

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, 2021–September 30, 2022

Summary of recorder data collected October 1, 2021–September 30, 2022

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 2021–September 2022 were reviewed for quality-assurance purposes. Approved data were made publicly available through the U.S. Geological Survey National Water Information System (NWIS) website (U.S. Geological Survey, 2023). Hyperlinks to the approved data are provided in this document.

Completeness of approved records during October 1, 2021–September 30, 2022

Water-level, temperature, and specific-conductance records were approved and considered 97.0 percent or more complete for all four sites (table 1). During quarterly site visits, the instruments were removed to download data, check for instrument fouling, and verify the calibration of the instruments’ sensors. The removal of the instruments contributed to data gaps in the records. 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.

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, during October 1, 2021, to September 30, 2022.

[The percentages equal the number of approved 10-minute values divided by 52,560 possible 10-minute values from October 1, 2021, to September 30, 2022, and multiplied by 100. For example, the temperature record for KAHO Well 1 was 99.5 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	Abbreviated station name	USGS site number	Record completeness, in percent		
			Water level	Temperature	Specific conductance
8-4061-01 KAHO Well 1, HI	KAHO Well 1	194053156013001	99.6	99.5	98.1
8-4161-02 KAHO Well 2, HI	KAHO Well 2	194120156013501	99.5	99.6	97.0
8-4161-01 KAHO Well 3, HI	KAHO Well 3	194125156015501	99.6	99.6	97.8
Aimakapa Fishpond 2-inch PVC monitoring pipe, HI	‘Aimakapā Fishpond monitoring pipe	194037156012901	99.7	99.7	99.6

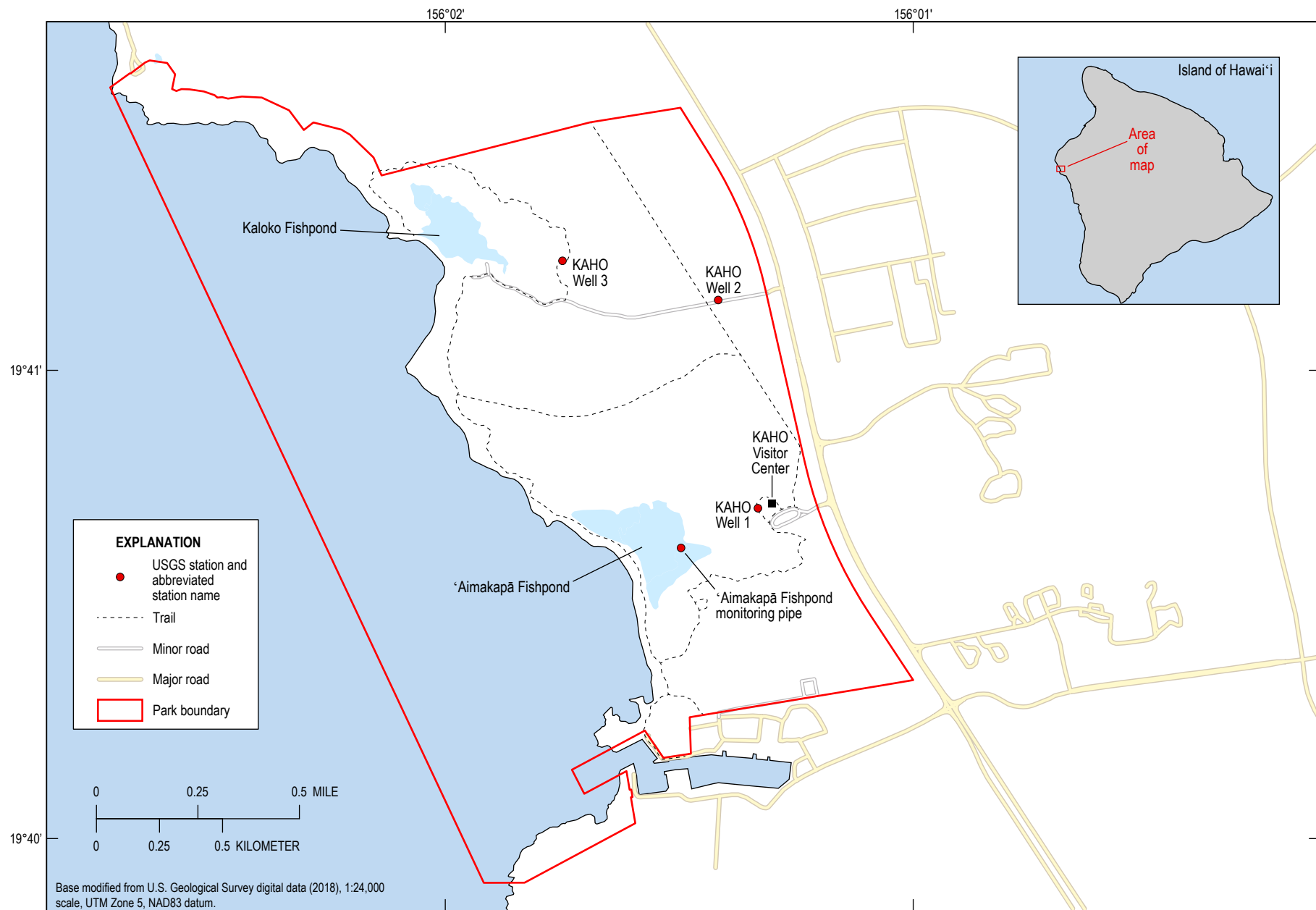


Figure 1. Map showing locations of KAHO Wells 1, 2, and 3, and 'Aimakapā Fishpond monitoring pipe, Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai'i.

Range of recorded water level, temperature, and specific conductance during October 1, 2021–September 30, 2022

The ranges of water-level, temperature, and specific-conductance values recorded at the four sites during October 2021–September 2022 are shown in Table 2. All water-level data are referenced to a vertical datum of local mean sea level. The lowest water level was recorded at KAHO Well 3 (0.47 foot [ft]) and the highest water level was recorded at KAHO Well 2 (3.01 ft). Water levels recorded at ‘Aimakapā Fishpond monitoring pipe had the smallest range (0.89–2.65 ft) and water levels recorded at KAHO Well 3 had the greatest range (0.47–2.93 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 monitoring pipe 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, during October 1, 2021, to September 30, 2022.

