We pursued a pleasing path back into the plantation, which was nearly level and very extensive, and laid out with great neatness into little fields planted with taro, yams, sweet potatoes, and the cloth plant...and the whole was watered in a most ingenious manner by dividing the general stream into little aqueducts leading in various directions so as to supply the most distant fields at pleasure, and the soil seems to repay the labor and industry of these people by the luxuriance of the production” (Hughes, 1997, p. 10).

The maintenance of the po‘owai, and ‘auwai created opportunities for people to bond. This gathering primarily focused on work. Nevertheless, after the work, taro farmers sat, analyzed, “talked story”, reminisced, asked questions, and shared information. This was very important to Hawaiian values and the concept of laulima, working together (Frona, Hawaiian Water Law Symposium, 1993 April 9-10).

The construction and maintenance of the ‘auwai system was a community effort under the supervision of a konohiki (Malo, 1951). The konohiki were the land stewards, serving as the kaikua‘ana of the people and the ka‘ika‘ina of the ‘āina. The name konohiki literally translates to “making requests happen.” In the social order of land use management, the konohiki were considered the ali‘i‘ai ahupua‘a, the chiefs that “consume” the responsibility

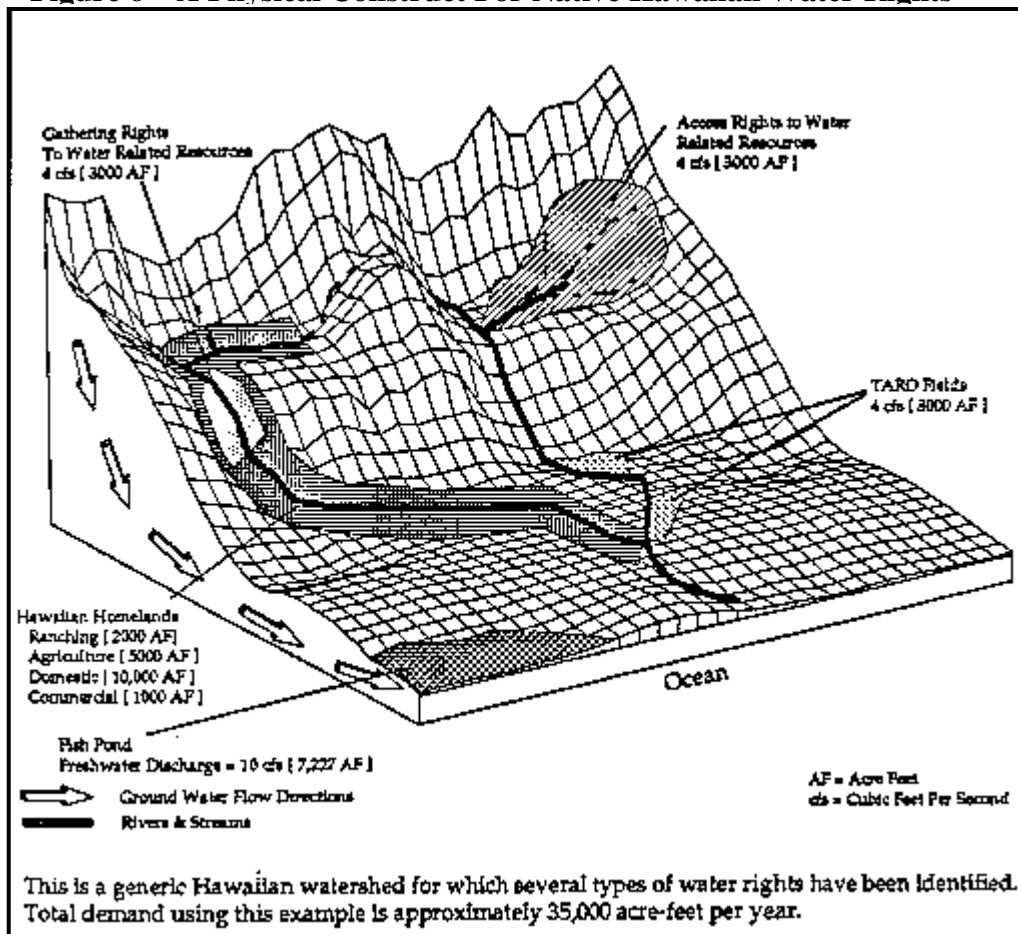
of land and water allocation in the ahupua‘a. The social hierarchy establishes their order as being above the maka‘āinana and under the ali‘i‘aimoku, the chief ruler of the island, and the Mō‘ī, the supreme ali‘i nui (Kamakau, 1992a).

The primary role of the konohiki, in the ahupua‘a land management system, was to develop and nurture land areas to produce higher yields and greater food production. The duties of the konohiki centered on managing water flow and allotment, monitoring stream maintenance, and directing the construction and maintenance of ‘auwai, lo‘i and loko i‘a projects. Culturally, the role of the ali‘i was to maintain the nurturing relationships between the various ‘ohana with the ‘āina. The role of the konohiki in this specific project was to ensure that the water rights of others taking water from the kahawai were protected. Konohiki secured rights for all, thus water settlement disputes were very rare.

The konohiki regulated water usage and allotment, and reserved the right to adjust this allotment as necessary to address issues of water misuse, drought, etc. Maintenance of the ‘auwai and the lo‘i system was paramount and therefore, division of water was based primarily upon the amount of labor contributed to the construction of the ‘auwai. The chief who provided more men to work justly gained more rights to water. Chiefs, in turn, distributed water in accordance with acreage planted. As long as the practitioner maintained the lo‘i and continued to assist with the maintenance of the ‘auwai, the rights of the practitioner were ensured. In the event that land was not used and left uncultivated, water privileges could also be lost. Those whose lands were watered assumed the responsibility of maintenance. The “right” to use water is associated with proper and active use of this resource as well as its protection and preservation. It involves understanding that this finite resource has a depletion threshold. Neglect of this duty was rare, for without water, there was no life.

Culturally, the maintenance of the ‘auwai was a kuleana, a responsibility to nurture the kinolau forms of the akua. The consecration of an ‘auwai embraced the importance of recognizing the role of the spiritual presence of akua in all things. According to Nakuina (1894), the consecration of an ‘auwai was spiritually intensive. Upon completion of the ‘auwai, preparations were made to build the manōwai. The kahuna of Lono was consulted because it was Lono that provided the “fertility” nature of water to the lo‘i. This is an interesting point. Although Kāne is the provider of fresh water for the stream, there is an introduction of another akua, Lono, upon the transferring of water from kahawai to ‘auwai. These intricate details illustrate how physically and spiritually intensive these ceremonies were. Proper ho‘okupu were given and an imu, an oven, was made in the ‘auwai where the water was to enter. The kinolau of Lono, a pua‘a, was offered, along with lū‘au leaf, taro, ‘awa, and i‘a. The consecration involved a variety of pule and symbolically invoked the presence of the akua (Handy, 1991, p. 60).

Figure 6 – A Physical Construct For Native Hawaiian Water Rights



Source: Vandemoer 1993

While the power of water has remained unchanged its understanding by Hawaiians has evolved. In early centuries of Hawaiian life, water was abundant and associated with peace, productivity, and prosperity. Western contact and changing land tenure systems had great affects on the symbolism of water. Water represented a prize of conquest and became

associated with warfare (Franco, p. 26). The traditional way of Hawaiian life was compromised by capitalism and absence of adequate water supplies. “With the introduction of the Western concept of material wealth, water came to be viewed as a commodity that could be separated from the land and consumed, rather than as a resource to be shared equally” (Minerbi, McGregor, and Matsuoka, p. 140).

6.1.4. Water Rights

The cultivation of taro and other subsistence activities require substantial and consistent sources of water. Based on customary use and common law doctrine three types of water rights exist. These rights are supported by the Hawai‘i State constitution, the State Water Code and the Hawai‘i Revised Statutes. Section 7-1 HRS explains the right to water in general terms:

“The people shall also have a right to drinking water, and running water, and the right of way. The springs of water, running water, and roads shall be free to all, on lands granted in fee simple; provided that this shall not be applicable to wells and water courses, which individuals have made for their own use.”

Various types of water rights involve different interest groups. Appurtenant rights are based on ancient and custom usage and are not exclusive to Hawaiians. Riparian rights are held by applicable Hawaiians and Non-Hawaiians who live adjacent to watercourses. Finally, Hawaiian Homes rights to water apply to beneficiaries of the Department of Hawaiian Homes Lands. The notion of water crosses between notions of property. In Western society water equates exclusion and rights. In comparison, Hawaiian cultural practices share water communally.

6.2. Community Views on Water Management

Community interests play an integral role in the effective planning of area resources. People who live in an area possess a resource of knowledge based on their experience of that locale. Their daily life experiences and relationships to the environment can be successfully integrated into management plans. As a result, community ownership and acceptance of plans is accomplished. The inclusion of knowledgeable community information from the beginning of a planning process can have many advantages to its efficacy and efficiency. Water management of the Valley effects a large community on the Hāmākua Coast including taro farmers, environmentalists, diversified agriculture farmers, cultural practitioners, and other area residents. The Practicum had opportunities to work with many individuals and organizations whom are stakeholders in the planning of Waipi‘o water. The community provided views on three subjects: the Lower Hāmākua Ditch, Hakalaoa Falls, and stream maintenance.

6.2.1. Lower Hāmākua Ditch

Water that naturally flows into Waipi‘o Valley is diverted for the use of diversified agriculture through the Lower Hāmākua Ditch. It is Waipi‘o water that benefits the Hāmākua community and allows future expansion of diversified agriculture. For this reason, Waipi‘o Valley community concerns are of particular importance. The process of planning

effectively should begin where the water resource originates. These concerns are essential to facilitate community buy-in of water management plans.

The Waipi‘o Taro Farmers Association (WTFA) is concerned with future potential uses of water. It advocates water for agricultural use only. It opposes policies that may eventually lead to a shortage of water in the Valley, a shortage that could affect the future of taro farming. The WTFA supports the maintenance of current water flow levels. Although the WTFA supports endeavors of diversified agriculture farmers, it has reservations about the ditch project because of its unknown effects on water levels, flooding, and stream maintenance.

In regard to the Lower Hāmākua Ditch Watershed and plan for restoration, the Waipi‘o Valley Community Association (WVCA) is concerned with several impacts. Issues include water rights, low flow effects on taro and native aquatic life, the impact of future diversions, water waste, and cultural and historic preservation. WVCA, with support of Earthjustice Legal Defense, feel that these diversions cannot adequately support taro cultivation, appurtenant and customary Hawaiian Practices, and native species and ecosystems. The concern is that taro cultivation, water rights, the continued stream diversions and leakage of the Lower Hāmākua Ditch System adversely affect in-stream usage (traditional and customary Hawaiian practices), ecosystems, recreational activities, and the watershed. The organization does not support closure of the ditch. However, water should not be continuously wasted. What is not being used on the upper ridge of the Valley should be returned to the Valley.

As water is returned to the Valley, the streams will run faster and cooler. The impact of ditch restoration to the ‘auwai is not known. This is a legitimate concern. However, as Marjorie Ziegler of Earthjustice commented, increasing the flow of water as restoration proceeds will probably not raise the water significantly. Rain causes flooding (personal communication, October 27 1999). This needs to be clarified by new and accurate data. Base flow data for normal, dry, and rainy seasons is necessary for determining the “excess” which will result when more water is released. Ziegler also commented that dumping of “excess” water into the main weir during rainier seasons is acceptable, as long as there is no effect on base flow levels.

Earthjustice and WVCA feel that there should be no more water waste. They feel the State Department of Agriculture (DOA) should submit a report justifying their continued use and neglect of the ditch and streams. Moreover, coordination between the USGS and the State Division of Aquatic Resources (under DLNR) should monitor data acquisition programs in the Waipi‘o Watershed. In-stream flow data regarding fishing, wildlife, aesthetics, recreational activities, water quality, ecological information, and basic stream flow characteristics are necessary for determining in-stream requirements.

6.2.2. Hakalaoa Falls

The WTFA understands the different views of parties involved in the restoration of Hakalaoa Falls. The falls are “a spectacular beauty, one of Waipi‘o Valley’s and Hawai‘i’s natural

treasures” (WTFA, 1998 January 12). The falls also have inherent cultural significance. While these attributes are important, WTFA does not support restoration if it means collapse of the ditch. This failure would negatively affect diversified agricultural farmers. Without preparations, the restoration of Hakalaoa Falls would result in a failure of the Lower Hāmākua Ditch. Taro farmers agree that the falls serve as an important cultural and aesthetic component of Waipi‘o Valley. Nevertheless, they are also concerned with survival of diversified agricultural farmers.

In 1992, WVCA member, Christopher Rathbun, filed a complaint with the Commission on Water Resource Management because of the Hakalaoa Falls diversion. Rathbun and Earthjustice demand the restoration of the falls. Moreover, they believe the required work on the falls is a completely separate issue from the Lower Hāmākua Ditch project. Hakalaoa restoration should not be stalled by difficulties with the LHD plan.

The Water Commission issued a violation of HRS §174C-71 and 93 for the diversion of Hakalaoa Stream without necessary permits in May 1997. As the present landowner, Kamehameha Schools Bishop Estate (KSBE) was ordered to remove the illegal diversion of Hakalaoa Stream. As result of a lease agreement, the DOA was later held additionally responsible for this restoration. At the October 1999 Water Commission meeting, the deadline for the removal of the diversion was again extended until June 1, 2000. The Commission recommendations require DOA to submit monthly written reports on the status of Hakalaoa restoration. The Commission also requires DOA and/or NRCS to submit permit applications to address the flooding concern of the WTFA (Commission on Water Resource Management, 1999 October 13).

Earthjustice agrees with the findings of the Commission. However, landowners should be required to submit monthly reports describing the purpose, nature and amount of diversions still existing. Earthjustice requested that the Commission hold informational public workshops to further discuss stream diversions and plans for restoration. WVCA and the Legal Aid Society are opposing the decision by the Commission to extend the deadline for completion of restoration to the Lower Hāmākua Ditch and Hakalaoa Falls.



The diversion of Hakalaoa Falls exists to maintain the ditch. As a result, the Twin Falls remain a singular waterfall until implementation of the Lower Hāmākua Ditch Plan can occur.

6.2.3. Stream Maintenance

There are many views on the necessity of stream maintenance in Waipi‘o Valley. The viability of human civilization and nature’s ecosystems are affected by one another. It is clear that a struggle exists to protect natural resources, avoid flooding, and cultivate taro. While the interests of residents may vary, each of these factors must coexist to protect the Valley.

6.2.3.1. History of Stream Maintenance

In 1979 a major flood devastated Waipi‘o Valley. The community, County of Hawai‘i, State of Hawai‘i, Mauna Kea Soil and Water Conservation District (MKSWCD) and NRCS assisted to perform recovery work. Farmers executed fieldwork while agencies provided administrative, financial, and regulatory support. Taro farmers have conducted stream maintenance based on water head sections and were able to provide maps of the primary waterways.

In August 1995, farmers of the WTFA prepared to perform routine river maintenance in Waipi‘o Valley. Over a period of seven years a section of Wailoa River had significantly strayed from historical pathways. The accumulation of large debris and sediment caused the River to meander and dangerously encroach on farmers’ lands. The threat of flood damage is a serious concern for taro farmers. Crops take an average of fourteen months to mature. The loss of a farm to flooding would require deep commitment and financial resources to return to rebuild taro lo‘i.

The WTFA inquired about obtaining relevant work permits in 1995. The ACE correspondence in response to their inquiry stated, “based on the information provided, a site visit on November 8, 1995 and additional information, we have determined that the proposed project is not subject to regulation under Section 404 of the Clean Water Act and therefore a Department of Army permit is not required” (Dadey, 1995). The ACE recommended that sediment be removed and stockpiled in an area away from the stream banks. All efforts were to be made to minimize disturbance of waters. Maintenance commenced in February 1996.

Nevertheless, in March 1996, the WTFA received a “cease and desist” order after maintenance had begun. The ACE issued the order because they believed the work being conducted was far beyond cleaning activities, thereby requiring a permit. The order questioned the scale of work implemented for maintenance. Since the order was given, no stream maintenance has been conducted. Thus, stream conditions have deteriorated to the point of requiring emergency cleanup and flood mitigation measures.

6.2.3.2. Expert Advice

The Lower Hāmākua Ditch Watershed Plan calls for increased water flow in Waipi‘o Valley. Despite assurances that this water will have little or no impact on flooding, serious scientific data has not been completed to prove this prediction. In fact, William Meyer, District Chief of USGS in a letter dated April 22, 1997 to Rae Loui, then Deputy Director of the Commission on Water Resource Management, indicated the estimated increase in stage discharge of the Wailoa River associated with ending the Lower Hāmākua Ditch diversion.

Estimated increases allows ranges from 0.02 feet at high flow to 0.55 feet at low flow, and this would occur lower downstream of the gauging station where the stream becomes wider and with braided channels. The letter cautions that this calculation is based on 1960 period data and a more reliable determination of the effects of eliminating the Lower Hāmākua Ditch diversion could be made if additional stream flow and channel morphology data were collected. USGS data completed in 1969 was utilized to support that Waipi‘o Valley will not suffer adverse affects of increased flows. Nevertheless, Rick Fontaine of the USGS feels that the data is skewed because it was collected upstream. Pointedly, impacts occur downstream of the gauging station (personal communication, November 16 1999). Presently USGS is conducting water and hydrology analysis in Waipi‘o Valley. Results from this data analysis may better predict the effects of increased water flow in Waipi‘o Valley.

6.2.3.3. Stream Maintenance Alternatives

There are three approaches to stream maintenance. The Waipi‘o Taro Farmers Association believes that regular stream maintenance is essential to a successful water management system. Water can only be properly allocated through ‘auwai systems if maintenance assures that waterways are clear of debris and silt. The WTFA’s Open Letter supports stream maintenance for its preventative measures, “regular routine maintenance not only assures efficient water flow but also helps prevent greater damage in more threatening weather conditions” (p. 5). The WTFA states “we are actually trying to restore it [river] to its original course and condition, as best we are able to” (p. 7).

Others including Chris Rathbun of the Waipi‘o Valley Community Association support complete freedom of the river. In this case no stream maintenance is conducted thus allowing the river to meander and change as it wills. He believes that “it is natural for a stream to move and shift over time.” The difficulty with this environmental approach is that Western privatization of land does not allow landowners to move around changing river patterns. Property boundaries are concrete divisions of land. In many cases residents have increasingly lost usable land to widening and meandering waterways. Rathbun believes “you can only protect yourself with the experience of others.” Stream maintenance can also harm the river’s natural ecosystem and can destroy riverbanks as well as stream biota. This environmental alternative negates the positive effects of stream maintenance because bulldozing has the effect of widening rivers. Sediment settles and a chain reaction occurs down stream. As a taro farmer who must also deal with the flooding nature of Waipi‘o Valley, Rathbun says, “We live in Waipi‘o Valley which is a waterbed. When taro gets wiped out you also get a foot of soil, it is a blessing in disguise. We simply can not control nature” (Personal Communication, September 26 1999). The difficulty remains with balancing the interests and needs of the river system, human settlements and taro cultivation.

A third approach to stream maintenance involves a level of compromise between other views. In understanding Native Hawaiian water management, it is clear that regular stream maintenance was an integral factor. Cultural practitioner Kia Fronda agreed that stream maintenance is essential for the vitality of Waipi‘o Valley. Traditional values connected the environment to Native Hawaiians and as a result maintained the protection of all interests. Moreover, practices allowed maintenance while protecting natural resources. For example,

the natural stream force was captured to clear silt and debris. Hand cleaning of streams also allowed maintenance to occur without harming ecosystems. In modern day this approach requires a strong commitment, because hand labor is quite intensive. This model may serve as the foundation of suitable “best practices” for stream maintenance.

Expert advice confirmed that each alternative has justification and reasoning. Dr. Ross Sutherland of the University of Hawai‘i, Geography Department commented that streams indeed like to meander. While this may be true, any alternative should prevent erosion and damage to private property. Sandbars and sediment identified as causal factors of stream meandering could be removed with environmentally sound procedures. While bulldozing can hurt river systems, other technology may aid maintenance in combination with traditional techniques. It is possible that modern technology and machinery can also be used to implement maintenance without detrimental effects to Wailoa River. Work areas can be isolated with silt screens to avoid down stream pollution. The goal is to select stream maintenance practices that limit harm to both people and the river system.

6.3. Permitting Process

Describing the permitting process tends to be somewhat cumbersome because it is not a clear-cut, sequential process. The difficulty is compounded because permits may be required by different government levels (Federal, State, and County) with varying jurisdictions. In actuality, any or all of these permits may or may not be needed for stream maintenance in Waipi‘o Valley. The scope and comprehensiveness of stream maintenance efforts will determine whether or not any of these permits will be required.

Since the inception of this Practicum project, the NRCS, as part of the Hāmākua Ditch Watershed Project, has made headway in working with the Waipi‘o Valley community to define the scope of stream maintenance and to acquire the necessary permits. Dudley Kubo of NRCS, has been working on a parallel track to the Practicum’s, to clarify the need for, and the nature of the permits that may be required to conduct stream maintenance. The following is a brief description of the various permits and review processes that are applicable to stream management efforts in Waipi‘o Valley. Please refer to Chart 1: Stream Maintenance Application Processes for a simplified diagram of the permitting procedure.

Government Level - County

Government Agency – County Planning Department

Permit/Process - Special Management Area Permit

Chapter 205A of the Hawai‘i Revised Statutes, Coastal Zone Management Part II, provides the authoritative legislation for Special Management Areas. The purpose of this legislation is to impose development control within the defined coastal zone to “avoid the permanent loss of valuable resources and the foreclosure of management options” and to “preserve, protect, and where possible, restore the natural resources of the coastal zone of Hawai‘i” (HRS §205A-21). The Special Management Area is that area defined as “the land extending inland from the shoreline as delineated on the maps filed with the authority as of June 8, 1977, or as amended pursuant to section 205A-23” (HRS §205A-22). The entirety of Waipi‘o Valley is determined to be

within the Special Management Area. Any development within Waipi‘o Valley is therefore subject to the SMA guidelines for development.

As defined by the legislation (HRS §205A-22), *development* is “any of the uses, activities, or operations on land or in or under water within a special management area that are included below:

- 1) Placement or erection of any solid material or any gaseous, liquid, solid, or thermal waste;
- 2) Grading, removing, dredging, mining, or extraction of any materials;
- 3) Change in the density or intensity of use of land, including but not limited to the division or subdivision of land;
- 4) Change in the intensity of use of water, ecology related thereto, or of access thereto; and
- 5) Construction, reconstruction, demolition, or alteration of the size of any structure.”

