NEIL ABERCROMBIE
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WILLIAM M. TAM
DEPUTY DIRECTOR

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT
P.O. BOX 621
HONOLULU, HAWAII 96809

STAFF SUBMITTAL

for the meeting of the
COMMISSION ON WATER RESOURCE MANAGEMENT

March 16, 2011
Honolulu, Oahu

Request to Authorize the Chairperson to
Enter into Joint Funding Agreements with U.S. Geological Survey
To Conduct a Study on Low-Flow Characteristics for Streams
In the Lahaina District, West Maui, Hawaii

SUMMARY OF REQUEST:

Staff requests that the Commission on Water Resource Management (Commission) authorize the Chairperson to enter into multiple Joint Funding Agreements (JFA) with the U.S. Geological Survey (USGS) to conduct a study of Low-Flow Characteristics for Streams in the Lahaina District of West Maui, Hawaii.

BACKGROUND:

In August 2006, Maui Pineapple Company, Inc. (MPC) petitioned the Commission to establish amended instream flow standards for Honokohau and Honolua Streams in West Maui. The petitions were accepted as complete on October 2, 2006.

In July 2008, the U.S. Army Corps of Engineers (USACE) contacted numerous agencies, including the Commission, expressing interest in developing a West Maui Watershed Plan. Discussions continue with the Department of Land and Natural Resources, the Department of Health, and various other federal agencies to develop a plan.

In November 2008, the Commission notified MPC that the petitions would be delayed due to the Na Wai Eha Surface Water Management Area designation, the Na Wai Eha High-Level Source and Interim IFS Contested Case Hearing, the adoption of interim instream flow standards (interim IFS) for five surface water hydrologic units in East Maui, the implementation and monitoring of five East Maui hydrologic units, and work to adopt interim IFS for the remaining 16 petitioned hydrologic units in East Maui.

The interim IFS established in East Maui are in the implementation and monitoring phases. The Commission staff is seeking to initiate the hydrologic studies necessary to address one of the two MPC petitions (Honolua) along with nine other hydrologic units. This study will also contribute

to the development of the USACE's West Maui Watershed Plan, for which an agreement is expected in the coming months. The Commission also hopes to benefit from its participation in the West Maui Watershed Plan, as various studies conducted under the Plan's cost-sharing program can provide beneficial information when addressing the other interim IFS in West Maui. The other stream for which MPC sought an amended IFS (Honokohau Stream) is not included in this study because extensive research has already been completed by USGS to characterize the availability and distribution of base flow in the lower reaches of the stream. In addition, there is an active continuous-record stream-gaging station in the upper reaches.

On March 1, 2011, following initial discussions, USGS prepared the attached Joint Funding Agreement and Study Proposal (Exhibit 1).

SCOPE OF SERVICES AND FUNDING:

The attached study proposes a 3-year cooperative study of the main streams within ten watersheds in the Lahaina District, West Maui. The objectives are to: 1) quantify the amount of water under natural, low-flow conditions upstream of diversions; and 2) characterize the magnitude and frequency of low flows at selected sites downstream of existing surface water diversions. The main streams included in this study are within the watersheds, or surface water hydrologic units, of Honolua, Honokahua, Kahana, Honokowai, Wahikuli, Kahoma, Kauaula, Launiupoko, Olowalu, and Ukumehame. The study will run from June 1, 2011 to June 30, 2014. The total cost will be $648,000.

USGS will undertake this study in five steps:

1) Conducting background research on existing surface water diversions, rainfall, groundwater, and surface-water;
2) Conducting stream reconnaissance surveys to understand the hydrologic conditions;
3) Establishing low-flow partial records stations to quantity streamflow under various conditions;
4) Conducting seepage analyses to characterize gains and losses in streamflow; and
5) Preparing maps to be published as part of the report.

JFA Period 1: June 1, 2011 to May 31, 2012. The total cost for Period 1 is $206,000 (Commission ($103,000) and USGS ($103,000)). The major tasks include planning, background research, reconnaissance, and initial data collection and analysis.

