



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

STAFF SUBMITTAL

COMMISSION ON WATER RESOURCE MANAGEMENT

October 18, 2022
Honolulu, Hawaii

Amend the Interim Instream Flow Standard on
Olowalu Stream Below Diversion 961 to Reflect a
Change in Monitoring Location and Hydrologic Conditions,
Olowalu Surface Water Hydrologic Unit, Lahaina, Maui

SUMMARY OF REQUEST

Staff is requesting that the Commission amend the interim IFS based on the availability of new hydrological data to reflect: (1) the new location of the interim IFS monitoring station; and (2) the availability of water at an elevation of 210 ft, upstream of Diversion 961 on Olowalu Stream:

OLOWALU (6003): Olowalu Stream

LEGAL AUTHORITY

The Code 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. In the 2000 appellate ruling on the first Waiāhole Ditch Contested Case Hearing Decision and Order (“*Waiāhole I*”), 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.” 94 Haw. 97, 148, 9 P.3d 409, 460. This submittal is proposing to address the interim IFS on one stream in West Maui.

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.” See HRS § 174C-3 (“Definitions”).

“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.

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.” HRS § 174C-71(2)(D).

“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 developed a framework for setting measurable instream flow standards statewide. This framework involves an assessment of natural flow conditions for the current climate period, an analysis of the instream uses protected by the State Water Code, the existing and planned uses of water, and the availability of water from multiple sources. The analysis for establishing interim IFS incorporates a balancing of the public trust uses with reasonable and beneficial uses. In some streams, reductions in downstream flow may affect the availability of surface water for other non-instream riparian uses, instream recreational uses, and aesthetic values. Reductions in streamflow have also limited the availability of habitat for native aquatic biota including amphidromous species and the protection of habitat for endemic damselflies, some of which are threatened or endangered. In *McBryde Sugar Co v. Robinson*, the Hawai‘i Supreme Court identified riparian rights as “the right to use water flowing without prejudicing the riparian rights of others and the right to the natural flow of the stream without substantial diminution in the shape and size given it by nature”. 54 Haw. at 198, 504 P.2d at 1344. 54 Haw. 174, 504 P.2d 1330. Further, the Hawai‘i Supreme Court affirmed the unity of the hydrological cycle such that surface and groundwater represent an integrated source of water, and “where surface and groundwater can be demonstrated to be interrelated as parts of a single system, established surface water rights may be protected against diversions that injure those rights whether the diversion is of surface water or groundwater.” *Reppun v. Board of Water Supply*, 65 Haw. at 531, 656 P.2d 57 at 79.

The public trust is a state constitutional doctrine which “continues to inform the Code’s interpretation, define its permissible ‘outer limits,’ and justify its existence...(T)he Code does not supplant the protections of the public trust doctrine.” *Waiāhole I*, 94 Hawai‘i at 133, 9 P.3d at 445. The State Supreme Court has described “the public trust relating to water resources as

the authority and duty ‘to maintain the purity and flow of our waters for future generations and to assure that the waters of our land are put to reasonable and beneficial uses (*emphases in original*.)” *Waiāhole I*, 94 Hawai‘i at 138, 9 P.3d at 450. “‘Reasonable-beneficial use’ means the use of water in such a quantity as is necessary for economic and efficient utilization, for a purpose, and in a manner which is both reasonable and consistent with the state and county land use plans and the public interest.” HRS § 174C-3.

The Hawai‘i Constitution requires the Commission both to protect natural resources and to promote their use and development. “The state water resources trust thus embodies a dual mandate of 1) protection and 2) maximum reasonable and beneficial use.” *Waiāhole I*, 94 Hawai‘i at 139, 9 P.3d at 451. The purposes or protected uses of the water resources trust are: 1) maintenance of waters in their natural state, 2) domestic water use of the general public, in particular, protecting an adequate supply of drinking water, 3) the use of water in the exercise of Native Hawaiian traditional and customary rights, and 4) the reservation of water enumerated by the State Water Code. *Waiāhole I*, 94 Hawai‘i at 136-37, 9 P.3d at 448-58; *In re Wai‘ola o Moloka‘i, Inc.* (“*Wai‘ola*”), 103 Hawai‘i 401, 431, 83 P.3d 664, 694 (2004). “In this jurisdiction, the water resources trust also encompasses a duty to promote the reasonable and beneficial use of water resources in order to maximize their social and economic benefits to the people of the state...(We) have indicated a preference for accommodating both instream and offstream uses where feasible...(and) reason and necessity dictate that the public trust may have to accommodate offstream diversions inconsistent with the mandate of protection, to the unavoidable impairment of public instream uses and values.” *Waiāhole I*, 94 Hawai‘i at 139, 141-42, 9 P.3d at 451, 453-54.

