

TECHNICAL MEMORANDUM

To: Luhdorff & Scalmanini (LSCE); Tehama County Flood Control and Water Conservation District (TCFCWCD)

From: Davids Engineering, Inc. (DE)

Date: March 31, 2026

Subject: **Summary of the Synoptic Stream Gaging Study in the Antelope Subbasin, including Results and Recommendations**

Executive Summary

The Synoptic Stream Gaging Study was conducted to address a key data gap identified in the Antelope Subbasin Groundwater Sustainability Plan (GSP) related to Interconnected Surface Waters (ISW) and Depletions of Interconnected Surface Water (DISW). There is currently limited understanding of and ability to evaluate stream–aquifer interactions. Addressing this data gap allows for potential refinement of the Tehama Integrated Hydrologic Model (IHM), which supports SGMA implementation.

To begin addressing this gap, Davids Engineering conducted coordinated, same-day synoptic streamflow measurements along Antelope Creek and Craig Creek within the Antelope Subbasin. The Antelope Subbasin and its surface water features are depicted in Figure 1¹. Three days of monitoring were completed on September 10, October 2, and December 2, 2025, under steady-state or near-steady-state conditions. Discharge measurements were collected at Antelope Creek at Cone Grove Park (ANCK01), Craig Creek at Craig Avenue (CRCK01), and Craig Creek near the Sacramento River (CRCKSR) using USGS standard mid-section protocols (USGS 2010). These were used to develop stream reach water budgets to evaluate stream–aquifer interactions and gaining or losing² conditions within the stream reaches between synoptic stream measurement sites.

A principal finding of the Study is that Antelope Creek becomes dry immediately downstream of its split with Craig Creek under low- to moderate-flow conditions. During two of the three synoptic events, all surface flow was routed into Craig Creek. This behavior is not represented in the current Tehama IHM and has important implications for delineation of ISW and evaluation of DISW.

Net Stream Gain (NSG) results show that the upstream reach (ANCK01-CRCK01) consistently functioned as a gaining reach, indicating persistent groundwater discharge to Antelope Creek. In contrast, the downstream reach (CRCK01-CRCKSR) alternated between gaining and losing conditions over the three days of monitoring. Across the combined reach (ANCK01-CRCKSR), NSG also varied between

¹ This initial synoptic stream gaging effort was focused on ISW flowing across the Antelope Subbasin, with Antelope Creek being the only ISW stream currently included in the Tehama IHM. Notably, the Sacramento River forms the western boundary of the Antelope Subbasin; it is an important regional waterway and could be included in a potential future expansion of ISW field data collection efforts.

² While we use the term “losing” when NSG is negative, it is important to highlight that this water isn’t being lost in the sense that it is no longer available for subsequent use. Rather, from the perspective of the underlying aquifer, this becomes a “gain” or source of recharge to the groundwater system.

measurement dates. This variability in gaining/losing conditions highlights potential seasonal variability and the importance of multi-season field data collection to better understand conditions. These results provide the Antelope Subbasin with its first coordinated, reach-specific dataset for characterizing stream-aquifer interactions, evaluating modeled stream-aquifer fluxes, and informing potential refinement of the Tehama IHM. Table 1 summarizes reach-scale net stream gains and losses observed during multiple monitoring events. Reported values include the associated uncertainty, which reflects the combined effects of discharge measurement uncertainty as well as uncertainty in estimated changes in stream storage, miscellaneous inflows and outflows, and evapotranspiration. The results illustrate spatial and seasonal variability in gaining and losing conditions and provide quantitative results for potential model refinement.

Recommended next steps include explicitly incorporating Craig Creek into the model, updating ISW delineations to reflect observed dry reach conditions, expanding streamflow and shallow groundwater monitoring, monitoring tailwater inflows to Antelope Creek and the Antelope-Craig Creek split, and expanding field data collection for additional refinement of Tehama IHM and its characterization of ISW.

Table 1. Net Stream Gain by reach and measurement date. Positive values indicate gaining conditions; negative values indicate losing conditions. Values shown are in cubic feet per second (CFS) and are presented as calculated Net Stream Gain $\pm$ total uncertainty, which incorporates uncertainty associated with quantification of other flow paths in the stream reach water budget.

Reach	Monitoring Date and Net Stream Gain (CFS) for each Reach			Interpretation
	Sep 10, 2025	Oct 2, 2025	Dec 2, 2025	
ANCK01–CRCK01 (Upstream)	+0.8 $\pm$ 0.8	+4.6 $\pm$ 1.0	+0.5 $\pm$ 1.8	Consistently gaining
CRCK01–CRCKSR (Downstream)	-3.3 $\pm$ 0.6	+1.9 $\pm$ 1.3	-4.0 $\pm$ 2.3	Alternates gaining/losing
ANCK01–CRCKSR (Combined)	-2.5 $\pm$ 0.9	+6.5 $\pm$ 1.5	-3.5 $\pm$ 2.4	Alternates gaining/losing

1 Introduction

The Tehama County Flood Control and Water Conservation District (TCFCWCD) serves as the Groundwater Sustainability Agency (GSA) within the Antelope Subbasin, which is shown in Figure 1 (along with streams and canals). As the GSA, TCFCWCD is responsible for managing groundwater resources sustainably, tracking groundwater conditions, and implementing the Antelope Subbasin Groundwater Sustainability Plan (GSP) per the Sustainable Groundwater Management Act (SGMA). The GSP outlines the strategies, monitoring networks, and management actions necessary to maintain or achieve long-term groundwater sustainability over SGMA's 20-year implementation horizon.

A foundational technical tool supporting SGMA implementation in the region is the Tehama IHM. The Tehama IHM is a numerical groundwater–surface water model built on the Integrated Water Flow Model (IWFM) platform, developed and maintained by the California Department of Water Resources (DWR). The model simulates hydrologic processes within the Antelope Subbasin and surrounding areas,

including groundwater flow, stream–aquifer³ interactions, recharge, pumping, and surface water diversions, along with simulating groundwater levels, storage, and conditions over time in the aquifer. By representing these processes through time, the Tehama IHM provides a framework for quantitatively evaluating groundwater conditions, forecasting future scenarios, and assessing whether projects and management actions will meet SGMA sustainability requirements. The Tehama IHM is described in detail in Appendix 2-J of Antelope Subbasin’s GSP (TCFCWCD 2024).

A critical element of SGMA is the requirement that GSAs understand and manage Interconnected Surface Waters (ISW) and prevent Depletions of Interconnected Surface Water (DISW). DISW is the sixth and final undesirable result defined in SGMA. The minimum threshold for this sustainability indicator “...shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results.” (23 CCR §354.28) An undesirable result for ISW is define as a DISW that would cause “significant and unreasonable” negative impacts on surface water use within the subbasin (23 CCR § 10721). Stream–aquifer interaction and exchange processes determine how groundwater pumping impacts surface water flows in interconnected streams and rivers. The Antelope Subbasin GSP identifies ISW as an important sustainability concern but also notes that data gaps—including limited stream gages and shallow monitoring wells—make it difficult to quantify the timing, magnitude, and location of these interactions (TCFCWCD 2024). SGMA requires GSAs statewide to evaluate and quantify DISW by 2027, and DWR has issued statewide guidance and technical papers, along with Recommended Corrective Actions in their letter of determination emphasizing the need for improved characterization of ISW (DWR 2025).

Although the Tehama IHM provides a valuable basin-scale framework for simulating hydrologic conditions, numerical models necessarily simplify the real-world system, and their accuracy depends on the quality and representativeness of available data. Many hydrologic processes—particularly stream–aquifer interactions—cannot be directly measured and instead must be inferred from indirect evidence, field measurements and observations, and modeled estimates. For this reason, both DWR and the Antelope Subbasin GSP highlight the importance of collecting new, on-the-ground data to refine model assumptions, improve representation of surface water features, and reduce uncertainty in ISW characterization.

The Synoptic Stream Gaging Study (Study) documented in this Technical Memorandum was undertaken to collect field measurements of streamflow and related parameters to inform and improve modeling efforts and begin to address these data gaps. By conducting coordinated streamflow measurements, identifying and quantifying other inflows and outflows, and developing stream reach water budgets across Antelope Creek and Craig Creek, the Study provides empirical information on the magnitude and variability of stream–aquifer interactions under different hydrologic conditions. These data are essential for improving the Tehama IHM’s simulation of streamflows and groundwater–surface water exchange, supporting refinement of the Tehama IHM and GSP implementation efforts, and strengthening the scientific foundation for meeting SGMA requirements related to ISW and DISW.

³ Water that infiltrates the ground moves vertically and/or horizontally (depending on aquifer characteristics) and is often ultimately stored in open spaces or pores beneath the surface of the ground. An aquifer is an underground area saturated with water (saturated zone); there is often also a layer above the saturated zone but below the ground surface called the unsaturated zone.

1.1 Overview of Interconnected Surface Waters (ISW)

Interconnected surface water (ISW) is defined in Title 23 of the California Code of Regulations (CCR), within the chapter on groundwater management, under CCR §351[o]. ISW is defined as “surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted.”

The definition from CCR is inclusive of both points in space and time where there is a direct connection between surface water freely flowing or ponded above the ground surface and the underlying groundwater aquifer; with this connection comes some level of interaction between ISW and groundwater. Interactions vary over space and time and are influenced by a variety of factors, including but not limited to: factors influencing the quantity and flow of surface water (such as streamflow, surface water diversions, precipitation, and surface runoff from surrounding lands), streambed and aquifer characteristics (such as their composition materials and associated porosity and permeability, and the presence of an aquitard or potential confining layer), and hydraulic gradient and conductivity.

Ultimately, interactions between ISW and groundwater are driven by two hydraulic properties (both influenced by the additional factors described above): the hydraulic gradient and hydraulic conductivity. The hydraulic gradient is the difference in water elevation between two locations and the resulting slope and hydraulic pressure caused by the force of gravity moving water from the higher location to the lower location. All else equal, a higher hydraulic gradient between ISW and groundwater will result in a higher flow rate between the two. Hydraulic conductivity is a measure of how quickly water can flow through a material; for ISW and an adjacent groundwater system, the materials of interest that conduct water are the aquifer and streambed (DWR 2024a).

For the stream-aquifer interactions occurring between ISW and groundwater, there are three different scenarios that can occur. They will be described relative to a stream, but they also apply to rivers, lakes, or other surface water features. The first scenario is a gaining stream, in which the groundwater elevation adjacent to a stream is higher in elevation, resulting in a “gain” to the stream (i.e., flow of water from groundwater to the stream). The second scenario is a losing stream, in which the groundwater elevation adjacent to a stream is lower in elevation, resulting in a “loss” from the stream (i.e., flow of water from the stream to groundwater). The third scenario is one in which groundwater elevations are below the streambed elevation and there is not a continuous saturated zone with a hydraulic connection to the stream; this is a disconnected stream (no longer an ISW). The hydraulic gradient and conductivity influences flow rates in these scenarios, and these conditions vary over space and time (including potential shifts from gaining to losing to disconnected along the same stream over space and/or time). Figure 2 (adapted from DWR 2024a) visually depicts these three scenarios.

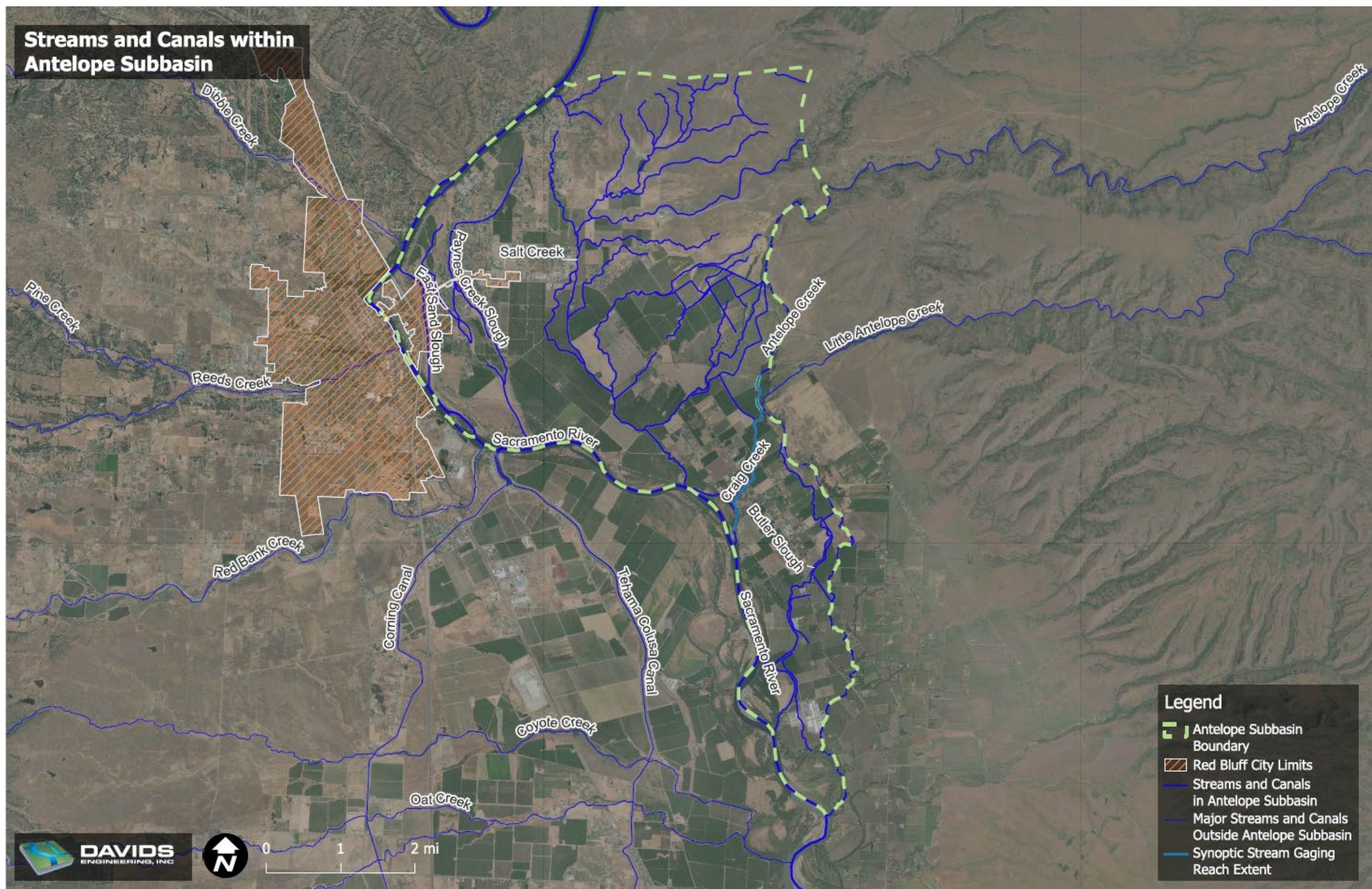


Figure 1. The Antelope Subbasin and its streams and canals. Antelope Subbasin has many braided and branching streams within its boundaries, and the Sacramento River forms its western boundary.

This page left intentionally blank.

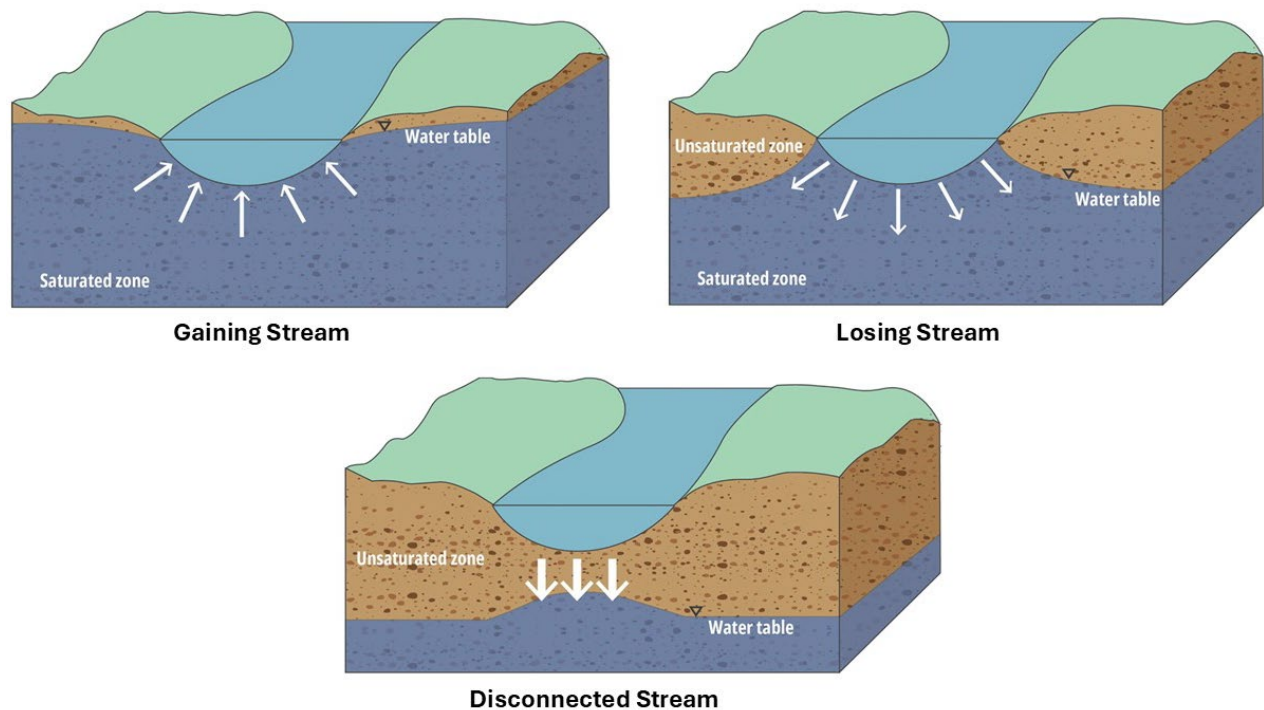


Figure 2. Schematics depicting groundwater levels and flow direction for gaining, losing, and disconnected streams (adapted from DWR 2024a).

An additional scenario that can potentially occur is a throughflow scenario, where a stream is gaining on one bank and losing on the other bank (Berhane 2015). This is particularly relevant to California in the context of SGMA in the Central Valley, as major surface water features often form the boundary between subbasins and differing groundwater use and management has the potential to result in a throughflow scenario where the groundwater system is providing “gains” to a boundary surface water feature from one subbasin while simultaneous “losses” from the stream to the groundwater system in another subbasin are occurring.

1.2 Interconnected Surface Waters Data Gap and Recommended Actions

As described above in the Introduction, characterizing and quantifying ISW and any DISW over space and time is notoriously difficult but is necessary for sustainable groundwater management under SGMA.

The Original 2022 and Revised 2024 Antelope Subbasin GSP both acknowledge significant uncertainty regarding the extent to which SW and GW systems are hydraulically connected within the subbasin. The GSP notes that this uncertainty is driven primarily by a limited number of shallow monitoring wells capable of capturing near-stream groundwater levels, and a lack of adequate stream gages on Antelope Creek, Craig Creek, and other perennial and intermittent watercourses (TCFCWCD 2024). Because of this limited monitoring network, the GSP relies heavily on (1) The Nature Conservancy’s Interconnected Surface Water in the Central Valley (ICONS) web tool as shown in to screen for potential ISW and (2) the Tehama Integrated Hydrologic Model (IHM) to identify reaches of Antelope Creek predicted to be gaining or losing. The GSP acknowledges that these tools provide only generalized indications of ISW and

that the subbasin lacks direct, reach-specific field measurements to confirm model results. Further, the GSP references a set of stream reach gaining/losing outputs intended to be included in a sub-appendix, but DWR's determination letter notes this sub-appendix was missing, increasing uncertainty regarding how ISW was characterized in the plan (DWR 2025).

To address these information gaps, the GSP identifies the need for additional data collection, improved monitoring, and refinement of ISW characterization. Specifically, the GSP recommends installing new shallow monitoring wells, expanding surface water monitoring, and continuing to develop methods for better understanding interactions between streams and the aquifer. These steps were intended to support future refinement of the Tehama IHM and inform more defensible Sustainable Management Criteria (SMCs) related to ISW.

In its GSP Determination Letter, DWR provided further clarity and direction. Under Recommended Action 6, DWR emphasizes that quantifying the location, quantity, and timing of pumping-induced DISW is essential for evaluating whether GSP implementation is on track. DWR staff noted that in the initial review of GSPs that most GSAs failed to quantify DISW but that after several years of project and management actions designed to address data gaps, most GSAs should more fully comply with SGMA's regulations. DWR acknowledges that estimating DISW is complex and may require additional time and monitoring infrastructure; however, the agency states that GSAs must make tangible progress toward completing these evaluations.

This need for improved streamflow and stream–aquifer interaction data is not unique to the Antelope Subbasin; rather, it reflects a statewide challenge recognized across California's groundwater basins. DWR has repeatedly emphasized that limited data on ISW, gaining and losing reaches, and late-season streamflow conditions is a common constraint affecting many GSAs as they work to comply with SGMA's requirements for characterizing and preventing DISW. This is one reason DWR is developing additional ISW guidance, best management practices, and monitoring recommendations: to support GSAs statewide in filling these data gaps and strengthening the technical basis for ISW-related SMCs.

DWR recommends that by the first periodic GSP evaluation, the GSA should:

- Estimate the quantity and timing of DISW across ISW reaches.
- Define undesirable results for ISW depletion and identify associated impacts on beneficial uses and users.
- Use forthcoming DWR ISW guidance to establish quantitative minimum thresholds, measurable objectives, and management actions for ISW.
- Continue to fill data gaps by collecting new monitoring data and refining interconnectivity assessments across surface water features.
- Collaborate with local, state, and federal agencies, along with stakeholders, to understand the full suite of beneficial uses that could be affected by stream depletion.

Collectively, the GSP's acknowledgment of uncertainty and DWR's Recommended Actions highlight the benefits to the subbasin from direct field measurements of streamflow and improved data on and understanding of stream–aquifer exchanges. This underscores the value of the present Study, which provides new empirical data to support refinement of the Tehama IHM, improve ISW delineations, and strengthen the GSA's ability to evaluate and manage DISW in accordance with SGMA.

1.3 Surface Water Features in the Tehama Integrated Hydrologic Model Overview

As described above, the Tehama IHM is a numerical groundwater–surface water model used to characterize the Antelope Subbasin, develop and implement the GSP, and meet the requirements of SGMA. The section below is focused on characterization of surface water features (i.e., streams) within the Antelope Subbasin.

1.3.1 Streams in Model

The Tehama IHM includes only two surface water features within the Antelope Subbasin: the Sacramento River and Antelope Creek. As shown in Figure 3, several additional perennial and seasonal streams occur within the subbasin—including Salt Creek, New Creek, East Sand Slough, and multiple tributaries to Antelope Creek—but these watercourses are not represented as modeled stream reaches. Many of these streams convey flow throughout much or all of the year under normal conditions and function as hydrologically meaningful features that influence recharge, local groundwater conditions, and that have the potential to be hydraulically connected to the shallow groundwater system with stream–aquifer interactions. Their absence from the model limits the ability of the Tehama IHM to simulate key surface water processes within the subbasin.

This simplified representation reflects the Tehama IHM’s original development objective—regional basin-scale simulation—rather than the finer spatial resolution needed for characterization of ISWs within a subbasin. By excluding all streams except Antelope Creek and the Sacramento River, the model is unable to simulate and characterize:

- Potential gaining or losing reaches along smaller perennial streams
- Tributary inflows that may influence surface water availability and stream-aquifer interactions
- Hydraulic gradients near smaller streams and tributaries that affect pumping-induced depletions
- The routing of flow along Craig Creek, which is a major surface water conduit downstream of the Antelope–Craig split

Although the Sacramento River is also a surface water feature for the Antelope Subbasin (forming its western boundary), this initial synoptic stream gaging effort was focused on ISW flowing across the Antelope Subbasin rather than bounding the subbasin. Also, inclusion of the Sacramento River would have substantially increased the complexity of the Study in a number of ways including site access, safety considerations, quantifying inflows and outflows from stream reaches, identifying steady state or near steady state conditions, and environmental monitoring approaches for measuring streamflow. The Sacramento River is an important regional waterway and could be included in a potential future expansion of ISW field data collection efforts.

1.4 Synoptic Stream Gaging

Synoptic stream gaging—also known as stream reach water budgets—provides a valuable method for directly assessing whether a stream reach is “gaining” (i.e., gaining water from groundwater, with flow increasing over space moving downstream) or “losing” (i.e., losing water to groundwater, with flow decreasing over space moving downstream). By completing coordinated upstream and downstream flow measurements during steady-state hydrologic conditions and documenting all measurable surface inflows and outflows (e.g., tributaries, tailwater, diversions, evaporation from the stream surface), the remaining imbalance required to close the water budget can be attributed to stream–aquifer exchange.

This closure term, the Net Stream Gain (NSG), represents either (1) groundwater discharge to the stream for gaining reaches or (2) seepage losses from the stream to the aquifer for losing reaches.

These interactions vary substantially across both space (e.g., between reaches such as Antelope Creek vs. Craig Creek) and time (e.g., before and after storm events, during irrigation season, or under baseflow conditions). As illustrated conceptually in Figure 4, seasonal shifts influenced by factors including hydraulic gradients, streambed permeability, land use, diversions, tailwater returns, and channel morphology all influence whether a given reach is gaining, losing, or hydraulically disconnected. Because of this complexity, numerical models such as the Tehama IHM should rely on field data whenever possible to confirm whether simulated stream–aquifer fluxes reasonably match observed on-the-ground conditions. Similar to how groundwater models are often compared to actual measured groundwater levels for calibration, a comparison of modeled results for ISWs to field data and actual measurements of streamflow or hydraulic gradients can be a helpful reference point for testing model simulations and potentially guiding model refinements.

As noted in the Antelope Subbasin GSP and reinforced in DWR’s Recommended Corrective Actions (as described in Section 1.2), the Subbasin currently lacks sufficient streamflow and shallow groundwater data to fully characterize ISW or evaluate DISW. Measuring related data (i.e., streamflow) directly in the field and quantifying NSG through stream reach water budgets provides an independent dataset that can be compared against Tehama IHM-simulated fluxes to identify where the model aligns with observed conditions and where refinements may be beneficial. A model that accurately reproduces measured field conditions increases confidence in its ability to simulate future hydrologic scenarios, estimate DISW, and support SGMA compliance.

The synoptic stream gaging completed for this Study was designed precisely for this purpose: to establish water budgets for selected reaches of Antelope Creek and Craig Creek, quantify the magnitude and direction of stream–aquifer interactions, and provide the Antelope Subbasin GSA with new empirical data to support refinement of ISW characterization and future improvements to the Tehama IHM. This field-based understanding of gaining and losing reaches lays a stronger foundation for sustainable groundwater management and for meeting SGMA’s requirements related to ISW and DISW.

Figure 4 depicts the different synoptic stream gaging fluxes (or stream reach water budget components) quantified as part of this effort. As described above, after quantifying all other inflows and outflows, the NSG can be calculated as the closure term (see Section 2.6.1 for more details).

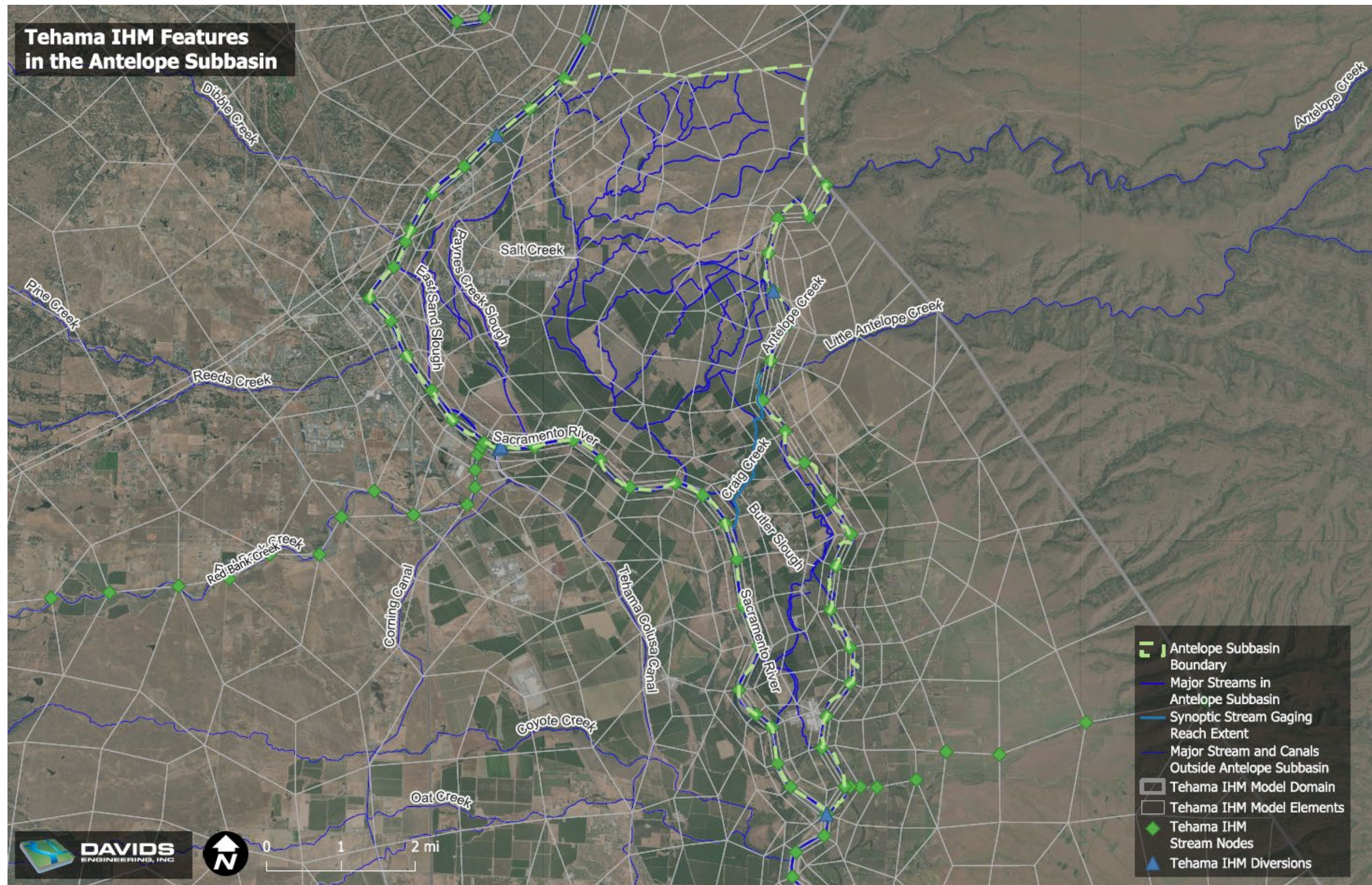


Figure 3. Streams within Antelope Subbasin and Tehama IHM features, including element delineations and stream nodes. The only streams with the subbasin that are represented in the Tehama IHM are the Sacramento River and Antelope Creek, even though multiple other streams are understood to convey flow throughout much or all of the year under normal conditions.