JFA Period 2: June 1, 2012 to May 31, 2013. The total cost for Period 2 is $295,000. The USGS and the Commission will share in the cost, but have also agreed to seek other funding partners to reduce the cost for each cooperating agency. The major task will be continued data collection and analysis.

JFA Period 3: June 1, 2013 to June 30, 2014. The total cost for Period 3 is $147,000. The USGS and the Commission will share in the cost, but will again seek other funding partners. The major tasks include the conclusion of data collection and analysis, report writing, report approval, and publication.

The funds for the Commission's share of JFA Period 1 ($103,000) are available from the Department's FY 2011 Budget, LNR 404, Water Resources Program.

ENVIRONMENTAL REVIEW (CHAPTER 343)

Hawaii Revised Statutes (HRS) Chapter 343 does not apply because this is a data collection and research study. Hawaii Administrative Rule §11-200-8(A)(5) exempts classes of action including, "*Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to and environmental resource.*"

RECOMMENDATION:

1. Staff recommends that the Commission authorize the Chairperson to enter into a Joint Funding Agreement between the Commission and the U.S. Geological Survey to conduct a Study on Low-Flow Characteristics for Streams in the Lahaina District, West Maui, Hawaii from June 1, 2011 to May 31, 2012 (Period 1),

2. Staff recommends that the Commission authorize the Chairperson to enter into subsequent Joint Funding Agreements (Periods 2 and 3) between the Commission and the U.S. Geological Survey to continue to conduct a Study on Low-Flow Characteristics for Streams in the Lahaina District, West Maui, Hawaii from June 1, 2012 to June 30, 2014.

The terms of these agreements will be subject to the availability of funding and the approval of the Chairperson and the Department's Deputy Attorney General.

Respectfully submitted,

WILLIAM M. TAM
Deputy Director

Exhibit 1. USGS Joint Funding Agreement and Proposal for a Study on Low-Flow Characteristics for Streams in the Lahaina District of West Maui, Hawaii.

APPROVED FOR SUBMITTAL:

WILLIAM J. AILA, JR.
Chairperson

United States Department of the Interior

U.S. GEOLOGICAL SURVEY

Pacific Islands Water Science Center
677 Ala Moana Blvd., Suite 415
Honolulu, Hawai'i 96813
Phone: (808) 587-2400/Fax: (808) 587-2401

TAKE PRIDE IN AMERICA

March 2, 2011

Mr. William Tam, Interim Deputy Director
State of Hawai'i
Department of Land and Natural Resources
Commission on Water Resource Management
P.O. Box 621
Honolulu, Hawai'i 96809

Attn.: Dean Uyeno

Dear Mr. Tam:

Subject: Joint Funding Agreement for a cooperative study to assess low-flow characteristics for streams in the Lahaina District, Maui

Enclosed are two copies of a Joint Funding Agreement between the State of Hawai'i Department of Land and Natural Resources Commission on Water Resource Management (CWRM) and the U.S. Geological Survey (USGS) for a cooperative study to assess low-flow characteristics for streams in the Lahaina District, Maui, during the period June 1, 2011 to May 31, 2012. The total cost of the agreement is $206,000, which will be shared by the CWRM ($103,000) and the USGS ($103,000).

The objectives of this three-year study on the main streams in the Lahaina District of West Maui are to (1) quantify the amount of water available under natural, low-flow conditions upstream of diversions; and (2) characterize the magnitude and frequency of low flows at selected sites downstream of existing surface-water diversions. Low flows are defined as less than median flow conditions. Included in the study are the main streams within the ten watersheds of Honolua, Honokahua, Kahana, Honokowai, Wahikuli, Kahoma, Kauaula, Launiupoko, Olowalu, and Ukumehame. Honokohau is excluded from the study because recent research by the USGS has been completed on the availability and distribution of base flow in the lower reaches of the Honokohau Stream, and that an active USGS continuous-record stream-gaging station is operating upstream of the diversion intake to provide information on long-term hydrologic conditions.