[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
8-4061-01 KAHO Well 1, HI	194053156013001	0.57–2.78	19.5–19.6	12,800–18,100
8-4161-02 KAHO Well 2, HI	194120156013501	0.69–3.01	19.0–19.1	8,230–12,000
8-4161-01 KAHO Well 3, HI	194125156015501	0.47–2.93	18.7–18.9	10,100–12,200
Aimakapa Fishpond 2-inch PVC monitoring pipe, HI	194037156012901	0.89–2.65	22.5–34.5	15,400–19,700

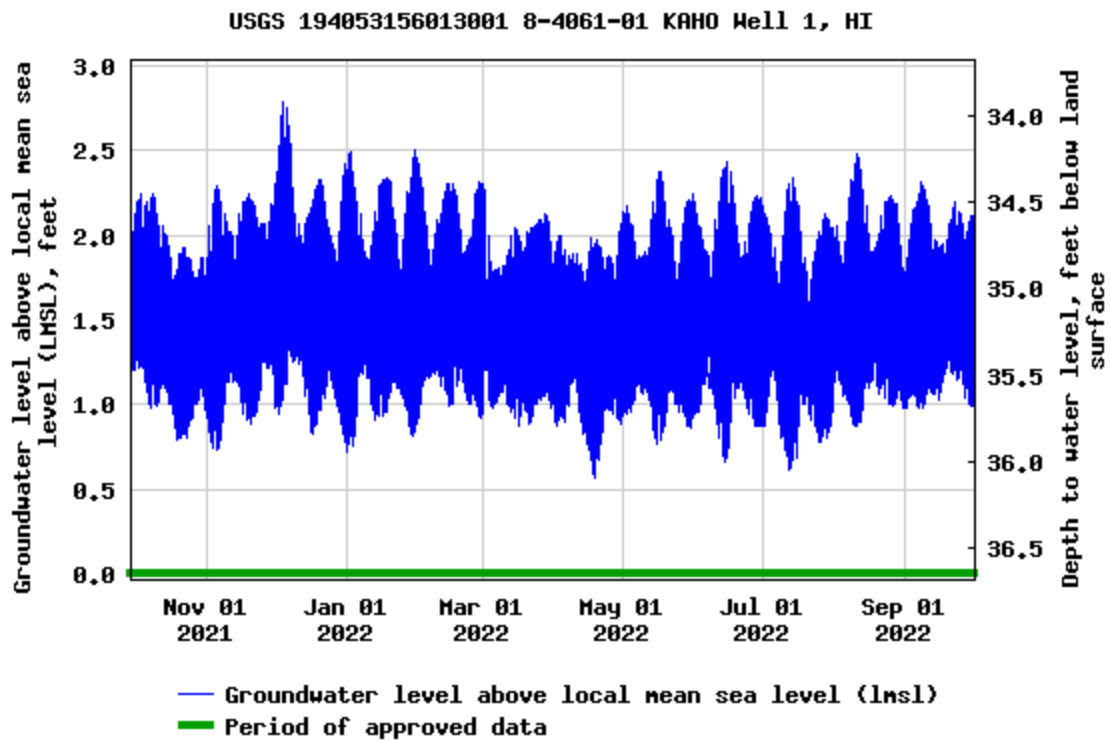


Figure 2. Water-level data for KAH0 Well 1, near the KAH0 Visitor Center, October 1, 2021–September 30, 2022.

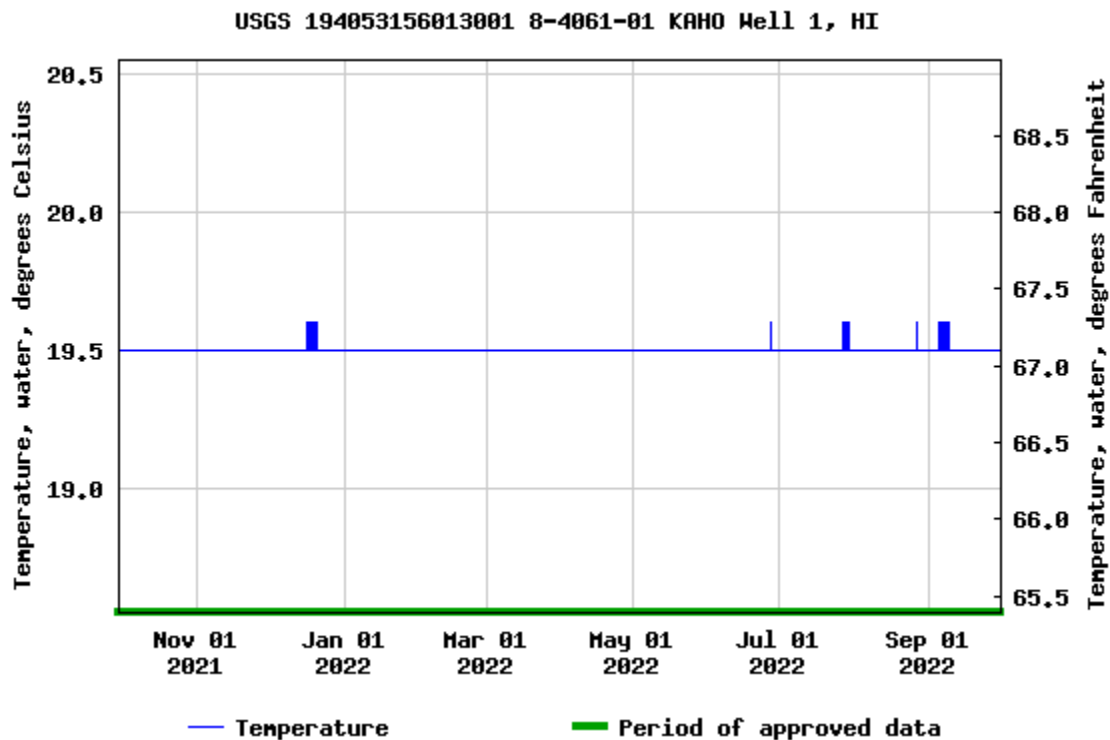


Figure 3. Temperature data for KAH0 Well 1, near the KAH0 Visitor Center, October 1, 2021–September 30, 2022.

