

Annual summary of recorded water-level, temperature, and specific-conductance data collected by the U.S. Geological Survey in Kaloko-Honokōhau National Historical Park, Island of Hawai‘i, October 1, 2018–September 30, 2019

Summary of recorder data collected October 1, 2018–September 30, 2019

Water-level (in terms of water pressure), temperature, and specific-conductance data were recorded at 10-minute intervals by instruments installed in three groundwater-monitoring wells and a monitoring pipe in Kaloko-Honokōhau (KAHO) National Historical Park (fig. 1). Data recorded in the wells and monitoring pipe during October 2018–September 2019 were reviewed, and approved data were made publicly available through the U.S. Geological Survey National Water Information Systems (NWIS) website (U.S. Geological Survey, 2019). Links to access the approved recorder data are provided in this document.

Completeness of approved records during October 1, 2018–September 30, 2019

None of the records were 100 percent complete because the recording instruments were removed briefly every quarter to download data, check for instrument fouling, and check the calibration of the instruments' sensors. In addition, some data were not approved because of sensor errors or because of non-representative sensor readings during periods when sensors were not equilibrated with groundwater in the wells or water in 'Aimakapā Fishpond after deployment.

Approved water-level, temperature, and specific-conductance records were 97 percent or more complete for all four sites during October 2018–September 2019 (table 1). At 'Aimakapā Fishpond and KAHO Well 3, all records were 99 percent or more complete. The temperature and specific-conductance records at KAHO Well 1 were 97.9 and 97.6 percent complete, respectively, because the recording instrument was deployed at an incorrect depth in the well during June 21–27, 2019. The incorrect deployment depth at KAHO Well 1 during June 21–27, 2019, did not affect the water-level data. The records generally were more complete during this year compared to past years because backup instruments were deployed in the wells. The backup instruments recorded data that were used if the primary instrument failed.

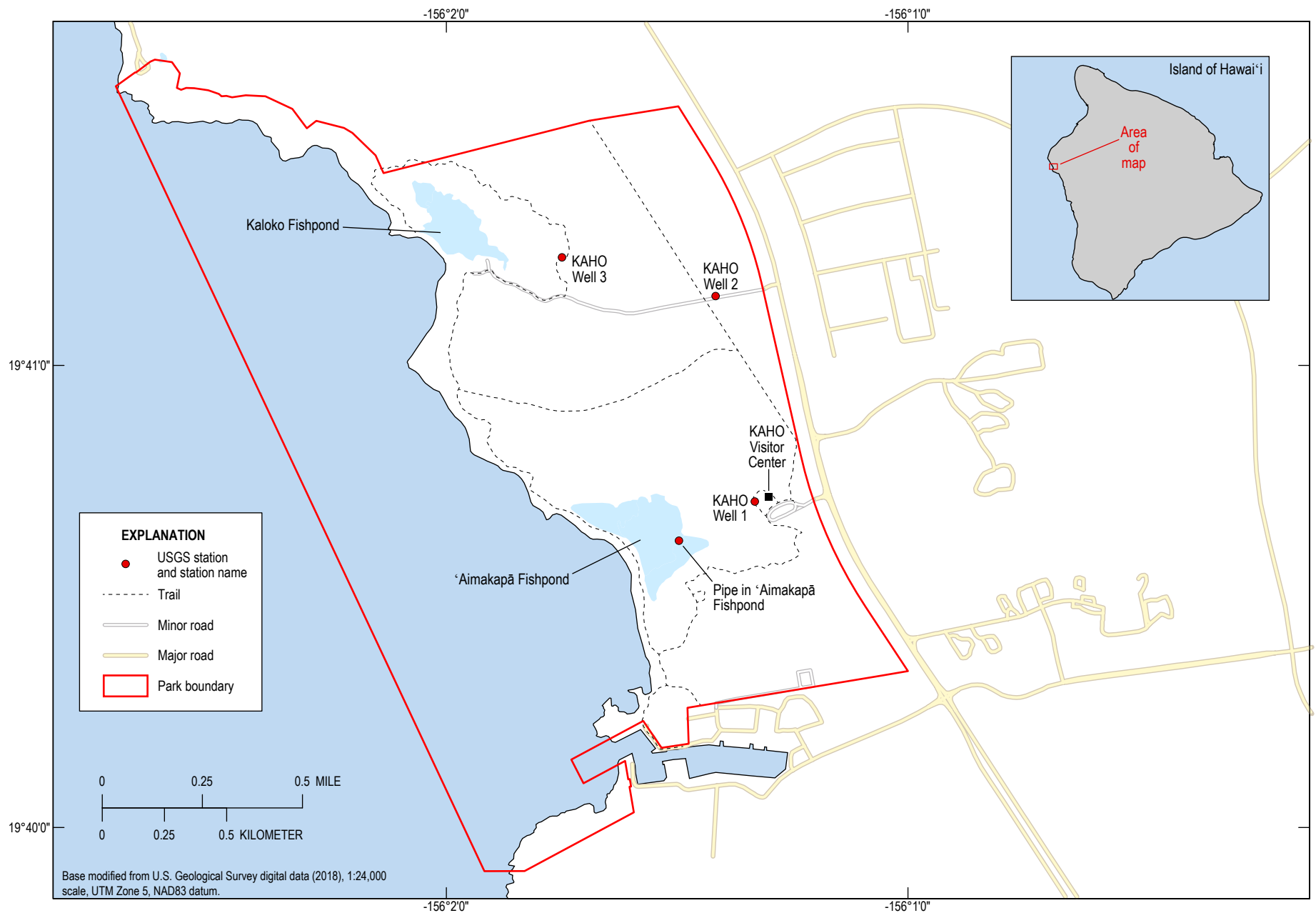


Figure 1. Map showing locations of KAHO Wells 1, 2, and 3, and monitoring pipe in Aimakapā Fishpond, Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai'i.

Table 1. Completeness of water-level, temperature, and specific-conductance records for four sites in Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai‘i. Available data period is from October 1, 2018, to September 30, 2019.

[The percentages equal the number of approved 10-minute values divided by 52,560 possible 10-minute values from October 1, 2018, to September 30, 2019, and multiplied by 100. For example, the temperature record for KAHO Well 1 was 97.9 percent complete. The USGS station names lack Hawaiian diacritical marks due to limitations within the USGS National Water Information System database. Abbreviations: USGS, U.S. Geological Survey]

USGS station name	USGS site number	Percentage complete		
		Water level	Temperature	Specific conductance
Aimakapa Fishpond 2-inch PVC monitoring pipe, HI	194037156012901	99.6	99.6	99.0
8-4061-01 KAHO Well 1, HI	194053156013001	99.6	97.9	97.6
8-4161-02 KAHO Well 2, HI	194120156013501	99.6	99.6	98.4
8-4161-01 KAHO Well 3, HI	194125156015501	99.7	99.6	99.4

Range of recorded water level, temperature, and specific conductance during October 1, 2018–September 30, 2019

The ranges of water-level, temperature, and specific-conductance values recorded at the four sites during October 2018–September 2019 are shown in Table 2. The lowest water level was recorded at KAHO Well 3 (0.34 ft) and the highest water level was recorded at KAHO Well 2 (2.90 ft). Water levels recorded at ‘Aimakapā Fishpond had the smallest range (0.76–2.57 ft) and water levels recorded at KAHO Well 3 had the greatest range (0.34–2.87 ft). Data from KAHO Well 1 are shown in figures 2–4; data from KAHO Well 2 are shown in figures 5–7; data from KAHO Well 3 are shown in figures 8–10; and data from ‘Aimakapā Fishpond are shown in figures 11–13.