This study will provide current surface-water data and information that will assist the CWRM in determining equitable, reasonable, and beneficial instream and off-stream uses of the surface-water resources in the Lahaina District of West Maui. Results from this study will be published in the USGS Scientific Investigations Report series and made available on the internet. The total cost for this study is estimated to be $648,000.

EXHIBIT 1

A more detailed description of the scope of work, budget, and timeline for the study is attached to the Joint Funding Agreement. Costs by agreement period are summarized below.

Category	06/01/11-05/31/12	06/01/12-05/31/13	06/01/13-06/30/14	Total
Labor[1]	153,320	214,854	126,791	494,965
Travel	30,106	49,001	4,352	83,459
Supplies	1,000	500	-	1,500
Report Printing	-	-	700	700
Science Support[2]	21,574	30,645	15,157	67,376
Total	**206,000**	**295,000**	**147,000**	**648,000**

[1]Labor includes salary and indirect costs for leave, facilities, and overhead assessments
[2]Science support includes indirect costs for project management, technical services, and report processing fees

If you wish to initiate this study, please sign and return one copy of the enclosed Joint Funding Agreement. The second copy is for your files.

The legal authority for the USGS to enter into this agreement is 43 USC 50. Work performed with funds from the agreement will be conducted on a fixed price basis. The results of all work under the agreement will be available for publication by the USGS. Your agency will be billed using form DI-1040, according to the terms of the agreement.

If you have any questions or would like more information about this study, please feel free to contact me at 587-2406 or by e-mail at santhony@usgs.gov. Thank you for your continued interest in working with the USGS to provide water-resource information for the State of Hawai'i.

Sincerely,

Stephen S. Anthony
Center Director

Enclosures

Page 1 of 2

Form 9-1366
(Oct. 2005)

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement

Customer #:	6000001189
Agreement #:	11WSHI000000005
Project #:	ZH00EH4
TIN #:	99-0266119
Fixed Cost Agreement	☑ Yes ☐ No

FOR
WATER RESOURCES INVESTIGATIONS

THIS AGREEMENT is entered into as of the 1st day of June, 2011, by the U.S. GEOLOGICAL SURVEY, UNITED STATES DEPARTMENT OF THE INTERIOR, party of the first part, and the COMMISSION ON WATER RESOURCE MANAGEMENT, DEPARTMENT OF LAND AND NATURAL RESOURCES, STATE OF HAWAI'I, party of the second part.

1. The parties hereto agree that subject to availability of appropriations and in accordance with their respective authorities there shall be maintained in cooperation a cooperative study to assess low-flow characteristics for streams in the Lahaina District, Maui, according to the scope of investigations provided in attachment 1, herein called the program. The USGS legal authority is 43 USC 36C; 43 USC 50; and 43 USC 50b.
2. The following amounts shall be contributed to cover all of the cost of the necessary field and analytical work directly related to this program. 2(b) includes In-Kind Services in the amount of $0.00.

   by the party of the first part during the period
   (a) $103,000.00 June 1, 2011 **to** May 31, 2012

   by the party of the second part during the period
   (b) $103,000.00 June 1, 2011 **to** May 31, 2012

   (c) Additional or reduced amounts by each party during the above period or succeeding periods as may be determined by mutual agreement and set forth in an exchange of letters between the parties.

   (d) The performance period may be changed by mutual agreement and set forth in an exchange of letters between the parties.

3. The costs of this program may be paid by either party in conformity with the laws and regulations respectively governing each party.
4. The field and analytical work pertaining to this program shall be under the direction of or subject to periodic review by an authorized representative of the party of the first part.
5. The areas to be included in the program shall be determined by mutual agreement between the parties hereto or their authorized representatives. The methods employed in the field and office shall be those adopted by the party of the first part to insure the required standards of accuracy subject to modification by mutual agreement.
6. During the course of this program, all field and analytical work of either party pertaining to this program shall be open to the inspection of the other party, and if the work is not being carried on in a mutually satisfactory manner, either party may terminate this agreement upon 60 days written notice to the other party.
7. The original records resulting from this program will be deposited in the office of origin of those records. Upon request, copies of the original records will be provided to the office of the other party.

