County of Kauai
Drought Mitigation Strategies

Prepared for:

Kauai Drought Committee

and

State of Hawaii
Department of Land and Natural Resources
Commission on Water Resource Management

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Editor's Note

The revisions in this Updated June 2012 report are limited to the addition, removal, or modification of the drought mitigation projects (projects) identified in the November 2004 version of this report. In 2007, the Hawaii State Legislature appropriated funding for drought mitigation projects in the four counties of Hawaii, which helped to implement some projects identified in the November 2004 version of this report. The purpose of this update was to update the list of projects by delisting any projects that have been completed, modifying project descriptions to reflect the current status, and to add projects identified to meet new drought mitigation needs.

The new projects were compiled during two time periods. First, in 2009, the County Drought Committees were asked to identify drought mitigation projects eligible for Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program funding. During this time, new projects were identified and project nomination sheets were completed and submitted to Hawaii State Civil Defense for funding consideration. Second, in 2011 at the request of the Hawaii Drought Council, the County Drought Committees were asked to review the list of projects their respective County Drought Mitigation Strategies. The Committees were asked to add, remove, or modify any projects to reflect current conditions and needs. New projects were also identified at this time. Note that both the High and Other priority project tables in Section 6 may be revised.

To qualify for FEMA hazard or disaster mitigation assistance, projects must be listed in the State or respective county Multi-Hazard Mitigation Plan. The projects in this Updated report that were submitted before the completion of the State of Hawaii Multi-Hazard Mitigation Plan, 2010, are also listed in the latter.

The new projects identified in 2009 and 2011 are included in this Update. Recommendations from 2011 on whether to remove or modify projects are also followed in this Update. These changes are reflected in the tables at the end of Section 6 of this report. Project description forms for new projects are appended to the Section 7 of this report. Revisions in this report were completed by Commission on Water Resource Management staff.

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1 INTRODUCTION

As part of a statewide effort to address and mitigate the effects of natural hazards, the County of Kauai has undertaken the development of strategies to mitigate the effects of drought. Drought is one of the most obstinate and pernicious of natural disasters which at its most severe form decimates crops and livestock, erodes the landscape, damages terrestrial and aquatic wildlife habitat, contributes to widespread wildfire, and results in hundreds of millions of dollars in damage. Drought moves slowly and manifests after months of below normal precipitation, and recovery requires much more than one good rainfall. Drought results from both climatic conditions and from human activities that increase demand for water.

Drought can lead to tough decisions regarding allocation of water, stringent water-use limitations in large urban areas, problems in ensuring safe drinking water and adequate water supplies for fire fighting efforts. In the past, drought was addressed as a temporary emergency. Actions were taken in response to impacts in a reactionary fashion. The most important lesson learned in recent years is that the best time to reduce the impacts of drought is before they occur. Therefore, it is important to develop a plan that advocates a proactive drought management approach. The County of Kauai Drought Mitigation Strategy was developed with this approach in mind.

This report presents the mitigation strategies developed by the Kauai Drought Committee as a result of workshops that were held on June 8, 9, and 29, 2004. The State Commission on Water Resource Management (CWRM), in cooperation with the State Civil Defense (CD), received Federal Emergency Management Agency (FEMA) assistance for the development of county drought mitigation strategies throughout the State of Hawaii. Workshops were undertaken to compile an inventory of existing drought mitigation programs, identify data gaps, identify drought risk areas, and recommend and prioritize drought mitigation projects. The Kauai Drought Committee has decided it will continue to meet regularly and earnestly work towards implementing the mitigation projects identified during the workshops.

2 BACKGROUND

The preparation of County Drought Mitigation Strategies is a part of a larger statewide drought planning framework. Statewide drought planning is guided by the *Hawaii Drought Plan* (HDP), which was most recently updated in 2004. In addition, drought mitigation planning is incorporated into the forthcoming *State of Hawaii Hazard Mitigation Plan* and each of the respective *County Multi-Hazard Mitigation Plans*.

2.1 Hawaii Drought Plan

The *Hawaii Drought Plan* provides a coordinated and consistent program and framework for integrating federal, State, county and private sector actions to reduce drought impacts. The plan is intended to serve as a working guide for those agencies and private entities that have the capabilities and resources to develop drought response and mitigation programs within their areas of jurisdiction.

The HDP includes a description of historical drought occurrences, current monitoring programs by federal, State and local agencies, climatological statistics, and risk assessments of susceptibility and vulnerability to drought. The plan emphasizes the identification of pre- and post- drought preparedness and mitigation measures for implementation by government agencies, stakeholders, and the general public.

The HDP recognizes County/Local Drought Committees (CLDCs) as an integral element for effective implementation of drought planning and mitigation. The plan anticipates that CLDCs will be the first to identify drought effects, be responsible for initial implementation of mitigation activities, and generally be the first to respond to and manage public health, safety and fire related issues.

2.2 State of Hawaii Hazard Mitigation Plan

To meet the requirements of the Disaster Management Act of 2000 and the planning guidelines by the Federal Emergency Management Agency, the State Department of Defense, Civil Defense Division is preparing the *State of Hawaii Hazard Mitigation Plan*, as well as plans for each of the four counties. At the time of this writing, the completion of the plan was anticipated by December 2004.

The Federal Disaster Management Act of 2000 requires each state and territory to conduct hazard mitigation planning and to implement projects to reduce hazard impacts prior to a disaster occurrence. This Act marked a fundamental shift in policy. Rather than placing primary emphasis on response and recovery, FEMA's focus broadened to incorporate mitigation as the foundation of emergency management.

Future funding for public assistance subsequent to disasters will be largely contingent upon mitigation plan completion. Additionally, states are required to have an

approved Standard State Mitigation Plan in order to receive additional Pre-Disaster Mitigation funds for state or local mitigation projects after November 1, 2004.

The Standard State Mitigation Plan will also be required for non-emergency assistance provided under the Stafford Act, including Public Assistance restoration of damaged facilities and Hazard Mitigation Grant Program funding. A state with a FEMA-approved Enhanced State Mitigation Plan at the time of a disaster declaration is eligible to receive increased funds under the Hazard Mitigation Grant Program, based on 20 percent of the total estimated eligible Stafford Act assistance. Therefore, the development of state and local hazard mitigation plans is key to maintaining eligibility for future FEMA mitigation and disaster recovery funding.

The *State of Hawaii Hazard Mitigation Plan* will encompass the broadest possible scope of disaster occurrences, focusing on nine natural hazards: hurricanes, tsunami, earthquakes, floods, volcanic eruptions and lava flow, coastal erosion, landslides, wildfire, and drought. Several of these hazard categories have current advisory boards or task forces that will be developing recommendations and strategies.

It is anticipated that some of the drought mitigation projects identified by CLDCs will be incorporated into the county and State hazard mitigation plans, thereby allowing these areas to be eligible for future assistance from FEMA.

2.3 County Multi-Hazard Mitigation Plan

The Disaster Mitigation Act of 2000 also requires the development of local or county plans for that particular county to be eligible for post-disaster funding. The purpose of these requirements is to ensure that there are local programs and projects in place that will help minimize the loss of life, property, and total cost of disasters.

Similar to the *State of Hawaii Hazard Mitigation Plan*, the county plans have been designed as multi-hazard mitigation plans. The initial *County Multi-Hazard Mitigation Plans* did not detail specific drought mitigation projects.

2.3.1 County Drought Mitigation Strategies

In order to develop county-specific drought mitigation strategies, the Commission on Water Resource Management (CWRM) conducted a series of workshops within each county. The resulting county-specific drought mitigation strategies, which are documented in this report, can be incorporated into each *County Multi-Hazard Mitigation Plan*. Formulation of these mitigation strategies resulted in the development of specific project proposals, which are documented in a *Drought Mitigation Strategy* report. The county can then choose to seek funding for these projects through FEMA or other sources. The CLDC will have the lead role in

implementing projects identified in their *Drought Mitigation Strategy* with assistance from the State Civil Defense Division, the Hawaii Drought Council, and the State Drought Coordinator.

The primary objectives of the county workshops were to establish standing CLDCs and improve the coordination and implementation of local drought mitigation and response actions. The CLDCs play a key role in Hawaii's drought leadership structure by providing directives and allowing for stakeholder representation at the county/local level. Improved coordination and project implementation will arise from better communication between government agencies and the private sector, from enhanced monitoring and data collection, and through the development of immediate and near-term drought mitigation strategies.

The expected outcomes of the county workshops included the following:

1. Identification of current mitigation measures and existing data gaps in drought information/planning;
2. Development and prioritization of county-based drought mitigation strategies, including ranking criteria for project selection and identification of priority mitigation projects which may be eligible for agency funding.
3. Transition from "emergency response" to early "proactive" mitigation;
4. Improved post-drought impact assessment; and
5. Validation of drought response/mitigation measures.