While Special Management Area guidelines are defined by State law, management and implementation of the areas and the required permits are administered at the County level.

Government Level - State

Government Agency – Department of Land and Natural Resources (DLNR), Commission on Water Resource Management

The Commission on Water Resource Management is responsible for administering the State Water Code (HRS §174C). More specifically, it “protects and manages water resources through resource assessments, planning and regulation [of] land-based surface waters and ground waters, and do not include coastal waters. The Water Commission is responsible for water quantity issues; water quality is handled by the State Department of Health.” (Commission on Water Resource Management, 2000, January, 17). Streams and stream management fall under the surface water category for which the Commission issues three types of permits. Only two of the three permits are directly applicable to stream management in Waipi‘o Valley – the Stream Channel Alteration Permit and the Stream Diversion Works Permit.

Permit/Process – Stream Channel Alteration Permit

Hawai‘i Administrative Rules (HAR) §13-169 – Protection of Instream Water Usage, provides the regulatory framework for the administration and issuance of Stream Channel Alteration Permits. As stated by HAR §13-169-50, the purpose of Stream Channel Alteration Permits are for the “protection from alteration whenever practicable to provide for fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses.”

Separate discussions with DLNR by Practicum members and NRCS have concluded that a Stream Channel Alteration Permit will be required for both exigency removal and long-term stream maintenance given the scope of the proposed maintenance measures (D. Higa, personal communication, November 11 1999; Kubo, 1999,

November 24). Under §13-169-50, “routine streambed and drainageway maintenance activities” are exempt from permit requirements. According to a correspondence (1995, August 28) from Rae M. Loui, then Deputy Director of the Commission on Water Resource Management, to Merrill Toledo, Chairman of Roads and River Maintenance, WTFA, routine maintenance is defined as that which involves “hand clearing of debris and vegetation.” Therefore, stream maintenance activities, as proposed for both the exigency removal and for long-term maintenance, are not considered “routine” and will require a permit. In addition, in order to conduct maintenance work without obtaining a Stream Channel Alteration Permit, the work cannot exceed 500 feet and must be completed in less than a week (D. Higa, personal communication, (November 11 1999). DLNR can issue a Declaratory Ruling where the Stream Channel Alteration Permit does not have an expiration date, provided the work is undertaken within specified guidelines.

In order to get a permit from the Commission on Water Resource Management, the application needs to be accompanied by a description of the planned work, the scope of work with quantities, a site plan, right of entry and access to work areas, and a description of the effects, if any, the channel alteration will have on other water users (D. Higa, personal communication, November 11 1999). HAR §13-169-51 lists specifically the information that is required for a permit application. A Special Management Area Permit or clearance is first required in order to file for the Stream Channel Alteration Permit. Once approval is granted for the SMA permit, DLNR then can issue the Stream Channel Alteration Permit (D. Higa, personal communication, November 11 1999). Also, if any activity is undertaken on government land or uses government funds, an Environmental Assessment will be required (Kubo, 1999 November 24).

Permit/Process – Stream Diversion Works Permit

Hawai‘i Administrative Rules §13-168 – Water Use, Wells, and Stream Diversion Works provides the regulatory framework for the administration and issuance of Stream Diversion Works Permits. As stated by §13-168-32, the purpose of Stream Diversion Works Permits is to “assure that the construction or alteration of such stream diversion works will not be inconsistent with the general plan and land use policies of the state and the affected county.” Additionally, its purpose is to assure that the diversion works do not adversely affect established instream uses, and stream water quantity and quality which can impact stream ecology.

Stream Diversion Works Permits are not applicable to stream cleanup, but are required to “construct or alter a stream diversion works” (HAR §13-168-32) or “to abandon or remove such works” (HAR §13-168-35). In other words, any new diversions (manōwai) constructed to redirect stream water into a new, existing, or restored ‘auwai will require a Stream Diversion Works Permits. A permit will also be required for any modification of an existing manōwai only if that modification alters the quantity of diverted water. Lastly, abandonment of an existing manōwai will also require a permit because it is returning water to the stream and increasing instream flow.

In addition to the Stream Modification Permit, a petition to amend the Interim Instream Flow Standards is required when stream flows are altered (increased or decreased) by any diversion works.

Government Agency – Department of Health

Permit/Process – Section 401: Water Quality Certification

Section 401 of the Clean Water Act requires that “any applicant for a Federal license or permit to conduct any activity ... which may result in any discharge into navigable waters, shall provide the licensing or permitting agency a certification from the State in which the discharge originates ...” (Clean Water Act, Section 401a). The main thrust of Section 401 is to ensure that Best Management Practices are used in any activity that can impact water quality. The State Department of Health (DOH) is mandated to carry out the provisions of Section 401, the issuance of Water Quality Certifications for federal permits relating to construction in nearshore and inland waters.

According to Farber (1997),

“water quality standards apply to “ambient” conditions in streams, wetlands, and the oceans around Hawai‘i. Historically, these standards have been applied based on the assumption that any change from ambient conditions is detrimental. Thus, ambient conditions for a particular project are generally defined as “water quality conditions that would occur in the receiving water if these water were not influenced by the new human activity. ... Accordingly, no project is allowed to lower the water quality below the State standards unless this change is “justifiable as a result of important economic or social developments and will not interfere with an ongoing legal use of the waters” (p. 88).

In relation to stream maintenance, the DOH wants to ensure that minimal disturbance is done to water quality, primarily through the prevention and minimization of pollutants (Kubo, 1999 November 24). In order to achieve minimal disturbance to water quality during stream maintenance activities, certain measures need to be implemented which may include building a coffer dam, a silt curtain and constructing a temporary diversion around the work site (D. Higa, personal communication, November 11, 1999). Additionally, it may be necessary to consider the “containment of polluted water and runoff from the construction area, siting of disposal areas to prevent leachate and runoff from directly entering the stream, and implementation of a monitoring plan” (Kubo, 1999 November 24).

Government Agency – Department of Land and Natural Resources, Historic Preservation Division

Permit/Process – Section 106 Review Process

Section 106 refers to Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended. The purpose of the NHPA is to protect and preserve the historical and cultural heritage of this Nation for future generations. Section 106 reads as follows:

“The head of any Federal agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department of independent agency having authority to license any undertaking shall, prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building, structure or object that is included in or eligible for inclusion in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under Title II of this Act a reasonable opportunity to comment with regard to such undertaking.”

Essentially, Section 106 only requires that Federal agencies take into account the effects of their actions on historic properties and allow the Advisory Council an opportunity to comment. This does not necessarily stop a project if it impacts historic resources, but it will likely require some level of mitigation. Regulations of the Advisory Council for Historic Preservation Governing the Section 106 Review Process, 36 CFR Part 800, require the Federal agency to conduct meaningful consultation throughout the process with various parties, including but not limited to, the State Historic Preservation Officer, Native Hawaiian organizations, and the applicants for a federal permit.

A Department of Army permit, if required for stream maintenance, is considered a federal undertaking and will trigger the Section 106 process. As defined by the NHPA, a federal undertaking is “...any project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including ... those requiring a Federal permit, license, or approval” This will require the federal agency in charge, the Army Corps of Engineers, to assess the potential impacts the undertaking will have on historic properties. The State Historic Preservation Division has expressed concerns about farmers’ actions inadvertently knocking down old lo‘i and ‘auwai walls (R. Cordy, personal communication, October 18, 1999 and November 23, 1999). Specific areas of concern are 1) the locations or path that would be used to get heavy equipment to the stream, in other words, how and where are they getting heavy equipment in and out, and 2) where would they be dumping the sediment, rocks, sand etc. that is cleared from the stream. One solution may be to enter into a memorandum of agreement or a programmatic agreement between the organization undertaking stream maintenance, the SHPD and the Army Corps. The agreement would stipulate specific actions by the stream maintenance organization to protect archaeological sites. Such actions may include having a map created of the work area showing ‘auwai and old lo‘i walls, doing simple archaeology, keeping maintenance work within the stream, indicating how and

where their equipment would go in an out of the stream and where they would place their extracted material.

State historic preservation laws covered under Chapter 6E (Historic Preservation) Hawai'i Revised Statutes are mirrored after the National Historic Preservation Act. Section 6E-8 stipulates that:

“Before any agency or officer of the State or its political subdivisions commences any project which may affect historic property ... the agency or officer shall advise the department and allow the department an opportunity for review of the effect of the proposed project on historic properties ... The proposed project shall not be commenced, or, in the event it has already begun, continued, until the department shall have give its written concurrence.”

The definition of *project* as provided in the legislation includes “any activity directly undertaken by the State or its political subdivisions or supported in whole or in part through appropriations, contracts, grants, subsidies, loans, or other forms of funding assistance from the State or its political subdivisions or involving any lease, permit, license, certificate, land use change, or other entitlement for use issued by the State or its political subdivision.” If an Army Corps permit were deemed unnecessary for stream maintenance work thereby avoiding the Section 106 process, any or all of the State permits that may or may not be required could also subject the proposed work to review by the State Historic Preservation Officer.

Government Level – Federal

Government Agency – United States Army Corps of Engineers (ACE)

Permit – Department of the Army Permit

The ACE is authorized to issue Department of the Army (DA) Permits under Section 404 of the Clean Water Act. “The Clean Water Act is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which set the basic structure for regulating discharges of pollutants to water of the United States” (U.S. Environmental Protection Agency, Summary of Clean Water Act). Section 404 specifically “establishes a program to regulate the discharge of dredged and fill material into waters of the United States, including wetlands. Activities in waters of the United States that are regulated under this program include fills for development, water resource projects (such as dams and levees), infrastructure development (such as highways and airports), and conversion of wetlands to uplands for farming and forestry” (U.S. Environmental Protection Agency, Section 404 of the Clean Water Act: An Overview). In implementing Section 404, the ACE:

- administers the day-to-day program, including individual permit decisions and jurisdictional determinations
- develops policy and guidance
- enforces Section 404 provisions”

(U.S. Environmental Protection Agency, Section 404 of the Clean Water Act: An Overview)

The ACE issues individual permits for activities that could have significant impacts on water quality. General permits are issued for activities that are expected to have minimal adverse impacts on water quality. General permits are issued on a state, regional or nationwide basis depending on the nature of the proposed activity.

At this point in time, there is some confusion as to whether or not a DA permit is required for stream maintenance in Waipi'o Valley. According to Kubo (1999, November 24) "a new Corps policy based on the overturn of the Tulloch Rule suspends all regulation of excavation under Section 404 in non-tidal waters. This situation means that all of the clean out activity except for the plug near the ocean will not require a 404 permit. ... However, other wetland areas are still regulated and must not be affected." It should be noted that while the Tulloch Rule is currently in effect, that policy could be reversed in the future.

As it pertains to stream maintenance, as long as excavation does not result in a fill and excavated material is deposited above the high water mark of the stream, a permit is not required from the ACE (Lennan, personal interview, November 3 1999). Equipment that does not produce discharge of dredge materials (e.g. use of crane and backhoe is recommended, not a bulldozer) should be used in conducting stream maintenance activities. In general, stream maintenance should be conducted in a manner which minimizes impacts to water quality and which may result in water quality being below State standards.



Po'owai headwaters for Waioa River in Waipi'o Valley (above).



Practicum students cross a river in the Valley (at right).



Students stand near a 'auwai in Waipi'o Valley. Each 'auwai serves many farms. Farmers who use water from this point must maintain the 'auwai to assure continuous water flows (October 1999).



River section at the headwaters of Wailoa (October 1999).

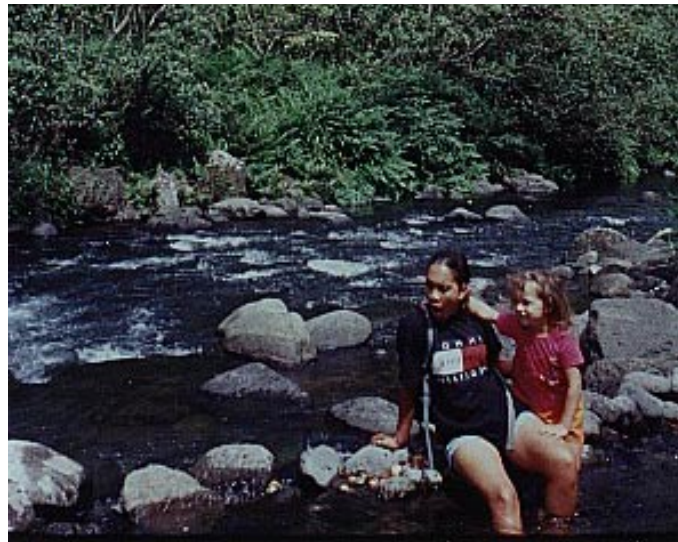
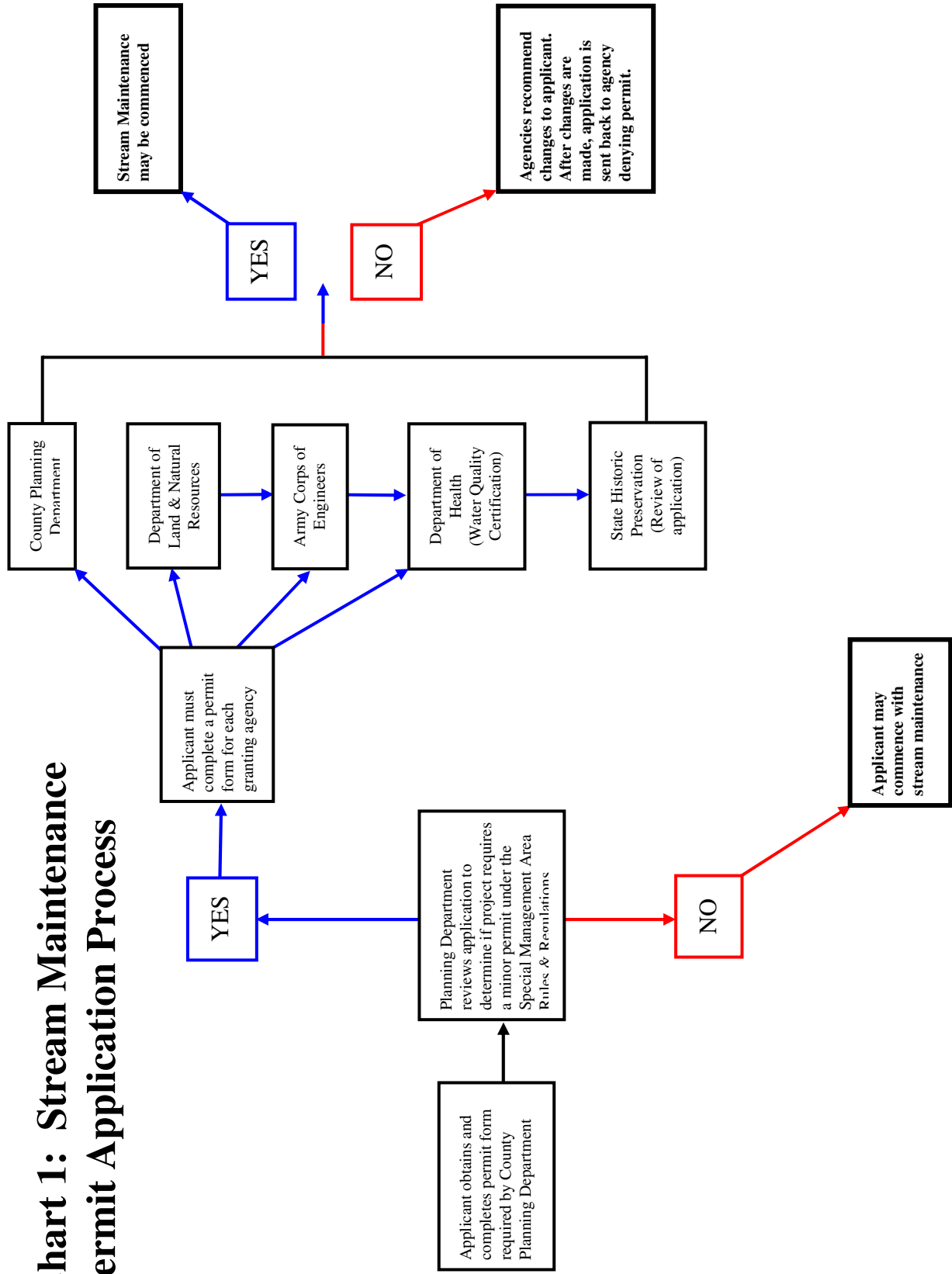


Chart 1: Stream Maintenance Permit Application Process



6.4. NRCS Technical Assistance Roles

Government holds natural resources in trust through regulatory and conservation practices. Section 7 of the Hawai'i State Constitution declares, "The State has an obligation to protect, control, and regulate the use of Hawai'i's water resources for the benefit of its people." Decisions based on the power of this trust may have far reaching impacts. Therefore, responsible government agencies are obligated to mitigate the impacts of these decisions. In this case, government must do what is necessary to ensure that agriculture and taro cultivation, the environment, and cultural lifestyles are not adversely affected. Government should assist the community in the permit process and with the cost of stream restoration and maintenance. This obligation is warranted because of governmental actions resulting in the issuance of a stop order (effectively leading to the interruption of needed stream maintenance), Lower Hāmākua Ditch restoration and continued water diversion.

As a result of the Lower Hāmākua Ditch Restoration Project, the NRCS has assumed a role in providing technical assistance for Waipi'o Valley stream maintenance planning and implementation. Implications of the ditch project, as well as community concerns, prompted NRCS to accept responsibility for particular aspects of stream maintenance in the Valley. Through a series of meetings and correspondence, NRCS has proposed three phases of water management in Waipi'o which vary in support from cost share funding to technical assistance and even no support capability in the case of long-term plans. Stream maintenance consists of three phases: 1) emergency cleanup, 2) one time cleanup, and 3) long term maintenance. Bulleted information below provides detailed explanations of NRCS' role in Waipi'o Valley as well as practicum recommendations.

Emergency Stream Excavation/Cleanout

- NRCS to provide technical assistance for emergency excavation and cleanup.
- Conducted by all community taro farmers; no government financial assistance to avoid completion of an Environmental Assessment (EA) or undergoing public review.
- ✘ **Practicum Recommends:** Administrative in-kind support to expedite the permit process. While NRCS may not be able to contribute in an official capacity due to constraints, the agency could work to assist the community in technical aspects of the paper work. NRCS could also promote a community application for permits instead of placing responsibility on one organization or agency. While there will be the need for more community outreach in Phase 2, it is important to distribute the responsibility of permit application to the community as a whole.

One Time Clean Up

- One-time clean out of Wailoa River to restore capacity by group effort with participation of landowner and land users.
- NRCS and MKSWCD to provide technical and partial financial assistance.

- Technical assistance includes developing stream modifications, sediment removal plan, and review of environmental and other impacts.
- Shared Project Costs (65% federal & 35% local).
 - LHD Watershed project funding will be used to cost-share improvements identified in the Stream Management Plan.
 - Local portion of costs can include in-kind services.
- State Department of Agriculture will obtain all necessary federal, state, and county permits required by law, ordinance, or regulation for installation of the works of improvement.
- Operation and maintenance plan agreement to be prepared by community with government support.
- ✘ Practicum Recommends: Commitment by NRCS to facilitate community ownership of the maintenance plan. Start with the basics: hold meetings to accomplish understanding of differences, teaching consensus-based approaches to decision making, and negotiation/mediation workshops. Outside instructors could be brought in to provide this type of technical support. Such a commitment would facilitate an exemplary maintenance plan. The formation of a Stream Maintenance Council will create a basis of understanding and can expedite the planning process. This type of “community based learning” approach will benefit the outcomes and public satisfaction with plans.

Long-term Stream Maintenance Plan

- No capability for NRCS commitment.
- No authority or means to accept full responsibility.
- Needed permits to be acquired by State Department of Agriculture. Provides basis for long-term maintenance permit.
- Has to be maintained by **Waipi‘o Valley community.**
- NRCS and MSWCD to facilitate process between Valley community, Bishop Museum, other landowners, and government agencies to determine needs.
- No government agency willing to take complete responsibility over stream.
- Disastrous flood may release cooperators from compliance with Stream Maintenance Plan.

- ✘ Practicum Recommends: Community emphasis in Phase 2 of the Stream Maintenance Plan will provide positive outcomes for this period. In Phase 3 the community must completely assume responsibilities. The skills provided and understanding achieved by the cooperative council in Phase 2 will be illustrated in the successes of Phase 3 community work. While NRCS funding and support will cease, agency goals should address Phase 3 outcomes.

Other

- Additional planner at NRCS field offices to serve cooperators in Hāmākua and Waipi‘o Valley.
- ✘ Practicum Recommends: The community has expressed some dissatisfaction with the hiring of another planner. Many feel hiring an additional planner is a waste of money that could be spent on streams. In order to address these interests, such a planner position should focus on community outreach as a strategy to develop a supported maintenance plan. The hired planner should possess skills in community planning and social policy. Community planning skills will be essential in facilitating the development and implementation of the Stream Council and Maintenance Plan. Technical support of this nature – working with people, addressing cultural issues, and mediating interests – will be equally important as scientific hydrological knowledge in stream restoration plans.
- ✘ Concurrently, throughout all phases NRCS and MKSWCS can organize a community-based workshop on best management practices for stream restoration. The workshop could involve WTFA, WVCA, community individuals, experts and representatives of the permitting agencies to achieve a common understanding of what is acceptable to farmers, residents, and agencies. This effort would work to eliminate the prospect of complaints, lawsuits, stop orders, and delays ensuring that timely and proper stream clean up materializes.
- ✘ NRCS and MKSWCS can harmonize stream data collection within the Valley by involving community associations, educational institutions and pertinent agencies to reassure the community of data reliability and fairness of use. This effort would also help create community ownership of plans.
- ✘ Grant writing to appropriate foundations and agencies can be initiated by NRCS and MKSWCS to help fund farmers and landowners share of the clean-up expenses.
- ✘ Efforts involved in stream maintenance and restoration in Waipi‘o Valley present an opportunity to obtain sizable multi-year grants from such agencies as the Environmental Protection Agency, National Science Foundation, USDA, USGS, and other private foundations. These grants can be used to document before and after stream restoration and maintenance. Waipi‘o Valley could serve as a laboratory for designing participatory environmental management processes and developing ecological simulation models of stream flows and channel morphology. This natural resource conservation effort could also provide needed research and training for educational endeavors. The research would

involve a problem-oriented approach to learning for the Waipi‘o community, the University, Kanu O Ka ‘Āina and Honoka‘a High School.