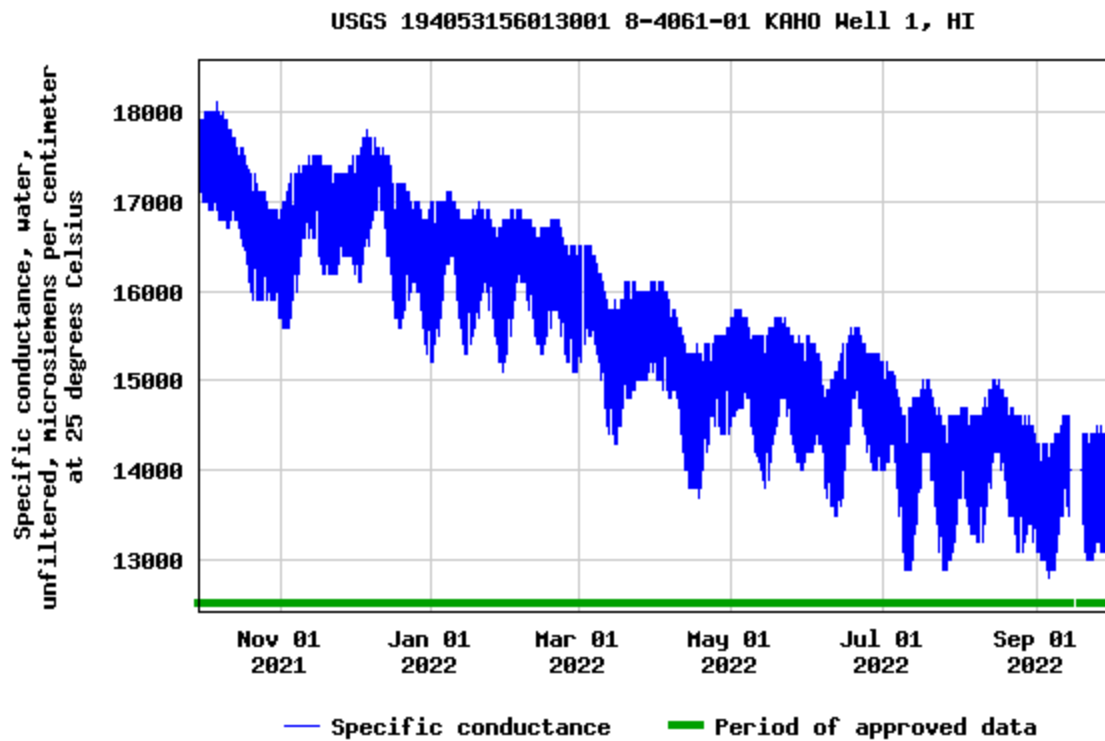


Figure 4. Specific-conductance data for KAHŌ Well 1, near the KAHŌ Visitor Center, October 1, 2021–September 30, 2022.

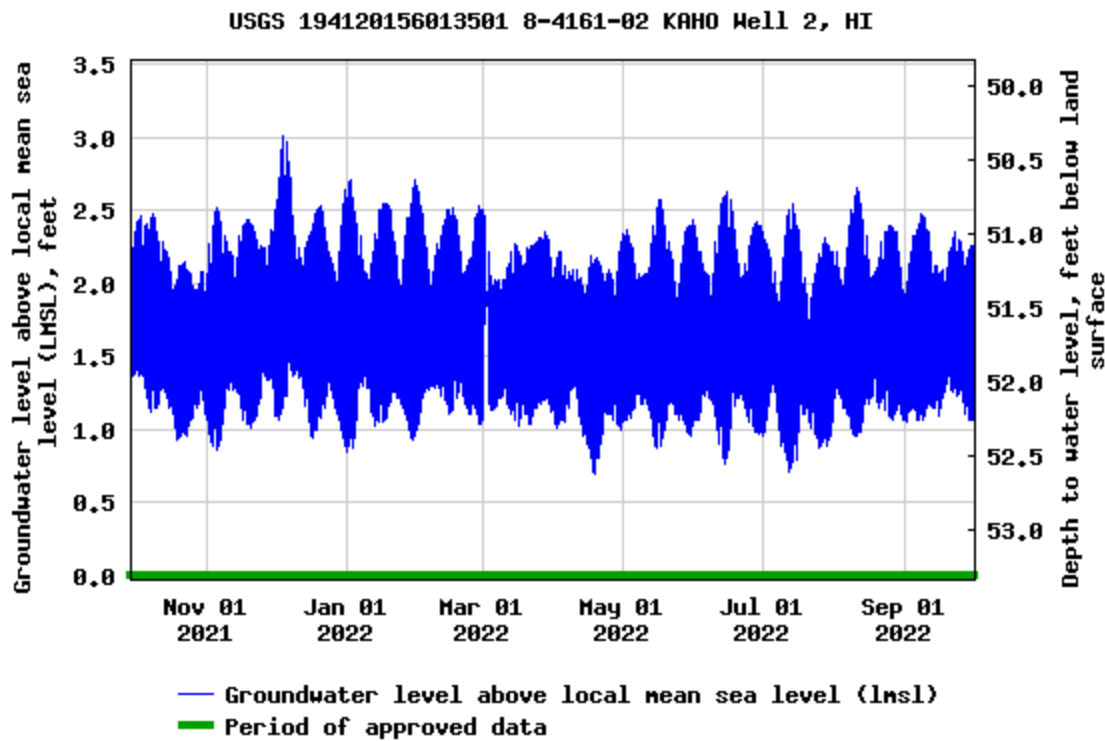


Figure 5. Water-level data for KAHŌ Well 2, the upper well, October 1, 2021–September 30, 2022.

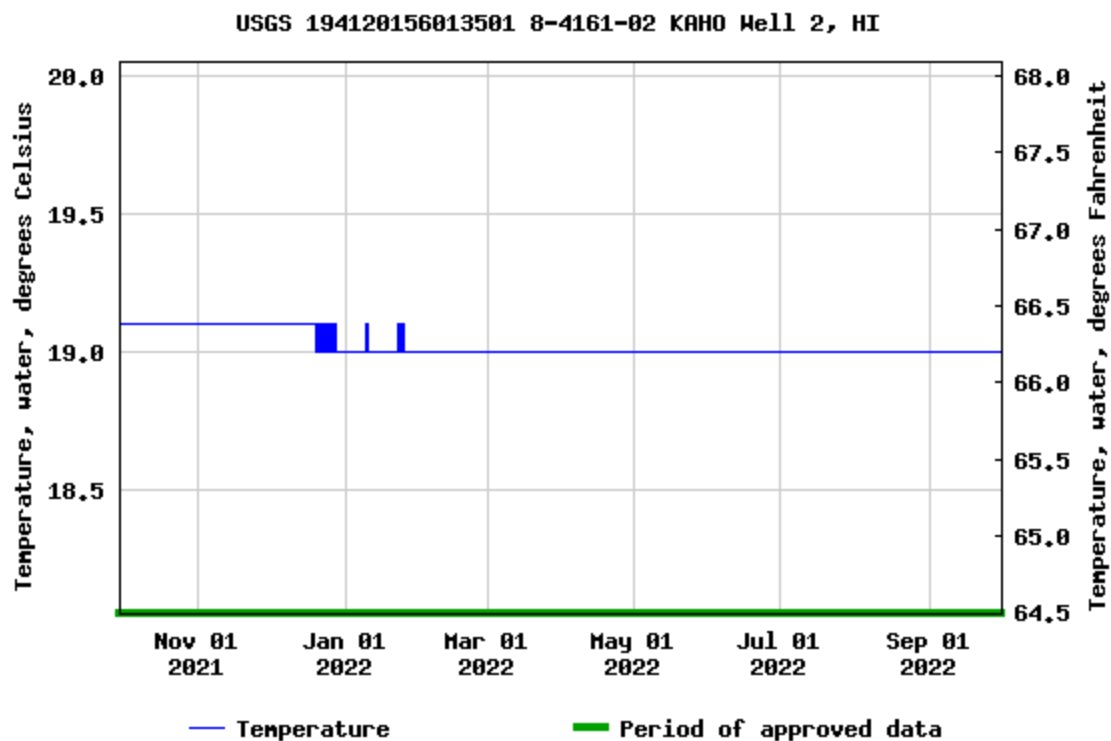


Figure 6. Temperature data for KAH0 Well 2, the upper well, October 1, 2021–September 30, 2022.