There are no absolute priorities under the Public Trust Doctrine. “Given the diverse and not necessarily complementary range of water uses, even among public trust uses alone, (the Court) consider(s) it neither feasible nor prudent to designate absolute priorities between broad categories of uses under the water resources trust. There are no absolute priorities between uses under the water resources trust...(and) the Commission inevitably must weigh competing public and private water uses on a case-by-case basis, according to any appropriate standards provided by law (emphasis added).” *Waiāhole I*, 94 Hawai‘i at 142, 9 P.3d at 454. The public trust creates an affirmative duty of the Commission “to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible¹ (emphasis added).” *Waiāhole I*, 94 Hawai‘i at 141, 9 P.3d at 453.

The water code does not place a burden of proof on any particular party; instead, the water code and case law interpreting the code have affirmed the Commission's duty to establish interim IFS that 'protect instream values to the extent practicable' and 'protect the public interest.'" *In re ‘Īao Ground Water Management Area High-Level Surface Water Use Permit Applications and Petition to Amend Interim Instream Flow Standards of Waihe‘e River and Waiehu, ‘Īao, and Waikapu Streams Contested Case Hearing* (“*Nā Wai ‘Ehā*”), 128 Hawai‘i 228, 258, 287 P.3d 129, 159 (2012)), *citing In re Water Use Permit Applications* (“*Waiāhole II*”), 105 Hawai‘i 1, 11, 93 P.3d 643, 653 ((2004)); and HRS §174C-71((2))(A)). In setting an interim IFS, the

¹ The Court refers to the term “feasible” as a balancing of benefits and costs and not to mean “capable of achievement.” (*Waiāhole I*, 94 Hawai‘i, at 141 n. 39; 9 P.3d, at 453 n. 39.)

Commission “need only reasonably estimate instream and offstream demands.” “*Nā Wai ‘Ehā*”, 128 Hawai‘i at 258, 287 P.3d at 159 (2012)); “*Waiāhole I*”, 94 Hawai‘i at 155 n. 60, 9 P.3d at 467 n. 60. “In requiring the Commission to establish instream flow standards at an early planning stage, the Code contemplates the designation of the standards based not only on scientifically proven facts, but also on future predictions, generalized assumptions, and policy judgments.” *Waiāhole I*, 94 Hawai‘i at 155, 9 P.3d at 467.

Further, Article 12, §7 of the Hawai‘i Constitution states that: “The State reaffirms and shall protect all rights, customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua‘a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights.”

Where scientific evidence is preliminary and not yet conclusive regarding the management of fresh water resources, it is prudent to adopt the “precautionary principles” in protecting the resource². That is, where there are present or potential threats of serious damage, lack of full scientific certainty should not be a basis for postponing effective measures to prevent environmental degradation... In addition, where uncertainty exists, a trustee's duty to protect the resource mitigates in favor of choosing presumptions that also protect the resource.³ The “precautionary principle” appears in diverse forms throughout the field of environmental law... The Hawai‘i Supreme Court confirmed that the principle, in its quintessential form, states: at minimum, the absence of firm scientific proof should not tie the Commission's hands in adopting reasonable measures designed to further the public interest. “*Waiāhole I*”, 94 Hawai‘i at 155 n. 60 p.13.

HRS §174C-71(2) and HAR §13-169-30(b) direct the Commission to establish instream flow standards on a stream-by-stream basis whenever necessary to protect the public interest in waters of the State. The staff of the Commission monitors and regulates these established instream flow standards to ensure the protection of instream uses and adequate sharing of this limited resource for non-instream purposes.

Based upon the best available information presented in each of the Instream Flow Stream Assessment Reports (IFSAR) (Exhibit 1), along with the oral and written comments received through the public review process (Exhibit 2) and provided in the informational briefing presented to the Commission during the March 20, 2018 recommendation (Exhibit 3), staff have developed a recommendation that seeks to balance public trust uses and the reasonable and beneficial needs of non-public trust uses. This process is challenging due to the unique nature of each stream, the various instream and noninstream uses of water, and the logistical challenges of instituting an interim IFS. Whether attempting to compare stream characteristics across multiple hydrologic units or within one unit, no single principal or equation determines the rate of flow restoration. However, the principals established by the State Constitution, the laws dictating the

² Commission on Water Resource Management. 1997. In the Matter of Water Use Permit Applications, Petitions for Interim Instream Flow Standard Amendments, and Petitions for Water Reservations for the Waiāhole Ditch Combined Contested Case Hearing. Final Decision & Order. CCH-OA-95-01.

³ Ibid.

Hawai‘i State Water Code (HRS chapter 174C), and the statutes which are used to implement these laws (HRS) are applied equally.

The State Water Code (Code), Chapter 174C, Hawaii Revised Statutes (HRS), provides that the Commission shall have jurisdiction statewide to hear any dispute regarding water resource protection, water permits, or constitutionally or otherwise legally protected water interests. HRS §13-167-23. If any person files a complaint with the Commission that any other person is wasting or polluting water, or is making a diversion, withdrawal, impoundment, consumptive use of waters or any other activity occurring without a permit where one is required, the Commission shall cause an investigation to be made, take appropriate action, and notify the complainant thereof. HRS §13-167-82. Further, the Commission may take jurisdiction of and resolve any disputes regarding water resource protection, water permits, or constitutionally protected water interests. HRS §13-167-3(4).

