

County of Maui Drought Mitigation Strategies

Prepared for:

Maui 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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* These individuals participated through telephone and e-mail correspondence with the State Drought Coordinator.

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1 INTRODUCTION

As part of a statewide effort to address and mitigate the effects of natural hazards, the County of Maui 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 Maui Drought Mitigation Strategy was developed with this approach in mind.

This report presents the mitigation strategies developed by the Maui Drought Committee as a result of workshops that were held on June 30 and July 19, 2004. The State Commission on Water Resource Management (CWRM), in cooperation with the State Civil Defense (CD), received Federal Emergency Management Agency (FEMA) assistance to develop county drought mitigation strategies. 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 Maui 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 integral elements 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 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 this *Drought Mitigation Strategies* 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* and may seek 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 MAUI DROUGHT COMMITTEE

3.1 Membership and Leadership

The Maui County/Local Drought Committee (hereafter referred to as "Maui Drought Committee") is comprised of representatives from key governmental agencies, non-governmental 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 entities:

- Maui Civil Defense Agency
- Maui Department of Water Supply
- Maui Fire Department
- Department of Agriculture
- Department of Hawaiian Home Lands, Maui District
- Department of Hawaiian Home Lands, Molokai District
- Department of Land and Natural Resources, Division of Forestry and Wildlife
- US Department of Agriculture, Farm Service Agency
- US Department of Agriculture, Natural Resource Conservation Service
- Maui Soil and Water Conservation Districts

- East Maui Irrigation Company and Hawaiian Commercial and Sugar Company
- Hawaii Farm Bureau Federation
- Lanai Water Company
- Molokai Irrigation System
- Molokai Ranch
- Ulupalakua Ranch

Representatives participated in workshop sessions held in June and July 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.

Committee members participating in the workshops generally agreed that this is a worthwhile effort deserving of continuation. Committee members selected Mr. Doug MacCluer to chair the Maui Drought Committee.

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 Maui 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 Maui 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 Maui 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 Maui 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 Maui 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 Maui 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 Maui Drought Committee for distribution to local agencies and stakeholders.

3.3.2 Data Collection and Drought Monitoring

The Maui 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 Maui Drought Committee should assist in monitoring ground water levels, stream/ditch conditions, and reservoir levels. The Maui 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 Maui 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 Maui 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 Maui Drought Committee. Drought mitigation projects identified by the Maui Drought Committee are discussed in chapters 5 and 6 of this report. It is the responsibility of the Maui 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 Maui Drought Committee with technical assistance and aid in the identification and acquisition of funds for project implementation. The Maui 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 Maui 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 Maui Drought Committee should advise the Hawaii Drought Council of any needs that cannot be met through existing Maui County resources. The Maui 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 Maui 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 Maui 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 MAUI

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 Maui identified in the report as subject to drought risk are shown in the table below.

County of Maui Drought Risk Areas			
Sector	Drought Stage		
	Moderate	Severe	Extreme
Water Supply	Kula, Kahului, Wailuku, Hana, Lahaina	Kula, Hana	Kula
Agriculture and Commerce	Western Molokai, central/south Lanai	South Lanai	
Environment, Public Health & Safety (based on 12-month time scale)	Kula	Kula, Central Molokai	Kula

Adapted from: Table 6.2 Drought Risk Areas for the Maui County, *Drought Risk and Vulnerability Assessment and GIS Mapping Project*, prepared for the State Commission on Water Resource Management, September 2003

The Maui Drought Committee examined the findings of the drought risk report and, through group discussion of areas of concern and drought impact sector issues, generated a revised list of specific geographic areas of the county that are most susceptible to drought. It was noted that Upcountry Maui (Kula, Makawao and Pukalani to Kaupo) and the western side of Molokai are particularly at risk to drought.

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

Drought Risk Areas Identified by the Maui Drought Committee	
Impact Sector	Drought Risk Areas
Water Supply	Upcountry Maui (including Kula, Makawao, and Pukalani to Kaupo-) Western part of Molokai
Agriculture	Central Maui Kahikinui Keokea Kula Ulupalakua Hoolehua (Molokai) Lanai (entire island)
Wildland Fire	Haleakala National Park Kahikinui Kihei Maalaea to Ukumehame Kula State Forest Reserve Ulupalakua Kawela Gulch and westward (Molokai) Lanai (entire island)

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

The following sections summarize the existing drought response and mitigation efforts and programs in the County of Maui. “Drought response” refers to emergency actions that are implemented directly in response to drought conditions. “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 degree of risk 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

Presently, private landowners and the County of Maui Fire Department cooperate to respond to wildland fire. Private landowners may allow access and provide equipment to respond to wildland fire. However, there are no formal agreements between the Fire Department and private landowners regarding wildland fire response due to liability concerns. The State Department of Land and Natural

Resources' (DLNR) Division of Forestry and Wildlife (DOFAW) responds to wildland fire on State forested lands, and assists with fires on non-State lands at the request of the Maui Fire Department.

5.1.2 Agriculture and Commerce Impacts

During periods of drought, East Maui Irrigation Company (EMI) closely monitors ditch flow and allocates water to priority uses. Any water cutbacks by EMI are shared across all users. During drought periods on Molokai, the State Department of Agriculture allocates water from the Molokai Irrigation System depending on crop type.

The US Department of Agriculture (USDA) has post disaster programs that share with agricultural producers the cost of rehabilitating eligible farmlands damaged by natural disasters and provide emergency water conservation assistance. Normally, the funds are used for conservation practices and compensation for livestock and agricultural losses. Since 1999, nearly \$1,000,000 has been disbursed in Maui for drought related compensation.

5.1.3 Water Supply Impacts

Water Supply response actions are undertaken primarily by the County Department of Water Supply. For Upcountry Maui, the County of Maui, Board of Water Supply Resolution No. 98-18 outlines actions for the Department of Water Supply to implement for varying stages of drought. Response actions are based on ditch flows and reservoir levels. Actions include voluntary and mandatory use restrictions, public outreach activities, and operational controls.

During dry periods, the Department of Hawaiian Homelands (DHHL) also inserts notices in water billings requesting water conservation.

5.2 Current Drought Mitigation Activities

5.2.1 Wildland Fire Impacts

Wildland fire mitigation activities in the County of Maui are currently conducted by federal and State and local agencies. The USDA Natural Resources Conservation Service administers the Emergency Watershed Protection Program, which provides for the construction of firebreaks and reservoirs.

State and local mitigation activities include implementation of the national Firewise program which addresses wildland fire through public outreach and education. The County of Maui has also adopted an ordinance that requires landowners to construct firebreaks between the agricultural/rural and urban interface. The ordinance is enforced by the Maui Fire Department. Finally, the DHHL sends notices to tenants to clear and remove weeds from their assigned lots to reduce fuels and hires

contractors to clear weeds from unassigned lots. The DHHL also invites the Maui Fire Department to attend DHHL association meetings to promote fire prevention awareness and outreach.