Table 2. Range of water-level, temperature, and specific-conductance values for four sites in Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai‘i. Available data period is from October 1, 2018, to September 30, 2019.

[The USGS station names lack Hawaiian diacritical marks due to limitations within the USGS National Water Information System database. Abbreviations: USGS, U.S. Geological Survey]

USGS station name	USGS site number	Water level, in feet relative to mean sea level	Temperature, in degrees Celsius	Specific conductance, in microsiemens per centimeter at 25 degrees Celsius
Aimakapa Fishpond 2-inch PVC monitoring pipe, HI	194037156012901	0.76–2.57	17.7–35.3	18,600–24,100
8-4061-01 KAHO Well 1, HI	194053156013001	0.41–2.71	19.4–19.5	19,200–21,600
8-4161-02 KAHO Well 2, HI	194120156013501	0.55–2.90	¹ 19.0	8,930–9,700
8-4161-01 KAHO Well 3, HI	194125156015501	0.34–2.87	18.8–18.9	12,100–15,900

¹Invariant

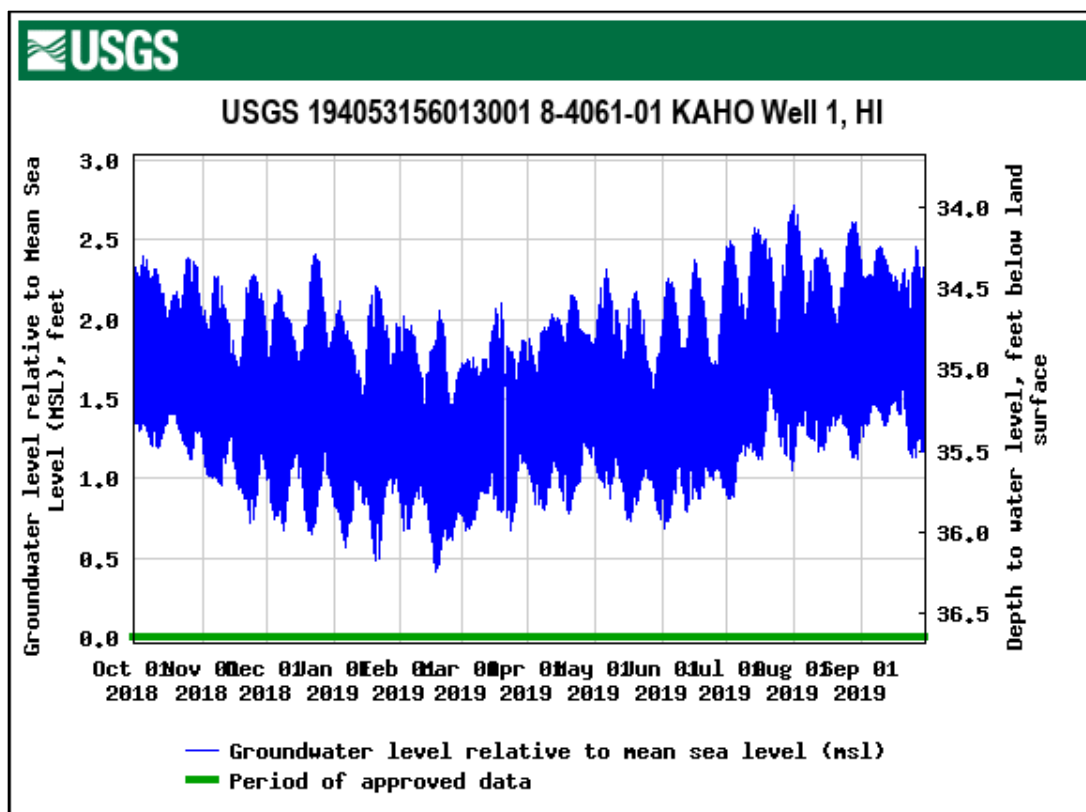


Figure 2. Water-level data for KAH0 Well 1, near the KAH0 Visitor Center, October 1, 2018–September 30, 2019.

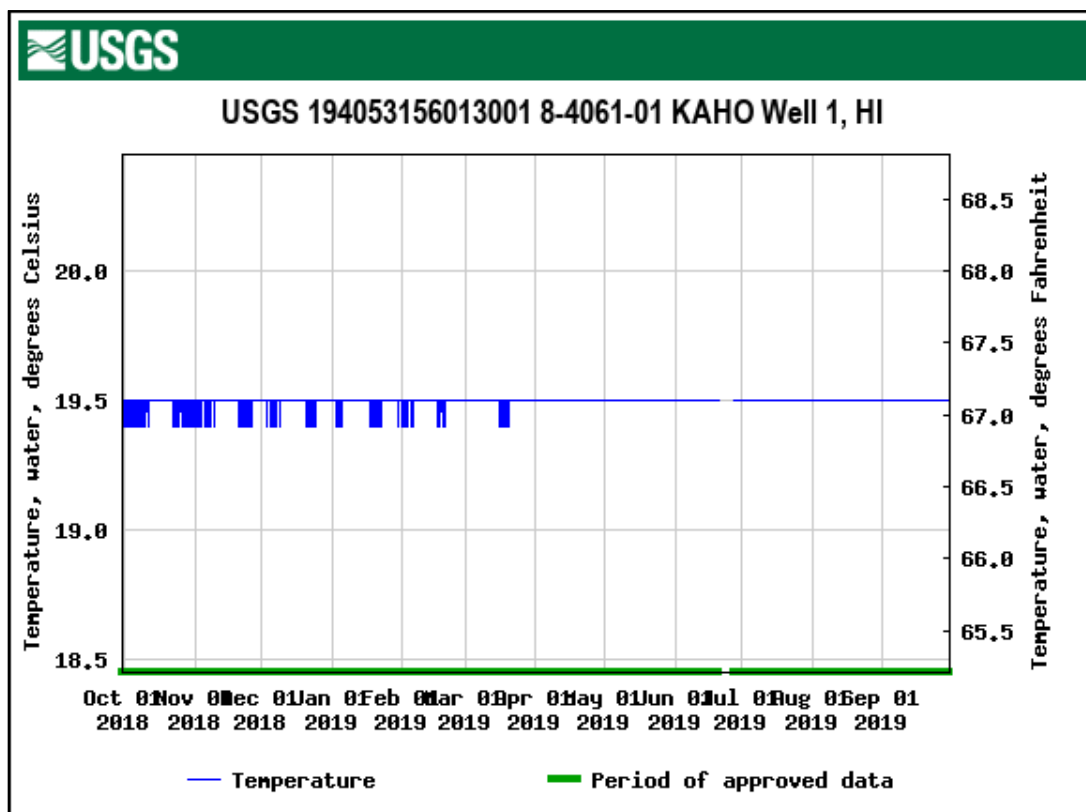


Figure 3. Temperature data for KAH0 Well 1, near the KAH0 Visitor Center, October 1, 2018–September 30, 2019.