Understanding that the availability of hydrologic data in these streams may be limited, as new data are developed, decisions may be revised by a future Commission action. 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 Code.

BACKGROUND

On March 20, 2018, the Commission approved an amendment to the interim instream flow standard (interim IFS) for the hydrologic unit of Olowalu (ID: 6005), as follows:

“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 (OWC) to meet their 0.196 mgd agricultural water demand and 0.141 mgd landscaping water demand at least 50-percent of the time.”⁴

In the recommended implementation, Commission approved a process where:

- Staff shall continue to coordinate with Olowalu Water Co. to identify and determine appropriate actions with regard to attaining the proposed interim IFS values

⁴ <https://files.hawaii.gov/dlnr/cwrm/submittal/2018/sb20180320B1.pdf>

- Staff shall continue to assess existing conditions and the status of all diversions 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 off-stream water losses, and minimize impacts to the natural stream resource.

In the recommended monitoring, Commission approved a timeline where:

- Within 100 days, OWC, in coordination with Commission staff, shall develop a monitoring plan to provide data on the amount of water diverted from the stream and distributed by the irrigation system to kuleana users. This shall include identifying existing gaging stations and the possible installation of additional gaging stations.
- Staff shall monitor stream flow by installing and maintaining stream gaging stations at the proposed interim IFS locations

Following the Commission order to establish the interim IFS at the abandoned USGS gaging station 16646200, at 130 feet in elevation, Commission staff met on June 22, 2018 with OWC to implement provisions of the order as well as requirements related to a follow-up order issued on May 15, 2018⁵.

RECENT SHIFTS IN CLIMATE

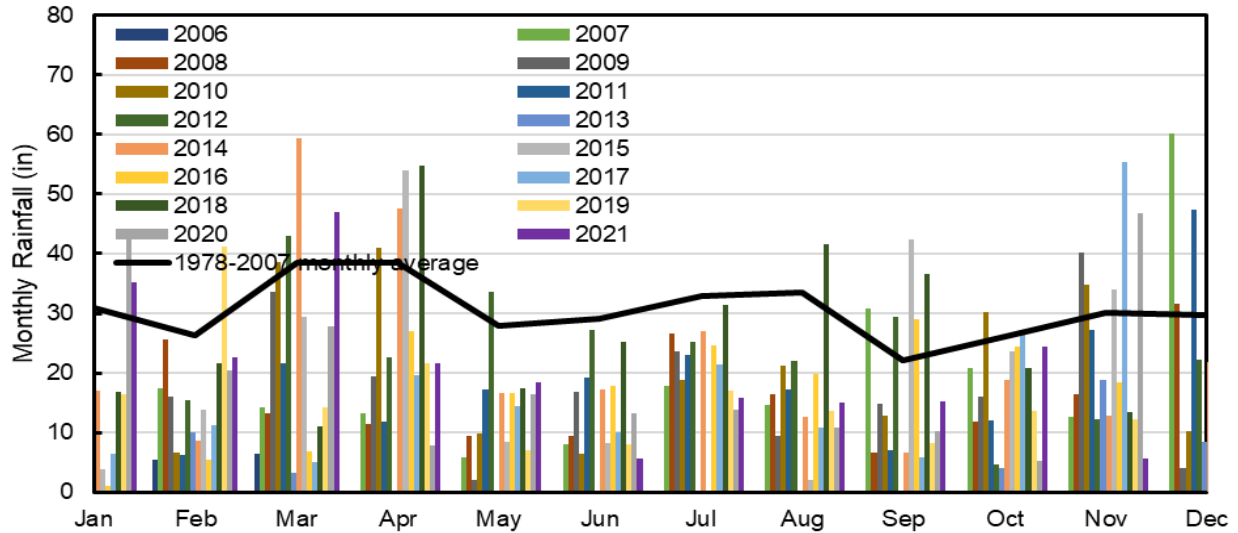
Long-term negative trends in annual and seasonal rainfall across the Hawaiian islands⁶ have resulted in reductions in groundwater recharge with consequences for baseflow in streams⁷. From 1920 to 2012 (93 years), there was a 1.63% per decade decline in rainfall in Olowalu. However, for the last 30-year period from 1983 to 2012, there was a 12.34% per decade decline in rainfall. Declines in rainfall in West Maui is typified by the monthly rainfall on Pu'u Kukui, which has surpassed the 1978-2007 long-term monthly mean only a few months since 2006 (Figure 1).

⁵ <https://files.hawaii.gov/dlnr/cwrm/submittal/2018/sb20180515B1.pdf>

⁶ Frazier and Giambelluca, 2017. Spatial trend analysis of Hawaiian rainfall from 1920 to 2012. *International Journal of Climatology*, 37(5): 2522-2531.

⁷ Bassiouni and Oki, 2013. Trends and shifts in streamflow in Hawaii, 1913-2008. *Hydrological Processes*, 27: 1484-1500.

Figure 1. Monthly rainfall from 2006 to 2021 and 1978-2007 monthly average at USGS rainfall station on Puu Kukui, West Maui.