This page left intentionally blank.

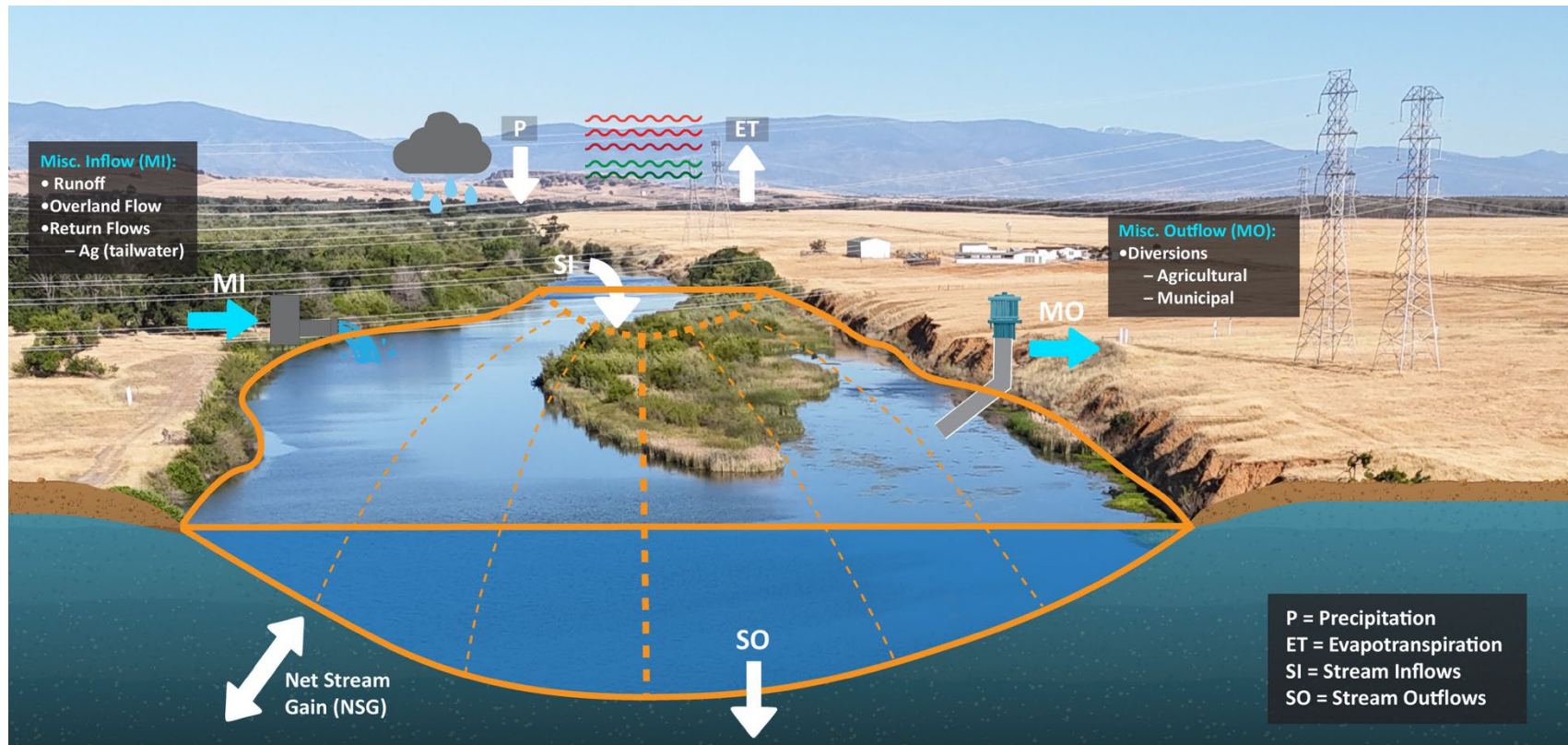


Figure 4. Conceptual illustration of a stream reach water budget for Stony Creek in Tehama County showing the major flux components used in the Study. Stream inflows (SI), stream outflows (SO), precipitation (P), evapotranspiration (ET), miscellaneous inflows (MI), and miscellaneous outflows (MO), and net stream gain (NSG) all contribute to the stream reach water budget for a defined reach (outlined in orange). This framework allows field measurements and estimated fluxes to be integrated to quantify NSG and evaluate stream–aquifer interactions. Note that stream outflow (SO) is the amount of flow continuing downstream of the stream reach in the surface stream even though the arrow could be misinterpreted to mean that it is infiltrating through the streambed. A stream reach water budget schematic is also included in Figure 6.

This page left intentionally blank.

2 Methods

As described previously, synoptic stream gaging (*i.e.*, stream reach water budgets) was completed to collect new in-field data to improve understanding of stream-aquifer interactions in the Antelope Subbasin and refine the Tehama IHM. The methods used for site selection and the equipment and procedures used for data collection, processing, and analysis are described in the subsections below.

2.1 Site Selection

2.1.1 Stream Reaches

The stream reaches identified for the synoptic stream gaging study were shown previously in Figure 1. Locations along the Antelope and Craig Creek were selected based on: (1) relevance to Tehama IHM characterization of stream-aquifer interactions, (2) accessibility, which was limited by landowner approval for access to private lands and safety concerns, (3) suitability for flow measurements, and (4) the presence or absence of unmeasured inflows or outflows between an upstream and downstream flow measurement site. Ultimately three measurement sites and two stream reaches were used in this study. Flow measurements and daily stream reach water budgets were repeated on Antelope and Craig Creek at least three times at each reach.

Among the location selection criteria above, a critical one was the need to have measurable or estimable (and preferably limited) inflow and outflow locations with the reach, such as tributaries or diversions, respectively. If inflows and outflows could not be identified and measured or estimated in any reach, it was not possible to complete a stream reach water budget and the value of measurements of streamflow only is more limited. Access to measurement locations was one of the primary constraints in identifying measurement sites, as nearly all of Antelope and Craig Creek within the Subbasin is surrounded by private land. Coordination with landowners for access to Antelope and Craig Creek was completed, but in most cases was unsuccessful. Finally, the size of the reach matters: Stream reaches need to be large enough to have some certainty regarding the potential presence of the substantial and measurable stream-aquifer interaction, but small enough to have some spatial specificity regarding where those interactions may be taking place along the stream. After reviewing potential measurement sites, and resulting reaches and their associated characteristics and factors, a total of two reaches were selected for development of stream reach water budgets as part of the Study.

The furthest upstream measurement location was on Antelope Creek at Cone Grove Park (Site ID: ANCK01). Measurements were then taken downstream on Craig Creek where Craig Ave crosses the creek (CRCK01) and just upstream of the mouth of Craig Creek where it enters the Sacramento River (CRCKSR). The upstream reach from Antelope Creek at Cone Grove Park to Craig Creek at Craig Ave. measured 6,660 feet (FT), or about 1.3 miles (~1.3 MI), in length following the streams thalweg. The downstream reach from Craig Ave. to upstream of the mouth of Craig Creek measured 6,020 FT (~1.1 MI). The measurement locations and stream reaches are depicted in Figure 5. As described previously, at the Antelope-Craig Creek split, the entirety of streamflow moves through the Craig Creek channel, rather than continuing down the Antelope Creek channel, under low to moderate flow conditions.

This page left intentionally blank.

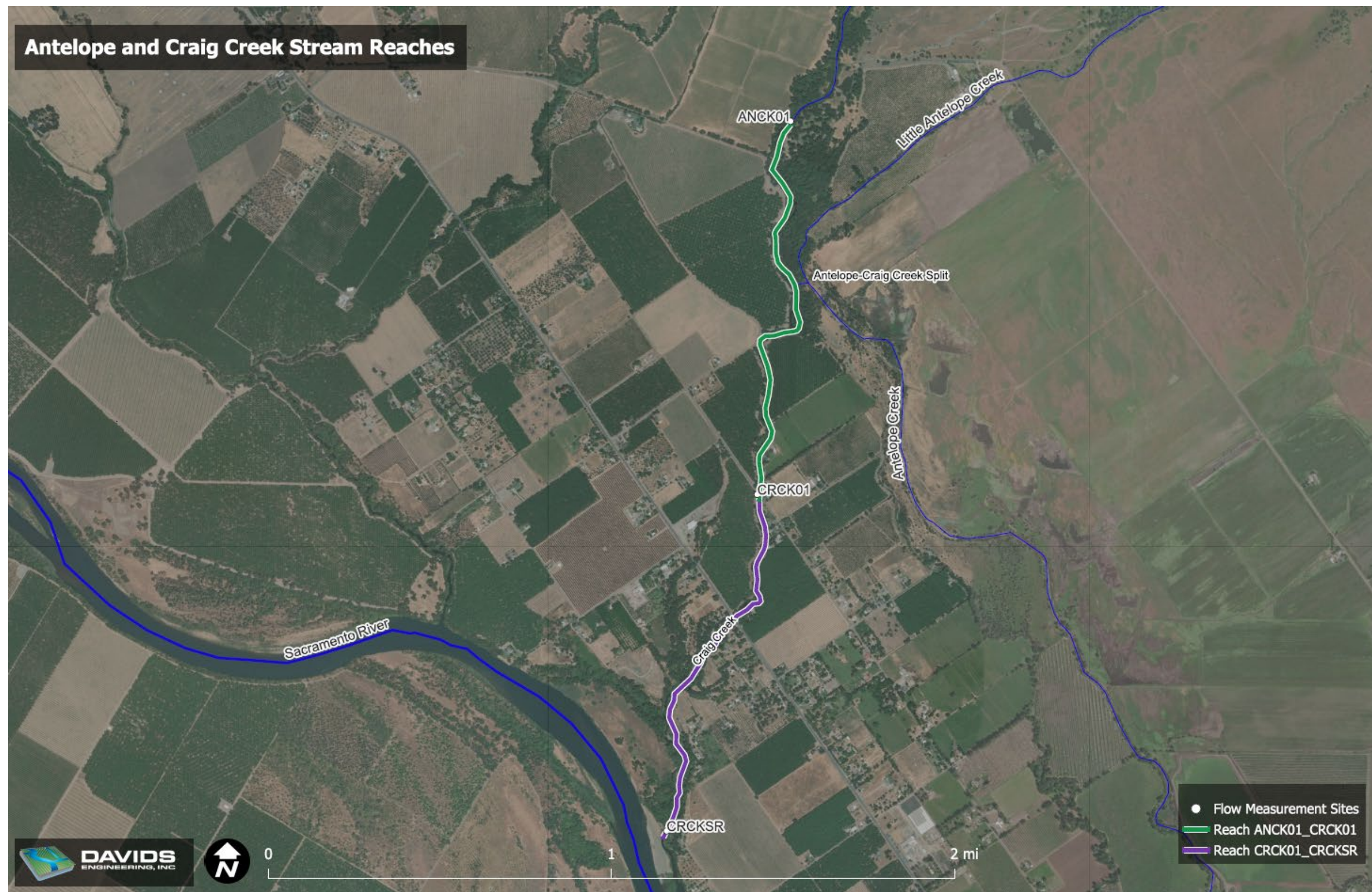


Figure 5. Flow measurement locations and stream reaches along Antelope Creek and Craig Creek. The figure shows the upstream and downstream measurement sites used for synoptic stream gaging, the delineated stream reach segments included in water budget analyses, and the location of Little Antelope Creek. Field observations and imagery confirm that Antelope Creek becomes dry downstream of its split with Craig Creek under low to moderate flow conditions, with all flow continuing downstream along Craig Creek to its confluence with the Sacramento River.

This page left intentionally blank.

2.2 Monitoring Equipment

The following subsections describe the various types of monitoring equipment and procedures used for field data collection during the Study.

2.2.1 Field Data Collection Forms

In order to record measurements and observations in the field for the Study, DE used field tablets loaded with custom data collection forms built using an open-source data collection tool called Open Data Kit (ODK)⁴; ODK utilizes user-built Microsoft Excel files using a standard called XLSForms⁵ to create survey forms with step-by-step instructions for field data collection. While in the field, the survey forms were completed using the field tablets, saved, and submitted for processing and analysis. The forms can be configured to request and record location using the Global Positioning System (GPS) functionality of the field tablet, time of data collection, and a variety other of user-provided inputs such as photos, numeric values, and text entries. The review and evaluation of data entered through field data collection forms is described in Sections 2.3 and 2.4. One ODK form was utilized for primary data collection as part of the Study, with additional miscellaneous field observations or photos recorded using other ODK forms.

2.2.2 Streamflow Measurement Equipment

The device used to measure streamflow was the SonTek FlowTracker2. The section below describes its measurement principles, and under what conditions it was used during the Study.

SonTek is a company that designs, manufactures, and sells an Acoustic Doppler Velocimeter (ADV) device called the FlowTracker2. An ADV emits sound waves and measures the doppler shift caused by the change in frequency to then calculate water velocity. It is typically mounted on a top-setting wading rod and used to measure velocity in wadable channels. The person wading in the channel measures the cross-sectional area of flow using the wading rod, as the ADV measures velocity. The resulting measurements of area and velocity are used to compute the total flow. The FlowTracker2 has one acoustic transmitter and two acoustic receivers. A FlowTracker2 was used to measure discharge in wadable conditions for the Study. The USGS mid-section measurement protocols were followed when taking measurements with the FlowTracker2 (USGS 2010).

2.2.3 Surveying Equipment

For surveying the location and elevation of points of interest for the Study, EMLID Reach Real-Time Kinematic (RTK) units were utilized. These use satellites to track locations with high precision and allow users to record their locations of interest and associated notes. An EMLID Reach RTK equipment configuration usually consisted of a Base Unit (Base) and a Rover Unit (Rover). The Base is set up as a stationary point and provides a positioning correction factor for the Rover, which is carried by the user and collects the survey points of interest. In close proximity to the Base, the Rover is precise to within 5 to 10 (MM), while the static Base has an accuracy of 4 to 8 MM (EMLID 2026). Additionally, post-processing can further improve the precision and accuracy of survey data in reference to established coordinate systems for the survey area.

⁴ More information about ODK is available at: <https://getodk.org/>

⁵ More information about XLSForms is available at: <https://xlsform.org/en/>

When there are topographic or logistical challenges to establishing a Base Station, a subscription for a Real-Time Network (RTN) can also be used to provide positioning correction factors to the Rover. The RTN provides real-time positioning corrections to the Rover via a cell SIM card, allowing for centimeter-level precision in location information. The RTN provides correction factors based off permanent Base Stations near the area where the survey is taking place. A RTN was used for correction factors for the Study.

2.3 Field Data Collection

2.3.1 Field Data Collection Forms

As described previously, one ODK form was primarily utilized for field data collection. This ODK form developed by DE was used to collect the flow measurement data and site conditions for each flow measurement. As described previously, the form was loaded onto a field tablet, which was used to record measurements and observations in the field during the Study.

2.3.2 Streamflow Measurement Equipment

Streamflow measurements for the Study were collected exclusively using the SonTek FlowTracker2 Acoustic Doppler Velocimeter (ADV). FlowTracker2 was selected because all measurement locations were wadable and provided suitable conditions for mid-section discharge measurements following USGS protocols (USGS 2010). At each site, field staff waded the channel using a top-setting wading rod to measure depth and velocity at multiple verticals across the transect. The number of verticals was adjusted based on channel width, flow variability, and site complexity to ensure that measured velocities and cross-section geometry were representative of actual conditions. In cases where initial transects indicated variability or inconsistency, additional verticals or repeat measurements were completed to improve measurement quality.

2.3.3 Surveying Equipment

The EMLID RTK unit was used in the field to collect water surface elevation (WSE) points at the time of the streamflow measurement, along with any other site-specific points of interest. These WSE points at the time of measurement provide a stream stage elevation relative to mean sea level that could be compared to adjacent shallow groundwater elevations.

2.4 Quality Control

2.4.1 Field Data Collection Forms

After data collection in the field and submittal via the field tablet, the data entries for each ODK Form were stored in a central database that was then paired with a custom web application called the Davids Engineering Data Portal (Data Portal). The Data Portal programmatically pulled and stored all entries from completed ODK forms held in the database via an application protocol interface (API). Through the Data Portal, the measurements and observations collected in the field were viewed, edited, or downloaded; the Data Portal includes maps to show site and submission locations, features to support data quality assurance and quality control (QA/QC), access to pictures taken and submitted via an ODK form, and customizable data graphing and visualizations. Importantly, the Data Portal was designed to include a QC flag that can be set to identify which records have been reviewed and approved from a QA/QC standpoint. It also records any and all edits made to data, including when and by whom edits to data entries were made, and includes a simple method for restoring submissions to prior states if

needed. After a QA/QC data review and approval via setting the QC flag value, the field data were ready for analysis and evaluation.

2.4.2 Streamflow Measurement Equipment

FlowTracker2 measurements were reviewed in SonTek software, with QA/QC focused primarily on verifying appropriate correction factors near channel margins and ensuring that measurement settings, velocity cells, and cross-section geometry were properly recorded; only minimal revisions to accompanying ODK forms were required. Every FlowTracker2 measurements was reviewed to ensure accuracy and consistency prior to analysis.

2.4.3 Surveying Equipment

The survey data collected in the field using the EMLID RTK unit were also reviewed for QA/QC, with corrections or adjustments as necessary, prior to their use in the final Study dataset for analysis and evaluation.

2.5 Data Analysis

Following the planning, data collection, and quality control and review described in the previous sections, this section describes the methods for the data analyses completed to calculate stream reach water budgets for the Study.

2.5.1 Stream Reach Water Budgets

A water budget quantifies all inflows to and outflows from a specific area of interest, while also accounting for change of storage within the area of interest. Based on the principle of the conservation of mass, if change in storage and all but one flow path are independently measured or estimated, the final flow path can be solved for as the closure term. The principle of the conservation of mass states that the difference between total inflows to and outflows from an area of interest for a given period of time is equivalent to the change in stored water within that accounting center. This is presented in Equation 1 below.

Equation 1. Water budget mass balance.

$$\text{Inflows} - \text{Outflows} = \text{Change in Storage } (\Delta S)$$

Each stream reach water budget required quantification of all water inflows and outflows. These included stream inflow (SI) to the reach, stream outflow (SO) from the reach, any miscellaneous surface inflows (MI) to or outflows (MO) from the reach, evapotranspiration (ET) from the reach, precipitation (P) into the reach, and net stream gains (NSG) for the reach. Each of these terms can be thought of as a flux, or rate, through the control volume (i.e., stream reach). To the greatest extent possible, the measurements and estimates comprising each water budget were performed during steady state conditions on the river and during the same day. Figure 6 depicts a typical stream reach water budget and the various possible inflows and outflows. Equation 2 represents the water budget mass balance equation for a stream reach: it shows all inflows on one side of the equation and outflows on the other; they need to be equal to each other after accounting for change in storage within the stream reach.

This page left intentionally blank.

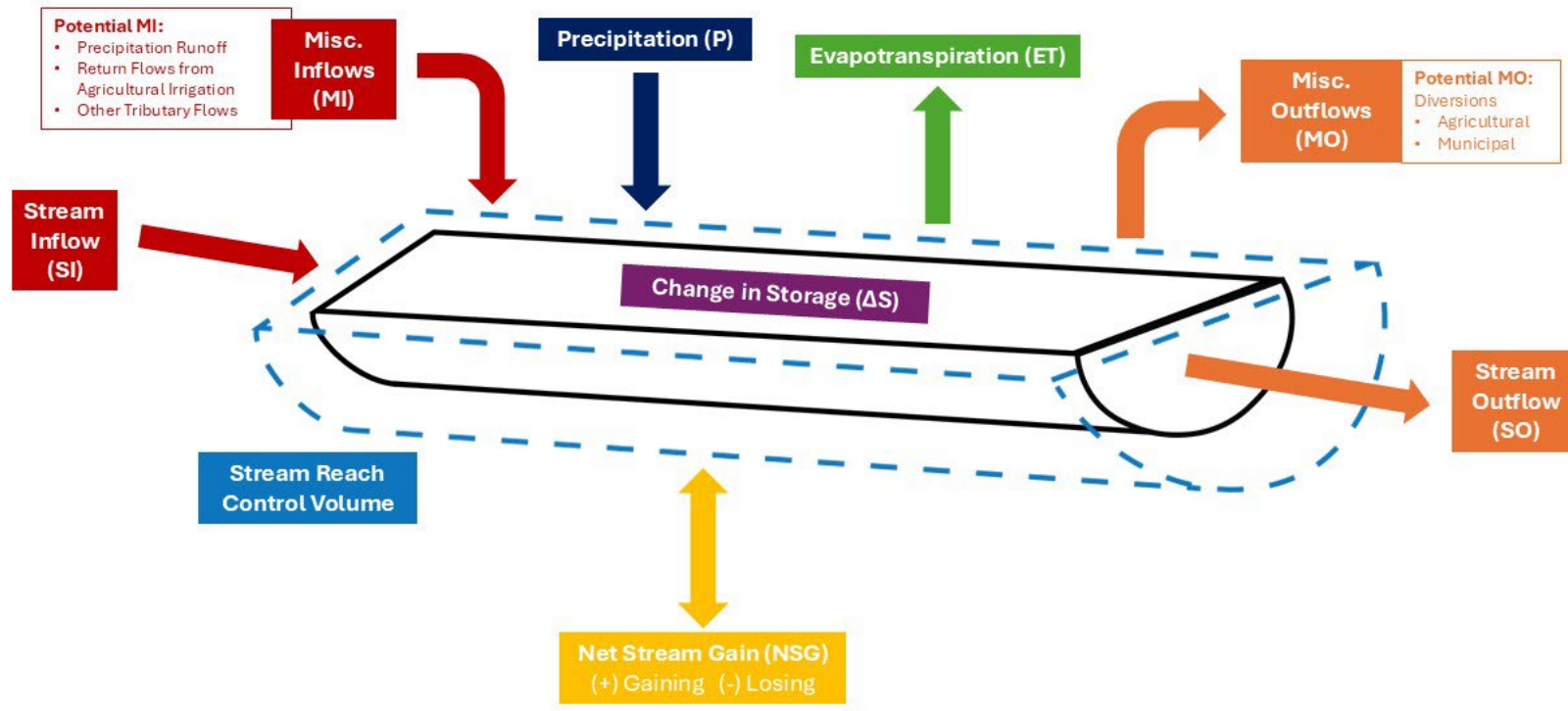


Figure 6. Stream reach water budget schematic showing all inflows to and outflows from the control volume, as well as change in storage within the control volume. After quantifying all other inflows and outflows and change in storage, net stream gain (NSG) can be solved for as the closure term.

This page left intentionally blank.

The closure term for the stream reach water budgets was net stream gain (NSG), which is impossible to practically measure through field data collection and was the primary flow path of interest for this analysis. Equation 3 is solved for NSG to determine Equation 4: After quantifying every other flow path in the stream reach water budget, NSG can be calculated to close the mass balance. For stream reach water budgets, each term was calculated as a flow rate with units of CFS.

Equation 2. Water budget mass balance for a stream reach.

$$SI + MI + P + NSG = SO + MO + ET \pm \Delta S$$

Where:

- *SI* = Surface Inflows (Flow entering the control volume from the stream)
- *MI* = Miscellaneous Inflows (Tributary inflows, pumping into control volume, etc.)
- *P* = Precipitation
- *NSG* = Net Stream Gain
- *SO* = Surface Outflows (Flow exiting the control volume from the stream)
- *MO* = Miscellaneous Outflows (Diversion and/or pumping out of the control volume, etc.)
- *ET* = Evapotranspiration (From water surface directly and adjacent riparian habitat, an outflow from the control volume)
- ΔS = Change in Storage (From changing water levels during flow measurements)

Equation 3. Stream reach water budget mass balance solved for net stream gain.

$$NSG = SO - SI + MO - MI + ET - P \pm \Delta S$$

Where: Parameters are same as defined above.

The remainder of Section 2.5.1 describes how each individual flow path was quantified, along with the associated uncertainties in the quantification of each, and finally how all the data were organized and assembled to compute the stream reach water budgets.

2.5.1.1 Quantification of Water Budget Flow Paths and Estimated Uncertainty

2.5.1.1.1 Surface Inflows and Outflows (SI and SO)

Surface inflows and outflows are the stream flows at the upstream and downstream ends of each stream reach. These were measured using the FlowTracker2 as described previously. Both SI and SO were measured on the same day for a reach, but due to travel time and other required field data collection, they weren't always measured consecutively. However, field data collection days were planned to have steady state or near steady state conditions, so any flow differences due changing conditions and the time difference between SI and SO measurements were minimized to the extent possible. The uncertainties for SI and SO flow measurements were set equal to the FlowTracker2 uncertainty value directly calculated and provided. These were used in calculations as relative uncertainties.

2.5.1.1.2 Miscellaneous Inflows and Outflows (MI and MO)

Miscellaneous inflows (MI) result from any runoff, tailwater, drainage, or tributary inflows, entering the control volume. Miscellaneous outflows (MO) result from a diversion out of the control volume (either

pumped or gravity-flow), or tributary outflows. The MI and MO flows are described in more detail below. For MI, the Little Antelope Creek tributary flowed into the upstream reach; it was only observed to be flowing during data collection on one occasion. For MO, the only identified outflow was flow down Antelope Creek downstream of the Antelope-Craig Creek split. Only during one day of data collection was there observed to be flow down Antelope Creek. On days flow occurred, the MI and MO flows described above were measured using the FlowTracker2. Overall, as described above, field data collection was carefully planned to avoid MI and MO to the extent possible, and all identified MI and MO were quantified using available data and assumptions about typical conditions.

2.5.1.1.3 Evapotranspiration (ET)

OpenET⁶ data was used to estimate evapotranspiration (ET) from stream reaches. The estimated surface extent of each stream reach from ET occurred was calculated as the average stream width measured at the upstream and downstream site, further increased by 50% of the average stream width on either bank to account for riparian vegetation, and then multiplied by the length of the stream reach to calculate a representative area. OpenET's Application Programming Interface (API) was utilized to obtain a raster dataset that with daily ET expressed in millimeters (MM) for each area at a 30-meter pixel resolution⁷. The daily ET for each pixel in the control volume was multiplied by pixel area to calculate an ET volume, and the resulting volumes were summed up for all pixels in the control volume to calculate a total volume. To convert to a flow rate, the total volume was divided by an assumed daily ET duration of eight hours. Because OpenET provides daily evapotranspiration (ET) totals, the study required a practical method for converting daily ET into an hourly flux for the reach-scale water budgets. Although actual ET varies throughout the day and generally follows a sinusoidal pattern with a mid-day peak, a full diurnal analysis was beyond the scope of this project. Therefore, an eight-hour ET duration was applied as a simplifying assumption to approximate the portion of the day during which most ET occurs. This approach provides a conservative estimate for stream-reach ET fluxes: it reflects the fact that ET is concentrated during daylight hours while also ensuring that ET is not over-represented in comparison to other components of the water budget, especially because field measurements typically occurred over a period of only up to about four hours. This simplification is commonly used in applied hydrologic studies when only daily ET data are available and when the goal is to obtain an order-of-magnitude estimate of ET losses relative to other fluxes. Relative to the other fluxes in stream reach water budgets, ET was typically very small, so this conservative estimate of including all daily ET was used. Equation 5 below is the one used to calculate the ET flux for stream reach water budgets.

Equation 4. ET Flux Equation

$$ET\ flux = \frac{OpenET\ depth * w * l}{t}$$

Where:

- *ET flux* = evapotranspiration flux from the stream reach (CFS)
- *OpenET depth* = evapotranspiration depth provided by OpenET in MM (converted to FT)
- *w* = average stream width based on the upstream and downstream measurement width, then increased by 50% of the stream width on either bank to account for riparian vegetation

⁶ OpenET provides satellite-based spatially explicit ET data for the Continental United States. More information, including data access, is available at: <https://etdata.org>

⁷ A 30-meter pixel resolution means that the raster is comprised of 30 meter by 30 meter squares (pixels), with each pixel representing approximately 0.22 acres (AC).

- l = stream length between the upstream and downstream measurement locations
- t = period of time during which ET occurs in a day. Eight hours (28,800 seconds) was used as a conservative estimate, since field data collection typically took place over a period of up to about four hours.