Page 2 of 2

Form 9-1366 continued

U.S. Department of the Interior
U.S. Geological Survey
Joint Funding Agreement

Customer #:	**6000001189**
Agreement #:	**11WSHI000000005**
Project #:	**ZH00EH4**
TIN #:	**99-0266119**

8. The maps, records, or reports resulting from this program shall be made available to the public as promptly as possible. The maps, records, or reports normally will be published by the party of the first part. However, the party of the second part reserves the right to publish the results of this program and, if already published by the party of the first part shall, upon request, be furnished by the party of the first part, at costs, impressions suitable for purposes of reproduction similar to that for which the original copy was prepared. The maps, records, or reports published by either party shall contain a statement of the cooperative relations between the parties.
9. USGS will issue billings utilizing Department of the Interior Bill for Collection (form DI-1040). Billing documents are to be rendered **quarterly**. Payments of bills are due within 60 days after the billing date. If not paid by the due date, interest will be charged at the current Treasury rate for each 30 day period, or portion thereof, that the payment is delayed beyond the due date. (31 USC 3717; Comptroller General File B-212222, August 23, 1983).

U.S. Geological Survey
United States
Department of the Interior

Commission on Water Resource Management
Department of Land and Natural Resources
State of Hawai'i

USGS Point of Contact

Name: Chui Cheng
Address: USGS-PIWSC
677 Ala Moana Blvd., Ste 415
Honolulu, HI 96813
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Customer Point of Contact

Name: Dean Uyeno
Address: CWRM
P.O. Box 621
Honolulu, HI 96809
Telephone: 808-587-0249
Email: dean.d.uyeno@hawaii.gov

Signatures

By SS Anthony Date 3/2/11
Name: Stephen S. Anthony
Title: Center Director

By_____ Date_____
Name:
Title:

By_____ Date_____
Name:
Title:

Signatures

By_____ Date_____
Name:
Title:

By_____ Date_____
Name:
Title:

By_____ Date_____
Name:
Title:

Attachment 1

Scope of Investigations

Low-Flow Characteristics for Streams in the Lahaina District of West Maui, Hawaii

U.S. Geological Survey
Pacific Islands Water Science Center

SUMMARY

For over a century, streams in the Lahaina District of West Maui, Hawaii, were diverted to provide water for large-scale sugarcane cultivation by the Pioneer Mill Company, other agricultural purposes, and domestic uses. The surface-water diversion systems that diverted the West Maui streams consisted of eight separate collection systems (Wilcox, 1996) that span eleven watersheds, from the northernmost watershed of Honokohau to the southernmost watershed of Ukumehame. Today, many of the diversion systems remain active and provide water for domestic uses, diversified agriculture, and cultural purposes.

Competition for limited water resources has been, and continues to be a major issue in Hawaii. With increasing water demands, it is critical to effectively manage the State's water resources for current and future needs. The proper management of the water resources requires an understanding of the current hydrologic conditions of the surface-water flows. Unfortunately, existing data that capture the recent hydrologic conditions of the study area are scarce. Additional scientific information, especially streamflow data, is needed to establish technically defensible instream flow standards that will support equitable, reasonable, and beneficial allocation of the water resources in the State.

The objectives of this 3-year cooperative study on the main streams in the Lahaina District of West Maui are to (1) quantify the amount of water available under natural, low-flow conditions upstream of diversions; and (2) characterize the magnitude and frequency of low flows at selected sites downstream of existing surface-water diversions. Low flows are defined as less than median flow conditions. Included in the study are the main streams within the ten watersheds of Honolua, Honokahua, Kahana, Honokowai, Wahikuli, Kahoma, Kauaula, Launiupoko, Olowalu, and Ukumehame. Honokohau is excluded from the study because extensive research has been done by Fontaine (2003) to characterize the availability and distribution of base flow in the lower reaches of the Honokohau Stream, and an active continuous-record stream-gaging station (station 16620000) is located upstream of the diversion intake to describe the hydrologic conditions at the gage.

