



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

SUZANNE D. CASE
CHAIRPERSON
WILLIAM D. BALFOUR, JR.
KAMANA BEAMER, PH.D.
MICHAEL G. BUCK
NEIL J. HANNAHS
PAUL J. MEYER
VIRGINIA PRESSLER, M.D.
JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR

STAFF SUBMITTAL

For the meeting of the
COMMISSION ON WATER RESOURCE MANAGEMENT

March 20, 2018
Kahului, Maui

Amended Interim Instream Flow Standards
For the Surface Water Hydrologic Units of
Ukumehame (6004), Olowalu (6005), Launiupoko, (6006), and Kaua'ula (6007), Maui

LOCATION MAP: See Figure 1

SUMMARY OF REQUEST:

Staff is requesting that the Commission consider the recommendations for amending the interim instream flow standard (Interim IFS) for four streams contained within the following four surface water hydrologic units in the region of West Maui (See Figure 1).

UKUMEHAME (6004): Ukumehame Stream
OLOWALU (6005): Olowalu Stream
LAUNIUPOKO (6006): Launiupoko Stream
KAUA'ULA (6007): Kaua'ula Stream

BACKGROUND:

The State Water Code (Code), Chapter 174C, Hawai'i Revised Statutes (HRS), provides that the Commission may adopt interim IFS on a stream-by-stream basis or a general IFS applicable to all streams within a specified area. This submittal seeks to address four streams in West Maui.

The current interim instream flow standard (interim IFS) for the streams being considered were established by way of Hawai'i Administrative Rules (HAR) §13-169-48, which, in pertinent part, reads as follows:

Interim instream flow standard for West Maui. The Interim Instream Flow Standard for all streams on West Maui, as adopted by the commission on water resource management on October 19, 1988, shall be that amount of water flowing in each stream on the effective date of this standard, and as that flow may naturally vary throughout the year and from year to year without further amounts of water being diverted offstream through new or expanded diversions, and under the stream conditions existing on the effective date of the standard...

The current interim IFS became effective on December 10, 1988. Thus, the status quo interim IFS, in effect, grandfathered all then-existing diversions that were registered with the Commission in subsequent years. Following the initial registration of stream diversions works, any new or modified stream diversion works structure requires a permit for construction and amendment to the interim IFS.

Under the Code, the Commission has the responsibility of establishing IFS on a stream-by-stream basis whenever necessary to protect the public interest in the waters of the State. In the Waiahole Ditch Contested Case Decision and Order (Waiahole), the Hawai'i Supreme Court emphasized that "instream flow standards serve as the primary mechanism by which the Commission is to discharge its duty to protect and promote the entire range of public trust purposes dependent upon instream flows."

The Code defines an instream flow standard as a "quantity or flow of water or depth of water which is required to be present at a specific location in a stream system at certain specified times of the year to protect fishery, wildlife, recreational, aesthetic, scenic, and other beneficial instream uses." In considering a petition to amend an interim instream flow standard, the Code directs the Commission to "weigh the importance of the present or potential instream values with the importance of the present or potential uses of water for noninstream purposes, including the economic impact of restricting such uses."

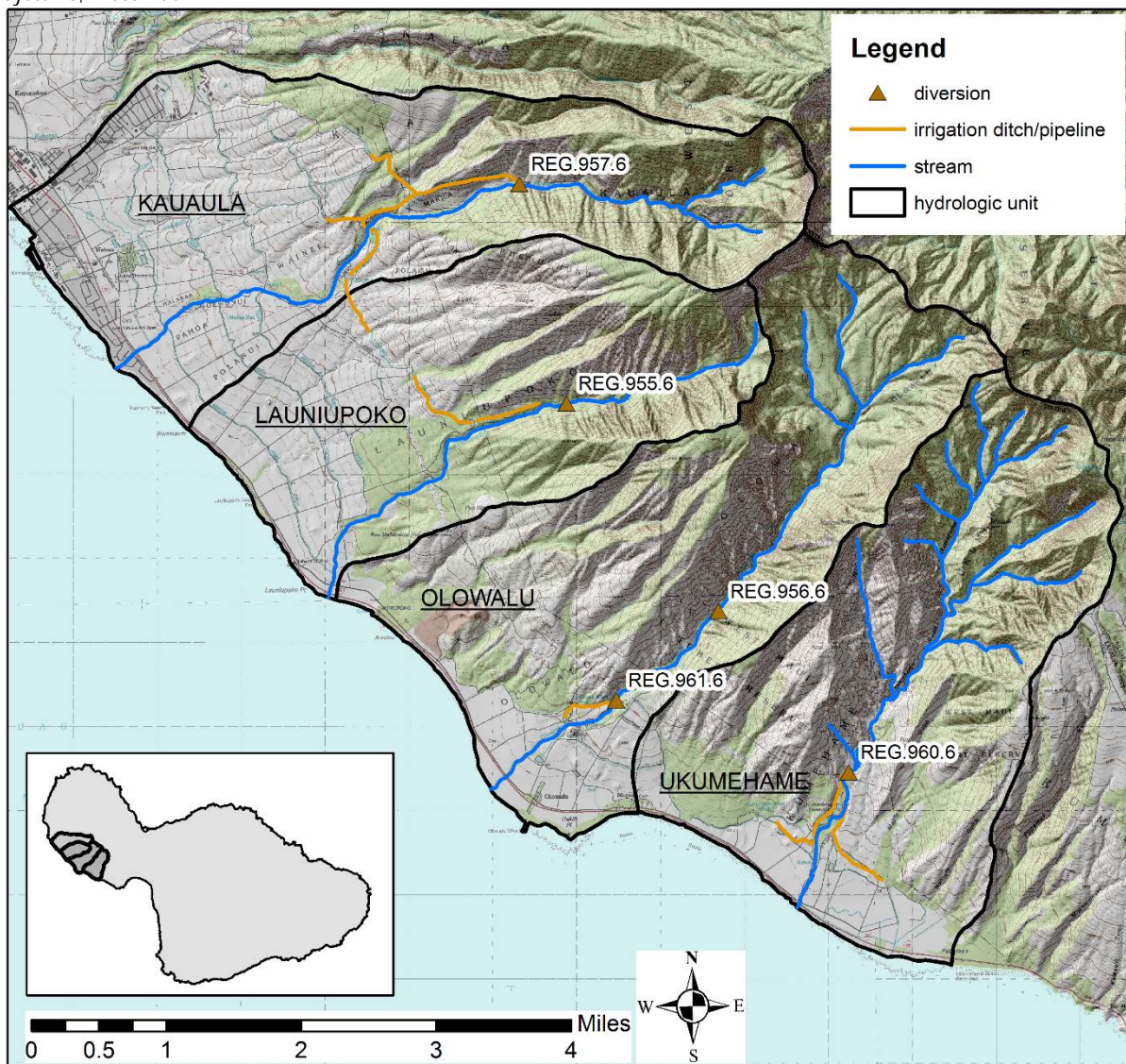
"Instream use" means beneficial uses of stream water for significant purposes which are located in the stream and which are achieved by leaving the water in the stream. Instream uses include, but are not limited to:

- 1) Maintenance of fish and wildlife habitats;
- 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) Navigation;
- 6) Instream hydropower generation;
- 7) Maintenance of water quality;
- 8) The conveyance of irrigation and domestic water supplies to downstream points of diversion; and
- 9) The protection of traditional and customary Hawaiian rights.

“Noninstream use” means the use of stream water that is diverted or removed from its stream channel and includes the use of stream water outside of the channel for domestic, agricultural, and industrial purposes.

Since the establishment of the Stream Protection and Management Branch in July 2002, the Commission has been developing a framework for setting measurable instream flow standards statewide. This framework involves an assessment of natural flow conditions for the current climate period (1984-2013), an analysis of the instream uses protected by the State Water Code, the existing and planned offstream uses of surface water, and the availability of water from multiple sources. This current assessment of instream uses for West Maui watersheds has been separated into two phases, the first of which addresses interim instream flow standards for Ukumehame, Olowalu, Launiupoko, and Kaua‘ula streams (Figure 1).

Figure 1. The Ukumehame, Olowalu, Launiupoko, and Kaua‘ula hydrologic units, registered diversion and irrigation systems, West Maui.



On March 16, 2011, the Commission authorized the Chairperson to enter into a Joint Funding Agreement between the Commission and the United States Geological Survey (USGS) for a cooperative study to assess low-flow characteristics for streams in the Lahaina District, Maui. The agreement was then signed on June 21, 2011 and the study took place between 2011 and 2013. This agreement supported fieldwork, data analysis, and documentation resulting in the production of a USGS Scientific Investigations Report (2014-5087).

In this report, Cheng (2014) used partial-record gaging stations in conjunction with index stations to estimate natural low-flow duration discharges (See Table 1). Following the publication of this report, staff began analyzing data in support of the production of Instream Flow Standard Assessment Reports (IFSAR) for each hydrologic unit. Due to the lack of staff and the immediacy of other surface water related issues, the analysis of data concerning West Maui was delayed until the last quarter of 2016.

Table 1. Estimated natural median (Q_{50}) and low-flow (Q_{70} and Q_{90}) values for four hydrologic units on West Maui (from Cheng 2014) above the main diversion. [cfs = cubic feet per second; mgd = million gallons per day]

Hydrologic Unit	Estimated natural-flow Q_{50}	Estimated natural-flow Q_{60}	Estimated natural-flow Q_{70}	Estimated natural-flow Q_{80}	Estimated natural-flow Q_{90}
Ukumehame (6004)	5.0 cfs (3.23 mgd)	4.5 cfs (2.91 mgd)	4.0 cfs (2.59 mgd)	3.6 cfs (2.33 mgd)	3.2 cfs (2.07 mgd)
Olowalu (6005) ¹	6.1 cfs (3.94 mgd)	5.2 cfs (3.36 mgd)	4.5 cfs (2.91 mgd)	4.0 cfs (2.59 mgd)	3.4 cfs (2.20 mgd)
Launiupoko (6006)	0.47 cfs (0.30 mgd)	0.44 cfs (0.28 mgd)	0.41 cfs (0.26 mgd)	0.38 cfs (0.25 mgd)	0.35 cfs (0.23 mgd)
Kaua‘ula (6007)	9.5 cfs (6.14 mgd)	8.1 cfs (5.24 mgd)	7.1 cfs (4.59 mgd)	6.2 cfs (4.00 mgd)	5.2 cfs (3.36 mgd)

¹USGS estimated natural flows above the upper Olowalu diversion. Following the September 2016 flood event, the upper diversion was discontinued and the lower diversion activated. There is approximately a 1.1 cfs loss in streamflow between the upper and lower diversions.