Regarding uncertainty in estimating ET, there are multiple sources of uncertainty including the estimated area over which ET occurs (stream reach width and length), the ET value itself, and the time over which ET occurs. An assumed 20% relative uncertainty was used for the calculation of stream width (based on average measured stream width and expanded area for riparian vegetation). An assumed 5% relative uncertainty was used for stream length, since upstream and downstream ends of the reach are more precisely located. A 39.8% relative uncertainty was assumed for the ET depth based upon the mean of the mean absolute error for grasslands (45.1%), mixed forests (39.6%), and wetlands (34.7%) in OpenET's evaluation of accuracy at a daily timestep (OpenET, 2021). Since all daily ET was used as a conservative estimate (as described above), no relative uncertainty related to time duration of ET was used.

2.5.1.1.4 Precipitation (P)

The timing of data collection was targeted, to the extent possible, to not occur during precipitation events. This planning successfully avoided data collection for stream reach water budgets during precipitation events, so direct precipitation inflows were equal to zero and did not need to be accounted for in the stream reach water budgets.

If precipitation had occurred during field data collection, it would have been quantified using a similar approach to ET where a representative area over which precipitation occurred would have been calculated and a precipitation raster dataset⁸ would be used to quantify precipitation within this area. Uncertainty also would have been calculated similarly.

2.5.1.1.5 Change in Storage

The timing of data collection was also targeted, to the extent possible, to occur during steady state conditions so that flows and change in storage within the stream reach targeted for data collection are not changing over the course of data collection. This goal minimized potential change in storage within each stream reach during data collection, but change in storage still needed to be estimated due to the dynamic nature of natural streams and systems and perfectly steady state conditions being unattainable.

The assumption used to estimate the change in storage (ΔS) relies on water-level data from the nearest available stream gage, even when the gage is located upstream or downstream of the specific study reach. This simplification was necessary because no continuous stage data were available within most reaches themselves. However, the magnitude of stage change over the short duration of synoptic measurements—typically about two to four hours—is generally very small relative to the overall water budget, and therefore the influence of this assumption on calculated ΔS is minimal. In other words, even though water-level fluctuations at a nearby gage may not perfectly represent the exact change at the

⁸ The precipitation raster dataset used would have likely been the Parameter-elevation Regressions on Independent Slopes Model (PRISM) dataset, developed for the contiguous United States and available from Oregon State University. More information on PRISM (including data access) is available at: <https://prism.oregonstate.edu>

measurement reach, the expected error introduced is negligible compared with the scale of the other fluxes being quantified (e.g., stream inflow and outflow). The purpose of including ΔS is to maintain a complete mass balance, while recognizing that its contribution is minor and that this simplification reflects the data limitations present during the study.

Change in storage was estimated by first calculating the surface area of the stream reach available to store water; this was calculated as the average width of the upstream and downstream measurement locations at either end of the stream reach multiplied by the length of the stream reach between measurement locations. The next step was to account for changes in water level within the stream reach that would result in a change in storage over the period of data collection. This was determined using water level data from the nearest permanent stream gage on the same stream as the stream reach for which data were being collected. If the stream gage was not located within the stream reach of interest, but was either directly upstream or downstream from the stream reach along the same stream, then the water level changes in that location were used as a proxy for the stream reach. The change in water level was then multiplied by the surface area to calculate a total volume change, and divided by the time between the upstream and downstream flow measurements to convert this to a volumetric flow rate, or flux. Equation 5 below, as described above, was used to calculate the change in storage flux for stream reach water budgets.

Equation 5. Change in Storage Flux Equation

$$\Delta S = \frac{\Delta h * w * l}{t}$$

Where:

- ΔS = change in storage (CFS)
- Δh = change in water level height from a stream gage
- w = average stream width based on the upstream and downstream measurement width
- l = stream length between the upstream and downstream measurement location
- t = time in between the upstream and downstream measurement

Regarding uncertainty in estimating change in storage, similar to ET, there are multiple sources of uncertainty for change in storage including estimated surface area for the reach (average stream reach width and reach length), the change in water level, and the time over which changes in water level occur. A 0.02 FT absolute uncertainty was assumed for the change in water level height detected by the stream gages; this accounts for a 0.01 FT uncertainty each for the starting and ending measurement of water level. Since the average width at the upstream and downstream location was averaged and used across the entire stream length, a 20% relative uncertainty was assumed for the width. An assumed 5% relative uncertainty was used for stream length, since upstream and downstream ends of the reach are more precisely located. Finally, a two-minute absolute uncertainty was used for the time component since the timing of flow measurements was tracked and reported on a one-minute timestep.

2.5.1.1.6 Net Stream Gain (NSG)

As described above and defined in Equation 3, Net Stream Gain (NSG) was calculated as the closure term of the stream reach water budgets after independently measuring or estimating every other flow path in the water budgets, as described in subsections above. The stream reach water budgets were designed

to solve for this flow path, since it is critical to understand to manage DISW under SGMA and an impossible flow path to directly measure.

The uncertainty in quantifying NSG as the closure term of the water budget is influenced by the uncertainty in measuring or estimating every other flow path in the water budget. If the quantification of every other flow path had relatively lower uncertainty, this relatively lower uncertainty would propagate through and result in a relatively lower uncertainty in NSG compared to if every other flow path had relatively higher uncertainty. The law of the propagation of uncertainties (NIST, 1994) was utilized to calculate the uncertainty in the quantification of NSG. Equation 6 below depicts the equation to calculate uncertainty for an unmeasured parameter y based on the uncertainties associated with related parameters x_i through x_N . In Equation 6, the contributing parameters for the second (covariance) term are assumed to be statistically independent, resulting in covariance between any pair of variables x_i and x_j equal to zero; the uncertainty can then be expressed solely as the sum of the individual variance terms. Equation 7 depicts this equation for NSG based on the uncertainties of every other flow path within the stream reach water budgets. NSG is defined as a linear combination of contributing flow components, each with a unit coefficient. As a result, the partial derivative of NSG with respect to each component equals one, resulting in removal of the derivative terms and leaving the total NSG uncertainty as the sum of the individual component variances.

Equation 6. Law of propagation of uncertainties (NIST, 1994).

$$u_c^2(y) = \sum_{i=1}^N \left(\frac{\partial f}{\partial x_i} \right)^2 u^2(x_i) + 2 \sum_{i=1}^{N-1} \sum_{j=i+1}^N \frac{\partial f}{\partial x_i} \frac{\partial f}{\partial x_j} u(x_i, x_j)$$

Equation 7. Calculation of uncertainty in Net Stream Gain (NSG) based on law of propagation of uncertainties (NIST, 1994).

$$u_{NSG}^2 = u_{SI}^2 + u_{SO}^2 + u_{MI}^2 + u_{MO}^2 + u_{ET}^2 + u_P^2 + u_{\Delta S}^2$$

2.5.2 Data Processing

In order to review, QA/QC, process, and organize the data required for stream reach water budgets, a number of automated python scripting processes were developed and utilized in coordination with manual data review and organization to produce water budget results. SI, SO, MI, and MO were processed and organized as described in the sections above for each measurement day and reach. Separate python scripts were created to estimate ET and change in storage for each measurement day and reach. After all input data for stream reach water budgets were organized and available, a final python script was developed to combine all stream reach water budget components, calculate NSG, and calculate the uncertainties associated with each flow path. The python scripts were also developed to create data summaries and visualizations that are included in the following Results and Discussion section.

3 Results and Discussion

3.1 Overview and Summary of Streamflow Measurements

Synoptic stream gaging was completed at three primary measurement locations—ANCK01 (Antelope Creek at Cone Grove Park), CRCK01 (Craig Creek at Craig Avenue), and CRCKSR (Craig Creek near the Sacramento River)—to develop stream-reach water budgets and quantify Net Stream Gains (NSG). Three synoptic stream gaging measurement events were conducted on September 10, 2025; October 2, 2025; and December 2, 2025, under steady-state or near-steady-state hydraulic conditions. Measurement dates were selected to span early fall baseflow, mid-fall post-storm conditions, and early winter transition flows. This provides a preliminary evaluation of temporal variability in stream–aquifer interactions across different hydrologic conditions, although greater variability in hydrologic conditions is expected throughout the water year and over different water year types.

In addition to discharge measurements, water surface elevations were recorded at each streamflow measurement site to provide spatial and temporal context for streamflow conditions along the Study reaches. While shallow groundwater measurements were not collected as part of this study, these water surface elevation data could be paired in future work with groundwater elevations in nearby shallow monitoring wells to evaluate and improve understanding surface water–groundwater connectivity. When combined, stream stage and shallow groundwater elevations could also be used to calculate hydraulic gradients, distinguish gaining and losing reaches, assess the degree of hydraulic connection between surface channels and the shallow aquifer, and compare to stream reach water budget results. As such, the water surface elevation data presented here provide complementary information to the synoptic discharge measurements.

Table 2 summarizes measured discharges, uncertainties, and water surface elevations for all streamflow measurement sites and dates. Flow magnitudes varied seasonally, with the lowest flows observed in September and the highest flows in December. Relative uncertainties remained low (generally <5%), indicating that the FlowTracker2 measurements provided high-quality quantified data for stream-reach water budgets.

The Little Antelope Creek Upstream from Antelope Creek (LTANCK) and Antelope Creek Downstream from Craig Creek Split (ANCRCK) are sites representing a miscellaneous inflow to and miscellaneous outflow from the reach ANCK01 to CRCK01. As the Little Antelope Creek channel exits the foothills and enters the valley floor, it appears braided and there may be multiple confluence points with Antelope Creek, depending on hydrologic conditions. Only one confluence point was observed to have flow and measured during the Study. Additionally, as described below, the Antelope-Craig Creek split is not well understood, including points of connection and under what flow conditions water proceeds down each of the respective creek channels. However, it is understood that, under the relatively low flow measured conditions in the Study and as directly observed in the field, Antelope Creek loses most or all of its flow at the split.

Table 2. Flow measurements in Antelope Subbasin during Study. Site LTANCK, Little Antelope Creek Upstream from Antelope Creek, represents a miscellaneous inflow to reach ANCK01 to CRCK01, and ANCRCK, Antelope Creek Downstream from Craig Creek Split represents a miscellaneous outflow from the reach. Elevations represent water surface elevations at the time of the flow measurement in feet above mean sea level (FT AMSL) in the North American Vertical Datum of 1988 (NAVD 88).

Site ID	Site Name	Date	Flow (CFS)	Uncertainty (%)	Water Surface Elevation (FT AMSL) (NAVD 88)
ANCK01	Antelope Creek at Cone Grove Park	2025-09-10	12.3	4.6%	272.97
CRCK01	Craig Creek at Craig Ave.	2025-09-10	12.7	3.0%	254.14
CRCKSR	Craig Creek upstream from Sacramento River	2025-09-10	9.1	4.9%	229.21
ANCK01	Antelope Creek at Cone Grove Park	2025-10-02	21.2	3.6%	272.28
CRCK01	Craig Creek at Craig Ave.	2025-10-02	25.6	1.8%	254.37
CRCKSR	Craig Creek upstream from Sacramento River	2025-10-02	27.3	4.2%	229.04
ANCRCK	Antelope Creek Downstream from Craig Creek Split	2025-12-02	5.1	4.1%	260.53
LTANCK	Little Antelope Creek Upstream from Antelope Creek	2025-12-02	5.2	4.3%	296.99
ANCK01	Antelope Creek at Cone Grove Park	2025-12-02	49.5	2.7%	272.89
CRCK01	Craig Creek at Craig Ave.	2025-12-02	50.0	2.3%	255.26
CRCKSR	Craig Creek upstream from Sacramento River	2025-12-02	46.0	4.2%	229.54

3.2 Antelope–Craig Creek Split

During preliminary planning and field reconnaissance, we observed an important geomorphic and hydrologic condition at the bifurcation point where Antelope Creek divides into Antelope Creek and Craig Creek. A review of recent satellite imagery in Google Earth suggested that Antelope Creek becomes dry downstream of the bifurcation point under low-to-moderate flow conditions, with all observable surface flow routing down Craig Creek as seen in Figure 5.

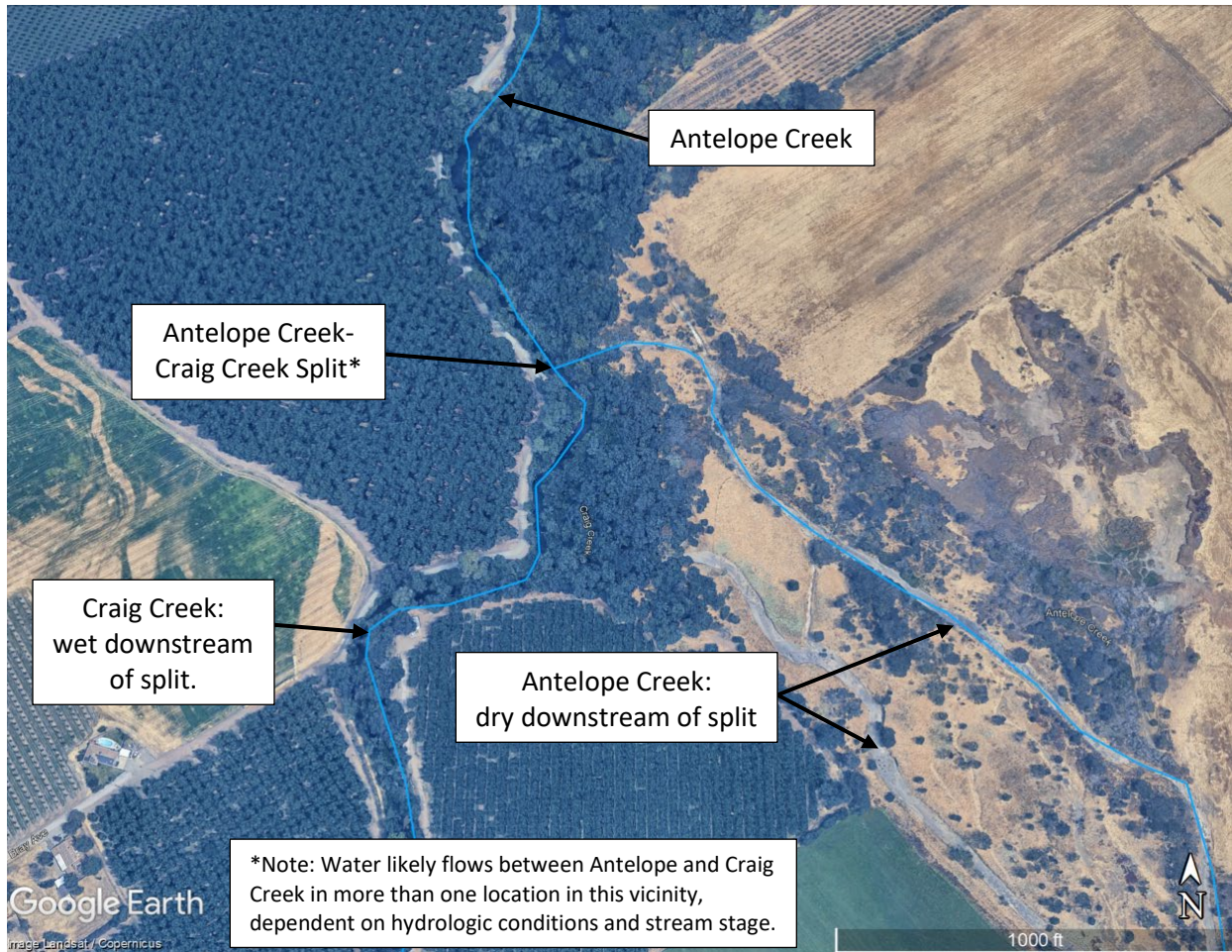


Figure 7. Satellite imagery in Google Earth from July of 2024 show Antelope Creek dry and Craig Creek wet below Antelope-Craig Creek Split. These conditions were also observed in the field during the Study.

This observation from imagery was confirmed during two of the three measurement events as seen in Figure 8. The dry channel downstream of the split represents a previously undocumented condition in the Antelope Subbasin GSP and has implications for both ISW delineations and Tehama IHM representation. During measurements on December 2nd, 2025, it was observed that the Antelope Creek was no longer dry downstream of Antelope-Craig Creek split, which represents a miscellaneous outflow from the reach from ANCK01 to CRCK01 as seen in Figure 9.



Figure 8. Dry Antelope Creek streambed observed 0.5 miles (Lat. 40.15542, Long. -122.12913) downstream of Antelope-Craig Creek split on September 3rd, 2025.

Since Craig Creek becomes the dominant surface water conveyance downstream of the split, ISW characterization and stream depletion analyses should explicitly include Craig Creek rather than relying solely on Antelope Creek. It would also be beneficial to improve understanding of the Antelope-Craig Creek split, including locations where flow between channels occurs and at what stream stage and flow conditions flow moves between Antelope and Craig Creeks and what the flow division between the two stream channels is. This may also be a dynamic relationship with the channel geometries, points of connection, and other influencing factors changing over time.



Figure 9. Antelope Creek 0.5 miles downstream of the Antelope-Craig Creek split was observed to be no longer dry on December 2nd, 2025. Measurements were taken of streamflow in the creek to characterize miscellaneous outflows from the Study stream reach. It would be worthwhile to identify the flow rates in Antelope Creek upstream that result in flow in Antelope Creek downstream of Antelope-Craig Creek split.

3.3 Stream Reach Water Budget Results

This section describes the results of the stream reach water budgets within the Study area. The results of the upstream and downstream reach water budgets can be seen in Figure 10, along with a map depicting the extent of each reach.

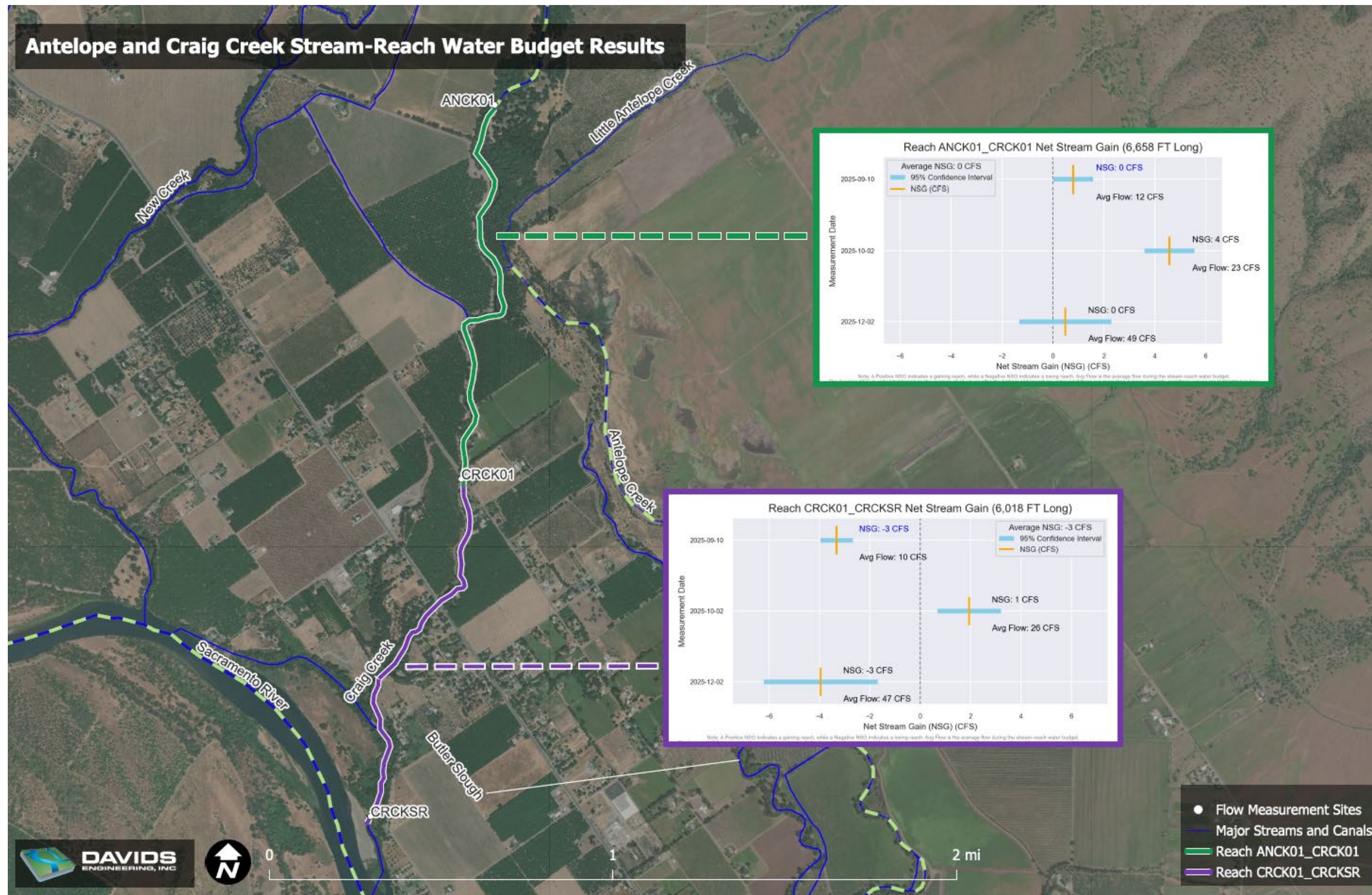


Figure 10. Stream reach water budget results for Antelope Creek and Craig Creek, showing Net Stream Gain (NSG) estimates for the ANCK01–CRCK01 and CRCK01–CRCKSR reaches. Each panel displays NSG values and associated uncertainties for the three 2025 synoptic gaging events, illustrating spatial and temporal variability in stream–aquifer interactions. The upstream reach (ANCK01–CRCK01) exhibits consistently gaining conditions, whereas the downstream reach (CRCK01–CRCKSR) alternates between gaining and losing behavior.

This page left intentionally blank.

3.3.1 Upstream Reach: ANCK01 to CRCK01

The NSG results indicate that the upstream reach consistently functioned as a gaining reach during the study period as seen in Table 3. Apart from direct stream inflows and outflows, other inflows and outflows to this reach were small during days of monitoring. ET was estimated as a small outflow, and during the monitoring day in December, there were roughly equivalent miscellaneous inflows to the reach from Little Antelope Creek and outflows from the reach to Antelope Creek that were measured. NSG values were +0.8 CFS (September), +4.6 CFS (October), and +0.5 CFS (December). These empirical findings generally align with the Tehama IHM, which classifies certain Antelope Creek segments as gaining. However, the magnitude of NSG calculated during the Study suggests that portions of the groundwater model may underestimate stream–aquifer exchange rates.

3.3.2 Downstream Reach: CRCK01 to CRCKSR

The downstream reach exhibited alternating gaining and losing behavior as seen in Table 4: –3.3 CFS in September, +1.9 CFS in October, and –4.0 CFS in December. Similar to the upstream reach, apart from direct stream inflows and outflows, other inflows and outflows to this reach were small during days of monitoring. The variability observed indicates that Craig Creek may be more hydrologically dynamic—and less predictable—than the upstream reach and than the representation of Antelope Creek in the current GSP or the Tehama IHM. The gaining condition observed in October may be representative of contributions of either water within the unsaturated zone or shallow groundwater following recent rainfall, or unidentified and unmeasured surface inflows to the reach through stormwater conveyance systems and small tributary inflows. The potential for surface inflows or short-term stream gains may be possible even when rainfall totals and potential runoff or subsurface flow are modest. Losing conditions measured in September and December may reflect downward hydraulic gradients away from Craig Creek toward the adjacent shallow groundwater systems or localized high-conductivity streambed zones. These findings, especially the dynamic gaining and losing conditions, highlight Craig Creek as a significant data gap in the Antelope Subbasin GSP. Given that Craig Creek conveys the entirety of Antelope Creek’s flow under all low to moderate flow conditions, failure to include Craig Creek in ISW analyses is a data gap that may lead to mischaracterization of DISW.

3.3.3 Combined Reach: ANCK01 to CRCKSR

The combined reach exhibited substantial temporal variability in Net Stream Gain as seen in Table 5. On September 10, the reach showed a losing condition (NSG = –2.5 CFS), suggesting seepage losses to groundwater or unmeasured outflows. On October 2, the reach switched to a gaining condition (NSG = +6.5 CFS), potentially reflecting storm-related increases in groundwater gradients or small surface inflows. By December 2, the reach returned to a losing condition (NSG = –3.5 CFS). This shows that the stream–aquifer interactions in the downstream reach are larger than the upstream reach and drive overall gains and losses for the combined reach. The average NSG value across all three events was approximately +0.17 CFS, indicating a slight net gain overall, but this average masks large temporal fluctuations that correspond with shifts in hydrologic conditions. These results emphasize that the combined reach is not consistently gaining or losing; instead, it responds dynamically to hydrologic influences, likely including antecedent precipitation, streambed heterogeneity, overall stream flows, and seasonal groundwater levels and gradients.

Table 3. Stream reach water budget components for the upstream ANCK01–CRCK01 reach across the three 2025 synoptic gaging events. Consistently positive Net Stream Gain (NSG) values (+0.8 to +4.6 CFS) indicate persistent gaining conditions, providing empirical evidence of groundwater discharge to Antelope Creek during the days of monitoring. These observations generally align with the Tehama IHM but suggest the model may underestimate the magnitude of stream–aquifer exchange in this reach, with implications for ISW characterization under SGMA.

Reach ID	Date	Flowpath	Description	Value (CFS)	Uncertainty (CFS)
ANCK01_CRCK01	2025-09-10	P	inflow	0.0	±0.0
		SI	inflow	12.3	±0.6
		MI	inflow	0.0	±0.0
		NSG	inflow	0.8	±0.8
		ET	outflow	-0.4	±0.2
		SO	outflow	-12.7	±0.4
		MO	outflow	-0.0	±0.0
		ΔS	storage	-0.0	±0.3
		Total	balance	0	
ANCK01_CRCK01	2025-10-02	P	inflow	0.0	±0.0
		SI	inflow	21.2	±0.8
		MI	inflow	0.0	±0.0
		NSG	inflow	4.6	±1.0
		ET	outflow	-0.2	±0.1
		SO	outflow	-25.6	±0.5
		MO	outflow	-0.0	±0.0
		ΔS	storage	-0.0	±0.4
		Total	balance	0	
ANCK01_CRCK01	2025-12-02	P	inflow	0.0	±0.0
		SI	inflow	49.5	±1.4
		MI	inflow	5.2	±0.2
		NSG	inflow	0.5	±1.8
		ET	outflow	-0.1	±0.0
		SO	outflow	-50.0	±1.1
		MO	outflow	-5.1	±0.2
		ΔS	storage	-0.0	±0.2
		Total	balance	0	

Table 4. Stream reach water budget components for the downstream CRCK01–CRCKSR reach across the three 2025 synoptic gaging events. NSG values alternate between losing (–3.3 CFS) in September, gaining (+1.9 CFS) in October, and losing (–4.0 CFS) in December, reflecting a seasonally responsive hydrologic system and dynamic stream-aquifer interactions. The variability is likely influenced from rainfall-driven runoff and subsurface movement towards streams, groundwater levels and gradients, and localized streambed heterogeneity. These findings highlight Craig Creek as a critical, previously unrepresented ISW feature in the Antelope Subbasin GSP and Tehama IHM.

Reach ID	Date	Flowpath	Description	Value (CFS)	Uncertainty (CFS)
CRCK01_CRCKSR	2025-09-10	P	inflow	0.0	±0.0
		SI	inflow	12.7	±0.4
		MI	inflow	0.0	±0.0
		NSG	inflow	-3.3	±0.6
		ET	outflow	-0.3	±0.2
		SO	outflow	-9.1	±0.4
		MO	outflow	-0.0	±0.0
		ΔS	storage	-0.0	±0.2
		Total	balance	0	
CRCK01_CRCKSR	2025-10-02	P	inflow	0.0	±0.0
		SI	inflow	25.6	±0.5
		MI	inflow	0.0	±0.0
		NSG	inflow	1.9	±1.3
		ET	outflow	-0.2	±0.1
		SO	outflow	-27.3	±1.2
		MO	outflow	-0.0	±0.0
		ΔS	storage	-0.0	±0.2
		Total	balance	0	
CRCK01_CRCKSR	2025-12-02	P	inflow	0.0	±0.0
		SI	inflow	50.0	±1.1
		MI	inflow	0.0	±0.0
		NSG	inflow	-4.0	±2.3
		ET	outflow	-0.1	±0.0
		SO	outflow	-46.0	±1.9
		MO	outflow	-0.0	±0.0
		ΔS	storage	-0.0	±0.4
		Total	balance	0	

Table 5. Stream reach water budget components for the combined ANCK01–CRCKSR reach across the three 2025 synoptic gaging events. The table shows substantial temporal variability in Net Stream Gain (NSG)—from losing (–2.5 CFS) in September, to gaining (+6.5 CFS) in October, and back to losing (–3.5 CFS) in December—highlighting dynamic stream–aquifer interactions influenced by factors including seasonal groundwater gradients, antecedent precipitation, and localized streambed conditions. These results underscore the importance of multi-season monitoring to characterize temporal variability in ISW behavior and provide valuable information for review and potential refinement of the Tehama IHM.