3 KAUAI DROUGHT COMMITTEE

3.1 Membership and Leadership

The Kauai County/Local Drought Committee (hereafter referred to as "Kauai Drought Committee") is comprised of representatives from key governmental agencies, quasi-public organizations, and major landowners with an active interest in drought-related issues. Based on participation in the drought workshops, the present membership includes the following agencies and organizations:

- Kauai Civil Defense
- Kauai Department of Water
- Kauai Fire Department
- Department of Hawaiian Homes, Kauai District
- Department of Land and Natural Resources, Division of State Parks
- Department of Land and Natural Resources, Land Division
- Department of Land and Natural Resources, Division of Forestry and Wildlife
- US Department of Agriculture, Farm Service Agency
- USDA Natural Resource Conservation Service

- Pacific Missile Range Facility
- East Kauai Soil and Water Conservation District
- East Kauai Water Users Cooperative
- Hawaii Cattleman's Council
- Grove Farm/Lihue Land Company
- Gay and Robinson
- A&B Properties Inc./Kauai Coffee Company
- Princeville Utilities

Representatives from these agencies and organizations participated in workshops held in June 2004 and shared local knowledge and information about current drought conditions, and past experiences coping with drought. Through facilitated discussion, the group collectively developed local and regional drought mitigation strategies to minimize the effects of drought upon domestic and municipal water supplies, fire suppression activities, agricultural water use, and the environment. Many of the agencies and organizations listed above were also involved in initial formation of a Kauai Drought Committee in 2001.

The Kauai Drought Committee will be led by representatives from the Kauai Department of Water and the Kauai Civil Defense. These two agencies have agreed to co-chair and facilitate future meetings. Committee members participating in the workshops generally agreed that this is a worthwhile effort deserving of continuation.

3.2 Relationship to State Drought Leadership

The *Hawaii Drought Plan* establishes a drought leadership structure that, in addition to the County/Local Drought Committees, consists of the Hawaii Drought Council, the State Drought Coordinator, and the Water Resources Committee. The purpose of each of these groups/entities and their relationship to the Kauai Drought Committee is as follows:

Hawaii Drought Council. The Hawaii Drought Council is the steering group that oversees the statewide coordination of drought-related activities. The Drought Council currently functions within existing agency authorities and responsibilities, and facilitates access to services and/or assistance to lessen the impacts of drought.

The Drought Council serves as the liaison between the various entities involved with drought planning/response, including the Kauai Drought Committee and the Office of the Governor. It also assumes the lead role in intergovernmental drought response coordination and media information releases.

State Drought Coordinator. The State Drought Coordinator is responsible for coordinating drought-related actions and communications between federal, State,

and county agencies, stakeholders, and the general public. The State Drought Coordinator position resides in the Commission on Water Resource Management.

The State Drought Coordinator will serve as the principal liaison between the Kauai Drought Committee, the Hawaii Drought Council, Water Resources Committee, and other government agencies.

Water Resources Committee. The Water Resources Committee monitors all available climatological data, reservoir storage levels, ground water conditions, weather forecasts and other pertinent information necessary to analyze the current status and forecasted level of drought conditions throughout the State.

Information gathered by the Water Resources Committee will be available to the Kauai Drought Committee through the State Drought website and reports distributed by the State Drought Coordinator.

3.3 Role and Responsibilities

3.3.1 Coordination and Communication with Government Agencies and Stakeholders

The Kauai Drought Committee will serve as a focal point for the exchange of information between federal, State, and county agencies, local stakeholders, and the Hawaii Drought Council. The Kauai Drought Committee will be responsible for monitoring drought conditions, gathering data, and forwarding information to the Hawaii Drought Council via the State Drought Coordinator. In turn, the State Drought Coordinator will provide data gathered by the Water Resources Committee to the Kauai Drought Committee for distribution to local agencies and stakeholders.

3.3.2 Data Collection and Drought Monitoring

The Kauai Drought Committee is uniquely qualified to provide information on crop and livestock impacts, reservoir water levels, stream conditions, ground water levels, and other drought issues at the County level. The Kauai Drought Committee should assist in monitoring ground water levels, stream/ditch conditions, and reservoir levels. The Kauai Drought Committee should also monitor and assess current and potential impacts of impending or ongoing drought, focusing upon impacts to the local economy, the environment, and natural resources.

Following each drought event, the Kauai Drought Committee should take the lead in conducting post-drought evaluations. Post-drought evaluations will assist in documenting statewide drought impacts and will serve to assess the effectiveness of specific response and mitigation measures implemented at both the State and county level. Upon development, the State Drought Coordinator will assist the Kauai

Drought Committee in applying a standardized methodology to document economic, environmental, and social drought impacts.

3.3.3 Mitigation Actions

Planning for drought mitigation activities is a key function of the Kauai Drought Committee. Drought mitigation projects identified by the Kauai Drought Committee are discussed in chapters 4 and 5 of this report. It is the responsibility of the Kauai Drought Committee to carry out activities in pursuit of the following:

- Further refinement and/or delineation of areas of drought risk;
- Application, receipt and administration of funds for the implementation of identified projects;and
- Provision of oversight and management of project implementation.

The State Drought Coordinator, the Hawaii Drought Council, and the Water Resources Committee are available to provide the Kauai Drought Committee with technical assistance and aid in the identification and acquisition of funds for project implementation. The Kauai Drought Committee is also responsible for the periodic review and appropriate revision of county drought mitigation strategies, adding, deleting or refining projects to reflect changing circumstances and priorities.

3.3.4 Response Actions

During drought, the Kauai Drought Committee will be responsible for initiating appropriate and coordinated drought response activities within the capabilities of local government agencies, and any State or federal drought programs. The Kauai Drought Committee should advise the Hawaii Drought Council of any needs that cannot be met through existing Kauai County resources. The Kauai Drought Committee will be the point of contact for the State Drought Coordinator relative to providing drought information and seeking assistance for response actions and documentation of impacts. The activities of the Kauai Drought Committee during drought periods should include the following actions:

- Meet quarterly (or more frequently) to discuss drought impacts and planned response actions;
- Monitor drought impacts and communicate this information to the Hawaii Drought Council via the State Drought Coordinator;
- Make recommendations as necessary for the issuance of county/local drought declarations in coordination with the Hawaii Drought Council and other Kauai County offices and agencies; and
- Provide for outreach activities targeting affected stakeholders with the purpose of determining needs, identifying detailed emergency assistance response

actions or projects, and requesting relief funding from the appropriate source with assistance from the State Drought Coordinator.

4 DROUGHT RISK AND VULNERABILITY FOR THE COUNTY OF KAUAI

In September 2003, the Commission on Water Resource Management completed a statewide *Drought Risk and Vulnerability Assessment and GIS Mapping Project*. The risk and vulnerability assessment illustrates the spatial extent and severity of drought risk for different impact sectors throughout the state. Areas in the County of Kauai identified in the report as subject to drought risk are shown in the table below.

County of Kauai Drought Risk Areas			
Sector	**Drought Stage**		
	Moderate	**Severe**	**Extreme**
Water Supply		Koloa, Anahola, Kapaa, Lihue and Poipu	Koloa, Lihue and Poipu
Agriculture and Commerce	Lihue, Poipu Anahola	Kekaha/Mana, Anahola	Southwest of Lihue
Environment, Public Health & Safety (based on 12-month interval)		Lihue/Poipu	Lihue, Poipu, and Koloa region

Adapted from: Table 6.4 Drought Risk Areas for the Kauai County, *Drought Risk and Vulnerability Assessment and GIS Mapping Project*, prepared for the State Commission on Water Resource Management, September 2003

The Kauai Drought Committee examined the findings of the drought risk and vulnerability report and, through group discussion of areas of concern and drought impact sector issues, generated a revised list of specific geographic areas of the island that are most susceptible to drought. It was noted that west side of Kauai usually experiences drought impacts before other areas on Kauai. Such areas include Hanapepe, Makaweli, Kokee, Mahaulepu and Kealia. From 2000 to 2001, drought also impacted Lihue, Anahola, and Hanalei-Princeville. The Committee noted that an extended drought, however, could have island-wide effects.

The table below summarizes the areas identified by the group as having the highest drought risk:

Drought Risk Areas Identified by the Kauai Drought Committee	
Impact Sector	**Drought Risk Areas**
Water Supply	Waimea Kekaha Hanapepe Kokee Poipu
Agriculture	Kealia-Anahola Kokee Makaweli ranch lands South Coast Mahaulepu Ranch lands Kilohana, Kipu/Haiku
Wildland Fire	West of Waimea Canyon Anahola

5 EXISTING DROUGHT RESPONSE AND MITIGATION ACTIVITIES FOR THE COUNTY OF KAUAI

The following sections summarize the existing drought response and mitigation efforts and programs in the County of Kauai. "Drought response" refers to emergency actions that are implemented directly in response to drought conditions. In contrast, "Drought mitigation" is defined as short- and long-term actions and/or programs that may be implemented prior to, during, and after drought events to reduce the severity of drought impacts to human life, property, and the economy. Drought response and mitigation activities are presented for each of three impact sectors: Wildland Fire; Agriculture; and Water Supply. Challenges and issues related to these existing programs are also summarized.

5.1 Current Drought Response Activities

5.1.1 Wildland Fire Impacts

There are inter-agency and public-private agreements in place to respond to wildland fire. The State Department of Land and Natural Resources Division of Forestry and Wildlife (DOFAW) has first response in forest reserve areas, then the County Fire Department responds. There are cooperative agreements with the Fire Department and the Navy's Pacific Missile Range Facility for fire response. Navy helicopters can be used to provide response assistance if no private helicopter contractors are available.

Private land owners such as Grove Farm/Lihue Land Company have provided for right of entry to roads and helicopter accessible water sources in the event of a fire.