5.2.2 Agriculture and Commerce Impacts

Agriculture mitigation activities are primarily undertaken by private landowners. Maui Land and Pineapple Company, Inc. (MLP) has installed wells and 25 million gallons of surface water storage capacity. During periods of drought, the wells can provide 90 percent of MLP's water supply, however, the cost of power makes running the wells cost prohibitive except as an emergency backup.

On Molokai, many farmers have converted to drip irrigation, which has reduced water demand.

5.2.3 Water Supply Impacts

Water supply mitigation activities are undertaken by the Maui Department of Water Supply (DWS), Department of Hawaiian Home Lands and the Lanai Water Company.

In order to reduce water demand, the DWS conducts outreach and promotes xeriscaping for new developments. However, these activities are not included in a formal conservation program.

The DHHL has encouraged homesteaders to practice water conservation. Some residents have installed drip irrigation systems and set irrigation timers to go on during the evening to conserve water.

The Lanai Water Company has implemented a number of drought mitigation measures in the Manele and Koele areas. These measures include:

Manele

- Encouragement of xeriscaping for roadside landscaping.
- Compliance with homeowner covenant requiring brackish water (>250 ppm Cl) to be used for irrigation, low water demand plantings, and limits for irrigated areas.
- Installation of a dual water line system (potable and brackish).
- Compliance with the Maui County mandate requiring use of R1 or brackish water for golf course irrigation.

Koele

- Construction of a 22 MG reservoir to capture urban runoff for golf course irrigation.

- Planned revisions to the master drainage plan for improvements to pipe water from Koele to Manele.
- Installation of a floating cover for the water supply reservoir to reduce loss due to evaporation.

5.3 Existing Gaps in Drought Mitigation

The Maui Drought Committee reviewed presently available information supporting their drought mitigation efforts and identified gaps in data, related deficiencies and concerns, and offered suggestions for improvements. Mitigation projects were “brainstormed” for the geographic areas that the Committee had identified as being at risk to drought.

5.3.1 Wildland Fire Mitigation Needs

The committee developed the following list of mitigation projects for areas at risk to wildland fire drought impacts:

Recommendations for all risk areas in the County of Maui:

- Improve and expand fire education programs.
- Examine and expand the use of fuel breaks.
- Form a committee to examine the issue of emerging wildland fire risk due to changes in land uses (former agricultural lands) and make recommendations for wildland fire mitigation.

Molokai: Kawela Gulch and westward

- Coordinate a cooperative program for private-public wildfire response.
- Improve vehicular access in the mauka Kalamaula-Makakupaia areas.
- Intensify fuel reduction mauka of the subdivisions from Makakupaia to Kalamaula. Projects may include constructing fuel breaks and maintaining and intensifying strip grazing.
- Allow for procurement, construction and/or access to open water storage facilities for wildland fire suppression.

Kahikinui

- Develop a coordinated grazing program to reduce wildfire risk.
- Develop a water system to utilize for wildfire response.
- Develop access points for fire fighting vehicles, including heavy equipment.
- Allow for procurement, construction and/or access to open water storage facilities for wildland fire suppression.

Ulupalakua

- Develop a coordinated grazing program to reduce wildfire risk.

- Work with the State to graze agriculture areas not currently under lease agreements.

Maalaea to Ukumehame

- Work with the State to graze agriculture areas not currently under lease agreements.
- Implement a conservation program.
- Reopen access points for fire fighting vehicles.
- Promote fuel reduction in portions of the Ukumehame area.

Kula State Forest Reserve

- Improve vehicular access and maintenance of firebreak access roads in the Kula Forest Reserve.
- Conduct wildland fuel reduction along roads in the Kula Forest Reserve.
- Install portable water storage facilities adjacent to the Kula Forest Reserve during drought conditions.
- Integrate a well-managed grazing program with existing conservation efforts in non-ecologically sensitive areas.

West Maui

- Allow for procurement, construction and/or access to open water storage facilities for wildland fire suppression.
- Provide fuel reduction projects in certain West Maui State Forest parcels via herbicide spray or physical fuel reduction projects.

5.3.2 Agriculture Mitigation Needs

The committee developed the following list of mitigation projects for areas at risk to agriculture drought impacts:

Central Maui (HC&S)

- Prioritize maintenance activities during drought periods.
- Prioritize water usage.

Kula, Ulupalakua, Keokea

- Prioritize water usage.
- Construct more surface water storage: lined reservoirs with capacities of 50 to 100 million gallons.
- Improve surface water sources. The County DWS's two upper systems have inadequate surface water intakes.
- Improve transmission systems. If the intakes are upgraded, the transmission system must be upgraded also.

- Develop ground-water sources to supplement the surface water supply during drought.
- Promote education. Expand the water conservation outreach and education program, promote xeriscaping, etc.
- Conduct a review of the current rate structure. Provide ideas for incentives or disincentives to encourage conservation, provide ideas on how to prioritize uses (establish hierarchy of users), etc.
- Continue development of a separate water supply system for agriculture.

Kahikinui

- Extend the current water system or develop a well. Currently, the infrastructure exists, but the water supply was cut off in the 1950s. Electricity for pumping water is an issue, but there may be an opportunity to examine wind energy source.

Hoolehua (Molokai)

- Molokai Irrigation System (MIS) (Hoolehua): Implement recommendations from the Molokai Irrigation System Assessment, State DOA report (June 10, 2004).
- MIS shallow well sources: repair pumps and electrical system (system damaged due to electrical malfunction).
- MIS System Control And Data Acquisition (SCADA) system: Repair and get the monitoring/control system back online.
- Install a pump in Molokai Ranch's Kakalahale cased well. This well could supply high chloride water for mixing with existing sources to meet non-potable water demands.
- Partition the MIS Reservoir to cut down the amount of evaporation and allow blending of high chloride water in certain sections.

5.3.3 Water Supply Mitigation Needs

The committee developed the following list of mitigation projects for areas at risk to water supply drought impacts:

Upcountry Maui (Kula, Makawao, Pukalani to Kaupo)

- There is a need for additional storage. Construct 50 - 100 million gallon lined reservoirs.
- Improve surface water sources. The County DWS's two upper systems have inadequate surface water intakes.
- Improve surface water transmission systems. If the intakes are upgraded, then transmission must also be upgraded.
- Develop ground-water sources. Ground water sources could supplement the surface water supply during periods of drought.

- Education program. Expand the water conservation outreach and education program, promote xeriscaping, etc.
- Conduct a review of the current rate structure. The current water rate structure does not promote conservation. Review the rate structure to provide incentives for conservation. Also, provide ideas on how to prioritize uses (establish hierarchy of users), etc.

Island of Lanai

- Identify alternate sources of water for non-agriculture irrigation on Lanai.

Island of Molokai

- Construct a transmission line that connects the various water supply systems.