6.5. Proposal for a Stream Maintenance Council

In mitigating community concerns, stream maintenance is an issue of importance. The different concepts of what stream maintenance is and how it should be executed remain controversial topics, nevertheless the work must be completed to assure the survival of Waipi‘o Valley. A Stream Maintenance Council would serve to allow community input on what programs will be implemented in the Valley. All types of residents and farmers in the Valley expressed a respect and care for streams. It is clear that despite differences, the protection of streams in Waipi‘o Valley for future generations remains a common goal. The Council would consist of community members and organizations with governmental liaison and technical support. The formation of a Stream Council could serve community interests and work with government while creating venues for input and education.

6.5.1. Planning A Stream Maintenance Council

The formation of a Stream Council, for example: “‘Ahahui Mālama i Nā Kahawai O Waipi‘o” – Alliance that cares for Waipi‘o Streams, would include the entire community. The planning of stream maintenance would involve the following mutual efforts:

- **Consensus Based Charter** – Charter serves as a grass roots community forum, which uses a consensus-based approach to problem solving.
- **Creation of A Mission Statement** – Statement that expresses the purpose of the Council, for example: To better appreciate, preserve, and protect stream relationships; restore and enhance Waipi‘o watershed resources; and maintain stream viability for future generations.
- **Cooperation and Coordination** – Efforts to work with one another in the community and abide by federal, state, and local laws and regulations.

6.5.2. Council Duties

Stream Council responsibilities could focus on several areas to provide relief to Waipi‘o Valley streams, farmers, and residents. Practices could incorporate basic Native Hawaiian traditions such as ho‘oponopono in planning processes. The organization could help to facilitate the following activities:

1. Cooperate in resource studies and planning.
2. Review, critique, and prioritize proposed stream protection and maintenance.
3. Identify and coordinate funding for research, planning, implementation, and long-term monitoring (This funding would help pay for cost shares).
4. Serve as an educational resource for the general public.

EXAMPLE:

‘Ahahui Mālama I Nā Kahawai O
Waipi‘o
Alliance Caring for Waipi‘o Streams
Stream Maintenance Council

Possible Council Initiatives:

Examples of the Council would be developed based on community interests and needs. First, a Council initiative could provide formal training of leadership in consensus based decision-making. This would equip the Council with useful skills for stream maintenance. This information could also help the community resolve conflicting interests. A seminar for Waipi'o leaders could begin the process of learning how to work together. A consensus approach would ensure the expression of ideas in a safe environment. The council would learn to make decisions based on general agreement.

Collaboration with youth proved useful and beneficial in this Practicum research project. The Council could continue to work with students from Kanu O Ka 'Āina Hawaiian Academy and Honoka'a High School in public education and participatory initiatives. This work would promote public understanding of issues facing Waipi'o streams. This collaborative effort could help to hold forums and discussions on best stream management practices. In this way, community members and students would receive educational benefits.

The Council formation will have positive impacts on working with government. The Stream Council could facilitate community relationships with agencies that regulate land and resources to benefit the area streams. Thus, the Council develops a role as an instrument to communicate with representatives of local, state, and federal agencies.

Finally, the Council serves to build up the community. Stakeholders will be encouraged to work together in a non-hostile setting. As a result of consensus-based decisions and compromise the council will develop goals and objectives for the sustainability of Waipi'o streams.

6.5.3. Stream Council Challenges

The formation of a council may seem overwhelming when dealing with issues that have remained unresolved for many years. The community experiences fatigue from the stress of conflict with government, private companies and one another. There are several rationales for a Stream Maintenance Council in Waipi'o Valley. It is evident that issues deal with the well-being of the entire Waipi'o water system. In Hawai'i's uncertain political climate, no individual can count on advancing long-term interests through courts, legislature, or Congress. It is important to realize that a unified alliance or Council of community members will have a greater impact in working with government and protecting the Valley. Organization, cooperation, and compromise create power to mobilize change. Individual interests will always be a part of humanity; nevertheless Council cooperation can help protect Waipi'o Valley and its streams. People have a strong commitment to the preservation Waipi'o Valley's uniqueness. This sentiment can be used to counteract interest group differences. The design of the Stream Maintenance Council can provide participants a common frame of reference and facilitate emphasis on community building.

Challenges facing the Council include expansion of participation. The Council should strive to involve a variety of groups, thereby being more truly representative of the community.

Although more people involved may mean more conflict, it also provides increased innovation and ideas for solutions. Individuals enter the Council with various skills and abilities. With expansion, the Council will have improved ability to address broader community issues and ultimately become more influential as an organization.

The Stream Maintenance Council could also strive to examine incentive-based, market driven approaches to achieving stream viability. Examples of this approach include certification of “sustainably grown” and harvested taro and crops. The implementation of environmental practices for stream maintenance as well as cultivation could create a demand for environmentally sound products. The hope is that marketing products would create a powerful economic incentive for landowners and farmers to participate in the Council and adopt resource management practices.

6.5.4. Case Study of Water Management: Mānoa Stream Maintenance Plan

The Mānoa Stream Maintenance Plan is an example of successful water management. While Mānoa Stream characteristics vary from conditions in Waipi‘o Valley and Wailoa River the management planning process can be applied as a guide in the Valley. The principles used in the Mānoa plan present a framework of best management practices for the community and government agencies.

Mānoa Stream Maintenance Plan – A dynamic process for creation, implementation and improvement of a stream maintenance plan.

- Plan allows flexibility and change as:
 - Experience is gained over time
 - New technologies progress
 - Additional ideas are presented

Visioning Summary: Consensus Statements

- Plans with ahupua‘a perspective (mauka/makai).
- Promotes community based cooperative planning.
 - People and agencies are informed, communicative, participative.
- Develops and implements responsible land, water, and resource management.
 - Practices and promotes sustainable natural environment.

Community Stewardship

- Malama o Mānoa Organization
- Mānoa Subwatershed Group

Stream Work

- Work scheduled annually
- Best Management Practices (BMP)
 - Prevent degradation of stream
 - Address consensus prior to doing work
 - Improve public education and awareness of proper stream stewardship activities.

- Avoid heavy equipment, vegetation and pesticides
- Stream Channel Alteration Permit (SCAP) needed for removal of silt and debris to restore stream capacity and protect adjacent property



Practicum members present findings and alternatives to WTFA member Ku'ulei Badua and Leslie Whitehead of MKSWCD.



UH DURP Practicum Final Presentation: Practicum members and WVCA member Christopher Rathbun



Morgan Toledo (WTFA), Kenneth Kaneshiro (NRCS), Daniel Kaniho (MKSWCD) and Honoka'a resident Thelma Martin.

7. Public Access and Tourism in Waipi'o Valley

In addition to stream maintenance and water rights, public access and tour/bed and breakfast operations are of major concern to those who work and live in Waipi'o Valley. Disputes over access and tourism are as complicated as that involving water, and require similar steps in order for agreements to be made between community groups, tour/bed and breakfast operators, governing agencies, and private agencies. There is need for a governance plan set by the community to establish regulations for public access and tourism. Moreover, there is a need for the State and County of Hawai'i, along with Bishop Museum (the largest landowner in Waipi'o Valley), to clarify their boundaries of responsibility over roadways, trails, and other areas. Agreeing on a plan and clarifying responsibilities are difficult as groups are split along cultural, legal, and personal views. In addition, because there has not been a survey done on roadways and trails in the Valley for many years, it is difficult to identify which areas are under State and/or County jurisdiction, or which are the responsibility of private landowners in the Valley.

The complexity of the issues demands highly skillful leadership to make decisions, initiate dialogue, and work toward progress. Leaders of community organizations and tour/bed and breakfast operations do seem to have the ability and stamina to facilitate discussions toward an agreement. Likewise, State and/or County agencies and Bishop Museum seem to want to resolve legal issues, but each of these groups (and individuals within the groups) will need an incentive to put aside differences and come to a compromise.

It is not the intent of this report to settle on-going disputes over access and tourism, but rather aims to clarify the problem and give suggestions on what could be done in order to move towards a resolution.

7.1. Background of Issues

The roads and trails in Waipi'o Valley have changed over the years, particularly due to the natural behavior of streams to meander. Many of the roads and trails that must be crossed in order to move throughout the Valley exist on private properties. In response to this, farmers and other tenants have erected gates to block their properties from being accessed by the public and tour groups. This has caused strained relationships between community members and tour/bed and breakfast operators. Blocking access has been especially difficult for tour/bed and breakfast operators that also live and farm taro in the Valley. Additionally, because streams are portaged in various places, some roads and trails are within the streambeds. This makes moving about the Valley more difficult.

Because public inventory of the roadways and trails in the Valley are not current, governing agencies are not sure which roadways and trails are within the boundary of their responsibility and continued maintenance. Yet, permits are still issued for public access (hiking and camping, as well as tour/bed and breakfast businesses). The permit process, as a tool to regulate access for tour operations and public use, is not well used. For instance, if someone is permitted by one agency, for example DLNR, it would be almost impossible for that person to access areas only under DLNR's authority without crossing over land within the jurisdiction of the County, and which may also be owned by Bishop Museum. In

addition, activities that may be permitted by one agency may not meet other agencies' requirements. This means people could be excused from many responsibilities by only acquiring one permit. These facts demand better cooperation among agencies, and permission requirements that address some basic interest of each group involved.

The existence of private landowners in addition to Bishop Museum lessees, the involvement of several agencies with different authorities, and the long history and accumulated changes of Waipi'o Valley have led to the fragmentation of land uses. As a result of land fragmentation and differences of opinion on how it should be used and regulated, planning for future public access of Waipi'o Valley will be a great challenge.

7.1.1. Past Initiatives

This section describes initiatives that have been taken to deal with access and tourism in the past. It also discusses community, tour/bed and breakfast operators, State and/or County and Bishop Museum's positions based on various correspondence. Legal, cultural and personal views are shared to show the complexity of issues at an individual level.

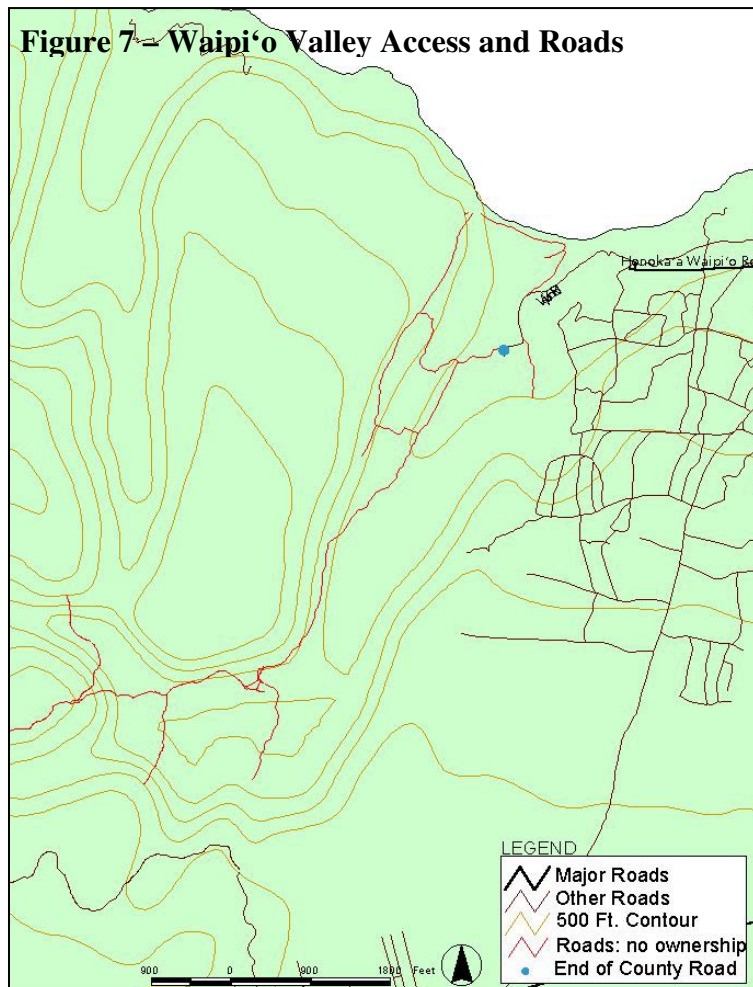
The completion of the Honoka'a-Kukuihaele Highway brought increased visitor use of the Waipi'o Valley Lookout. The steep access road into the Valley would supposedly deter local and non-local visitors from entering the Valley and protect the it from a high volume of visitors. Until 1962, mules and horses were the only methods of transportation into and out of the Valley. After 1962, the four-wheel drive access road was established at the Waipi'o Valley Lookout at the top of the pali. The one-mile access road descends 800 feet at an average grade of 20 percent. This road slants at a 45-degree angle at some points. The County has taken over maintenance and improvement of this road and restricts traffic to four-wheel drive vehicles. It was also proposed that the access road be improved to a two-lane highway, but this plan was halted due to lack of funding. A plan drafted for Waipi'o Valley in 1975 by the Hāmākua District Development Council (HDDC) Planning Committee recommended that the County: (1) maintain public access roadways in the Valley; (2) widen narrow segments of the roadway to permit 2-way usage and improve visibility; (3) provide guard rails as needed along the route where natural protective banks are lacking; (4) provide for eventual 2-lane pavement for the entire length of the road; (5) retain the ruling that only vehicles with four-wheel drive be permitted to use the road; and (6) support a safety-education program on use of the road. The Planning Committee of HDDC also recommended that bridges be erected to aid access in the Valley, especially during the flooding or rainy season. Old foot, horse, and sled trails were upgraded to jeep trails to accommodate lessees, tenants, and visitors.

In regard to tourism becoming an economic mainstay in Waipi'o Valley, the Planning Committee found, "[t]hat the economic approach is feasible is not to be denied, but for the sake of prominent basic values of the Valley, and in the Valley, the community cannot afford its conversion by the schemes of developers to yet another tourist destination that will ultimately, inevitably, crowd out a large segment of the natural untrammelled attributes of the Valley" (Hāmākua District Development Council, 1975). This plan also proposed a visitor service center in Kukuihaele to provide a rest stop, restaurant and souvenir shop and a hotel

facility for those staying near Waipi'o Valley over night. In addition, this visitor service center would provide a base for jeep and mule-back tours into the Valley.

The Plan emphasized that foot trails be the main routes in the Valley. A camping facility was proposed for the old school site (which is maintained by the County). The County planned for a pavilion at the base of the pali below the lookout, but the plan fell through awaiting an archaeological study of a specific pavilion site. The old school site would have been an ideal place for a public campground because it is easily accessible and safe from normal flooding. This suggestion could still be entertained by the community and governing agencies. A designated camp ground and a provision that areas can only be accessed by foot (for individual travelers) may help to regulate the number of people using the Valley for recreation and relieve the congestion of four-wheel drive vehicles into and around the Valley.

In addition, in an attempt to bridge cultural methods, preservation and tourism in Waipi'o Valley, Muliwai Trail was selected in 1997 as one of the trails for a pilot eco-tour program conducted by DLNR through Nā 'Ala Hele. The Nā 'Ala Hele Trails and Access Program granted one-year permits to selected companies to balance public use and trail stewardship with limited natural tourism. As Curt Cottrell, Program Manager for Nā 'Ala Hele on the Big Island commented, "The State can continue to ignore eco-tourism, place a kapu on commercial activity, or find a balance between commercial activity and public recreation and management" ("State Seeks Trail Tours Applicants" 1997). Cottrell envisions eco-tourism as a means of protecting and properly managing the environmental and cultural resources in the Valley, while allowing for public access and commercial activities that promotes and enhances stewardship of the environment and resources and benefit the Waipi'o community.



7.2. Issues and Positions

Resolving conflicts over public access and tourism is a very complex proposition. There are so many issues and perspectives that come to bear upon these conflicts. Legal questions need to be resolved regarding jurisdiction, interpretation of existing laws on permitted uses within the Valley, and enforcement of regulations. On top of this, there are many cultural issues that must be considered in dealing with Waipi'o Valley, inarguably a place which holds significant value in Hawaiian history and culture. The following discussion will attempt to clarify the legal and cultural issues surrounding access and tourism in Waipi'o Valley. In addition, the positions and concerns of community members, tour/bed & breakfast operators, and the majority landowner – Bishop Museum – are presented.

7.2.1. Legal Issues

It seems evident that landowners, lessees and tour operators are caught between State and County disagreements about commercial tour operations and regulating boundaries between properties and public thoroughfares. The lack of certainty on the part of the governing agencies has led to the inability to enforce regulations. This continues to feed the disputes over access and tourism in the community. Accordingly, the disagreements among groups in the Valley encourages continued impassivity by the State, County and Bishop Museum concerning laws, and a wavering commitment to helping the community work out their differences (Refer to Chart 2: Public Access and Tourism).

Waipi'o Valley is zoned Ag-40 (Agriculture-40 acres) with a portion makai of the beach road zoned as Conservation. The entire Valley is governed by rules and regulations stipulated in the Special Management Area (SMA) for the County of Hawai'i. Permitted uses include those related to agriculture or as permitted by acquisition of a Special Permit. The County and the State Land Use Commission administer the agricultural district. The Conservation District is administered by DLNR. Before new uses are established in the law; they must be reviewed for compliance under Sections 25-5-71, 72: 1 (a)(16); 1 (a)(19); and 1 (c)(3) of the County SMA. Riding academies, and rentals or boarding stables, and bed & breakfasts are allowed with a Special Permit. The Planning Department maintains records on Special Permits issued by the Planning Commission and the State Land Use Commission. The DLNR board also reviews all applications for Special Permits. No Special Permits have been issued for parcels in Waipi'o Valley to date. Moreover, no public hearings have been held to address these matters.

The State and County also seem to differ in their laws allowing/prohibiting camping in Waipi'o Valley. Jeff Bell of Bishop Museum questioned the County about whether

its provisions overrule the State in allowing for overnight camping, as stipulated in the Special Management Area Rules and Regulations 25-5-72. Established State rules prohibit overnight camping. Bishop Museum was asked to discuss specific cases of land use questions with the Planning Department about issuance of Special Permits HRS §205-4.5(b), and §§205-6 and 8. No clarification has been made to date in regard to this matter.

The County maintains one (1) roadway in the Valley. The roadway is 1.6 miles from the base of the access road, along the southern edge of the Valley, then toward the center of the Valley, terminating at a Kunaka Stream. Another road, which parallels the shoreline across the mouth of the Valley, is also government road. However, this road is not on the Public Works inventory. The Department of Public Works (DOPW) is responsible for maintaining County roadways. The DOPW should clarify road boundaries in the Valley.

According to a letter from Richard Wurderman of the Corporation Counsel to Jeff Bell on April 21, 1999, tourism is a grievance of lessees and residents in the Valley. He states, "Tour rides are clearly not agricultural and should not be allowed without a Special Permit. Commercial carriage of passengers for hire is under jurisdiction of Public Utilities Commission and requires a Certificate of Public Convenience and Necessity to be legally performed. Bed & Breakfasts must also be properly permitted." Conversely, Deputy Director of the Planning Department, Russell Kokubun stated that tours are open-space activities, thus permitted under the County's designation of allowed activities in agricultural districts. He further stated that "The natural course of a Valley's rivers and streams have changed so often over time that easements and lot lines are literally 'all over the map'" (Bishop, 1995 November 15). Such dissenting opinions on tourism serve to widen the gap between community members.

In regard to whether Bishop Museum is required to provide legal easements across their properties for landlocked or otherwise impaired landowners, the County Corporation Counsel stated that easements are established by necessity. Necessity would be determined on a case-by-case basis and does not involve the County. However, the County did not identify under whose jurisdiction case-by-case prescriptions are made, or the process in which they are determined.

Locals and visitors also venture into Waipi'o Valley (not as part of tours) in order to go to the beach or hike. As stated, because there are many agencies involved in permitting access and tours in the Valley, and because it does not seem that there are any established roads/trails to conduct businesses, people are misled to believe that they are conducting themselves in a legal, if not culturally appropriate manner.

In response to questions about public and tour companies accessing private properties without permission, the Planning Department stated that violations in the Agricultural Zone are to be reported to their department. Violations in the Conservation Zone are addressed by DLNR. "Trespass" complaints should be directed to the Police Department or by swearing a complaint before the Prosecuting Attorney. The Planning Department enforces the law, while the police addresses and prevents trespassing. But, determining when violations are

occurring depends on certain statutes/authorities that are not being met, and prosecution may not necessarily result from violations. According to Captain Edwin Rapoza of the Honoka'a Police, laws regarding access in the Valley are inconclusive and difficult to interpret (Bishop, 1995 November 15). Thus, enforcing these laws is nearly impossible. As a result, community members are frustrated that the police department must be called to assist in this matter, because such violations are difficult to "prove" and response time can take days.

7.2.2. Cultural Issues

Kenneth Brown consultant to Friends of the Future stated, "Waipi'o is the most outstanding example of a total dilemma; it's a treasure—with residents, all trying to peacefully co-exist in the Valley. These forces are bumping into one another daily, and there is no governance structure to guide them." (Friends of the Future, 1998 September 23). For access and tourism to continue, an organized, innovative and thoughtful plan controlling and regulating such should be created. This plan should consider and protect areas that are not appropriate for access (private lands, as well as culturally and historically sensitive areas). Those visiting the Valley should respect the people who live and farm there. Tours should be an educational experience so visitors obtain a deeper appreciation for Waipi'o Valley. Businesses extending this experience to the public should be mindful of the sensitivity and importance of Waipi'o, and contribute as much as possible to its preservation. Kia Fronda of the Waipi'o Valley Community Association, who is involved in programs to promote cultural-learning in the Valley, feels that in order to be more culturally-appropriate, people should be invited into the Valley and that they should aim to give back to the land (personal communication, November 21, 1999). Access through invitation and cultural-sharing could be accomplished by adopting an eco-cultural approach to tourism and establishing a cultural-learning center near the access road into the Valley. Before this can happen, people in the Valley need to heal the rifts between them and remain in balance with nature.

Education is the key to bettering the future of the Valley. In order to be more culturally sensitive to the Valley, visitors should have a greater purpose for entering, besides basically "touring" the Valley. The perception of Waipi'o as a "recreational tour spot" would need change to be more in-tune with the culture—let people know its history and sacredness before they arrive. In the words of Kia Fronda, "Kānaka waiwai", invoke the essence of Hawaiian spiritual power first. Then, develop protocols, lessons for the rest of the world; food and sustenance with a higher mission: real life experience of the lo'i" (Friends of the Future, 1998, September 23).