Reach ID	Date	Flowpath	Description	Value (CFS)	Uncertainty (CFS)
ANCK01_CRCKSR	2025-09-10	P	inflow	0.0	±0.0
		SI	inflow	12.3	±1.0
		MI	inflow	0.0	±0.0
		NSG	inflow	-2.5	±1.0
		ET	outflow	-0.7	±0.0
		SO	outflow	-9.1	±0.0
		MO	outflow	-0.0	±0.0
		ΔS	storage	-0.0	±0.0
		Total	balance	0	
ANCK01_CRCKSR	2025-10-02	P	inflow	0.0	±0.0
		SI	inflow	21.2	±1.0
		MI	inflow	0.0	±0.0
		NSG	inflow	6.5	±1.0
		ET	outflow	-0.4	±0.0
		SO	outflow	-27.3	±1.0
		MO	outflow	-0.0	±0.0
		ΔS	storage	-0.0	±0.0
		Total	balance	0	
ANCK01_CRCKSR	2025-12-02	P	inflow	0.0	±0.0
		SI	inflow	49.5	±1.4
		MI	inflow	5.2	±0.2
		NSG	inflow	-3.5	±2.4
		ET	outflow	-0.2	±0.1
		SO	outflow	-46.0	±1.9
		MO	outflow	-5.1	±0.2
		ΔS	storage	-0.0	±0.4
		Total	balance	0	

3.4 Implications for ISW Characterization

Across all reaches, NSG patterns reveal a system with substantial spatial and temporal variability. Based on Study results, Antelope Creek upstream of the split appears to be a consistently gaining reach. In contrast, based on Study results, Craig Creek transitions between gaining and losing conditions, depending on season and antecedent hydrologic conditions. These dynamics are directly impacted by adjacent shallow groundwater levels (which define the hydraulic gradient through these reaches) and other factors described previously, and they directly affect where and when pumping-induced depletions of interconnected surface water might occur.

The results underscore the need for: (1) inclusion of Craig Creek in the Tehama IHM, (2) expanded field monitoring beyond baseflow conditions, and (3) improved ISW delineations that reflect the observed dry-reach behavior of Antelope Creek during most flow regimes. These, along with other recommendations, are described in more detail in the section below.

4 Recommendations

The recommendations stemming from the Study include recommendations within three different categories, as outlined in subsections below. These include recommendations for immediate review and potential refinement of the Tehama IHM, for additional field monitoring similar to that done in the Study to further improve understanding of ISW in the Antelope Subbasin, and for expansion of the scale and scope of ISW field monitoring not only for the Antelope Subbasin, but for the broader Sacramento Valley region.

4.1 Review and Refinement of Tehama IHM

4.1.1 Refine ISW delineations to include Craig Creek

Field observations and synoptic flow measurements confirm that Antelope Creek becomes dry immediately downstream of its split with Craig Creek under low- to moderate-flow conditions. During two of three synoptic measurements, surface flow from Antelope Creek was observed to route entirely into Craig Creek, leaving the Antelope Creek channel dry for a substantial distance downstream of the bifurcation. This condition is not currently represented in the Tehama IHM, which assumes continuous surface water conveyance along Antelope Creek.

Because Craig Creek conveys all surface water beyond the split under most hydrologic conditions, it should be explicitly incorporated as a modeled stream reach in the next refinement of the Tehama IHM. Inclusion of Craig Creek would allow the model to more accurately characterize stream–aquifer exchanges, simulate depletion impacts, and support development of Sustainable Management Criteria (SMCs) for ISW. The configuration and modeled conditions in Antelope Creek should also be edited to represent the bifurcation of flow between Antelope and Craig Creek, with all flow continuing down Craig Creek under low- to moderate-flow conditions.

4.1.2 Review water budget results against model characterization of ISW

The streamflow measurements and stream reach water budgets can also be used as reference points for comparison to model results from the Tehama IHM for that specific period of time or a historical time under similar hydrologic conditions to evaluate and, depending on the outcome of the evaluation and

other factors, potentially refine model results. This is recommended based on Study results, although results are limited and additional field data collection would be beneficial, as outlined in the following sections.

4.2 Enhancements to Support ISW Characterization

The Study only includes a limited dataset on ISW (three days of stream reach water budget results for two stream reaches), and the sections below highlight opportunities for additional field data collection related to stream reach water budgets to improve understanding and characterization of ISW.

4.2.1 Additional stream gages and measurements to characterize ISW

At present, only one permanent stream gage exists within the Antelope Subbasin—the Antelope Creek gage located upstream of the diversion dam⁹. This single stream gage limits the ability of the GSA and stakeholders to evaluate temporal and spatial variability in surface water availability, characterize gaining versus losing reaches, and identify potential depletion impacts. Expansion of the stream gage network would provide valuable additional information for ISW and related SGMA requirements and address the DWR recommendation to expand the Antelope Subbasin monitoring network.

LSCE has installed several shallow monitoring wells as part of ongoing groundwater monitoring improvements. These wells will provide valuable groundwater elevation (GWE) data, but additional surface water measurements of stage are needed to link water surface elevation (WSE) to groundwater levels. Doing so will improve the GSA understanding of when and where surface water is hydraulically connected to shallow groundwater and allow for calculation of a hydraulic gradient between streams and adjacent shallow groundwater.

Accordingly, we recommend the installation of additional stream gages collocated with shallow monitoring wells. These gages—combined with expanded seasonal discharge measurements—will enable quantification of WSE–GWE gradients and improve understanding of the timing, magnitude, and spatial extent of ISW connectivity across the subbasin. These gages could be installed along Antelope, Craig, and Little Antelope Creek and other potential ISW streams in the subbasin.

4.2.2 Additional measurements to characterize flows of tailwater into Antelope Creek

Antelope Creek downstream of the bifurcation with Craig Creek does receive tailwater inflows from upgradient agricultural operations. These inputs contribute measurable surface flow even when natural creek inflow is absent. Presently, the magnitude, timing, and recurrence of these tailwater contributions are not well characterized. We recommend conducting targeted field measurements during the irrigation season to:

1. Quantify flow of tailwater inflows to Antelope Creek
2. Map locations of tailwater inflows and extent of surface flow downstream in Antelope Creek
3. Measure water quality and timing of tailwater deliveries
4. Evaluate whether tailwater contributions influence stream–aquifer exchanges

⁹ The permanent stream gage is CDEC Station ATC, with data available online at: https://cdec.water.ca.gov/dynamicapp/staMeta?station_id=ATC

Characterizing these flows will help the GSA distinguish natural hydrologic signals from irrigation-related influences and improve the representation of surface water inputs in the Tehama IHM.

4.2.3 Installation of water level sensor to determine periods where water does flow down Antelope Creek

To better define when Antelope Creek carries surface flow below the split with Craig Creek—and when it becomes hydraulically disconnected—we recommend installing continuous water-level sensors (pressure transducers) at one or more locations along the dry-reach segment of Antelope Creek. These sensors will allow the GSA to:

1. Identify the onset and cessation of flow during storm events
2. Quantify the duration and frequency of intermittent surface water connectivity
3. Differentiate natural flow events from tailwater discharge
4. Support improved ISW delineation and stream depletion analysis

The installation of sensors could potentially be combined with streamflow measurements (either spot discharge measurements, as performed in this Study, or stream gages, as recommended above) to better understand the division of flows between Antelope and Craig Creeks below the split. Incorporating these observations into future GSP updates and IHM refinements will substantially improve the accuracy of stream-aquifer interaction modeling and strengthen the defensibility of ISW-related SMCs.

4.3 Expansion of Scale and Scope ISW Field Monitoring

In addition to the recommendations above focused specifically on review and potential refinement of the Tehama IHM and additional stream-related field data collection and monitoring in the Antelope Subbasin, the Study also results in recommendations for expansion of both the scale and scope of ISW monitoring and analyses for both the Antelope Subbasin and the broader Sacramento Valley region. These recommendations are presented below, and can be pursued and implemented, dependent on GSA and DWR priorities and available funding and implementation opportunities.

4.3.1 Expansion of Scale of ISW Field Monitoring

As described previously, this initial synoptic stream gaging effort was focused in scope on quantifying stream-aquifer exchanges through stream reach water budgets and was limited in scale to Antelope and Craig Creeks with only three measurement sites and two reaches identified and included in the Study. Opportunities to expand the scale of this synoptic stream gaging and stream reach water budget approach include:

1. Additional measurement sites and stream reaches along Antelope Creek
2. Additional measurement sites along other potential ISW streams flowing across the subbasin (e.g. New Creek, Salt Creek, East Sand Slough)
3. Additional measurement sites and stream reaches along the Sacramento River, which forms the western boundary of the Antelope Subbasin and is a surface water feature of regional importance.

The first two items listed above would be supported by implementation of the recommendations described in Section 4.2.

4.3.2 Expansion of Scope of ISW Field Monitoring

The scope of field monitoring and subsequent analyses could also be expanded to improve understanding of ISW and DISW, refine modeling through the Tehama IHM, and improve SGMA implementation and support groundwater sustainability. These expansion opportunities include both an expansion of the current Study to include additional related field data collection to improve characterization of ISW within the Tehama IHM and incorporation of new field data collection efforts and datasets to inform understanding of ISW and potential refinement of the Tehama IHM.

As noted previously, the current Study provides data limited both spatially and temporally, and continued data collection would increase understanding of ISW on these streams. Additionally, the field data collection could be expanded to include:

1. Surveying stream cross-sections to better understanding and improve simulation of stream stage-wetted perimeter relationships in the Tehama IHM, which defines the extent of connection and area of stream-aquifer interaction.
2. Collecting stream stage and flow measurements across the full range of hydrologic conditions to better understand stage-discharge relationship along ISW streams, which are also included within the Tehama IHM.
3. Evaluation of stream reach water budgets against Tehama IHM results, as recommended above, and potentially using stream reach water budget results for NSG to calibrate streambed conductivities in the Tehama IHM to more closely align with data measured in the field.

New field data collection efforts that could undertaken to improve understanding of ISW and potential refinement of the Tehama IHM include:

1. Measurement of stream stage and adjacent shallow groundwater levels to evaluate potential hydraulic connections between groundwater and surface water over space and time and to calculate hydraulic gradients (this recommendation was also previously described in Section 4.2).
2. Water sampling and testing for stable isotopes and radon to evaluate water source and gaining or losing conditions within streams.
3. Biological surveys along streams to evaluate presence of groundwater dependent ecosystems (GDEs) and location of GDEs along riparian corridors as an independent evaluation of where ISW may be present within the subbasin.

Overall, the implementation in part or whole of the recommendations above will improve the understanding of ISW and characterization of ISW in the Tehama IHM, which will in turn improve modeling of different conditions within the subbasin and management to prevent DISW.

5 References

California Department of Water Resources (DWR), 2024a. Guidance on Interconnected Surface Water Paper 1: Depletions of ISW: An Introduction. Draft Published February 2024.

https://data.cnra.ca.gov/dataset/.../depletionsofisw_paper1_intro_draft.pdf

California Department of Water Resources (DWR), 2024b. Guidance on Interconnected Surface Water Paper 2: Techniques for Estimating ISW Depletion Caused by Groundwater Use. Draft Published September 2024. https://data.cnra.ca.gov/dataset/.../depletionsofisw_paper2_techniques_draft.pdf

California Department of Water Resources (DWR), 2024c. Guidance on Interconnected Surface Water Paper 3: Examples for Estimating ISW Depletion Caused by Groundwater Use. Draft Published September 2024. https://data.cnra.ca.gov/dataset/.../depletionsofisw_paper3_examples_draft.pdf

California Department of Water Resources (DWR), 2025. Statement of Findings Regarding the Approval of the Sacramento Valley – Antelope Subbasin 2024 Groundwater Sustainability Plan.

<https://sgma.water.ca.gov/portal/gsp/assessments/134>

EMLID, 2026. ELIMD Reach RS3 Datasheet. Available online at:

<https://docs.emlid.com/reachrs3/specifications/specs/>, accessed in March 2026.

National Institute of Science and Technology (NIST) Technical Note 1297: Guidelines for Evaluating and Expressing the Uncertainty of NIST Measurement Results. 1994.

<https://www.nist.gov/pml/nist-technical-note-1297>

See Appendix A. Law of Propagation of Uncertainty. Accessed on 06/25/2025.

<https://www.nist.gov/pml/nist-technical-note-1297/nist-tn-1297-appendix-law-propagation-uncertainty>

OpenET. 2021. Intercomparison and Accuracy Assessment Report.

<https://etdata.org/wp-content/uploads/2021/10/Intercomparison-and-Accuracy-Assessment-Report.pdf>

Tehama County Flood Control and Water Conservation District (TCFCWCD), 2022. Groundwater Sustainability Plan.

<https://sgma.water.ca.gov/portal/service/gspdocument/download/8072?saveas=GSP%202022.pdf>

Tehama County Flood Control and Water Conservation District (TCFCWCD), 2024. Groundwater Sustainability Plan. <https://sgma.water.ca.gov/portal/service/gspdocument/download/10082>

United States Geological Survey (USGS), 2010. Discharge Measurements at Gaging Stations: Techniques and Methods – Chapter 22 of Book 3, Section A. Written by D. Phil Turnipseed and Vernon B. Sauer.

<https://pubs.usgs.gov/tm/tm3-a8/tm3a8.pdf>

6 Appendices

6.1 Flow Measurement Reports

6.1.1 ANCK01

 Discharge Measurement Summary	
Site name	ANCK01
Site number	
Operator(s)	JGO
File name	ANCK01_20250910-091222.ft
Comment	

Start time	9/10/2025 8:13 AM	Sensor type	Top Setting
End time	9/10/2025 9:10 AM	Handheld serial number	FT2H2126012
Start location latitude	40.169	Probe serial number	FT2P2127007
Start location longitude	-122.135	Probe firmware	1.30
Calculations engine	FlowTracker2	Handheld software	2.0

# Stations	Avg interval (s)	Total discharge (ft ³ /s)
34	40	12.2683

Total width (ft)	Total area (ft ²)	Wetted Perimeter (ft)
40.300	31.5020	40.600

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
33	0.782	0.3894

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
68.393	1.150	0.9692

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.2%	2.2%
Velocity	0.6%	4.0%
Width	0.1%	0.1%
Method	1.4%	
# Stations	1.5%	
Overall	2.4%	4.6%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

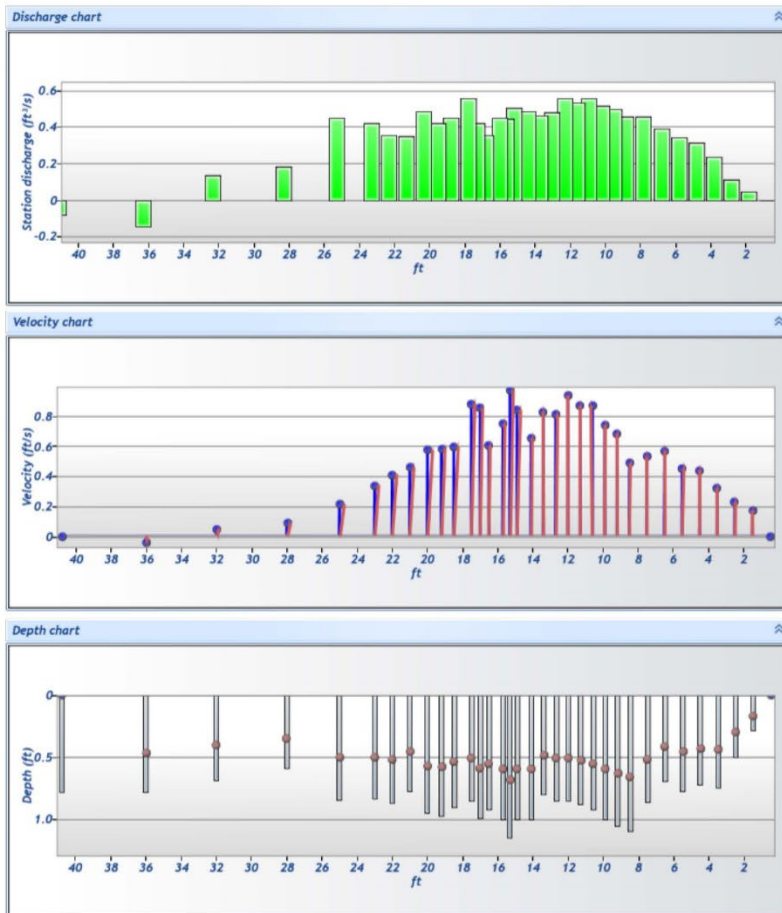
Summary overview
No changes were made to this file
Quality control warnings

9/11/2025 8:23:59 AM

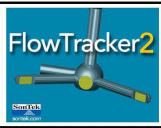
Discharge Measurement Summary

Site name	ANCK01
Site number	
Operator(s)	JGO
File name	ANCK01_20250910-091222.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



9/11/2025 8:23:59 AM



Discharge Measurement Summary

Site name ANCK01
Site number
Operator(s) JGO
File name ANCK01_20250910-091222.ft
Comment

Measurement results

St.#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	8:13 AM	0.500	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.1713	0.0000	0.0000	0.00	✓
1	8:13 AM	1.500	0.6	0.280	0.6000	0.168	80	0.1713	1.0000	0.1713	0.2800	0.0480	0.39	✓
2	8:15 AM	2.500	0.6	0.500	0.6000	0.300	80	0.2284	1.0000	0.2284	0.5000	0.1142	0.93	✓
3	8:17 AM	3.500	0.6	0.740	0.6000	0.444	80	0.3196	1.0000	0.3196	0.7400	0.2365	1.93	✓
4	8:19 AM	4.500	0.6	0.720	0.6000	0.432	80	0.4388	1.0000	0.4388	0.7200	0.3159	2.58	✓
5	8:21 AM	5.500	0.6	0.770	0.6000	0.462	80	0.4514	1.0000	0.4514	0.7700	0.3476	2.83	✓
6	8:24 AM	6.500	0.6	0.690	0.6000	0.414	80	0.5684	1.0000	0.5684	0.6900	0.3922	3.20	✓
7	8:26 AM	7.500	0.6	0.860	0.6000	0.516	80	0.5307	1.0000	0.5307	0.8600	0.4564	3.72	✓
8	8:28 AM	8.500	0.6	1.100	0.6000	0.660	80	0.4877	1.0000	0.4877	0.9350	0.4560	3.72	✓
9	8:30 AM	9.200	0.6	1.050	0.6000	0.630	80	0.6819	1.0000	0.6819	0.7350	0.5012	4.09	✓
10	8:32 AM	9.900	0.6	1.000	0.6000	0.600	80	0.7392	1.0000	0.7392	0.7000	0.5174	4.22	✓
11	8:34 AM	10.600	0.6	0.920	0.6000	0.552	80	0.8688	1.0000	0.8688	0.6440	0.5595	4.56	✓
12	8:36 AM	11.300	0.6	0.880	0.6000	0.528	80	0.8667	1.0000	0.8667	0.6160	0.5339	4.35	✓
13	8:37 AM	12.000	0.6	0.850	0.6000	0.510	80	0.9363	1.0000	0.9363	0.5950	0.5571	4.54	✓
14	8:38 AM	12.700	0.6	0.850	0.6000	0.510	80	0.8123	1.0000	0.8123	0.5950	0.4833	3.94	✓
15	8:39 AM	13.400	0.6	0.800	0.6000	0.480	80	0.8297	1.0000	0.8297	0.5600	0.4646	3.79	✓
16	8:41 AM	14.100	0.6	1.000	0.6000	0.600	80	0.6523	1.0000	0.6523	0.7500	0.4892	3.99	✓
17	8:44 AM	14.900	0.6	1.000	0.6000	0.600	80	0.8401	1.0000	0.8401	0.6000	0.5041	4.11	✓
18	9:08 AM	15.300	0.6	1.150	0.6000	0.690	80	0.9692	1.0000	0.9692	0.4600	0.4458	3.63	✓
19	8:45 AM	15.700	0.6	1.000	0.6000	0.600	80	0.7501	1.0000	0.7501	0.6000	0.4500	3.67	✓
20	8:47 AM	16.500	0.6	0.920	0.6000	0.552	80	0.6001	1.0000	0.6001	0.5980	0.3589	2.93	✓
21	9:10 AM	17.000	0.6	0.990	0.6000	0.594	80	0.8523	1.0000	0.8523	0.4950	0.4219	3.44	✓
22	8:48 AM	17.500	0.6	0.850	0.6000	0.510	80	0.8804	1.0000	0.8804	0.6375	0.5613	4.58	✓
23	8:49 AM	18.500	0.6	0.900	0.6000	0.540	80	0.5932	1.0000	0.5932	0.7650	0.4538	3.70	✓
24	9:02 AM	19.200	0.6	0.970	0.6000	0.582	80	0.5802	1.0000	0.5802	0.7275	0.4221	3.44	✓
25	8:51 AM	20.000	0.6	0.950	0.6000	0.570	80	0.5726	1.0000	0.5726	0.8550	0.4896	3.99	✓
26	9:04 AM	21.000	0.6	0.770	0.6000	0.462	80	0.4562	1.0000	0.4562	0.7700	0.3513	2.86	✓
27	8:53 AM	22.000	0.6	0.870	0.6000	0.522	80	0.4113	1.0000	0.4113	0.8700	0.3579	2.92	✓
28	9:06 AM	23.000	0.6	0.830	0.6000	0.498	80	0.3386	1.0000	0.3386	1.2450	0.4215	3.44	✓
29	8:54 AM	25.000	0.6	0.840	0.6000	0.504	80	0.2152	1.0000	0.2152	2.1000	0.4520	3.68	✓
30	8:55 AM	28.000	0.6	0.590	0.6000	0.354	80	0.0905	1.0000	0.0905	2.0650	0.1869	1.52	✓
31	8:57 AM	32.000	0.6	0.680	0.6000	0.408	80	0.0500	1.0000	0.0500	2.7200	0.1361	1.11	✓
32	8:58 AM	36.000	0.6	0.780	0.6000	0.468	80	-0.0411	1.0000	-0.0411	3.4320	-0.1410	-1.15	✓
33	9:00 AM	40.800	None	0.780	0.0000	0.000	0	0.0000	1.0000	-0.0411	1.8720	-0.0769	-0.63	✓

9/11/2025 8:23:59 AM

Discharge Measurement Summary

Site name ANCK01
Site number
Operator(s) JGO
File name ANCK01_20250910-091222.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	15.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
23	8:49 AM	18.500	0.6	0.900	0.6000	0.540	Velocity Angle > QC
24	9:02 AM	19.200	0.6	0.970	0.6000	0.582	Velocity Angle > QC
25	8:51 AM	20.000	0.6	0.950	0.6000	0.570	Velocity Angle > QC
26	9:04 AM	21.000	0.6	0.770	0.6000	0.462	Velocity Angle > QC
27	8:53 AM	22.000	0.6	0.870	0.6000	0.522	Velocity Angle > QC
28	9:06 AM	23.000	0.6	0.830	0.6000	0.498	Velocity Angle > QC
29	8:54 AM	25.000	0.6	0.840	0.6000	0.504	Velocity Angle > QC
30	8:55 AM	28.000	0.6	0.590	0.6000	0.354	Velocity Angle > QC

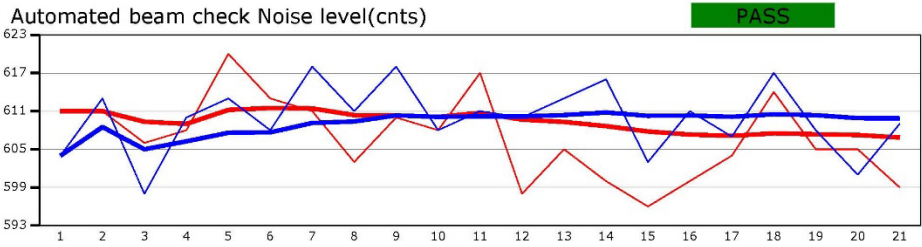
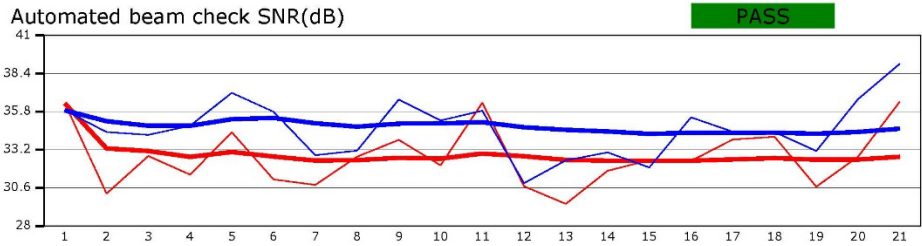
9/11/2025 8:23:59 AM

Discharge Measurement Summary

Site name	ANCK01
Site number	
Operator(s)	JGO
File name	ANCK01_20250910-091222.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 9/10/2025 8:12:29 AM



Automated beam check Quality control warnings No quality control warnings

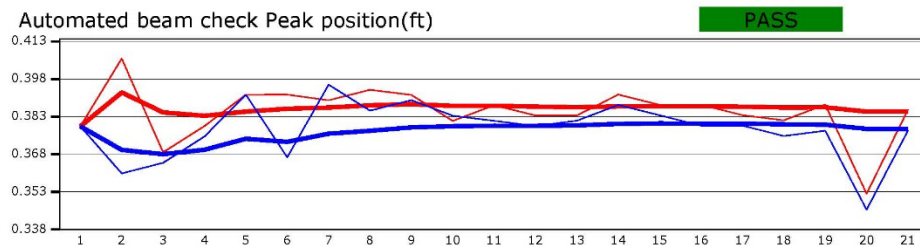
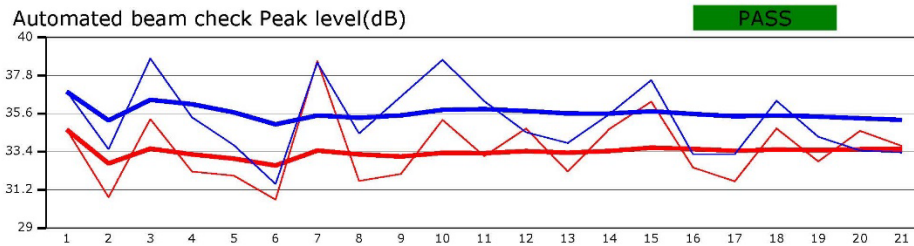
9/11/2025 8:23:59 AM

Discharge Measurement Summary

Site name	ANCK01
Site number	
Operator(s)	JGO
File name	ANCK01_20250910-091222.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 9/10/2025 8:12:29 AM



Automated beam check Quality control warnings No quality control warnings

9/11/2025 8:23:59 AM

Discharge Measurement Summary

Site name	1139.14.ANCK01
Site number	
Operator(s)	JGO
File name	1139_14_ANCK01_20251002-132851.ft
Comment	

Start time	10/2/2025 12:35 PM	Sensor type	Top Setting
End time	10/2/2025 1:25 PM	Handheld serial number	FT2H2126012
Start location latitude	40.169	Probe serial number	FT2P2127007
Start location longitude	-122.135	Probe firmware	1.30
Calculations engine	FlowTracker2	Handheld software	2.0

# Stations	Avg interval (s)	Total discharge (ft³/s)
34	40	21.2433

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
41.000	27.1535	41.339

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
38	0.662	0.7823

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
64.443	1.000	1.4294

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.3%	2.5%
Velocity	0.5%	2.5%
Width	0.1%	0.1%
Method	1.4%	
# Stations	1.5%	
Overall	2.3%	3.6%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

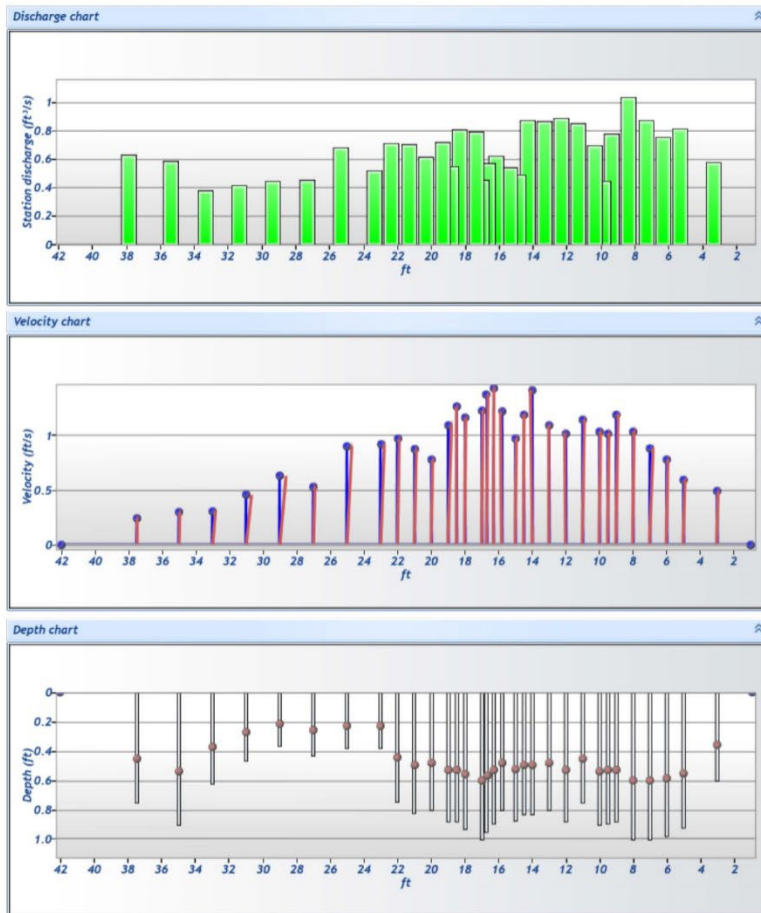
Summary overview
No changes were made to this file
Quality control warnings

12/1/2025 2:06:22 PM

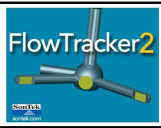
Discharge Measurement Summary

Site name	1139.14.ANCK01
Site number	
Operator(s)	JGO
File name	1139_14_ANCK01_20251002-132851.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



12/1/2025 2:06:22 PM



Discharge Measurement Summary

Site name 1139.14.ANCK01
Site number
Operator(s) JGO
File name 1139_14_ANCK01_20251002-132851.ft
Comment