6 MAUI COUNTY DROUGHT MITIGATION STRATEGIES

This section summarizes drought mitigation strategies for Maui based on the input received at the 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 county drought committee workshop 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 Maui 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 are reproduced in chapter 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):

Maui Drought Committee High Priority Drought Mitigation Projects			
Drought Impact Sector	Mitigation Project Description	Preliminary Cost Estimate	Implementation Timeframe
Wildland Fire	Improve vehicular access in mauka Kalamaula-Makakupaia and Kula Forest. Improve and maintain about 3 miles of Waipoli Road in Kula Forest and 2 miles of road in the mauka Kalamaula-Makakupaia area. The roads will need to be maintained at least annually and possibly more frequently depending on erosion and vegetation growth. Annual costs will be significantly less once initial improvements are completed.	\$200,000 to \$400,000	Immediate; Annual maintenance

Maui Drought Committee High Priority Drought Mitigation Projects			
Drought Impact Sector	Mitigation Project Description	Preliminary Cost Estimate	Implementation Timeframe
	Conservation Management Plan and Implementation. Develop and implement a conservation management plan to reduce wildland fire risk through appropriate best management practices. The plan will cover the subdivisions from Makakupaia to Kalamaula, portions of Ukumehame, Kula State Forest.	\$2 million to \$3 million	Immediate
	Maui Fire Prevention Campaign. Conduct a campaign to educate and inform the public about fire risk and personal responsibilities to reduce fire risk.	\$15,000 annually	Immediate
	Procure, construct and provide access to open water storage facilities for wildland fire suppression in South Maui, West Maui, West Molokai, Kahikinui, and other high-risk areas.		Immediate; Long-term
	Develop and implement fuel reduction grazing plan for appropriate West Maui wildland fire risk areas		Immediate; annual maintenance
	Remote Automated Weather Stations (RAWS) for South Maui and West Maui.	~\$63,000	Immediate; Long-term
	Install (13) fire hose connections to agricultural water system in Paliwai Basin (Lanai). Partnership between Lanai Fire Department and Lanai Water Co.	\$10,000	Immediate; Long-term
	Community Wildfire Protection Plans for Communities at Risk	\$100,000	Long-term

Maui Drought Committee High Priority Drought Mitigation Projects			
Drought Impact Sector	Mitigation Project Description	Preliminary Cost Estimate	Implementation Timeframe
Agriculture	Molokai Irrigation System Improvements. Implement various initiatives and projects related to restoring the Molokai Irrigation System to full operation and to ensure its long-term reliability. <i>(NOTE: HDOA continues to implement as funding becomes available)</i>	\$3 million	Immediate; Long-term
	Upcountry Maui Agriculture Pipeline Extension. Install a separate agricultural water distribution system to supply untreated water for irrigation purposes to farmers in the Upper Kula area. The water source will be Kahakapao Reservoir. <i>(NOTE: HDOA continues to implement as funding becomes available)</i>	\$5 million to \$8 million	Long-term
	Stock water storage and delivery for ranchers on the Island of Maui (75 x 2500 gallon polyethylene tanks + water deliveries)	~\$276,000	Immediate w/long-term benefits
Agriculture / Water Supply	Construct new 100 to 200 MG storage reservoir. Construct an open lined reservoir after the intakes for the Piihola WTP. The reservoir would provide continuous supply to DWS customers in times of drought.	\$30 million to \$60 million	Long-term
	Implement recommendations of Upcountry (Kula) Stormwater Reclamation and Reuse Study – including further feasibility study, environmental review, planning & design and construction.	\$35 million to \$60 million	Long-term

Maui Drought Committee High Priority Drought Mitigation Projects			
Drought Impact Sector	Mitigation Project Description	Preliminary Cost Estimate	Implementation Timeframe
Water Supply	Improve surface water sources in Upcountry Maui. Improve existing intakes to capture a higher percentage of surface water. This may involve adding intakes at known surface sources. The intakes must also be maintained for maximum operational efficiency. <i>(Upcountry (Kula) Stormwater Reclamation and Reuse Study completed)</i>	\$5 million to \$10 million	Long-term; Continuous maintenance
	Improve surface water transmission system in Upcountry Maui. Improve the surface water transmission system improve the flow of water for agriculture, domestic supply and fire protection. <i>(Kula Agricultural Park reservoir relining completed)</i>	\$5 million to \$10 million	Long-term
All w/focus on ranching	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:

Maui Drought Committee Other Priority Drought Mitigation Projects	
Drought Impact Sector	Mitigation Project Description
Wildland Fire	Coordinate a cooperative program for private-public wildfire response on Molokai from Kawela Gulch and westward.
	Reopen access points for fire fighting vehicles in Maalaea.
	Install portable water storage facilities adjacent to the Kula State Forest during drought conditions.
	Pursue fuel reduction projects in certain West Maui State Forest parcels via herbicide spray or physical fuel reduction projects.
	Form a committee on land use changes. Due to the decline of plantation agriculture, large tracts of fallow agricultural lands can pose a wildland fire risk if vegetation is allowed to become overgrown.
Agriculture	Educate water users on water conservation, promote xeriscaping, etc.; with specific focus on large water users. Communication & outreach project.
	Evaluate the DWS water rate structure to provide incentives for water conservation and to establish a hierarchy of water use.
	Prioritize maintenance of the surface water system in Central Maui during drought.
	Prioritize water use in Central Maui and Kula.
	Improve surface water intakes of DWS systems in Kula.
	Improve the surface water transmission system in Kula.
	Develop groundwater sources in Kula to supplement the surface water system during drought.
	Extend the current water system or develop a well in Kahikinui. Currently, the infrastructure exists, but the water supply was cut off in the 1950's.
	Install a pump in Molokai Ranch's Kakalahale cased well. This well could supply high chloride water for mixing with existing sources to meet non-potable water demands.
Partition the MIS Reservoir in Hoolehua to cut down the amount of evaporation and allow blending of high chloride water in certain sectors.	
Water Supply	Develop additional groundwater sources.
	Educate water users on water conservation.
	Evaluate the DWS water rate structure to provide incentives for water conservation and to establish a hierarchy of water use.

7 SUMMARY AND RECOMMENDATIONS

Members of the Maui 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 10 “High” 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 funding 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 Maui Drought Committee

The Maui Drought Committee agreed to convene regular meetings and work towards implementing the priority mitigation projects identified during the workshop process. The Maui drought committee should consider whether it should become a formalized entity.

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 Maui 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 Maui Drought Mitigation Strategy Update

This report has been prepared in manner such that it could be readily incorporated into the County of Maui Multi-Hazard Mitigation Plan or function as a stand-alone report. The Maui Drought Committee should work together with the appropriate

entities to ensure that this report's findings are represented in the next revision of the County's Multi-Hazard Mitigation Plan. This report should be evaluated and updated on a regular basis.

7.1.4 Drought Impact Assessment/Post-drought Evaluation

In order to effectively document the impacts of drought, the Maui 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 Maui 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 any available federal program assistance.