GEOLOGY

Olowalu Stream has gaining reaches due to contributions from high-elevation, dike-impounded groundwater in the upper elevations but has losing reaches in the lower elevations due to infiltration losses to alluvium (Figure 2). For a stream reach that is losing surface flow to groundwater, restored flow infiltrates underground, contributing to groundwater recharge. In some cases, flow will become continuous only after enough water has infiltrated the streambed and raised the water table, allowing base flow to be maintained by equilibrium with sub-surface flow. In other cases, the restored stream will remain dry at low-flows where the water table drops below the elevation of the stream bed.

RECENT TRENDS IN SURFACE WATER

Streamflow monitored at three nearby USGS stations indicate that there have been persistent declines in streamflow during extended dry periods (Figure 3). A lack of sustained wet season rainfall has kept low-flow conditions from rebounding during typically wet periods, resulting in severe consequences for ecological, cultural, and recreational uses.

Figure 2. Streamflow measurement locations by elevation and quantities during a seepage run by USGS on May 12, 2022.

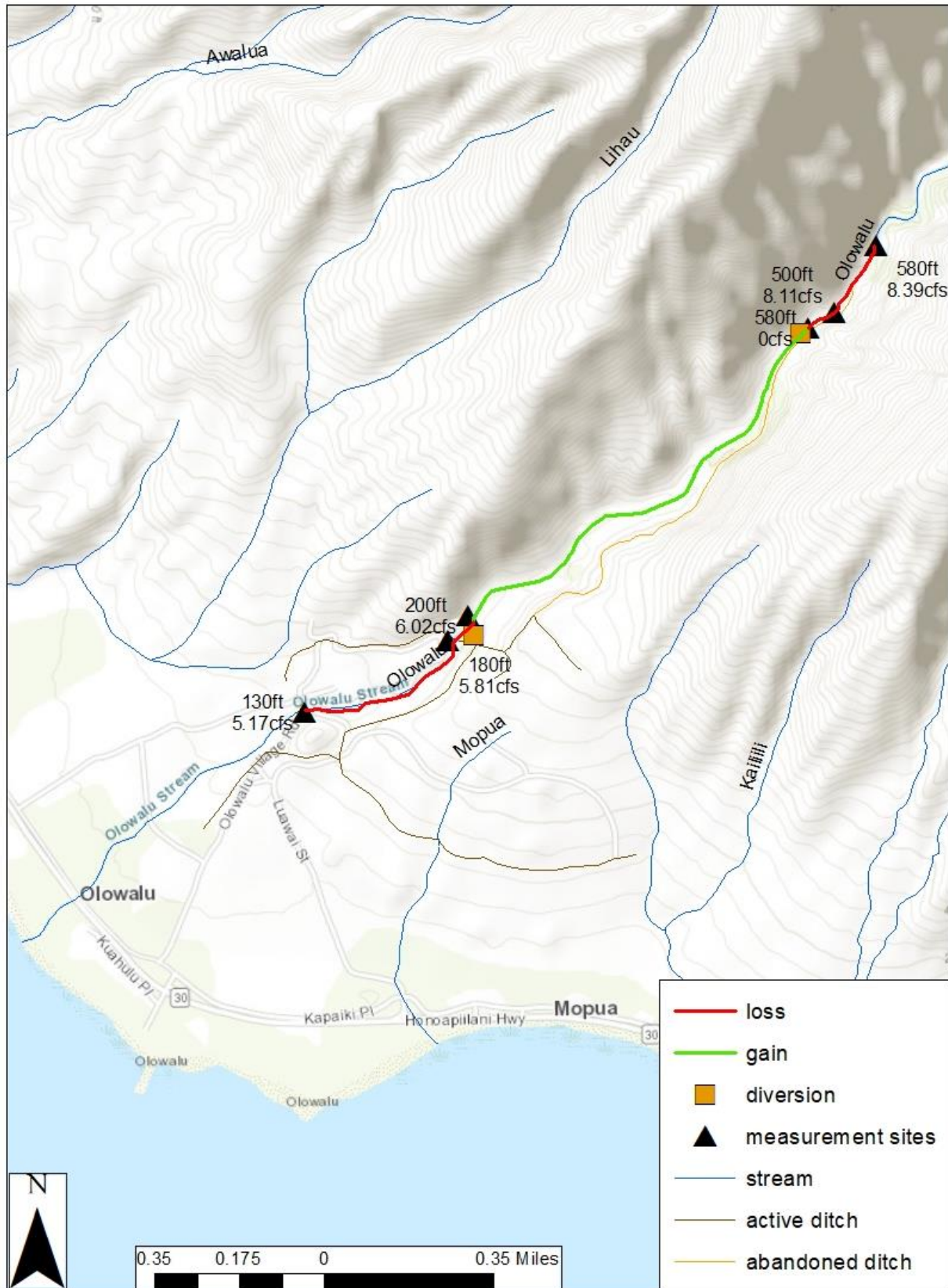


Figure 3. Streamflow trends from June 2020 to June 2022 based on mean daily flow at three locations in West Maui with the median (Q50) and 90th percentile flow (Q90) flow indicated; top: USGS 16620000 on Honokōhau Stream; middle: USGS 16641000 on Kauaula Stream; bottom: 16604500 on Wailuku Stream