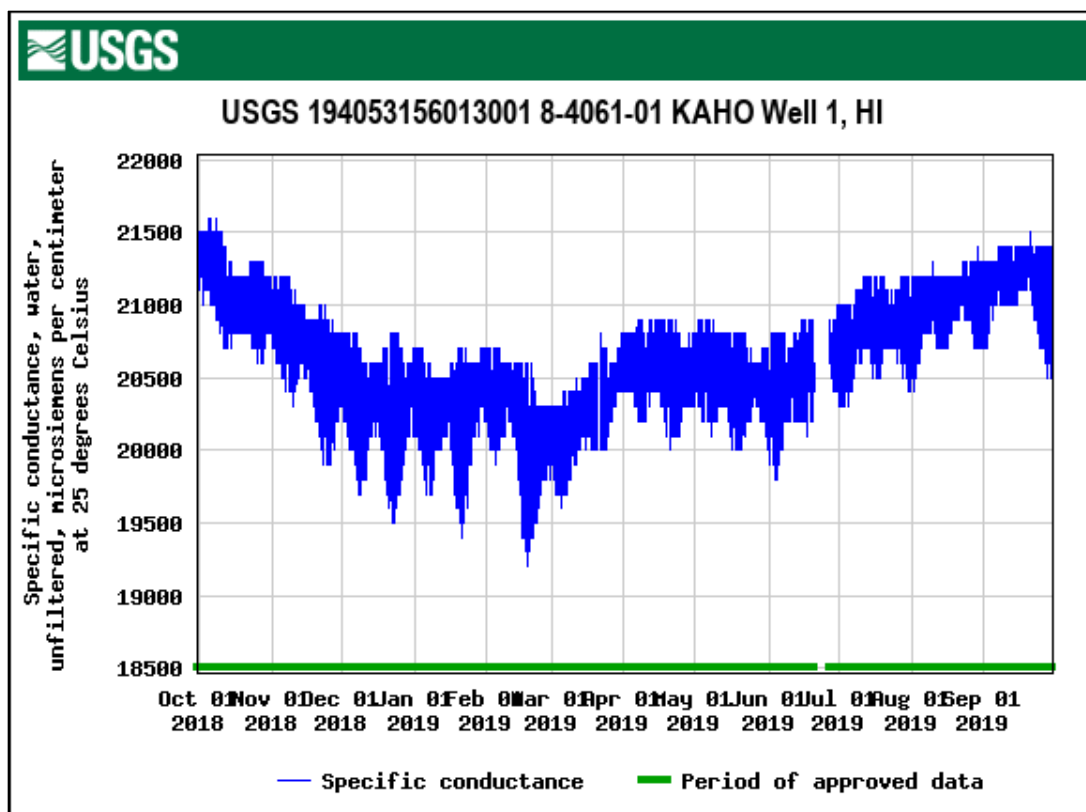


Figure 4. Specific-conductance data for KAH0 Well 1, near the KAH0 Visitor Center, October 1, 2018–September 30, 2019.

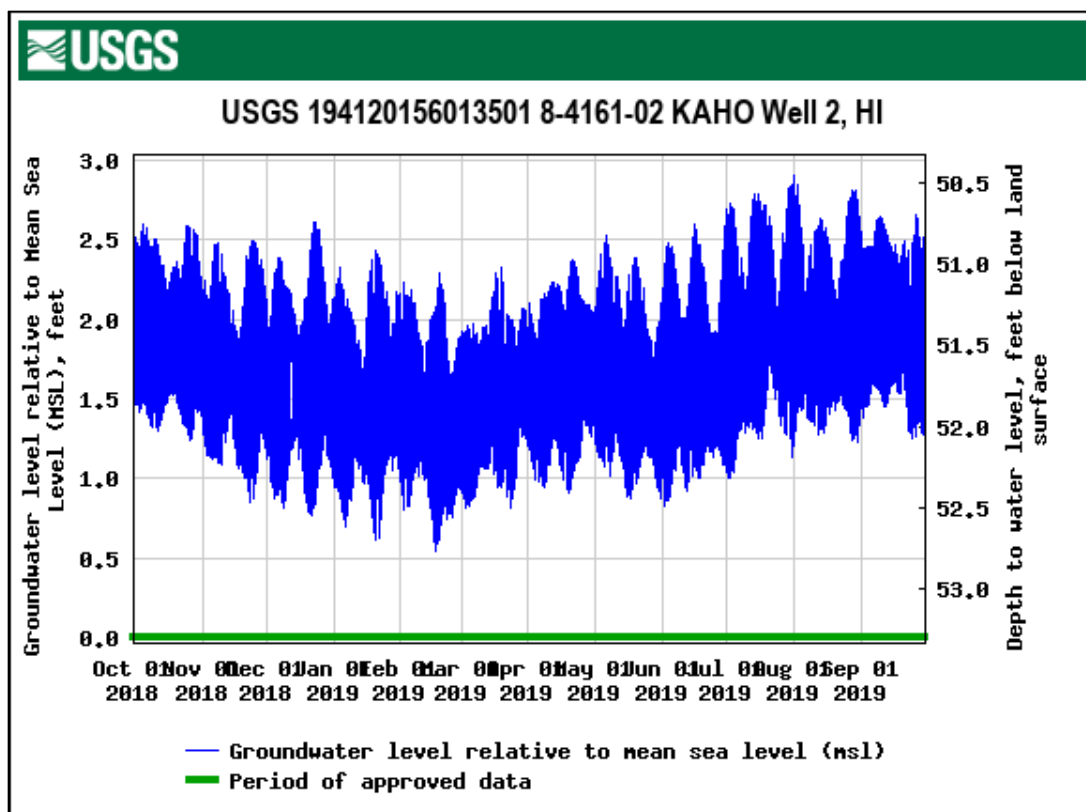


Figure 5. Water-level data for KAH0 Well 2, the upper well, October 1, 2018–September 30, 2019.