Chart 2: Public Access & Tourism

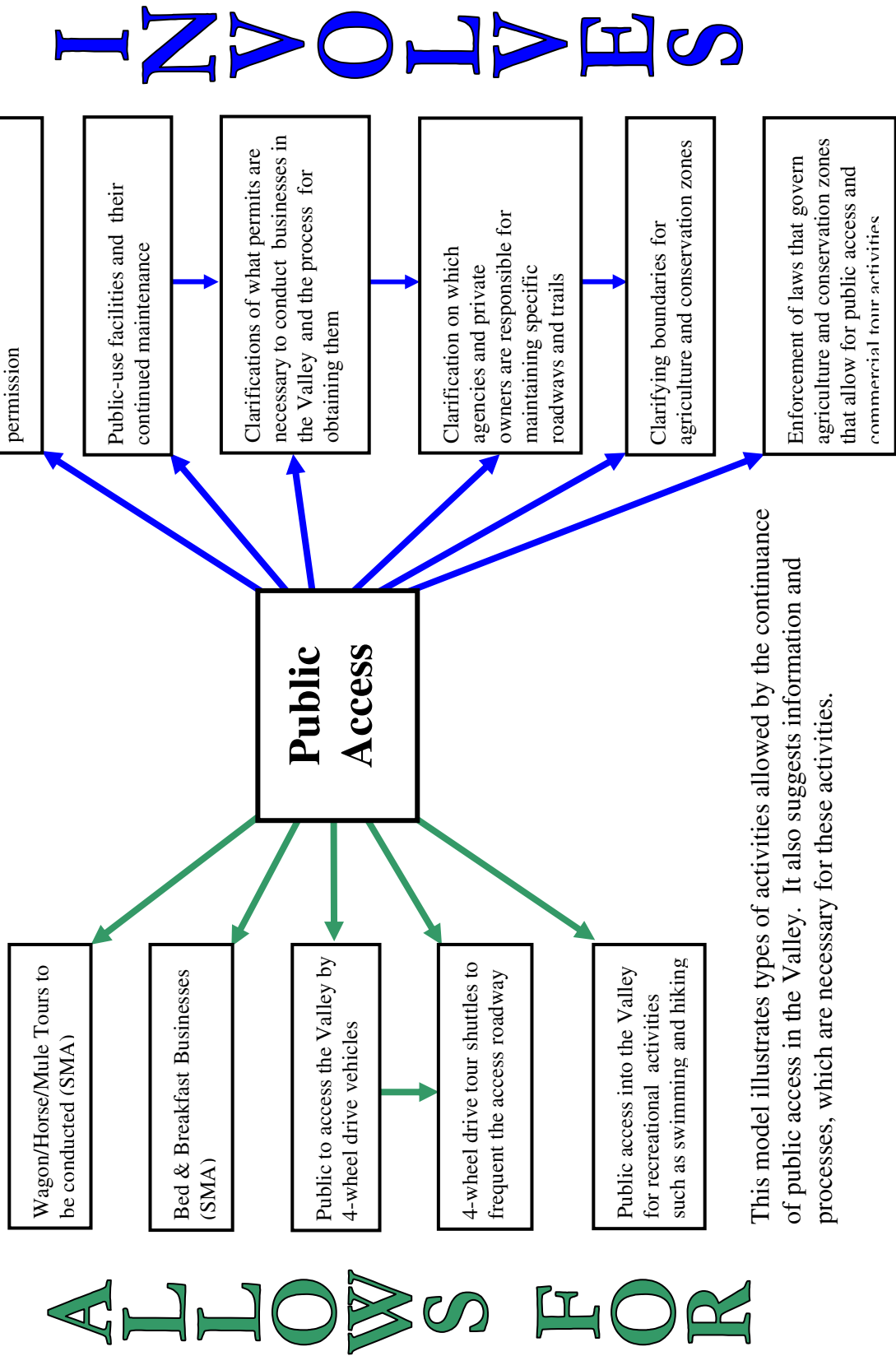
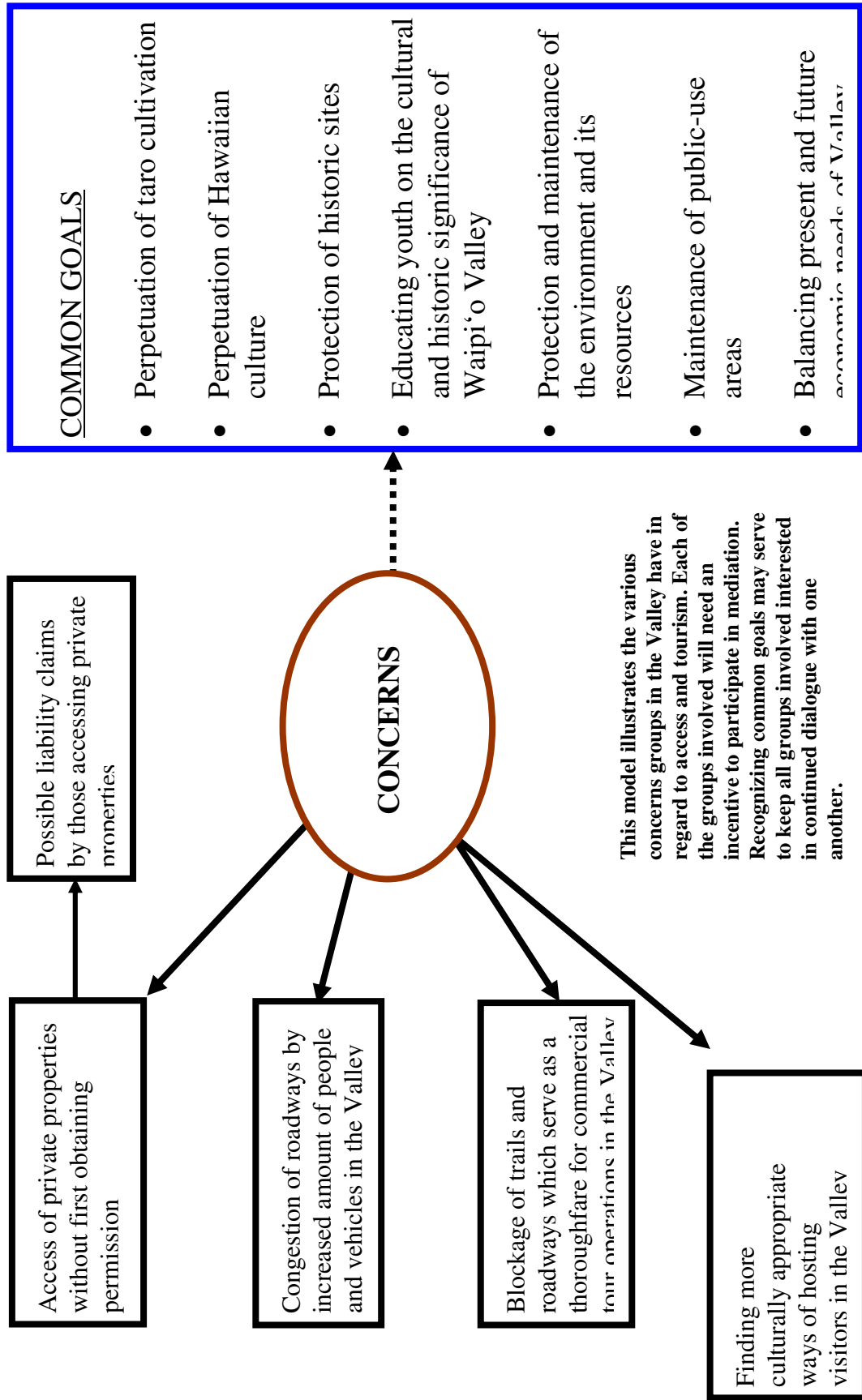


Chart 3: Model of Community Concerns & Interests



7.2.3. Community Views

The interest and positions of the Waipi'o Valley community are complex due to the diversity of members' backgrounds (Refer to Chart 3: Community Interests and Concerns). Opinions on how access and tourism should be regulated, and how regulations should be enforced, differ along legal, cultural, and personal bounds within each organization.

There are several concerns from community members:

- Waipi'o Valley may be changed permanently into an area dominated by tourists and tourist-related businesses.
- The rapid growth of tourism has negatively impacted the Valley, causing increased traffic on already dangerous roads, and increased waste and pollution, etc.
- Tenants/lessees have had to obtain costly insurance policies for liability as a result of increasing amounts of people crossing over their properties.
- The type of tourism being conducted does not include culturally appropriate methods of engaging visitors in hands-on experiences; giving them a chance to "know" the community and culture of Waipi'o Valley. Instead, history and legends are only reverberated to visitors on tours. Many people feel this is not enough to perpetuate Hawaiian cultural practices and protect historic sites.
- The rapid growth of tourism within the last few years has led many homeowners and property developers to engage in bed and breakfast establishments. This has resulted in:
 - Discouraging and reducing the number of long-term residents in the area.
 - Attracting more real estate investors with a primary interest for "real estate speculation." This has caused the value of land to increase along with real property taxes, which will eventually impact the future affordability of real estate for long-time local families.

7.2.4. Views from Tour/Bed and Breakfast Operators

According to the WTFA Open Letter (1998), tour companies host close to 1,000 visitors into the Valley per week:

- Horse rides service approximately 400 visitors per week
- Tour vans service approximately 300 visitors per week
- Wagon tours service approximately 250 visitors/week

Linda Beech is the owner and operator of Waipi'o Valley Treehouse and Waterfall Retreat. Continued misunderstandings and blockage to her property led Beech to sue neighboring landowner, Morgan Toledo. In doing so, she sought to have the courts establish legal access to her property as well as determine boundaries of the parcels in Waipi'o (Bishop, 1999 November 15). It is unfortunate that this situation could not be remedied between community members before such an extreme circumstance resulted. In a recent interview,

Beech asserted that because there is a common desire to preserve the culture, cultivation of taro, and beauty of the Valley, compromise could be attained. She hopes for peace with those that she has long-standing differences with. (Beech, 1999 November 22).

With regard to roadways and trails within the Valley, Ann Frances Smith, manager of Waipi'o Wagon Tours emphasized that their wagons stay on government roads. Smith says that the company checked with government agencies when they first established their business to inquire about permits. However, they were told that no permits were necessary, since tours were being conducted on government roads (Smith, 1999 November 29).

Stan Dzura, owner of the property in which Waipi'o Wagon Tours operates from in the Valley feels that the public has the right to access the Waipi'o Valley coastline; that the coastline should not be reserved for the interest of any particular community group or business. He is disheartened by the current dissension among people and by those who continue to disrespect the beauty and significance of the Valley, stating that, "The crush of people and deflowering of the Valley has destroyed the allure it once held [for us]" (Dzura, personal communication, November 5, 1999). He suggested that in order for laws regulating the Valley to be enforced, which he feels is unattainable because of the current ownership situation, all private/Bishop Museum lands would need to be condemned and the Valley made into a state/federal park. In this way, the Valley could adopt rules that govern businesses that operate on government lands. Hopefully, unless desired by the community, this option will not be pursued.

7.2.5. The Role of Bishop Museum In Relation to Access and Tourism

Bishop Museum leases approximately 66 acres in the Valley, but owns about 164 separate parcels and a total of 538 acres in the Valley. The single largest lessee of these lands is Morgan Toledo, President of the Waipi'o Taro Farmers Association. Toledo says that approximately 2/3 of the tour operations use his land. He feels that tour operators are being allowed to pass through private properties without permission from the owners and lessees (Friends of the Future, 1998, September 23). The laws regulating access and tours are not clear thus, tour operators have yanked out gates erected in front of lessees' and/or tenants' properties. It is deplorable that operators feel they must pull out these gates, as it is distressing that these gates must exist in the first place.

Bishop Museum stated that they are currently working with the farmers, tour operators, and bed and breakfast businesses. It is not clear whether these businesses have the pertinent permits to operate. Their alleged "illegality" should be addressed by the County and not by Bishop Museum or the community. It would be helpful for the Museum to move the governing agencies along to clarifying these questions. The WTFA used to collect money from tour operators to fund programs for roadway and stream maintenance. However, this arrangement fell through. Bishop Museum is willing to facilitate a plan that would allow for tours in a way that is compatible with landowners/lessees in the Valley (Duarte & Bell, personal communication, October 15, 1999). The Museum would still need clarification from the County and State as to where the public-use trails and roads are at this moment.

7.3. Alternatives for Community Consideration

Alternatives in tourism include eco-cultural approaches and the establishment of a cultural learning center. Both concepts would serve to educate people about respect and appropriate conduct in Waipi'o Valley. Is a cultural code possible in the Valley? The community could work to develop mechanisms that invite visitors in while being "pa'a" with the culturally appropriate way of entering the Valley.

7.3.1. Eco-Cultural Approach to Tourism

What harm would come if a cultural practice should vanish or a historical site is destroyed? Who would suffer or grieve if the stories of our native people were lost? It seems an innate need within us to preserve the wisdom of the past for future generations. In the words of Native American archaeologist, John Sax, "... Our daily lives are enriched immensely when we have the ability to attain first-hand knowledge of past [human] behavior, [and] through the preservation of the past, this can be achieved most vividly" (Sax, 1976, p. 27). Learning about technology tools and social structures of the past and how they work in harmony with the environment and resources in the area are of interest to the local community as well as to visitors. According to Sax (1976), tours help to celebrate and share the history and ethnic plurality of native people.

Unfortunately, to many people tourism is viewed as being counter to efforts of cultural and environmental protection. Tourist mecca, such as Waikiki, Lahaina's commercial district, and Poipu Beach are some of the areas in Hawai'i that have left a bitter image of tourism in the minds of Hawaiians and locals. The over-commercialization, destruction and exploitation of deeply valued cultural sites and practices have turned many native communities away from considering any economic activity that capitalizes on tourism. There are alternative approaches to tourism, however, which do not aim to exploit places and cultures for dollar, but protect and perpetuate them. Eco-cultural tourism gives communities the opportunity to manage their environment and decide how money will be allocated for continued cultural, environmental and economic sustainability.

Distinguishing Eco-cultural Tourism From Conventional Tourism

1. Focus on natural and cultural experiences in combination with specialized marketing.
2. Consists of small-scale facilities and infrastructure that strive to respect the heritage of the area.
3. Fosters small-group, one-to-one, positive host-guest interactions and mutual understanding.
4. Emphasizes local control and equitable dispersion of benefits.
5. Enhances environmental quality, community cohesion, and cultural revitalization.

(Collin, 1995, pp. 45-46)

Alternative tourism maintains a bottom-up method of diplomacy, instead of one regulated by an outside agency or by government. The community has the opportunity to devise a

Community Based Economic Development plan for eco-cultural tours that fit the objectives of their organization. The community will also be able to decide how a share of money from tours will be allocated to support other projects and interests. The extent of tour operations will be within the discretion of the community and does not have to follow the conventional marketing trends of the tourism economy.

The most encouraging part of the changing trends toward alternative types of tourism is that each tour destination is distinguished by its own educational value. Therefore, these destinations are not in direct competition with one another for visitor dollars. Communities are able to market their tours together. For instance, many Native American communities advertise their eco-cultural tours on the same brochure or web page, thus sharing the cost of marketing.

7.3.2. Establishing a Cultural-Learning Center

Kia Fronda first contacted Friends of the Future in order to get their help in establishing a cultural-learning center in the Valley. Friends of the Future is working with the Edith Kanaka'ole Foundation in order to establish just such a cultural-learning center. The concept of such a learning center has also been discussed with Bishop Museum and WTFa. Community members and the public generally support this idea.

If the entrance of the Valley could be moved further back from the access road, a cultural-learning center could be established at this point in order to educate the public on Waipi'o. Local and non-local visitors could be informed about the sensitivity of accessing the Valley before they make the decision to do so.

Moreover, the center could count visitors traveling into the Valley in order to impose a ceiling on the number of visitors accessing the Valley at any one time. Visitors could be educated about the roadway and individual ventures into the Valley. A community-owned shuttle service (connected with the cultural-learning center and perhaps in connection with wagon/horse/mule and bed and breakfast operations) could be provided to transport people to the beachfront or to other areas specified by the community for hiking. Unless potential campers will be staying with community members (on their properties) or have registered to stay in community-designated areas, over-night camping should be discouraged.

A small community-based economic development project could emerge out of this effort. Community hosts would provide face-to-face interpersonal connection between visitors and the Valley in order to promote a greater understanding of its history and culture as well as engage visitors in hands-on work in the lo'i. Community hosts will help to perpetuate the cultural practices and history of the Valley and have helping hands in the lo'i. Visitors will benefit from the deeper experience they gain through an interpersonal connection with the community and Valley culture. Tour operators and vacation rental owners would be instrumental in conveying this idea to visitors and engaging them in the deeper experience by working with taro farmers. Farmers and tenants could allow a throughway through their properties. In turn, tour operators and community tour operators could assist these members

periodically with their farms or cleaning the trails and roadways they use. The following are further suggestions for the cultural-learning center:

1. Provide information to visitors on the cultural, historical, and agricultural aspects of Waipi'o Valley through brochures, and tour guides.
2. Provide information to visitors about what are considered appropriate and inappropriate behaviors by local community, to improve mutual respect and respect to natural environment.
3. Coordinate the time that tour operations use the access road into the Valley.
4. Establish a public parking zone at the cultural-learning center.

Additionally, providing a liability waiver for all local and non-local visitors that wish to enter the Valley may release the landowners and lessees from being wholly responsible for these people as they travel around the Valley. A waiver may also release the State and/or County from being responsible if accidents occur. As discussed, traveling the roadways into and around the Valley is a dangerous venture. However, if a signed liability waiver will not fully release landowners and lessees from liability claims, the community may choose to charge a fee to visitors entering the Valley, or lobby a granting organization for funds to cover insurance costs.

Furthermore, because the area is a flood zone and is frequented by flooded conditions, there is a responsibility to warn visitors before they access the Valley. Educating visitors on the roadway and other conditions in the Valley, as well as the cultural, historical and environmental sensitivity of the Valley are all important considerations for State and County agencies, Bishop Museum, community groups and tour/bed and breakfast operators.

Without support from local community, tour operations will not be sustainable for the long-term future. Well-regulated tours/ bed and breakfasts could be constructive to local culture and resources.

7.4. Toward a Resolution

A partnership between Bishop Museum and WTFa already exists. Both can work to establish rules for boundary issues to be resolved with other community groups and tour/bed and breakfast operators. Perhaps Bishop Museum could consider moving Waipi'o Valley from its real-estate portfolio to its collections as a major cultural asset. The impact of this decision on the land and farmers would need to be discussed further. This decision could provide an opportunity for partnerships, grants, and revenue to help assist in the maintenance and restoration of cultural assets in the Valley. The Kanaka'ole Foundation may be willing to work with the Museum to realize their mission in the Valley. Perhaps a children's learning center could be established, as well as the restoration of the fishpond and King's Quarters. External funding can be sought for these cultural projects.

Parties could also contact the Center for Alternative Dispute Resolution at the Judiciary or Neighborhood Justice to facilitate mediation. These organizations do charge a fee for

services. But, their expertise is helpful for encouraging a non-threatening atmosphere focused on substantive issues, not emotions.

7.5. Considering Limitations

In 1991, a task force consisting of State and private agencies and community organizations was asked to consider State acquisition of all Bishop Museum lands in Waipi'o. This proposal was suggested by the Department of Land and Natural Resources in order to better manage and preserve the agricultural, cultural, and historical significance of the Valley (Task Force to Preserve Waipi'o Valley, 1991). The task force disbanded before recommendations were agreed upon, but the purpose of the task force study highlighted important considerations for the community to address. In particular:

1. How should Waipi'o be managed and administrated to insure perpetuation of agriculture, culture, and history for the future generations?
2. How will the community balance present and future agricultural, cultural, historic and economic needs of the Valley?
3. If the community cannot come to an agreement on how tourism will be managed in the present and future, who will end up making decisions?
4. Should a ceiling on the number of persons entering the Valley be established?
5. If it is agreed upon that a ceiling on the number of persons entering the Valley should be established, how will such a decision be implemented and enforced?
 - Many community members have specified to Friends of the Future that they do not want a tollbooth at the entrance to the Valley. Because of this, a cultural-learning center would be a better method of visitor education, which would also serve to limit access to the Valley. Many have also expressed that all people, not just non-local visitors, need to have greater respect for the area, as well as a deeper reason for going into Waipi'o. The beach is not ideal for swimming and recreation. Thus, the resurrection of cultural sites such as the fishpond and King's Quarters may be a way to attract those who want to learn from the Valley and not just "tour" it.
 - Perhaps, as suggested in the 1975 Master Plan for Waipi'o Valley, vehicular activity (recreational riding) within the Valley could be discouraged. Instead, horse and or walking concessions could be made available. Stream sanitation and roadways in regard to using horses and mules would need to be considered. Horses and mules could be stabled outside the Valley, perhaps at the proposed cultural-learning center.
6. Should the proposed liability waiver be required for all persons traveling into the Valley? What would be the positive and negative impacts of such a decision?

By coming to an agreement on public access and tourism, the community will create more congenial means of dealing with access that will not need to involve government intervention. Moreover, an agreement would better serve to improve relations in the Valley, as well as protect farmers/tenants property and allow tours/bed and breakfast establishments to shuttle visitors around the Valley without arousing disputes. A subsequent study by all agencies is necessary for a final determination of responsibility to the roadways and trails within the Valley.

7.6. Resolving Differences

The differences between groups involved in the disputes are long-standing. Thus, it would be unrealistic to expect differences to be resolved by one or two meetings. Effective dialogue will continue as long as parties:

- Are not committed to absolute positions;
- Recognize that the other party has particular interests and needs which are important to them;
- Recognize that there are common interests within the standing conflict; and
- Recognize the importance of their continued participation in mediation (for the larger community, as well as for their own interests).

(Moore, 1996, pp. 200-211)

Releasing “control issues” and having a mutual understanding of this is necessary for resolving conflicts and moving forward. Cooperation will benefit all parties involved in disputes. It is difficult to mobilize government and/or private agencies to become more active when the community is split along cultural and personal lines. For a compromise to be reached, community groups must recognize that all their demands cannot be accommodated. If all groups desire peace, they must be able to let go a few wants in order to reach a compromise (Refer to Chart 4: Moving Toward a Resolution). Tourism and public access will continue. The community needs to work together and set rules that will allow agriculture, tourism and public access to continue, but not infringe upon the rights of private land owners/lessees or damage the environmental and cultural sites and practices of the Valley. Tourism and access can exist, but be limited to some extent, and perhaps be more culturally and environmentally sensitive. Tour companies should also have the necessary permits to be legally operating within the Valley. Perhaps tour/bed and breakfast operators will have an incentive to seek dialogue with farmers/tenants if a public hearing is needed in order for them to acquire Special Permits. Informal efforts toward bettering relations and negotiating terms could be done before such hearings are called. This would lessen tension between groups and perhaps start the process toward mediation.