7.2 Future Maui Drought Committee Operational Activities

The Maui Drought Committee agreed to conduct regular 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 upon short notice. The Committee agreed that Mr. Doug MacCluer will act as chairperson. Members are urged to collaborate on the development of meeting agendas and to 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)

WF-1	Improve vehicular access in mauka Kalamaula-Makakupaia and Kula Forest
WF-2	Conservation Management Plan and Implementation
WF-3	Maui Fire Prevention Campaign
WF-4	Procure, construct and provide access to open water storage facilities for wildland fire suppression in South Maui, West Maui, West Molokai, Kahikinui and other high risk areas
WF-5*	Develop and implement fuel reduction grazing plan for appropriate West Maui wildland fire risk areas
WF-6*	Remote Automated Weather Stations (RAWS) for South Maui and West Maui
WF-7*	Install (13) fire hose connections to agricultural water system in Paliwai Basin (Lanai)
WF-8*	Community Wildfire Protection Plans for Communities at Risk
AG-1	Molokai Irrigation System Improvements
AG-2	Upcountry Maui Agriculture Pipeline Extension
AG-4*	Stock water storage and delivery for ranchers on the Island of Maui
AG-3 & WS-1	Construct New 100 to 200 MG Storage Reservoir
AG-5*	Implement recommendations of Upcountry (Kula) Stormwater Reclamation and Reuse Study
WS-2	Improve Surface Water Sources in Upcountry Maui
WS-3	Improve Surface Water Transmission System in Upcountry Maui
ALL-1*	Convene sector-based drought workshops to assist stakeholders in developing or improving their individual drought/water conservation plans

* Added June 2012

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WF-1

Jurisdiction: Maui County		Agency/Organization: DOFAW, the Nature Conservancy, County Fire Dept.	
Project Title: Improve vehicular access in mauka Kalamaula-Makakupaia (2 miles) & Kula Forest (3 miles).		Contact Person: Glenn Shishido	
		Phone: 808-873-3501	
		e-mail: mafire@aloha.net	
Hazard(s): High Fire Risk			
Flood Zone: NA		Base Flood Elevation: NA	
Erosion Rate: NA			
Critical Facility/Population/Asset at Risk: Endangered species, prevention of erosion and flooding			
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: \$100,000 to \$300,000		Project Period (duration): Annual maintenance	
Estimated Value of Structure or Facility:			
Sources of Financial Support: Various sources			
Project Objectives: To improve vehicular access to for fire suppression and to create a fire break for protection of natural resources.			
Project Description: Improve approximately 3-miles of existing road in the Kula Forest (Waipoli Road). This is an existing public access. The road needs to be maintained at least annually, and possibly more frequently depending on erosion and vegetation growth. Cost estimate for this project is approximately \$100,000. Annual cost would be significantly less once initial improvements are completed. Improve approximately 2-miles of road in the Kalamaula-Makakupaia area. Access would be restricted by landowners and used by DOFAW/the Nature Conservancy/Maui Fire Department for fire suppression and natural resources management. The project needs to be maintained at least annually, and possibly more frequently depending on erosion and vegetation growth. Cost estimate for this project is approximately \$200,000. Annual cost would be significantly less once initial improvements are completed.			
Proposal Date: July 2004, Modified June 2012			

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WF-2

Jurisdiction: Maui County		Agency/Organization: DOFAW, NRCS, FSA, DHHL, SWCD	
Project Title: Conservation Management plan and implementation for Makakupaia to Kalamaula, portion of Ukumehame and Kahikinui, and Kula Forest Road.		Contact Person: Glenn Shishido and Ranae Ganske	
		Phone: Glenn Shishido 873-3501; Ranae Ganske 244-3100 ext. 3	
		e-mail: mafire@aloha.net (Glenn Shishido) ranae.ganske@hi.usda.gov (Ranae Ganske)	
Hazard(s): Fire, mudslides, loss of electricity, road closures			
Flood Zone:	Base Flood Elevation:	Erosion Rate:	
Critical Facility/Population/Asset at Risk: Highway, Electrical Power Line/ Homeowners, Tourists/ Natural resources and wildlife including endangered species.			
Environmental Impact: High Medium Low		Historical Preservation Impact: Questionable due to lack of knowledge regarding the archaeological sites. Bulldozing may alter sites. 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: \$2 to \$3 million for planning and implementation		Project Period (duration): Year round	
Estimated Value of Structure or Facility: There are power lines, reservoirs and delivery system. No estimate of total value.			
Sources of Financial Support: County, USDA, USFWS, EPA, DOH, DLNR, DHHL			
Project Objectives: This Management Plan will identify mitigation measures which will reduce the impact of wild land fires through best management practices within Maalaea to Ukumehame Area, Kahikinui, and Kula Forest.			
Project Description: Division of Forestry and Wildlife(DOFAW), Maui Fire Department (MFD), and Department of Transportation (DOT) will provide technical assistance through the following: <ul style="list-style-type: none"> • Fuel Reduction by grazing management • Partner with MECO and other landowners to implement vegetation management, i.e. 10-foot buffers around all power poles, etc.. • Proposed Subdivision fire mitigation plans through Firewise • Fire prevention Education such as signage and brochures • Maintaining and utilizing and access road firebreaks. • Operation and maintenance for highway Fire Prevention 			

Project Description (continued):

USDA- Farm Service Agency (FSA) & Natural Resources Conservation Service will:

- Develop Conservation Plan for landowners and operators.
- Install conservation practices according to NRCS specifications such as Prescribed Grazing, Brush Management, Firebreaks, Fencing Water Facilities, Access Road, and Upland Wildlife Habitat, which include Threatened and Endangered species.
- Cost share may be available through NRCS and FSA
- Emergency Watershed Protection (EWP) which responds to emergencies created by natural disasters

Proposal Date: July 2004

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WF-3

Jurisdiction: Maui County		Agency/Organization: Maui Fire Dept., DOFAW, Community Organizations	
Project Title: Maui Fire Prevention Education Campaign		Contact Person: County Fire Chief	
		Phone: 808-270-7561	
		e-mail:	
Hazard(s): Fire			
Flood Zone:		Base Flood Elevation:	Erosion Rate:
Critical Facility/Population/Asset at Risk: All of Maui County			
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: \$15,000 annually		Project Period (duration): On-going	
Estimated Value of Structure or Facility:			
Sources of Financial Support: County Fire Dept, DOFAW, other fire organizations, community groups			
Project Objectives: Create an educated and informed public concerning Maui County fire risk and personal responsibilities to reduce such risk.			
Project Description: Invigorate current fire education and outreach program to reach a greater number of Maui County residents through a more disciplined and organized fashion. During fire seasons and periods of drought, the campaign should be customized to represent the risk and threat to residents.			
Proposal Date: July 2004			