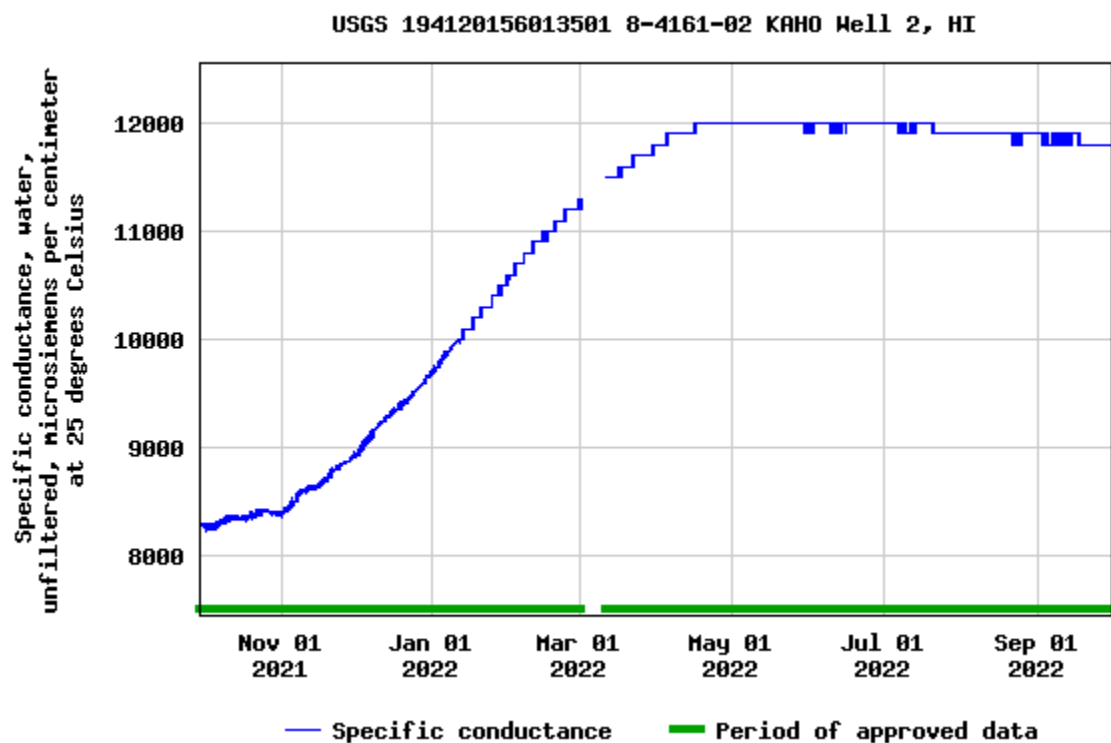


Figure 7. Specific-conductance data for KAH0 Well 2, the upper well, October 1, 2021–September 30, 2022.

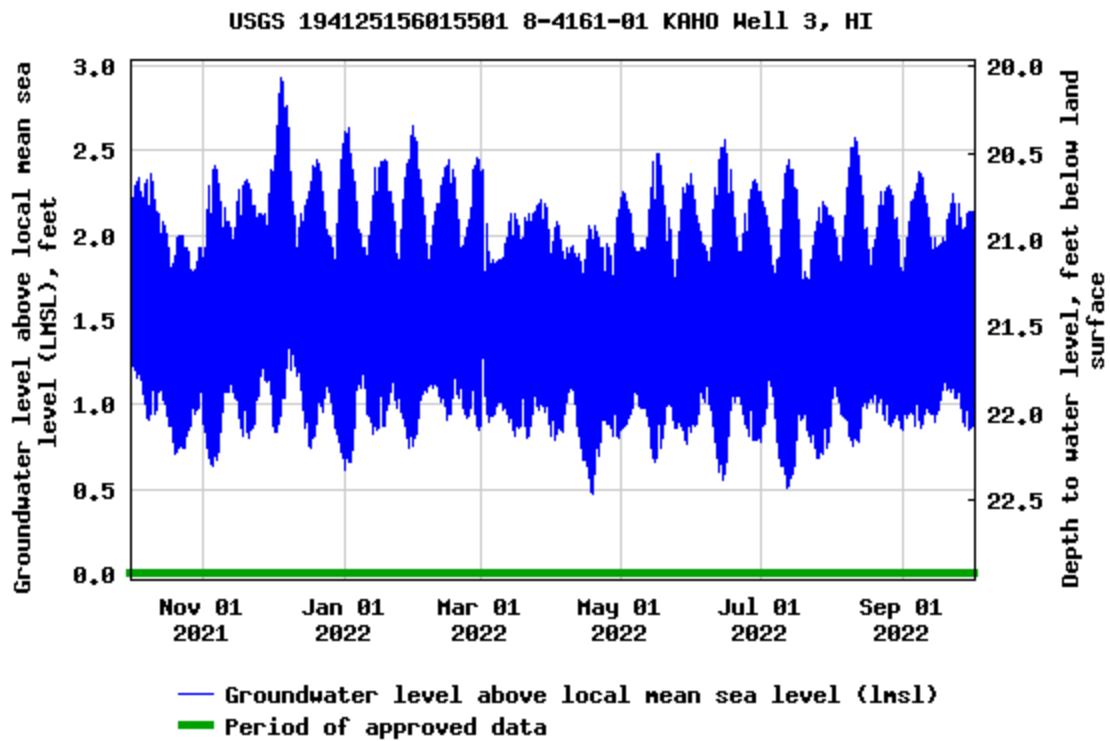


Figure 8. Water-level data for KAH0 Well 3, the lower well, October 1, 2021–September 30, 2022.