However, these arrangements are not formally recognized with agencies in a Memorandum of Understanding or other agreement. Grove Farm can also respond to traffic impacts caused by wildfire by opening cane haul roads for traffic detours during times of emergency.

5.1.2 Agriculture and Commerce Impacts

In response to drought impacts on agricultural activities, reductions in crop irrigation are pursued. During past drought periods, for example, Kauai Coffee reduced irrigation from 48 hours to 12 hours per week across their 3,200 acres in cultivation.

The US Department of Agriculture (USDA) has a post-disaster emergency conservation program which shares with agricultural producers the cost of rehabilitating eligible farmlands damaged by natural disasters. The USDA also has programs to provide assistance in the form of emergency irrigation and livestock water supplies.

5.1.3 Water Supply Impacts

The Department of Water has a conservation program in place that includes public outreach and awareness components. For example, the program provides for press releases promoting voluntary conservation activities, such as restricting car washing and lawn watering, during drought periods.

5.2 Current Drought Mitigation Activities

5.2.1 Wildland Fire Impacts

Wildland fire mitigation activities in Kauai are currently conducted by federal and State agencies, as well as large private landowners. Such activities include the construction of firebreaks, restricted entry to forest reserves, and the identification of water sources for helicopter access.

The State Department of Land and Natural Resources, Division of Forestry and Wildlife and the County of Kauai Civil Defense Agency developed a wildfire mitigation plan that provides for a coordinated and consistent program to guide State and Kauai County agencies in reducing drought impacts and minimizing property losses due to wildland fire.

DOFAW invokes area closures over forest reserves curtails or suspends hunting, and closes public access to critical areas as necessary during periods of drought. DOFAW is also working on finalizing a fire danger rating system using weather station data gathered by the Pacific Disaster Center on Maui.

In Anahola, the Department of Hawaiian Home Lands has established firebreaks in residential areas using weed abatement to create a buffer zone of 75 to 100 feet between property boundaries and wildland areas.

The USDA Natural Resource Conservation Service (NRCS) recognizes the importance of preventing wildland fires. In Kauai County, NRCS provided funds for the construction of firebreaks in Kokee State Park in the aftermath of Hurricane Iniki. However, maintaining these firebreaks is difficult due to aggressive vegetative regrowth and funding limitations. Using $2 million from the Public Law 566 Program through the Soil and Water Conservation District (SWCD), twenty-one miles of road were cleared of vegetation and debris, but regular maintenance remains a challenge. There were also eight dual helistops built for safe refuge spots, as well as turnarounds for tankers and trucks.

5.2.2 Agriculture and Commerce Impacts

Agriculture and commerce mitigation activities are currently conducted by federal agencies and large private landowners.

The SWCD has an outstanding water conservation program utilizing alternate means of irrigation, including a farmers cooperative that has been developed to relieve agricultural demands on the domestic water supply.

The USDA has pre- and post-disaster conservation programs. Pre-disaster funding may be pursued through local districts for activities such as the repair of and maintenance of irrigation systems and the construction of fire breaks. Due to the income qualifications, the majority of ditch systems owned by major landowners do not qualify for pre-disaster programs, such as irrigation systems maintenance.

5.2.3 Water Supply Impacts

Water supply mitigation activities are currently undertaken by the County's Department of Water (DOW), as well as the State Department of Land and Natural Resources, Division of State Parks, and private water purveyors.

The DOW has implemented a conservation program including 100% customer metering, a meter repair/replacement program, a leak detection program, tank overflow controls/alarms, plumbing code requirements for water efficient fixture and pressure reducing valves, voluntary water restriction notices, and public outreach/education programs. As part of the National Water Education for Teachers program (Project WET), a water festival was held involving fifth graders and other groups and agencies to convey the importance of water and water conservation.

The Kilohana area has experienced declines in well water levels, likely due to the reduction in ground-water recharge rates that occurred after the closure of sugar plantation operations. The USGS is studying this issue, as Lihue area well productivity is declining. Grove Farm has developed a surface water treatment plant, through a cost-sharing agreement with the DOW, to supplement potable water supplies. Just a small fraction of surface water previously used for irrigation would be treated at the plant. Shallow wells can then be rested to allow the recovery of ground-water levels.

Princeville has a private water system consisting of 900 service connections. Two years ago, the utility was considering voluntary water restrictions, but such restrictions were ultimately unnecessary. Public education on conservation is continuously accomplished through newsletters and via school curriculums. Before 1994, water use was not metered, however, the installation of meters was followed by a sharp decline in water use. Princeville currently employs a flat rate structure, but will be pursuing a conservation-based rate structure.

At the Kokee State Park, voluntary water conservation was unsuccessful. As a result, conservation is accomplished by shutting off the park's water supply at night.

5.3 Existing Gaps in Drought Mitigation

The Kauai Drought Committee reviewed available information supporting drought mitigation efforts and identified gaps in data, related deficiencies and concerns, and offered suggestions for improvements.

5.3.1 Wildland Fire Mitigation Needs

With respect to wildland fire mitigation activities, the need for better information for decision-making and the continuing lack of funding resources was a theme in the workshop discussions. The following needs and concerns were specifically identified by the Committee:

- Remote automated weather stations (RAWS): More weather stations are needed in strategic locations.

- Fire suppression: Helicopter landing sites and water sources available for fire suppression should be pre-identified. A mobilization plan is needed for which contractors are available and what types of equipment (tankers) may be provided.

- Use of prescribed burns: DOFAW could consider prescribed burns, but impacts to endangered species populations and critical habitat areas are of concern. Funding and training would also be a problem. Herbicide is

currently being applied to maintain firebreaks, but spraying activities are hindered by limited personnel and funding.

- Economic loss data: Data is lacking to quantify economic losses due to fire. More specific costs and impact data are required to justify funding to support appropriate studies. Baseline data needs to be collected on an ongoing basis to account for losses over time. In the past, Hawaii benefited from Forest Service funds made available due to California wildfires.

- Fire access: Vehicular access road into forested areas must be maintained for fire trucks and support staff.

5.3.2 Agriculture Mitigation Needs

For pursuing agriculture mitigation activities, the importance of the ditch systems on Kauai and need for better maintenance of these systems was a recurring theme in the workshop discussions. The following needs and concerns were specifically identified by the Committee:

- Irrigation System improvements: Three State irrigation systems on Kauai were identified for improvements in the State *Agricultural Water Use and Development Plan*: Kekaha, Kokee and Anahola ditch systems. There is a need to also address improvements along privately owned systems. An inventory of ditch systems is also needed to clarify ownership and maintenance responsibilities. As some of these systems were built in the late 1800s, their current condition may have deteriorated to the extent that it may be advisable to consider conveying the water in pipelines for better system efficiency.

- Alexander reservoir: This reservoir, located in Kalaheo, has considerable silt buildup and requires cleaning. The associated ditch systems also require maintenance to remedy leaks broken gates, and to repair ditch banks. The Hanapepe River ditch provides 17 mgd of water to irrigate two-thirds of Kauai Coffee's farmlands. This volume would be increased if repairs were made to the gunite ditch at points where significant water loss is occurring.

- Hydropower potential: Existing irrigation systems could be used for alternative energy, namely the generation of hydroelectric power. This would provide farmers with an alternate power supply and such a project is more likely to attract funding. In the past, efforts were made to pursue hydroelectric power along the south fork of the Wailua River, but the project was stymied when environmental concerns could not be addressed. However, the hydroelectric resource potential remains. The Hawaii Farm Bureau Federation and the State of Hawaii Agricultural Development Corporation are exploring possible

hydroelectric opportunities in West Kauai at former Amfac project sites. Agricultural economic feasibility can be enhanced by hydroelectric projects.

- Non-potable water for irrigation: Potable water is currently being supplied to farmers by the DOW, but it would be good to consider utilizing non-potable sources such as reuse or catchment. Truck farming operations use potable water. For food safety, however, potable water is required or adequate treatment must be applied before using the water for overhead sprinkler systems. It is cheaper to purchase potable water than to treat nonpotable water. Kauai is one of counties that are leading water reuse practices. The DOH has revised its guidelines for reuse applications and public acceptance of reuse applications has also improved.

- Municipal and agricultural water distinctions: The distinction between municipal water supply and agriculture water supply is unclear. Possible partnerships for rehabilitation should be explored. The Agricultural Condominium Property Regime (CPR) is a problem; with 10-, 15-, and 20-acre lots, as many as five homes can be placed on each lot without undergoing subdivision. Water use is assigned based on 1 house, but large lots likely use more water.

5.3.3 Water Supply Mitigation Needs

For pursuing water supply mitigation activities, the use and conversion of non-potable supplies particularly from former sugar cane irrigation sources was discussed during the workshops. The following needs and concerns were specifically identified by the Committee:

- Princeville: The Makai golf course uses treated effluent for irrigation. The course has four lakes, but Princeville lacks the ability to pump water from the lower lakes. The installation of a system to pump water from the lower lakes to the highest lake would allow water reuse during drought. This would decrease the irrigation demand for potable water.