As discussed, State and County agencies will need to establish where their boundaries of control lie, specifying which agencies are responsible for maintenance of roadways, trails and the beachfront. These agencies should also devise a consistent and practical method of enforcing regulations. Likewise, if the State and County continue to allow public access for beach recreation, hiking, camping, and tours, public facilities (toilets and trash receptacles) should be available in the Valley (especially near the beach). Bishop Museum would be

instrumental in moving these agencies toward establishing boundaries and becoming more active in maintenance and enforcement. Although correspondence by mail is helpful in preliminary steps toward understanding laws and responsibilities, face-to-face discussions are necessary for clearly identifying positions and responsibilities.

Friends of the Future, the Edith Kanaka'ole Foundation and Kanu O Ka 'Āina could also be called upon to assist in mobilizing the process toward an agreement between groups. At this moment, Bishop Museum is taking a passive role as the major landowner in Waipi'o. This is unfortunate, since the Valley holds a wealth of investment possibilities for the Museum in order to uphold the mission of Charles Reed Bishop – to perpetuate the Valley for the benefit of the children of Hawai'i.

Kanu O Ka 'Āina could also be instrumental in resolving differences by generating a survey of all those living and working within the Valley. This educational group serves as a neutral party with youthful perspectives. The survey could be a continuation of the survey done by the practicum at the Honoka'a Taro Festival in November. The updated map and database of the landowners and lessees provided by the practicum would also aid students in this project. The focus of the survey would be to further identify common interests and solutions. Moreover, a type of shuttle diplomacy could be implemented working towards a meeting involving community members and tour/ vacation rental operators.

All groups involved need an incentive to begin dialogue toward conflict resolution. It seems that all groups want better relations with one another in the Valley. An on-going dispute does not benefit anyone involved or the Valley. All parties seem to recognize the importance of preserving cultural practices (including taro cultivation), historic sites, and beauty of the Valley. Representatives of all parties involved have expressed these common interests through various interviews and documents. It should be considered that:

- All of the groups have valid concerns in their differing opinions over access.
- None of the groups want to be told what to do or be “pushed around” by the other.
- Parties, as well as the community-at-large and the livelihood of the Valley will benefit by putting aside differences and working together to form an access agreement.

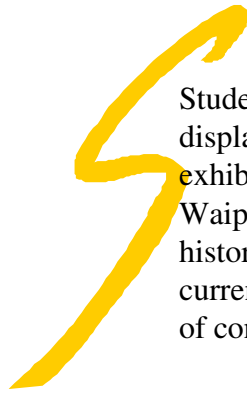
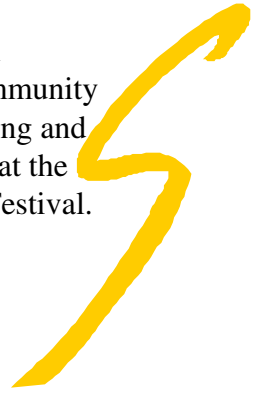
Negotiations may be volatile at times as there is a clash between old ways of doing things and new ideas. However, increased dialogue, whether argumentative or kind, is an indication that parties *are* ready to resolve long-standing conflicts about tourism and access. Elders in the Valley hold the wisdom of the past. Youth are important for tying issues and concerns back to the present for the sake of the future.

It appears that there is a continuous cycle of mediation and planning in the Valley, but with no implementation of plans. A governance model with a specific plan for implementation is imperative. This plan should specify the responsibilities and tasks of all groups involved. Enforcement of responsibilities and accountability for negative actions should be consistent.

For the community to continue to manage and “own” the Valley, all must move forward together, recognizing their equal roles in continued maintenance, preservation, protection, and perpetuation of the Valley.



The Practicum conducted community concept mapping and a mini-survey at the Annual Taro Festival.

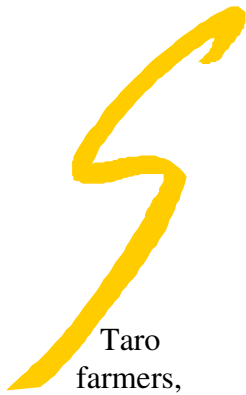
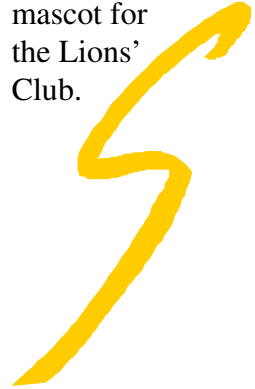


Students displayed an exhibit on Waipi'o Valley history and current issues of concern.





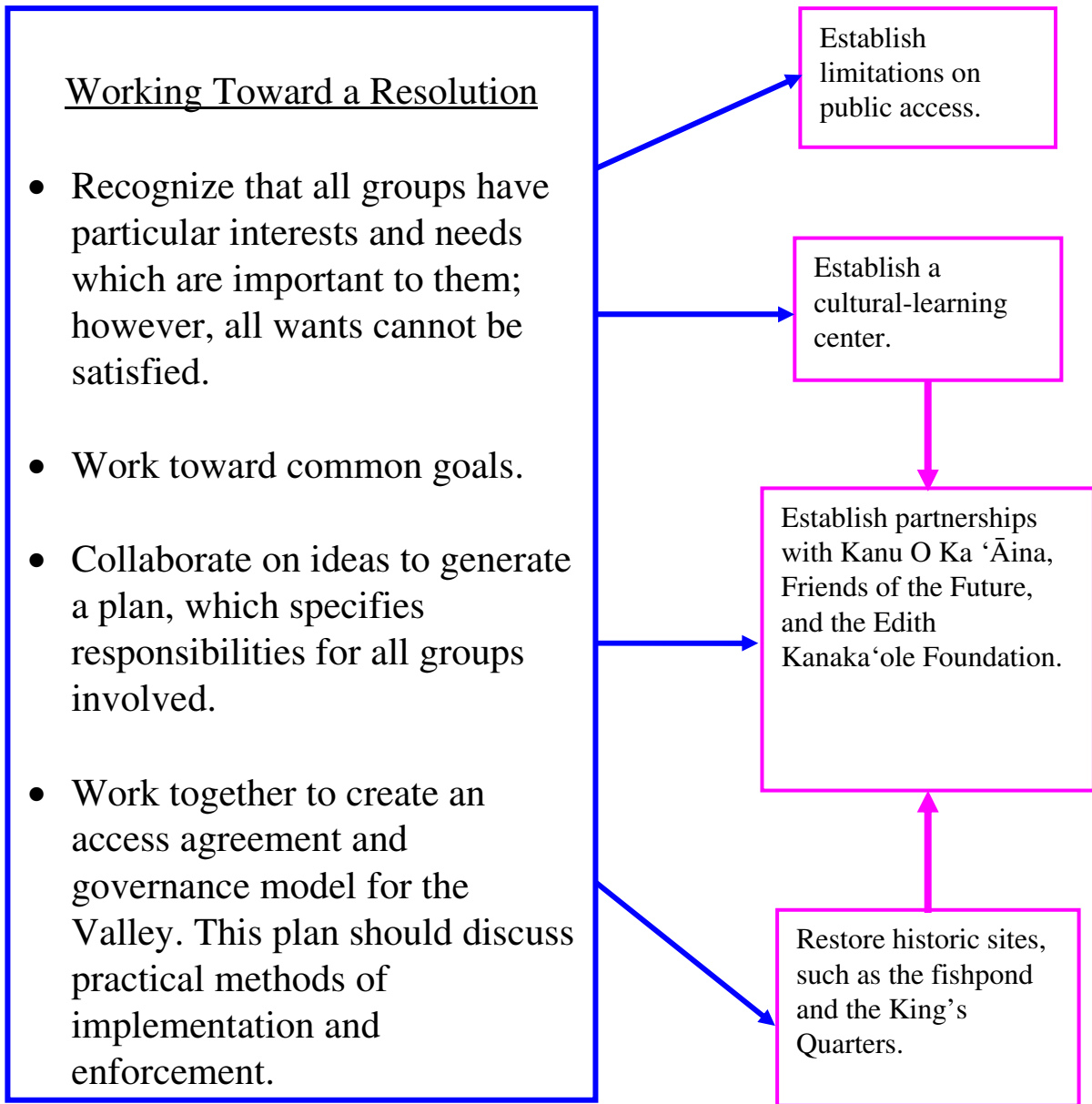
Practicum students pose with community mascot for the Lions' Club.



Taro farmers, teachers, and students discuss Waipi'o concerns and future visions



Chart 4: Moving Together Towards A Resolution

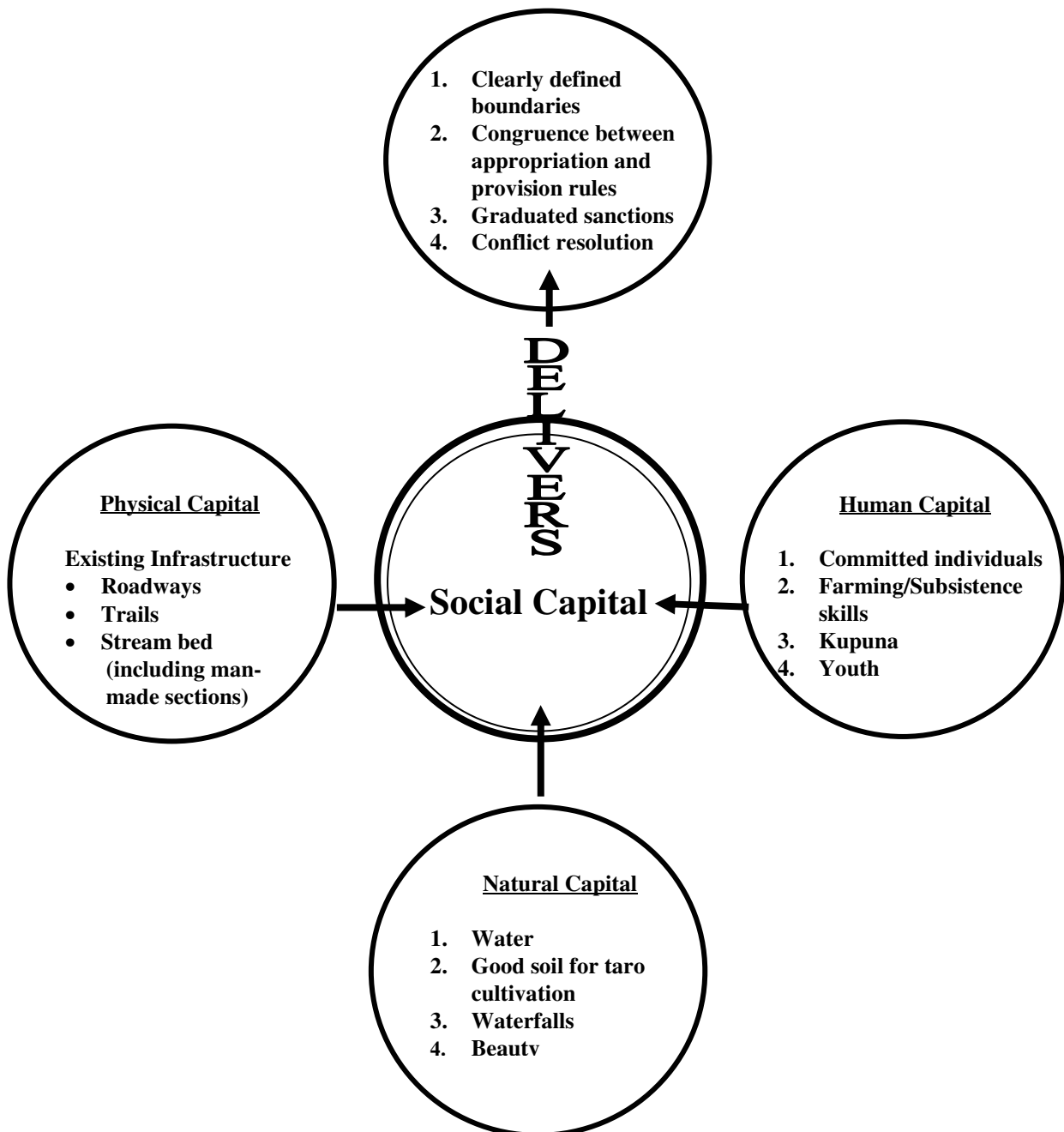


This model suggests how groups involved may work together toward resolving differences in regard to access and tourism. This model also suggests further collaboration with Kanu O Ka 'Āina, Friends of the Future and the Edith Kanaka'ole Foundation in various projects to perpetuate history and culture in Waipi'o Valley.

8. Conclusion: Community Assets and Social Capital

Social Capital is the necessary link of cooperative community management. It is concerned with institutions, relationships, and norms that shape the quality and quantity of a community’s social interactions. In other words, social capital refers to *community cooperation*, which is crucial for economic development and long-term community sustainability. Social capital is the “glue” that binds people, their environment, and physical infrastructure. It helps determine a community’s ability to grow and be productive. Refer to Chart 5: Social Capital: The “Missing Link” of Cooperative Community Management.

Chart 5: Social Capital -The “Missing Link” of Cooperative Community Management



8.1. What Social Capital Delivers

Elinor Ostrom, in her book *Governing the Commons*, sets forth characteristics that define a sustainable community. Although these suggestions are not traditional Hawaiian approaches to community management, they may serve to aid the community in establishing a model of governance for the Valley.

✧ Clearly defined boundaries

Clarifying boundaries is perhaps the most important characteristic of a successful community, although it is the most difficult to negotiate. It involves community participation for defining boundaries of action for all members and visitors of the community. For instance, provisions for access, water use and management, and environmental protection.

✧ Congruence between appropriation and provision

Congruence between appropriation and rules refers to agreed upon rules and regulations that should provide for equal benefit and treatment of all members of a community. Defining what is “equal benefit” or “equal treatment” of individuals who all have different wants, needs and interests is also difficult. However, recognizing the importance of this step will allow community leaders to understand that in order for individuals to participate in community efforts and adhere to rules and regulations, they must also benefit from common resources.

✧ Graduated Sanctions

Those who violate operational rules would need to be given graduated sanctions, depending on the type of offense and degree of seriousness. The whole community should define these sanctions.

✧ Conflict Resolution

The Community should appropriate a method of conflict resolution that would be binding in order for the community to continue working together in harmony.

**There is something that transcends
 all of this
 I am I ... You are you
 Yet I and you connect
 Somehow, sometime
 To understand the “cultural needs”
 Sameness & Differences of
PEOPLE
 Needs an open BEING see-hear-feel
 With no judgement or interpretation
 Reach out maybe with that
 physical touch, or eyes, or aura
 You exhibit your oneness &
 willingness to
 Listen & Learn and,
 you tell and share
 In so doing... you share your
humanness
 It is acknowledged and shared
 Something happens...
Mutual Understanding**

Unknown Author

8.2. Human Capital

The Waipi‘o Valley community has a number of organizational leaders committed to bringing about positive change in Waipi‘o. This is evident in the growing support by government and private agencies. Such agencies are reacting to the pleas of community leaders to improve water management and roadways, control access into the area, establish public use facilities, and strengthen community relations.

Community members also possess extensive agricultural skills, knowledge of water management and Hawaiian culture. These skills can be utilized by the community to successfully manage and maintain the culture and beauty of the Valley.

Moreover, the youth of the Waipi‘o and Honoka‘a community help bring community members together to perpetuate lo‘i cultivation, Hawaiian culture and environmental preservation. Youth serve as “common ground” for adults who often get caught up in controversial issues. Youthful views can help provide clarity in resolving complex situations. Likewise, kupuna are vital for passing on knowledge and wisdom of the past, to instill a sense of respect for the environment and culture, and to teach the youth about proper uses and maintenance of the ‘āina.

8.3. Natural Capital

There is no question that Waipi‘o is rich with natural resources, making it a prime agricultural area, cultural-learning center, as well as beautiful place to live and visit. While many areas in Hawai‘i suffer from lack of water and natural resources, Waipi‘o Valley has continued to flourish with the riches of both. Community cooperation is needed for the continued protection and proper utilization of natural resources.

8.4. Physical Capital

Physical capital includes man-made and natural structures that are necessary for continued agricultural production, human movement, and overall management of the Valley. Long-term endurance of these structures depends on the community members’ adherence to rules and regulations set in cooperation with one another, and in conjunction with governing and private agencies.

Since Waipi‘o Valley is in desperate need of public infrastructure, restroom facilities and roadways; the community must fill the void with “cultural infrastructure.” This is illustrated by the spirit of sharing and aloha that still exists despite dissention and conflict.

Establishing a structure of governance based on community cooperation will be the vehicle for long-term social, environmental, cultural, and economic sustainability. Each member of

the community must recognize the necessity of social capital and their individual role in sustaining productivity, preservation and growth. Such community cooperation can help to yield political awareness and the capital improvements needed to better equip the Valley.

While research and plans of areas often begin with an analysis of social capital, the practicum instead concludes with this concept. In Waipi'o Valley, social capital is central to community planning for the future. The analysis of social capital closes with optimism. The Waipi'o community is equipped with many tools and assets to work towards planning a future for the Valley of Kings.



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Glossary of Hawaiian Terms

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<i>Ahupua'a</i>	Land division usually extending from <i>mauka</i> (uplands) to <i>makai</i> (sea), so called because the boundary was marked by an <i>ahu</i> (heap) of stones surmounted by an image of a <i>pua'a</i> (pig), or because a pig or other tribute was laid on the alter as a tax to a chief.
<i>'Aikapu</i>	To eat under taboo; to observe eating taboos.
<i>'Āina</i>	Land.
<i>Akua</i>	God, goddess, spririt, ghost, devil, image, idol, corpse; divine, supernatural, godly.
<i>Ali'i</i>	Chief, chieftess, officer, ruler, monarch, peer, headman, noble, aristocrat, kingly.
<i>Ali'i'ai'ahupua'a</i>	Chief who rules an <i>ahupua'a</i> .
<i>Ali'i'ai moku</i>	Chief who rules a <i>moku</i> .
<i>Ali'i nui</i>	High chief.
<i>Aloha</i>	Love, affection, compassion, mercy, sympathy, pity, kindness, sentiment, grace, charity.
<i>'Aumakua</i>	Family or personal gods.
<i>'Auwai</i>	Ditch, canal.
<i>'Awa</i>	Native plant used for religious, cultural, and medicinal purposes.
<i>Hānai</i>	Foster child, adopted child; foster, adopted.
<i>Heiau</i>	Religious shrine.
<i>Hihīwai</i>	Endemic grainy snail that lives in both fresh and brackish water, eaten both cooked and raw.
<i>Ho'okupu</i>	To grow; ceremonial gift-giving.
<i>Ho'olohe</i>	To hear; to obey.
<i>Ho'omalū</i>	To protect.
<i>Ho'oponopono</i>	To correct; to make right.

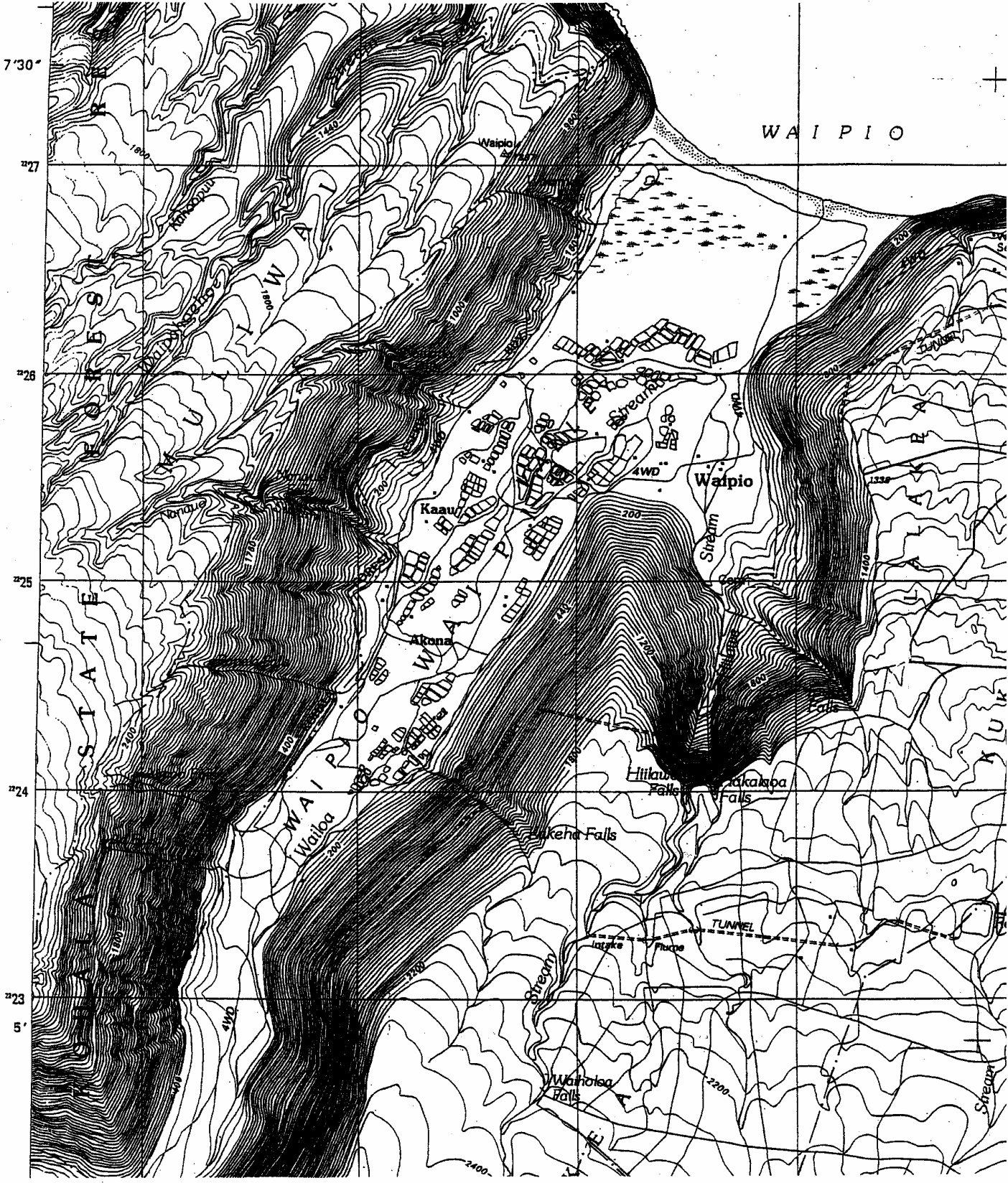
<i>I'a</i>	Fish.
<i>Kahawai</i>	Stream, creek, river; valley, ravine, gulch, whether wet or dry.
<i>Kahuna</i>	Priest, sorcerer, magician, wizard, minister expert in any profession (whether male or female).
<i>Ka'ika'ina</i>	Younger brother of sibling or cousin of the same sex, as younger brother or male cousin of a male, or younger sister or female cousin of a female; sibling or cousin of the same sex of the junior line, whether older or younger.
<i>Kaikua'ana</i>	Older sibling or cousin of the same sex; sibling or cousin of the same sex of the senior line, whether older or younger.
<i>Kalo</i>	Taro. In Hawai'i taro has been the staple food from the earliest times to the present. All parts of the plant are eaten, its starchy root principally as poi, and its leaves as luau. Specifically, <i>kalo</i> is the name of the first taro growing from the planted stalk; also, names of generations as listed for Hawai'i.
<i>Kapu</i>	Taboo, prohibition; special privilege or exemption from ordinary taboo; sacredness, prohibited, forbidden; sacred, holy, consecrated; no trespassing, keep out.
<i>Kauoha</i>	Order; command; decree.
<i>Kinolau</i>	Many forms taken by a supernatural body, as Pele, who could at will become a flame of fire, a young girl, or an old hag.
<i>Konohiki</i>	Headman of an <i>ahupua'a</i> land division under the chief; land or fishing rights under control of the <i>konohiki</i> ; such rights are often called <i>konohiki</i> rights.
<i>Kua'ana</i>	Term of address for older sibling or cousin of the same sex, or cousin of the same sex of the senior line of a family; sometimes used in place of <i>kaikua'ana</i> or <i>kaiku'ana</i>
<i>Kumulipo</i>	Origin; genesis; source of life.
<i>Lo'i</i>	Irrigated terrace, especially for taro, but also for rice; paddy.
<i>Loko'ia</i>	Fishpond
<i>Lū'au</i>	Young taro crops, especially as baked with coconut cream and chicken or octopus.

