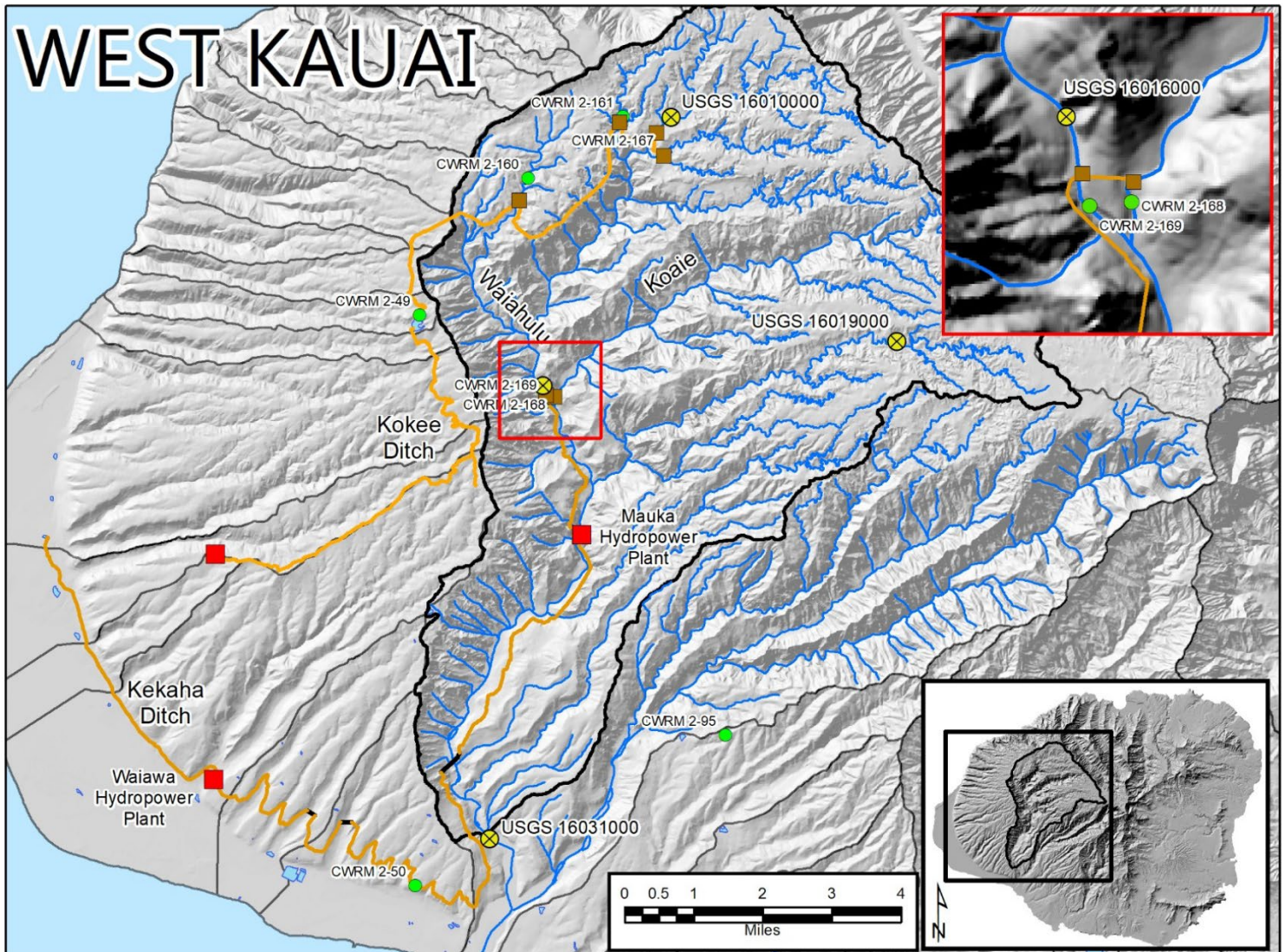


COMMISSION ON WATER RESOURCE MANAGEMENT

Surface Water Monitoring : Waimea Watershed Agreement

| Gage ID | Location Name | Operator | Station Type | Period of Record |
|----------|---|----------|----------------------|------------------|
| 16010000 | Kawaikoi Stream nr Waimea | USGS | Real-time continuous | 1909-P |
| 16016000 | Waimea River abv Kekaha-Waiahulu Intake | USGS | Real-time continuous | 2020-P* |
| 16019000 | Waialae Str at alt 3,820 ft nr Waimea | USGS | Real-time continuous | 1920-P |
| 16031000 | Waimea River nr Waimea | USGS | Real-time continuous | 1910-P |
| 2-49 | Kokee Ditch abv Puu Lua Reservoir | KAA | Non-continuous | 1979-P |
| 2-50 | Kekaha Ditch at Hukipo Flume | KAA | Continuous | 1979-P |
| 2-160 | Kokee Stream abv Kokee Ditch | CWRM | Non-continuous | |
| 2-161 | Kauaikinana Stream abv Kokee Ditch | CWRM | Non-continuous | |
| 2-162 | Waiakoali Stream at Kokee Ditch Intake | CWRM | Non-continuous | |
| 2-168 | Koaie Stream blw Koaie Intake | CWRM | Non-continuous | |
| 2-169 | Waimea River blw Waiahulu Intake | CWRM | Non-continuous | |

*station to be activated in 2020



Surface Water Resources and Current Instream Flow Standards

| stream name | irrigation System | Q ₅₀ (mgd) | Q ₉₀ (mgd) | interim IFS for Phase One (mgd) | interim IFS for Phase Two (mgd) | estimated flow available for use at Q ₅₀ (mgd) |
|--------------------|-------------------|-----------------------|-----------------------|---------------------------------|---------------------------------|---|
| Kōke'e | Kōke'e | 0.5 | <0.3 | natural flow | 1.2 | 0.0 |
| Kauaikinana | Kōke'e | 1.2 | 0.3 | 0.7 | 0.6 or 2/3 of flow | 0.5 |
| Kawaikoi | Kōke'e | 6.4 | 2.3 | 4.9 | 6.4 or 2/3 of flow | 1.5 |
| Waiakoali | Kōke'e | 1.3 | 0.4 | 1.4 | 1.3 or 2/3 of flow | 0.9 |
| Koaie | Kekaha | 11.2 | 6.3 | 2.0 | 2.0 | 9.2 |
| Waiahulu | Kekaha | 8.8 | 7.9 | 8.0 | 8.0 | 0.8 |
| Waimea | Kekaha | n/a | n/a | 25.0* | 25.0* | n/a |