- DOW Water Master Plan 2020: The DOW has developed CIP projects prioritized for 20 year build-out, including a short-range financial plan. 12 of the 13 DOW water systems are either source or storage-deficient, with a need for catch-up, new sources, and replacement lines. DOW identified over 200 projects. For drought mitigation, more storage and source projects should be built. Some system interconnections are identified among these CIP projects, but interconnections may also be possible with other private potable systems, such as Kaimakani or Princeville. There are also more stringent Environmental Protection Agency and State Department of Health restrictions to ensure water quality, adequate operation and maintenance, and wellhead protection.

- Waimea-Kekaha: Waimea and Kekaha shafts which were developed for agriculture use could be restored for domestic potable use.

- State Kokee system: The State Kokee Water System has experienced decreased shallow well capacity due to reduced recharge of perched groundwater and increased system water demand as a result of increased development and population. The system has been exposed to increased risk from wildfires. There is a need for additional wells, reduction of water system leakage, exploration of federal partnerships (since the Kokee system supplies the Department of Defense), implementation of water conservation measures and rates, and maintenance of existing systems. The following actions are identified in the *Kauai Multi-Hazard Mitigation Strategy* and should be pursued:

    1. Complete construction of new well and place in service.
    2. Develop additional groundwater wells.
    3. Reduce water system leakage. Replace old pipelines, oversizing if necessary.
    4. Explore partnerships with Navy and Air National Guard to improve the water system.
    5. Implement water conservation measures among customers, and mandatory restrictions if necessary.
    6. Develop additional water tank storage capacity to meet increased demand for fire-fighting purposes.

- Waimea Water Shaft: One historic source for this public water system, the Waimea Shaft No. 9, was declared as influenced by surface water so it was shut down. It can be reactivated if turbid water from Waimea Shaft can be treated to acceptable water quality levels. There is a need is to renovate the Waimea shaft, develop a water treatment system, and treat water that is under the influence of surface sources.

- Kekaha Sugar Shaft: The Kekaha Sugar shaft can be converted to a potable source. The shaft must be renovated to provide domestic supply. There is also a need to replace the old line with a larger main to provide an improved interconnection between the Kekaha and Waimea water systems.

- County-Private water systems: There is a need to continue programs with the hotels to promote water conservation practices, such as low-flow fixtures. Input from private system operators is needed to improve conservation measures. There is a need to look at incentives or disincentives for improving water conservation and efficiency.

6 KAUAI COUNTY DROUGHT MITIGATION STRATEGIES

This section summarizes drought mitigation strategies for Kauai based on the input received at the first workshop. Committee members described existing drought mitigation programs and efforts, and relayed gaps in data and areas where improvements are needed. Areas susceptible to drought were identified, and various projects were proposed to help mitigate future occurrences of drought. Drought-related discussions of programs, concerns, and proposals were organized into the three main categories of impacts: wildland fire, agriculture, and water supply.

The goal of the CLDC workshops was to brainstorm strategies to guide the identification of future mitigation projects and the formulation of project descriptions. The following sections describe:

- Methodology for Project Prioritization
- "High" Priority Projects
- "Other" Priority projects

6.1 Methodology for Project Prioritization

A prioritization process was undertaken by the Kauai Drought Committee to categorize the proposed mitigation projects. This resulted in lists of "high" and "other" priority projects for each impact sector.

Some general guidelines were discussed for consideration during the project prioritization discussion, and are listed below:

- Potential impacts to people;
- Potential impacts to critical natural resources (endangered species habitat, watersheds, cultural resources, erosive soils, etc.);
- Potential impacts to economic resources (jobs, agriculture sector, tax revenues, etc.); and
- Impacts to critical government services (emergency services, water supply, health & human safety).

Generalized timelines were also agreed upon for high priority projects to indicate whether the projects were intended for immediate and/or long-term implementation.

For high priority projects, the Committee members developed detailed project descriptions, utilizing a form developed by the Hawaii Hazard Mitigation Forum. These forms provide project justification and estimated cost information to support the future pursuit of funding and implementation activities. These forms and are

reproduced in Section 7.3 of this report and should be updated and revised as more information becomes available.

6.2 Summary of "High" Priority Projects

Summaries of the "high" priority projects for all impact sectors, with preliminary cost estimates and general implementation time frames, as voted on and agreed to by the committee are as follows (Updated June 2012):

Kauai Drought Committee High Priority Drought Mitigation Projects			
Drought Impact Sector	**Mitigation Project Description**	**Preliminary Cost Estimate**	**Implementation Timeframe**
Wildland Fire	**Installation of Remote Automatic Weather Stations:** Need for more weather stations in West Kauai to capture microclimate data for area closures and pre-stage for mobilization of fire units. (*NOTE: partially completed*)	$20,000/ each RAWS	Immediate
	Roadside fuel treatments: Roadside fuel treatments maintenance in West Kauai. Firebreaks are maintained to protect the Wildland Urban Interface Zone that borders Kokee State Park. *(NOTE: heavy equipment for this task purchased for DOFAW)*	$150,000	Continuous Long Term
	Maintain Kokee Ditch system and reservoirs (Puulua, Kitano, Puuopae): Need to maintain Kokee ditch system and reservoirs for functioning and fire suppression.	$750,000	Long Term
	Fire Prevention: Need for fire prevention education – fire-wise program, wildland-urban interface – County fair, garden fair. (*NOTE: Community Wildfire Protection Plan completed for Kaua*i)	$12,000	Immediate Long Term
	Maintain and Expand Fire breaks at Anahola: Fire breaks established, now quarterly maintenance being undertaken, and fire-wise program underway.	$12,000	Immediate Long Term

Kauai Drought Committee High Priority Drought Mitigation Projects			
Drought Impact Sector	**Mitigation Project Description**	**Preliminary Cost Estimate**	**Implementation Timeframe**
	Hazardous Fuels Reduction by Removing, Clearing and Thinning of Vegetation: Puu Ka Pele and Na Pali Kona Forest Reserve	$210,000	Continuous Long Term
Agriculture	**Repair, Maintain and Reestablish the Anahola ditch system:** Repair Anahola ditch system to support DHHL development east of the airfield, future agriculture, and support during drought.	N/A	Long Term
	Maintenance and Upgrade of the Kekaha ditch system	$6,800,000	Immediate Long Term
	Upgrade and Maintain Pump 3 ditch system and Alexander Reservoir (hydropower plant)	$3,000,000	Immediate Long Term
	Emergency Water Supply Measures for Mahaulepu-Kipu-Haiku-Kahili	$50,000	Long Term
Water Supply	**County-wide Conservation and Education Program:** Develop a comprehensive State/County/ Private conservation plan including demand and supply-side management. *(NOTE: partially completed)*	$100,000	Immediate Long Term
	Kekaha Amfac Shaft Renovation and Replacement Pipeline, Kekaha Water System *(NOTE: partially completed)*	$1,700,000	Immediate Long Term
	Emergency Interconnection – Kekaha Sugar System and DOW Kekaha Water System	$50,000	Immediate
	State Kokee System Wells: Develop deeper ground water wells to improve the quantity and quality of potable wells.	N/A	Immediate
	Emergency Interconnection – DOW Koloa Water System – Grove Farm Koloa System.	$50,000	Immediate Long Term

Kauai Drought Committee High Priority Drought Mitigation Projects			
Drought Impact Sector	**Mitigation Project Description**	**Preliminary Cost Estimate**	**Implementation Timeframe**
All	**Convene sector-based drought workshops to assist stakeholders in developing or improving their individual drought / water conservation plans. Includes retaining experts in respective sectors.**	~$50,000	Immediate

6.3 Summary of "Other" Priority Projects

"Other" priority projects for each sector as voted on and agreed to by the committee are as follows:

Kauai Drought Committee Other Priority Drought Mitigation Projects	
Drought Impact Sector	**Mitigation Project Description**
Wildland Fire	Additional road clearings – Waimea: 10 – 15 additional miles of roads need to be cleared.
	Weather stations in Anahola: Need for 2 – 3 more weather stations.
	Fencing to control unauthorized dumping in Anahola
	Look into feasibility for conducting controlled burns in Anahola
	Inventory of sources of water and equipment for mobilization plan in Anahola
Agriculture	Potential for hydroelectric power – Kokee (from ditch system, not using streams or dams)
	Maintaining ditches and reservoirs – Makaweli
	Possibility of second hydropower plant in south coast
	Improved forecasting tools and data collection needed for agricutural uses (El Nino, climate prediction center 90-day forecast, but projected out to a year)

Kauai Drought Committee Other Priority Drought Mitigation Projects	
Drought Impact Sector	**Mitigation Project Description**
Water Supply	Increased water supply and storage – Anahola: Need to increase supply and storage for future growth (3 wells supply residential area, 3 storage tanks, not enough for fire suppression and future).
	Maintain physical interconnections for backup in Anahola.
	Assess surface sources and reservoirs – Kokee: Assess developing surface water sources and storage reservoirs toincrease capacity, meet increased demand, and for fire-fighting.
	Reduce water system leakage – Kokee. Replace old pipelines, oversizing as needed.
	Explore partnerships with Navy and National Guard. PMRF study proposed projects, including use of ditch water and drilling another well source.
	Implement water conservation – Kokee: Implement water conservation measures among customers, including reuse of gray water for irrigation, impose mandatory restrictions if necessary, and change rate structure.
	Pump system needed for Princeville – Makai golf course uses treated effluent for irrigation – four lakes, but no ability to pump from lower lakes. Need a system to pump from the lower lakes to the highest lake to then allow reuse during drought and relieve potable water supplies.