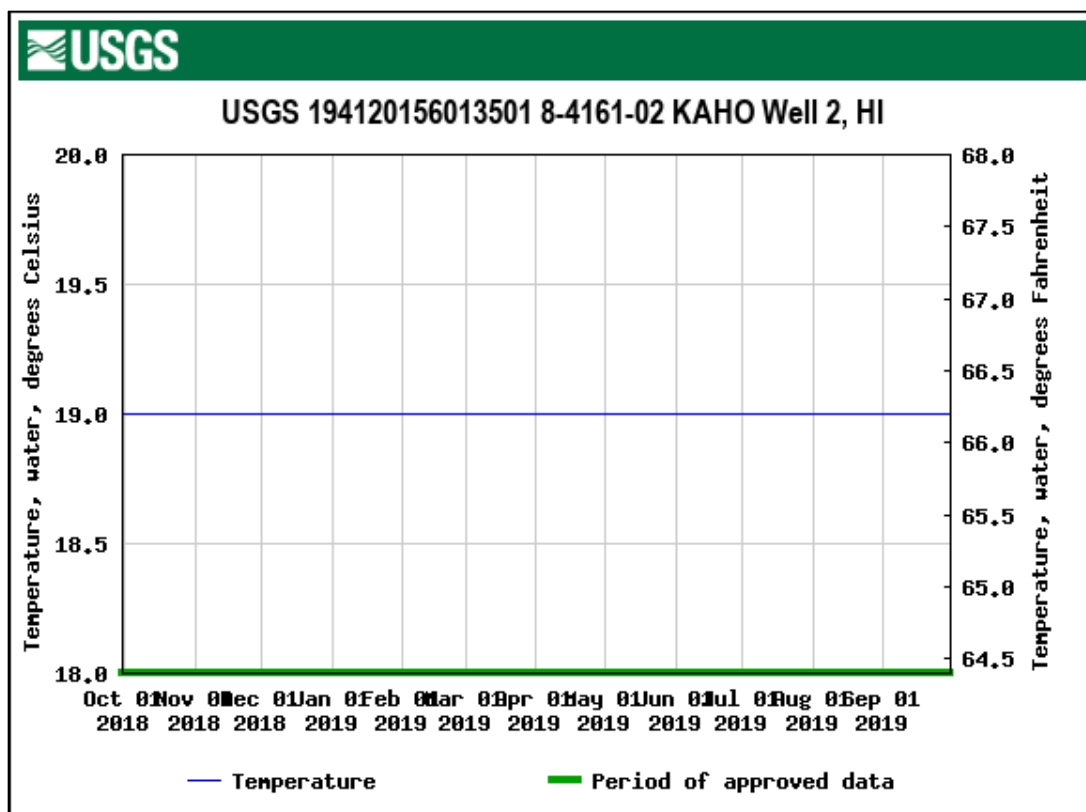


Figure 6. Temperature data for KAHO Well 2, the upper well, October 1, 2018–September 30, 2019.

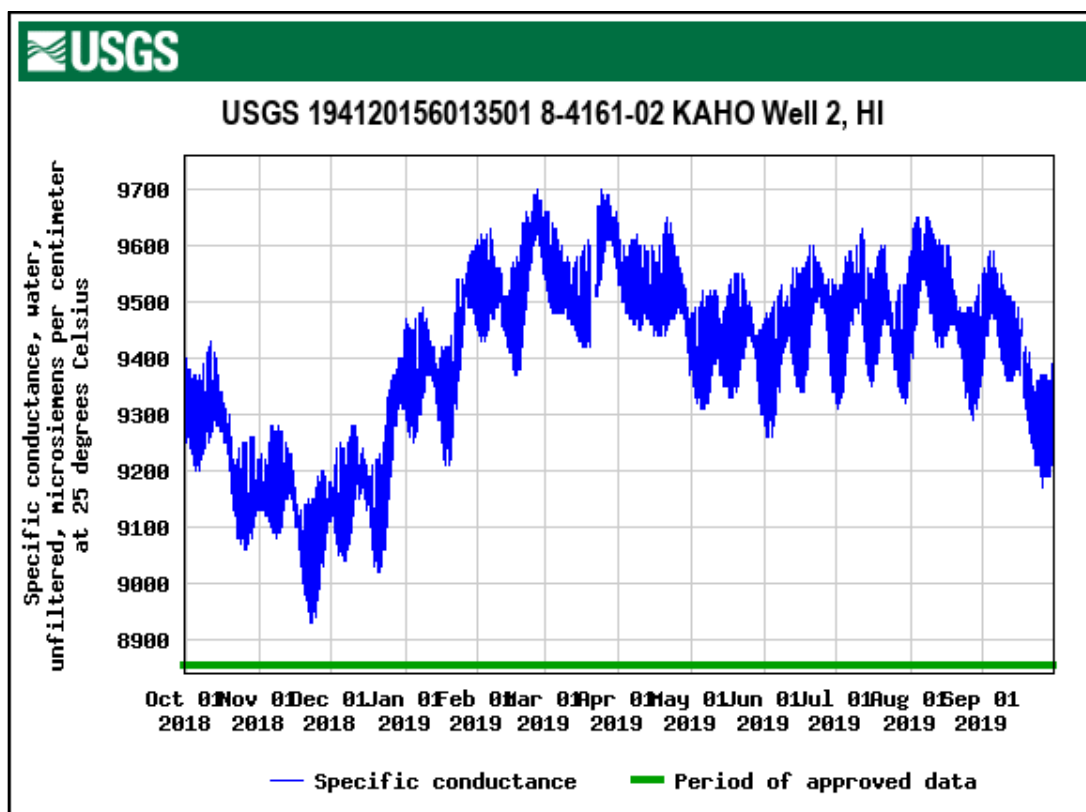


Figure 7. Specific-conductance data for KAHO Well 2, the upper well, October 1, 2018–September 30, 2019.