*If the IIFS of 25.0 mgd is not met, then no more than 6.0 mgd can be diverted from Waimea River as measured at Hukipō Flume (CWRM gage 2-50)

Instream Flow Standards Timeline in West Kaua'i

| | |
|-----------|--|
| Dec 1988 | HAR § 13-169-48 Interim instream flow standard for Kaua'i adopted on June 15, 1988, effective on October 8, 1988 |
| July 2013 | EarthJustice on behalf of Po'ai Wai Ola and West Kaua'i Alliance, filed a complaint for dispute resolution, a petition to amend the interim instream flow standards, and a petition for declaratory order against waste. |
| Aug 2013 | Commission delegates authority to the chairperson to hire an investigator |
| Apr 2015 | Commission conducts a limited meeting to visit portions of the Kōke'e and Kekaha ditch systems |
| Apr 2015 | Commission had briefings by the Kekaha Agriculture Association (KAA) and Kauai Island Utility Cooperative (KIUC) |
| May 2015 | Commission requested additional information from Agribusiness Development Corporation (ADC) and KAA related to water use |
| Oct 2015 | Commission conducted additional site visits to portions of the Kokee and Kekaha ditch systems |
| Dec 2015 | Commission delegates authority to the chairperson to hire a mediator |
| Feb 2015 | Commission approved terms of reference for mediation |
| Oct 2016 | Element Environmental, LLC (investigator) provided a report on the investigation of Kōke'e and Kekaha ditch systems |
| Sept 2016 | Commission was provided an update on the mediation and request for extension |
| Jan 2017 | Commission was provided an update on the mediation |
| Apr 2017 | Parties reach a mediated agreement on the amended interim instream flow standards and adopted Watershed Management Agreement and approved by the Commission |

For More Information

Commission on Water Resource Management:
 Stream Protection and Management Branch:
 West Kauai IIFS information:
 USGS Pacific Islands Water Science Center:

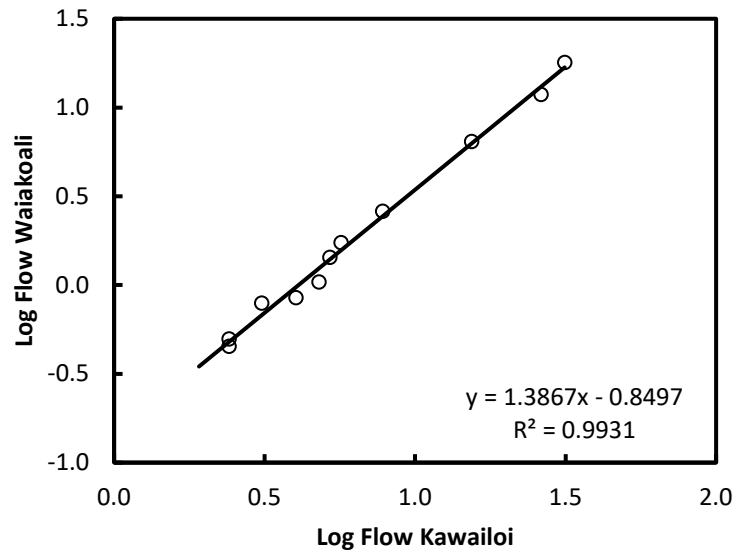
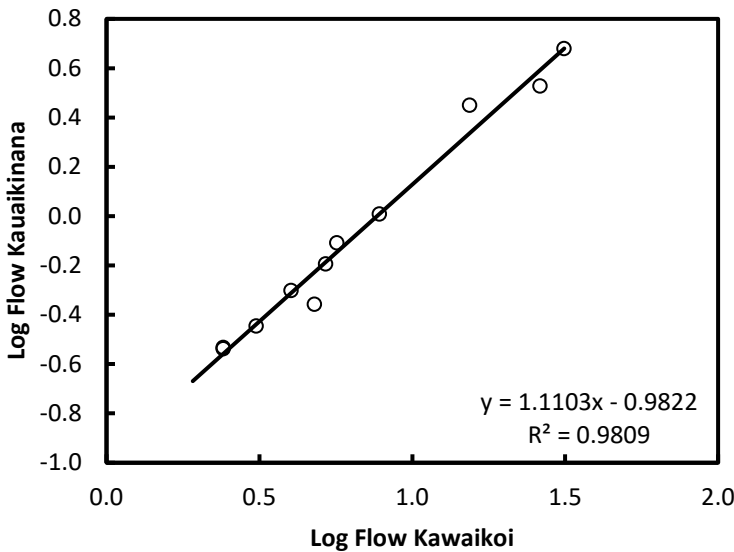
<https://dlnr.hawaii.gov/cwrp/>
<https://dlnr.hawaii.gov/cwrp/surfacewater/>
<https://dlnr.hawaii.gov/cwrp/surfacewater/ifs/westkauai/>
<https://www.usgs.gov/centers/piwsc>

Evaluation of Low-Flow Duration Statistics

Using the MOVE.1 Model with the USGS station on Kawaikoi Stream (USGS 1601000) as an index station, low-flow duration characteristics were estimated based on point measurements made across a range of low-flow conditions:

| Date | CWRM gage 2-161 Kauaikinana abv Kōke'e Ditch | | CWRM gage 2-162 Waiakoali Stream abv Kōke'e Ditch | | USGS 1601000 Kawaikoi Stream | |
|-------------|--|----------|---|----------|------------------------------|----------|
| | Flow (cfs) | Log Flow | Flow (cfs) | Log Flow | Mean Daily Flow (cfs) | Log Flow |
| 5/4/2017 | 0.78 | -0.10791 | 1.73 | 0.238585 | 5.67 | 0.753583 |
| 7/7/2017 | 0.50 | -0.30103 | 0.85 | -0.07058 | 4.02 | 0.604226 |
| 9/6/2017 | 0.29 | -0.5376 | 0.50 | -0.30394 | 2.41 | 0.382017 |
| 9/7/2017 | 0.29 | -0.53183 | 0.45 | -0.3457 | 2.41 | 0.382017 |
| 9/18/2017 | 0.36 | -0.44529 | 0.79 | -0.10255 | 3.09 | 0.489958 |
| 10/13/2017* | 0.33 | | 0.48 | | 5.35 | |
| 10/14/2017* | 0.26 | | 0.53 | | 4.53 | |
| 10/15/2017* | 0.33 | | 9.90 | | 34.15 | |
| 10/16/2017* | 0.61 | | 5.09 | | 18.79 | |
| 4/17/2018 | 4.79 | 0.680336 | 17.95 | 1.254088 | 31.4 | 1.49693 |
| 5/4/2018 | 3.38 | 0.528626 | 11.84 | 1.073257 | 26.20 | 1.418301 |
| 5/5/2018 | 2.82 | 0.449959 | 6.43 | 0.808059 | 15.40 | 1.187521 |
| 6/15/2018 | 1.02 | 0.00954 | 2.60 | 0.415371 | 7.81 | 0.892651 |
| 7/30/2018 | 0.64 | -0.19382 | 1.43 | 0.155336 | 5.21 ¹ | 0.716838 |
| 8/16/2018 | 0.44 | -0.357 | 1.04 | 0.017388 | 4.79 | 0.680336 |