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	12:35 PM	1.000	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.4826	0.0000	0.0000	0.00	✓
1	12:36 PM	3.000	0.6	0.600	0.6000	0.360	80	0.4826	1.0000	0.4826	1.2000	0.5791	2.73	✓
2	12:37 PM	5.000	0.6	0.920	0.6000	0.552	80	0.5903	1.0000	0.5903	1.3800	0.8147	3.83	✓
3	1:01 PM	6.000	0.6	0.980	0.6000	0.588	80	0.7727	1.0000	0.7727	0.9800	0.7572	3.56	✓
4	12:39 PM	7.000	0.6	1.000	0.6000	0.600	80	0.8769	1.0000	0.8769	1.0000	0.8769	4.13	✓
5	1:03 PM	8.000	0.6	1.000	0.6000	0.600	80	1.0357	1.0000	1.0357	1.0000	1.0357	4.88	✓
6	12:40 PM	9.000	0.6	0.880	0.6000	0.528	80	1.1866	1.0000	1.1866	0.6600	0.7831	3.69	✓
7	1:06 PM	9.500	0.6	0.890	0.6000	0.534	80	1.0162	1.0000	1.0162	0.4450	0.4522	2.13	✓
8	1:04 PM	10.000	0.6	0.900	0.6000	0.540	80	1.0335	1.0000	1.0335	0.6750	0.6976	3.28	✓
9	12:41 PM	11.000	0.6	0.750	0.6000	0.450	80	1.1382	1.0000	1.1382	0.7500	0.8537	4.02	✓
10	1:07 PM	12.000	0.6	0.880	0.6000	0.528	80	1.0141	1.0000	1.0141	0.8800	0.8924	4.20	✓
11	12:42 PM	13.000	0.6	0.800	0.6000	0.480	80	1.0899	1.0000	1.0899	0.8000	0.8719	4.10	✓
12	1:10 PM	14.000	0.6	0.830	0.6000	0.498	80	1.4102	1.0000	1.4102	0.6225	0.8779	4.13	✓
13	1:14 PM	14.500	0.6	0.830	0.6000	0.498	80	1.1902	1.0000	1.1902	0.4150	0.4939	2.33	✓
14	12:44 PM	15.000	0.6	0.870	0.6000	0.522	80	0.9682	1.0000	0.9682	0.5655	0.5475	2.58	✓
15	1:17 PM	15.800	0.6	0.800	0.6000	0.480	80	1.2105	1.0000	1.2105	0.5200	0.6295	2.96	✓
16	1:12 PM	16.300	0.6	0.890	0.6000	0.534	80	1.4294	1.0000	1.4294	0.4005	0.5725	2.69	✓
17	1:16 PM	16.700	0.6	0.950	0.6000	0.570	80	1.3630	1.0000	1.3630	0.3325	0.4532	2.13	✓
18	12:45 PM	17.000	0.6	1.000	0.6000	0.600	80	1.2237	1.0000	1.2237	0.6500	0.7954	3.74	✓
19	1:19 PM	18.000	0.6	0.930	0.6000	0.558	80	1.1592	1.0000	1.1592	0.6975	0.8086	3.81	✓
20	1:22 PM	18.500	0.6	0.880	0.6000	0.528	80	1.2586	1.0000	1.2586	0.4400	0.5538	2.61	✓
21	12:46 PM	19.000	0.6	0.880	0.6000	0.528	80	1.0933	1.0000	1.0933	0.6600	0.7216	3.40	✓
22	1:23 PM	20.000	0.6	0.800	0.6000	0.480	80	0.7779	1.0000	0.7779	0.8000	0.6223	2.93	✓
23	12:47 PM	21.000	0.6	0.820	0.6000	0.492	80	0.8671	1.0000	0.8671	0.8200	0.7110	3.35	✓
24	1:25 PM	22.000	0.6	0.740	0.6000	0.444	80	0.9620	1.0000	0.9620	0.7400	0.7119	3.35	✓
25	12:49 PM	23.000	0.6	0.380	0.6000	0.228	80	0.9134	1.0000	0.9134	0.5700	0.5206	2.45	✓
26	12:50 PM	25.000	0.6	0.380	0.6000	0.228	80	0.8984	1.0000	0.8984	0.7600	0.6828	3.21	✓
27	12:51 PM	27.000	0.6	0.430	0.6000	0.258	80	0.5274	1.0000	0.5274	0.8600	0.4536	2.14	✓
28	12:52 PM	29.000	0.6	0.360	0.6000	0.216	80	0.6275	1.0000	0.6275	0.7200	0.4518	2.13	✓
29	12:54 PM	31.000	0.6	0.460	0.6000	0.276	80	0.4550	1.0000	0.4550	0.9200	0.4186	1.97	✓
30	12:55 PM	33.000	0.6	0.620	0.6000	0.372	80	0.3059	1.0000	0.3059	1.2400	0.3793	1.79	✓
31	12:57 PM	35.000	0.6	0.900	0.6000	0.540	80	0.2927	1.0000	0.2927	2.0250	0.5927	2.79	✓
32	12:58 PM	37.500	0.6	0.750	0.6000	0.450	80	0.2402	1.0000	0.2402	2.6250	0.6305	2.97	✓
33	1:00 PM	42.000	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.2402	0.0000	0.0000	0.00	✓

12/1/2025 2:06:22 PM

Discharge Measurement Summary

Site name 1139.14.ANCK01
Site number
Operator(s) JGO
File name 1139_14_ANCK01_20251002-132851.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	15.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
9	12:41 PM	11.000	0.6	0.750	0.6000	0.450	Standard Error > QC
11	12:42 PM	13.000	0.6	0.800	0.6000	0.480	Standard Error > QC
12	1:10 PM	14.000	0.6	0.830	0.6000	0.498	Standard Error > QC
13	1:14 PM	14.500	0.6	0.830	0.6000	0.498	Standard Error > QC
14	12:44 PM	15.000	0.6	0.870	0.6000	0.522	Standard Error > QC
15	1:17 PM	15.800	0.6	0.800	0.6000	0.480	Standard Error > QC
18	12:45 PM	17.000	0.6	1.000	0.6000	0.600	Standard Error > QC
26	12:50 PM	25.000	0.6	0.380	0.6000	0.228	Velocity Angle > QC
28	12:52 PM	29.000	0.6	0.360	0.6000	0.216	Velocity Angle > QC
29	12:54 PM	31.000	0.6	0.460	0.6000	0.276	Velocity Angle > QC
30	12:55 PM	33.000	0.6	0.620	0.6000	0.372	Velocity Angle > QC
33	1:00 PM	42.000	None	0.000	0.0000	0.000	Water Depth > QC

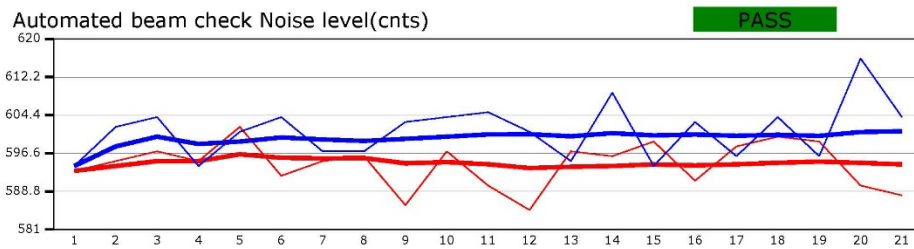
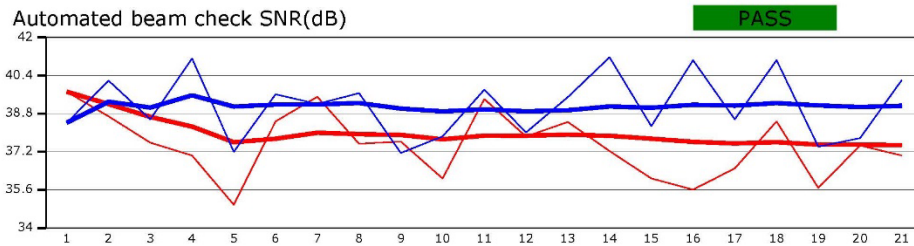
12/1/2025 2:06:22 PM

Discharge Measurement Summary

Site name	1139.14.ANCK01
Site number	
Operator(s)	JGO
File name	1139_14_ANCK01_20251002-132851.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 10/2/2025 12:35:23 PM



Automated beam check Quality control warnings No quality control warnings

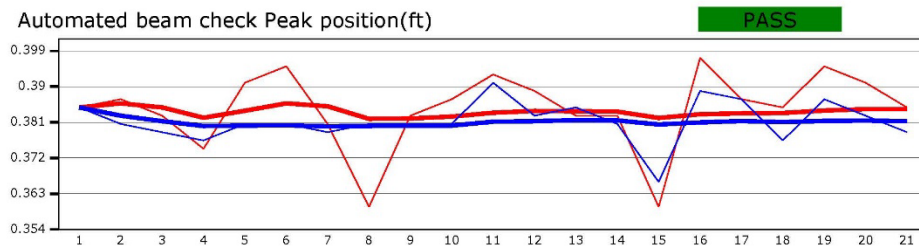
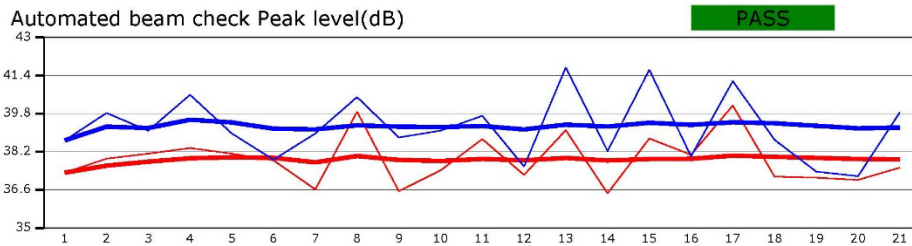
12/1/2025 2:06:22 PM

Discharge Measurement Summary

Site name	1139.14.ANCK01
Site number	
Operator(s)	JGO
File name	1139_14_ANCK01_20251002-132851.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 10/2/2025 12:35:23 PM



Automated beam check Quality control warnings No quality control warnings

12/1/2025 2:06:22 PM

Discharge Measurement Summary

Site name	1179.ANCK01
Site number	
Operator(s)	JGO
File name	1179_ANCK01_20251202-132429.ft
Comment	

Start time	12/2/2025 12:34 PM	Sensor type	Top Setting
End time	12/2/2025 1:19 PM	Handheld serial number	FT2H2126012
Start location latitude	40.169	Probe serial number	FT2P2127007
Start location longitude	-122.135	Probe firmware	1.30
Calculations engine	FlowTracker2	Handheld software	2.0

# Stations	Avg interval (s)	Total discharge (ft³/s)
31	40	49.5448

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
40.500	33.4400	40.839

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
30	0.826	1.4816

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
45.541	1.210	2.6048

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.2%	2.0%
Velocity	0.5%	1.6%
Width	0.1%	0.1%
Method	1.5%	
# Stations	1.7%	
Overall	2.5%	2.7%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

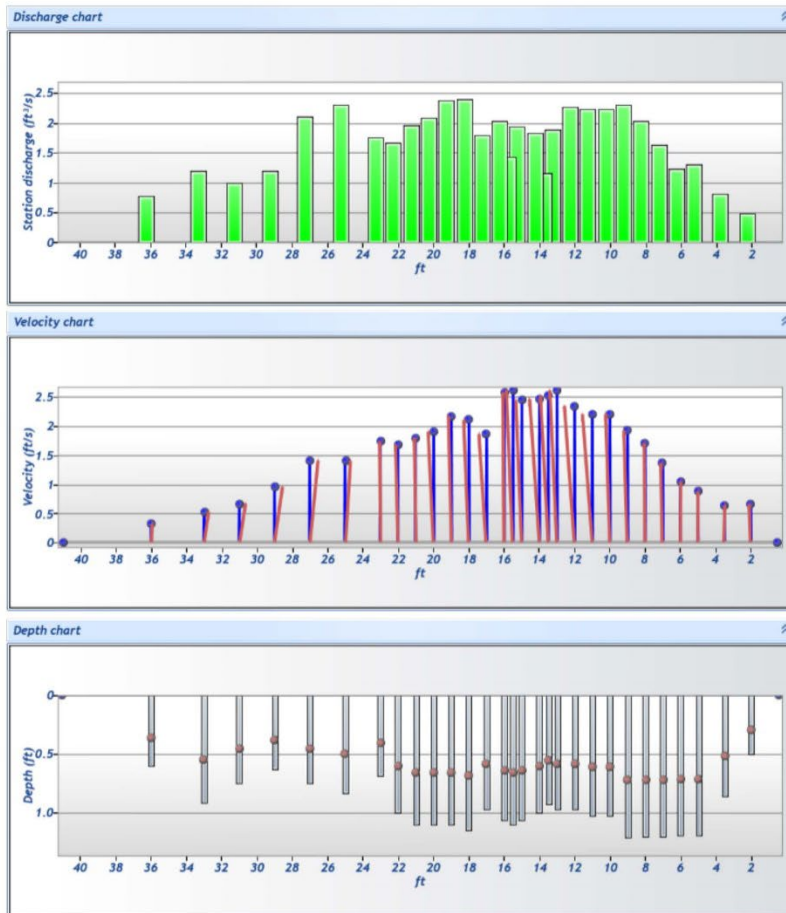
Summary overview
No changes were made to this file
Quality control warnings

12/3/2025 3:23:28 PM

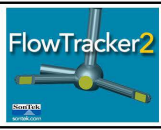
Discharge Measurement Summary

Site name	1179.ANCK01
Site number	
Operator(s)	JGO
File name	1179_ANCK01_20251202-132429.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



12/3/2025 3:23:28 PM

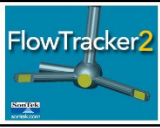


Discharge Measurement Summary

Site name 1179.ANCK01
Site number
Operator(s) JGO
File name 1179_ANCK01_20251202-132429.ft
Comment

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	12:34 PM	0.500	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.6584	0.0000	0.0000	0.00	✓
1	12:35 PM	2.000	0.6	0.500	0.6000	0.300	80	0.6584	1.0000	0.6584	0.7500	0.4938	1.00	✓
2	12:37 PM	3.500	0.6	0.860	0.6000	0.516	80	0.6348	1.0000	0.6348	1.2900	0.8189	1.65	✓
3	12:40 PM	5.000	0.6	1.190	0.6000	0.714	80	0.8750	1.0000	0.8750	1.4875	1.3016	2.63	✓
4	12:41 PM	6.000	0.6	1.190	0.6000	0.714	80	1.0410	1.0000	1.0410	1.1900	1.2388	2.50	✓
5	12:44 PM	7.000	0.6	1.200	0.6000	0.720	80	1.3571	1.0000	1.3571	1.2000	1.6286	3.29	✓
6	12:45 PM	8.000	0.6	1.200	0.6000	0.720	80	1.6973	1.0000	1.6973	1.2000	2.0367	4.11	✓
7	12:46 PM	9.000	0.6	1.210	0.6000	0.726	80	1.9142	1.0000	1.9142	1.2100	2.3162	4.67	✓
8	12:48 PM	10.000	0.6	1.020	0.6000	0.612	80	2.1987	1.0000	2.1987	1.0200	2.2426	4.53	✓
9	12:49 PM	11.000	0.6	1.020	0.6000	0.612	80	2.1970	1.0000	2.1970	1.0200	2.2410	4.52	✓
10	12:51 PM	12.000	0.6	0.970	0.6000	0.582	80	2.3381	1.0000	2.3381	0.9700	2.2680	4.58	✓
11	12:53 PM	13.000	0.6	0.970	0.6000	0.582	80	2.6043	1.0000	2.6043	0.7275	1.8947	3.82	✓
12	1:18 PM	13.500	0.6	0.920	0.6000	0.552	80	2.5088	1.0000	2.5088	0.4600	1.1540	2.33	✓
13	12:54 PM	14.000	0.6	1.000	0.6000	0.600	80	2.4577	1.0000	2.4577	0.7500	1.8433	3.72	✓
14	12:55 PM	15.000	0.6	1.060	0.6000	0.636	80	2.4367	1.0000	2.4367	0.7950	1.9372	3.91	✓
15	1:19 PM	15.500	0.6	1.100	0.6000	0.660	80	2.6048	1.0000	2.6048	0.5500	1.4327	2.89	✓
16	12:57 PM	16.000	0.6	1.060	0.6000	0.636	80	2.5684	1.0000	2.5684	0.7950	2.0419	4.12	✓
17	12:58 PM	17.000	0.6	0.970	0.6000	0.582	80	1.8571	1.0000	1.8571	0.9700	1.8014	3.64	✓
18	12:59 PM	18.000	0.6	1.140	0.6000	0.684	80	2.0988	1.0000	2.0988	1.1400	2.3926	4.83	✓
19	1:01 PM	19.000	0.6	1.100	0.6000	0.660	80	2.1684	1.0000	2.1684	1.1000	2.3853	4.81	✓
20	1:02 PM	20.000	0.6	1.100	0.6000	0.660	80	1.8950	1.0000	1.8950	1.1000	2.0845	4.21	✓
21	1:03 PM	21.000	0.6	1.100	0.6000	0.660	80	1.7906	1.0000	1.7906	1.1000	1.9696	3.98	✓
22	1:04 PM	22.000	0.6	1.000	0.6000	0.600	80	1.6768	1.0000	1.6768	1.0000	1.6768	3.38	✓
23	1:06 PM	23.000	0.6	0.680	0.6000	0.408	80	1.7290	1.0000	1.7290	1.0200	1.7636	3.56	✓
24	1:07 PM	25.000	0.6	0.830	0.6000	0.498	80	1.3956	1.0000	1.3956	1.6600	2.3167	4.68	✓
25	1:09 PM	27.000	0.6	0.750	0.6000	0.450	80	1.4036	1.0000	1.4036	1.5000	2.1055	4.25	✓
26	1:10 PM	29.000	0.6	0.630	0.6000	0.378	80	0.9503	1.0000	0.9503	1.2600	1.1974	2.42	✓
27	1:12 PM	31.000	0.6	0.750	0.6000	0.450	80	0.6639	1.0000	0.6639	1.5000	0.9959	2.01	✓
28	1:13 PM	33.000	0.6	0.910	0.6000	0.546	80	0.5242	1.0000	0.5242	2.2750	1.1925	2.41	✓
29	1:14 PM	36.000	0.6	0.600	0.6000	0.360	80	0.3222	1.0000	0.3222	2.4000	0.7733	1.56	✓
30	1:16 PM	41.000	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.3222	0.0000	0.0000	0.00	✓

12/3/2025 3:23:28 PM



Discharge Measurement Summary

Site name 1179.ANCK01
Site number
Operator(s) JGO
File name 1179_ANCK01_20251202-132429.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	20.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
4	12:41 PM	6.000	0.6	1.190	0.6000	0.714	Standard Error > QC
5	12:44 PM	7.000	0.6	1.200	0.6000	0.720	Standard Error > QC
6	12:45 PM	8.000	0.6	1.200	0.6000	0.720	Standard Error > QC
7	12:46 PM	9.000	0.6	1.210	0.6000	0.726	Standard Error > QC
8	12:48 PM	10.000	0.6	1.020	0.6000	0.612	Standard Error > QC
9	12:49 PM	11.000	0.6	1.020	0.6000	0.612	Standard Error > QC
10	12:51 PM	12.000	0.6	0.970	0.6000	0.582	Standard Error > QC
11	12:53 PM	13.000	0.6	0.970	0.6000	0.582	Standard Error > QC
12	1:18 PM	13.500	0.6	0.920	0.6000	0.552	Standard Error > QC
13	12:54 PM	14.000	0.6	1.000	0.6000	0.600	Standard Error > QC
14	12:55 PM	15.000	0.6	1.060	0.6000	0.636	Standard Error > QC
15	1:19 PM	15.500	0.6	1.100	0.6000	0.660	Standard Error > QC
16	12:57 PM	16.000	0.6	1.060	0.6000	0.636	Standard Error > QC
17	12:58 PM	17.000	0.6	0.970	0.6000	0.582	Standard Error > QC
18	12:59 PM	18.000	0.6	1.140	0.6000	0.684	Standard Error > QC
19	1:01 PM	19.000	0.6	1.100	0.6000	0.660	Standard Error > QC
20	1:02 PM	20.000	0.6	1.100	0.6000	0.660	Standard Error > QC
21	1:03 PM	21.000	0.6	1.100	0.6000	0.660	Standard Error > QC
22	1:04 PM	22.000	0.6	1.000	0.6000	0.600	Standard Error > QC
23	1:06 PM	23.000	0.6	0.680	0.6000	0.408	Standard Error > QC
24	1:07 PM	25.000	0.6	0.830	0.6000	0.498	Standard Error > QC
26	1:10 PM	29.000	0.6	0.630	0.6000	0.378	Velocity Angle > QC
27	1:12 PM	31.000	0.6	0.750	0.6000	0.450	Velocity Angle > QC
28	1:13 PM	33.000	0.6	0.910	0.6000	0.546	Velocity Angle > QC

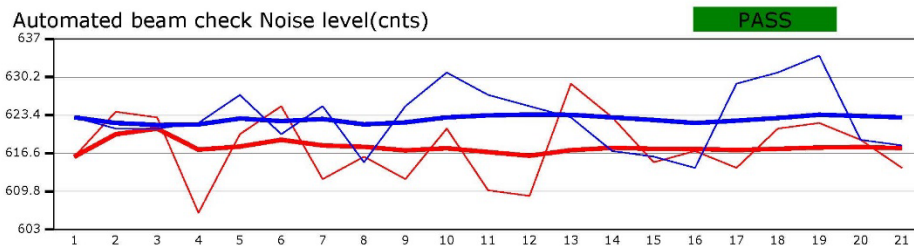
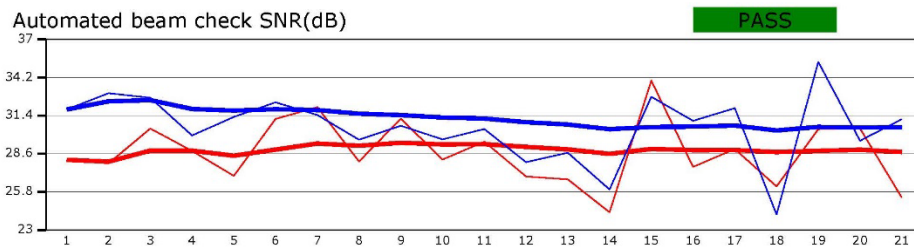
12/3/2025 3:23:28 PM

Discharge Measurement Summary

Site name	1179.ANCK01
Site number	
Operator(s)	JGO
File name	1179_ANCK01_20251202-132429.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 12:34:24 PM



Automated beam check Quality control warnings No quality control warnings

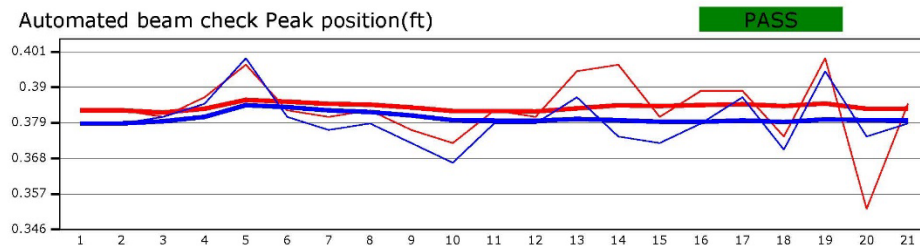
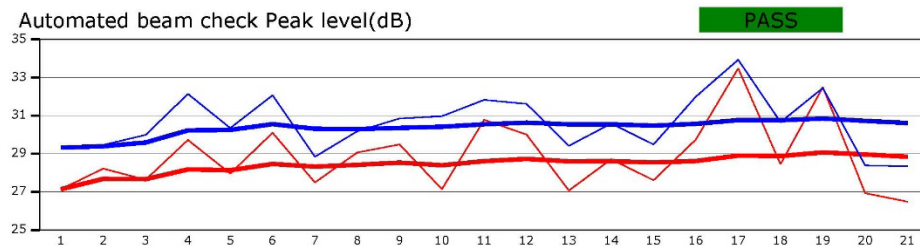
12/3/2025 3:23:28 PM

Discharge Measurement Summary

Site name	1179.ANCK01
Site number	
Operator(s)	JGO
File name	1179_ANCK01_20251202-132429.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 12:34:24 PM



Automated beam check Quality control warnings No quality control warnings

12/3/2025 3:23:28 PM

6.1.2 MI LTANCK

	Discharge Measurement Summary
---	---

Site name	LTANCK
Site number	
Operator(s)	DM
File name	LTANCK_20251202-121411.ft
Comment	

<table> <tr><td>Start time</td><td>12/2/2025 10:56 AM</td></tr> <tr><td>End time</td><td>12/2/2025 12:03 PM</td></tr> <tr><td>Start location latitude</td><td>40.171</td></tr> <tr><td>Start location longitude</td><td>-122.123</td></tr> <tr><td>Calculations engine</td><td>FlowTracker2</td></tr> </table>	Start time	12/2/2025 10:56 AM	End time	12/2/2025 12:03 PM	Start location latitude	40.171	Start location longitude	-122.123	Calculations engine	FlowTracker2	<table> <tr><td>Sensor type</td><td>Top Setting</td></tr> <tr><td>Handheld serial number</td><td>FT2H2126012</td></tr> <tr><td>Probe serial number</td><td>FT2P2127007</td></tr> <tr><td>Probe firmware</td><td>1.30</td></tr> <tr><td>Handheld software</td><td>2.0</td></tr> </table>	Sensor type	Top Setting	Handheld serial number	FT2H2126012	Probe serial number	FT2P2127007	Probe firmware	1.30	Handheld software	2.0
Start time	12/2/2025 10:56 AM																				
End time	12/2/2025 12:03 PM																				
Start location latitude	40.171																				
Start location longitude	-122.123																				
Calculations engine	FlowTracker2																				
Sensor type	Top Setting																				
Handheld serial number	FT2H2126012																				
Probe serial number	FT2P2127007																				
Probe firmware	1.30																				
Handheld software	2.0																				

# Stations	Avg interval (s)	Total discharge (ft³/s)
29	40	5.1765

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
22.200	31.5600	23.583

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
32	1.422	0.1640

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
50.461	2.450	0.5390

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.1%	1.5%
Velocity	0.6%	3.9%
Width	0.1%	0.1%
Method	0.9%	
# Stations	1.8%	
Overall	2.3%	4.3%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings		
Salinity	0.000	PSS-78
Temperature	-	
Sound speed	-	
Mounting correction	0.000	%

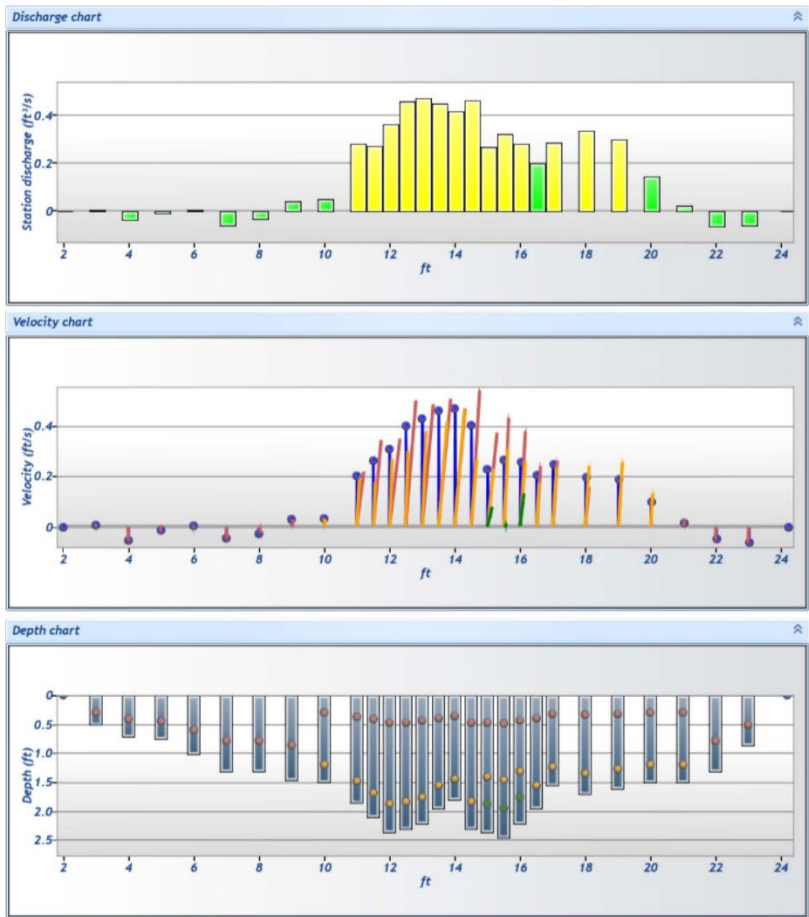
Summary overview
No changes were made to this file
Quality control warnings

12/3/2025 3:26:20 PM

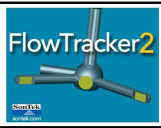
Discharge Measurement Summary

Site name	LTANCK
Site number	
Operator(s)	DM
File name	LTANCK_20251202-121411.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



12/3/2025 3:26:20 PM

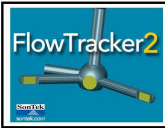


Discharge Measurement Summary

Site name LTANCK
Site number
Operator(s) DM
File name LTANCK_20251202-121411.ft
Comment