<i>Mahalo</i>	Thanks; gratitude.
<i>Māhele</i>	Portion, division, section, zone, lot, piece, installment, bureau, department, precinct, category, section or act in a play; share as of stocks; measure in music; land division of 1848 (the <i>Great Mahele</i>).
<i>Maka'āinana</i>	Commoner; subject of a monarch; people who attend the land.
<i>Mālama</i>	To take care of, attend, care for, preserve, protect, beware, save, maintain; to keep or observe, as a taboo; to conduct, as a service; to serve.
<i>Makai</i>	<i>Kai</i> , ocean.
<i>Mana</i>	Supernatural or divine powers, mana, miraculous power; a powerful nation, authority; spiritual.
<i>Mauka</i>	<i>Uka</i> , inland.
<i>Mō'i</i>	King; sovereign; monarch; majesty; ruler; queen.
<i>Nā kānaka</i>	Human beings; men; people.
<i>'Ohana</i>	Family; relative; kin; group; related.
<i>Oli</i>	Chant
<i>'O'opu</i>	Name for fishes in the families Eleotridae, Gobiidae, and Blennidae. Some are in salt water near the shore, others in fresh water, and some are said to be in either fresh or salt water.
<i>'Opae</i>	Shrimp.
<i>Pa'a</i>	Firm, solid, definite; steadfast in righteousness.
<i>Pali</i>	Cliff, precipice, steep hill or slope suitable for olonā or wauke.
<i>Po'owai</i>	Water source or head, dam.
<i>Pua'a</i>	Pig.
<i>Pule</i>	Prayer, blessing.
<i>Wā</i>	Period of time; epoch; era; time; occasion; season; age.
<i>Wai</i>	Water

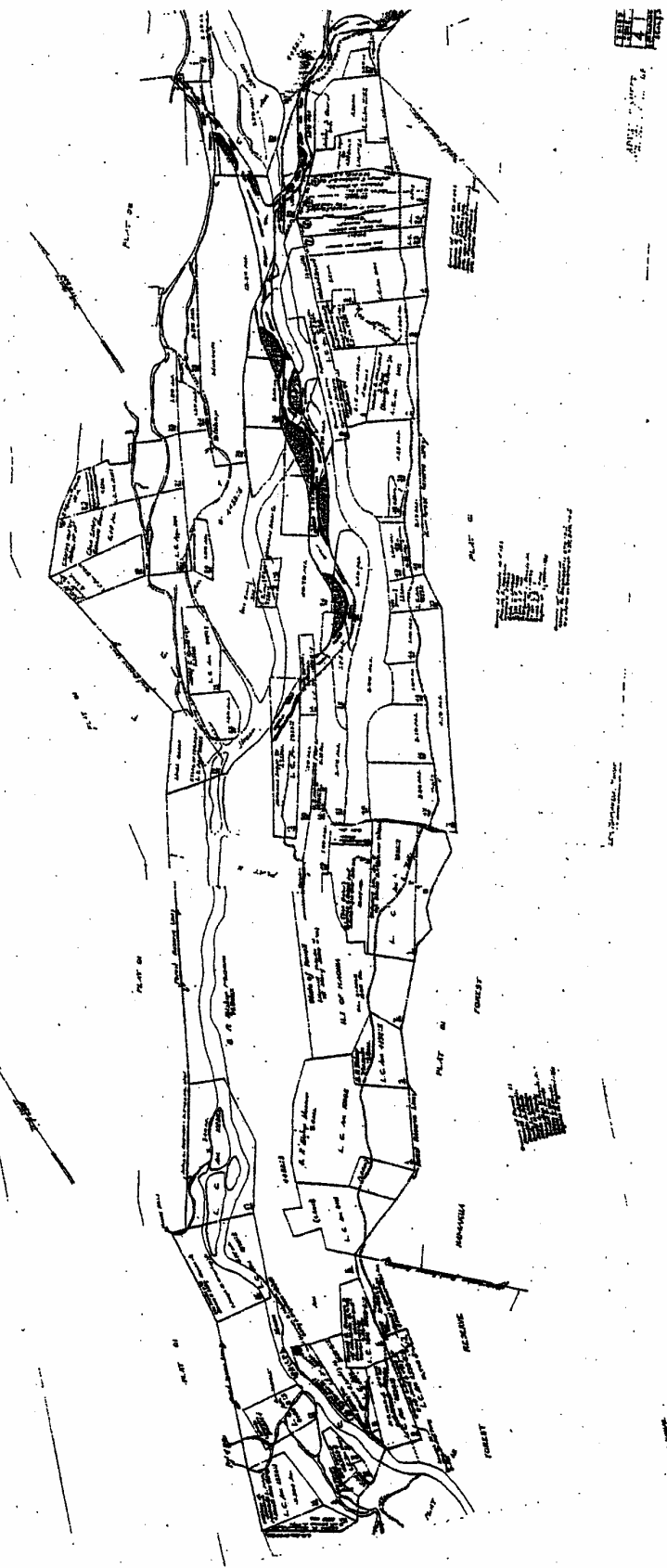
Map Reference List/Maps

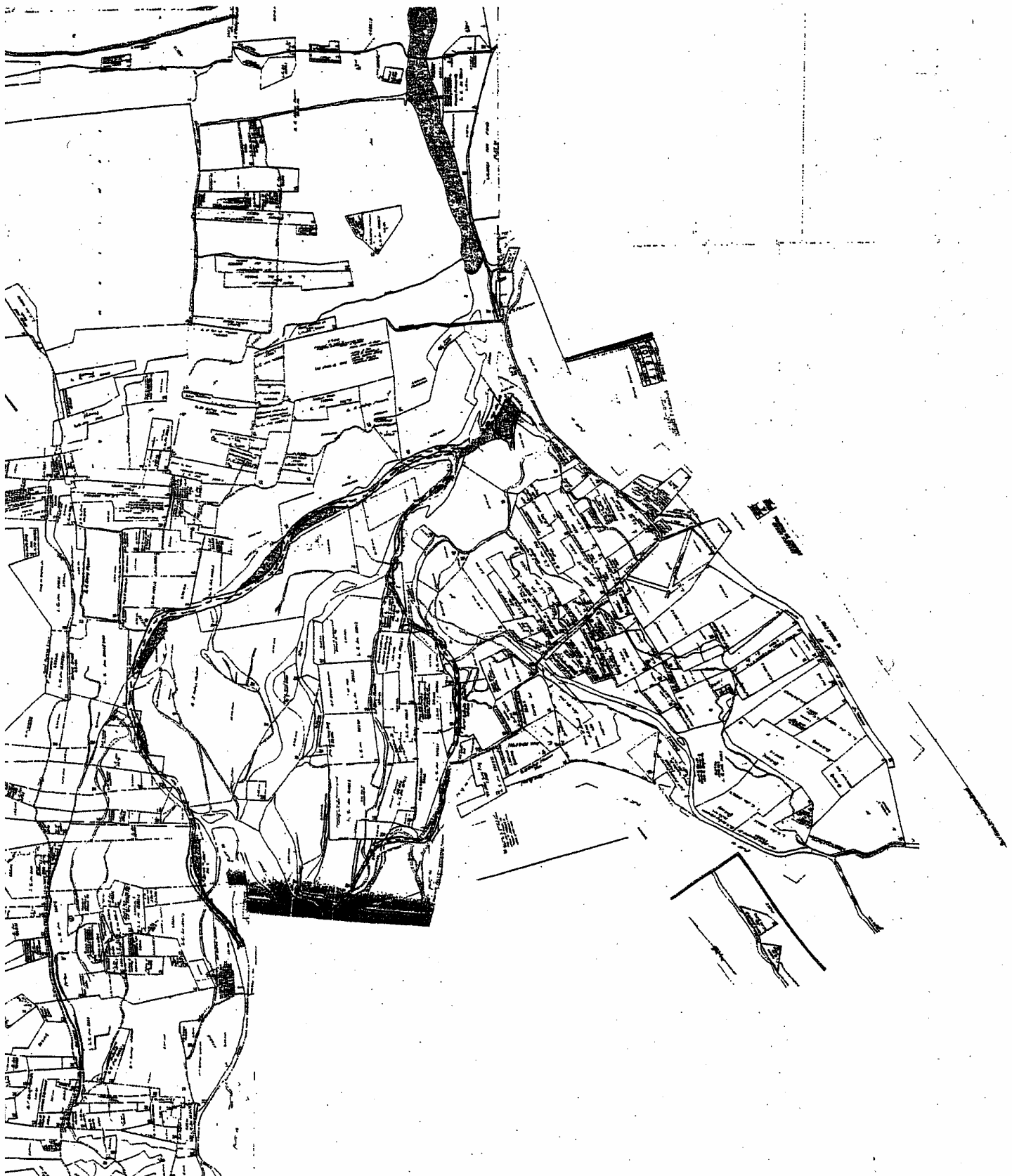
List of Maps

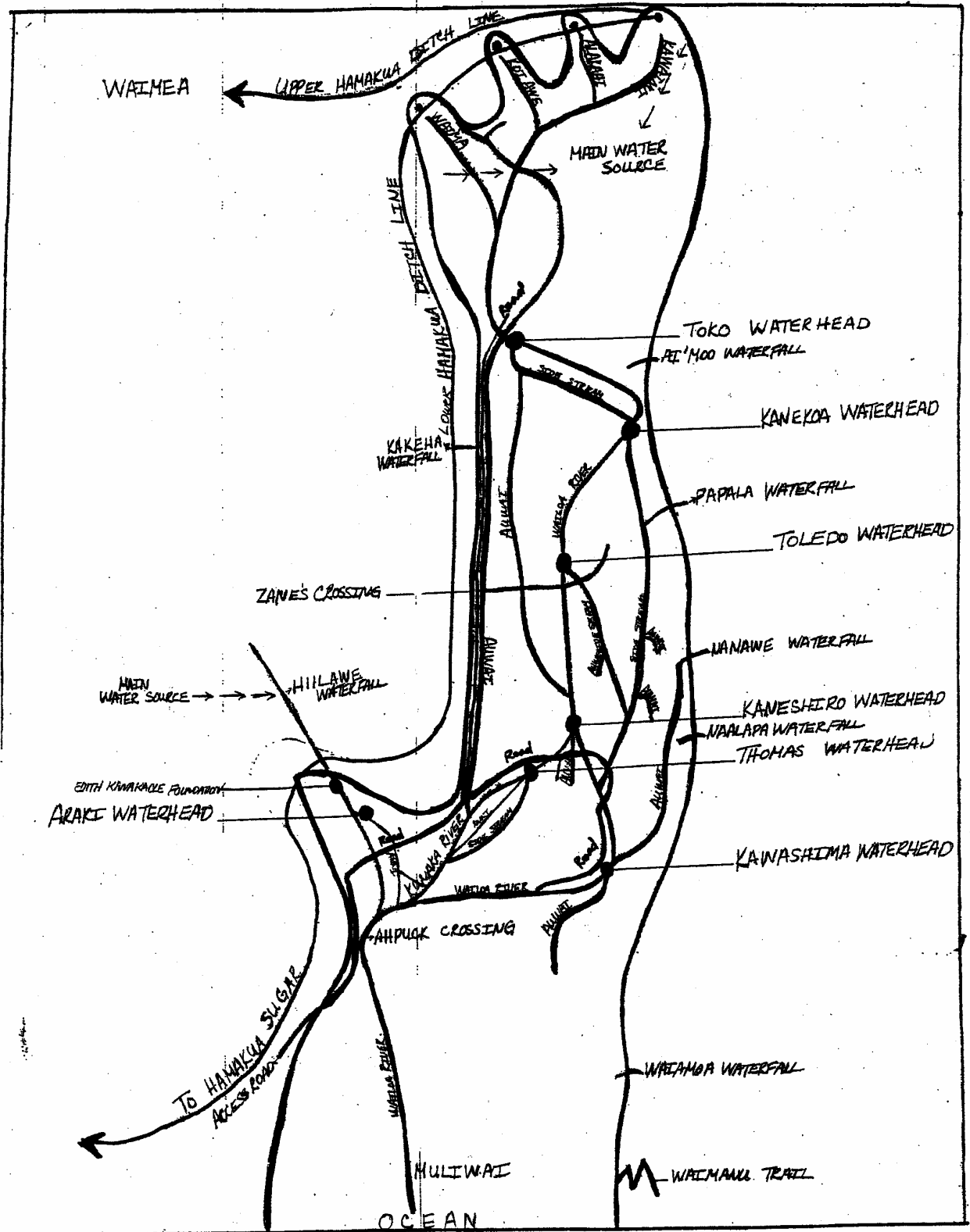
- B-1 US Geological Survey. 1995. Kukuiahaele, Quadrangle, HI Waipi'o Valley, Hawai'i.
- B-2 Waipi'o Taro Farmers Association. (WTFA) Sand/Gravel Bars in Waihola Stream, No. 1.
- B-3 Waipi'o Taro Farmers Association. (WTFA) Sand/Gravel Bars in Waihola Stream, No. 2.
- B-4 Waipi'o Taro Farmers Association. (WTFA) Water Heads in the Streams in Waipi'o Valley, Hawaii.
- B-5 County of Hawai'i. GIS Map of Waipi'o Valley, Hawaii.
- B-6 Bishop Estate. 1914. Map of Waipi'o No. 570.
- B-7 Emerson, S. 1881. Map of the Valley of Waipio, Hawaii.
- B-8 Wright, George F. 1914. Waipio Valley, Hawaii.
- B-9 US Geological Survey. Map of Stream and Ditch Flow Gauges in the Waipio Valley Area.

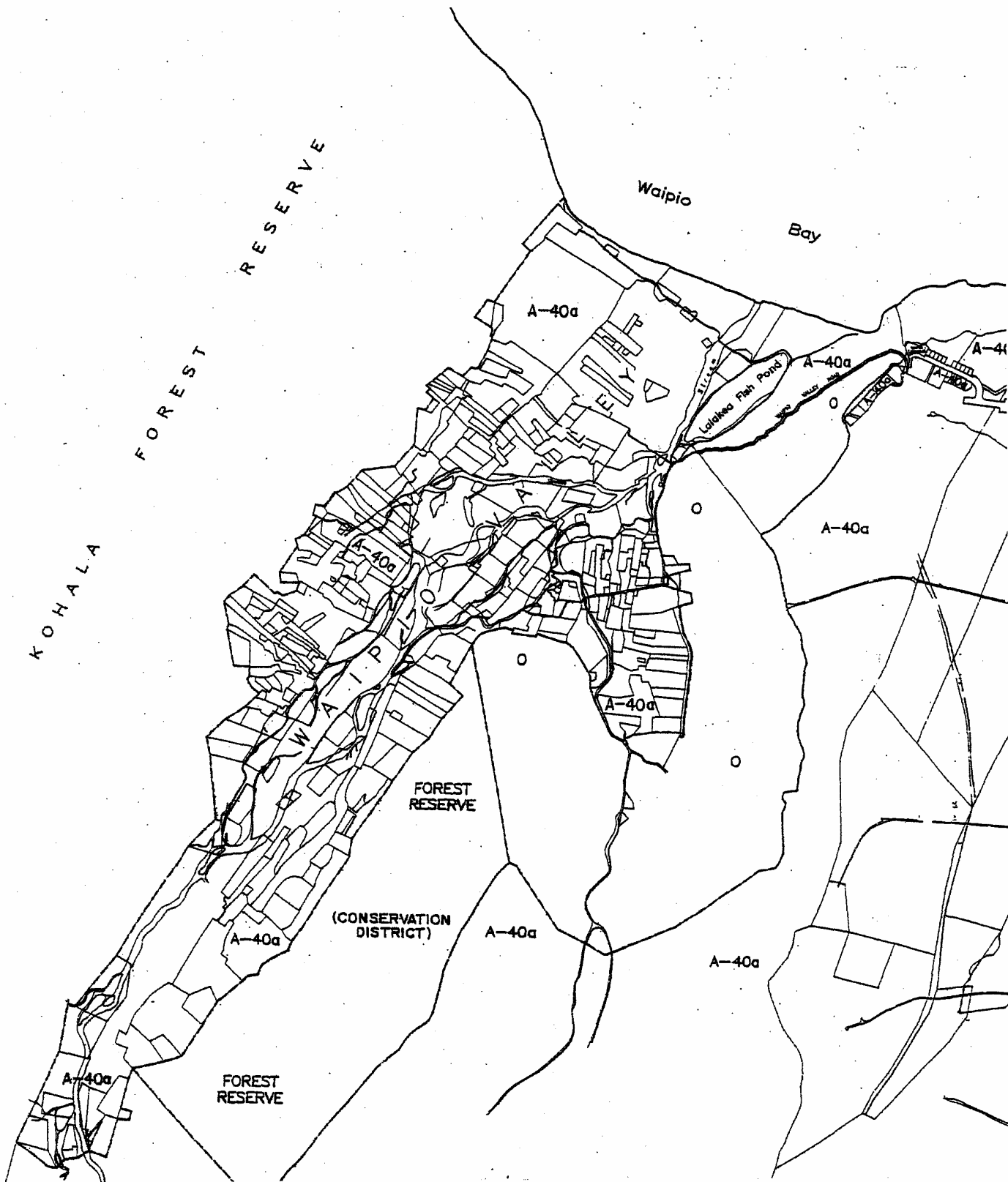


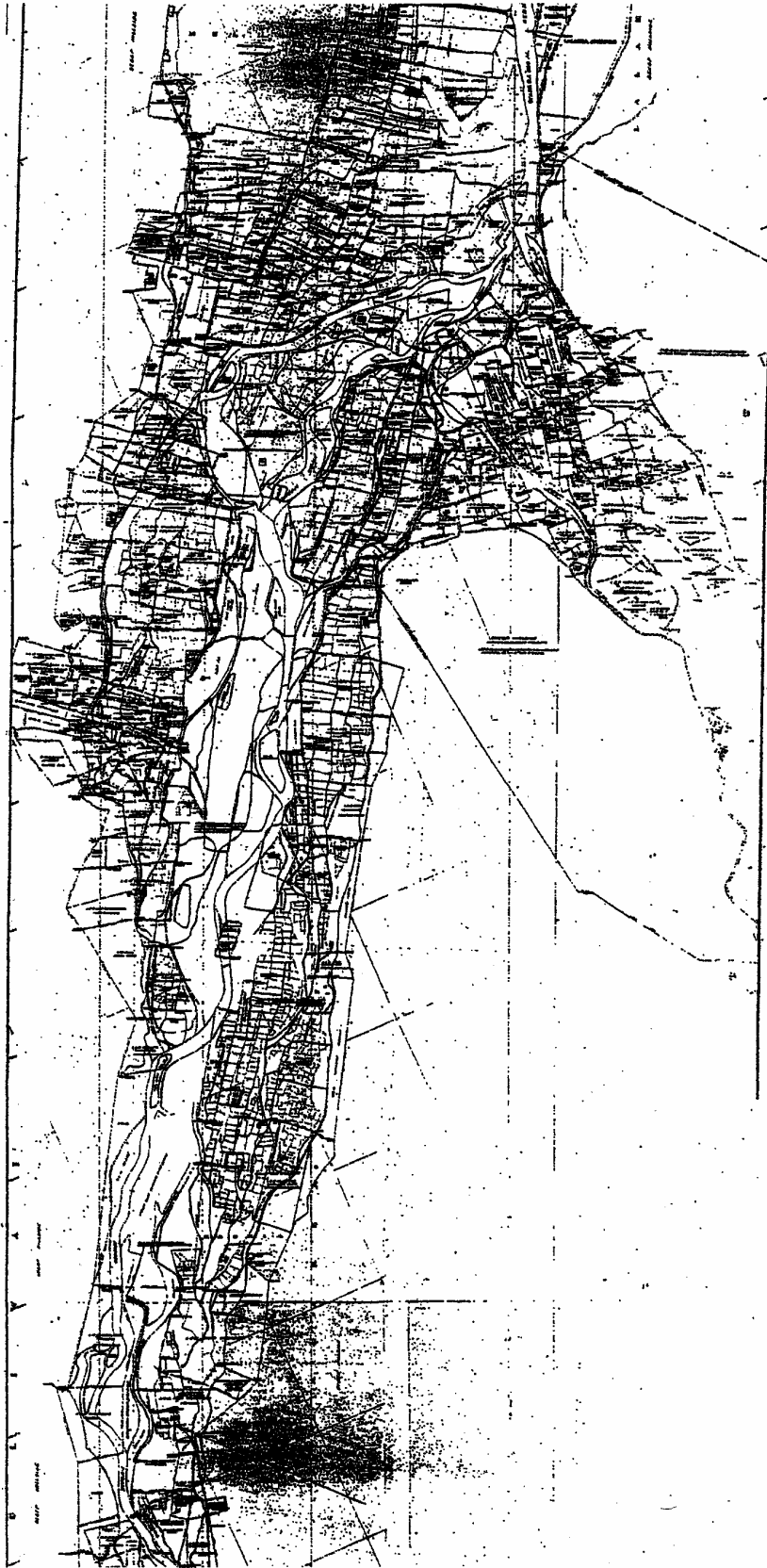
Waipi'o Valley: Towards Community Planning and Ahupua'a Management
-B1-