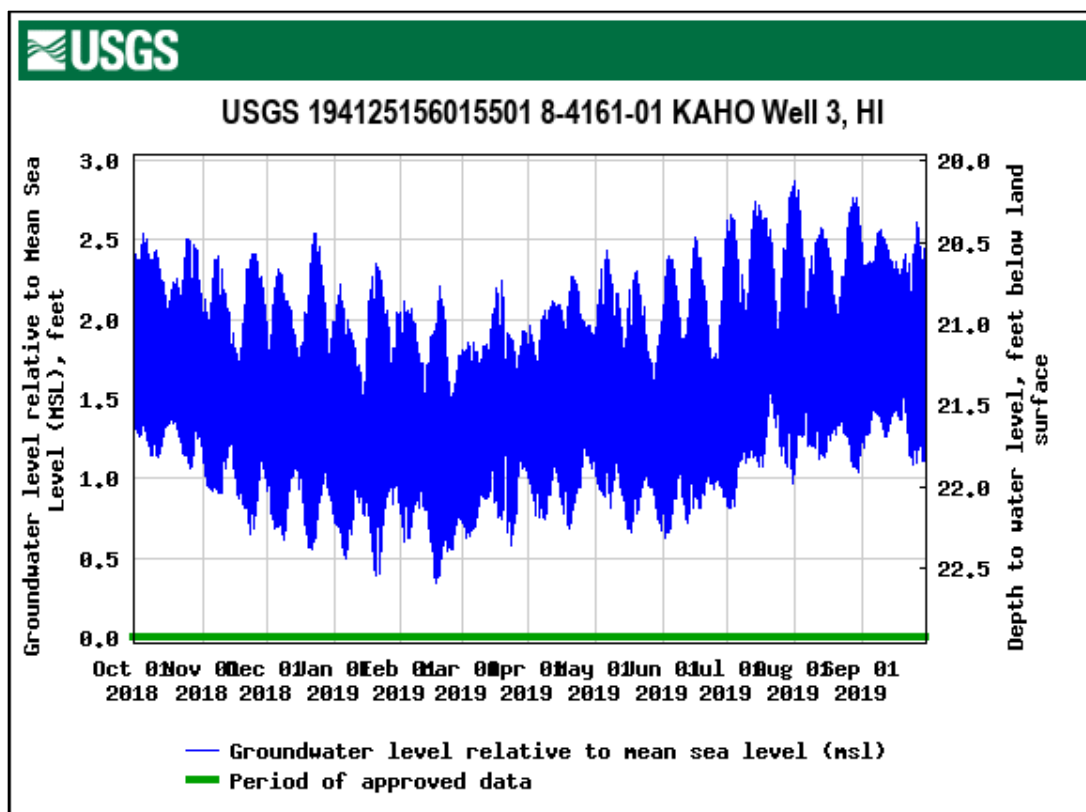


Figure 8. Water-level data for KAH0 Well 3, the lower well, October 1, 2018–September 30, 2019.

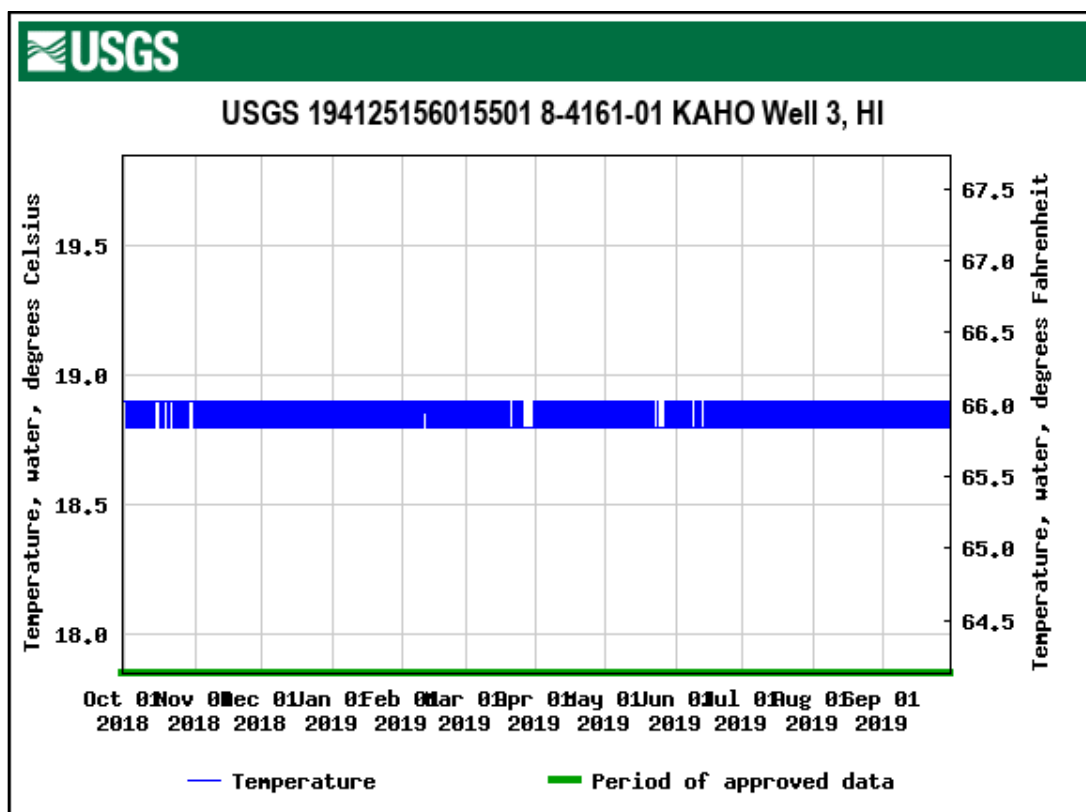


Figure 9. Temperature data for KAH0 Well 3, the lower well, October 1, 2018–September 30, 2019.

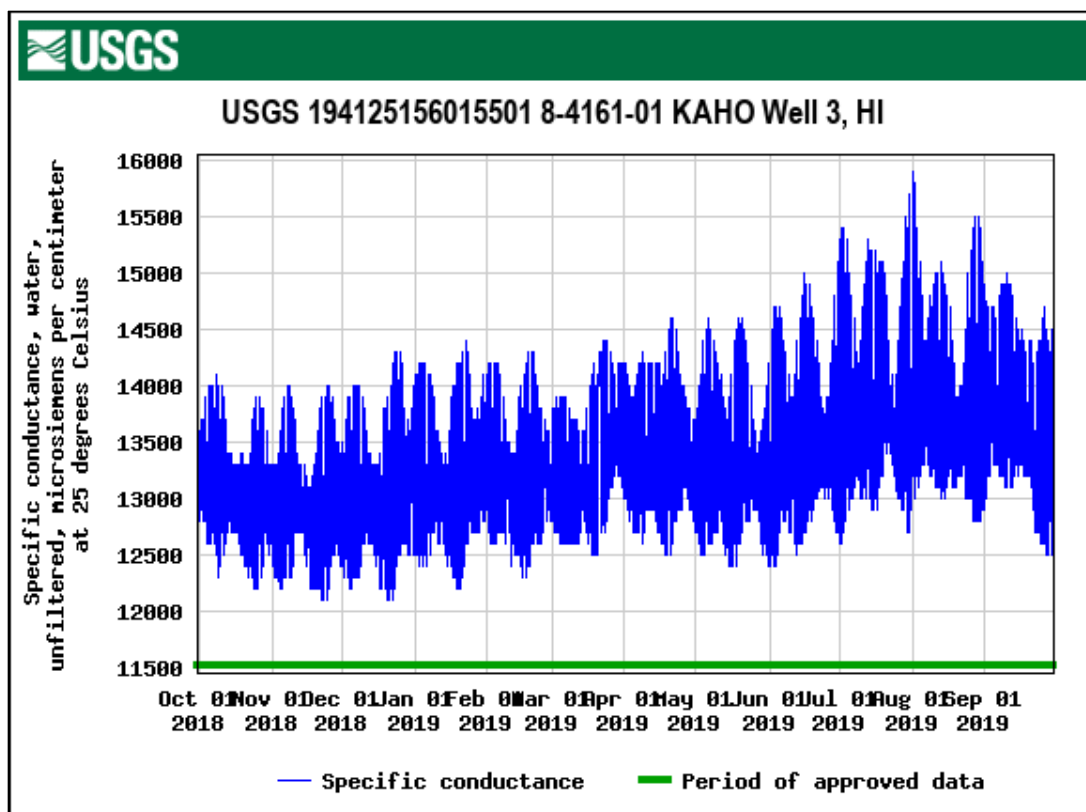


Figure 10. Specific-conductance data for KAHŌ Well 3, the lower well, October 1, 2018–September 30, 2019.