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	10:56 AM	2.000	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.0081	0.0000	0.0000	0.00	✓
1	10:56 AM	3.000	0.6	0.500	0.6000	0.300	80	0.0081	1.0000	0.0081	0.5000	0.0041	0.08	✓
2	10:58 AM	4.000	0.6	0.700	0.6000	0.420	80	-0.0539	1.0000	-0.0539	0.7000	-0.0377	-0.73	✓
3	11:00 AM	5.000	0.6	0.750	0.6000	0.450	80	-0.0153	1.0000	-0.0153	0.7500	-0.0114	-0.22	✓
4	11:02 AM	6.000	0.6	1.000	0.6000	0.600	80	0.0040	1.0000	0.0040	1.0000	0.0040	0.08	✓
5	11:03 AM	7.000	0.6	1.300	0.6000	0.780	80	-0.0457	1.0000	-0.0457	1.3000	-0.0595	-1.15	✓
6	11:04 AM	8.000	0.6	1.300	0.6000	0.780	80	-0.0251	1.0000	-0.0251	1.3000	-0.0326	-0.63	✓
7	11:05 AM	9.000	0.6	1.450	0.6000	0.870	80	0.0294	1.0000	0.0294	1.4500	0.0426	0.82	✓
8	11:06 AM	10.000	0.2/0.8	1.500	0.2000	0.300	80	0.0364	1.0000	0.0323	1.5000	0.0484	0.93	✓
8	11:06 AM	10.000	0.2/0.8	1.500	0.8000	1.200	80	0.0281	1.0000	0.0323	1.5000	0.0484	0.93	✓
9	11:11 AM	11.000	0.2/0.8	1.850	0.2000	0.370	80	0.2167	1.0000	0.2020	1.3875	0.2802	5.41	✓
9	11:11 AM	11.000	0.2/0.8	1.850	0.8000	1.480	80	0.1872	1.0000	0.2020	1.3875	0.2802	5.41	✓
10	11:46 AM	11.500	0.2/0.8	2.100	0.2000	0.420	80	0.3418	1.0000	0.2592	1.0500	0.2722	5.26	✓
10	11:46 AM	11.500	0.2/0.8	2.100	0.8000	1.680	80	0.1767	1.0000	0.2592	1.0500	0.2722	5.26	✓
11	11:13 AM	12.000	0.2/0.8	2.350	0.2000	0.470	80	0.3481	1.0000	0.3076	1.1750	0.3614	6.98	✓
11	11:13 AM	12.000	0.2/0.8	2.350	0.8000	1.880	80	0.2671	1.0000	0.3076	1.1750	0.3614	6.98	✓
12	11:49 AM	12.500	0.2/0.8	2.300	0.2000	0.460	80	0.4992	1.0000	0.3994	1.1500	0.4593	8.87	✓
12	11:49 AM	12.500	0.2/0.8	2.300	0.8000	1.840	80	0.2996	1.0000	0.3994	1.1500	0.4593	8.87	✓
13	11:16 AM	13.000	0.2/0.8	2.200	0.2000	0.440	80	0.4837	1.0000	0.4301	1.1000	0.4731	9.14	✓
13	11:16 AM	13.000	0.2/0.8	2.200	0.8000	1.760	80	0.3765	1.0000	0.4301	1.1000	0.4731	9.14	✓
14	11:53 AM	13.500	0.2/0.8	1.950	0.2000	0.390	80	0.5049	1.0000	0.4601	0.9750	0.4486	8.67	✓
14	11:53 AM	13.500	0.2/0.8	1.950	0.8000	1.560	80	0.4152	1.0000	0.4601	0.9750	0.4486	8.67	✓
15	11:18 AM	14.000	0.2/0.8	1.800	0.2000	0.360	80	0.4673	1.0000	0.4658	0.9000	0.4192	8.10	✓
15	11:18 AM	14.000	0.2/0.8	1.800	0.8000	1.440	80	0.4642	1.0000	0.4658	0.9000	0.4192	8.10	✓
16	11:55 AM	14.500	0.2/0.8	2.300	0.2000	0.460	80	0.5390	1.0000	0.4016	1.1500	0.4618	8.92	✓
16	11:55 AM	14.500	0.2/0.8	2.300	0.8000	1.840	80	0.2642	1.0000	0.4016	1.1500	0.4618	8.92	✓
17	11:21 AM	15.000	0.2/0.6/0.8	2.350	0.2000	0.470	80	0.3726	1.0000	0.2274	1.1750	0.2672	5.16	✓
17	11:21 AM	15.000	0.2/0.6/0.8	2.350	0.6000	1.410	80	0.2291	1.0000	0.2274	1.1750	0.2672	5.16	✓
17	11:21 AM	15.000	0.2/0.6/0.8	2.350	0.8000	1.880	80	0.0789	1.0000	0.2274	1.1750	0.2672	5.16	✓
18	11:58 AM	15.500	0.2/0.6/0.8	2.450	0.2000	0.490	80	0.4299	1.0000	0.2641	1.2250	0.3235	6.25	✓
18	11:58 AM	15.500	0.2/0.6/0.8	2.450	0.6000	1.470	80	0.3071	1.0000	0.2641	1.2250	0.3235	6.25	✓
18	11:58 AM	15.500	0.2/0.6/0.8	2.450	0.8000	1.960	80	0.0121	1.0000	0.2641	1.2250	0.3235	6.25	✓
19	11:25 AM	16.000	0.2/0.6/0.8	2.200	0.2000	0.440	80	0.3773	1.0000	0.2565	1.1000	0.2822	5.45	✓
19	11:25 AM	16.000	0.2/0.6/0.8	2.200	0.6000	1.320	80	0.2591	1.0000	0.2565	1.1000	0.2822	5.45	✓
19	11:25 AM	16.000	0.2/0.6/0.8	2.200	0.8000	1.760	80	0.1305	1.0000	0.2565	1.1000	0.2822	5.45	✓
20	12:03 PM	16.500	0.2/0.8	1.950	0.2000	0.390	80	0.2388	1.0000	0.2056	0.9750	0.2004	3.87	✓
20	12:03 PM	16.500	0.2/0.8	1.950	0.8000	1.560	80	0.1723	1.0000	0.2056	0.9750	0.2004	3.87	✓
21	11:29 AM	17.000	0.2/0.8	1.550	0.2000	0.310	80	0.2593	1.0000	0.2462	1.1625	0.2862	5.53	✓
21	11:29 AM	17.000	0.2/0.8	1.550	0.8000	1.240	80	0.2331	1.0000	0.2462	1.1625	0.2862	5.53	✓
22	11:32 AM	18.000	0.2/0.8	1.700	0.2000	0.340	80	0.1547	1.0000	0.1967	1.7000	0.3343	6.46	✓
22	11:32 AM	18.000	0.2/0.8	1.700	0.8000	1.360	80	0.2387	1.0000	0.1967	1.7000	0.3343	6.46	✓
23	11:34 AM	19.000	0.2/0.8	1.600	0.2000	0.320	80	0.1210	1.0000	0.1882	1.6000	0.3012	5.82	✓
23	11:34 AM	19.000	0.2/0.8	1.600	0.8000	1.280	80	0.2555	1.0000	0.1882	1.6000	0.3012	5.82	✓
24	11:37 AM	20.000	0.2/0.8	1.500	0.2000	0.300	80	0.0625	1.0000	0.0968	1.5000	0.1452	2.81	✓
24	11:37 AM	20.000	0.2/0.8	1.500	0.8000	1.200	80	0.1312	1.0000	0.0968	1.5000	0.1452	2.81	✓
25	11:39 AM	21.000	0.2/0.8	1.500	0.2000	0.300	80	0.0314	1.0000	0.0157	1.5000	0.0236	0.46	✓
25	11:39 AM	21.000	0.2/0.8	1.500	0.8000	1.200	80	0.0000	1.0000	0.0157	1.5000	0.0236	0.46	✓
26	11:41 AM	22.000	0.6	1.300	0.6000	0.780	80	-0.0483	1.0000	-0.0483	1.3000	-0.0628	-1.21	✓
27	11:43 AM	23.000	0.6	0.850	0.6000	0.510	80	-0.0623	1.0000	-0.0623	0.9350	-0.0582	-1.13	✓
28	11:44 AM	24.200	None	0.000	0.0000	0.000	0	0.0000	1.0000	-0.0623	0.0000	0.0000	0.00	✓

12/3/2025 3:26:20 PM



Discharge Measurement Summary

Site name LTANCK
Site number
Operator(s) DM
File name LTANCK_20251202-121411.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	15.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings						
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)
1	10:56 AM	3.000	0.6	0.500	0.6000	0.300
2	10:58 AM	4.000	0.6	0.700	0.6000	0.420
3	11:00 AM	5.000	0.6	0.750	0.6000	0.450
4	11:02 AM	6.000	0.6	1.000	0.6000	0.600
5	11:03 AM	7.000	0.6	1.300	0.6000	0.780
7	11:05 AM	9.000	0.6	1.450	0.6000	0.870
9	11:11 AM	11.000	0.2/0.8	1.850	0.2000	0.370
9	11:11 AM	11.000	0.2/0.8	1.850	0.8000	1.480
10	11:46 AM	11.500	0.2/0.8	2.100	0.2000	0.420
10	11:46 AM	11.500	0.2/0.8	2.100	0.8000	1.680
11	11:13 AM	12.000	0.2/0.8	2.350	0.2000	0.470
11	11:13 AM	12.000	0.2/0.8	2.350	0.8000	1.880
12	11:49 AM	12.500	0.2/0.8	2.300	0.2000	0.460
12	11:49 AM	12.500	0.2/0.8	2.300	0.8000	1.840
13	11:16 AM	13.000	0.2/0.8	2.200	0.2000	0.440
13	11:16 AM	13.000	0.2/0.8	2.200	0.8000	1.760
14	11:53 AM	13.500	0.2/0.8	1.950	0.2000	0.390
14	11:53 AM	13.500	0.2/0.8	1.950	0.8000	1.560
15	11:18 AM	14.000	0.2/0.8	1.800	0.2000	0.360
15	11:18 AM	14.000	0.2/0.8	1.800	0.8000	1.440
16	11:55 AM	14.500	0.2/0.8	2.300	0.2000	0.460
16	11:55 AM	14.500	0.2/0.8	2.300	0.8000	1.840
17	11:21 AM	15.000	0.2/0.6/0.8	2.350	0.2000	0.470
17	11:21 AM	15.000	0.2/0.6/0.8	2.350	0.6000	1.410
17	11:21 AM	15.000	0.2/0.6/0.8	2.350	0.8000	1.880
18	11:58 AM	15.500	0.2/0.6/0.8	2.450	0.2000	0.490
18	11:58 AM	15.500	0.2/0.6/0.8	2.450	0.6000	1.470
18	11:58 AM	15.500	0.2/0.6/0.8	2.450	0.8000	1.960
19	11:25 AM	16.000	0.2/0.6/0.8	2.200	0.2000	0.440
19	11:25 AM	16.000	0.2/0.6/0.8	2.200	0.6000	1.320
19	11:25 AM	16.000	0.2/0.6/0.8	2.200	0.8000	1.760
20	12:03 PM	16.500	0.2/0.8	1.950	0.2000	0.390
20	12:03 PM	16.500	0.2/0.8	1.950	0.8000	1.560
21	11:29 AM	17.000	0.2/0.8	1.550	0.2000	0.310
21	11:29 AM	17.000	0.2/0.8	1.550	0.8000	1.240
22	11:32 AM	18.000	0.2/0.8	1.700	0.2000	0.340
22	11:32 AM	18.000	0.2/0.8	1.700	0.8000	1.360
23	11:34 AM	19.000	0.2/0.8	1.600	0.2000	0.320
23	11:34 AM	19.000	0.2/0.8	1.600	0.8000	1.280
24	11:37 AM	20.000	0.2/0.8	1.500	0.2000	0.300
24	11:37 AM	20.000	0.2/0.8	1.500	0.8000	1.200
25	11:39 AM	21.000	0.2/0.8	1.500	0.2000	0.300
25	11:39 AM	21.000	0.2/0.8	1.500	0.8000	1.200
27	11:43 AM	23.000	0.6	0.850	0.6000	0.510
28	11:44 AM	24.200	None	0.000	0.0000	0.000

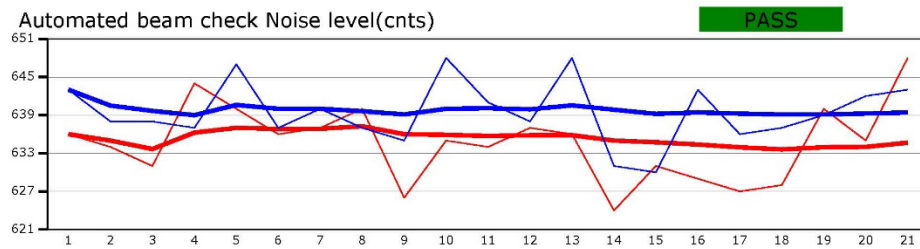
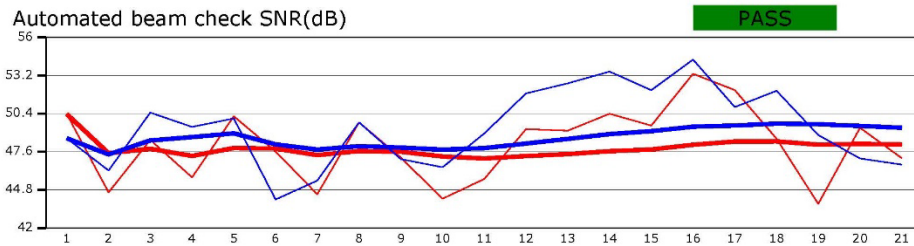
12/3/2025 3:26:20 PM

Discharge Measurement Summary

Site name	LTANCK
Site number	
Operator(s)	DM
File name	LTANCK_20251202-121411.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 10:55:51 AM



Automated beam check Quality control warnings No quality control warnings

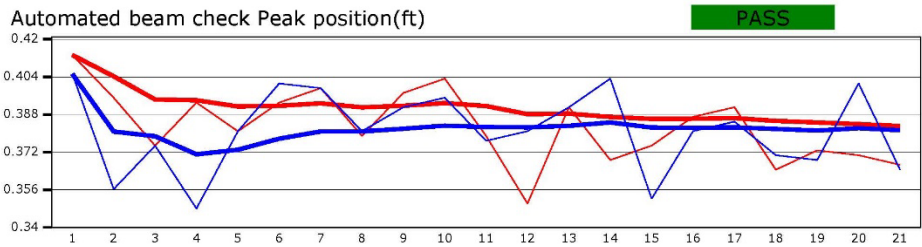
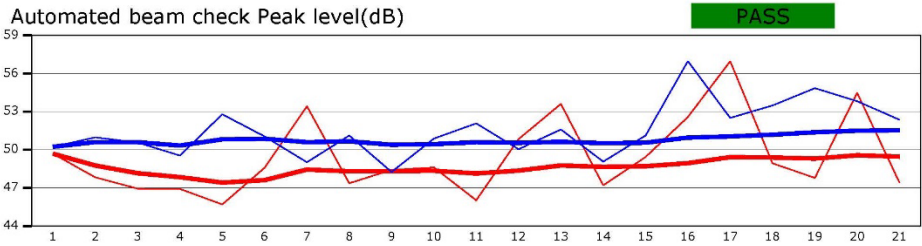
12/3/2025 3:26:20 PM

Discharge Measurement Summary

Site name	LTANCK
Site number	
Operator(s)	DM
File name	LTANCK_20251202-121411.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 10:55:51 AM



Automated beam check Quality control warnings No quality control warnings
--

12/3/2025 3:26:20 PM

6.1.3 MO ANCRCK

	Discharge Measurement Summary
---	---

Site name	1179.14.03.03.ANCRCK		
Site number			
Operator(s)	JGO		
File name	ANCRCK_20251202-100553.ft		
Comment			

Start time	12/2/2025 9:06 AM	Sensor type	Top Setting
End time	12/2/2025 9:59 AM	Handheld serial number	FT2H2126012
Start location latitude	40.154	Probe serial number	FT2P2127007
Start location longitude	-122.129	Probe firmware	1.30
Calculations engine	FlowTracker2	Handheld software	2.0

# Stations	Avg interval (s)	Total discharge (ft³/s)
32	40	5.1425

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
22.300	10.9490	22.604

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
20	0.491	0.4697

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
47.692	0.770	0.8133

Discharge Uncertainty			Discharge equation	Mid Section
Category	ISO	IVE	Discharge uncertainty	IVE
Accuracy	1.0%	1.0%	Discharge reference	Rated
Depth	0.3%	3.4%		
Velocity	0.6%	2.0%		
Width	0.1%	0.1%		
Method	1.5%			
# Stations	1.6%			
Overall	2.5%	4.1%		

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

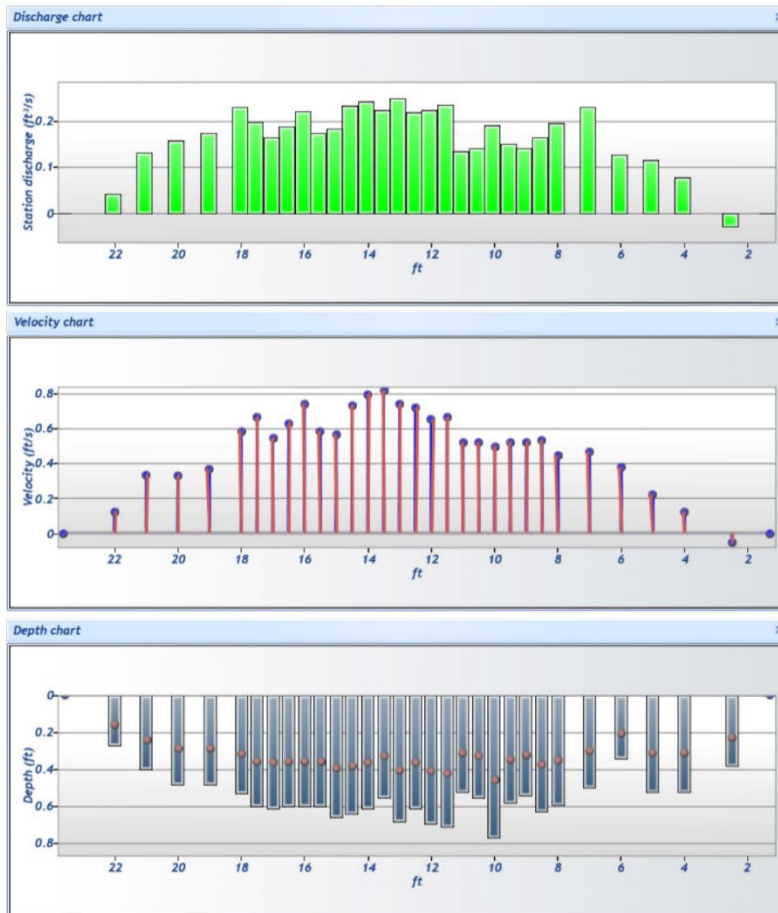
Summary overview
No changes were made to this file
Quality control warnings

12/3/2025 3:24:29 PM

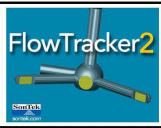
Discharge Measurement Summary

Site name	1179.14.03.03.ANCRCCK
Site number	
Operator(s)	JGO
File name	ANCRCCK_20251202-100553.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



12/3/2025 3:24:29 PM



Discharge Measurement Summary

Site name 1179.14.03.03.ANCRCCK
Site number
Operator(s) JGO
File name ANCRCCK_20251202-100553.ft
Comment

Measurement results

St.#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	9:06 AM	1.300	None	0.000	0.0000	0.000	0	0.0000	1.0000	-0.0523	0.0000	0.0000	0.00	✓
1	9:07 AM	2.500	0.6	0.380	0.6000	0.228	80	-0.0523	1.0000	-0.0523	0.5130	-0.0268	-0.52	✓
2	9:09 AM	4.000	0.6	0.520	0.6000	0.312	80	0.1221	1.0000	0.1221	0.6500	0.0794	1.54	✓
3	9:12 AM	5.000	0.6	0.520	0.6000	0.312	80	0.2232	1.0000	0.2232	0.5200	0.1160	2.26	✓
4	9:13 AM	6.000	0.6	0.340	0.6000	0.204	80	0.3756	1.0000	0.3756	0.3400	0.1277	2.48	✓
5	9:15 AM	7.000	0.6	0.500	0.6000	0.300	80	0.4627	1.0000	0.4627	0.5000	0.2313	4.50	✓
6	9:17 AM	8.000	0.6	0.590	0.6000	0.354	80	0.4440	1.0000	0.4440	0.4425	0.1965	3.82	✓
7	9:44 AM	8.500	0.6	0.630	0.6000	0.378	80	0.5279	1.0000	0.5279	0.3150	0.1663	3.23	✓
8	9:23 AM	9.000	0.6	0.540	0.6000	0.324	80	0.5204	1.0000	0.5204	0.2700	0.1405	2.73	✓
9	9:48 AM	9.500	0.6	0.580	0.6000	0.348	80	0.5205	1.0000	0.5205	0.2900	0.1510	2.94	✓
10	9:24 AM	10.000	0.6	0.770	0.6000	0.462	80	0.4937	1.0000	0.4937	0.3850	0.1901	3.70	✓
11	9:46 AM	10.500	0.6	0.550	0.6000	0.330	80	0.5170	1.0000	0.5170	0.2750	0.1422	2.76	✓
12	9:27 AM	11.000	0.6	0.520	0.6000	0.312	80	0.5154	1.0000	0.5154	0.2600	0.1340	2.61	✓
13	9:51 AM	11.500	0.6	0.710	0.6000	0.426	80	0.6613	1.0000	0.6613	0.3550	0.2348	4.57	✓
14	9:28 AM	12.000	0.6	0.690	0.6000	0.414	80	0.6469	1.0000	0.6469	0.3450	0.2232	4.34	✓
15	9:50 AM	12.500	0.6	0.610	0.6000	0.366	80	0.7157	1.0000	0.7157	0.3050	0.2183	4.24	✓
16	9:30 AM	13.000	0.6	0.680	0.6000	0.408	80	0.7362	1.0000	0.7362	0.3400	0.2503	4.87	✓
17	9:53 AM	13.500	0.6	0.550	0.6000	0.330	80	0.8133	1.0000	0.8133	0.2750	0.2237	4.35	✓
18	9:31 AM	14.000	0.6	0.610	0.6000	0.366	80	0.7932	1.0000	0.7932	0.3050	0.2419	4.70	✓
19	9:54 AM	14.500	0.6	0.640	0.6000	0.384	80	0.7291	1.0000	0.7291	0.3200	0.2333	4.54	✓
20	9:32 AM	15.000	0.6	0.660	0.6000	0.396	80	0.5587	1.0000	0.5587	0.3300	0.1844	3.59	✓
21	9:56 AM	15.500	0.6	0.600	0.6000	0.360	80	0.5816	1.0000	0.5816	0.3000	0.1745	3.39	✓
22	9:33 AM	16.000	0.6	0.600	0.6000	0.360	80	0.7363	1.0000	0.7363	0.3000	0.2209	4.30	✓
23	9:57 AM	16.500	0.6	0.600	0.6000	0.360	80	0.6253	1.0000	0.6253	0.3000	0.1876	3.65	✓
24	9:35 AM	17.000	0.6	0.610	0.6000	0.366	80	0.5421	1.0000	0.5421	0.3050	0.1654	3.22	✓
25	9:59 AM	17.500	0.6	0.600	0.6000	0.360	80	0.6615	1.0000	0.6615	0.3000	0.1984	3.86	✓
26	9:36 AM	18.000	0.6	0.530	0.6000	0.318	80	0.5830	1.0000	0.5830	0.3975	0.2317	4.51	✓
27	9:37 AM	19.000	0.6	0.480	0.6000	0.288	80	0.3645	1.0000	0.3645	0.4800	0.1750	3.40	✓
28	9:39 AM	20.000	0.6	0.480	0.6000	0.288	80	0.3270	1.0000	0.3270	0.4800	0.1570	3.05	✓
29	9:40 AM	21.000	0.6	0.400	0.6000	0.240	80	0.3297	1.0000	0.3297	0.4000	0.1319	2.56	✓
30	9:41 AM	22.000	0.6	0.270	0.6000	0.162	80	0.1204	1.0000	0.1204	0.3510	0.0423	0.82	✓
31	9:44 AM	23.600	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.1204	0.0000	0.0000	0.00	✓

12/3/2025 3:24:29 PM

Discharge Measurement Summary

Site name	1179.14.03.03.ANCRCCK
Site number	
Operator(s)	JGO
File name	ANCRCCK_20251202-100553.ft
Comment	

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	20.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	9:07 AM	2.500	0.6	0.380	0.6000	0.228	Large SNR Variation
9	9:48 AM	9.500	0.6	0.580	0.6000	0.348	Boundary Interference
10	9:24 AM	10.000	0.6	0.770	0.6000	0.462	Boundary Interference
27	9:37 AM	19.000	0.6	0.480	0.6000	0.288	Boundary Interference
30	9:41 AM	22.000	0.6	0.270	0.6000	0.162	Boundary Interference

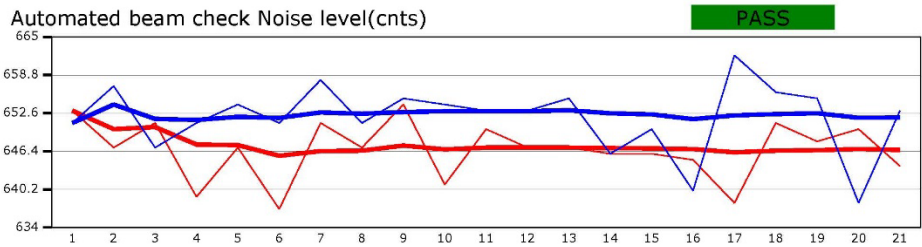
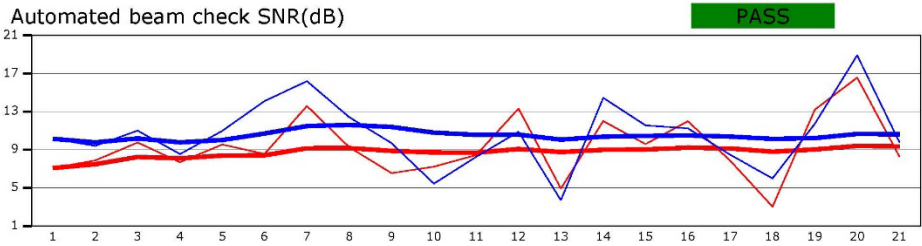
12/3/2025 3:24:29 PM

Discharge Measurement Summary

Site name	1179.14.03.03.ANCRCCK
Site number	
Operator(s)	JGO
File name	ANCRCCK_20251202-100553.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 9:06:31 AM



Automated beam check Quality control warnings No quality control warnings

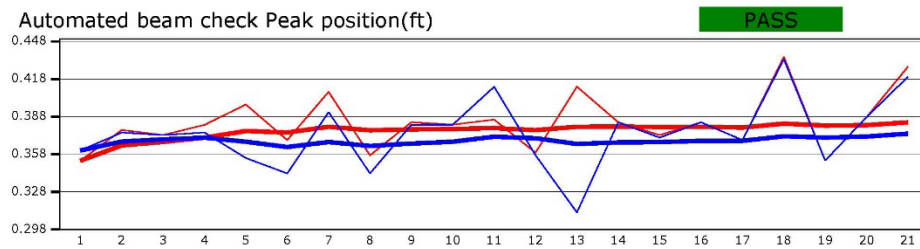
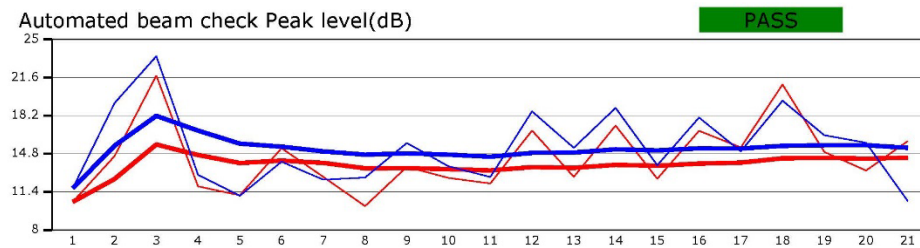
12/3/2025 3:24:29 PM

Discharge Measurement Summary

Site name	1179.14.03.03.ANCRCCK
Site number	
Operator(s)	JGO
File name	ANCRCCK_20251202-100553.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 9:06:31 AM



Automated beam check Quality control warnings No quality control warnings

12/3/2025 3:24:29 PM

6.1.4 CRCK01



Discharge Measurement Summary

Site name CRCK01
Site number 1
Operator(s)
File name CRCK01_20250910-110838.ft
Comment

Start time 9/10/2025 10:02 AM

End time 9/10/2025 11:05 AM

Start location latitude 40.153

Start location longitude -122.137

Calculations engine FlowTracker2

Sensor type Top Setting

Handheld serial number FT2H2126012

Probe serial number FT2P2127007

Probe firmware 1.30

Handheld software 2.0

# Stations	Avg interval (s)	Total discharge (ft³/s)
25	40	12.6952

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
11.700	12.0500	12.890

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
31	1.030	1.0535

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
70.229	1.600	1.9203

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.2%	2.1%
Velocity	0.5%	1.8%
Width	0.1%	0.1%
Method	1.3%	
# Stations	2.0%	
Overall	2.7%	3.0%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