7 SUMMARY AND RECOMMENDATIONS

Members of the Kauai Drought Committee actively participated in a set of facilitated workshop sessions to develop mitigation strategies with the purpose of proactively addressing the impacts of drought at the County and local level. Representatives from agencies and organizations shared local knowledge and information about current drought conditions, past experiences in dealing with drought, and collectively developed local and regional drought mitigation strategies to minimize the impacts and reduce the risk of drought upon the domestic and municipal water supply, wildland fire-prone areas, agricultural operations, and the environment.

The workshops were successfully concluded with the identification of 13 priority projects, which are categorized as they relate to the major drought impact sectors of wildland fire, agriculture, and water supply. These priority projects can be pursued by the Committee and associated lead agencies for immediate and long-term implementation.

7.1 Recommendations and Issues to Consider in Future Drought Mitigation Planning

The following issues were discussed in the workshops and should be considered in future drought mitigation planning. These recommendations are consistent with the goals and objectives of the Hawaii Drought Plan.

7.1.1 Formalization of Kauai Drought Committee

The Kauai Drought Committee agreed to convene quarterly meetings and earnestly work towards implementing the priority mitigation projects identified during the workshop process. The Committee will be co-chaired by representatives of the Kauai Department of Water and the Kauai Civil Defense Agency. There was general consensus among Committee members participating in the workshop that Committee meetings are worthwhile and deserving of continuation. The Kauai Drought Committee should consider whether it should become a formalized entity through recognition by the Mayor or the Kauai Disaster Mitigation Committee.

7.1.2 Project Implementation and Funding Strategy

Project implementation should be focused on those projects that have been identified as having an immediate need and which are most easily achieved. The Kauai Drought Committee should seek planning or project funding opportunities through existing government programs, private foundation grants, and county, State, or federal appropriations. Forming partnerships with existing groups (i.e., watershed partnerships, water user cooperatives, etc.) and coordinating mitigation projects will help leverage any funding opportunities or cost-sharing requirements.

7.1.3 Kauai Drought Mitigation Strategy Update

This report has been prepared in manner such that it could be readily incorporated into the County of Kauai Multi-Hazard Mitigation Strategy or function as a stand-alone report. The Kauai Drought Committee should work together with the Kauai Disaster Mitigation Committee to ensure that this report's findings are represented in the next revision of the County of Kauai Multi-Hazard Mitigation Strategy. This report should be evaluated and updated on a regular basis in consultation with the Kauai Disaster Mitigation Committee.

7.1.4 Drought Impact Assessment/ Post-drought Evaluation

In order to effectively document the impacts of drought, the Kauai Drought Committee should work with the Hawaii Drought Council and the State Drought Coordinator to apply a standardized methodology to document economic, environmental, and social drought impacts. A post-drought evaluation is also recommended to evaluate the efficacy of mitigation and response actions executed

by government and private sector organizations, and to make recommendations for improvement.

7.1.5 Drought Response Project Identification

Although this report focuses on preparedness and mitigation, there may be circumstances where emergency assistance is necessary to alleviate drought impacts to stakeholders. Limited federal program funding may be available to help with emergency drought relief. In these cases the Kauai Drought Committee should assess and identify these needs within the community and provide a detailed description of drought assistance projects to the State Drought Coordinator, who will submit project proposals from all affected counties for federal program assistance.

7.2 Future Kauai Drought Committee Operational Activities

The Kauai Drought Committee agreed to hold quarterly meetings. Critical times for meetings include: 1) December - prior to the Hawaii legislative session and the upcoming Congressional session, and 2) June – just prior to the end of the Federal fiscal year when funds may become available on short notice. The Committee will be co-chaired by representatives of the Department of Water and the Kauai Civil Defense Agency, who are urged to collaborate on the development of meeting agendas and share responsibilities for meeting coordination.

7.3 Project Forms

For identified high priority projects, Committee members developed more detailed project descriptions using the format provided by the State Hazard Mitigation Forum. A project form was used to enable consistent project descriptions and includes general project justification and cost information to support the pursuit of project funding and implementation. Specific project details should be developed upon selection of a project for implementation.

The project forms are provided for reference on the following pages. These forms should be updated and revised as more information becomes available.

Index of Project Forms
(Updated June 2012)

* Added June 2012

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WF-1

Jurisdiction: Kauai County		**Agency/Organization:** DLNR, DOFAW
Project Title: Installation of Remote Automatic Weather Stations		**Contact Person:** Alvin Kyono
		Phone: (808) 274-3433
		e-mail: Alvin.M.Kyono@hawaii.gov
Hazard(s): Wildfires		
Flood Zone:	**Base Flood Elevation:**	**Erosion Rate:**
Critical Facility/Population/Asset at Risk: Watershed, Natural Resources (T&E, Erosion, Timber Stands)		
Environmental Impact: **High** Medium Low		**Historical Preservation Impact:** **High** **Medium** Low
Risk of Hazard Impact: **High** Medium Low		**Importance to Protection of Life and Property and Recovery from Disaster:** **High** Medium Low
Estimated Cost of Project: $200,000		**Project Period (duration):** Indefinite
Estimated Value of Structure or Facility: $25,000 / unit		
Sources of Financial Support: USFS, State		

Project Objectives:

Purchase and install six (6) Remote Automatic Weather Stations (RAWS) units to capture microclimate data for area closures and pre-staging for mobilization of fire equipment.

Project Description:

Acquisition of six (6) RAWS units is necessary to mitigate the wildfire threat in West Kauai. Strategically located, the RAAWS units have sensors that can augment the intelligence gathering capability for the "Fire Danger Rating System" (FDRS). Besides providing fire danger information, the sensors can provide warnings of flooding and high winds.

Estimated Cost:
$150,000 for 6 RAWS units
50,000 for Installation and Maintenance for first 5 years ($10,000 per year)
$200,000

Proposal Date: 6/29/04

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WF-2

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: DLNR, DOFAW</td></tr>
<tr><td colspan="2" rowspan="3">Project Title:
Roadside Fuel Treatments</td><td colspan="2">Contact Person: Alvin Kyono</td></tr>
<tr><td colspan="2">Phone: (808) 274-3433</td></tr>
<tr><td colspan="2">e-mail: Alvin.M.Kyono@hawaii.gov</td></tr>
<tr><td colspan="4">Hazard(s): Wildfires</td></tr>
<tr><td>Flood Zone:</td><td colspan="2">Base Flood Elevation:</td><td>Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
Watershed, Natural Resources (Native Plants, T&E, Erosion, Timber)</td></tr>
<tr><td colspan="2">Environmental Impact:

High Medium Low</td><td colspan="2">Historical Preservation Impact:

High Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

High Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $150,000
($50,000 per year)</td><td colspan="2">Project Period (duration): 3 years</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support: USFS, State</td></tr>
<tr><td colspan="4">Project Objectives:

Maintain regrowth along 21 miles of firebreaks in the Forest Reserves and State Parks of West Kauai.</td></tr>
<tr><td colspan="4">Project Description:

Remove and mulch roadside tress from firebreak area 30’ to 50’ from road edge. Mulching of plant material will reduce the fire spread potential and limit soil erosion.</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WF-5

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: DLNR, DOFAW</td></tr>
<tr><td colspan="2" rowspan="3">Project Title:
Fire Prevention</td><td colspan="2">Contact Person: Alvin Kyono</td></tr>
<tr><td colspan="2">Phone: (808) 274-3433</td></tr>
<tr><td colspan="2">e-mail: Alvin.M.Kyono@hawaii.gov</td></tr>
<tr><td colspan="4">Hazard(s): Wildfires</td></tr>
<tr><td>Flood Zone:</td><td>Base Flood Elevation:</td><td colspan="2">Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
Natural Resources</td></tr>
<tr><td colspan="2">Environmental Impact:

High Medium Low</td><td colspan="2">Historical Preservation Impact:

High Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

High Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $12,000</td><td colspan="2">Project Period (duration): Indefinite</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support: USFS, State, County</td></tr>
<tr><td colspan="4">Project Objectives:

Prevention education and public outreach. Establish a Fire-Wise program and distribute information on Wildland Urban Interface (WUI).</td></tr>
<tr><td colspan="4">Project Description:

Attend public events such as fairs, conventions, and schools to distribute informationa dn converse with the public on fire prevention. Work with home owners and different agencies to establish and promote Fire-Wise and the WUI programs. Assist the County Fire Prevention Personnel.

Estimated Costs:
$ 4,000 First Year
8,000 ($2,000/year for four years)
$12,000</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WF-4 & AG-3

Jurisdiction: Kauai County		**Agency/Organization:** DOFAW, Parks, DHHL, ADC
Project Title: Maintain Kokee Ditch system and reservoirs (Puulua, Kitano, Puuopae)		**Contact Person:** Alvin Kyono, Wayne Souza, Roland Licona, Sam Lee
		Phone: (808) 274-3433
		e-mail: Alvin.M. Kyono@hawaii.gov
Hazard(s): Loss of flows creating increased fire hazards, reduced fire-fighting capabilities		
Flood Zone:	**Base Flood Elevation:**	**Erosion Rate:**
Critical Facility/Population/Asset at Risk: Kokee cabins, pump stations, PMRF, Waimea Hydropower Plant, Hawaii Air National Guard facility, agricultural production losses, DHHL lessees and DHHL land users		
Environmental Impact: **High** Medium Low		**Historical Preservation Impact:** **High** Medium Low
Risk of Hazard Impact: **High** Medium Low		**Importance to Protection of Life and Property and Recovery from Disaster:** **High** Medium Low
Estimated Cost of Project: $350,000 - $750,000 (plus annual maintenance)		**Project Period (duration):** Long Term
Estimated Value of Structure or Facility: Irreplaceable historic structure		
Sources of Financial Support: Private sector (ditch users), Navy, USDA potential, State of Hawaii, COE, BOR		

Project Objectives:

Ensure adequate flow in ditch system, maintain ditch and reservoir integrity, control vegetation and seepage. USDA programs can help, but State lease terms are problematic.