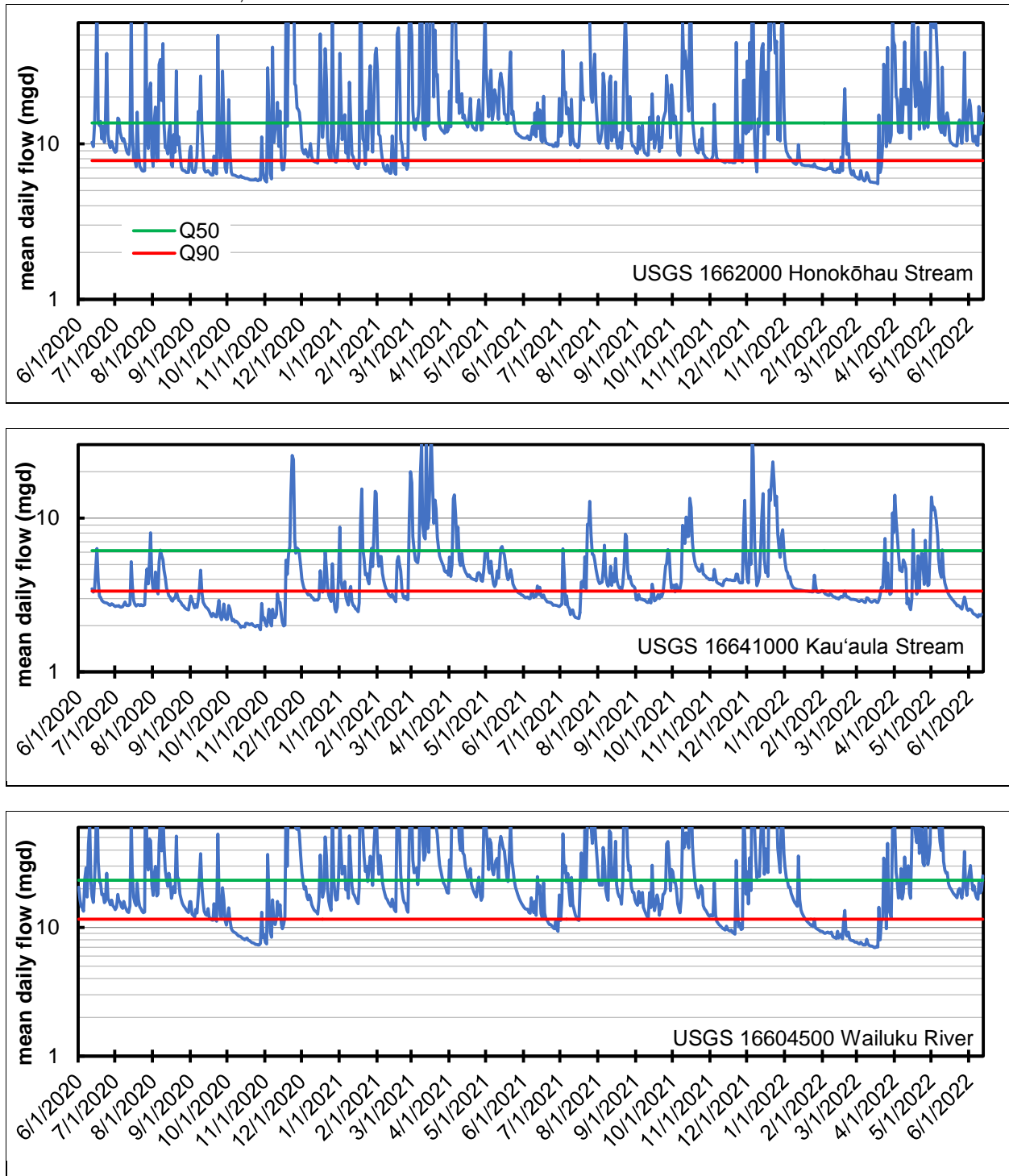