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WF-4

Jurisdiction: County of Maui		Agency/Organization: DOFAW, DHHL, Ulupalakua Ranch	
Project Title: Procure, construct and provide access to open water storage facilities (reservoirs) for wildland fire suppression areas in the West Maui (former cane lands), west Molokai, Kahikinui, and other high risk areas		Contact Person: Sumner Erdman, George Maioho (DHHL Molokai)	
		Phone: Sumner Erdman 878-1202 George Maioho 560-6104	
		e-mail:	
Hazard(s): Wildland fire suppression			
Flood Zone:	Base Flood Elevation:	Erosion Rate:	
Critical Facility/Population/Asset at Risk: Residences, telecommunication towers, power lines, natural resources			
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: (to be provided by contacts)		Project Period (duration):	
Estimated Value of Structure or Facility:			
Sources of Financial Support: grants, Tri-Isle RC&D, County funds, OHA			
Project Objectives: Develop new water storage facilities and reservoirs for wildland fire suppression activities.			
Project Description: Inventory sites for possible reservoir development suitable for helicopter and/or vehicle access. After the inventory has been completed, develop sites based upon accessibility for fire equipment access.			
Proposal Date: July 2004			

Hazard Mitigation Project Proposal State of Hawaii: WF-5

Date:			
Jurisdiction:	Maui County, State of Hawaii	Agency/Organization:	DOFAW, WMMWP, Maui Cattlemens's Council
Project Title:	Develop and implement fuel reduction grazing plan for W.Maui wildland risk areas	Contact Person:	
		Phone:	808-873-3501
		e-mail:	
Project Physical Address:	Various locations in West Maui determined to have high wildland fire risk		
Project TMK:	various		

Natural Hazard(s) to be Mitigated (check hazard(s) that apply):					
<input checked="" type="checkbox"/> Drought	<input type="checkbox"/> Erosion	<input type="checkbox"/> Flood	<input type="checkbox"/> Hurricane, High	<input type="checkbox"/> Landslide	<input type="checkbox"/> Seismic
<input type="checkbox"/> Tsunami	<input type="checkbox"/> Volcano/Lava	<input checked="" type="checkbox"/> Wildfire	<input type="checkbox"/> Other		

Meets Criteria for Environmental / Historical Preservation Soundness:	Yes
Long Range Solution (+15 years):	Yes 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:	No	County Plan:	No Other (specify):

Apply For (check all that apply):			
<input checked="" type="checkbox"/> HMGP	<input checked="" type="checkbox"/> PDM	<input checked="" type="checkbox"/> State Mitigation Plan Project List	<input type="checkbox"/> Other (specify):

Estimated TOTAL Cost of	\$100,000	Project Period:	
Estimated Federal Share of Project::	\$50,000	Estimated Non-Federal Share of Project::	\$50,000
Estimated Value of Structure or Facility:	>\$100,000		
Estimated Value of Structure's Contents:			
Source(s) of Non-Federal Cost Match:	Watershed partnerships, State agencies, private landowners		

Project Description:

Develop and implement plan(s) to use grazing animals to reduce the vegetative fuel loads in West Maui areas at high risk to wildland fires. Components of the plan would include identifying locations and landowners, right-of-entry or other agreements, fencing concepts, water supply, grazing plan, partners and funding opportunities. The majority of project costs would apply towards fencing material and construction, provision of water supply, and transportation of animals. Animals may be moved seasonally, depending on weather conditions and vegetative fuel loads.

Evaluation Category	Considerations	Comments
Social	Community Acceptance	Yes
	Adversely Affects Segments of the Population	No

County of Maui Drought Mitigation Strategies

Technical	Technical Feasibility	Yes
	Long-Term Solution	Yes
	Secondary Impacts	No
Administrative	Staffing	Via Watershed Partnerships.
	Funding Allocated	Via grant opportunities or allocated funds.
	Maintenance/Operations	Via Watershed Partnerships.
Political	Political Support	Yes
	Plan Proponent	Yes
	Public Support	Yes
Legal	Authority	Yes
	Action Subject to Legal Challenge	Possibly
Economic	Benefit	Yes
	Cost of Action	Noted above.
	Contributes to Economic Goals	Yes
	Outside Funding Required	Yes
Environmental	Affects Land/Water Bodies	Positive effects.
	Affects Endangered Species	Possible
	Affects Hazardous Materials and Waste Sites	No
	Consistent with Community Environmental Goals	Reducing wildland fire risk and incidents prevent erosion and sediment runoff into near shore waters.
	Consistent with Federal Laws	Yes

Hazard Mitigation Project Proposal State of Hawaii: WF-6

Date:	September 11, 2009		
Jurisdiction:	Maui County, State of Hawaii	Agency/Organization:	Maui District/DOFAW
Project Title:	Purchase of Remote Automated Weather Stations (RAWS)	Contact Person:	Glenn Shishido
		Phone:	808-873-3501
		e-mail:	glenn.n.shishido@hawaii.gov
Project Physical Address:	Stations will be placed on private property in Lahaina and Ulupalakua		
Project TMK:	various		

Natural Hazard(s) to be Mitigated (check hazard(s) that apply):					
<input type="checkbox"/> Drought	<input type="checkbox"/> Erosion	<input type="checkbox"/> Flood	<input type="checkbox"/> Hurricane, High	<input type="checkbox"/> Landslide	<input type="checkbox"/> Seismic
<input type="checkbox"/> Tsunami	<input type="checkbox"/> Volcano/Lava	<input checked="" type="checkbox"/> Wildfire	<input type="checkbox"/> Other		

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

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

Apply For (check all that apply):			
<input checked="" type="checkbox"/> HMGP	<input checked="" type="checkbox"/> PDM	<input checked="" type="checkbox"/> State Mitigation Plan Project List	<input type="checkbox"/> Other (specify):

Estimated TOTAL Cost of Project::	\$60,000	Project Period:	
Estimated Federal Share of Project::	\$60,000	Estimated Non-Federal Share of Project::	
Estimated Value of Structure or Facility:	\$60,000		
Estimated Value of Structure's Contents:			
Source(s) of Non-Federal Cost Match:	Watershed partnerships, State agencies		

Project Description:

Install and monitor three Remote Automated Weather Stations (RAWS) as part of wildland fire mitigation efforts. Data gathered from the stations will be used for wildland fire suppression preparedness/response planning and implementation. Stations will be located in Lahaina and within the Ulupalakau area on the island of Maui, Hawaii.		
Evaluation Category	Considerations	Comments
Social	Community Acceptance	Yes
	Adversely Affects Segments of the Population	No

County of Maui Drought Mitigation Strategies

Technical	Technical Feasibility	Yes
	Long-Term Solution	Yes
	Secondary Impacts	No
Administrative	Staffing	Via Watershed Partnerships.
	Funding Allocated	Via grant opportunities.
	Maintenance/Operations	Via Watershed Partnerships.
Political	Political Support	Yes
	Plan Proponent	Yes
	Public Support	Yes
Legal	Authority	None
	Action Subject to Legal Challenge	No
Economic	Benefit	Yes
	Cost of Action	Noted above.
	Contributes to Economic Goals	Yes
	Outside Funding Required	No
Environmental	Affects Land/Water Bodies	No
	Affects Endangered Species	No. Data obtained from RAWS will be used to mitigate wildland fire damage to natural resources such as Endangered flora and fauna.
	Affects Hazardous Materials and Waste Sites	No
	Consistent with Community Environmental Goals	Yes. Data obtained from RAWS will be used to mitigate damage from wildland fire to natural resources as well as adjacent communities within the project areas.
	Consistent with Federal Laws	Yes