This cooperative study will provide an understanding of the streams in the western part of West Maui with current surface-water data. This study will also assist CWRM in determining equitable, reasonable, and beneficial instream and off-stream uses of the surface-water resources in the Lahaina District of West Maui. Results from this study will be published in the USGS Scientific Investigations Report series and made available on the internet. The study cost is estimated to be $648,000.

PROBLEM

For over a century, streams in the Lahaina District of West Maui, Hawaii (Figure 1), were diverted to provide water for large-scale sugarcane cultivation by the Pioneer Mill Company (Pioneer Mill), other agricultural purposes, and domestic uses. The surface-water diversion systems that diverted the West Maui streams were constructed in the early 1900s and consisted of eight separate collection systems. Honolua Ranch commonly referred to as Maui Land & Pine (ML&P), built and owned the Honokohau Ditch, which was the largest of the eight systems. Honokohau Ditch (also known as Honolua Ditch) was built twice and renovated once during its first 20 years of operation. The final system was concrete lined, mostly tunnels, and extends approximately 12.5 miles southwest from Honokohau Stream. The remaining seven collection systems were built by Pioneer Mill and consisted of Honokowai, Kahoma, Kanaha, Kauaula, Launiupoko, Olowalu, and Ukumehame ditches, all of which were named after the streams they diverted or the areas they served – such as the Olowalu Ditch that supplied water to the Olowalu village for domestic use (Wilcox, 1996). Between 1913 and 2000, 83 percent of the total flow (or median flow of 19 Mgal/d) upstream from the diversion on Honokohau Stream at an altitude of 825 feet was diverted by Honokohau Ditch (Fontaine, 2003). The other seven systems diverted a median flow of 25.7 Mgal/d, collectively (Wilcox, 1996). The diversion system spans eleven watersheds from the northernmost watershed of Honokohau to the southernmost watershed of Ukumehame. These watersheds occupy approximately 56,780 acres, about two-thirds of which are privately owned. In addition to surface water, Pioneer Mill supplemented its water supply with groundwater sources. Pioneer Mill ceased operation in 1999 with stable sugar production recorded at 63,000 tons in the 1960s (Dorrance and Morgan, 2000).

Today, many of the diversion systems remain active and provide water for domestic uses, diversified agriculture, and cultural purposes.

The Hawaii State Water Code mandates that the Commission on Water Resource Management (CWRM) establish a statewide instream-use protection program (Chapter 174C-71, Hawaii Revised Statutes). The principal mechanism that CWRM has for the protection of instream uses is to establish instream flow standards. "Each instream flow standard shall describe the flows necessary to protect the public interest in the particular stream. Flows shall be expressed in terms of variable flows of water necessary to protect adequately fishery, wildlife, recreational, aesthetic, scenic, or other beneficial instream uses in the stream in light of existing and potential water developments including the economic impact of restriction of such use" (Chapter 174C-71, Hawaii Revised Statutes). In 1988, CWRM set interim instream flow standards for all streams in the state of Hawaii. Subsequently, the interim instream flow standard was defined as the amount of water in the stream as of June 15, 1988 (Section 13-169-44, Hawaii Administrative Rules). This method of setting instream flow standards was challenged in a contested-case hearing related to water diverted by the Waiahole Ditch system on Oahu. In August 2000, the Hawaii Supreme Court, in a landmark decision, overturned the method used by CWRM in setting instream flow standards and ordered that CWRM set quantitative instream flow standards for the streams affected by the Waiahole Ditch system. In addition, CWRM must also set quantitative instream flow standards for all perennial streams statewide. CWRM has recognized certain uses as beneficial, including: (1) maintenance of fish and wildlife habitat, (2) outdoor recreational activities, (3) maintenance of ecosystems such as estuaries, wetlands, and stream vegetation, (4) aesthetic values such as waterfalls and scenic waterways, (5) maintenance

of water quality, (6) the conveyance of irrigation and domestic water supplies to downstream points of diversion, and (7) the protection of traditional and customary Hawaiian rights.