*indicates highly variable streamflow at index station (measurement not used)

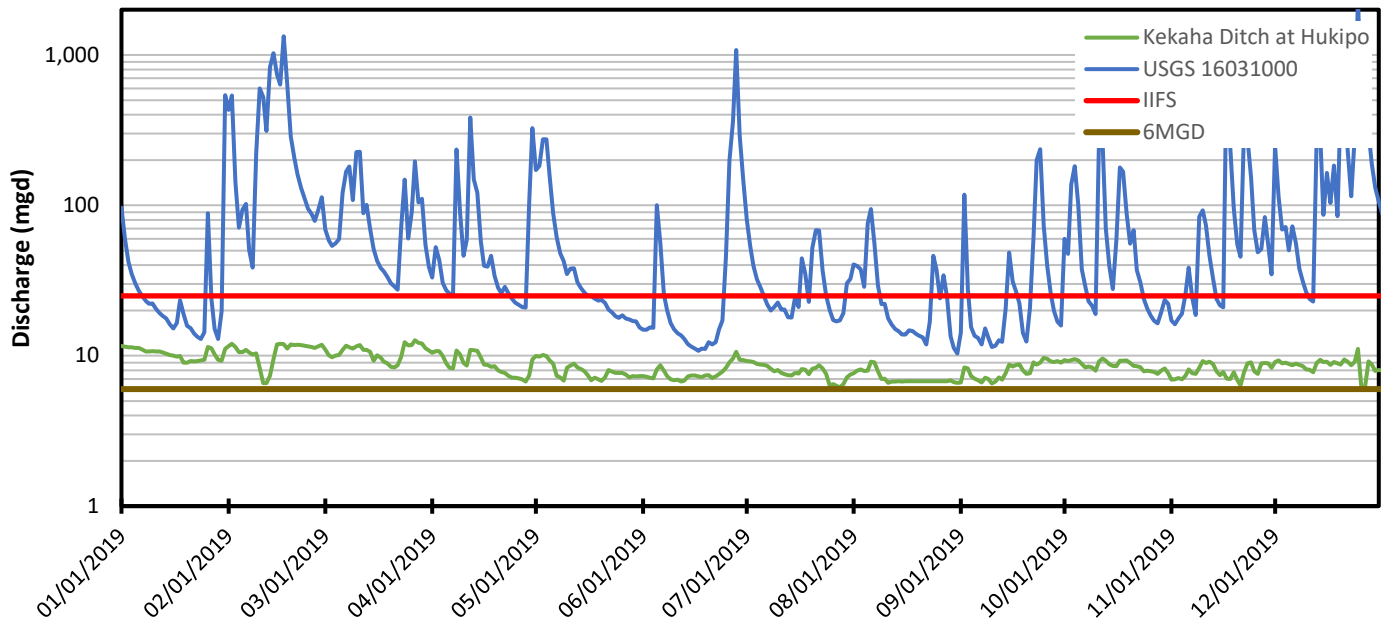
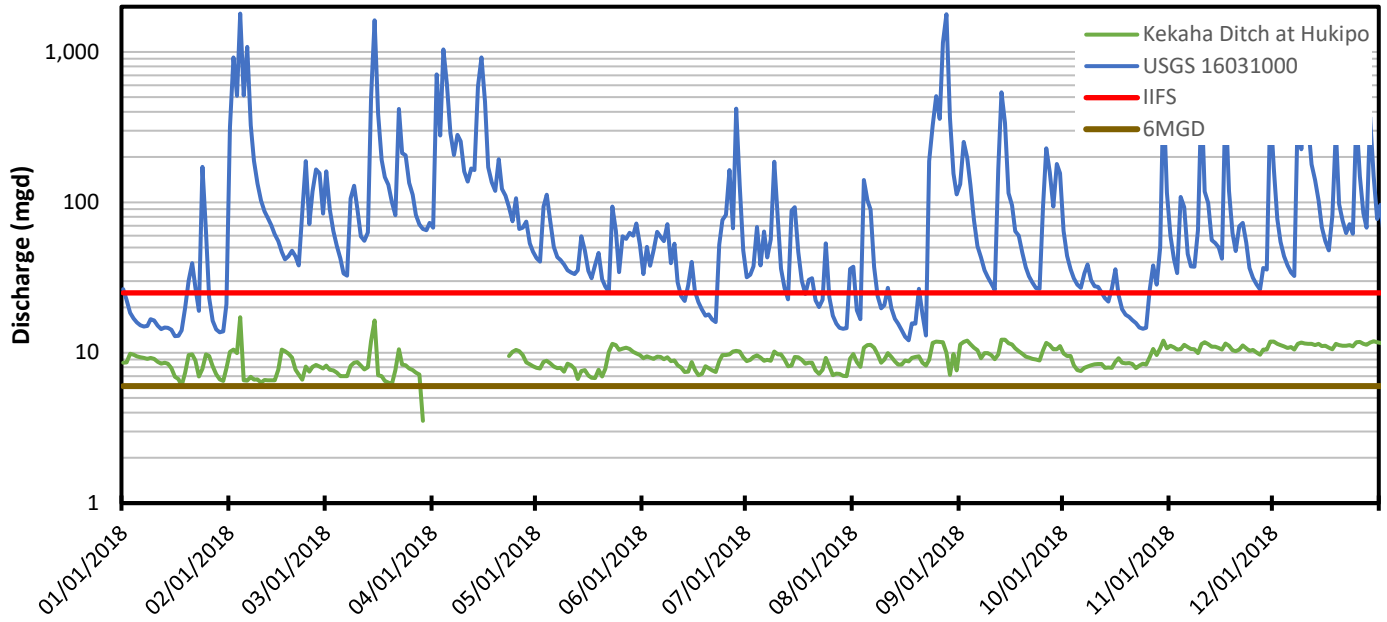