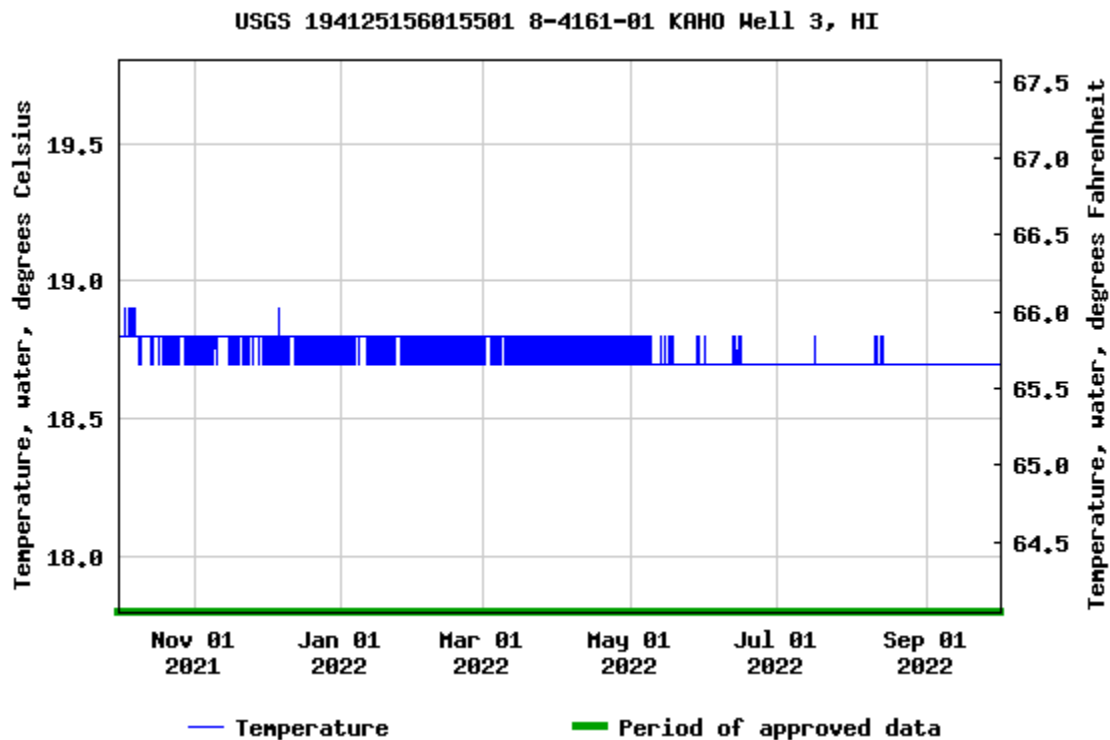


Figure 9. Temperature data for KAH0 Well 3, the lower well, October 1, 2021–September 30, 2022.

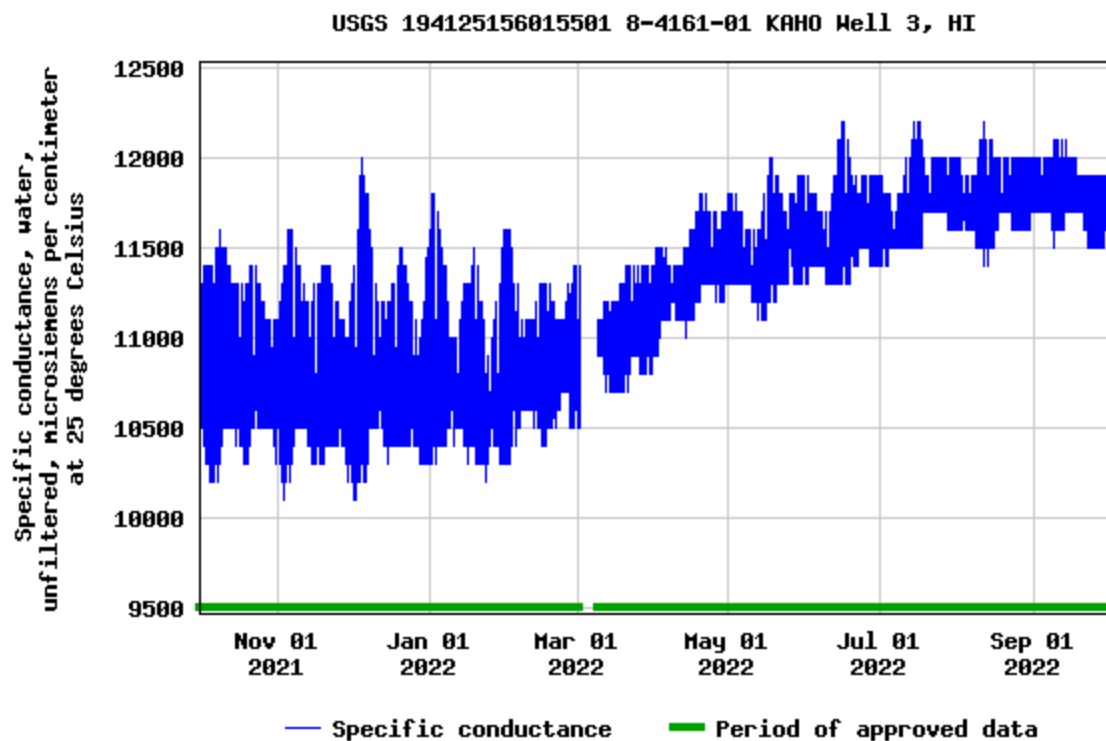


Figure 10. Specific-conductance data for KAH0 Well 3, the lower well, October 1, 2021–September 30, 2022.

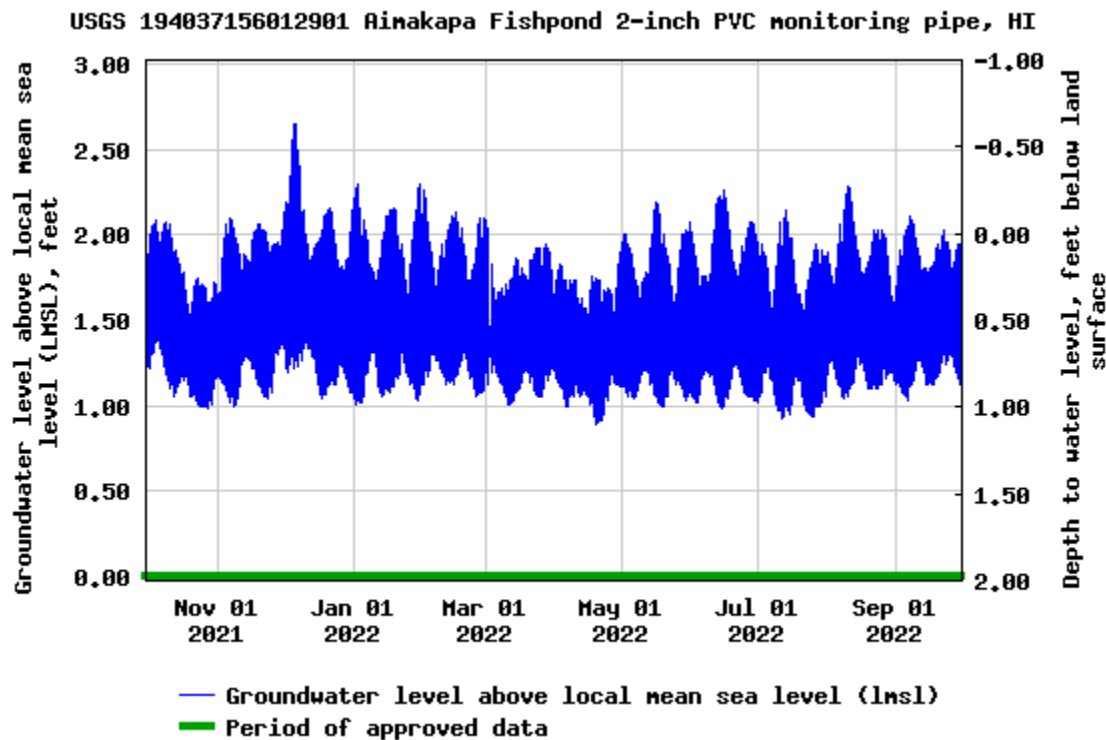


Figure 11. Water-level data for ‘Aimakapā Fishpond monitoring pipe, October 1, 2021–September 30, 2022.