Hazard Mitigation Project Proposal State of Hawaii: WF-7

Date:			
Jurisdiction:	Island of Lanai	Agency/Organization:	Lanai Water Co., Lanai Fire Department
Project Title:	Install fire hose connections to agricultural water system in Paliwai Basin, Lanai	Contact Person:	John Stubbart
		Phone:	808-565-3352
		e-mail:	jstubbart@castlecooke.com
Project Physical Address:			
Project TMK:			

Natural Hazard(s) to be Mitigated (check hazard(s) that apply):						
<input type="checkbox"/> Drought	<input type="checkbox"/> Erosion	<input type="checkbox"/> Flood	<input type="checkbox"/> Hurricane, High	<input type="checkbox"/> Landslide	<input type="checkbox"/> Seismic	
<input type="checkbox"/> Tsunami	<input type="checkbox"/> Volcano/Lava	<input checked="" type="checkbox"/> Wildfire	<input type="checkbox"/> 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): County of Maui Drought Mitigation Strategies

Apply For (check all that apply):			
<input checked="" type="checkbox"/> HMGP	<input checked="" type="checkbox"/> PDM	<input type="checkbox"/> State Mitigation Plan Project List	<input type="checkbox"/> Other (specify):

Estimated TOTAL Cost of Project::	\$10,000	Project Period:	12 months
Estimated Federal Share of Project::		Estimated Non-Federal Share of Project::	
Estimated Value of Structure or Facility:			
Estimated Value of Structure's Contents:			
Source(s) of Non-Federal Cost Match:	Private, County		

Project Description:

Installation of 13 fire hose connections in the Paliwai Basin agricultural system to fill firefighting equipment and pumpers. This area is dry land pasture surrounding the Lanai Airport. This would provide firefighters a more convenient access to water when fighting fires in the area. The estimated cost of materials and labor is \$10,000.

Evaluation Category	Considerations	Comments
Social	Community Acceptance	Yes
	Adversely Affects Segments of the Population	No adverse affect

County of Maui Drought Mitigation Strategies

Technical	Technical Feasibility	Is feasible
	Long-Term Solution	Yes
	Secondary Impacts	No negative secondary impacts
Administrative	Staffing	Lanai Water Co. and Lanai Fire Department
	Funding Allocated	Lanai Water Co. and Lanai Fire Department
	Maintenance/Operations	Lanai Water Co. and Lanai Fire Department
Political	Political Support	Yes
	Plan Proponent	Yes
	Public Support	Yes
Legal	Authority	Yes
	Action Subject to Legal Challenge	No legal challenge expected
Economic	Benefit	Increased fire protection and pasture protection
	Cost of Action	\$10,000
	Contributes to Economic Goals	Benefits tourism, ranching industry
	Outside Funding Required	Yes
Environmental	Affects Land/Water Bodies	Would not negatively affect land/water bodies
	Affects Endangered Species	Would not negatively affect endangered species
	Affects Hazardous Materials and Waste Sites	Would not affect hazardous materials or waste sites
	Consistent with Community Environmental Goals	Yes
	Consistent with Federal Laws	Yes

Hazard Mitigation Project Proposal State of Hawaii: WF-8

Date:	September 14, 2009		
Jurisdiction:	County of Maui	Agency/Organization:	DLNR Division of Forestry and Wildlife
Project Title:	Community Wildfire Protection Plans for Communities at Risk	Contact Person:	Glenn Shishido
		Phone:	808-984-8100
		e-mail:	glenn.n.shishido@hawaii.gov
Project Physical Address:	This is a planning project		
Project TMK:	This is a planning project, TMKs TBD		

Natural Hazard(s) to be Mitigated (check hazard(s) that apply):					
<input checked="" type="checkbox"/> Drought	<input type="checkbox"/> Erosion	<input type="checkbox"/> Flood	<input type="checkbox"/> Hurricane, High	<input type="checkbox"/> Landslide	<input type="checkbox"/> Seismic
<input type="checkbox"/> Tsunami	<input type="checkbox"/> Volcano/Lava	<input checked="" type="checkbox"/> Wildfire	<input type="checkbox"/> 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): County of Maui Drought Mitigation Strategies

Apply For (check all that apply):			
<input checked="" type="checkbox"/> HMGP	<input checked="" type="checkbox"/> PDM	<input checked="" type="checkbox"/> State Mitigation Plan Project List	<input type="checkbox"/> Other (specify):

Estimated <u>TOTAL</u> Cost of Project::	\$100,000	Project Period:	24 months
Estimated Federal Share of Project::	\$75,000	Estimated Non-Federal Share of Project::	\$25,000
Estimated Value of Structure or Facility:	N/A		
Estimated Value of Structure's Contents:	N/A		
Source(s) of Non-Federal Cost Match:	In-kind services from State, County, and private organizations		

Project Description:

County of Maui Drought Mitigation Strategies

This is a planning project to develop Community Wildfire Protection Plans (CWPP) in the County of Maui. These plans would be developed for communities identified as at-risk from wildland-urban interface by the State of Hawaii Division of Forestry and Wildlife.

CWPP will follow established forest management guidelines and will include at a minimum:

- (1) Collaboration - CWPP will be developed by local and state government agencies in consultation with federal and other interested parties.
- (2) Prioritized Fuel Reduction - identification and prioritization of areas of hazardous fuel reduction.
- (3) Treatment of Structural Ignitability - CWPP will recommend measures that homeowners and communities can take to reduce the ignitability of structures in their community.

The completion of CWPP will help communities mitigate their risk to wildfire hazards. CWPP may also give an advantage to the community when applying for federal grants; as certain federal funding opportunities give priority to projects and fuel treatment areas identified in CWPP.

Communities identified at-risk to wildland-urban interface include but are not limited to: Napili to Olowalu, Kihei to Makena, and Waiehu to Kahului. Hoolehua, Kualapuu, Kaunakakai, and Kaluakoi.