Summary overview

No changes were made to this file

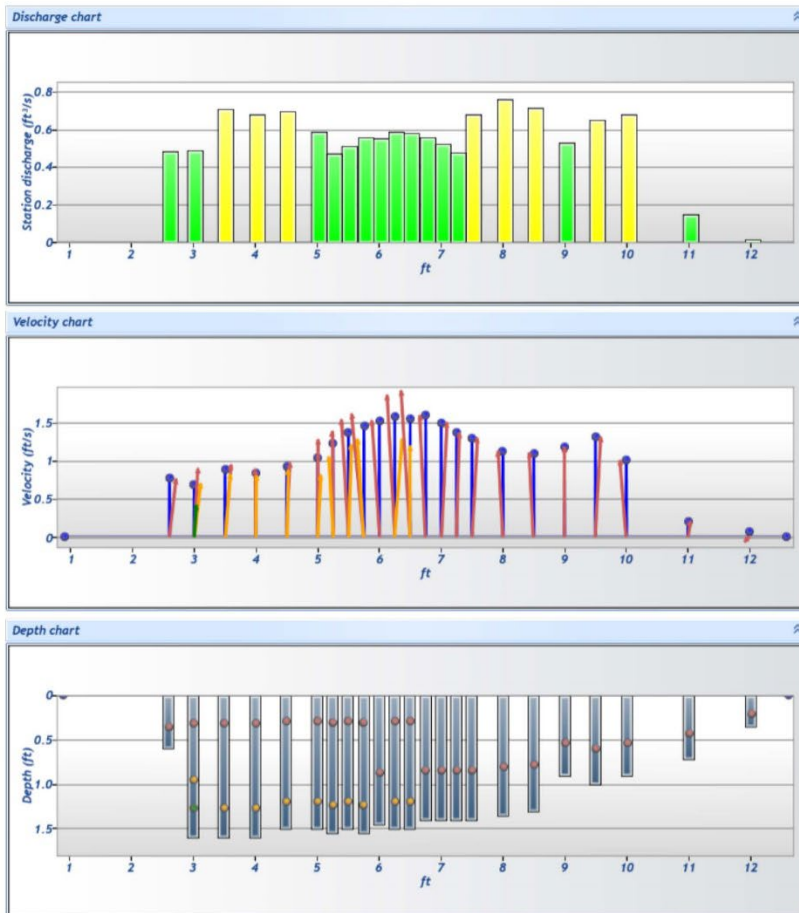
Quality control warnings

9/11/2025 8:26:10 AM

Discharge Measurement Summary

Site name	CRCK01
Site number	1
Operator(s)	
File name	CRCK01_20250910-110838.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



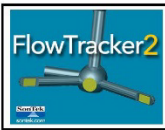
9/11/2025 8:26:10 AM

Discharge Measurement Summary

Site name CRCK01
Site number 1
Operator(s)
File name CRCK01_20250910-110838.ft
Comment

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	10:02 AM	0.900	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.7669	0.0000	0.0000	0.00	✓
1	10:31 AM	2.600	0.6	0.600	0.6000	0.360	80	0.7669	1.0000	0.7669	0.6300	0.4831	3.81	✓
2	10:02 AM	3.000	0.2/0.6/0.8	1.600	0.2000	0.320	80	0.9002	1.0000	0.6836	0.7200	0.4922	3.88	✓
2	10:02 AM	3.000	0.2/0.6/0.8	1.600	0.6000	0.960	80	0.7048	1.0000	0.6836	0.7200	0.4922	3.88	✓
2	10:02 AM	3.000	0.2/0.6/0.8	1.600	0.8000	1.280	80	0.4245	1.0000	0.6836	0.7200	0.4922	3.88	✓
3	10:35 AM	3.500	0.2/0.8	1.600	0.2000	0.320	80	0.9500	1.0000	0.8873	0.8000	0.7099	5.59	✓
3	10:35 AM	3.500	0.2/0.8	1.600	0.8000	1.280	80	0.8247	1.0000	0.8873	0.8000	0.7099	5.59	✓
4	10:09 AM	4.000	0.2/0.8	1.600	0.2000	0.320	80	0.8884	1.0000	0.8495	0.8000	0.6796	5.35	✓
4	10:09 AM	4.000	0.2/0.8	1.600	0.8000	1.280	80	0.8107	1.0000	0.8495	0.8000	0.6796	5.35	✓
5	10:38 AM	4.500	0.2/0.8	1.500	0.2000	0.300	80	0.9748	1.0000	0.9307	0.7500	0.6980	5.50	✓
5	10:38 AM	4.500	0.2/0.8	1.500	0.8000	1.200	80	0.8865	1.0000	0.9307	0.7500	0.6980	5.50	✓
6	10:12 AM	5.000	0.2/0.8	1.500	0.2000	0.300	80	1.2795	1.0000	1.0478	0.5625	0.5894	4.64	✓
6	10:12 AM	5.000	0.2/0.8	1.500	0.8000	1.200	80	0.8160	1.0000	1.0478	0.5625	0.5894	4.64	✓
7	11:05 AM	5.250	0.2/0.8	1.550	0.2000	0.310	80	1.3882	1.0000	1.2216	0.3875	0.4734	3.73	✓
7	11:05 AM	5.250	0.2/0.8	1.550	0.8000	1.240	80	1.0550	1.0000	1.2216	0.3875	0.4734	3.73	✓
8	10:41 AM	5.500	0.2/0.8	1.500	0.2000	0.300	80	1.5403	1.0000	1.3766	0.3750	0.5162	4.07	✓
8	10:41 AM	5.500	0.2/0.8	1.500	0.8000	1.200	80	1.2130	1.0000	1.3766	0.3750	0.5162	4.07	✓
9	10:51 AM	5.750	0.2/0.8	1.550	0.2000	0.310	80	1.6159	1.0000	1.4513	0.3875	0.5624	4.43	✓
9	10:51 AM	5.750	0.2/0.8	1.550	0.8000	1.240	80	1.2868	1.0000	1.4513	0.3875	0.5624	4.43	✓
10	10:15 AM	6.000	0.6	1.450	0.6000	0.870	80	1.5264	1.0000	1.5264	0.3625	0.5533	4.36	✓
11	10:54 AM	6.250	0.2/0.8	1.500	0.2000	0.300	80	1.8626	1.0000	1.5774	0.3750	0.5915	4.66	✓
11	10:54 AM	6.250	0.2/0.8	1.500	0.8000	1.200	80	1.2921	1.0000	1.5774	0.3750	0.5915	4.66	✓
12	10:43 AM	6.500	0.2/0.8	1.500	0.2000	0.300	80	1.9203	1.0000	1.5576	0.3750	0.5841	4.60	✓
12	10:43 AM	6.500	0.2/0.8	1.500	0.8000	1.200	80	1.1950	1.0000	1.5576	0.3750	0.5841	4.60	✓
13	10:57 AM	6.750	0.6	1.400	0.6000	0.840	80	1.5971	1.0000	1.5971	0.3500	0.5590	4.40	✓
14	10:17 AM	7.000	0.6	1.400	0.6000	0.840	80	1.5046	1.0000	1.5046	0.3500	0.5266	4.15	✓
15	11:00 AM	7.250	0.6	1.400	0.6000	0.840	80	1.3689	1.0000	1.3689	0.3500	0.4791	3.77	✓
16	10:46 AM	7.500	0.6	1.400	0.6000	0.840	80	1.2979	1.0000	1.2979	0.5250	0.6814	5.37	✓
17	10:19 AM	8.000	0.6	1.350	0.6000	0.810	80	1.1261	1.0000	1.1261	0.6750	0.7601	5.99	✓
18	10:48 AM	8.500	0.6	1.300	0.6000	0.780	80	1.1061	1.0000	1.1061	0.6500	0.7190	5.66	✓
19	10:21 AM	9.000	0.6	0.900	0.6000	0.540	80	1.1812	1.0000	1.1812	0.4500	0.5315	4.19	✓
20	11:02 AM	9.500	0.6	1.000	0.6000	0.600	80	1.3085	1.0000	1.3085	0.5000	0.6543	5.15	✓
21	10:22 AM	10.000	0.6	0.900	0.6000	0.540	80	1.0076	1.0000	1.0076	0.6750	0.6802	5.36	✓
22	10:24 AM	11.000	0.6	0.720	0.6000	0.432	80	0.2105	1.0000	0.2105	0.7200	0.1515	1.19	✓
23	10:25 AM	12.000	0.6	0.350	0.6000	0.210	80	-0.0691	-1.0000	0.0691	0.2800	0.0193	0.15	✓
24	10:29 AM	12.600	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.0691	0.0000	0.0000	0.00	✓

9/11/2025 8:26:10 AM



Discharge Measurement Summary

Site name CRCK01
Site number 1
Operator(s)
File name CRCK01_20250910-110838.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	15.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings						
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)
1	10:31 AM	2.600	0.6	0.600	0.6000	0.360
9	10:51 AM	5.750	0.2/0.8	1.550	0.2000	0.310
9	10:51 AM	5.750	0.2/0.8	1.550	0.8000	1.240
10	10:15 AM	6.000	0.6	1.450	0.6000	0.870
11	10:54 AM	6.250	0.2/0.8	1.500	0.2000	0.300
11	10:54 AM	6.250	0.2/0.8	1.500	0.8000	1.200
12	10:43 AM	6.500	0.2/0.8	1.500	0.2000	0.300
12	10:43 AM	6.500	0.2/0.8	1.500	0.8000	1.200
15	11:00 AM	7.250	0.6	1.400	0.6000	0.840
19	10:21 AM	9.000	0.6	0.900	0.6000	0.540
23	10:25 AM	12.000	0.6	0.350	0.6000	0.210

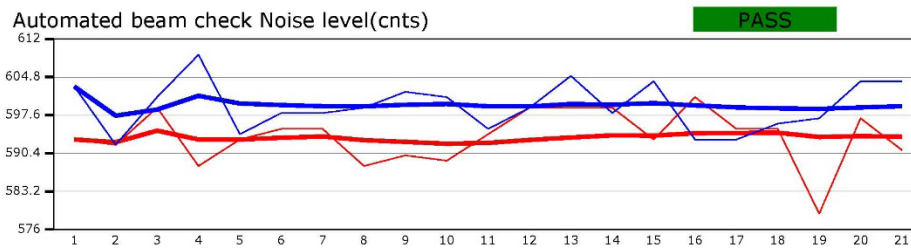
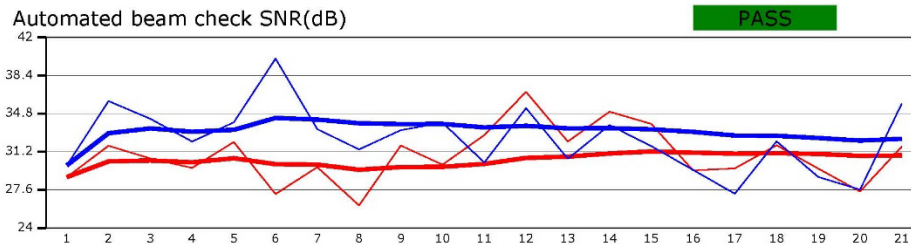
9/11/2025 8:26:10 AM

Discharge Measurement Summary

Site name	CRCK01
Site number	1
Operator(s)	
File name	CRCK01_20250910-110838.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 9/10/2025 10:01:29 AM



Automated beam check Quality control warnings No quality control warnings

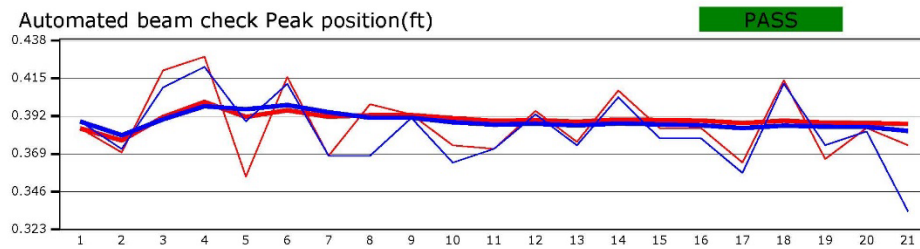
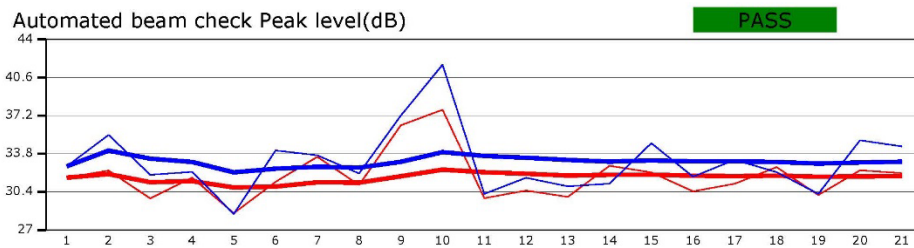
9/11/2025 8:26:10 AM

Discharge Measurement Summary

Site name	CRCK01
Site number	1
Operator(s)	
File name	CRCK01_20250910-110838.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 9/10/2025 10:01:29 AM



Automated beam check Quality control warnings No quality control warnings

9/11/2025 8:26:10 AM

Discharge Measurement Summary

Site name	CRCK01
Site number	1
Operator(s)	DM
File name	CRCK01_20251002-152514.ft
Comment	

Start time	10/2/2025 1:53 PM	Sensor type	Top Setting
End time	10/2/2025 3:21 PM	Handheld serial number	FT2H2126012
Start location latitude	40.153	Probe serial number	FT2P2127007
Start location longitude	-122.137	Probe firmware	1.30
Calculations engine	FlowTracker2	Handheld software	2.0

# Stations	Avg interval (s)	Total discharge (ft³/s)
34	40	25.6001

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
13.500	17.5200	15.023

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
39	1.298	1.4612

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
64.349	2.100	2.4737

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.1%	1.2%
Velocity	0.5%	1.0%
Width	0.1%	0.1%
Method	0.9%	
# Stations	1.5%	
Overall	2.1%	1.8%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

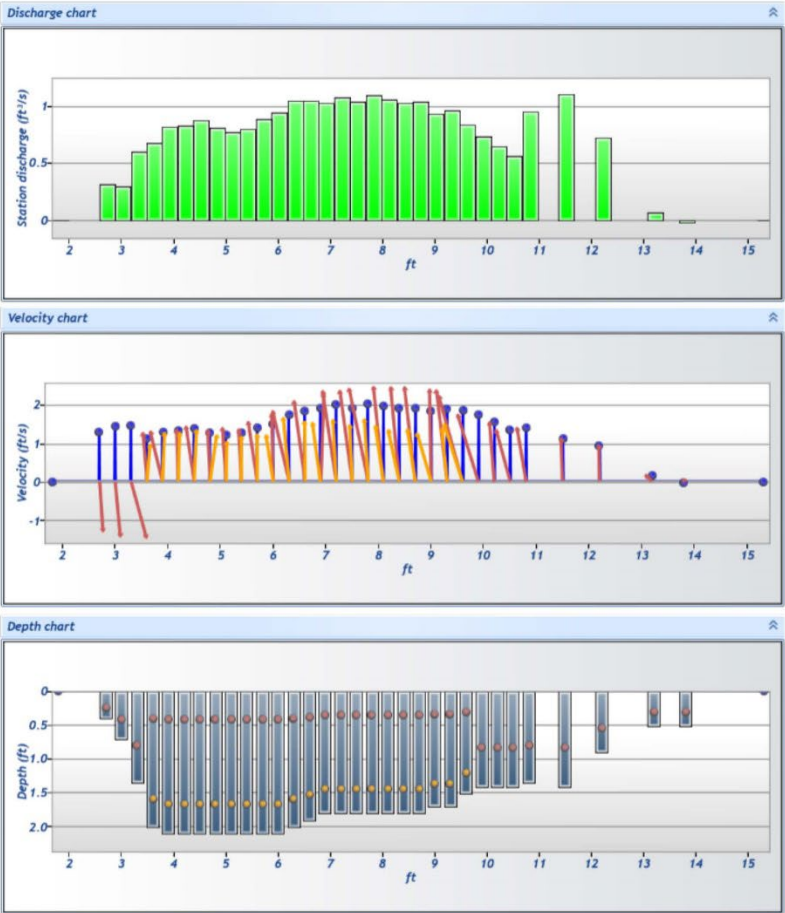
Summary overview
No changes were made to this file
Quality control warnings

10/10/2025 9:26:19 AM

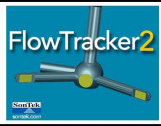
Discharge Measurement Summary

Site name	CRCK01
Site number	1
Operator(s)	DM
File name	CRCK01_20251002-152514.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



10/10/2025 9:26:19 AM

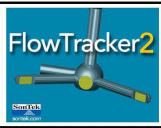


Discharge Measurement Summary

Site name CRCK01
Site number 1
Operator(s) DM
File name CRCK01_20251002-152514.ft
Comment

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Corrected	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q
0	1:53 PM	1.800	None	0.000	0.000	0.000	0	0.0000	1.0000	1.3091	0.0000	0.0000	0.00
1	1:55 PM	2.700	0.6	0.400	0.6000	0.240	80	-1.3091	-1.0000	1.3091	0.2400	0.3142	1.23
2	1:57 PM	3.000	0.6	0.700	0.6000	0.420	80	-1.4295	-1.0000	1.4295	0.2100	0.3002	1.17
3	1:59 PM	3.300	0.6	1.350	0.6000	0.810	80	-1.4757	-1.0000	1.4757	0.4050	0.5976	2.33
4	2:03 PM	3.600	0.2/0.8	2.000	0.2000	0.400	80	1.2799	1.0000	1.1230	0.6000	0.6738	2.63
4	2:03 PM	3.600	0.2/0.8	2.000	0.8000	1.600	80	0.9660	1.0000	1.1230	0.6000	0.6738	2.63
5	2:07 PM	3.900	0.2/0.8	2.100	0.2000	0.420	80	1.3119	1.0000	1.2944	0.6300	0.8155	3.19
5	2:07 PM	3.900	0.2/0.8	2.100	0.8000	1.680	80	1.2770	1.0000	1.2944	0.6300	0.8155	3.19
6	2:10 PM	4.200	0.2/0.8	2.100	0.2000	0.420	80	1.3556	1.0000	1.3135	0.6300	0.8275	3.23
6	2:10 PM	4.200	0.2/0.8	2.100	0.8000	1.680	80	1.2713	1.0000	1.3135	0.6300	0.8275	3.23
7	2:12 PM	4.500	0.2/0.8	2.100	0.2000	0.420	80	1.4376	1.0000	1.3892	0.6300	0.8752	3.42
7	2:12 PM	4.500	0.2/0.8	2.100	0.8000	1.680	80	1.3408	1.0000	1.3892	0.6300	0.8752	3.42
8	2:14 PM	4.800	0.2/0.8	2.100	0.2000	0.420	80	1.3417	1.0000	1.2807	0.6300	0.8068	3.15
8	2:14 PM	4.800	0.2/0.8	2.100	0.8000	1.680	80	1.2197	1.0000	1.2807	0.6300	0.8068	3.15
9	2:17 PM	5.100	0.2/0.8	2.100	0.2000	0.420	80	1.4070	1.0000	1.2257	0.6300	0.7722	3.02
9	2:17 PM	5.100	0.2/0.8	2.100	0.8000	1.680	80	1.0443	1.0000	1.2257	0.6300	0.7722	3.02
10	2:19 PM	5.400	0.2/0.8	2.100	0.2000	0.420	80	1.3708	1.0000	1.2706	0.6300	0.8004	3.13
10	2:19 PM	5.400	0.2/0.8	2.100	0.8000	1.680	80	1.1703	1.0000	1.2706	0.6300	0.8004	3.13
11	2:22 PM	5.700	0.2/0.8	2.100	0.2000	0.420	80	1.5642	1.0000	1.4017	0.6300	0.8831	3.45
11	2:22 PM	5.700	0.2/0.8	2.100	0.8000	1.680	80	1.2392	1.0000	1.4017	0.6300	0.8831	3.45
12	2:25 PM	6.000	0.2/0.8	2.100	0.2000	0.420	80	1.7668	1.0000	1.4927	0.6300	0.9404	3.67
12	2:25 PM	6.000	0.2/0.8	2.100	0.8000	1.680	80	1.2186	1.0000	1.4927	0.6300	0.9404	3.67
13	2:27 PM	6.300	0.2/0.8	2.000	0.2000	0.400	80	1.8457	1.0000	1.7538	0.6000	1.0523	4.11
13	2:27 PM	6.300	0.2/0.8	2.000	0.8000	1.600	80	1.6619	1.0000	1.7538	0.6000	1.0523	4.11
14	2:30 PM	6.600	0.2/0.8	1.900	0.2000	0.380	80	2.1031	1.0000	1.8367	0.5700	1.0469	4.09
14	2:30 PM	6.600	0.2/0.8	1.900	0.8000	1.520	80	1.5703	1.0000	1.8367	0.5700	1.0469	4.09
15	2:33 PM	6.900	0.2/0.8	1.800	0.2000	0.360	80	2.2919	1.0000	1.9145	0.5400	1.0338	4.04
15	2:33 PM	6.900	0.2/0.8	1.800	0.8000	1.440	80	1.5370	1.0000	1.9145	0.5400	1.0338	4.04
16	2:36 PM	7.200	0.2/0.8	1.800	0.2000	0.360	80	2.3634	1.0000	1.9888	0.5400	1.0739	4.20
16	2:36 PM	7.200	0.2/0.8	1.800	0.8000	1.440	80	1.6141	1.0000	1.9888	0.5400	1.0739	4.20
17	2:38 PM	7.500	0.2/0.8	1.800	0.2000	0.360	80	2.3748	1.0000	1.9278	0.5400	1.0410	4.07
17	2:38 PM	7.500	0.2/0.8	1.800	0.8000	1.440	80	1.4807	1.0000	1.9278	0.5400	1.0410	4.07
18	2:41 PM	7.800	0.2/0.8	1.800	0.2000	0.360	80	2.4148	1.0000	2.0220	0.5400	1.0919	4.27
18	2:41 PM	7.800	0.2/0.8	1.800	0.8000	1.440	80	1.6291	1.0000	2.0220	0.5400	1.0919	4.27
19	2:43 PM	8.100	0.2/0.8	1.800	0.2000	0.360	80	2.4737	1.0000	1.9644	0.5400	1.0608	4.14
19	2:43 PM	8.100	0.2/0.8	1.800	0.8000	1.440	80	1.4551	1.0000	1.9644	0.5400	1.0608	4.14
20	2:46 PM	8.400	0.2/0.8	1.800	0.2000	0.360	80	2.4642	1.0000	1.9068	0.5400	1.0297	4.02
20	2:46 PM	8.400	0.2/0.8	1.800	0.8000	1.440	80	1.3494	1.0000	1.9068	0.5400	1.0297	4.02
21	2:49 PM	8.700	0.2/0.8	1.800	0.2000	0.360	80	2.4661	1.0000	1.9149	0.5400	1.0341	4.04
21	2:49 PM	8.700	0.2/0.8	1.800	0.8000	1.440	80	1.3637	1.0000	1.9149	0.5400	1.0341	4.04
22	2:52 PM	9.000	0.2/0.8	1.700	0.2000	0.340	80	2.4025	1.0000	1.8271	0.5100	0.9318	3.64
22	2:52 PM	9.000	0.2/0.8	1.700	0.8000	1.360	80	1.2518	1.0000	1.8271	0.5100	0.9318	3.64
23	2:55 PM	9.300	0.2/0.8	1.700	0.2000	0.340	80	2.3810	1.0000	1.8832	0.5100	0.9604	3.75
23	2:55 PM	9.300	0.2/0.8	1.700	0.8000	1.360	80	1.3855	1.0000	1.8832	0.5100	0.9604	3.75
24	2:58 PM	9.600	0.2/0.8	1.500	0.2000	0.300	80	2.2309	1.0000	1.8692	0.4500	0.8411	3.29
24	2:58 PM	9.600	0.2/0.8	1.500	0.8000	1.200	80	1.5075	1.0000	1.8692	0.4500	0.8411	3.29
25	3:01 PM	9.900	0.6	1.400	0.6000	0.840	80	1.7519	1.0000	1.7519	0.4200	0.7358	2.87
26	3:03 PM	10.200	0.6	1.400	0.6000	0.840	80	1.5491	1.0000	1.5491	0.4200	0.6506	2.54
27	3:05 PM	10.500	0.6	1.400	0.6000	0.840	80	1.3533	1.0000	1.3533	0.4200	0.5684	2.22
28	3:06 PM	10.800	0.6	1.350	0.6000	0.810	80	1.4107	1.0000	1.4107	0.6750	0.9522	3.72
29	3:08 PM	11.500	0.6	1.400	0.6000	0.840	80	1.1303	1.0000	1.1303	0.9800	1.1077	4.33
30	3:12 PM	12.200	0.6	0.900	0.6000	0.540	80	0.9434	1.0000	0.9434	0.7650	0.7217	2.82
31	3:15 PM	13.200	0.6	0.500	0.6000	0.300	80	0.1809	1.0000	0.1809	0.4000	0.0724	0.28
32	3:17 PM	13.800	0.6	0.500	0.6000	0.300	80	-0.0254	1.0000	-0.0254	0.5250	-0.0133	-0.05
33	3:21 PM	15.300	None	0.000	0.0000	0.000	0	0.0000	1.0000	-0.0254	0.0000	0.0000	0.00

10/10/2025 9:26:19 AM



Discharge Measurement Summary

Site name CRCK01
Site number 1
Operator(s) DM
File name CRCK01_20251002-152514.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	15.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	1:55 PM	2.700	0.6	0.400	0.6000	0.240	Velocity Angle > QC
2	1:57 PM	3.000	0.6	0.700	0.6000	0.420	Velocity Angle > QC
3	1:59 PM	3.300	0.6	1.350	0.6000	0.810	Stn Spacing > QC, Velocity Angle > QC
11	2:22 PM	5.700	0.2/0.8	2.100	0.2000	0.420	Standard Error > QC
11	2:22 PM	5.700	0.2/0.8	2.100	0.8000	1.680	Standard Error > QC
12	2:25 PM	6.000	0.2/0.8	2.100	0.2000	0.420	Standard Error > QC
12	2:25 PM	6.000	0.2/0.8	2.100	0.8000	1.680	Standard Error > QC
13	2:27 PM	6.300	0.2/0.8	2.000	0.2000	0.400	Standard Error > QC
13	2:27 PM	6.300	0.2/0.8	2.000	0.8000	1.600	Standard Error > QC
14	2:30 PM	6.600	0.2/0.8	1.900	0.2000	0.380	Standard Error > QC
14	2:30 PM	6.600	0.2/0.8	1.900	0.8000	1.520	Standard Error > QC
15	2:33 PM	6.900	0.2/0.8	1.800	0.2000	0.360	Standard Error > QC
15	2:33 PM	6.900	0.2/0.8	1.800	0.8000	1.440	Standard Error > QC
16	2:36 PM	7.200	0.2/0.8	1.800	0.2000	0.360	Standard Error > QC
16	2:36 PM	7.200	0.2/0.8	1.800	0.8000	1.440	Standard Error > QC
17	2:38 PM	7.500	0.2/0.8	1.800	0.2000	0.360	Standard Error > QC
17	2:38 PM	7.500	0.2/0.8	1.800	0.8000	1.440	Standard Error > QC
18	2:41 PM	7.800	0.2/0.8	1.800	0.2000	0.360	Standard Error > QC
18	2:41 PM	7.800	0.2/0.8	1.800	0.8000	1.440	Standard Error > QC
19	2:43 PM	8.100	0.2/0.8	1.800	0.2000	0.360	Standard Error > QC
19	2:43 PM	8.100	0.2/0.8	1.800	0.8000	1.440	Standard Error > QC
20	2:46 PM	8.400	0.2/0.8	1.800	0.2000	0.360	Standard Error > QC
20	2:46 PM	8.400	0.2/0.8	1.800	0.8000	1.440	Standard Error > QC
21	2:49 PM	8.700	0.2/0.8	1.800	0.2000	0.360	Standard Error > QC
21	2:49 PM	8.700	0.2/0.8	1.800	0.8000	1.440	Standard Error > QC
22	2:52 PM	9.000	0.2/0.8	1.700	0.2000	0.340	Standard Error > QC
22	2:52 PM	9.000	0.2/0.8	1.700	0.8000	1.360	Standard Error > QC
23	2:55 PM	9.300	0.2/0.8	1.700	0.2000	0.340	Standard Error > QC
23	2:55 PM	9.300	0.2/0.8	1.700	0.8000	1.360	Standard Error > QC
24	2:58 PM	9.600	0.2/0.8	1.500	0.2000	0.300	Standard Error > QC
24	2:58 PM	9.600	0.2/0.8	1.500	0.8000	1.200	Standard Error > QC
25	3:01 PM	9.900	0.6	1.400	0.6000	0.840	Standard Error > QC
26	3:03 PM	10.200	0.6	1.400	0.6000	0.840	Standard Error > QC
27	3:05 PM	10.500	0.6	1.400	0.6000	0.840	Standard Error > QC
28	3:06 PM	10.800	0.6	1.350	0.6000	0.810	Standard Error > QC
29	3:08 PM	11.500	0.6	1.400	0.6000	0.840	Standard Error > QC
30	3:12 PM	12.200	0.6	0.900	0.6000	0.540	Standard Error > QC
31	3:15 PM	13.200	0.6	0.500	0.6000	0.300	Velocity Angle > QC
33	3:21 PM	15.300	None	0.000	0.0000	0.000	Stn Spacing > QC

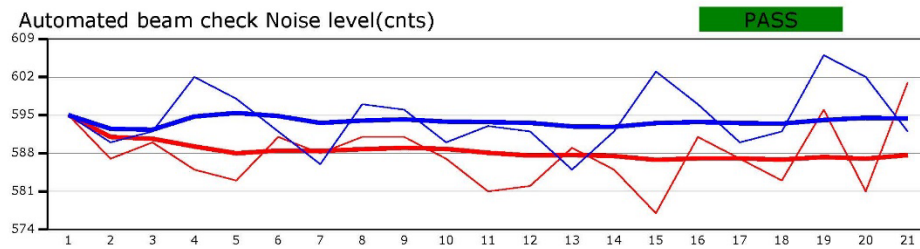
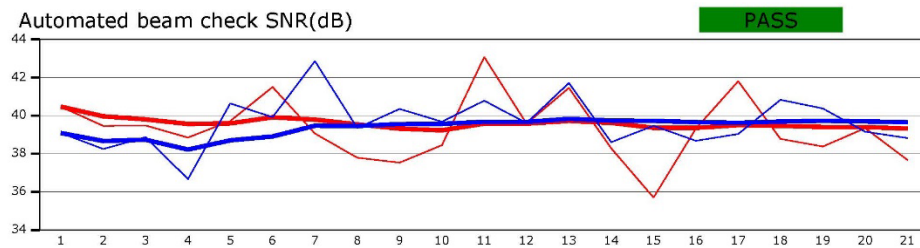
10/10/2025 9:26:19 AM