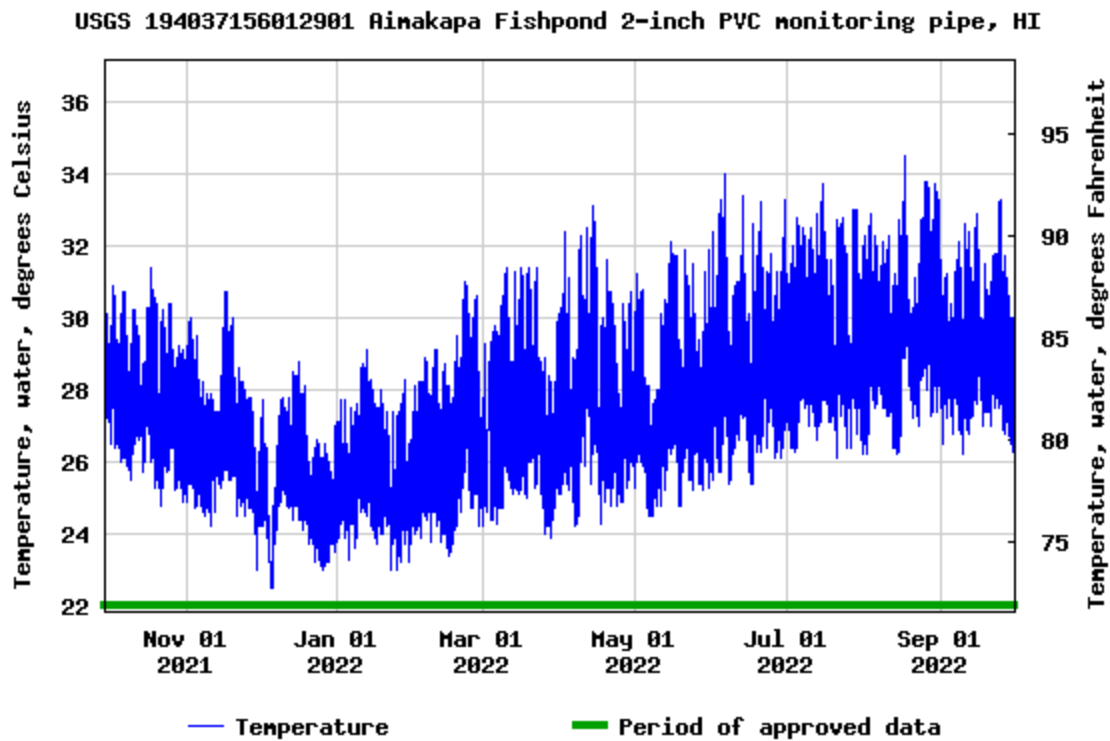


Figure 12. Temperature data for ‘Aimakapā Fishpond monitoring pipe, October 1, 2021–September 30, 2022.

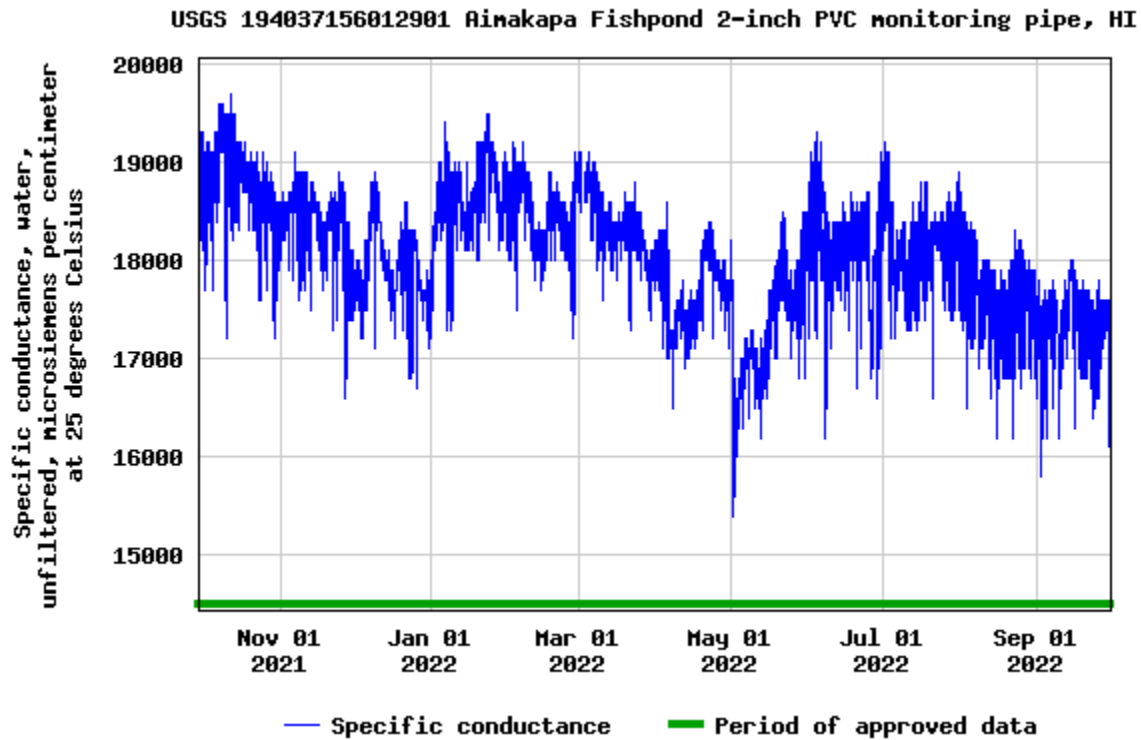


Figure 13. Specific-conductance data for ‘Aimakapā Fishpond monitoring pipe, October 1, 2021–September 30, 2022.