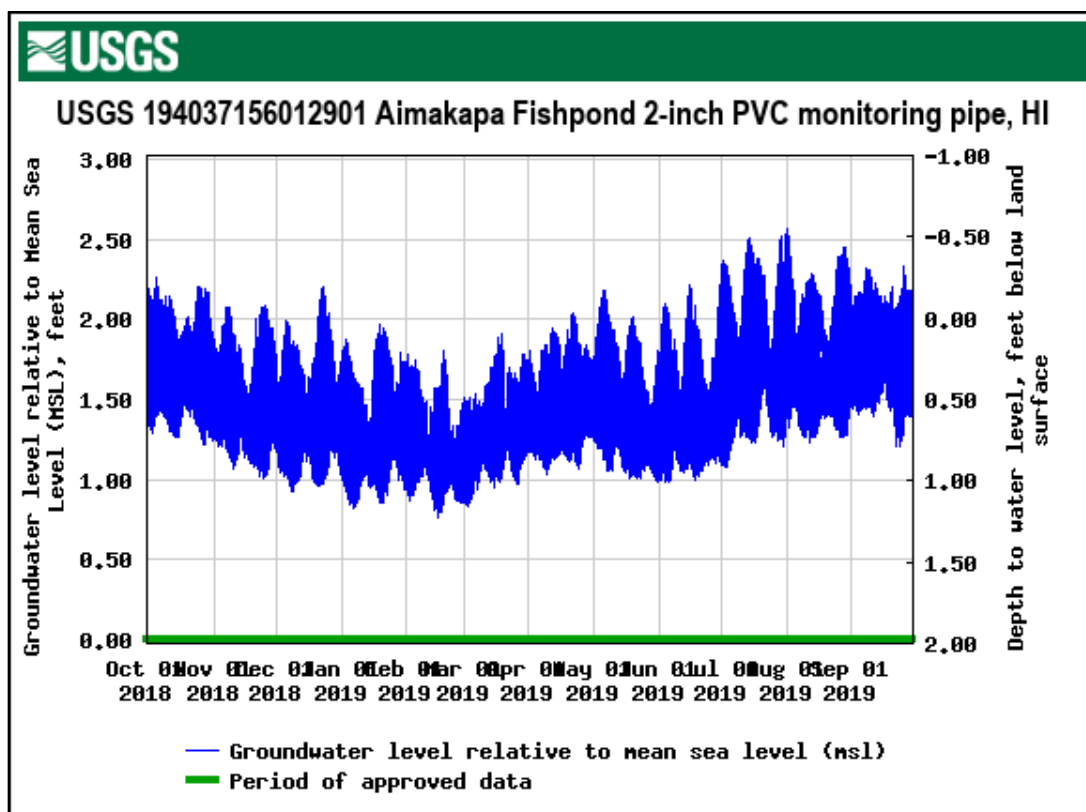


Figure 11. Water-level data for ‘Aimakapā Fishpond 2-inch PVC monitoring pipe, October 1, 2018–September 30, 2019.

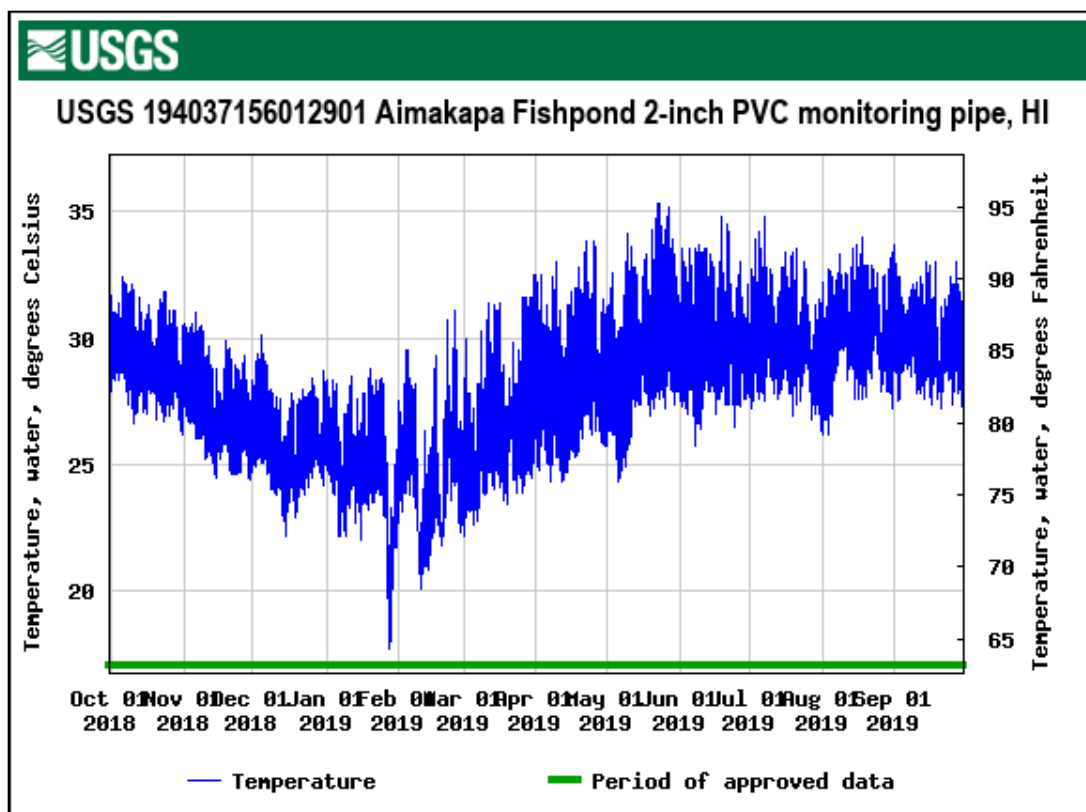


Figure 12. Temperature data for ‘Aimagapā Fishpond 2-inch PVC monitoring pipe, October 1, 2018–September 30, 2019.