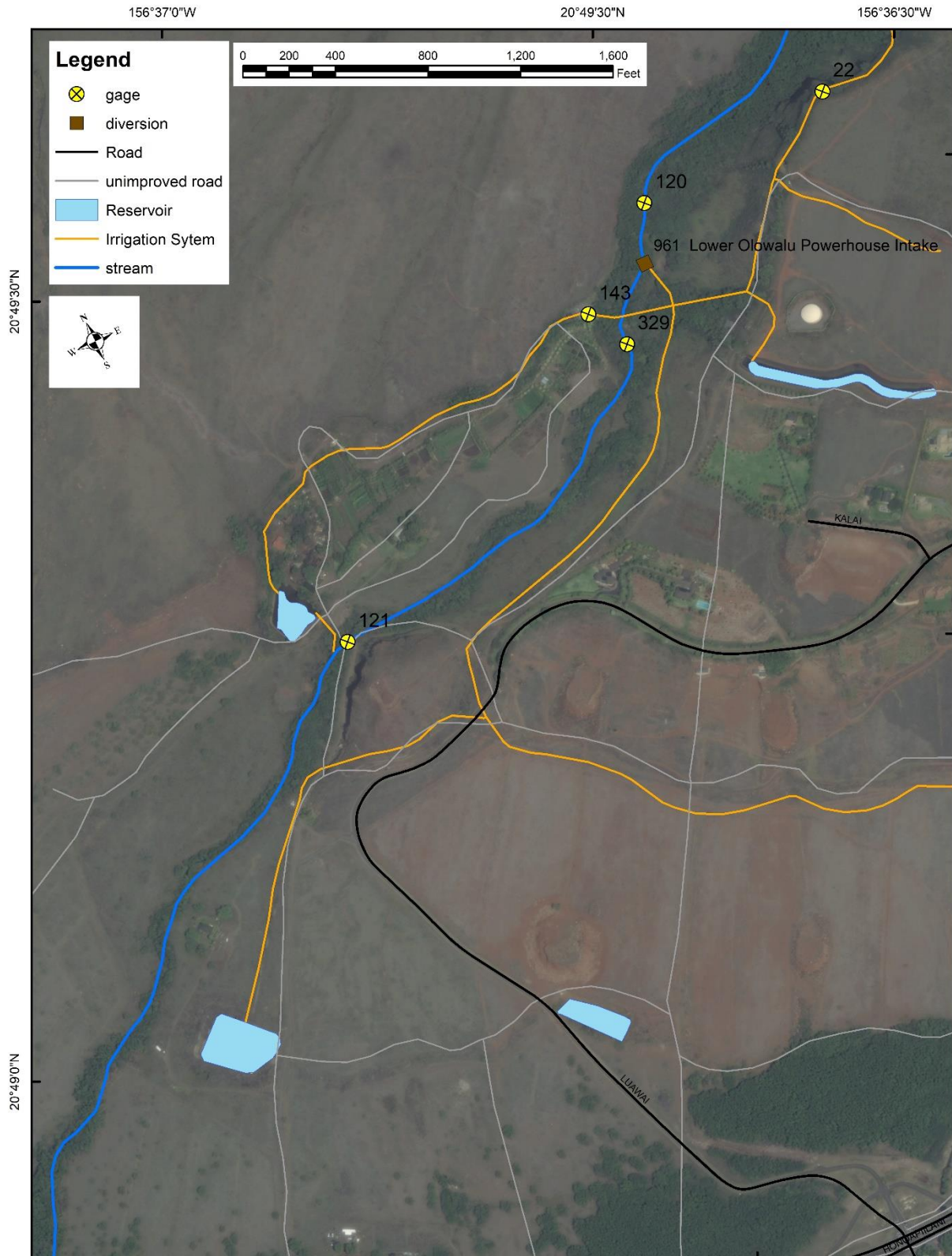