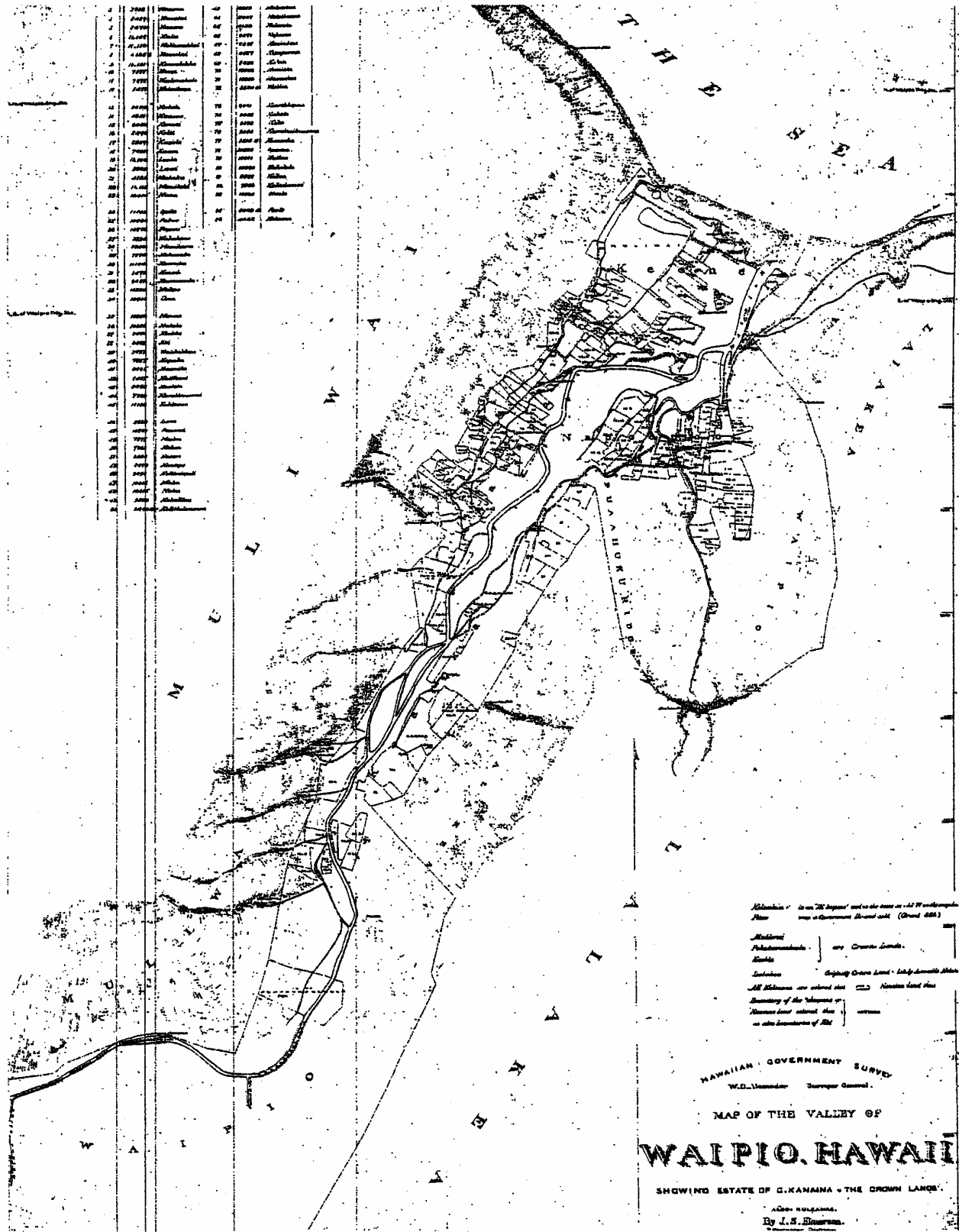




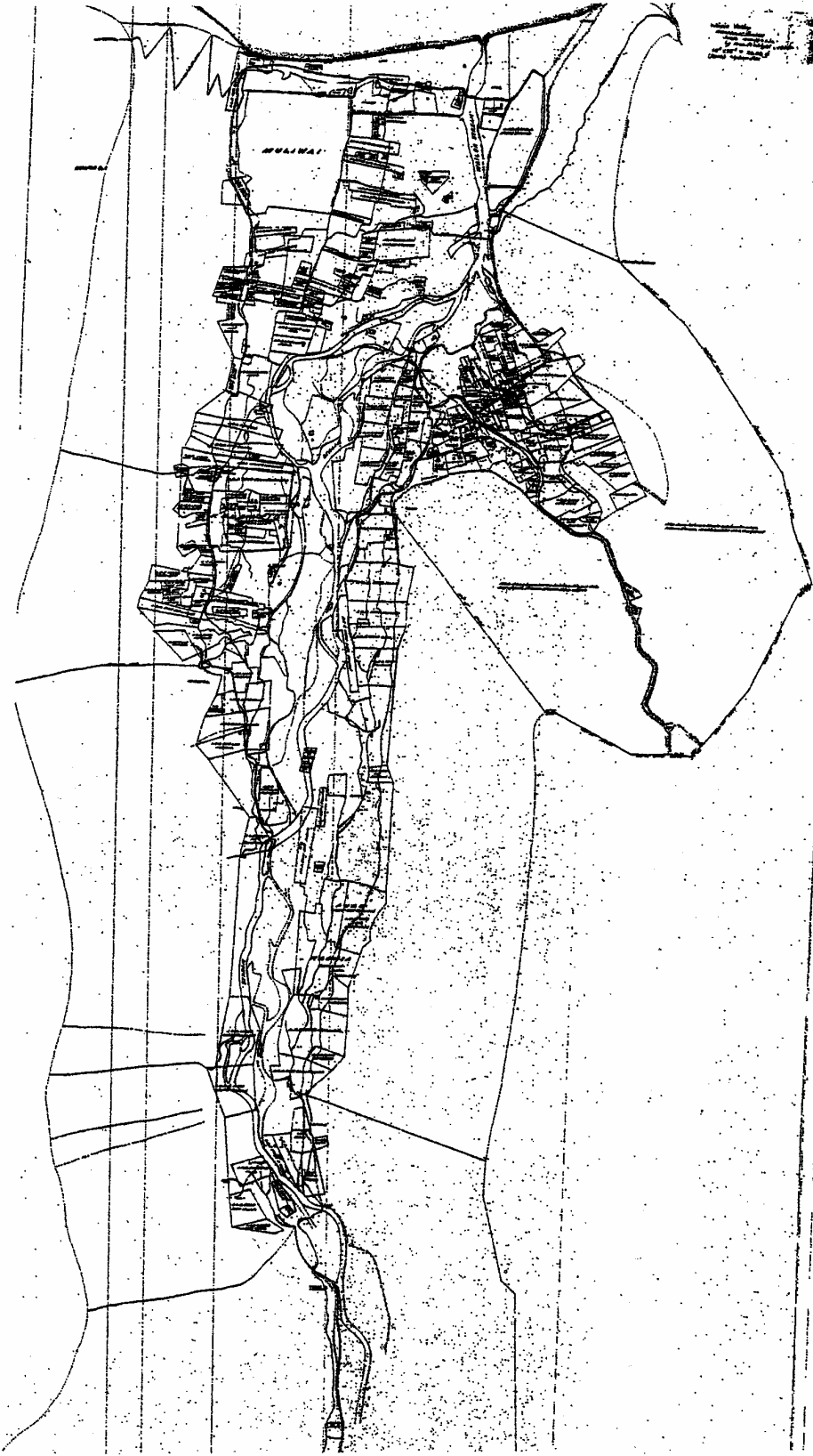


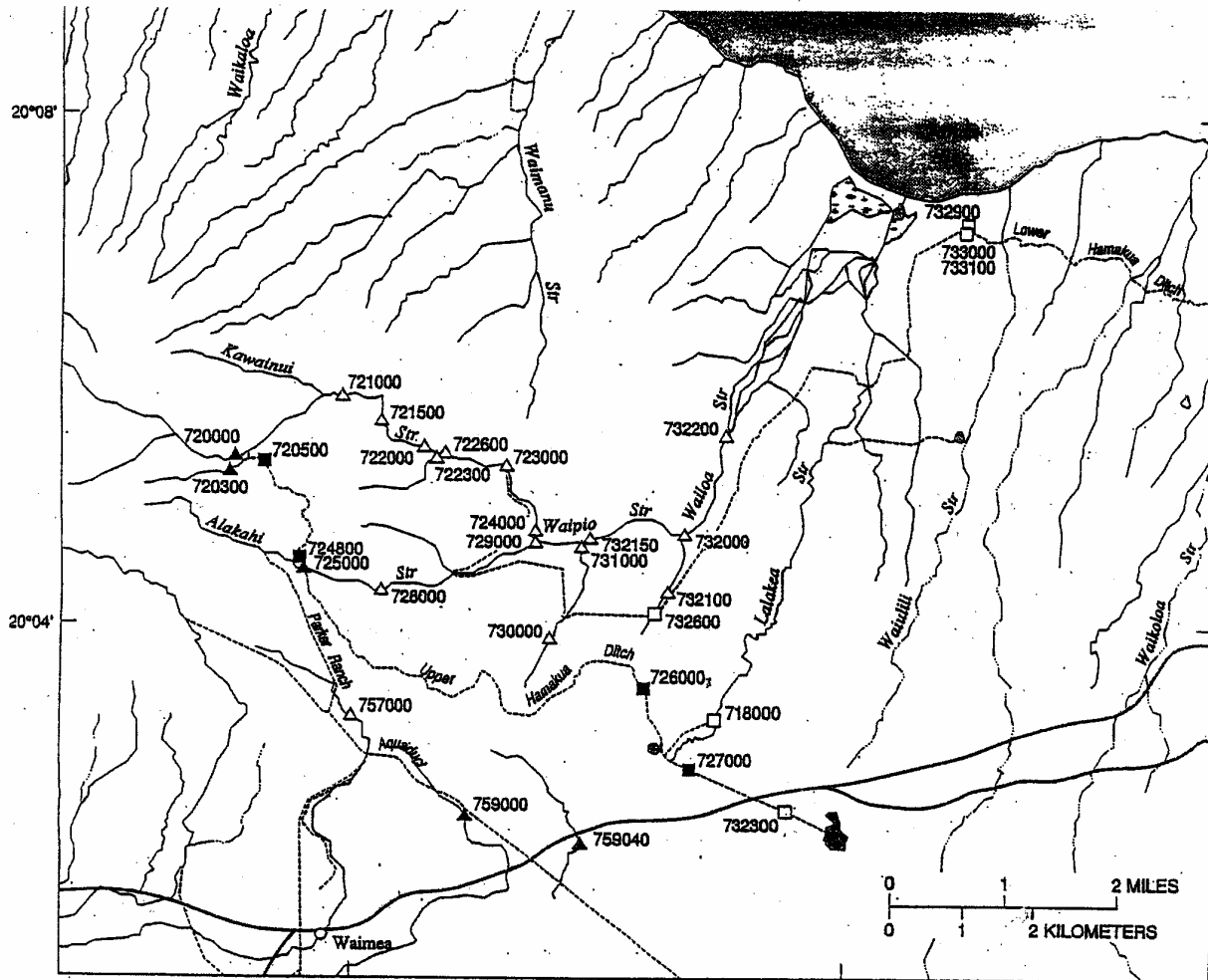






Waipi'o Valley: Towards Community Planning and Ahupua'a Management
 -B7-





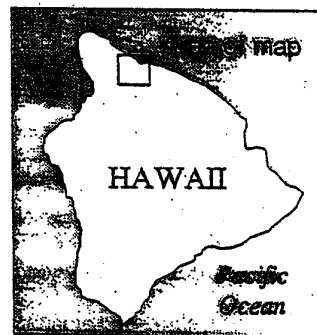
EXPLANATION

ACTIVE GAGING STATION AND ABBREVIATED NUMBER—Complete number is preceded by 16

- 720300 ▲ CONTINUOUS-RECORD (STREAM)
- 728000 ■ CONTINUOUS-RECORD (DITCH)
- 759040 ▲ CREST-STAGE (STREAM)

INACTIVE GAGING STATION AND ABBREVIATED NUMBER—Complete number is preceded by 16

- 730000 △ CONTINUOUS-RECORD (STREAM)
- 732300 □ CONTINUOUS-RECORD (DITCH)



Mythological Reference: Legends Associated with Waipi'o

Mythological Reference: Legends Associated with Waipi'o Valley

There are many important associations of Waipi'o Valley with gods, demigods, noted chiefs and personages, linking Waipi'o Valley as a most important place for genealogical connections; navigational linkages to Kahiki; mythical adventures; connection with the spirit word; supernatural events; historical facts; sacred sites; afterlife; poetical narratives and legends; hula and chants; introductions of rituals and customs; and the seat of ruling chiefs of Hawai'i.

- ✘ ***Kaikilani***, a beautiful maiden dwells beside the falls of ***Hi'ilawe*** in a breadfruit grove with the birds. She is found by the brothers of ***Lono*** who seeks a wife. She becomes his wife and goddess ***Kahikilani'ali'io'opuna***. They live and enjoy surfing at ***Kealakekua***. ***Lono*** erroneously believing she betrayed him, beats her to death and then repenting, institutes the ***Makahiki*** in her honor (Beckwith, 1970, p. 36).
- ✘ ***La'ama'ōma'ō*** wind and storm god or goddess companion of ***Mo'ikeha*** go to ***Moloka'i*** or ***Waipi'o*** (Beckwith, 1970, p. 86).
- ✘ ***Maui***, the demigod, obtains the "gourd of constant wind" from the ***Kahuna, Kaleiolu*** in ***Waipi'o*** Valley to fly his kite (Beckwith, 1970, p. 86).
- ✘ ***Milu***, is the chief in ***Waipi'o*** when strangers from ***Kahiki*** come to settle at ***Kukuihaele*** above ***Waipi'o***. They spread diseases wherever they go and seek the death of ***Milo***. ***Milo*** ask assistance to ***Lono-Puha*** but fails to obey the required ***kapu*** and disappears while surfing (Beckwith, 1970. p. 118).
- ✘ The gods ***Kāne*** and ***Kanaloa*** dwell at ***'Alakahi*** in ***Waipi'o*** with the lesser gods ***Maliu, Kaekae, 'Ouhi*** and a number of others [***uli***] (Beckwith, 1970, p. 122).
- ✘ ***Wakea*** lived in ***Waipi'o*** in his old age and became a ruler of the underworld at his death. ***Milu*** succeeds ***Wakea*** as chief in ***Waipi'o*** and, after death, he becomes associated with ***Wakea*** in the rule of the underworld. One of the three entrances to the pit of ***Milu*** is in ***Waipi'o*** (Beckwith, 1987, p. 155).
- ✘ ***Puapualenalena*** is the yellow dog of ***Waipi'o***, a great thief, who steals the famous conch shell ***Kihapu*** on the road down to ***Waipi'o***. The spirits of the Valley previously stole this conch shell from a ***heiau*** on ***O'ahu*** (Beckwith, 1970, p. 349). A ***hula*** on ***Kipahu*** at ***Waipi'o*** is recorded by Emerson (Beckwith, 1970, p. 351).
- ✘ ***Olopana*** settles in ***Waipi'o*** with wife ***Lu'ukia***. They are driven out by the flood and go to ***Kahiki***. ***Mo'ikeha*** becomes infatuated with ***Lu'ukia*** and ***Olopana*** raises no objections, but ***Lu'ukea*** rejects ***Mo'ikeha*** (Beckwith, 1970, p. 353). The priests of ***Olopana*** can cause thunder, lightning and earthquake (Beckwith, 1970, p. 510).
- ✘ ***Kila*** is instructed by his father, ***Mo'ikeha***, in the art of navigation and the knowledge of stars. ***Kila*** is enticed to go to ***Waipi'o*** seeking his father's bones which have been hidden in a cliff at ***Hā'ena***. He passes through ***Waipi'o*** as a slave, but each time

when gathering firewood at *Pua'ahuku* a rainbow accompanies him and a priest of the temple of *Paka'alana* suspect his rank. A chief who made him a land agent adopts him. It is *Kila* who devises the system of working a certain number of days for the chiefs. Eventually *Kila* goes to *Kahiki* with *La'amaikahiki* to deposit *Mo'ikeha's* bones, as his family was originally from North-Western districts of Tahiti. (Beckwith, 1970, pp. 355-358).

- ✧ *La'amaikahiki* is credited with the introduction of image worship of *Lonoikaouali'i*, the coconut fiber rope called *Lanalanawa'a* and the *Kā'eke* drum and the *hula* dance to *Hawai'i* (Beckwith, 1970, p. 359).
- ✧ To *Lu'ukia* is ascribed the introduction of the bark-cloth skirt of five thickness commonly worn by women, the network cover for the water gourd, and the very sacred lashing of the outrigger canoe (Beckwith, 1970, p. 361)
- ✧ *Liloa* is said to have died in 1575 in his home in *Waipi'o* (Beckwith, 1970, p. 389). The woven sennit casket of *Liloa* and *Lono'okamakahiki* once in Bishop Museum, are reputed to have been taken back by someone to *Waipi'o*.
- ✧ The most sacred *Heiau* of *Hawai'i* is *Paka'alana* in *Waipi'o* (Beckwith, 1970, p. 389).
- ✧ The legend of '*Umi* is the most popular of all Hawaiian prose sagas of heroes. '*Umi*, son of the chief *Liloa* and a beautiful commoner's daughter, grew up in incognito at *Kealakaha*. He had the feather cape, ivory pendant, helmet, and *Kauila* spear of his fathers as tokens of recognition. When he was ten, he went to meet his father in *Waipi'o*. He broke a *kapu* in entering the chief's residence, in leaping toward *Liloa* and in sitting on his lap. But the father recognized the tokens and kissed and wept over '*Umi*. '*Umi* built great taro patches in *Waipi'o*. *Aku* fishing was his delight. He organized people according to occupations. He kept up the worship of the gods and magnified the practice of human sacrifices. He lived in incognito away from his brother, *Hakau*, for sometime, but supernatural signs followed him so that he was recognized as a chief even away from *Waipi'o*. He was also a skillful in surfing and fishing. There are many stories about *Umi*, including his battle against the gods and the god *Ku* likening the offering with a tongue of fire at the *Heiau, Moa'ula*, in *Waipi'o*. His reign was peaceful with no war with *Pi'ilani*, the ruler of *Maui*. (Beckwith, 1970, p. 391; Kamakau, 1992, pp. 6-21, 203).
- ✧ '*Ōpele* the sleeper, the father of *Kalele'aluaka* is born in *Waipi'o* (Beckwith, 1970, p. 510)
- ✧ *Ha'inakolo* belongs to a family in *Waipi'o* associated with a simpler religion imported by a young chief from abroad who brings the drum and *kapu* ceremonies before unknown in *Hawai'i* (Beckwith, 1970, p. 510).
- ✧ *Lauka'ie'ie* is a beautiful girl brought up secretly by adopted parents with birds, flowers, and singing shells as playmates. *Hi'ilawe*, is a chief. A feast is celebrated in

- Waipi'o* near the *Heiau, Kahukuwelowelo*, with music and dancing (Beckwith, 1970, p. 523).
- ✘ *Waipi'o* had a surf that ran toward the sand (I'i, J., 1959, p. 134). *Ka'ahumanu*, in 1830, was able to direct a canoe landing in *Waipi'o* when the waves were very rough (I'i, J., 1959, p. 158). *Waipi'o* was famous for its fine *kapa* (Kamakau, 1992, p. 62).
 - ✘ '*Alapai*, who ruled over *Hawai'i*, lived in *Waipi'o* (Kamakau, 1992, pp. 66-77).
 - ✘ *Keo'uakua'u'ula* ravaged *Waipi'o*, by destroying the fishponds, the taro patches and by robbing the people (Kamakau, 1992, p. 151).
 - ✘ *Ka'eokulani*, ruling chief of *Kaua'i* at the time of *Kamehameha*, landed in *Waipi'o* and wantonly destroyed the sacred places and the *kapu* thresholds of *Liloa* (Kamakau, 1992, p. 160).
 - ✘ *Ka'ahumanu* found the bones of *Liloa, Lono'ikamakahiki, Kauhola*, and *Lole* at *Waipi'o* and these she removed to *Ka'awaloa* (Kamakau, 1992, p. 285).
 - ✘ "One who rides a *hōlua* sled" [Descendants of the chiefly families of *Waipi'o* were well known for their skills in *hōlua* sledding] (Pukui, 1983, pp. 571, 66).
 - ✘ "The furrow-cutting rain in *Waipi'o*" (Pukui, 1983, pp. 604, 173).
 - ✘ "Cliffs of *Waipi'o* that face each other" (Pukui, 1983, p. 249).
 - ✘ "*Waipi'o* and *Waimanu*, the twin valleys that face the wind" (Pukui, 1983, p. 278).
 - ✘ "...there is none to step over the sacred platform of *Liloa*" (Pukui, 1983, p. 286).

Honoka'a Taro Festival Survey and Results

Taro Festival Results

Survey

The Practicum students conducted a community visioning exercise at the Honoka'a Taro Festival on Saturday, November 6, 1999 in order to gain feedback from the Waipi'o Valley community and others about how they would like to see the Valley maintained for the future.

The groups prepared two display boards depicting events that shaped Waipi'o Valley's past and issues of present concern. In order to generate ideas from participants for strengthening Waipi'o Valley's future, the group prepared a poster-size paper highlighting five topics of importance to the valley today:

- Water/stream management
- Access/tourism
- Historic preservation
- Education
- Lo'i cultivation

Participants of the survey were encouraged to write or draw their ideas on this paper. In addition, a short survey was developed.