In 2016, Commission staff began to research the history of individual diversions and irrigation systems in West Maui. The streams in West Maui were diverted as part of sugarcane plantation irrigation systems since at least the 1930s. With the passage of the Hawai‘i State Water Code, these diversions were registered, with the instream flow standard adopted as status quo (Table 2). With the closure of Pioneer Mill (a subsidiary of Amfac, Inc.), operation of these diversions and irrigation systems were transferred to various companies that purchased the agricultural lands once owned by Pioneer Mill.

Table 2. Registered diversions, hydrologic units and their registered primary use with acreage in the Ukumehame, Olowalu, Launiupoko and Kaua‘ula hydrologic units, West Maui.

Diversion Registration ID	Diversion name	Stream name	Registrant	Hydrologic Unit	Primary Use	Area (acres)
960.6	Ukumehame	Ukumehame	PIONEER MILL	Ukumehame (6004)	Irrigation	344
961.6	Lower Intake (Powerhouse)	Olowalu	PIONEER MILL	Olowalu (6005)	Irrigation	255
956.6	Upper Olowalu Intake	Olowalu	PIONEER MILL	Olowalu (6005)	Irrigation	255
955.6	Launiupoko Intake	Launiupoko	PIONEER MILL	Launiupoko (6006)	Irrigation	107
957.6	Kaua‘ula Intake	Kaua‘ula	PIONEER MILL	Kaua‘ula (6007)	Irrigation	525

Despite the cessation of sugarcane cultivation, streamflow has continued to be diverted by these new companies for the irrigation of small diversified commercial agriculture, landscaping in agricultural-zoned lots, and roadway medians (Table 3).

Table 3. Median amount diverted from 1983-1987 as reported in the stream diversion registration and in 2017 as reported by the current operator. [cfs = cubic feet per second; mgd = million gallons per day]

Hydrologic Unit	Median amount diverted 1983-1987	Median amount diverted 2017
Ukumehame (6004)	6.07 cfs (3.92 mgd)	0.025 cfs (0.016 mgd) ²
Olowalu (6005) ¹	5.85 cfs (3.78 mgd)	2.25 cfs (1.45 mgd)
Launiupoko (6006)	0.96 cfs (0.62 mgd)	0.37 cfs (0.24 mgd)
Kaua‘ula (6007)	7.00 cfs (4.52 mgd)	7.09 cfs (4.58 mgd)

¹Following the September 2016 flood, the upper diversion was discontinued and the lower diversion activated; ²Estimated based on direct communications with the system manager when diversion is active (pre-summer 2016 fire).

Uka, LLC (West Maui Investors) purchased the lands makai of diversion 960.6 in Ukumehame; Olowalu Elua Associates, LLC (a subsidiary of West Maui Land Company, WML), purchased lands makai of diversion 956.6 and including diversion 961.6 in Olowalu; Makila Land Co., LLC (a subsidiary of West Maui Land Company) purchased lands makai of diversion 955.6 and 957.6 in Launiupoko and Kaua‘ula. Diversions 961.6 and 956.6 on Olowalu Stream are managed by Olowalu Water Company (a subsidiary of West Maui Land Company) and diversion 955.6 on Launiupoko stream and diversion 957.6 on Kaua‘ula stream are managed by Launiupoko Irrigation Company (a subsidiary of West Maui Land Company). Olowalu Water Company has

a certificate from the Public Utilities Commission to distribute approximately 273,000 gallons per day (gpd) of non-potable water when the approximately 600 acres of land owned by Olowalu Elua are fully developed (<http://files.hawaii.gov/dcca/dca/dno/dno2008/09242008-02.pdf>). Launiupoko Irrigation Company has a certificate from the Public Utilities Commission to distribute 1,331,000 gallons per day of non-potable water in 2008 when the approximately 6,000 acres are fully developed (<http://files.hawaii.gov/dcca/dca/dno/dno2003/20424.pdf>).

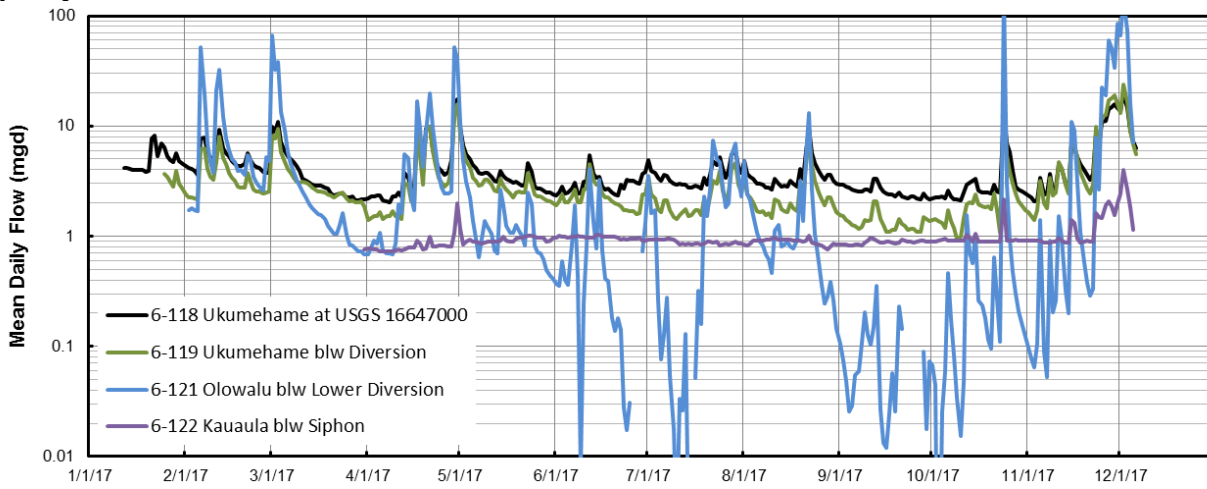
A lack of streamflow has continued to impede kuleana uses of water, including traditional and customary gathering practices, the cultivation of taro, and the recreational use of water. Informal complaints (e.g., phone calls, letters, emails) regarding the lack of streamflow in this region have been numerous (Table 4).

Table 4. Summary of complaints associated with the Ukumehame, Olowalu, Launiupoko and Kaua‘ula hydrologic units in West Maui to commission staff.

Hydrologic Unit	Date	Description of Complaint
Ukumehame	May 2014	Subdivision developer altered the stream channel
	September 2011	Illegal stream diversion in violation of agreements
	February 2010	Kuleana user’s pipe removed from stream
	February 2010	Inquiry on Petition to Amend the interim IFS to divert water for agriculture near the ocean
	August 2009	General complaint regarding auwai and/or reservoir management
	July 2008	Access to stream and/or kuleana lands
	April 2006	Maui Land Agent conveys complaints from people with kuleana rights regarding stream diversion for new subdivision
	April 2006	SMA comments on proposed Ukumehame subdivision
Olowalu	January 2017	New concrete poured in Olowalu Stream at lower diversion
	December 2016	Water dumping in a pasture
	September 2010	Lack of water in stream for lo‘i
	June 2008	No water flowing in stream
	June 2008	Unauthorized alteration to streambed
Launiupoko	December 2004	Alteration of stream for subdivision road
Kaua‘ula	August 2008	Multiple complaints about lack of sufficient streamflow for kuleana users
	July 2008	Traditional water rights are being denied
	April 2008	Water diversions are restricting traditional kuleana uses of land

Three of the four hydrologic units considered in this submittal have kuleana uses downstream of the diversions, and these streams also provide excellent habitat for a number of native aquatic fauna. Stream reaches are classified as gaining in the higher elevation portions as groundwater augments runoff in supplying surface water. The lower reaches are classified as losing, as surface water is lost to groundwater, likely recharging the basal aquifer. Continuous mauka to makai flow is estimated to naturally occur 100-percent of the time in Ukumehame, Olowalu, and Kaua‘ula streams if diversions were not in place. Stream gaging stations were established in 2017 to begin collecting baseline data at particular points in the stream below diversions as documented in Figure 2.

Figure 2. Mean daily flow at selected stream monitoring stations in the Ukumehame, Olowalu, Launiupoko, and Kaua'ula hydrologic units, West Maui.



In October 2016, Commission staff began to reach out to irrigation managers, community groups, land owners, and stakeholders in order to better understand the current state of water management and to gather information regarding instream uses in West Maui. In December 2016, staff began conducting field investigations with managers and stakeholders, installing stream monitoring stations, and surveying stream resources (Table 5).