Data shown in figures 2–4 for KAHO Well 1, near the KAHO Visitor Center, are available at:
https://nwis.waterdata.usgs.gov/usa/nwis/uv/?cb_all=on&cb_00010=on&cb_00095=on&cb_72150=on&format=rdb&site_no=194053156013001&period=&begin_date=2021-10-01&end_date=2022-09-30

Data shown in figures 5–7 for KAHO Well 2, the upper well, are available at:
https://nwis.waterdata.usgs.gov/usa/nwis/uv/?cb_all=on&cb_00010=on&cb_00095=on&cb_72150=on&format=rdb&site_no=194120156013501&period=&begin_date=2021-10-01&end_date=2022-09-30

Data shown in figures 8–10 for KAHO Well 3, the lower well, are available at:
https://nwis.waterdata.usgs.gov/usa/nwis/uv/?cb_all=on&cb_00010=on&cb_00095=on&cb_72150=on&format=rdb&site_no=194125156015501&period=&begin_date=2021-10-01&end_date=2022-09-30

Data shown in figures 11–13 for ‘Aimakapā Fishpond monitoring pipe are available at:
https://nwis.waterdata.usgs.gov/usa/nwis/uv/?cb_all=on&cb_00010=on&cb_00095=on&cb_72150=on&format=rdb&site_no=194037156012901&period=&begin_date=2021-10-01&end_date=2022-09-30

Monthly mean water level, temperature, and specific conductance

Monthly mean water-level, temperature, and specific-conductance values during October 2021–September 2022 are shown in figures 14, 15, and 16, respectively. To better illustrate long-term trends in the data, the monthly mean values during October 2015–September 2021 also are included in figures 14, 15, and 16.

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 above local mean sea level (LMSL), feet”; (2) entering the desired date range from 2015-10 to 2022-09 for KAHO Wells 1–3 and ‘Aimakapā Fishpond monitoring pipe; (3) checking the box labeled “Use incomplete data for statistics calculation”; and (4) pressing the “Submit” button.

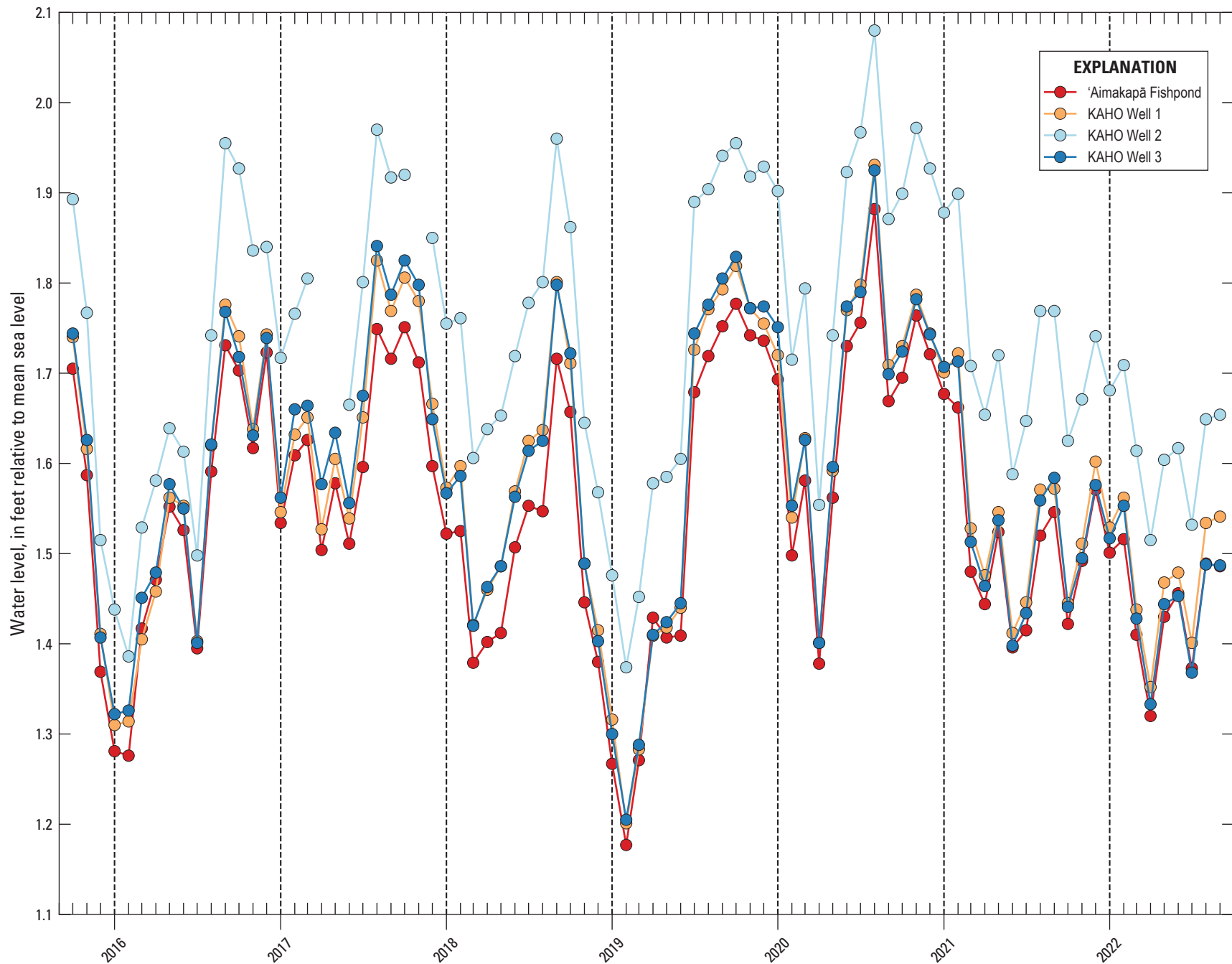


Figure 14. Monthly mean water level at four monitoring sites in Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai'i, October 2015–September 2022, including months with incomplete data.