Competition for limited water resources has been, and continues to be a major issue in Hawaii. Conflicts have sometimes led to litigation over rights to the water, such as the contested-case hearing that was initiated in 2007 to address the instream flow standards for the Na Wai Eha streams in the eastern part of West Maui. With increasing water demands, it is critical to effectively manage the State's water resources for current and future needs. The proper management of the water resources requires an understanding of the current hydrologic conditions of the surface-water flows, which is available from active continuous-record stream-gaging stations or can be estimated from long-term historical streamflow records. Unfortunately, all but one of the surface-water gages in the study area (Figure 1) have less than ten years of record between the years 1910 and 1920. One gaging station (16636000) has fourteen years of record and was discontinued in 1932. This cooperative study will provide an understanding of the streams in the western part of West Maui with current surface-water data. Results from the study will also build on the existing knowledge base on the more recent hydrologic conditions of the entire West Maui, where much of the eastern part of West Maui (i.e., Waihee River, Waiehu, Iao, and Waikapu Streams) has been characterized by Oki and others (2010). Most importantly, scientific information generated from this study will assist CWRM in determining equitable, reasonable, and beneficial instream and off-stream uses of the surface-water resources in the Lahaina District of West Maui. Results from the study will assist CWRM in (1) documenting water rights and uses associated with the streams in the Lahaina District of West Maui; (2) assessing the effects of

existing uses on these streams; and (3) determining quantitative and technically defensible instream flow standards for these streams.

OBJECTIVES

The objectives of this 3-year cooperative study on the streams in the Lahaina District of West Maui are to (1) quantify the amount of water available under natural, low-flow conditions upstream of diversions; and (2) characterize the magnitude and frequency of low flows at selected sites downstream of existing surface-water diversions. The study area is illustrated in Figure 1 with the watershed and streams included in the study area listed, from north to south, in Table 1. Honokohau Stream is excluded from the study because extensive research has been done by Fontaine (2003) to characterize the availability and distribution of base flow in the lower reaches of the stream, and an active continuous-record stream-gaging station (station 16620000) is located upstream of the diversion intake to describe the hydrologic conditions at the gage. This study will not address any aspect (e.g., distribution, abundance, reproduction, and recruitment) related to native stream fauna (fish, shrimp, and snails) and invertebrate species. This study also will not address water requirements for agricultural, aesthetic, or recreational uses.

Table 1. Watersheds and streams included in the study area, listed from north to south.
[* indicate streams with existing seepage-analysis data]

Watershed	Major Streams and Tributaries
Honolua	Honolua Stream* and tributary Papua Gulch
Honokahua	Honokahua Stream* and tributary Mokupea Gulch
Kahana	Kaopala Gulch; Kahana Stream* and tributaries Mailepai and Kahanaiki Gulch
Honokowai	Honokowai Stream and tributaries Amalu Gulch and Kapaloa Stream
Wahikuli	Wahikuli Gulch and tributaries Hahakea Gulch and Kealii Gulch
Kahoma	Kahoma Stream and tributaries Halona and Kanaha Streams
Kauaula	Kauaula Stream*
Launiupoko	Launiupoko Stream*
Olowalu	Olowalu Stream*
Ukumehame	Ukumahame Gulch*

APPROACH

To accomplish the objectives of this study, the USGS proposes to undertake a 3-year study with the following 5-phased approach:

1. *Background research* will be conducted to gather information on existing surface-water diversions in the streams listed in Table 1. Available rainfall, groundwater, and surface-water data of the study area (Figure 1) will be compiled.
2. *Stream reconnaissance surveys* will be conducted during the early stages of the study to provide a general understanding of the hydrologic status of the streams in the study area, and to identify stream reaches with noticeable differences in discharge. During these surveys, discharge-measurement sections will be selected upstream and downstream from diversion intakes for the low-flow partial-record stations (see item 3) and seepage analyses (see item 4). Hydrologic conditions of the stream and measurement sites will be documented with photographs and a handheld GPS unit.
3. *Low-flow partial-record stations* will be established upstream from existing diversion intakes to quantify the amount of water available under natural, undiverted low-flow conditions in the streams in the study area (OBJECTIVE #1). If appropriate, undiverted flows also may be estimated by obtaining measurements of both the diverted flow at the ditch intake and the remaining flow downstream from the diversion. About 18 low-flow partial-record stations will be established and about ten discharge measurements will be made at each station during periods of independent flow recessions. Low-flow characteristics will be estimated using record-extension methods that relate flow measurements at the low-flow partial-record stations and concurrent daily flow at index stations (Hirsch, 1982).