Table 5. Summary of field investigations, by date, taken by Commission staff in support of amendment to the interim instream flow standards for West Maui. [WMI = West Maui Investments, LLC; WML = West Maui Land Company, Inc; MLP = Maui Land & Pineapple Co.; MCDWS = Maui County Department of Water Supply]

Date	Description
Dec 1, 2016	Introduction to WML employees; Launiupoko site visit
Jan 10, 2017	Kahoma site visit with Kahoma Ranch; Ukumehame site visit, gage installation; rating curve development
Jan 25, 2017	WML meeting in Kahului; MLP field office meeting in Kapaloa
Jan 26, 2017	Kaua'ula and Olowalu site visit with WML; Ukumehame site visit with WMI water manager
Feb 1, 2017	Meeting with MCDWS; Lahainaluna WTF site visit; Olowalu complaint investigation site visit; Ukumehame rating curve development
Feb 2, 2017	Honokōwai site visit with Maui Cultural Lands; Olowalu gage installation; rating curve development
Mar 8, 2017	Wahikuli site visit with Maui Ridge to Reef; Kaua'ula gage installation; Olowalu and Ukumehame rating curve development
Mar 9, 2017	Honolua site visit with MLP
Mar 10, 2017	Kanahā site visit with Hans Micheal; meeting with Hawai'i Water Service
Mar 31, 2017	Meeting with Kaanapali Land Co.; Honokōhau Ditch at Mahinahina Weir site visit; Kaua'ula and Olowalu gage rating curve development; Kahoma debris dam site visit
April 1, 2017	Presentation at Maui Cultural Lands community meeting
May 18, 2017	Honokōhau Ditch gage installation and rating curve development
May 20, 2017	Kaua'ula site visit with community; Kanahā site visit with community; Kahoma site visit with community
Dec 6, 2017	Community fact-gathering meeting in Lahaina
Jan 26, 2018	Kaua'ula site visit with community

Based upon the best available information, as presented in the IFSARs and provided in this submittal, staff has developed a recommendation that seeks to protect instream uses while providing for some noninstream uses. The recommendations provided herein have also been developed in consideration of interim IFS values that were adopted by the Commission for previous areas of Maui (i.e., East Maui and Na Wai ‘Ehā). As in those decisions, the Commission staff has relied upon the basic tenets of adaptive management, which are to: 1) Establish management objectives; 2) Implement management decisions; 3) Monitor effectiveness of decisions; 4) Evaluate results of management; and 5) Revise management decisions as necessary¹. Should initial management decisions need further amendment, the decisions can then be revised and the process repeated. This is a learning process that can be repeated over and over, until a sound management decision is reached. Due to the complex and dynamic nature of Hawai‘i’s stream systems, adaptive management affords staff the ability to proceed in making reasonable management decisions and ensuring that impacts are minimized in the face of uncertainty, thus allowing staff to proceed responsibly while advancing the clear intentions of the State Water Code.

ISSUES/ANALYSIS:

This section of the submittal begins with general considerations of issues that broadly apply to the development of an interim IFS for all four surface water hydrologic units (Figure 1). The general considerations are followed by simplified schematic diagrams and assessment summaries for each specific hydrologic unit. Each summary identifies key points from the respective IFSAR and is by no means intended to substitute the information compiled in each report. Likewise, each schematic diagram is a simplified representation of the stream and its hydrologic characteristics and is not intended to substitute the information compiled in each report.

In developing the interim IFS recommendations, staff has attempted to remain consistent in weighing all of the instream and noninstream uses of each stream based upon the best available information presented in the IFSARs, along with the oral and written comments received through the public review process. Needless to say, this process has proved challenging due to the unique nature of each stream, whether in attempting to compare stream characteristics across multiple hydrologic units or within a single one.

The first step in developing an IFS is assessing the hydrology of each hydrologic unit. Streams are largely characterized by the different geologic components that affect flow regimes, particularly the groundwater contribution to streamflow. The amount of water flowing in a given stream is also affected by regional climate variations (e.g., rainfall, fog drip, solar radiation). The quantity and quality of data available for each stream that is reflective of these geologic and hydrologic characteristics varies considerably from stream to stream. For streams with available measured data, the process for developing an interim IFS may be greatly different from that of streams with limited hydrologic data.

¹ Adapted from The Instream Flow Council, 2004, p.126.

The next step is to weigh often competing instream and noninstream uses of water against the amount of water available to accommodate the needs of these uses. Again, the quantity and quality of information varies from stream to stream. This step is further complicated by the tremendous variability of instream and noninstream uses across and within surface water hydrologic units. For example, one stream may support extensive taro cultivation while another may primarily support domestic uses. The potential of the stream and hydrologic unit to support additional water use in the future has also been considered. The priority is always given to public trust purposes of water: (1) water in its natural state; (2) water for traditional and customary practices; (3) water for domestic uses; (4) water for the Department of Hawaiian Home Lands. If there is sufficient water to meet the instream uses, then noninstream uses can be considered. The process is based upon best available information when weighing the present or potential, instream and noninstream uses.

Hydrologic Considerations: The hydrologic characteristics of a stream are critical to determining the interim IFS recommendation. These characteristics indicate the effects of geology and soils on the flow of water in the stream. Of great importance is the concept of a gaining and losing stream reach. A gaining reach is typically interpreted as where the streambed intersects the underlying water table and groundwater contributes to streamflow as seepage or springs. A losing reach is where the streambed is above the water table and water infiltrates into the streambed and recharges the aquifer, sometimes leaving the stream dry. A stream can also become dry from prolonged periods of little or no rainfall as the water table drops below the streambed. In this case, adequate rainfall is necessary to restore the interaction between surface and groundwater, and to return base flow in the stream.

The presence of gaining, losing, and dry reaches in a stream complicates the characterization of streamflow. In West Maui, streams generally have losing reaches in the lower elevations and have considerable groundwater gains from springs and development tunnels in the upper elevations. A common misconception is that flow restoration from diversion ditches is immediately followed by continuous flow downstream from the point of release all the way to the coast (analogous to turning on the faucet). When sufficient flow is restored to a stream that normally gains groundwater from the point of release to the mouth, streamflow will increase and the stream will probably flow along the entire length. For a stream that is losing, restored flow infiltrates underground once it reaches the losing section. In this case, flow is oftentimes absent downstream of the losing reach. In some cases, flow will become continuous after enough water has infiltrated the streambed and raised the water table, allowing base flow to be maintained by groundwater input. In other cases, the restored stream will remain dry at low-flow where the water table cannot be raised high enough to allow groundwater discharge to the stream.

In determining the recommended interim IFS, the estimated flow in the stream that supports nearly full habitat restoration is assumed to be the Q_{70} flow, the magnitude of flow that occurs at least 70-percent of the time. In previous fieldwork on Maui, 100-percent of the natural Q_{70} flow provides approximately 100-percent of natural habitat (Oki et al. 2010) and similarly, 100-percent of natural habitat is provided by flows greater than 80-percent of the natural median flow (Gingerich and Wolff 2005). Declines in flow below these values reduce the availability of wetted habitat for native species and with decreasing streamflow trends in Hawai‘i, a more

conservative estimate of the current flow condition is warranted. However, these estimates used continuous monitoring of streamflow at long-term stations. Due to the uncertainty of estimates based on partial-record gaging stations with limited continuous data, a slightly more conservative value maybe needed to ensure protection of instream uses.

Another factor in the selection of interim IFS sites, though not necessarily hydrologic in nature, is the accessibility of each proposed site for monitoring and regulation by Commission staff. For these four hydrologic units, major diversions are usually situated in higher elevations and monitoring stations are located in more accessible locations at lower elevations, although this is not always the case.

Finally, the availability of alternative water sources to meet the needs of offstream uses is considered. In each of the hydrologic units considered here, the maximum sustainable yield for groundwater withdrawals is substantially greater than the current total groundwater pumping rates or total installed pump capacity (Table 6). Thus, groundwater is a viable alternative to support the current and future offstream water demands.

Table 6. Current sustainable yields for aquifers associated with four hydrologic units in West Maui, current (2017) total 12-month moving average (MAV) groundwater pumping (million gallons per day, mgd), and total installed pump capacity.

Hydrologic Unit	Aquifer	Sustainable Yield (mgd)	12-month MAV (mgd)	Total Installed Pump Capacity (mgd)
Ukumehame	Ukumehame	3.0	0.062	0.116
Olowalu	Olowalu	2.0	0.104	0.360
Launiupoko	Launiupoko	7.0	0.864	4.019
Kaua'ula	Launiupoko	7.0	0.864	4.019

Instream Use Considerations: The maintenance of instream flows is important for the protection of traditional and customary Hawaiian rights, as they relate to the maintenance of stream (e.g., hihiwai, 'ōpae, 'o'opu) and riparian (vegetation) resources for gathering, recreation within streams, and the cultivation of taro. While the traditional Hawaiian ahupua'a concept is based on the premise of mauka-to-makai flow, it is difficult to fully represent in words the depth of the cultural aspects of streamflow, including traditions handed down through the generations regarding gathering, ceremonial and religious rites, and the ties to water that are pronounced in Hawaiian legend and lore. The landscape, economy, and people of the island of Maui have changed considerably in the last several decades, with many people affected by the use of surface water.

The maintenance and restoration of stream habitat benefits from continuous streamflow. Streams in Maui are recognized as important habitats for native Hawaiian stream animals. With a few exceptions, diversions capture almost all base flow and an unknown amount of total streamflow in each stream, decreasing flow downstream of the diversion and sometimes causing streams to go dry. The dry reaches that are often found immediately downstream from the diversions can inhibit species migration. Diversion structures themselves often impede the downstream movement of larvae of native stream species (entrainment) and the upstream movement of adults (recruitment). This prevents the upstream migration of native stream

animals, restricts surviving adult animals to the disconnected deep pools, and causes postlarvae recruits to be stranded at the stream mouth.

Other instream uses that must be considered include maintenance of water quality (e.g., temperature, dissolved oxygen, turbidity), instream hydropower, the aesthetic value of water flowing in a stream, and ecosystem services (e.g., supporting riparian species of value, streambank stability, biogeochemical cycling, groundwater recharge).

It is also important to note that flow restoration from diversions may not achieve the desired results of mauka-to-makai flow. A critical component that affects streamflow is the condition of the stream channel and the watershed that contributes to the streamflow within that channel. Streams are often overgrown with alien grasses and shrubs, which are believed to take up large amounts of water when sufficient flow is in the stream.