Project Description:

Continue ongoing maintenance, repair, rehabilitation, remove vegetation, repair flumes, ditch flow monitoring, reservoirs maintenance (leakage of reservoirs, gates in disrepair). (see DLNR inventory of dams – Sterling Yong)

Inventory ditch connections – end users
Piping/undergrounding potential
Additional Hydropower plant systems
Presently, only minimal maintenance being done on ditch system – need to increase maintenance.
Recreational benefits – commercial flume rides, trout fishing

Proposal Date: 6/29/04

KAUAI DROUGHT MITIGATION PROJECT IDENTIFITION FORM: WF-7

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td>Agency/Organization: DHHL, County Fire, DOFAW, DOA, Private landowners (Thomas McClusky & Justin Hughes)</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: Maintain and Expand Fire Breaks at Anahola</td><td>Contact Person: Roland Licona, Fire Dept, Alvin Kyono, Jeff Rivera (for McClusky), Bruce Laymon (for Hughes)</td></tr>
<tr><td>Phone: (808) 274-3131</td></tr>
<tr><td>e-mail: roland.e.licona@hawaii.gov</td></tr>
<tr><td colspan="3">Hazard(s): Fire</td></tr>
<tr><td>Flood Zone:</td><td>Base Flood Elevation:</td><td>Erosion Rate:</td></tr>
<tr><td colspan="3">Critical Facility/Population/Asset at Risk:
Residences in urban interface, livestock, State Parks and communication tower, water supply facility/well systems, archaeological remains</td></tr>
<tr><td colspan="2">Environmental Impact:

<u>High</u> Medium Low</td><td>Historical Preservation Impact:

High <u>Medium</u> Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

<u>High</u> Medium Low</td><td>Importance to Protection of Life and Property and Recovery from Disaster:
<u>High</u> Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $10-$12,000 annually</td><td>Project Period (duration): Long Term</td></tr>
<tr><td colspan="3">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="3">Sources of Financial Support: DHHL</td></tr>
<tr><td colspan="3">Project Objectives:

Maintain and expand fire breaks for safety of DHHL residents and property, livestock</td></tr>
<tr><td colspan="3">Project Description:

Conduct quarterly maintenance and undertake fire-wise program and outreach on fire safety.</td></tr>
<tr><td colspan="3">Proposal Date: 6/29/04</td></tr>
</table>

Hazard Mitigation Project Proposal State of Hawaii WF-8

Date:	September 10, 2009		
Jurisdiction:	County of Kauai, State of Hawaii	Agency/Organization:	DLNR, DOFAW
Project Title:	Hazardous Fuels Reduction by Removing, Clearing and Thinning of Vegetation	Contact Person:	Galen Kawakami
		Phone:	808 274-3436
		e-mail:	galen.k.kawakami@hawaii.gov
Project Physical Address:	Puu Ka Pele and Na Pali Kona Forest Reserve		
Project TMK:	4-1-4-001:003, 4-1-4-001:014		

Natural Hazard(s) to be Mitigated (check hazard(s) that apply):						
☐ Drought	☐ Erosion	☐ Flood	☒ Hurricane, High	☐ Landslide	☐ Seismic	
☐ Tsunami	☐ Volcano/Lava	☒ Wildfire	☐ Other			

Meets Criteria for Environmental / Historical Preservation Soundness:			Yes
Long Range Solution (+15 years):	No	If yes, # of years:	

Is Project Currently Listed in the State Multi Hazard Mitigation Plan and/or applicable County Multi Hazard Mitigation Plan?					
State Plan:	Yes	County Plan:	No	Other (specify):	

Apply For (check all that apply):					
☒ HMGP	☒ PDM	☐ State Mitigation Plan Project List	☐ Other (specify):		

Estimated TOTAL Cost of	$210,000	Project Period:	
Estimated Federal Share of		Estimated Non-Federal Share of	
Estimated Value of Structure or Facility:			
Estimated Value of Structure's Contents:			
Source(s) of Non-Federal Cost Match:			

Project Description:

This project consists of the purchase of a Skid Steer with a Forestry Cutter attachment to accomplish hazardous fuels reduction by removing, clearing and thinning vegetation in wildland urban interface zones within the Na Pali Kona and Puu Ka Pele Forest Reserves, and Kokee State Park. Also, the state would like to purchase a Bull Dozer to widen access routes and roads to cabins and structures in the area. There are currently over 100 cabins being used and these activities will reduce the risk to human life and structures from wildland fires. In addition to these there are state park facilities throughout the areas that are used by approximately 700,000 visitors and locals each year.

Also, these areas consist of forests that exceed 100 ft. in height and can become hazardous with high winds and hurricanes. It will reduce the risk of damage from natural disasters by reducing these stands around structures and roads to create defensible space.

Evaluation Category	Considerations	Comments
Social	Community Acceptance	High Acceptance from Community
	Adversely Affects Segments of the Population	No adverse affects
Technical	Technical Feasibility	High feasibility
	Long-Term Solution	With proper maintenance long term solution is very good
	Secondary Impacts	Forest Health improvement by creating new growth of native plants
Administrative	Staffing	All work will be done by DOFAW staff
	Funding Allocated	Additional General Funds will support this project
	Maintenance/Operations	All O&M will be done by DOFAW staff
Political	Political Support	Yes
	Plan Proponent	Yes
	Public Support	Yes
Legal	Authority	Yes
	Action Subject to Legal Challenge	No
Economic	Benefit	Safety for visiting tourist
	Cost of Action	$210,000
	Contributes to Economic Goals	Yest, promotes tourism on Kauai
	Outside Funding Required	Yes, stat general funds will support this project
Environmental	Affects Land/Water Bodies	No negative affects on the land and water of the area
	Affects Endangered Species	No affect on threatened and endangered species
	Affects Hazardous Materials and Waste Sites	No
	Consistent with Community Environmental Goals	Yes
	Consistent with Federal Laws	Yes

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: AG-1

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: DHHL, DLNR, Kealia Ranch (Thomas McClusky)</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: Repair, maintain and reestablish Anahola ditch system</td><td colspan="2">Contact Person: Roland Licona, Alvin Kyono, Jeff Rivera (McClusky), Bruce Laymon</td></tr>
<tr><td colspan="2">Phone: (808) 274-3131</td></tr>
<tr><td colspan="2">e-mail: roland.e.licona@hawaii.gov</td></tr>
<tr><td colspan="4">Hazard(s): Loss of agricultural production, loss of livestock, reduced fire suppression capabilities</td></tr>
<tr><td>Flood Zone:</td><td colspan="2">Base Flood Elevation:</td><td>Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
private ranch house, fencing, ranch infrastructure, agricultural enterprises in area</td></tr>
<tr><td colspan="2">Environmental Impact:

<u>High</u> Medium Low</td><td colspan="2">Historical Preservation Impact:

<u>High</u> Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

<u>High</u> Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High <u>Medium</u> Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: (Roland to provide estimate)</td><td colspan="2">Project Period (duration): Long Term</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility: Irreplaceable historic system</td></tr>
<tr><td colspan="4">Sources of Financial Support: DHHL, DHHL land users, landowners</td></tr>
<tr><td colspan="4">Project Objectives:

Repair ditch system to support DHHL development east of the airfield, future agriculture, and support during drought.</td></tr>
<tr><td colspan="4">Project Description:

Evaluation and planning of 3,111 acres for potential land use.
Need an estimate/projection of use/users.
Prepare an implementation and maintenance plan for the ditch system (water in ditch system not used for 15 years) – portions have minimal flow. 2 users of land – 65 and 5 acres. Upper system in total disrepair.</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: AG-2

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: DLNR, Gay & Robinson, ADC,</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: Maintenance and Upgrade of Kekaha Ditch System</td><td colspan="2">Contact Person: Thomas Oi, Howard Green (G&R), Wayne Katayama</td></tr>
<tr><td colspan="2">Phone: (808) 274-3491</td></tr>
<tr><td colspan="2">e-mail: Thomas.h.oi@hawaii.gov</td></tr>
<tr><td colspan="4">Hazard(s): loss of agricultural production, flood protection, loss of hydropower</td></tr>
<tr><td>Flood Zone:</td><td colspan="2">Base Flood Elevation:</td><td>Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
PMRF, Waimea WWTP, agricultural production losses, Waiawa Power Plant, Waimea-Kekaha residences</td></tr>
<tr><td colspan="2">Environmental Impact:

<u>High</u> Medium Low</td><td colspan="2">Historical Preservation Impact:

<u>High</u> Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

<u>High</u> Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
<u>High</u> Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $6.8 million (rehabilitation costs - DOA) + $500,000 annual maintenance</td><td colspan="2">Project Period (duration): Long Term</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support: DOA, USDA, lessees, COE,</td></tr>
<tr><td colspan="4">Project Objectives:

Upkeep help with Floodplain protection,</td></tr>
<tr><td colspan="4">Project Description:

Conduct the needed engineering and feasibility studies (see DOA Water Use and Development Plan description)

Upgrading of hydropower plant for increased service and production.</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: AG-6

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: Kauai Coffee, Fire Dept, DLNR-DOFAW</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: Upgrade and Maintain Pump 3 Ditch System and Alexander Reservoir System (hydropower plant)</td><td colspan="2">Contact Person: Greg Williams, Richard Loreo, Alvin Kyono</td></tr>
<tr><td colspan="2">Phone: (808) 335-0052</td></tr>
<tr><td colspan="2">e-mail: gwilliams@abinc.com</td></tr>
<tr><td colspan="4">Hazard(s): Loss of power generation, loss of agricultural production, flood control, reduced fire suppression</td></tr>
<tr><td>Flood Zone:</td><td>Base Flood Elevation:</td><td colspan="2">Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
Kalaheo Hydropower Plant, Kalaheo-Eleele communities, Kauai Coffee, seed corn growers, orchards, National Tropical Botanical Garden</td></tr>
<tr><td colspan="2">Environmental Impact:

High Medium Low</td><td colspan="2">Historical Preservation Impact:

High Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

High Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $2 - $3 million, $50,000 annual maintenance</td><td colspan="2">Project Period (duration): Long term</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support: Kauai Coffee, lessees, BOR, COE, USDA/NRCS</td></tr>
<tr><td colspan="4">Project Objectives:

Upgrade and maintain system, improve water deliveries, safety and reliability of hydro system, tie-in additional fire suppression facilities.</td></tr>
<tr><td colspan="4">Project Description:

Engineering assessments for system upgrades
Ditch system upgrade (piping)
Penstock replacement
Additional hydropower potential assessment (200 foot elevation drop to Pump 3)
Identify additional resources for fire-fighting and mitigation

Alexander Reservoir – valving and penstock, 75-year old infrastructure, engineering evaluation for upgrades and maintenance</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: AG-9 & 10

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: DLNR-DOFAW, Grove Farm, Knudsen Trust, lessees, Kahili Adventist Church/School</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: Emergency water supply measures for Mahaulepu-Kipu-Haiku-Kahili</td><td colspan="2">Contact Person: Alvin Kyono, Stacy Wong (Knudsen), Bill Cowern (lessees)</td></tr>
<tr><td colspan="2">Phone: (808) 274-3433</td></tr>
<tr><td colspan="2">e-mail: Alvin.M.Kyono@hawaii.gov</td></tr>
<tr><td colspan="4">Hazard(s): loss of agricultural production, fire hazards,</td></tr>
<tr><td>Flood Zone:</td><td>Base Flood Elevation:</td><td colspan="2">Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
Kahili Mt. School, highway, power lines, livestock, forestry resources, watercress farm</td></tr>
<tr><td colspan="2">Environmental Impact:

High Medium Low</td><td colspan="2">Historical Preservation Impact:

High Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

High Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $25,000 - $50,000 plus maintenance</td><td colspan="2">Project Period (duration): Long Term</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support: BOR, private, US Forestry</td></tr>
<tr><td colspan="4">Project Objectives:

Identify and develop surface and ground water resources for emergency use.</td></tr>
<tr><td colspan="4">Project Description:

Identify 5 – 10 access points for water hauls during emergencies (standpipe locations). Inventory locations, owners, entryways and maintenance. Pumps could be purchased by government funding and user agreements established to maintain and access pumps.

Identify unused or nonpotable wells for use during emergencies.</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFCATION FORM: WS-1

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: DOW, DOD, State Parks, Private landowners w/irrigation systems,</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: County-wide Conservation and Education Program</td><td colspan="2">Contact Person: Ed Tschupp, Steve Hironaka, Wayne Souza</td></tr>
<tr><td colspan="2">Phone: (808) 245-5408</td></tr>
<tr><td colspan="2">e-mail: etschupp@kauaiwater.org</td></tr>
<tr><td colspan="4">Hazard(s): Losses of water from poor management practices</td></tr>
<tr><td>Flood Zone:</td><td>Base Flood Elevation:</td><td colspan="2">Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
principal agricultural and urban areas</td></tr>
<tr><td colspan="2">Environmental Impact:

<u>High</u> Medium Low</td><td colspan="2">Historical Preservation Impact:

High Medium <u>Low</u></td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

<u>High</u> Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
<u>High</u> Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $25 - $50,000 plan development, $25 - $50,000 annually</td><td colspan="2">Project Period (duration): Long Term</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support: DOW, BOR Water Conservation, USDA, Rural Utility Services, FEMA, EPA, grants from private trusts and foundations</td></tr>
<tr><td colspan="4">Project Objectives:

Develop a comprehensive strategy for County including all key community leaders to develop a comprehensive message for water conservation, including youth education, anti-terrorism/water security issues, ocean safety.</td></tr>
<tr><td colspan="4">Project Description:

Create a comprehensive plan/vision for all types of water resources
Develop outreach materials
Implementation plan – similar to project WET (Water Education for Teachers) program which is private foundation funded</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WS-4a

<table>
<tr><td colspan="2">Jurisdiction: Kaua'I County</td><td colspan="2">Agency/Organization: Department of Water, County of Kauai</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: Kekaha Amfac Shaft (5842-02) renovation and replacement pipeline, Kekaha Water System, Kekaha, Kauai</td><td colspan="2">Contact Person: Edward Tschupp</td></tr>
<tr><td colspan="2">Phone: (808) 245-5408</td></tr>
<tr><td colspan="2">e-mail: etschupp@kauaiwater.org</td></tr>
<tr><td colspan="4">Hazard(s): Drought mitigation</td></tr>
<tr><td>Flood Zone:</td><td>Base Flood Elevation:</td><td colspan="2">Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk: Drinking Water Supply / 4,874 pop./ Public water supply</td></tr>
<tr><td colspan="2">Environmental Impact:

High Medium Low</td><td colspan="2">Historical Preservation Impact:

High Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

High Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $1.7 million</td><td colspan="2">Project Period (duration): 12 months</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support:</td></tr>
<tr><td colspan="4">Project Objectives:

Renovate and upgrade the Kekaha (Amfac) Shaft (5842-02) and construct 12 –inch ductile iron mainline, TMK: 1-2-02: 1 (por), Kekaha, Kauai.</td></tr>
<tr><td colspan="4">Project Description:

The former sugar plantation Kekaha Sugar system current owner is the State DLNR. The private water system provided potable water to the sugar mill and surrounding plantation camps. The private system included the Kekaha (Amfac) Shaft, a 700 gpm shaft/pump, two – 75,000 gallon (172 feet elevation) tanks and 12" and 8" transmission mains that ran along cane haul roads to service the mill and camp area. The Kekaha Sugar system was deactivated in 2000. Its operational status is unknown.

The project includes the renovation and upgrade of the Kekaha (Amfac) Shaft source and a 12" replacement ductile iron transmission mainline. The renovated source will pump into the existing DOW Kekaha Water System storage tanks (overflow 196'). The renovated source will be incorporated into the DOW Kekaha Water system as a primary source facility.

The scope includes:
1. Abandon existing tanks and 12" and 8" mainlines
2. Renovation and upgrade of Kekaha (Amfac) Shaft , new pump and controls
3. New 12" Ductile Iron connecting mainline.</td></tr>
</table>

Project Description (continued):

The interim project improvements will be replaced in the future when the Department of Water completes the renovation and upgrade of the Kekaha Sugar system's Kekaha Amfac Shaft source and pipeline. The future project that will incorporate the Kekaha Amfac Shaft source as a primary source of the DOW Kekaha Water system is programmed for the next five years.

Proposal Date: 6/29/04

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WS-4b

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: Kauai Department of Water</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: Emergency Interconnection – Kekaha Sugar System & DOW Kekaha Water System</td><td colspan="2">Contact Person: Edward Tschupp</td></tr>
<tr><td colspan="2">Phone: 808-245-5408</td></tr>
<tr><td colspan="2">e-mail: etschupp@kauaiwater.org</td></tr>
<tr><td colspan="4">Hazard(s): Drought mitigation</td></tr>
<tr><td>Flood Zone:</td><td colspan="2">Base Flood Elevation:</td><td>Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
Drinking Water Supply / 4,874 pop./ Public water supply</td></tr>
<tr><td colspan="2">Environmental Impact:

High Medium Low</td><td colspan="2">Historical Preservation Impact:

High Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

High Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $50,000</td><td colspan="2">Project Period (duration): 3 months</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support:</td></tr>
<tr><td colspan="4">Project Objectives:

Provide emergency interconnection between County Kekaha Water System and former plantation Kekaha Sugar System in Kekeha, Kaua‘i, Hawai‘I to enable emergency alternate water supply flow between both drinking water systems.</td></tr>
<tr><td colspan="4">Project Description:

The project will include a interim emergency interconnection between the County’s Kekeha Water System and the State DLNR owned Kekaha Sugar system. The interconnection shall be located in the vicinity of the former Kekaha Sugra Mill complex along Kekaha Road. Work scope will include:
1. Piping, control valves, backflow preventers, meters, emergency pump connections, vault, security and security fencing.