4. *Seepage analyses* will be conducted to characterize gains and losses in flow along the stream, downstream of diversions, within the study area (OBJECTIVE #2). A seepage analysis consists of multiple discharge measurements made nearly simultaneously at selected sites along the stream. For streams with active diversions, the seepage analyses will be conducted below the points of diversion during controlled releases of flow into the streams from the diversions. A controlled flow release is the partial or full restoration of flow to the stream from the diversion for periods of up to a few weeks to allow continuous flow to the ocean, so that measurements of streamflow can be made in stream reaches that are commonly dry under diverted conditions. This way, information from the seepage analyses will provide insight related to streamflow during undiverted conditions. Cooperation between the owners of the existing diversions and USGS is necessary to coordinate the controlled flow releases and discharge measurements. If such cooperation cannot be achieved, seepage analyses will be conducted where flow is present and the absence of flow at selected sites downstream of existing diversions will be documented. Existing seepage-analysis data have been collected for current, diverted conditions. Table 1 indicates streams with existing seepage-analysis data.
5. *Maps* will be prepared and published as part of the report (see PRODUCTS) that document photographed sites, low-flow partial-record stations, and discharge-measurement sites for the seepage analyses. All maps will be made available digitally.

PRODUCTS

Data and results of all analyses will be documented and published in the USGS Scientific Investigations Report series. The report will be made readily available to the public through the internet. The probable report title, report outlet, and milestone dates are listed in Table 2.

Table 2. Milestone dates for planned report.

Probable title	Report outlet	First draft	Review	Approval	Publication
Low-Flow Characteristics for Streams in the Lahaina District of West Maui, Hawaii	USGS SIR	11/30/13	12/31/13	03/31/14	06/30/14

BUDGET

A total of $648,000 is needed for this 3-year study. A cost breakdown is provided in Table 3. Labor includes salary and indirect costs for leave, facilities, and overhead assessments. Science support includes indirect costs for project management, technical services, and report processing fees.

Table 3. Project budget.

Category	06/01/11-05/31/12	06/01/12-05/31/13	06/01/13-06/30/14	Total
Labor	$153,320	$214,854	$126,791	$494,965
Travel	$ 30,106	$ 49,001	$ 4,352	$ 83,459
Supplies	$ 1,000	$ 500	$ -	$ 1,500
Report Printing	$ -	$ -	$ 700	$ 700
Science Support	$ 21,574	$ 30,645	$ 15,157	$ 67,376
Total	$206,000	$295,000	$147,000	$648,000

WORKPLAN

The major tasks and associated periods of activity for this study are summarized in Table 4.

Table 4. Timeline for major tasks.

	Period 1: 06/01/2011 - 05/31/2012												Period 2: 06/01/2012 - 05/31/2013												Period 3: 06/01/2013 - 06/30/2014											
Tasks	06/2011	07/2011	08/2011	09/2011	10/2011	11/2011	12/2011	01/2012	02/2012	03/2012	04/2012	05/2012	06/2012	07/2012	08/2012	09/2012	10/2012	11/2012	12/2012	01/2013	02/2013	03/2013	04/2013	05/2013	06/2013	07/2013	08/2013	09/2013	10/2013	11/2013	12/2013	01/2014	02/2014	03/2014	04/2014	05/2014	06/2014
Planning	■	■																																			
Background research		■	■	■																																	
Reconnaissance					■	■	■	■	■	■																											
Data collection and analysis											■	■	■	■	■	■	■	■	■	■	■	■	■	■	■												
Report writing																									■	■	■	■	■	■							
Peer review																															■	■	■				
Report approval																																		■			
Publication																																		■	■	■	■

REFERENCES CITED

Dorrance, W.A. and Morgan, F.S., 2000, Sugar islands: The 165-year story of sugar in Hawaii: Honolulu, Mutual Publishing, 259 p.