Noninstream Use Considerations: Diversions on the streams considered here were originally built to primarily irrigate sugarcane. Today, water from these hydrologic units is primarily diverted for small commercial agriculture, small private farm lots and landscaping water needs. In Ukumehame, Uka LLC, (West Maui Investors) is the major developer that uses water from Ukumehame Stream for non-potable uses. Two wells are also available to provide potable water for the planned 45 lot subdivision on former Pioneer Mill sugarcane land. Non-potable water from the stream is distributed throughout the hydrologic unit for irrigation of commercial (one lot) and residential (two lots) properties. There are two commercial farms in the Ukumehame hydrologic unit that produce sod or nursery trees with an estimated demand of 45,400 gallons per day.

In the Olowalu hydrologic unit, Olowalu Water Company provides approximately 33,600 gpd potable water for commercial buildings, domestic homes, small commercial agriculture and agriculturally-zoned parcels. Approximately 200,000 gallons per day of non-potable water is provided by Olowalu Water Company for irrigation of pasture lots, agriculture and landscaping of agriculturally-zoned homes, some small commercial agriculture, and lo'i and agriculture for Maui Cultural Lands (a lessee). Current commercial agricultural demand in Olowalu is estimated at 196,000 gallons per day. Olowalu Water Company also provides potable water to domestic homes and commercial businesses from two wells. In 2011, the Public Utility Commission approved the revised tariff sheets and rate schedules for Olowalu Water Company (Docket No. 2010-0340) assuming they deliver 273,000 gallons per day.

The Launiupoko Irrigation Company, provides non-potable water diverted from Launiupoko and Kaua'ula streams for irrigation of small commercial agriculture, agriculturally-zoned parcels, and landscaping across the Launiupoko and Kaua'ula hydrologic units. Additionally, diverted water from Kaua'ula is provided to agricultural lessees on land owned by Kamehameha Schools, estimated at 396,000 gallons per day. Water is also used to generate electricity through hydropower operated by Makila Hydro, LLC to operate pumps that supply potable well water through the Launiupoko Water Company, pressurize the irrigation distribution system, and send excess power to Maui Electric Company's grid. A small amount of water is pumped up hill to TMK parcels with appurtenant rights originally fulfilled by the Pi'ilani auwai, which was

subsequently replaced by the Kaua‘ula Ditch during the plantation era. Approximately 1.5 cfs (1.0 mgd) is currently released at the Kaua‘ula siphon back into Kaua‘ula Stream after the hydropower plant to support lo‘i agriculture for kuleana users in Kaua‘ula Gulch, as part of an informal agreement. Non-potable water is also provided directly to these homes via a separate transmission pipe on the west side of the gulch. Table 7 provides a summary of the major noninstream water uses and average water diverted for each hydrologic unit.

Table 7. Estimated non-potable water use for four hydrologic units in West Maui and reported water diverted in 2017. Launiupoko and Kaua‘ula hydrologic unit agriculture and landscaping uses are combined since they share a common distribution system managed by Launiupoko Irrigation Company. [IWREDSS = Integrated Water Requirement Estimation Decision Support System; cfs = cubic feet per second; mgd = million gallons per day]

Hydrologic unit	Water Users	Method	Current Estimated Use
Ukumehame	Landscaping (2 lots; 0.813 acres)	Estimated	0.006 cfs (0.004 mgd)
	Agriculturally-zoned parcels (9.089 acres)	IWREDSS	0.070 cfs (0.045 mgd)
	Lo‘i (4)	Reported	0.131 cfs (0.086 mgd)
Reported Water Diverted: 0.025 cfs (0.016 mgd)		Total Water Use:	0.143 cfs (0.092 mgd)
Olowalu	Agriculturally-zoned parcels (9; 49.41 acres)	IWREDSS	0.303 cfs (0.196 mgd)
	Maui Cultural Lands lo‘i (9)	Estimated	0.233 cfs (0.150 mgd)
	Landscaping (69 lots; 28.3 acres)	IWREDSS	0.219 cfs (0.141 mgd)
Reported Water Diverted: 3.110 cfs (2.010 mgd)		Total Water Use:	0.755 cfs (0.487 mgd)
Launiupoko			
Reported Water Diverted: 0.643 cfs (0.416 mgd)			
Kaua‘ula	Kamehameha Schools lessees	Reported	0.613 cfs (0.396 mgd)
	Agriculturally-zoned parcels (88.2 acres)	IWREDSS	0.469 cfs (0.303 mgd)
	Landscaping (193.8 acres)	IWREDSS	1.502 cfs (0.969 mgd)
	Return to stream	Reported	1.550 cfs (1.000 mgd)
Reported Water Diverted: 7.09 cfs (4.58 mgd)		Total Water Use:	4.134 cfs (2.672 mgd)

The partial list below summarizes some of the economic impacts of limiting water availability to Uka, LLC and West Maui Land, LLC.

- **Employment.** Uka and West Maui Land hire employees who maintain the irrigation systems. While temporary, construction of homes on agriculturally-zoned farms provides

employment. Some farm lots hire seasonal or full-time workers to maintain the farming operation.

- Groundwater. Limiting surface water resources for irrigation will induce higher dependence on groundwater wells for irrigation, which will cost more energy thus money to pump, possibly affecting agricultural operations.
- Suppliers. Uka and West Maui Land spend money in the local economy to support its operations in Maui, including to pipe suppliers and irrigation system distributions.
- Hydroelectric Power: Limiting surface water resources to West Maui Land will reduce the production of hydropower that is used to operate the groundwater pumps for potable water supply and pressurize the non-potable irrigation system, increasing the electrical costs to operate their systems.
- Landscape and tourism. The tourism industry relies on vacation rentals and secondary homes, which may be diminished if surface water is limited. Visitors expect green grassy landscaping. The Visitor Industry provides 40-percent of all jobs on the island, generates 75-percent of the County's economy, and contributes about 40-percent of the total Real Property Tax collections.

Assessment Summary: Ukumehame

Hydrology. Natural low-flow duration discharge characteristics were determined for Ukumehame Stream by Cheng (2014) using a partial-record gaging station (at 410 feet elevation) and an index station on Wailuku River (USGS 16604500). Based on the available information and field investigations, the stream naturally flows mauka to makai 100-percent of the time. Some water is diverted by the Ka‘akau Auwai to supply 16 lo‘i and then is returned to the stream below the main Ukumehame diversion. The main diversion currently only supplies water for two sets of two lo‘i but could support much more agriculture. A small amount of diverted water (~0.10 cubic feet per second) is returned to the stream below the first set of lo‘i off Ukumehame Ditch at an elevation of 175 feet.

Maintenance of Fish and Wildlife Habitat. Ukumehame Stream naturally provides mauka to makai streamflow year-round and as such, provides substantial habitat for freshwater fauna. Previous surveys by the Division of Aquatic Resources (DAR) support the conclusion that native species, including ‘o‘opu alamo‘o (*Lentipes concolor*), ‘o‘opu nōpili (*Sicyopterus stimpsoni*), ‘o‘opu nākea (*Awaous stamineus*), and ‘ōpae kala‘ole (*Atyioda bisulcata*) are common, making it an important stream supporting freshwater habitat for native aquatic fauna. Recent follow-up surveys by DAR staff and The Nature Conservancy confirm the presence of ‘o‘opu alamo‘o, ‘o‘opu nōpili, ‘o‘opu nākea, ‘ōpae kala‘ole, and hihiwai (*Neretina granosa*).

Outdoor Recreational Activities. Ukumehame Stream provides tourists and locals with recreational opportunities along its lowest reaches. Swimming is common in the stream below the diversion and especially near the highway.

Maintenance of Ecosystems. Although the riparian resources of Ukumehame were not classified as “outstanding” by the Hawai‘i Stream Assessment, the West Maui Forest Reserve occupies 76.0% of the hydrologic unit and the stream supports a diversity of riparian species that are important for bank stability, biogeochemical processes, and habitat for aquatic and terrestrial fauna. Previous stream surveys identified a variety of Megalagrion species (endangered native damselflies) which inhabit riparian areas. About 52% of the hydrologic unit is composed of alien vegetation largely due to the clearing of lands for agriculture, urbanization, and the presence of non-native ungulates. The lowest reaches support emergent wetland species.

Aesthetic. Due to easy accessibility, Ukumehame Stream supports aesthetic value in the lowest reaches near the highway, as well as to hikers and hunters in the middle to upper reaches.

Maintenance of Water Quality. Ukumehame Stream is classified by the Department of Health as Class 1b inland waters in the upper elevations and Class 2 inland waters in the lower elevations. It does not appear on the 2014 List of Impaired Waters in Hawai‘i, Clean Water Act §303(d), although there was insufficient data to support any conclusions. Increased downstream flows reduce stream temperature, an important characteristic of habitat quality for native aquatic species.