Flow-duration estimates for Kauaikinana and Waiakoali streams at Kōke'e Ditch based on the MOVE.1 Model are as follows:

| Percentile | Kauaikinana (cfs) | Kauaikinana (mgd) | Waiakoali (cfs) | Waiakoali (mgd) |
|------------|----------------------|----------------------|--------------------|--------------------|
| 50 | 1.50 | 0.97 | 3.94 | 2.55 |
| 55 | 1.28 | 0.83 | 3.23 | 2.08 |
| 60 | 1.11 | 0.72 | 2.71 | 1.75 |
| 65 | 0.98 | 0.63 | 2.31 | 1.49 |
| 70 | 0.86 | 0.56 | 1.98 | 1.28 |
| 75 | 0.76 | 0.49 | 1.69 | 1.09 |
| 80 | 0.65 | 0.42 | 1.39 | 0.90 |
| 85 | 0.56 | 0.37 | 1.17 | 0.76 |
| 90 | 0.47 | 0.30 | 0.93 | 0.60 |
| 95 | 0.36 | 0.23 | 0.68 | 0.44 |

Interim Instream Flow Standard Evaluation 2018-2019

When the streamflow at USGS 16031000 on the Waimea River drops below 25 mgd, then flow in Kekaha Ditch at Hukipo Flume cannot be above 6 mgd.



Mean daily flow (MDF) in Kekaha Ditch at Hukipo Flume (CWRM gage 2-50) by month for days when the interim instream flow standard on Waimea River at USGS 16031000 was not met.



| Month | 2018 MDF (mgd) | 2019 MDF (mgd) |
|-----------|----------------|----------------|
| January | 8.22 | 9.98 |
| February | -- | -- |
| March | -- | -- |
| April | -- | 7.00 |
| May | -- | 7.37 |
| June | 7.61 | 7.22 |
| July | 7.53 | 7.41 |
| August | 8.79 | 6.77 |
| September | -- | 7.52 |
| October | 8.37 | 7.97 |
| November | -- | 7.36 |
| December | -- | 7.92 |