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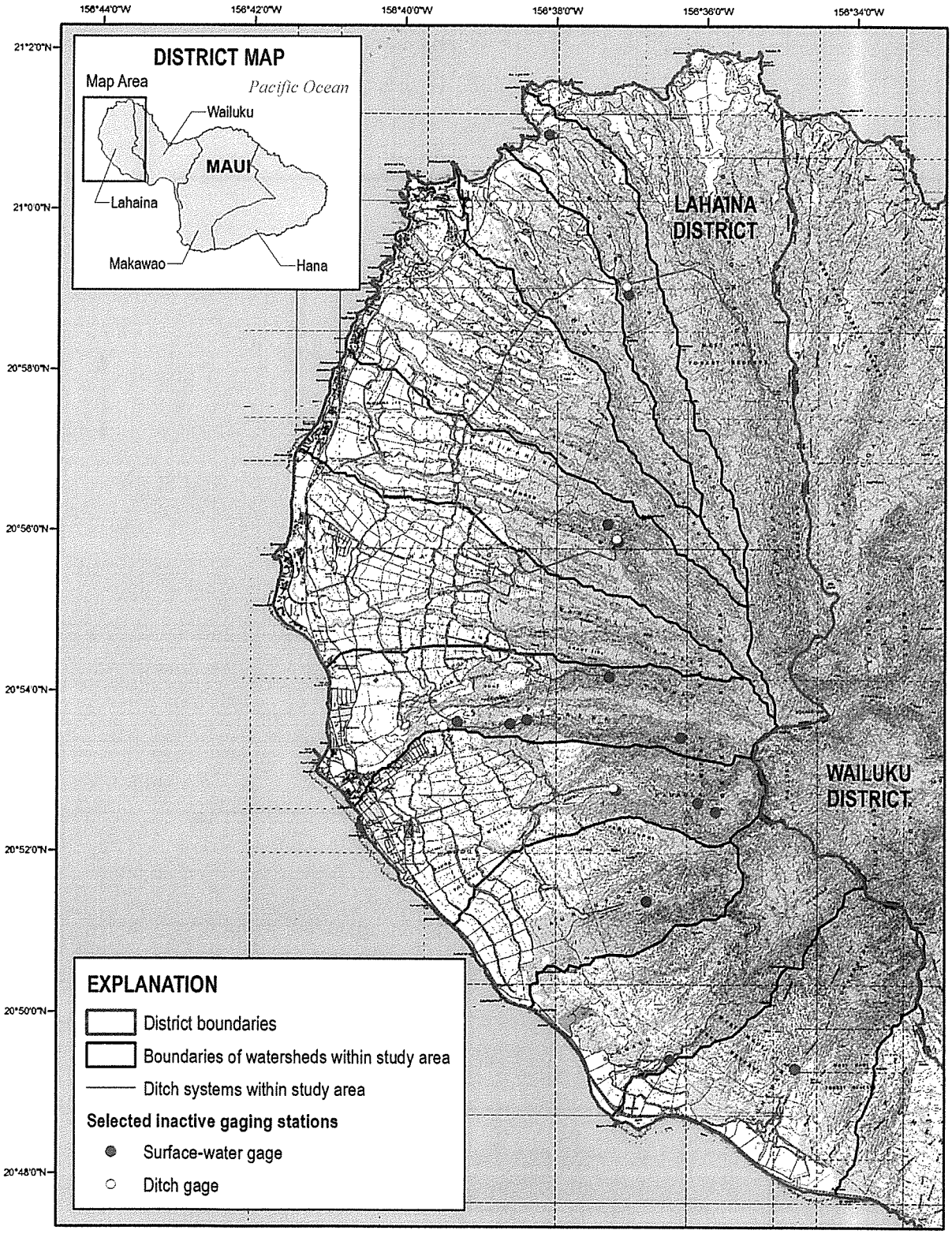
Figure 1. Study area watershed boundaries and streams, island of Maui, Hawaii.