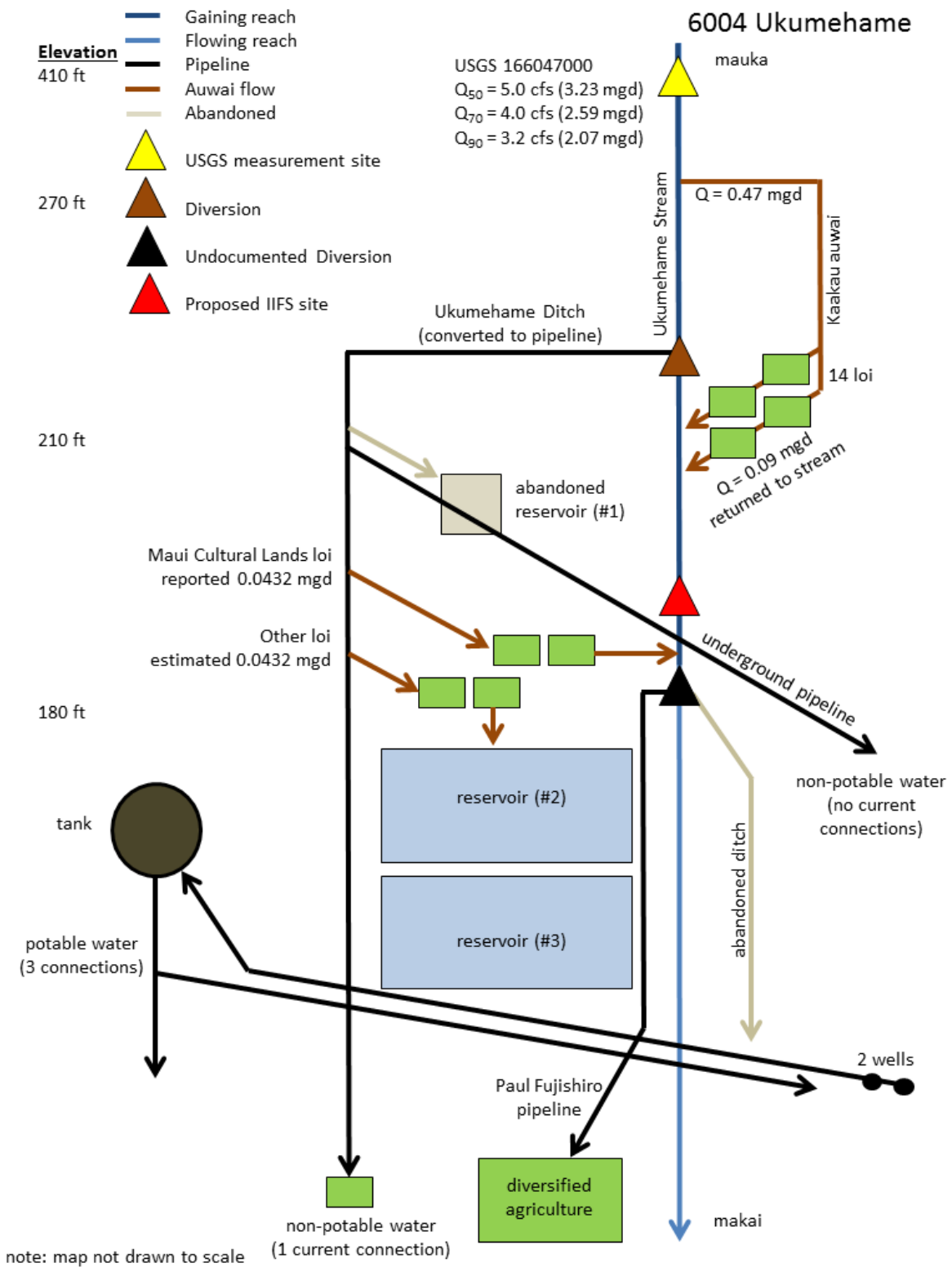
Conveyance of Irrigation and Domestic Water Supplies. Ukumehame Stream is not used for

the conveyance of irrigation or domestic water supplies.

Protection of Traditional and Customary Hawaiian Rights. Insufficient flow might affect taro cultivation although the current lo'i are fed by the existing plantation diversion and ditch system, which replaced the historic auwai. Traditional gathering in Ukumehame Valley was also common. Above the main diversion is the Ka'akau Auwai that supports the cultivation of 16 lo'i.

Noninstream Uses. Ukumehame Stream is diverted at the Ukumehame Ditch Intake (REG.960.6) by Uka, LLC, mainly for the irrigation needs of two small commercial farms and two home lots (0 acres of agriculture) in the Ukumehame hydrologic unit. Up to 45 private farm lots are planned for the subdivision. There is one unregistered diversion supplying water for domestic purposes below diversion 960.6.

Figure 3: Simplified schematic diagram for the hydrologic unit of Ukumehame.



Assessment Summary: Olowalu

Hydrology. Natural low-flow duration discharge characteristics were determined for Olowalu Stream by Cheng (2014) using a partial-record gaging station (at 560 feet elevation) and an index station on Iao Stream (USGS 1604500). The September 2016 flood destroyed the upper Olowalu intake and now only the lower Olowalu intake is active. Thus, estimates of natural streamflow have to take into consideration the approximate 1.1 cubic feet per second loss between the upper and lower intakes. Based on the available information, the stream reach below the lower diversion is a losing reach but flows to the ocean 100-percent of the time. A small amount of water is returned to the stream below the Maui Cultural Lands and from the lower Olowalu Reservoir at an elevation of 130 feet.

Maintenance of Fish and Wildlife Habitat. Olowalu Stream provides mauka to makai streamflow year-round and provides substantial habitat for freshwater fauna. Previous surveys by the Division of Aquatic Resources (DAR) support the conclusion that native species, including ‘o‘opu nōpili (*Sicyopterus stimpsoni*), ‘o‘opu nākea (*Awaous stamineus*), and ‘ōpae kala‘ole (*Atyioda bisulcata*), are common in Olowalu Stream. Recent (2017) follow-up surveys by DAR staff and The Nature Conservancy confirm the presence of ‘o‘opu alamo‘o (*Lentipes concolor*), ‘o‘opu nōpili, and ‘o‘opu nākea.

Outdoor Recreational Activities. The Hawai‘i Stream Assessment classified the recreational resources of Olowalu as “limited”, although tourists and locals have been witnessed hiking along the stream and walking their dogs during field investigations. The West Maui Forest Reserve occupies 68.3% of the hydrologic unit.

Maintenance of Ecosystems. Although the riparian resources of Olowalu were not classified as “outstanding” by the Hawai‘i Stream Assessment. Reserves occupy 43.3-percent of the hydrologic unit and the stream supports a diversity of riparian and aquatic species that are important for bank stability, biogeochemical processes, and habitat for aquatic and terrestrial fauna. Previous stream surveys identified a variety of Megalagrion species (endangered native damselflies) which inhabit riparian areas. About 60% of the hydrologic unit is composed of alien vegetation largely due to the clearing of lands for agriculture, urbanization, and the presence of non-native ungulates.

Aesthetic. Olowalu Stream does not support substantial aesthetic value in the lowest reaches near the highway, although in the middle to upper reaches, the stream has some aesthetic value based on field interviews with residents.

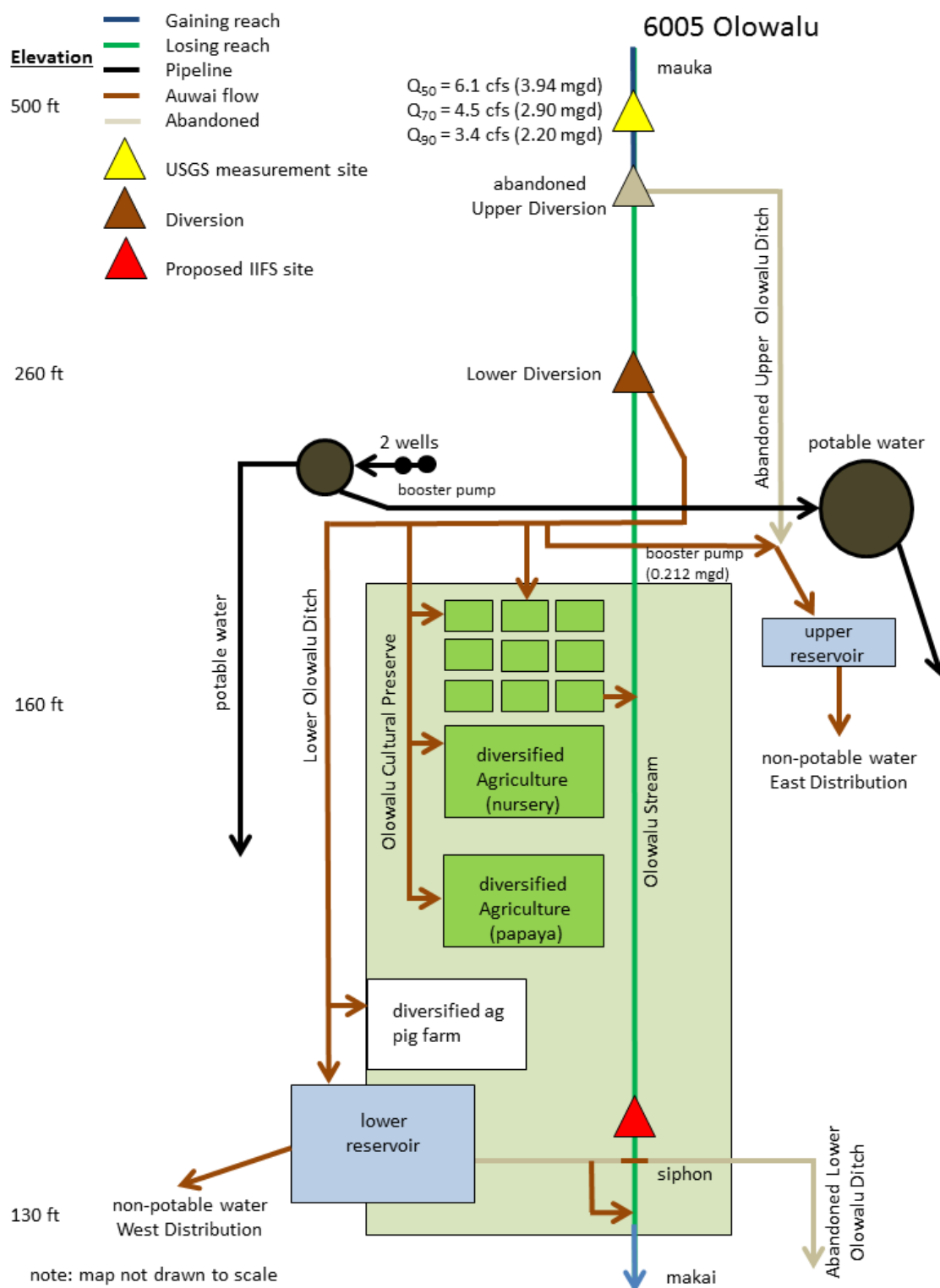
Maintenance of Water Quality. Olowalu Stream is classified by the Department of Health as Class 1b inland waters in the upper elevations and Class 2 inland waters in the lower elevations. It does not appear on the 2014 List of Impaired Waters in Hawai‘i, Clean Water Act §303(d), although there was insufficient data to support any conclusions.