The project will enable emergency flow of water from the Kekaha Sugar system into the Department of Water Kekaha Water System. A portable gas powered pump will be required to pump water from the lower Kekaha Sugar system (172 feet elevation) into the higher DOW Kekaha Water system (196 feet elevation).

The interim project improvements will be replaced in the future when the Department of Water completes the renovation and upgrade of the Kekaha Sugar system’s Kekaha Amfac Shaft source and pipeline. The future project that will incorporate the Kekaha Amfac Shaft source as a primary source of the DOW Kekaha Water system is programmed for the next five years.</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WS-5

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: DLNR Parks, PMRF</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: State Kokee System Wells</td><td colspan="2">Contact Person: Wayne Souza, Steve Hironaka</td></tr>
<tr><td colspan="2">Phone: (808) 274-3446</td></tr>
<tr><td colspan="2">e-mail: wayne.h.souza@hawaii.gov</td></tr>
<tr><td colspan="4">Hazard(s): Drought mitigation</td></tr>
<tr><td>Flood Zone:</td><td colspan="2">Base Flood Elevation:</td><td>Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
Kokee residents, park users, military</td></tr>
<tr><td colspan="2">Environmental Impact:
High Medium Low</td><td colspan="2">Historical Preservation Impact:
High Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:
High Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project:</td><td colspan="2">Project Period (duration):</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support:</td></tr>
<tr><td colspan="4">Project Objectives:

Improve the quantity and quality of potable wells.</td></tr>
<tr><td colspan="4">Project Description:

There are two operating wells on the State Kokee water system which extend 37 feet deep and 100 feet deep. There is need to extend these wells deeper, to about 200 to 300 feet deep to eliminate lead and acidic water contamination problems.</td></tr>
<tr><td colspan="4">Proposal Date: 6/29/04</td></tr>
</table>

KAUAI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WS-10

<table>
<tr><td colspan="2">Jurisdiction: Kauai County</td><td colspan="2">Agency/Organization: Department of Water, County of Kauai</td></tr>
<tr><td colspan="2" rowspan="3">Project Title: Emergency Interconnection-DOW Kōloa Water System – Grove Farm Kōloa System</td><td colspan="2">Contact Person: Edward Tschupp</td></tr>
<tr><td colspan="2">Phone: 808-245-5408</td></tr>
<tr><td colspan="2">e-mail: etschupp@kauaiwater.org</td></tr>
<tr><td colspan="4">Hazard(s): Drought mitigation</td></tr>
<tr><td>Flood Zone:</td><td>Base Flood Elevation:</td><td colspan="2">Erosion Rate:</td></tr>
<tr><td colspan="4">Critical Facility/Population/Asset at Risk:
Drinking Water Supply / 5,136 pop./ Public water supply</td></tr>
<tr><td colspan="2">Environmental Impact:

High Medium Low</td><td colspan="2">Historical Preservation Impact:

High Medium Low</td></tr>
<tr><td colspan="2">Risk of Hazard Impact:

High Medium Low</td><td colspan="2">Importance to Protection of Life and Property and Recovery from Disaster:
High Medium Low</td></tr>
<tr><td colspan="2">Estimated Cost of Project: $ 50,000</td><td colspan="2">Project Period (duration): 3 months</td></tr>
<tr><td colspan="4">Estimated Value of Structure or Facility:</td></tr>
<tr><td colspan="4">Sources of Financial Support:</td></tr>
<tr><td colspan="4">Project Objectives:

Provide a emergency interconnection between the Department of Water Kōloa Water System and the Grove Farm Kōloa system in Kōloa, Kaua‘i to enable emergency water supply flow between both water systems.</td></tr>
<tr><td colspan="4">Project Description:

The project will include an emergency interconnection between the County’s Kōloa Water System and the Grove Farm Kōloa system in the vicinity of Wailaau Road, Kōloa, Kaua‘i. The project improvements will include connecting piping, control valves, backflow preventer, meter, emergency pump connections, vault and security fencing to enable emergency flow in both direction at the interconnection point. The project will provide each system with a alternate supply of water.

The overflow elevation of the Grove Farm Kōloa rectangular concrete tank is 311 feet and the overflow elevation of the DOW Kōloa System is 366 feet. Emergency pump connections for a gas powered pump will be required to move water into the DOW Kōloa Water system. A pressure reducing control value will be required to move water into the Grove Farm Kōloa system.</td></tr>
</table>

Project Description (continued):

The Grove Farm Kōloa system includes a tunnel source and chlorination facilities at the Kahili School and camp ground site. A connecting pipeline transmits water to a rectangular concrete tank located near Wailaau Road in Kōloa. The system provides potable water to the Kahili School and camp grounds and 15 consumers along Wailaau Road. The system has adequate capacity to provide emergency water supply to the County Kōloa Water System.

The County Kōloa Water system includes three deep wells and two storage tanks. The average day use for Kōloa is approximately 0.8 million gallons per day. The system has adequate capacity to provide emergency water supply to the Grove Farm Kōloa System.

Proposal Date: 6/29/04

Hazard Mitigation Project Proposal State of Hawaii ALL-1

Date:	2011		
Jurisdiction:	County of Kauai	Agency/Organization:	DLNR Commission on Water Resource Management
Project Title:	Convene community or sector-based workshops on drought preparedness	Contact Person:	Neal Fujii
		Phone:	808 587-0264
		e-mail:	neal.d.fujii@hawaii.gov
Project Physical Address:	This is a planning project		
Project TMK:	This is a planning project		

Natural Hazard(s) to be Mitigated (check hazard(s) that apply):

☒ Drought ☐ Erosion ☐ Flood ☐ Hurricane, High ☐ Landslide ☐ Seismic
☐ Tsunami ☐ Volcano/Lava ☐ Wildfire ☐ Other

Meets Criteria for Environmental / Historical Preservation Soundness:			yes
Long Range Solution (+15 years):	yes	If yes, # of years:	20+

Is Project Currently Listed in the State Multi Hazard Mitigation Plan and/or applicable County Multi Hazard Mitigation Plan?

State Plan:	no	County Plan:	no	Other (specify):	Oahu Drought Mitigation Strategies

Apply For (check all that apply):

☒ HMGP ☒ PDM ☒ State Mitigation Plan Project List ☐ Other (specify):

Estimated TOTAL Cost of Project::	$50,000	Project Period:	24 months
Estimated Federal Share of Project::	$12,500	Estimated Non-Federal Share of Project::	$37,500
Estimated Value of Structure or Facility:	N/A		
Estimated Value of Structure's Contents:	N/A		
Source(s) of Non-Federal Cost Match:	State cash and in-kind services		

Project Description:

Convene five drought preparedness workshops targeting sectors or communities at risk to drought impacts. The workshops would assist agricultural operators, organizations, or communities in developing individual drought and water conservation plans. Workshop training curriculum will be based on the National Drought Mitigation Center's 2010 publication - Drought-Ready Communities, A Guide to Community Drought Preparedness.

This project would also entail retaining subject matter experts for the respective drought impact sectors, e.g., range/grazing specialist, water conservation expert, etc.

Evaluation Category	Considerations	Comments
Social	Community Acceptance	Yes
	Adversely Affects Segments of the Population	Project would help community or drought impact sector
Technical	Technical Feasibility	Technical guidelines established
	Long-Term Solution	Yes
	Secondary Impacts	No negative secondary impacts
Administrative	Staffing	CWRM staff to manage project,
	Funding Allocated	No funding allocated
	Maintenance/Operations	No maintenance or operation required
Political	Political Support	State executive and legislative branches supportive
	Plan Proponent	State executive and legislative branches supportive
	Public Support	Community supportive
Legal	Authority	Existing authority
	Action Subject to Legal Challenge	Not likely
Economic	Benefit	Economic benefits vary
	Cost of Action	Economic costs vary
	Contributes to Economic Goals	Drought preparedness will ameliorate economic losses due to drought
	Outside Funding Required	Yes
Environmental	Affects Land/Water Bodies	May affect water bodies
	Affects Endangered Species	Not likely to affect
	Affects Hazardous Materials and Waste Sites	Not likely to affect
	Consistent with Community Environmental Goals	Plan would be consistent
	Consistent with Federal Laws	Plan would be consistent

8 REFERENCES

State of Hawaii, Department of Land and Natural Resources, Commission on Water Resource Management. *Hawaii Drought Plan*. Prepared by Wilson Okamoto Corporation, December 2004.

State of Hawaii, Department of Land and Natural Resources, Commission on Water Resource Management. *Drought Risk and Vulnerability Assessment and GIS Mapping Project*. Prepared by University of Hawaii, Social Science Research Institute, September 2003.

State of Hawaii, Department of Defense, Civil Defense Division. *State of Hawaii Hazard Mitigation Plan*. Draft, December 2004.

State of Hawaii, Department of Agriculture. *Agricultural Water Use and Development Plan.* Draft, December 2003.

County of Kauai, Civil Defense Agency. *County of Kauai Multi-Hazard Mitigation Strategy*. 2003.

State of Hawaii, Department of Land and Natural Resources, Division of Forestry and Wildlife. *Kauai Wildfire Mitigation Plan.* Update, 1998.

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