Discussion of Survey Questions

One hundred forty seven people participated in the survey. Some participants marked more than one answer for questions 1, 2, and 3. The multiple responses explain the deviation from the actual number of persons taking the survey (147). The survey responses are reflected numerically and graphically on pages D-4 and D-5.

Questions 1 through 3 aimed to gather demographic information on survey participants in order to determine how well associated they were with Waipi'o Valley, farming, Hawaiian culture, and tourism. Only a small number of participants (3% of 147) actually live in Waipi'o Valley, although a sizable amount of participants (30%) live in the Honoka'a area. In regard to ethnicity, 73 participants indicated that they are of Hawaiian ancestry. It could be implied that those of Hawaiian ancestry who also live in the Honoka'a and Waipi'o area would have a strong feelings about preserving traditional lo'i cultivation in Waipi'o Valley.

Question 3 asked what type of industry participants work in. Practicum students hoped to gather feedback from participants who work in farming, especially lo'i cultivation, and tourism to get an idea of broader sentiments towards the growing trend in tourism in Waipi'o Valley. For instance, what types of commercial tour ventures could exist in the Valley that would not impede upon the traditional cultivation of taro or lifestyle of the Valley. Twenty-five people indicated that they work in diversified agriculture/farming, including taro cultivation and 14 people indicated that they work in the tourist industry. As discussed in the section on public access and tourism, commercial tour ventures have existed in Waipi'o Valley for about 30 years. From interviews with individuals and

community organizations, public access and tourism is of great concern to the tenants/lessees of the Valley.

Question 4 and 5 were intended to ascertain how well participants were associated with Waipi'o Valley. Seventy-four percent of survey participants indicated that they know someone who lives or works in Waipi'o Valley. Moreover, according to the responses to Question 5, many of the people surveyed travel into the Valley to visit friends and relatives. Therefore, it may be implied that a large number of participants do indeed have a strong interpersonal connection with the Valley, which would give credibility to the seriousness of answers to Question 6.

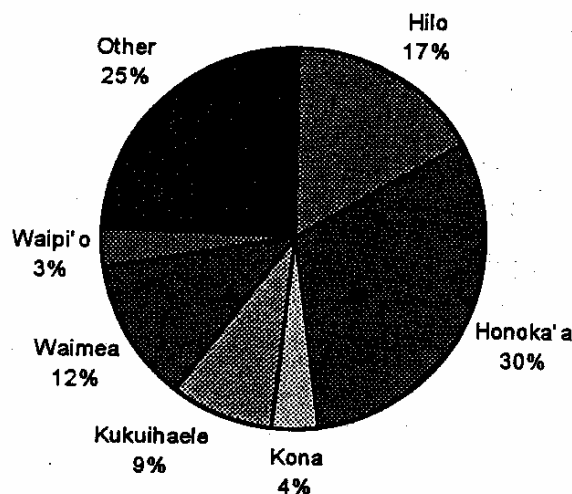
Question 6 aimed to gather qualitative feelings from participants about their "vision" of Waipi'o's future. Participants answered both on the survey questionnaire and on the "visioning" poster provided by Practicum students. In regard to water and stream management, many participants supported the need to fix the Hāmākua Ditch, clean streams, have the community agree to a cooperative management plan, and to restore Hakalaoa Falls. In regard to tourism, although a few participants indicated that tourism should not be allowed in the Valley, most people indicated that controlled tourism or an eco-cultural type of tourism venture would be acceptable. Some participants supported the idea of a Hawaiian Village or visitor center. Other sentiments include:

- establishing public beach facilities
- the need to keep the beach area clean
- controlling road access
- controlling drug activity
- establishing a school or educational center in the Valley
- continuation of taro farming
- keeping the Valley in a "natural" state
- restoration of old trails
- balancing preservation with economic growth
- encouraging more community cooperation
- reversion of the Valley back to Hawaiians or old Hawaiian ways

It is difficult to fully convey the sentiments of participants who answered the qualitative section of the survey. However, after reviewing individual comments, it is evident that most people hope that taro farming will continue to be the main economic activity in Waipi'o, that water issues will be resolved through community cooperation, and that people will help to keep the Valley clean, safe and beautiful for future generations to utilize and enjoy.

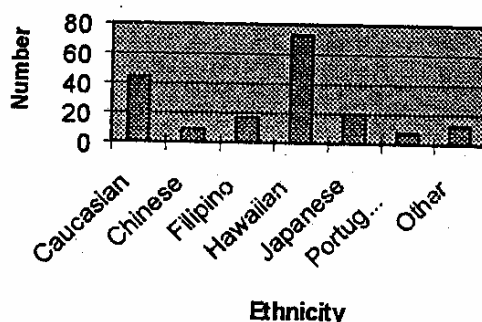
1. Where do you live?

Hilo	25
Honoka'a	47
Kona	6
Kukuihaele	13
Waimea	18
Waipi'o	5
Other	37
Total	151



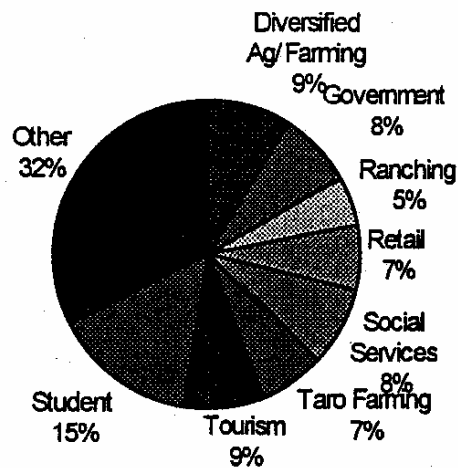
2. What is your ethnicity?

Caucasian	44
Chinese	9
Filipino	17
Hawaiian	73
Japanese	20
Portuguese	8
Other	13
Total	184



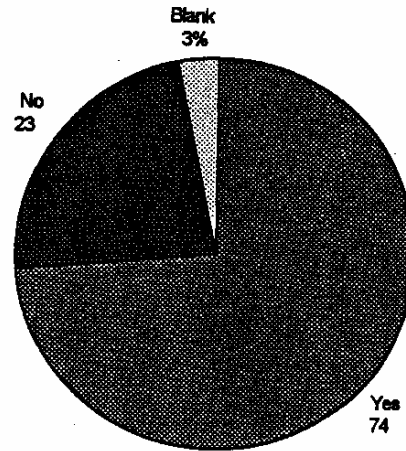
3. What industry do you work in ?

Diversified Ag/Farming	14
Government	13
Ranching	8
Retail	11
Social Services	13
Taro Farming	11
Tourism	14
Student	24
Other	52
Total	160



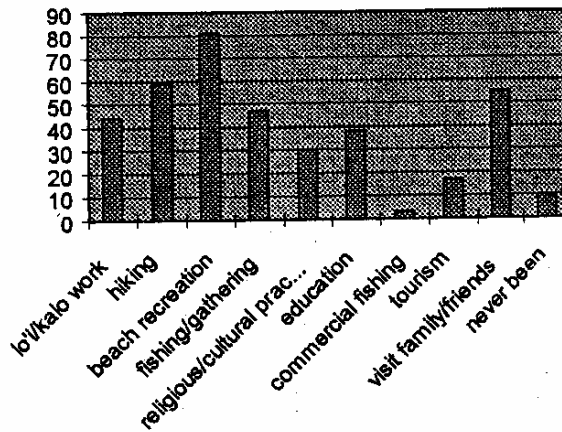
4. Do you know someone who lives or works in Waipi'o Valley?

Yes	108
No	34
Blank	5



5. What did you/do you go to Waipi'o Valley for?

lo'i/kalo work	44
hiking	59
beach recreation	81
fishing/gathering	47
religious/cultural practice	30
education	38
commercial fishing	3
tourism	17
visit family/friends	55
never been	10



Waipi'o Historical Timelines

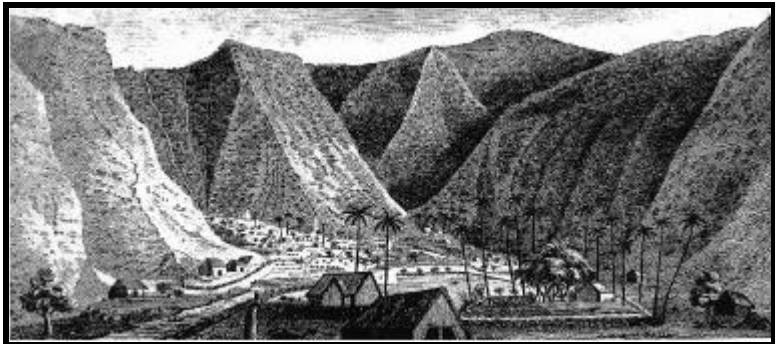
Waipiyo of the Past

Major Settlement Area

- At its peak, approximately 10,000 people lived in the Valley and some oral traditions place this number as high as 40,000.
- In pre-history, approximately 2 square miles of taro was cultivated in the valley, enough to sustain 30,000 people.
- At the time of Capt. James Cooke's visit to Waipiyo in 1779, approximately 4,000 people lived in the Valley.
- In 1823, the Reverend William Ellis records seeing 265 houses, 8 heiau and 14 major ponds in the Valley supporting approximately 1,325 residents.
- By the late 1800's the resident population is decimated by disease and emigration and approximately 200 Native Hawaiians are left in the Valley.



Stearns, H. and Macdonald, G. (1946). *Geology and Groundwater Resources of the Island of Hawaii*.



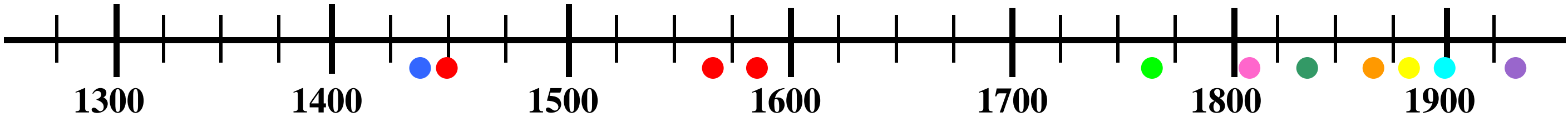
Ellis, William. (1823)



Photograph by David Franzen (1984). Courtesy of State Historic Preservation.

Lower Hāmākua Ditch

- Constructed in 1910 to irrigate approximately 27,500 acres of sugar cane and to flume sugar down the coast to the mill.
- Water diverted from the Kawainui, Alakahi, and Koiyaw streams to feed the ditch system.
- Waimā stream tapped and added to the system in the 1960s.
- Diversions remove approximately half of the water that would naturally flow through Waipiyo Valley.
- Original length was 24.75 miles which includes the 8.9 miles of tunnels from the Kawainui intake to the weir at Kukuihaele, one of the longest in the State.



Valley of the Kings

- Valley housed a succession of Pili line rulers from Kahajimoeleja (1460) to Li'loa (1580) and his son ŷUmi-a-Li'loa (1600).
- By the mid 1400s, Waipiyo becomes the ruling center of Hawai'i Island.
- Chief ŷUmi-a-Li'loa, who united the Island of Hawaii into a single kingdom, resided in Waipiyo Valley.
- King Kamehameha I born and raised in Waipiyo Valley.
- Following the Great Mahele in 1848, 58,000 acres was granted to Charles Kanayina.
- In 1881 these lands were purchased by Col. Sam Parker in auction and in turn sold to Charles Reed Bishop.
- Charles Reed Bishop conveyed these land to Bishop Museum in 1896.



Varez, Dietrich. *Collector's Portfolio*, Volcano Art Center



Photograph by David Franzen (1984). Courtesy of State Historic Preservation.

Religious Center

- Valley housed numerous large heiau.
- Pakajalana, a luakini heiau was considered "the most sacred heiau on Hawaii."
- Refuge complex of Pujuhonua.
- Hale o Li'loa, a royal mortuary heiau contained the remains of 5 to 6 rulers or chiefs.
- Honuajula, a luakini heiau was built by Li'loa.
- Moajula, a luakini heiau was a major heiau during the time of ŷUmi.



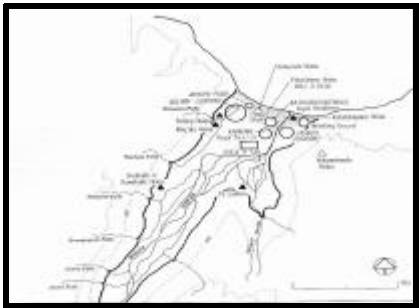
Varez, Dietrich. *Collector's Portfolio*, Volcano Art Center

Tidal Wave

- 1946 tidal wave devastates Waipiyo Valley.
- Many farmers and residents didn't return to the Valley to rebuild after the destruction.



Hawai'i State Archives, Negative 5161. (circa 1880).



Cordy, Ross. (1994) *A Regional Synthesis of Hāmākua District: Island of Hawai'i*.

Waipiyo of the Present

Twin falls of Hijilawe reduced to a single waterfall.

In 1989, the Lower Hāmākua Ditch tunnel that runs through the cliffs behind Hakalaoa Falls collapses. Temporary flume constructed around the collapsed tunnel to ensure continued water flow to the Hāmākua coast. Hāmākua Sugar Co. diverts Hakalaoa Stream to prevent further failure of the tunnel and the temporary flume.



United States Dept. of Agriculture, Natural Resource Conservation Service under its PL-566 program produces a Watershed management and ditch restoration plan.

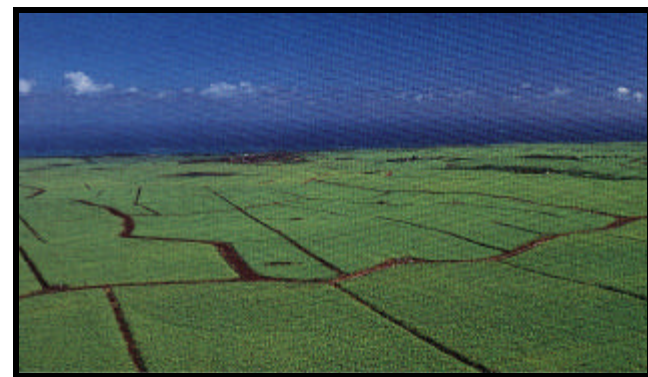
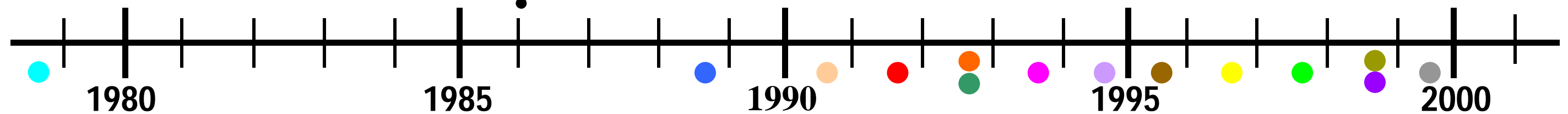
- 1995 1st Draft of the Environmental Impact Statement rejected for lack of data to support analyses.
- 1998 Revised draft Environmental Impact Statement completed.
- 1999 Final Environmental Impact Statement filed.
 - NRCS to pay for 60% of project.
 - 7.4 million gallons per day to be diverted from Hakalaoa Stream into the ditch system.
 - Temporary diversion to be removed and Hakalaoa Falls will be restored.
 - New tunnel to be dug in the cliff face behind Hakalaoa Falls.
 - All but two of the wooden flumes will be replaced with metal pipes.
 - By an agreement with the State Historic Preservation Division, two wooden flumes will be reconstructed using, to the extent possible, original materials and methods of construction.

Complaints Filed with the State Water Commission

- 1992 Complaint filed to restore Hijilawe Falls.
- 1997 Petition filed to restore stream flows.
- State Dept. of Agriculture granted extension to restore Hijilawe Falls by August 31, 2000.

Lower Hāmākua Ditch

State is only allowed to conduct basic maintenance to keep the ditch water flowing. Because of limited authority and funding, ditch is not well maintained and is deteriorating rapidly. Wooden flumes may be leaking as much as 10 to 15 million gallons/day.



No more sugar in Hāmākua

1993 - Hāmākua Sugar Co. shuts down, approximately 600 workers displaced. Thousands of acres no longer in sugar production. Diversified agriculture proposed for ex-sugar lands. Kamehameha Schools/Bishop Estate purchased portions of Hāmākua Sugar's land at bankruptcy auction. This included the land underneath the Hakalaoa Stream diversion.



Culture and Education

Edith Kanakajole Foundation starts restoration of loji at Napojopojo. 1999 Kanu O Ka jĀina begins project-based learning in Waipiyo Valley.



Valley Management

1979 Waipiyo Valley flooded leaving great devastation. Cooperative recovery efforts repair flood damage. 1991 State Task Force convened to study possible State acquisition of Bishop Museum lands in Waipiyo Valley. Guardrails installed by County along access road. 1996 All stream maintenance halted.



Photograph by Robert B. Goodman. *The Hawaiians*.

1993 WTFA secures 20-year leases from Bishop Museum

Farmers on a month-to-month lease since 1973. Long-term leases allow farmers to qualify for loans for property improvements and production.

Clarifications and Corrections

Date 4-4-2000

Please insert in the following report. Mahalo, Luciano Minerbi, Professor:

Department of Urban and Regional Planning. Fall 1999 Practicum. Waipi'o Valley: Toward Community Planning and Ahupua'a Management. University of Hawai'i.

Errata - Corrige and Clarifications

.....

Page 63 sixth paragraph.

Errata

Kenneth Brown consultant to Friends of the Future

Corrige

Kenneth Brown chair of the Board of Directors of Friends of the Future

.....

Date: Thu, 23 Mar 2000 15:49:17 -1000
From: Marjorie Ziegler <mziegler@earthjustice.org>
To: luciano@hawaii.edu
Subject: correction in Waipi`o report

Mahalo for allowing us to clarify our statements on page 37 of the report, "Waipi`o Valley: Towards Community Planning and Ahupua`a Management." We appreciate your and the students' good work. This report will be very useful to those involved in Waipi`o issues.

Page 37, 2nd full paragraph: The sentence regarding the Waipi`o Valley Community Association's concerns should read: "The concern is that the continued stream diversions and leakage of the Lower Hamakua Ditch System adversely affect in-stream usage (taro cultivation, traditional and customary Hawaiian practices, ecosystems, recreational activities), water rights, and the watershed.

Page 37, 3rd full paragraph: My and Earthjustice' Legal Defense Fund's position is that dumping of "excess" water through the Lower Hamakua Ditch near the main weir during rainier seasons, may be acceptable in extreme and unusual circumstances, but we do not support using the ditch as a flood-control measure on a regular basis. Endemic stream fauna, such as `o`opu, hihiwai, and `opae may depend on freshets or high-flow events to trigger spawning and recruitment. Uneven flows, including peak flows, are also essential to maintaining stream channels and river beds. Maintaining streams at base-flow levels, and eliminating high and medium flows, are contrary to natural reproduction of native stream species and natural stream channel maintenance.

Date 4-24-2000

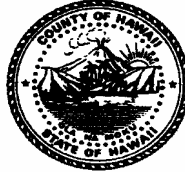
Please insert in the following report. Mahalo, Luciano Minerbi, Professor:

**Department of Urban and Regional Planning. Fall 1999 Practicum. Waipi'o Valley:
Toward Community Planning and Ahupua'a Management. University of Hawai'i.**

Feedback, Corrections & Clarifications

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Stephen K. Yamashiro
Mayor



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Dr. Luciano Minerbi
University of Hawaii at Manoa
Department of Urban and Regional Planning
Social Sciences Room 107
2424 Maile Way
Honolulu, HI 96822

Dear Dr. Minerbi:

Thank you for sending me a copy of the report, "Waipi'o Valley: Towards Community Planning and Ahupua'a Management."

You have outlined the major concerns and challenges facing this very special community and I appreciate your efforts to work with residents to resolve the problems.

Please extend my appreciation to the graduate students for their excellent report and for their emphasis on community cooperation. The information will be useful for future planning of Waipio Valley.

Sincerely,

A handwritten signature in cursive script, appearing to read "Steve".

Stephen K. Yamashiro
MAYOR

IRRB 658

BENJAMIN J. CAYETANO
Governor



State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 South King Street
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April 17, 2000

Luciano Minerbi, Dr. Arch, MUP, AICP
Department of Urban and Regional Planning
University of Hawaii at Manoa
Social Sciences Room 107
2424 Maile Way
Honolulu, HI 96822

Dear Professor Minerbi:

RE: Fall 1999 Practicum Report
"Waipi'o Valley: Towards Community Planning and
Ahupua'a Management"

Thank you for the opportunity to review and provide comments to the above mentioned report. In general, the report covers many problems, issues, and concerns and provides recommendations for their resolutions. However, there are a few corrections and clarifications we would like to make and they are listed below:

1. Page 1, 2nd paragraph, 3rd sentence - the DOA is the "Hawaii" Department of Agriculture, not the "United States". This correction should be made throughout the report as it appears in several other parts of the report. Replace "Resource" with "Resources".
2. Page 2, 2nd paragraph, 1st sentence - the phrase "redevelopment plans" is inaccurate; it should be "restoration plan".
3. Page 17, 3rd paragraph, 1st sentence - the word "intake" should be revised to "transmission" as there is no water source diverted at the site.
4. Page 19, 3rd paragraph, 3rd sentence - delete "HRS 167" and add "Chapter 167, Hawaii Revised Statutes" which is the correct reference.

Luciano Minerbi, Dr. Arch, MUP, AICP
Page 2
April 17, 2000

5. Page 21, 4th paragraph, 1st sentence - delete "will be captured" and replace with "will flow past the diversions".
6. Page 52, 2nd and 7th paragraphs - delete in entirety and replace with "State Department of Agriculture is responsible as the local sponsoring agency for all permits required by law, ordinance, or regulation for the Lower Hamakua Ditch Watershed's works of improvements. For maintenance of the Waipio Valley stream, studies and investigations required to obtain all necessary permits will be prepared by the ACE under a cost sharing agreement between the DOA and the ACE. The permits will be the responsibility of the WTFA and the WVCA."
7. Page 90, "Pennaz, James" - replace "United States Geological Survey, Honolulu Branch" with "United States Army Corps of Engineer, Pacific Ocean Division."

If you have any questions, please call me at 973-9473.

Sincerely,



PAUL T. MATSUO, P.E.
Administrator and Chief Engineer
Agricultural Resource Management
Division

c: NRCS (D. Kubo)