Conveyance of Irrigation and Domestic Water Supplies. Olowalu Stream is not used for the conveyance of irrigation or domestic water supplies.

Protection of Traditional and Customary Hawaiian Rights. Taro cultivation on land leased by Maui Cultural Lands is supported by the lower Olowalu stream diversion. There are currently 9 to 12 lo‘i, but recent field investigations revealed that the lo‘i are not active.

Noninstream Uses. Olowalu Stream is currently diverted at the Lower Olowalu ditch intake by Olowalu Water Company, a major diversion structure, mainly for the irrigation needs of agriculture (55.44 acres) and landscaping of agriculturally-zoned homes (28.3 acres) in the Olowalu hydrologic unit. Agricultural demand for water is estimated at 0.196 mgd (0.303 cfs) and landscaping demand for water is estimated at 0.141 mgd (0.220 cfs). The diversion was repaired following the large September 2016 flood which destroyed the Upper Olowalu ditch intake.

Figure 4: Simplified schematic diagram for the hydrologic unit of Olowalu.



Assessment Summary: Launiupoko

Hydrology. Natural low-flow duration discharge characteristics were determined for Launiupoko Stream by Cheng (2014) using a partial-record gaging station (at 1,340 feet elevation) and an index station on Honokōhau Stream (USGS 16620000). Based on the available information and field investigations, the stream reach below the diversion is dry. The stream is expected to naturally flow mauka to makai less than 20-percent of the time.

Maintenance of Fish and Wildlife Habitat. Above the diversion, Launiupoko Stream has the lowest continual flow in the Lahaina District. The middle reaches below the diversion are expected to be naturally dry most of the time, providing no instream habitat.

Outdoor Recreational Activities. The Hawai‘i Stream Assessment classified the recreational resources of Launiupoko as “limited”. Recreational opportunities included hiking, hunting, and scenic views.

Maintenance of Ecosystems. The riparian resources of Launiupoko were not classified as “outstanding” by the Hawai‘i Stream Assessment. Reserves occupy 43.3-percent of the hydrologic unit and the stream supports a diversity of riparian and aquatic species that are important for bank stability. About 60-percent of the hydrologic unit is composed of alien vegetation largely due to the clearing of lands for agriculture, urbanization, and the presence of non-native ungulates.

Aesthetic. Because it does not regularly flow to the ocean, Launiupoko Stream does not support substantial aesthetic value.

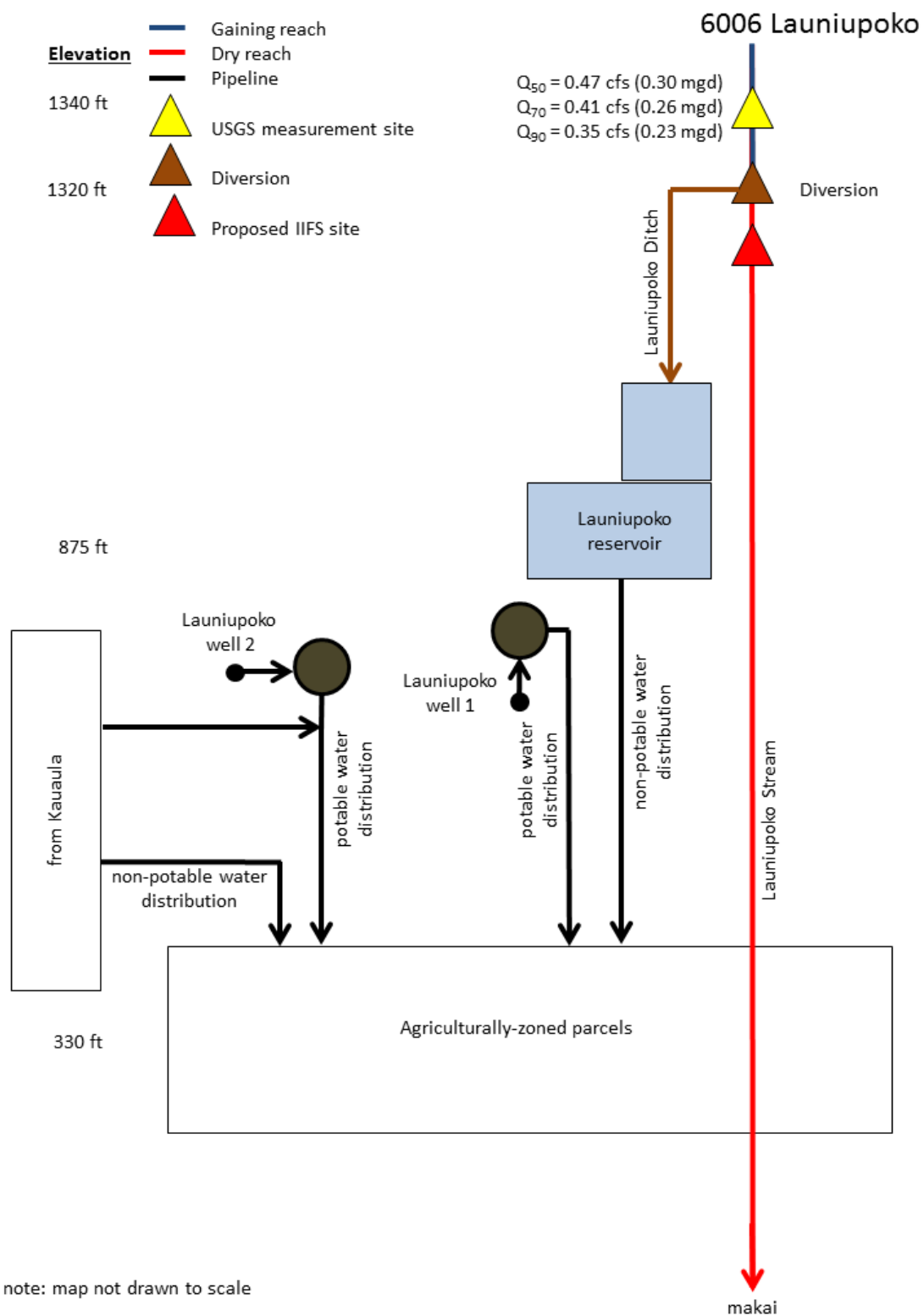
Maintenance of Water Quality. Launiupoko Stream is classified by the Department of Health as Class 1b inland waters in the upper elevations and Class 2 inland waters in the lower elevations. It does not appear on the 2014 List of Impaired Waters in Hawai‘i, Clean Water Act §303(d), although there was insufficient data to support any conclusions.

Conveyance of Irrigation and Domestic Water Supplies. Launiupoko Stream is not used for the conveyance of irrigation or domestic water supplies.

Protection of Traditional and Customary Hawaiian Rights. There is currently no flooded lo‘i in Launiupoko. Testimony from residents suggest that only dryland agriculture was traditionally practiced in the Launiupoko ahupua‘a.

Noninstream Uses. Launiupoko Stream is diverted at the Launiupoko Ditch Intake by Launiupoko Irrigation Company mainly for the irrigation needs of agriculture (88.3 acres; 0.303 mgd) and the landscaping needs of agriculturally-zoned homes (193.8 acres; 1.5 mgd) in the Kaua‘ula and Launiupoko hydrologic units. Water is also used to irrigate the roadway medians.

Figure 5: Simplified schematic diagram for the hydrologic unit of Launiupoko.



Assessment Summary: Kaua‘ula

Hydrology. Natural low-flow duration discharge characteristics were determined for Kaua‘ula Stream by Cheng (2014) using a partial-record gaging station (at 1,560 feet elevation) and an index station on Honokōhau Stream (USGS 16620000). Based on the available information and field investigations, the stream reach below the main diversion is dry. A small amount of water (~1.5 cubic feet per second) is returned to the stream below the siphon on the Kaua‘ula Ditch at an elevation of 880 feet. Since staff investigations began in January 2017, there has been continual flow to the ocean below the siphon.

Maintenance of Fish and Wildlife Habitat. Above the diversion, Kaua‘ula Stream has the highest streamflow in the Lahaina District, other than Honokōhau Stream. However, the middle reaches below the diversion are dry due to the diversion, providing no instream habitat. Some water is returned to the stream below the Kaua‘ula Ditch siphon and native animals have been observed in the stream channel, including ‘o‘opu nākea and ‘o‘opu ‘akupa. However, there is not enough long-term data to make conclusions regarding the instream fish habitat use provided by Kaua‘ula Stream. Testimony identified Kaua‘ula as supporting populations of native species during higher flow periods. Since native species are common in nearby streams that support smaller flows, it is assumed that restoration of flows to this stream will greatly benefit native aquatic species.

Outdoor Recreational Activities. The Hawai‘i Stream Assessment classified the recreational resources of Kaua‘ula as “substantial”. Recreational opportunities included hiking, fishing, hunting, swimming, and scenic views. About 43.3-percent of the hydrologic unit is conservation land, with a small portion of this in the West Maui Forest Reserve and another portion in the West Maui Natural Area Reserve (Pana‘ewa Section).

Maintenance of Ecosystems. The riparian resources of Kaua‘ula were not classified as “outstanding” by the Hawai‘i Stream Assessment. The stream supports a diversity of riparian and aquatic species that are important for bank stability, biogeochemical processes, and habitat for aquatic and terrestrial fauna. About 60-percent of the hydrologic unit is composed of alien vegetation largely due to the clearing of lands for agriculture, urbanization, and the presence of non-native ungulates.