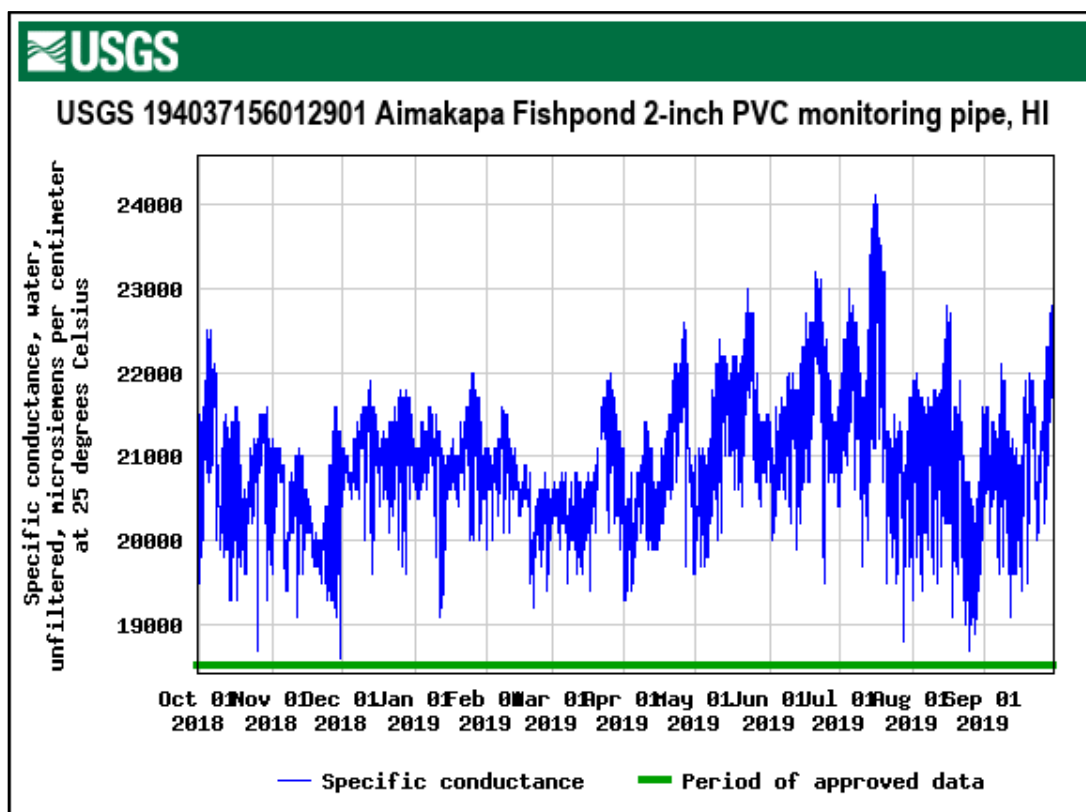


Figure 13. Specific-conductance data for ‘Aimagapā Fishpond 2-inch PVC monitoring pipe, October 1, 2018–September 30, 2019.

Data shown in figures 2–4 for KAHŌ Well 1, near the KAHŌ Visitor Center, are available at:
https://nwis.waterdata.usgs.gov/hi/nwis/uv?cb_00010=on&cb_00095=on&cb_72150=on&format=rdb&site_no=194053156013001&period=&begin_date=2018-10-01&end_date=2019-09-30

Data shown in figures 5–7 for KAHŌ Well 2, the upper well, are available at:
https://nwis.waterdata.usgs.gov/hi/nwis/uv?cb_all=on&cb_00010=on&cb_00095=on&cb_72150=on&format=rdb&site_no=194120156013501&period=&begin_date=2018-10-01&end_date=2019-09-30

Data shown in figures 8–10 for KAHŌ Well 3, the lower well, are available at:
https://nwis.waterdata.usgs.gov/hi/nwis/uv?cb_00010=on&cb_00095=on&cb_72150=on&format=rdb&site_no=194125156015501&period=&begin_date=2018-10-01&end_date=2019-09-30

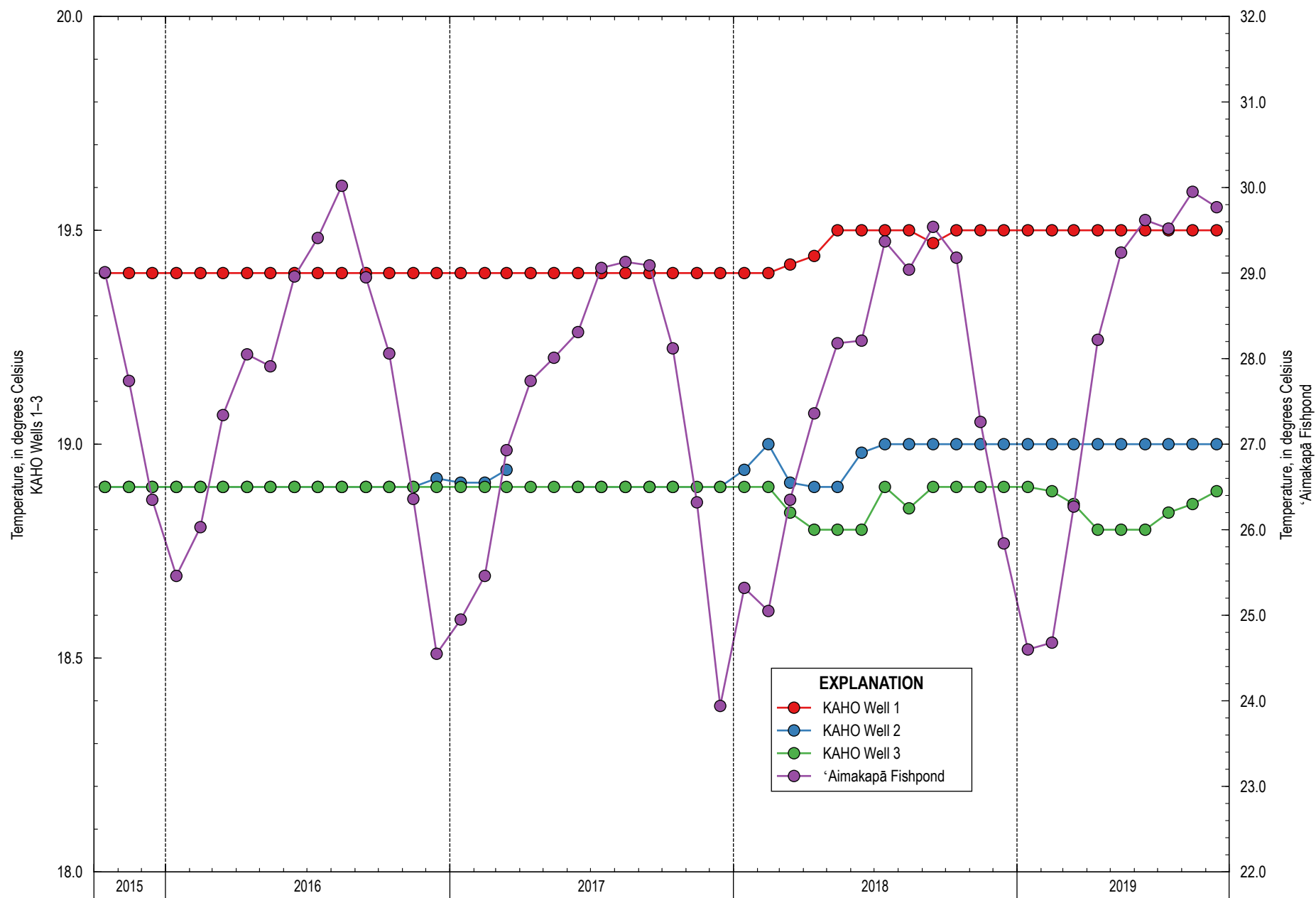
Data shown in figures 11–13 for the ‘Aimakapā Fishpond 2-inch PVC monitoring pipe are available at:
https://nwis.waterdata.usgs.gov/hi/nwis/uv?cb_all=on&cb_00010=on&cb_00095=on&cb_72150=on&format=rdb&site_no=194037156012901&period=&begin_date=2018-10-01&end_date=2019-09-30

Monthly mean water level, temperature, and specific conductance

Monthly mean water-level, temperature, and specific-conductance values during October 2018–September 2019 are shown in figures 14, 15, and 16, respectively. For comparison, the monthly mean values from October 2015–September 2018 also are included in figures 14, 15, and 16.