Evaluation Category	Considerations	Comments
Social	Community Acceptance	Yes
	Adversely Affects Segments of the Population	No
Technical	Technical Feasibility	Yes
	Long-Term Solution	Yes
	Secondary Impacts	Positive
Administrative	Staffing	State, County, and Private
	Funding Allocated	In-kind services from State, County, and private sector
	Maintenance/Operations	CWPP may require updates from time to time
Political	Political Support	Yes
	Plan Proponent	State Division of Forestry and Wildlife, County of Maui Civil Defense, Maui Fire Department
	Public Support	Yes
Legal	Authority	Yes
	Action Subject to Legal Challenge	No
Economic	Benefit	Yes
	Cost of Action	None

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	Contributes to Economic Goals	Yes
	Outside Funding Required	Yes
Environmental	Affects Land/Water Bodies	CWPP implementation would not adversely impact land/water bodies
	Affects Endangered Species	CWPP would be developed so that there would be minimal impact to endangered species
	Affects Hazardous Materials and Waste Sites	CWPP would be developed so that there would be no adverse impacts to any hazardous materials or waste sites
	Consistent with Community Environmental Goals	Yes
	Consistent with Federal Laws	Yes

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: AG-1

Jurisdiction: Maui County (Molokai)		Agency/Organization: HDOA/ARMD	
Project Title: Molokai Irrigation System Improvements		Contact Person: Brian Kau	
		Phone: 808-973-9473	
		e-mail: brian.k.kau@hawaii.gov	
Hazard(s): Drought			
Flood Zone:		Base Flood Elevation:	
		Erosion Rate:	
Critical Facility/Population/Asset at Risk: Irrigation water to the farmers of the Molokai Irrigation System. This is the largest state-owned water irrigation system. Supplies a significant portion of irrigation water on Molokai.			
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: \$3 Million		Project Period (duration): 2 years (estimate)	
Estimated Value of Structure or Facility: \$120,000,000			
Sources of Financial Support: State of Hawaii			
Project Objectives: Improve the Molokai Irrigation System with respect to emergency, life/safety, reliability, and maintenance issues.			
Project Description: Conduct various initiatives and projects related to restoring the Molokai Irrigation System to full operation and ensuring its long-term reliability. Some initiatives will address immediate operational deficiencies such as recent electrical malfunctions that have led to pump failures. Another sub-project may improve maintenance infrastructure and equipment, such as access roads, tunnel lighting, etc. Life/safety issues, such as exposed high voltage power lines and warning signs, must also be addressed. Finally, an ongoing repair and maintenance program must be developed and implemented to reduce the likelihood of future catastrophic system failures.			
Proposal Date: July 2004			

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: AG-2

Jurisdiction: Maui County		Agency/Organization: HDOA/ARMD	
Project Title: Upcountry Maui Agriculture Pipeline Extension		Contact Person: Brian Kau	
		Phone: 808-973-9473	
		e-mail: brian.k.kau@hawaii.gov	
Hazard(s): Drought			
Flood Zone:		Base Flood Elevation:	Erosion Rate:
Critical Facility/Population/Asset at Risk:			
Reduce the risk of drought to farmland, reduce treatment cost, and reduce potable water demand in Upcountry Maui.			
Environmental Impact:		Historical Preservation Impact:	
High Medium Low		High Medium Low	
Risk of Hazard Impact:		Importance to Protection of Life and Property and Recovery from Disaster:	
High Medium Low		High Medium Low	
Estimated Cost of Project: \$5 to \$8 Million		Project Period (duration) 3 years	
Estimated Value of Structure or Facility: \$20,000,000			
Sources of Financial Support: NRCS, State of Hawaii			
Project Objectives:			
Provide affordable irrigation water to the Upper Kula Farmers and increase irrigation water availability and reliability.			
Project Description:			
This project proposes the installation of a separate agricultural water distribution system to supply untreated water for irrigation purposes to farmers in the Upper Kula area. The water source will be Kahakapao Reservoir. The main distribution pipeline will extend from Olinda to Keokea with nine lateral systems serving the areas of Olinda, Crater Road, Kimo Road, Pulehuiki/Kamehameiki, Kealahou, Waiakoa, Kaonoulu, Waiohuli, Keokea/DHHL.			
Proposal Date: July 2004			

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: AG-3 & WS-1

Jurisdiction: Maui County		Agency/Organization: Department of Water Supply	
Project Title: Construct new 100 – 200 MG storage reservoir		Contact Person: Larry Winter	
		Phone: 270-7835	
		e-mail: larry.winter@maui.co.hi.us	
Hazard(s): Drought			
Flood Zone:		Base Flood Elevation:	
		Erosion Rate:	
Critical Facility/Population/Asset at Risk: Upcountry water using population, both agricultural and domestic water users (about 25,000+ people).			
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: \$30 to \$60 Million		Project Period (duration): 10+ years	
Estimated Value of Structure or Facility:			
Sources of Financial Support: Federal grants/state loans/County funds			
Project Objectives: To reduce the impacts of drought on upcountry farmers and residents.			
Project Description: Construct an open lined reservoir after the intakes for the Piiholo WTP. This reservoir would be sized to minimize drought and provide continuous supply to DWS customers in times of drought. The transmission line to feed the reservoir is an existing line and the reservoir would be along that alignment. A Preliminary Engineering Study for the project is being prepared.			
Proposal Date: July 2004			

Hazard Mitigation Project Proposal State of Hawaii: AG-4

Date:	August 31, 2011		
Jurisdiction:	Maui Island	Agency/Organization:	Maui Cattlemen's Association
Project Title:	Stock Water Storage and Delivery for Ranchers on the Island of Maui	Contact Person:	William Jacintho
		Phone:	808-283-1316
		e-mail:	
Project Physical Address:	Various		
Project TMK:	Various		

Natural Hazard(s) to be Mitigated (check hazard(s) that apply):					
<input checked="" type="checkbox"/> Drought	<input type="checkbox"/> Erosion	<input type="checkbox"/> Flood	<input type="checkbox"/> Hurricane, High	<input type="checkbox"/> Landslide	<input type="checkbox"/> Seismic
<input type="checkbox"/> Tsunami	<input type="checkbox"/> Volcano/Lava	<input type="checkbox"/> Wildfire	<input type="checkbox"/> 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): County of Maui Drought Mitigation Strategies

Apply For (check all that apply):			
<input checked="" type="checkbox"/> HMGP	<input checked="" type="checkbox"/> PDM	<input checked="" type="checkbox"/> State Mitigation Plan Project List	<input type="checkbox"/> Other (specify):

Estimated TOTAL Cost of Project::	\$275,625	Project Period:	12-months
Estimated Federal Share of Project::		Estimated Non-Federal Share of Project::	
Estimated Value of Structure or Facility:			
Estimated Value of Structure's Contents:			
Source(s) of Non-Federal Cost Match:	Private ranchers, Cattlemen's Association		

Project Description:

During drought, Maui ranchers suffer from shortage of stock water and storage capacity. This project will provide water storage tanks and water deliveries to 23 ranches on Maui Island. This would include the purchase of 75 portable polyethylene water storage tanks (2500 gallon) for livestock watering, and 40 water tanker deliveries of 5000 gallons of stock water.