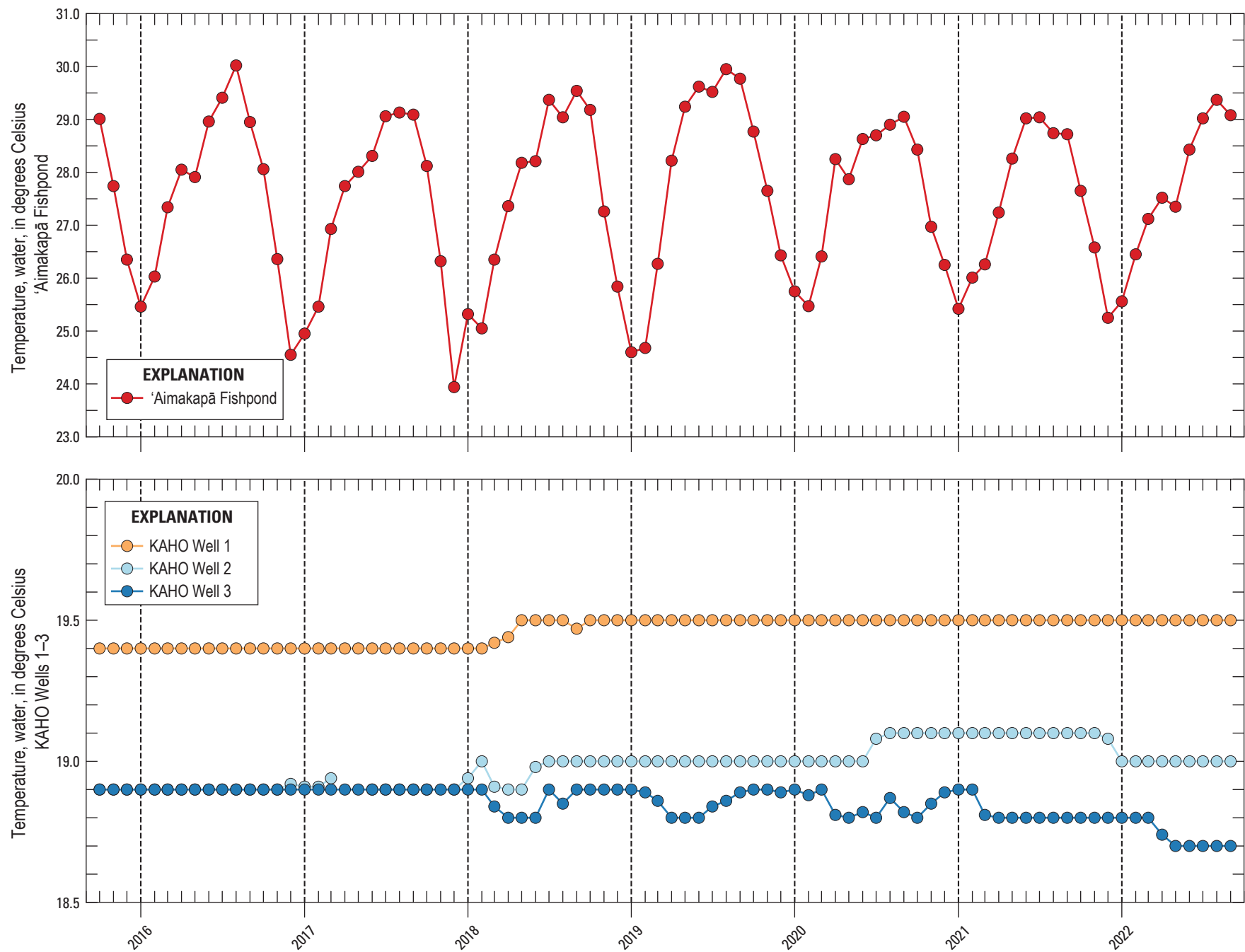


Figure 15. Monthly mean water temperature at four monitoring sites in Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai'i, October 2015–September 2022, including months with incomplete data.

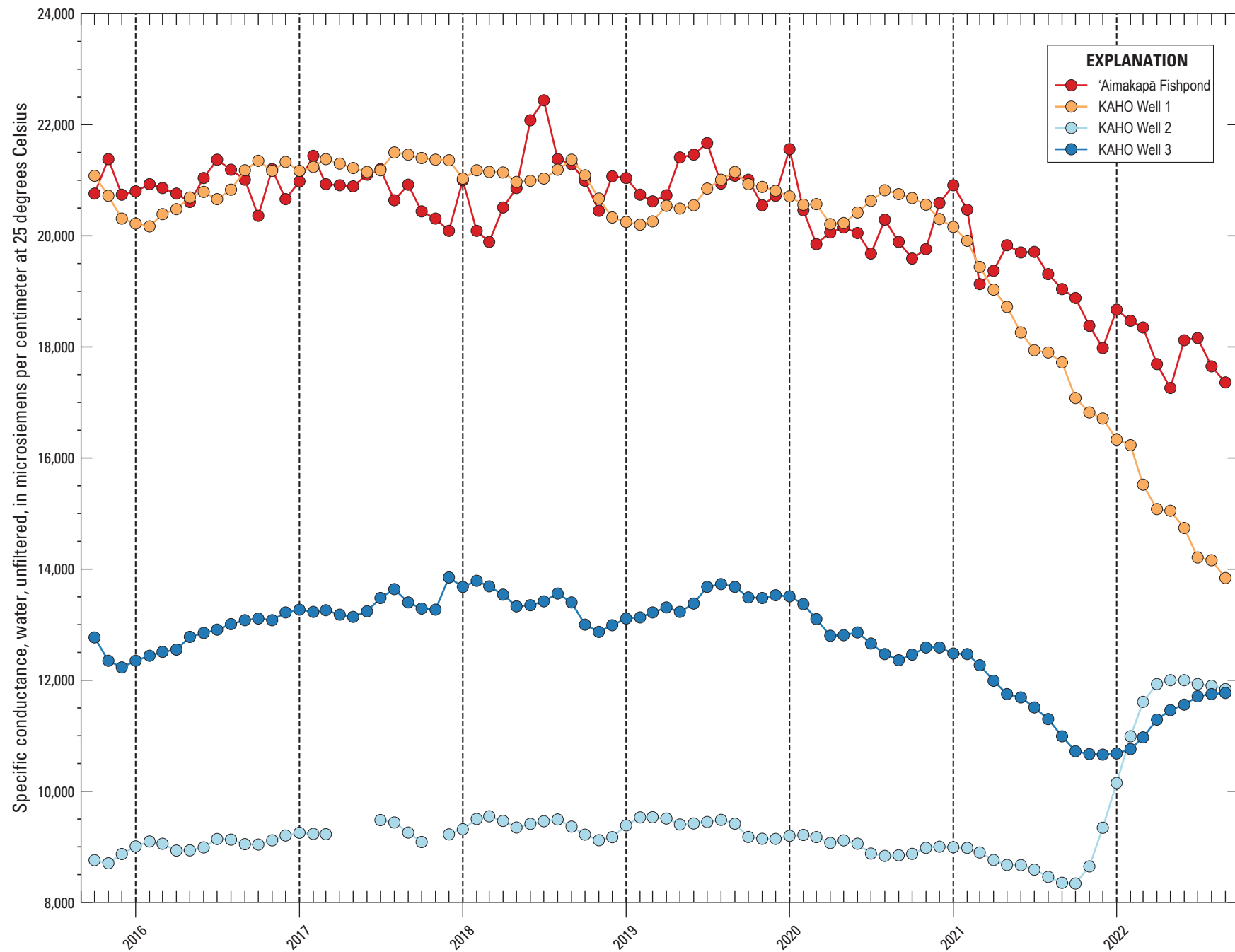


Figure 16. Monthly mean water specific conductance at four monitoring sites in Kaloko-Honokōhau (KAHO) National Historical Park, Island of Hawai'i, October 2015–September 2022, including months with incomplete data.

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 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, 2023, USGS water data for the nation: U.S. Geological Survey National Water Information System Web, accessed May 4, 2023, at <https://doi.org/10.5066/F7P55KJN>.