Figure 4. Map of stream and ditch gaging station locations near the Lower Olowalu Ditch including the existing interim IFS station (6-121) and the proposed new interim IFS station (6-329).



CHANGE IN ELEVATION OF THE INTERIM IFS MONITORING STATION

In the original order, the Commission established the interim IFS at an easily monitored location where the abandoned USGS gaging station 16646200 was located at approximately 130 feet in elevation (CWRM 6-121). From 2011 to 2014, Cheng (2014) estimated low-flow characteristics for Olowalu Stream at an elevation of 560 ft, upstream of the upper diversion, which had been active until 2017. Following a flood in 2017, OWC abandoned the upper diversion at an elevation of 500 ft, and reactivated the lower diversion at approximately 190 ft. The distance between these two diversions is approximately 0.95 miles.

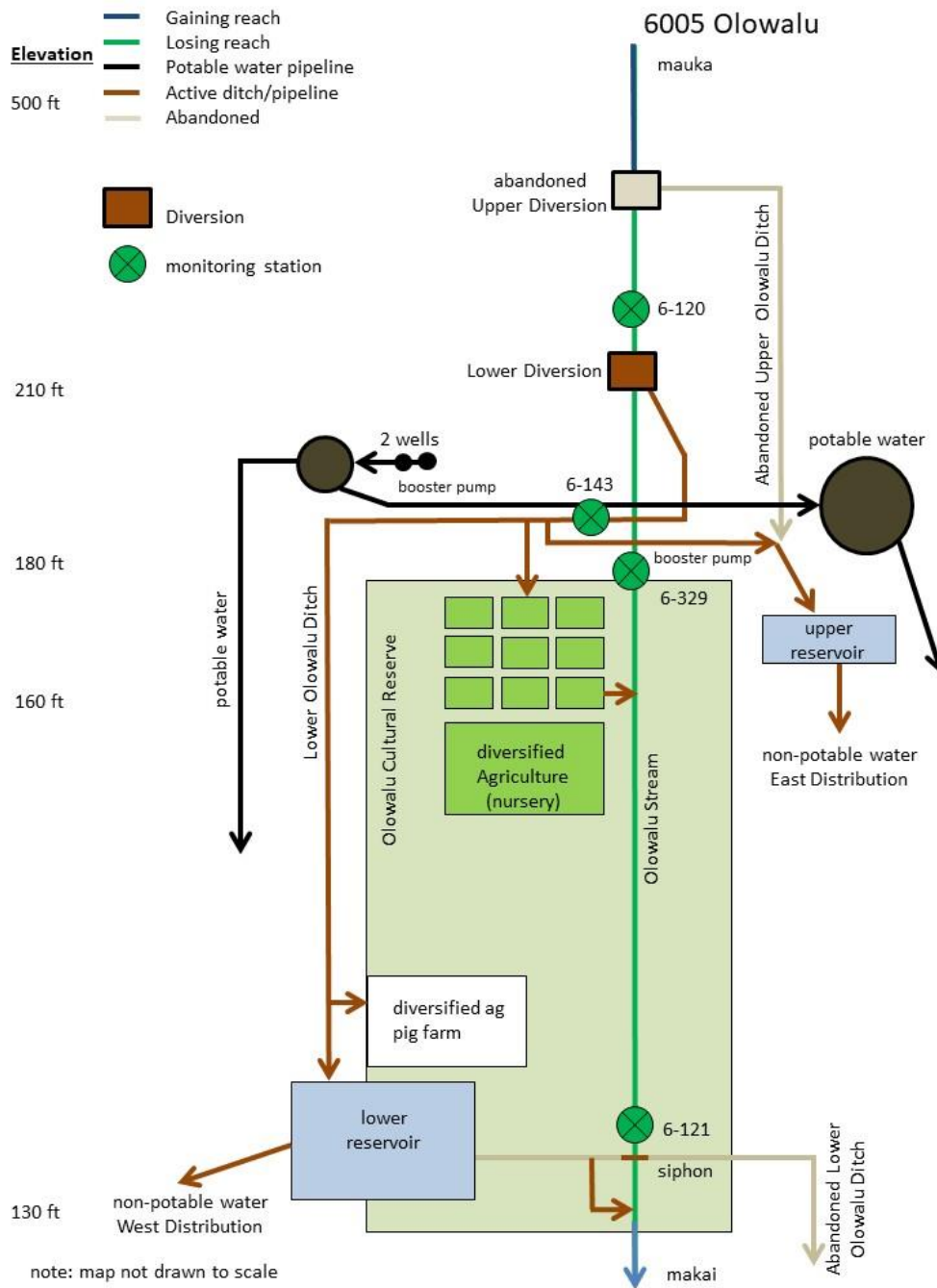
In 2013, USGS estimated a seepage loss of 0.95 cfs (0.61 mgd) equating to 1.1 cfs per stream mile (0.71 mgd per stream mile) between a measurement site 400 ft downstream of the upper diversion and a measurement site upstream of the lower diversion. In 2022, USGS estimated a seepage loss of 2.09 cfs (1.35 mgd) over a slightly longer distance, equating to a 2.2 cfs per stream mile (1.42 mgd per stream mile). The difference in seepage loss is noteworthy considering the flow measurements made at 560 ft in elevation was within 1% of each other: 8.46 cfs (5.47 mgd) in 2013 and 8.39 cfs (5.42 mgd) in 2022.

Between the lower diversion and the interim IFS site at the abandoned USGS station 16646200, there is an estimated seepage loss of 0.63 cfs (0.41 mgd).

On September 9, 2019, Commission staff measured 0.50 cfs (0.32 mgd) on Olowalu Stream at the interim IFS station and measured 0.14 cfs (0.09 mgd) on Olowalu Stream at Honoapi‘ilani Highway to estimate seepage loss between the interim IFS location and the highway. Estimated seepage loss was 0.36 cfs (0.23 mgd), supporting the previous conclusions that when the interim IFS is met, mauka to makai stream will be maintained.

In order to more accurately reflect the restoration of flow at Diversion 961 (Lower Olowalu Diversion), OWC requested that the interim IFS monitoring site be relocated to a new location (CWRM station 6-329), immediately downstream from the Lower Olowalu Ditch Flume (Figure 5). Since the original 2018 Commission order required the interim IFS to be monitored at 130 ft in elevation, the Commission must amend the interim IFS to reflect this change. Since July 2022, Commission staff have measured streamflow at CWRM 6-329 on an interim basis until the Commission approves the permanent modification to the interim IFS.

Figure 5. Schematic diagram of stream and ditch gaging station locations near the Lower Olowalu Ditch including the existing interim IFS station (6-121) and the proposed new interim IFS station (6-329).



UPDATED LOW-FLOW DURATION STATISTICS FOR OLOWALU STREAM AT DIVERSION 961

From January 2019 to October 2022 Commission staff and USGS staff made 23 site visits to Olowalu Stream to update low-flow characteristics at Diversion 961. Eleven measurements were made under low flow conditions above Diversion 961, when streamflow at nearby index stations did not indicate variable flow conditions (Table 1). Low-flow duration discharge statistics for the 2018-2022 period were estimated using the maintenance of variance model (MOVE.1) for Olowalu Stream above Diversion 961 with an index station at USGS 16604500 on Wailuku River and are provided in Table 2. Model results closely estimated observed measurements ($R^2 = 0.94$; root mean squared error = 0.51; Nash-Sutcliffe Efficiency Index = 0.92) as depicted in Figure 6.