Figure 14. Monthly mean water level at four monitoring sites in Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai'i, October 2015–September 2019, including months with incomplete data.



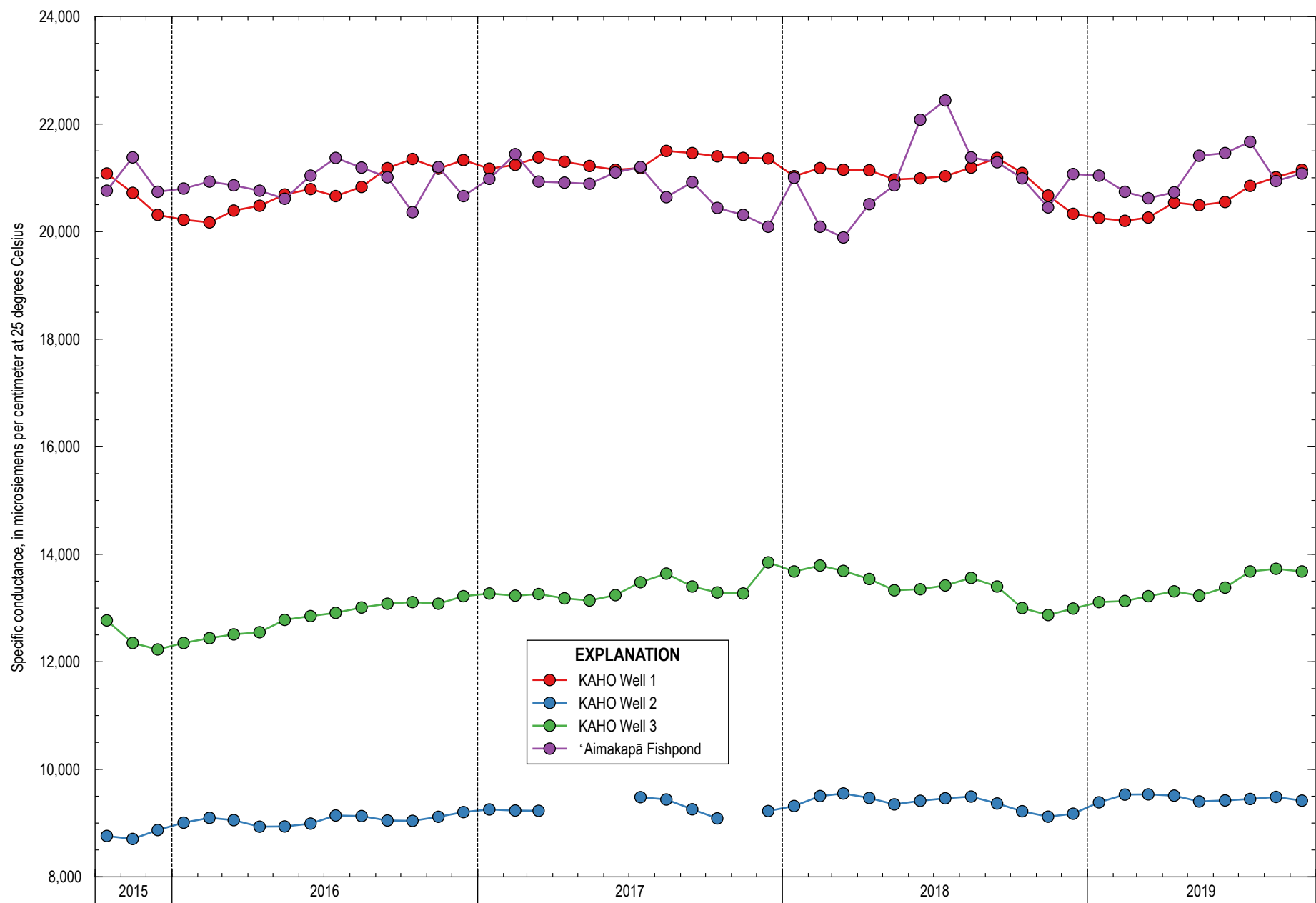


Figure 16. Monthly mean specific conductance at four monitoring sites in Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai'i, October 2015–September 2019, including months with incomplete data.

Monthly mean values in figures 14–16 were obtained from NWIS using the links shown below and by completing the following actions on the NWIS webpages: (1) checking each of the three boxes corresponding to the Parameter Names “Temperature, water, degrees Celsius,” “Specific conductance, water, unfiltered, microsiemens per centimeter at 25 degrees Celsius,” and “Groundwater level relative to Mean Sea Level (MSL), feet”; (2) entering the desired date range from 2015-10 to 2019-09 for KAHO Wells 1–3 and ‘Aimakapā Fishpond; (3) checking the box labeled “Use incomplete data for statistics calculation”; and (4) pressing the “Submit” button.

Monthly mean values of approved data recorded at KAHO well 1, near the KAHO Visitor Center, are available at:

https://waterdata.usgs.gov/hi/nwis/monthly?referred_module=sw&search_site_no=194053156013001&format=sites_selection_links

Monthly mean values of approved data recorded at KAHO well 2, the upper well, are available at:

https://waterdata.usgs.gov/hi/nwis/monthly?referred_module=sw&search_site_no=194120156013501&format=sites_selection_links

Monthly mean values of approved data recorded at KAHO well 3, the lower well, are available at:

https://waterdata.usgs.gov/hi/nwis/monthly?referred_module=sw&search_site_no=194125156015501&format=sites_selection_links

Monthly mean values of approved data recorded at ‘Aimakapā Fishpond 2-inch PVC monitoring pipe are available at:

https://waterdata.usgs.gov/hi/nwis/monthly?referred_module=sw&search_site_no=194037156012901&format=sites_selection_links

References cited

U.S. Geological Survey, 2019, USGS water data for the nation: U.S. Geological Survey National Water Information System Web, accessed December 17, 2019, at <https://dx.doi.org/10.5066/F7P55KJN>.