Aesthetic. Kaua‘ula Stream does not support substantial aesthetic value in the lowest reaches near the highway, although this might be because the stream was dry for most of recent history. In the middle to upper reaches, the stream has aesthetic value based on field interviews with residents.

Maintenance of Water Quality. Kaua‘ula Stream is classified by the Department of Health as Class 1b inland waters in the upper elevations and Class 2 inland waters in the lower elevations. It does not appear on the 2014 List of Impaired Waters in Hawai‘i, Clean Water Act §303(d), although there was insufficient data to support any conclusions.

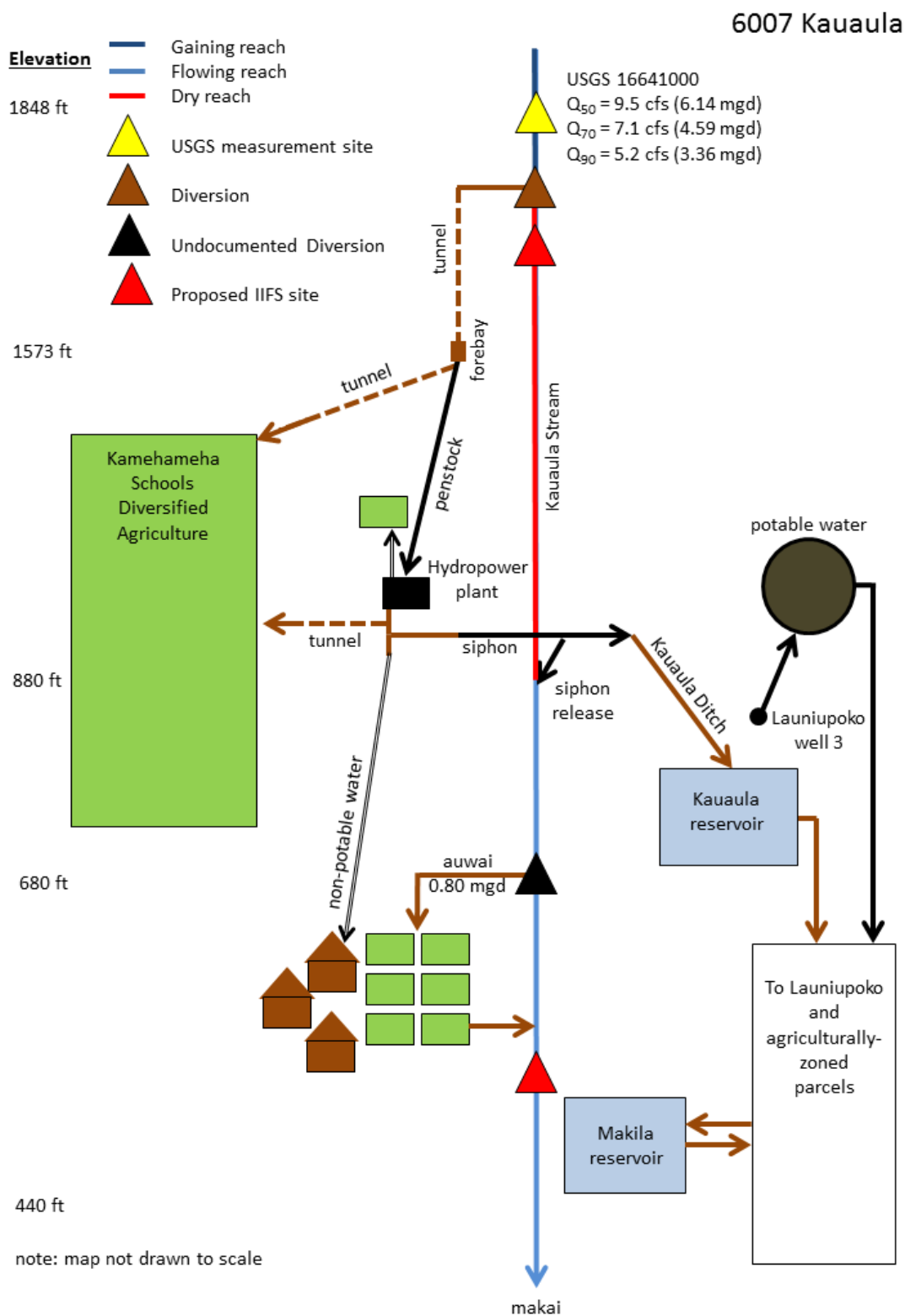
Conveyance of Irrigation and Domestic Water Supplies. Kaua‘ula Stream is not used for the

conveyance of irrigation or domestic water supplies.

Protection of Traditional and Customary Hawaiian Rights. Insufficient flow is affecting taro cultivation and traditional gathering in Kaua‘ula Valley. There is currently one auwai supplying sufficient water for six lo‘i, but recent field investigations revealed that as many as 33 lo‘i have been cleared and are ready to be planted if sufficient water were supplied.

Noninstream Uses. Kaua‘ula Stream is diverted at the Kaua‘ula Ditch Intake by Launiupoko Irrigation Company using a large diversion structure. Diverted water is conveyed to lessees on land owned by Kamehameha Schools (66 acres, 0.4 mgd) through tunnels and to a hydropower plant through a penstock. Following the hydropower plant, water is used for the irrigation needs agriculture (88.3 acres; 0.303 mgd) and the landscaping needs of agriculturally-zoned homes (193.8 acres; 1.5 mgd) in the Kaua‘ula and Launiupoko hydrologic units. Some water is delivered to kuleana users above the hydropower plant (flow through is returned to the ditch) and below the siphon (water released into the stream).

Figure 6: Simplified schematic diagram for the hydrologic unit of Kaua'ula.



ENVIRONMENTAL REVIEW CHAPTER 343, HAWAII REVISED STATUTES

The proposed action does not meet the applicability requirements under Hawaii Revised Statutes §343-5, therefore an Environmental Assessment is not triggered.

RECOMMENDATION:

UKUMEHAME (6004) RECOMMENDATIONS:

The Ukumehame Stream diversion (REG.960.6) originally supported sugarcane cultivation by Pioneer Mill but is now managed by Uka, LLC (West Maui Investors). Water from Ukumehame is diverted at three different locations: 1) at the Ka‘akau auwai for the cultivation of 16 lo‘i; 2) at the main diversion (REG.960.6) for multiple uses including to support taro lo‘i, commercial farming, landscaping and proposed agriculturally-zoned homes; and 3) at the lower dam for domestic uses. The stream supports many native aquatic species of substantial ecological and cultural importance as well as recreational and aesthetic value. At USGS station 16647000 (elevation 410 ft) above all diversions, the median natural streamflow is estimated to be 5.0 cubic feet per second (3.2 million gallons per day) and Ukumehame Stream is estimated to flow mauka to makai 100-percent of the time. The limited available data suggests there is minimal seepage loss between this station and the main diversion. In order to balance instream and noninstream uses for Ukumehame Stream, restored flow should result in suitable instream habitat, water for lo‘i development, and continuous mauka to makai streamflow. It is assumed that the aesthetic and recreational values will be maintained if sufficient instream habitat is restored.

Staff recommends that one measurable interim IFS be established for Ukumehame Stream:

- **Proposed Interim IFS:** The interim IFS below the main Ukumehame Stream diversion near an altitude of 220 feet, shall be established at an estimated flow of 4.5 cubic feet per second (2.9 million gallons per day) based on USGS estimates of total flow Q_{60} , measured at the lower dam at an elevation of 180ft. At least 0.20 cfs (0.13 mgd) must be supplied for taro lo‘i from diversion 960.6. Due to the uncertainty of existing hydrogeologic conditions of Ukumehame Stream, should an estimated flow of 4.5 cubic feet per second not be sufficient to meet the instream habitat needs, the interim IFS may be revised by a future Commission action. This interim IFS allows Uka, LLC to meet their 0.045 mgd agricultural water demand and 0.004 mgd landscaping water demand at least 50-percent of the time with surface water.

In addition to the General Recommendations listed below, staff recommends approval of the following adaptive management strategies for the hydrologic unit of Ukumehame:

- Complete after-the-fact permitting for undocumented diversions.
- Due to the lack of data concerning streamflow gain and loss below the natural flow monitoring station (USGS station 16647000) and the main diversion, additional seepage run streamflow measurements and measurements of stream habitat structure (depth, width, velocity) above and below the diversion are needed to support any revised future Commission action.

OLOWALU (6005) RECOMMENDATIONS:

The Olowalu Stream is diverted for multiple uses at a diversion (REG.961.6) managed by Olowalu Water Company, including supporting taro lo‘i, commercial farming, livestock husbandry, landscaping and agriculturally-zoned homes. The stream supports many native aquatic species of substantial ecological and cultural importance as well as recreational and aesthetic value. Following the large flood in September 2016, the upper diversion (REG.956.6) sustained considerable damage and the landowner (State of Hawai‘i) is in the process of formally abandoning this diversion. Above the lower diversion, the median natural streamflow is estimated to be 5.0 cubic feet per second (3.2 million gallons per day) and Olowalu Stream is estimated to naturally flow mauka to makai 100-percent of the time. In order to balance instream and noninstream uses for Olowalu Stream, restored flow should result in suitable instream habitat and continuous mauka to makai streamflow. It is assumed that the aesthetic and recreational values will be maintained if sufficient instream habitat is restored.