Table 1. Measured streamflow (in cubic feet per second) in Olowalu Stream above Diversion 961 (Lower Olowalu Ditch), during site visits from 2019 to 2022 and concurrent mean daily flow at two nearby index stations under stable flow conditions.

date	Olowalu Stream abv Lower Diversion 961	Wailuku River at USGS 16604500
9/9/2019	1.25	12.80
1/8/2021	1.99	16.87
7/22/2021	2.26	23.72
11/2/2021	1.35	12.28
11/15/2021	1.18	9.63
3/29/2022	1.37	11.7
5/12/2022	6.02	43.0
7/15/2022	7.47	58.30
7/18/2022	4.08	23.53
7/20/2022	4.40	32.12
9/16/2022	1.34	10.02
9/22/2022	1.05	9.24

Figure 6. Observed and modeled flow measurements on Olowalu Stream above Lower Diversion

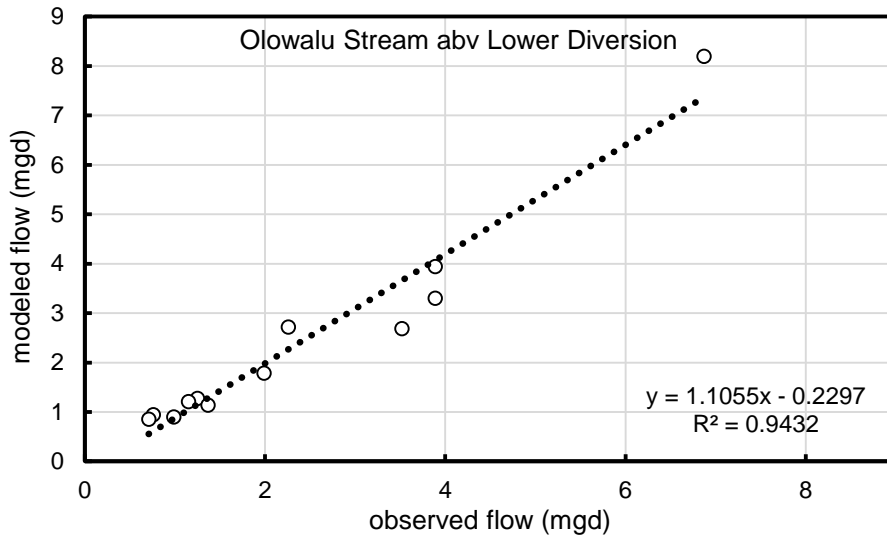


Table 2. Low-flow duration discharge statistics for the 1984-2013 period (from Cheng, 2014; USGS SIR 2014-5087) and for the 2018-2022 period using the MOVE.1 model with an index station on Wailuku River (USGS 16604500).

	Q ₅₀	Q ₅₅	Q ₆₀	Q ₆₅	Q ₇₀	Q ₇₅	Q ₈₀	Q ₈₅	Q ₉₀	Q ₉₅	Q ₉₉
1984-2013 Olowalu Stream at 560 ft elevation (above upper diversion)											
Flow (cfs)	6.1	5.6	5.2	4.8	4.5	4.2	4.0	3.7	3.4	3.1	
Flow (mgd)	3.94	3.62	3.36	3.10	2.91	2.71	2.59	2.39	2.20	2.00	
2018-2022 Olowalu Stream at 220 ft elevation (above lower diversion)											
Flow (cfs)	4.8	4.2	3.8	3.4	3.0	2.7	2.4	2.2	1.6	1.4	1.0
Flow (mgd)	3.08	2.71	2.44	2.17	1.93	1.74	1.56	1.40	1.06	0.89	0.65

RECOMMENDATIONS

Staff recommends that the Commission order the following:

1. That the interim IFS be amended such that the interim IFS is located immediately below the Lower Olowalu Flume at an elevation of approximately 180 ft, reflecting a change in location from the abandoned USGS station 1664200 at an elevation of 130 ft.
2. That the interim IFS be amended to be 2.5 cubic feet per second (1.62 million gallons per day) reflecting a change in the hydrology of Olowalu Stream.

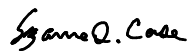
Ola i ka wai,

M. KALEO MANUEL
 Deputy Director

Exhibits:

1. Olowalu Instream Flow Assessment Report (*available online*)
<https://files.hawaii.gov/dlnr/cwrn/ifsar/PR201802-6005-Olowalu.pdf>
2. March 20, 2018 Commission-approved staff submittal to amend the interim IFS for Olowalu Stream (*available online*)
<https://files.hawaii.gov/dlnr/cwrn/submittal/2018/sb20180320B1.pdf>

APPROVED FOR SUBMITTAL:



SUZANNE D. CASE
Chairperson