Evaluation Category	Considerations	Comments
Social	Community Acceptance	Yes
	Adversely Affects Segments of the Population	Would not adversely affect population

County of Maui Drought Mitigation Strategies

Technical	Technical Feasibility	Yes
	Long-Term Solution	Yes
	Secondary Impacts	No negative secondary impacts
Administrative	Staffing	Ranchers would provide transportation and labor for water tanks.
	Funding Allocated	No
	Maintenance/Operations	Ranchers would maintain and operate water tanks
Political	Political Support	Yes
	Plan Proponent	Yes
	Public Support	Yes
Legal	Authority	Yes
	Action Subject to Legal Challenge	No legal challenge expected
Economic	Benefit	Ranching industry on Maui would benefit
	Cost of Action	See project cost above
	Contributes to Economic Goals	Contributes to the goal of sustainable agriculture in Hawaii
	Outside Funding Required	Yes
Environmental	Affects Land/Water Bodies	Would not negatively affect land/water bodies
	Affects Endangered Species	Would not negatively affect endangered species
	Affects Hazardous Materials and Waste Sites	Would not affect hazardous materials or waste sites
	Consistent with Community Environmental Goals	Yes
	Consistent with Federal Laws	Yes

Hazard Mitigation Project Proposal State of Hawaii: AG-5

Date:			
Jurisdiction:	Maui County	Agency/Organization:	Central Maui Soil & Water Conservation District
Project Title:	Implementation of Upcountry (Kula) Stormwater Reclamation & Reuse Study	Contact Person:	Doug MacCluer
		Phone:	808-871-5500
		e-mail:	
Project Physical Address:	various		
Project TMK:	various		

Natural Hazard(s) to be Mitigated (check hazard(s) that apply):					
<input checked="" type="checkbox"/> Drought	<input type="checkbox"/> Erosion	<input type="checkbox"/> Flood	<input type="checkbox"/> Hurricane, High	<input type="checkbox"/> Landslide	<input type="checkbox"/> Seismic
<input type="checkbox"/> Tsunami	<input type="checkbox"/> Volcano/Lava	<input type="checkbox"/> Wildfire	<input type="checkbox"/> Other		

Meets Criteria for Environmental / Historical Preservation Soundness:	Yes
Long Range Solution (+15 years):	Yes If yes, # of years: 25+

Is Project Currently Listed in the State Multi Hazard Mitigation Plan and/or applicable County Multi Hazard Mitigation Plan?			
State Plan:	Yes	County Plan:	Yes Other (specify):

Apply For (check all that apply):			
<input checked="" type="checkbox"/> HMGP	<input checked="" type="checkbox"/> PDM	<input type="checkbox"/> State Mitigation Plan Project List	<input type="checkbox"/> Other (specify):

Estimated TOTAL Cost of Project::	\$36M-\$125M	Project Period:	
Estimated Federal Share of Project::		Estimated Non-Federal Share of Project::	
Estimated Value of Structure or Facility:			
Estimated Value of Structure's Contents:			
Source(s) of Non-Federal Cost Match:			

Project Description:

This project would implement the recommendations of the Upcountry (Kula) Stormwater Reclamation and Reuse Study. Work would include:

- Feasibility Study
- Environmental Review
- Planning & design
- Construction

The preliminary study phase of project is listed in the State of Hawaii Multi-Hazard Mitigation Plan as "Maui County Storm Water Capture Planning and Engineering Study."

County of Maui Drought Mitigation Strategies

Evaluation Category	Considerations	Comments
Social	Community Acceptance	Yes
	Adversely Affects Segments of the Population	No
Technical	Technical Feasibility	Yes
	Long-Term Solution	Yes
	Secondary Impacts	No negative secondary impacts anticipated
Administrative	Staffing	NRCS, County of Maui, and private interest
	Funding Allocated	No
	Maintenance/Operations	County of Maui, private interests would operate and maintain
Political	Political Support	Yes
	Plan Proponent	Yes
	Public Support	Agricultural industry support
Legal	Authority	Yes
	Action Subject to Legal Challenge	May have legal challenges
Economic	Benefit	Benefits sustainable agriculture and agricultural security economy
	Cost of Action	see estimated cost above
	Contributes to Economic Goals	Contributes to sustainable agriculture and agricultural security goals
	Outside Funding Required	yes
Environmental	Affects Land/Water Bodies	may affect land and water resources
	Affects Endangered Species	not anticipated
	Affects Hazardous Materials and Waste Sites	not anticipated
	Consistent with Community Environmental Goals	yes
	Consistent with Federal Laws	yes

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WS-2

Jurisdiction: Maui County		Agency/Organization: Department of Water Supply	
Project Title: Improve surface water sources in upcountry Maui		Contact Person: Jeff Pearson	
		Phone: 270-7834	
		e-mail: jeff.pearson@co.maui.hi.us	
Hazard(s): Drought			
Flood Zone:	Base Flood Elevation:	Erosion Rate:	
Critical Facility/Population/Asset at Risk: Upcountry water system, resident population of 25,000+			
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: \$5 to \$10 Million		Project Period (duration): continuous	
Estimated Value of Structure or Facility:			
Sources of Financial Support: Fed. Loans/State loans/County funds			
Project Objectives: To increase or improve source water (surface) for the upcountry system. This will increase the available water to minimize drought impacts			
Project Description: Improve existing intakes to capture a higher percentage of surface water. This may involve adding intakes at known surface sources. The intakes must also be maintained to enable optimal operational efficiency. A preliminary project assessment will be prepared to develop project costs and specifications.			
Proposal Date: July 2004			

MAUI DROUGHT MITIGATION PROJECT IDENTIFICATION FORM: WS-3

Jurisdiction: Maui County		Agency/Organization: Department of Water Supply	
Project Title: Improve surface water transmission system in Upcountry Maui		Contact Person: Jeff Pearson	
		Phone: 270-7834	
		e-mail: jeff.pearson@co.maui.hi.us	
Hazard(s): Drought			
Flood Zone:		Base Flood Elevation:	Erosion Rate:
Critical Facility/Population/Asset at Risk: Upcountry system and population, farming and water supply, 25,000+ population.			
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: \$5,000,000 to \$10,000,000		Project Period (duration): Ongoing CIP projects	
Estimated Value of Structure or Facility:			
Sources of Financial Support: State loans/ County loans and funds			
Project Objectives: To improve the surface water transmission system to improve the flow of water for agriculture, domestic supplies, and fire protection.			
Project Description: Systematically improve the existing surface water transmission system by replacing existing lines or installing new lines.			
Proposal Date: July 2004			

Hazard Mitigation Project Proposal: ALL-1

Date:	2011		
Jurisdiction:	County of Maui	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):					
<input checked="" type="checkbox"/> Drought	<input type="checkbox"/> Erosion	<input type="checkbox"/> Flood	<input type="checkbox"/> Hurricane, High	<input type="checkbox"/> Landslide	<input type="checkbox"/> Seismic
<input type="checkbox"/> Tsunami	<input type="checkbox"/> Volcano/Lava	<input type="checkbox"/> Wildfire	<input type="checkbox"/> 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):			
<input checked="" type="checkbox"/> HMGP	<input checked="" type="checkbox"/> PDM	<input checked="" type="checkbox"/> State Mitigation Plan Project List	<input type="checkbox"/> Other (specify):

Estimated TOTAL Cost of Project::	\$100,000	Project Period:	24 months
Estimated Federal Share of Project::	\$25,000	Estimated Non-Federal Share of Project::	\$75,000
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.

County of Maui Drought Mitigation Strategies

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

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.