Staff recommends that one measurable interim IFS be established for Olowalu Stream:

- **Proposed Interim IFS:** The interim IFS, near an altitude of 130 feet as measured at the abandoned USGS gaging station 16646200, shall be 3.6 cubic feet per second (2.33 million gallons per day). This is based on USGS estimates of total flow Q_{60} of 5.2 cubic feet per second (3.36 million gallons per day) at the upper diversion, an estimated flow of 4.1 cubic feet per second (2.65 million gallons per day) at the lower diversion, an estimated seepage loss (1.1 cubic feet per second; 0.71 million gallons per day) between the two diversions, and further seepage loss between the lower Olowalu diversion, near altitude of 190 feet, and the abandoned USGS station 16646200. Due to the uncertainty of existing hydrogeologic conditions of Olowalu Stream, should an estimated flow of 3.6 cubic feet per second not be sufficient to meet the instream habitat needs, the interim IFS may be revised by a future Commission action. This interim IFS allows Olowalu Water Company to meet their 0.196 mgd agricultural water demand and 0.141 mgd landscaping water demand at least 50-percent of the time.

In addition to the General Recommendations listed below, staff recommends approval of the following adaptive management strategies for the hydrologic unit of Olowalu:

- Due to the lack of data concerning streamflow loss and natural streamflow at the lower diversion, additional monitoring of natural streamflow is recommended above the lower diversion as well as measurements of stream habitat structure (depth, width, velocity) above and below this diversion to support any revised future Commission action.

LAUNIUPOKO (6006) RECOMMENDATIONS:

Launiupoko Stream naturally supports limited aquatic fauna or ecological services and thus likely has limited cultural importance. Further, the stream supplies limited aesthetic or recreational value. The stream is assumed to be losing below the diversion, although a seepage run on this stream was not possible. Based on average seepage-loss rates of 0.05 to 1.6 cubic feet per second per mile, Launiupoko Stream is estimated to flow to the ocean less than 20-percent of the time. There is no streamflow below the existing diversion under most flows but this is believed to be sufficient to support existing instream uses.

Staff recommends that one measurable interim IFS be established for Launiupoko Stream:

- **Proposed Interim IFS:** The interim IFS below the diversion (REG.955.6), near an altitude of 1,340 feet, shall remain as designated on December 31, 1988. This is equivalent to an estimated flow of 0 cubic feet per second (0 million gallons per day). This interim IFS allows Launiupoko Irrigation Company to meet their 0.303 mgd agricultural water demand at least 50-percent of the time without any water supplied by Kaua‘ula Stream.

Water conservation should be mandated throughout the hydrologic unit, including the planting of drought tolerant plants. Large expanses of sod as landscaping is an inappropriate use of scarce water resources and should be eliminated as much as possible.

KAUA‘ULA (6007) RECOMMENDATIONS:

The balance of instream and noninstream uses for Kaua‘ula Stream considers both the importance of diverted streamflow for the Kamehameha Schools lessees; the non-potable irrigation demands of the Launiupoko Irrigation Co., the kuleana users which rely on the stream for cultural practices, taro cultivation, recreation, and other instream uses, as well as the substantial ecological potential of the stream to support native Hawaiian stream fauna. Restored flow would result in continuous streamflow from mauka to makai. A coordinated study of a one-year release of water past the diversion (REG.957.6) should be sufficient to determine the sustainability of the proposed standard.

In the matter of amending the interim IFS for Kaua‘ula Stream, staff recommends that two measurable interim IFS be established for Kaua‘ula Stream:

- **Proposed Interim IFS A:** The interim IFS below the main diversion (REG.957.6), near an altitude of 1,540 feet, shall be established at an estimated flow of 5.2 cubic feet per second (3.36 million gallons per day) based on USGS estimates of total flow Q_{90} . This interim IFS is designed to provide habitat and maintain a wetted pathway between the diversion and the siphon release point. Due to the uncertainty of existing hydrogeologic conditions of Kaua‘ula Stream, this interim IFS will be subject to a conditional release of water and monitoring by Commission staff. Should an estimated flow of 5.2 cubic feet per second not be sufficient, the interim IFS may be revised by a future Commission action.
- **Proposed Interim IFS B:** The interim IFS below the kuleana users near an altitude of 270 feet, shall be established at an estimated flow of 6.35 cubic feet per second (4.1 million gallons per day) based on USGS estimates of total flow Q_{70} and seepage losses. This interim IFS is designed to provide habitat and maintain a wetted pathway between the siphon release point and the ocean while providing for kuleana water needs downstream of the siphon. Due to the uncertainty of existing hydrogeologic conditions of Kaua‘ula Stream, this interim IFS will be subject to a conditional release of water and monitoring by Commission staff. Should an estimated flow of 6.35 cubic feet per second not be sufficient, the interim IFS may be revised by a future Commission action. This interim IFS allows Launiupoko Irrigation Company to meet the 0.4 mgd agricultural demand for Kamehameha Schools 100-percent of the time and when combined with water diverted

from Launiupoko Stream, allows Launiupoko Irrigation Company to meet their 0.303 mgd agricultural water demand 100-percent of the time.

In addition to the General Recommendations listed below, staff recommends approval of the following adaptive management strategies for the hydrologic unit of Kaua‘ula:

- Complete after-the-fact permitting for undocumented diversions.
- Launiupoko Irrigation Company, in coordination with Commission staff, shall release water to bypass the Kaua‘ula Stream diversion (REG. 957.6) to determine the attainability of the two proposed interim IFS values for Kaua‘ula Stream.
- Modification of the ditch intake such that streamflow naturally flows over the dam and provides a wetted pathway for migratory stream fauna and modifications to the dam to support upstream movement of stream fauna.

GENERAL RECOMMENDATIONS:

Staff recommends approval of the following adaptive management strategies for all four of the hydrologic units being considered:

IMPLEMENTATION

- Staff shall seek to enforce the provisions of the State Water Code should any unauthorized, non-registered or non-permitted diversions be discovered in the course of its fieldwork. Staff recommends that all owners of unauthorized diversion works structures contact staff to file the necessary applications to seek compliance with all permitting requirements set forth by the Code.
- Staff shall continue to coordinate with Uka, LLC and West Maui Land Co. to identify and determine appropriate actions with regard to attaining the proposed interim IFS values downstream of existing diversion structures.
- Staff shall continue to assess existing conditions and the status of all diversions, in coordination with Uka, LLC, West Maui Land Co., and the Division of Aquatic Resources, to determine if any modifications are possible to improve habitat conditions for stream biota.
- Any party diverting water from a stream shall be responsible to maintain system efficiencies, minimize offstream water losses, and minimize impacts to the natural stream resource.

MONITORING

- Uka, LLC and West Maui Land Co. shall notify Commission staff when any considerable repairs or maintenance to existing stream diversions structures are performed in the future. Any alterations to existing stream diversions that will substantially change the divertible capacity will still be subject to the provisions of the State Water Code, Chapter 174C, HRS.
- Within 100 days, Uka, LLC and West Maui Land Co., in coordination with Commission staff, shall develop a monitoring plan to provide data on the amount of water diverted from each stream, if needed, and distributed by each irrigation system to kuleana users. This shall include identifying existing gaging stations and the possible installation of additional gaging stations.

- Uka, LLC and West Maui Land Co., in consultation with Commission staff, shall regularly report monthly water use or related monitoring data (e.g., ditch flow, reservoir levels, pumpage amounts, etc.).
- Staff shall monitor streamflow by installing and maintaining stream gaging stations at the proposed interim IFS locations and if needed at ditch intakes.
- Periodic biological surveys shall be conducted, subject to available funding, to monitor the response of stream biota to post-interim IFS implementation.
- Anyone claiming to be negatively impacted as a result of the adopted interim IFS shall monitor and document, in cooperation with staff, the impact upon instream or noninstream uses, including economic impacts. Data shall be provided to staff to substantiate any claims.
- Likewise, anyone claiming that negative impacts are a direct result of actions (i.e., diverting too much water, violating the interim IFS) caused by another party, shall monitor and document the impact upon instream or noninstream uses, including economic impacts. Data shall be provided to staff to substantiate any claims.
- All claimants shall cooperate with staff in conducting appropriate investigations and studies, particularly with regard to granting access to stream channels and private property related to such investigations, subject to the provisions of the State Water Code, Chapter 174C, HRS.

EVALUATION

- Within two years from the date of adoption of an interim IFS, staff shall report to the Commission on the progress of implementing the interim IFS and the application of the adaptive management strategies outlined above, and the impacts of the interim IFS upon instream and noninstream uses.
- Within six months, Uka, LLC and West Maui Land Co. shall report to the Commission on the status and implementation of their monitoring plan, the locations of the gaging stations, and provide data on the volume and end uses of water delivered through each system.
- Staff shall assess the implementation of these strategies on an as-needed basis, as may be necessary upon consultation with the affected parties.
- Should there be changes to the operational status of Uka, LLC and/or West Maui Land Co. changes to the current water uses declared by Uka, LLC and West Maui Land Co. and/or any substantial changes in water needs as determined by the Commission or Commission staff, staff shall reassess the interim IFS for streams affected by the irrigation system.

Respectfully submitted,

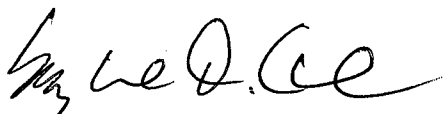


JEFFREY T. PEARSON, P.E.
Deputy Director

Note: Exhibits 1 to 4 are available from the Commission website at
<http://hawaii.gov/dlnr/cwrn/currentissues.htm>.

- Exhibit 1 Instream Flow Standard Assessment Report for Ukumehame Unit 6004,
PR-2018-01
- Exhibit 2 Instream Flow Standard Assessment Report for Olowalu Unit 6005, PR-2018-02
- Exhibit 3 Instream Flow Standard Assessment Report for Launiupoko Unit 6006,
PR-2018-03
- Exhibit 4 Instream Flow Standard Assessment Report for Kaua'ula 6007, PR-2018-04
- Exhibit 5 Compilation of Public Review Comments, PR-2018-05

APPROVED FOR SUBMITTAL:

A handwritten signature in black ink, appearing to read 'Suzanne D. Case', written in a cursive style.

SUZANNE D. CASE
Chairperson