Discharge Measurement Summary

Site name	CRCK01
Site number	1
Operator(s)	DM
File name	CRCK01_20251002-152514.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 10/2/2025 1:52:34 PM



Automated beam check Quality control warnings No quality control warnings

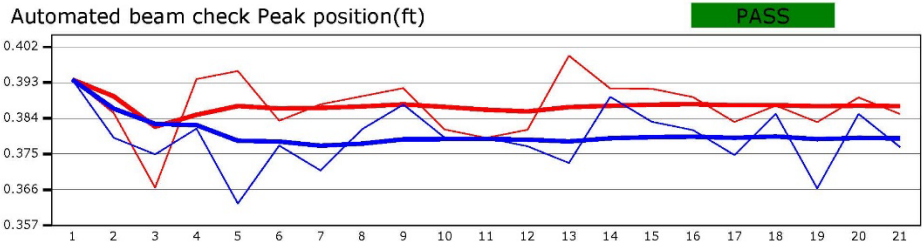
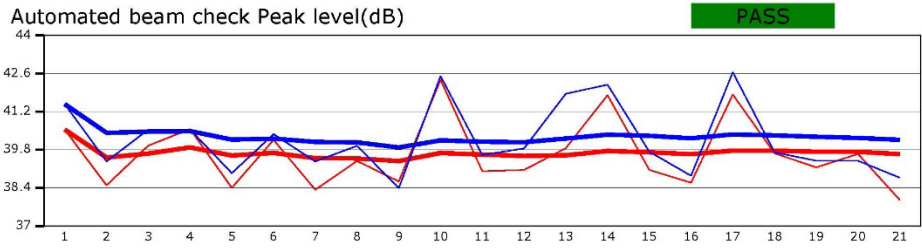
10/10/2025 9:26:19 AM

Discharge Measurement Summary

Site name	CRCK01
Site number	1
Operator(s)	DM
File name	CRCK01_20251002-152514.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 10/2/2025 1:52:34 PM



Automated beam check Quality control warnings

No quality control warnings

10/10/2025 9:26:19 AM

Discharge Measurement Summary

Site name	1139.CRCK01
Site number	
Operator(s)	JGO
File name	CRCK01_20251202-174711.ft
Comment	

Start time	12/2/2025 4:36 PM	Sensor type	Top Setting
End time	12/2/2025 5:41 PM	Handheld serial number	FT2H2126012
Start location latitude	40.153	Probe serial number	FT2P2127007
Start location longitude	-122.137	Probe firmware	1.30
Calculations engine	FlowTracker2	Handheld software	2.0

# Stations	Avg interval (s)	Total discharge (ft³/s)
29	40	49.9855

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
28.800	40.0330	29.528

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
27	1.390	1.2486

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
46.478	2.200	2.3142

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.1%	1.2%
Velocity	0.3%	1.6%
Width	0.1%	0.1%
Method	0.9%	
# Stations	1.8%	
Overall	2.2%	2.3%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

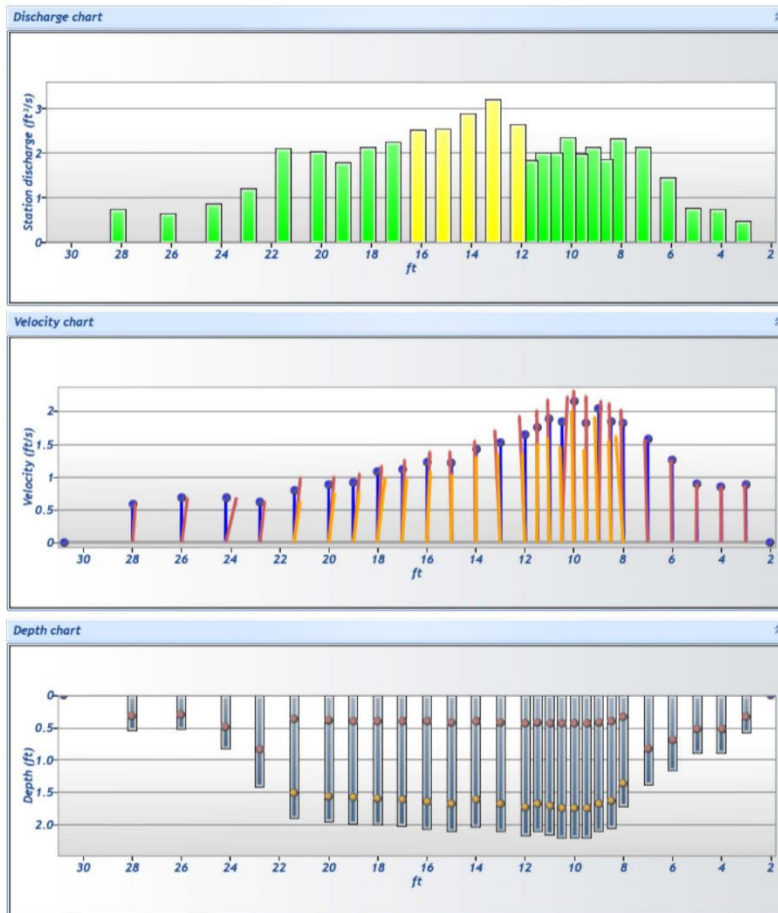
Summary overview
No changes were made to this file
Quality control warnings

12/3/2025 3:25:00 PM

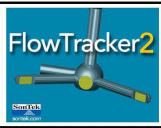
Discharge Measurement Summary

Site name	1139.CRCK01
Site number	
Operator(s)	JGO
File name	CRCK01_20251202-174711.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



12/3/2025 3:25:00 PM



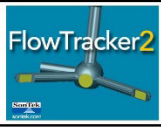
Discharge Measurement Summary

Site name 1139.CRCK01
Site number
Operator(s) JGO
File name CRCK01_20251202-174711.ft
Comment

Measurement results

St.#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	4:36 PM	2.000	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.8738	0.0000	0.0000	0.00	✓
1	4:37 PM	3.000	0.6	0.560	0.6000	0.336	80	0.8738	1.0000	0.8738	0.5600	0.4893	0.98	✓
2	4:40 PM	4.000	0.6	0.880	0.6000	0.528	80	0.8533	1.0000	0.8533	0.8800	0.7509	1.50	✓
3	4:41 PM	5.000	0.6	0.880	0.6000	0.528	80	0.8946	1.0000	0.8946	0.8800	0.7872	1.57	✓
4	4:43 PM	6.000	0.6	1.160	0.6000	0.696	80	1.2584	1.0000	1.2584	1.1600	1.4597	2.92	✓
5	4:45 PM	7.000	0.6	1.370	0.6000	0.822	80	1.5680	1.0000	1.5680	1.3700	2.1481	4.30	✓
6	4:46 PM	8.000	0.2/0.8	1.710	0.2000	0.342	80	2.0266	1.0000	1.8245	1.2825	2.3400	4.68	✓
6	4:46 PM	8.000	0.2/0.8	1.710	0.8000	1.368	80	1.6225	1.0000	1.8245	1.2825	2.3400	4.68	✓
7	5:30 PM	8.500	0.2/0.8	2.050	0.2000	0.410	80	2.1217	1.0000	1.8353	1.0250	1.8812	3.76	✓
7	5:30 PM	8.500	0.2/0.8	2.050	0.8000	1.640	80	1.5489	1.0000	1.8353	1.0250	1.8812	3.76	✓
8	4:48 PM	9.000	0.2/0.8	2.100	0.2000	0.420	80	2.1603	1.0000	2.0369	1.0500	2.1387	4.28	✓
8	4:48 PM	9.000	0.2/0.8	2.100	0.8000	1.680	80	1.9135	1.0000	2.0369	1.0500	2.1387	4.28	✓
9	5:41 PM	9.500	0.2/0.8	2.200	0.2000	0.440	80	2.2281	1.0000	1.8206	1.1000	2.0026	4.01	✓
9	5:41 PM	9.500	0.2/0.8	2.200	0.8000	1.760	80	1.4130	1.0000	1.8206	1.1000	2.0026	4.01	✓
10	4:51 PM	10.000	0.2/0.8	2.200	0.2000	0.440	80	2.3142	1.0000	2.1528	1.1000	2.3681	4.74	✓
10	4:51 PM	10.000	0.2/0.8	2.200	0.8000	1.760	80	1.9914	1.0000	2.1528	1.1000	2.3681	4.74	✓
11	5:35 PM	10.500	0.2/0.8	2.200	0.2000	0.440	80	2.2231	1.0000	1.8426	1.1000	2.0268	4.05	✓
11	5:35 PM	10.500	0.2/0.8	2.200	0.8000	1.760	80	1.4620	1.0000	1.8426	1.1000	2.0268	4.05	✓
12	4:54 PM	11.000	0.2/0.8	2.150	0.2000	0.430	80	2.1754	1.0000	1.8860	1.0750	2.0275	4.06	✓
12	4:54 PM	11.000	0.2/0.8	2.150	0.8000	1.720	80	1.5967	1.0000	1.8860	1.0750	2.0275	4.06	✓
13	5:38 PM	11.500	0.2/0.8	2.100	0.2000	0.420	80	2.0146	1.0000	1.7525	1.0500	1.8402	3.68	✓
13	5:38 PM	11.500	0.2/0.8	2.100	0.8000	1.680	80	1.4905	1.0000	1.7525	1.0500	1.8402	3.68	✓
14	4:57 PM	12.000	0.2/0.8	2.170	0.2000	0.434	80	1.9251	1.0000	1.6366	1.6275	2.6636	5.33	✓
14	4:57 PM	12.000	0.2/0.8	2.170	0.8000	1.736	80	1.3482	1.0000	1.6366	1.6275	2.6636	5.33	✓
15	5:00 PM	13.000	0.2/0.8	2.100	0.2000	0.420	80	1.7106	1.0000	1.5267	2.1000	3.2061	6.41	✓
15	5:00 PM	13.000	0.2/0.8	2.100	0.8000	1.680	80	1.3429	1.0000	1.5267	2.1000	3.2061	6.41	✓
16	5:02 PM	14.000	0.2/0.8	2.030	0.2000	0.406	80	1.5488	1.0000	1.4285	2.0300	2.8999	5.80	✓
16	5:02 PM	14.000	0.2/0.8	2.030	0.8000	1.624	80	1.3083	1.0000	1.4285	2.0300	2.8999	5.80	✓
17	5:05 PM	15.000	0.2/0.8	2.100	0.2000	0.420	80	1.3875	1.0000	1.2125	2.1000	2.5462	5.09	✓
17	5:05 PM	15.000	0.2/0.8	2.100	0.8000	1.680	80	1.0374	1.0000	1.2125	2.1000	2.5462	5.09	✓
18	5:08 PM	16.000	0.2/0.8	2.060	0.2000	0.412	80	1.3828	1.0000	1.2331	2.0600	2.5402	5.08	✓
18	5:08 PM	16.000	0.2/0.8	2.060	0.8000	1.648	80	1.0834	1.0000	1.2331	2.0600	2.5402	5.08	✓
19	5:10 PM	17.000	0.2/0.8	2.020	0.2000	0.404	80	1.2594	1.0000	1.1167	2.0200	2.2558	4.51	✓
19	5:10 PM	17.000	0.2/0.8	2.020	0.8000	1.616	80	0.9740	1.0000	1.1167	2.0200	2.2558	4.51	✓
20	5:13 PM	18.000	0.2/0.8	2.000	0.2000	0.400	80	1.1669	1.0000	1.0719	2.0000	2.1438	4.29	✓
20	5:13 PM	18.000	0.2/0.8	2.000	0.8000	1.600	80	0.9769	1.0000	1.0719	2.0000	2.1438	4.29	✓
21	5:15 PM	19.000	0.2/0.8	1.980	0.2000	0.396	80	1.0491	1.0000	0.9085	1.9800	1.7989	3.60	✓
21	5:15 PM	19.000	0.2/0.8	1.980	0.8000	1.584	80	0.7679	1.0000	0.9085	1.9800	1.7989	3.60	✓
22	5:17 PM	20.000	0.2/0.8	1.950	0.2000	0.390	80	1.0027	1.0000	0.8784	2.3400	2.0555	4.11	✓
22	5:17 PM	20.000	0.2/0.8	1.950	0.8000	1.560	80	0.7541	1.0000	0.8784	2.3400	2.0555	4.11	✓
23	5:20 PM	21.400	0.2/0.8	1.890	0.2000	0.378	80	0.9804	1.0000	0.8006	2.6460	2.1184	4.24	✓
23	5:20 PM	21.400	0.2/0.8	1.890	0.8000	1.512	80	0.6208	1.0000	0.8006	2.6460	2.1184	4.24	✓
24	5:22 PM	22.800	0.6	1.400	0.6000	0.840	80	0.6181	1.0000	0.6181	1.9600	1.2115	2.42	✓
25	5:23 PM	24.200	0.6	0.810	0.6000	0.486	80	0.6815	1.0000	0.6815	1.2960	0.8832	1.77	✓
26	5:25 PM	26.000	0.6	0.510	0.6000	0.306	80	0.6761	1.0000	0.6761	0.9690	0.6552	1.31	✓
27	5:27 PM	28.000	0.6	0.530	0.6000	0.318	80	0.5871	1.0000	0.5871	1.2720	0.7468	1.49	✓
28	5:28 PM	30.800	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.5871	0.0000	0.0000	0.00	✓

12/3/2025 3:25:00 PM



Discharge Measurement Summary

Site name 1139.CRCK01
Site number
Operator(s) JGO
File name CRCK01_20251202-174711.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	20.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
6	4:46 PM	8.000	0.2/0.8	1.710	0.2000	0.342	Standard Error > QC
6	4:46 PM	8.000	0.2/0.8	1.710	0.8000	1.368	Standard Error > QC
7	5:30 PM	8.500	0.2/0.8	2.050	0.2000	0.410	Standard Error > QC
7	5:30 PM	8.500	0.2/0.8	2.050	0.8000	1.640	Standard Error > QC
9	5:41 PM	9.500	0.2/0.8	2.200	0.2000	0.440	Standard Error > QC
9	5:41 PM	9.500	0.2/0.8	2.200	0.8000	1.760	Standard Error > QC
10	4:51 PM	10.000	0.2/0.8	2.200	0.2000	0.440	Standard Error > QC
10	4:51 PM	10.000	0.2/0.8	2.200	0.8000	1.760	Standard Error > QC
11	5:35 PM	10.500	0.2/0.8	2.200	0.2000	0.440	Standard Error > QC
11	5:35 PM	10.500	0.2/0.8	2.200	0.8000	1.760	Standard Error > QC
12	4:54 PM	11.000	0.2/0.8	2.150	0.2000	0.430	Standard Error > QC
12	4:54 PM	11.000	0.2/0.8	2.150	0.8000	1.720	Standard Error > QC
13	5:38 PM	11.500	0.2/0.8	2.100	0.2000	0.420	Standard Error > QC
13	5:38 PM	11.500	0.2/0.8	2.100	0.8000	1.680	Standard Error > QC
14	4:57 PM	12.000	0.2/0.8	2.170	0.2000	0.434	Standard Error > QC
14	4:57 PM	12.000	0.2/0.8	2.170	0.8000	1.736	Standard Error > QC
15	5:00 PM	13.000	0.2/0.8	2.100	0.2000	0.420	Standard Error > QC
15	5:00 PM	13.000	0.2/0.8	2.100	0.8000	1.680	Standard Error > QC
17	5:05 PM	15.000	0.2/0.8	2.100	0.2000	0.420	Standard Error > QC
17	5:05 PM	15.000	0.2/0.8	2.100	0.8000	1.680	Standard Error > QC
23	5:20 PM	21.400	0.2/0.8	1.890	0.2000	0.378	Velocity Angle > QC
23	5:20 PM	21.400	0.2/0.8	1.890	0.8000	1.512	Velocity Angle > QC
25	5:23 PM	24.200	0.6	0.810	0.6000	0.486	Velocity Angle > QC

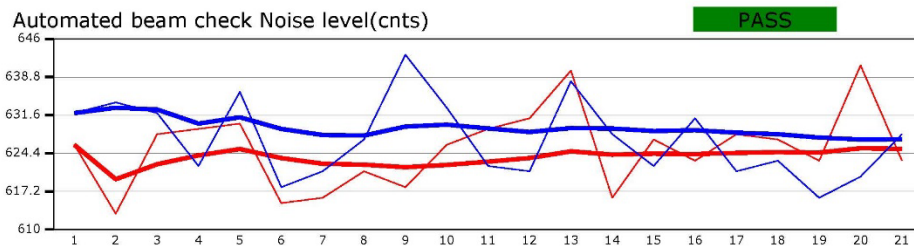
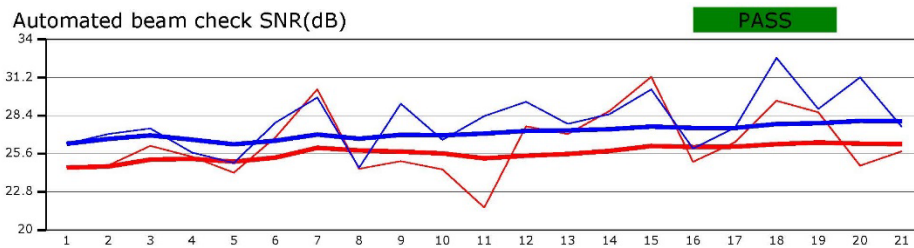
12/3/2025 3:25:00 PM

Discharge Measurement Summary

Site name	1139.CRCK01
Site number	
Operator(s)	JGO
File name	CRCK01_20251202-174711.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 4:36:16 PM



Automated beam check Quality control warnings No quality control warnings

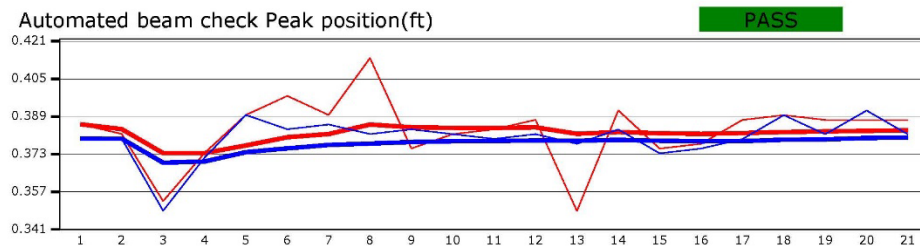
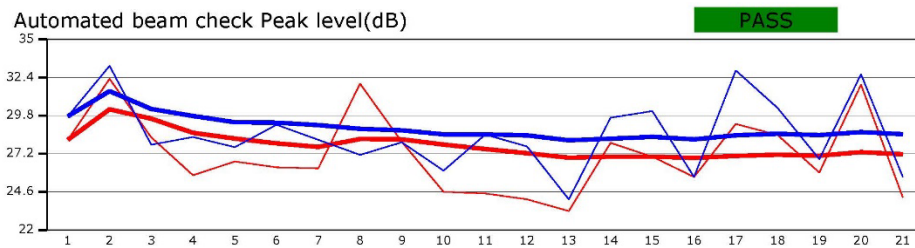
12/3/2025 3:25:00 PM

Discharge Measurement Summary

Site name	1139.CRCK01
Site number	
Operator(s)	JGO
File name	CRCK01_20251202-174711.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 4:36:16 PM



Automated beam check Quality control warnings No quality control warnings

12/3/2025 3:25:00 PM

6.1.5 CRCKSR

	Discharge Measurement Summary
---	---

Site name	CRCKSR
Site number	1
Operator(s)	DM
File name	CRCKSR_20250910-135549.ft
Comment	

Start time 9/10/2025 12:53 PM End time 9/10/2025 1:49 PM Start location latitude 40.139 Start location longitude -122.141 Calculations engine FlowTracker2	Sensor type Top Setting Handheld serial number FT2H2126012 Probe serial number FT2P2127007 Probe firmware 1.30 Handheld software 2.0
---	---

# Stations	Avg interval (s)	Total discharge (ft³/s)
37	40	9.0724

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
38.100	37.8975	38.633

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
30	0.995	0.2394

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
72.252	1.450	0.6548

Discharge Uncertainty			Discharge equation Mid Section	
Category	ISO	IVE	Discharge uncertainty	IVE
Accuracy	1.0%	1.0%	Discharge reference	Rated
Depth	0.1%	1.9%		
Velocity	0.4%	4.4%		
Width	0.1%	0.1%		
Method	1.5%			
# Stations	1.4%			
Overall	2.3%	4.9%		

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

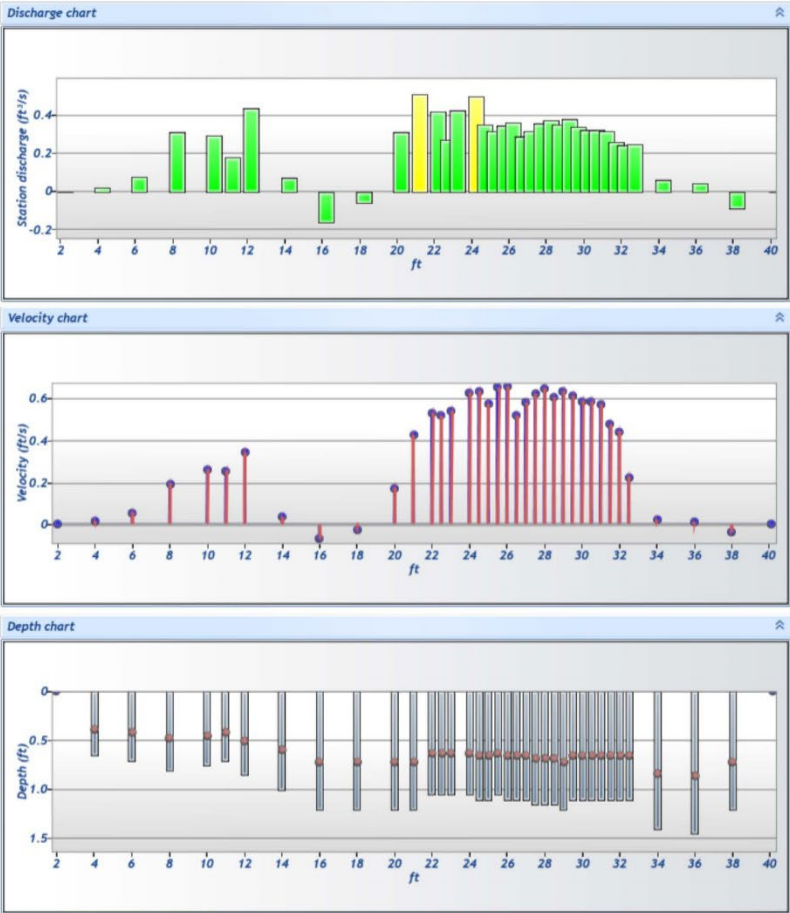
Summary overview
No changes were made to this file
Quality control warnings

9/11/2025 8:27:30 AM

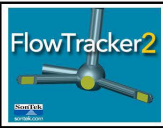
Discharge Measurement Summary

Site name	CRCKSR
Site number	1
Operator(s)	DM
File name	CRCKSR_20250910-135549.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



9/11/2025 8:27:30 AM



Discharge Measurement Summary

Site name CRCKSR
Site number 1
Operator(s) DM
File name CRCKSR_20250910-135549.ft
Comment

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	12:53 PM	2.000	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.0175	0.0000	0.0000	0.00	✓
1	12:54 PM	4.000	0.6	0.650	0.6000	0.390	80	0.0175	1.0000	0.0175	1.3000	0.0228	0.25	✓
2	12:56 PM	6.000	0.6	0.700	0.6000	0.420	80	0.0554	1.0000	0.0554	1.4000	0.0776	0.86	✓
3	12:57 PM	8.000	0.6	0.800	0.6000	0.480	80	0.1943	1.0000	0.1943	1.6000	0.3109	3.43	✓
4	12:59 PM	10.000	0.6	0.750	0.6000	0.450	80	0.2591	1.0000	0.2591	1.1250	0.2914	3.21	✓
5	1:28 PM	11.000	0.6	0.700	0.6000	0.420	80	0.2551	1.0000	0.2551	0.7000	0.1786	1.97	✓
6	1:00 PM	12.000	0.6	0.850	0.6000	0.510	80	0.3420	1.0000	0.3420	1.2750	0.4361	4.81	✓
7	1:02 PM	14.000	0.6	1.000	0.6000	0.600	80	0.0364	1.0000	0.0364	2.0000	0.0727	0.80	✓
8	1:04 PM	16.000	0.6	1.200	0.6000	0.720	80	-0.0665	1.0000	-0.0665	2.4000	-0.1595	-1.76	✓
9	1:05 PM	18.000	0.6	1.200	0.6000	0.720	80	-0.0256	1.0000	-0.0256	2.4000	-0.0615	-0.68	✓
10	1:06 PM	20.000	0.6	1.200	0.6000	0.720	80	0.1734	1.0000	0.1734	1.8000	0.3120	3.44	✓
11	1:32 PM	21.000	0.6	1.200	0.6000	0.720	80	0.4243	1.0000	0.4243	1.2000	0.5092	5.61	✓
12	1:07 PM	22.000	0.6	1.050	0.6000	0.630	80	0.5298	1.0000	0.5298	0.7875	0.4172	4.60	✓
13	1:30 PM	22.500	0.6	1.050	0.6000	0.630	80	0.5147	1.0000	0.5147	0.5250	0.2702	2.98	✓
14	1:26 PM	23.000	0.6	1.050	0.6000	0.630	80	0.5398	1.0000	0.5398	0.7875	0.4251	4.69	✓
15	1:09 PM	24.000	0.6	1.050	0.6000	0.630	80	0.6272	1.0000	0.6272	0.7875	0.4939	5.44	✓
16	1:34 PM	24.500	0.6	1.100	0.6000	0.660	80	0.6327	1.0000	0.6327	0.5500	0.3480	3.84	✓
17	1:24 PM	25.000	0.6	1.100	0.6000	0.660	80	0.5716	1.0000	0.5716	0.5500	0.3144	3.47	✓
18	1:49 PM	25.500	0.6	1.050	0.6000	0.630	80	0.6490	1.0000	0.6490	0.5250	0.3407	3.76	✓
19	1:10 PM	26.000	0.6	1.100	0.6000	0.660	80	0.6548	1.0000	0.6548	0.5500	0.3602	3.97	✓
20	1:36 PM	26.500	0.6	1.100	0.6000	0.660	80	0.5162	1.0000	0.5162	0.5500	0.2839	3.13	✓
21	1:23 PM	27.000	0.6	1.100	0.6000	0.660	80	0.5765	1.0000	0.5765	0.5500	0.3171	3.50	✓
22	1:47 PM	27.500	0.6	1.150	0.6000	0.690	80	0.6181	1.0000	0.6181	0.5750	0.3554	3.92	✓
23	1:11 PM	28.000	0.6	1.150	0.6000	0.690	80	0.6472	1.0000	0.6472	0.5750	0.3721	4.10	✓
24	1:38 PM	28.500	0.6	1.150	0.6000	0.690	80	0.6037	1.0000	0.6037	0.5750	0.3471	3.83	✓
25	1:21 PM	29.000	0.6	1.200	0.6000	0.720	80	0.6310	1.0000	0.6310	0.6000	0.3786	4.17	✓
26	1:40 PM	29.500	0.6	1.100	0.6000	0.660	80	0.6109	1.0000	0.6109	0.5500	0.3360	3.70	✓
27	1:12 PM	30.000	0.6	1.100	0.6000	0.660	80	0.5864	1.0000	0.5864	0.5500	0.3225	3.55	✓
28	1:41 PM	30.500	0.6	1.100	0.6000	0.660	80	0.5836	1.0000	0.5836	0.5500	0.3210	3.54	✓
29	1:20 PM	31.000	0.6	1.100	0.6000	0.660	80	0.5712	1.0000	0.5712	0.5500	0.3142	3.46	✓
30	1:43 PM	31.500	0.6	1.100	0.6000	0.660	80	0.4741	1.0000	0.4741	0.5500	0.2607	2.87	✓
31	1:14 PM	32.000	0.6	1.100	0.6000	0.660	80	0.4416	1.0000	0.4416	0.5500	0.2429	2.68	✓
32	1:45 PM	32.500	0.6	1.100	0.6000	0.660	80	0.2255	1.0000	0.2255	1.1000	0.2481	2.73	✓
33	1:15 PM	34.000	0.6	1.400	0.6000	0.840	80	0.0239	1.0000	0.0239	2.4500	0.0587	0.65	✓
34	1:17 PM	36.000	0.6	1.450	0.6000	0.870	80	0.0139	1.0000	0.0139	2.9000	0.0402	0.44	✓
35	1:18 PM	38.000	0.6	1.200	0.6000	0.720	80	-0.0349	1.0000	-0.0349	2.4600	-0.0859	-0.95	✓
36	1:19 PM	40.100	None	0.000	0.0000	0.000	0	0.0000	1.0000	-0.0349	0.0000	0.0000	0.00	✓

9/11/2025 8:27:30 AM

Discharge Measurement Summary

Site name	CRCKSR
Site number	1
Operator(s)	DM
File name	CRCKSR_20250910-135549.ft
Comment	

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	15.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	12:54 PM	4.000	0.6	0.650	0.6000	0.390	SNR Threshold Variation
2	12:56 PM	6.000	0.6	0.700	0.6000	0.420	Boundary Interference, Large SNR Variation
7	1:02 PM	14.000	0.6	1.000	0.6000	0.600	SNR Threshold Variation
8	1:04 PM	16.000	0.6	1.200	0.6000	0.720	SNR Threshold Variation, Velocity Angle > QC
9	1:05 PM	18.000	0.6	1.200	0.6000	0.720	SNR Threshold Variation
33	1:15 PM	34.000	0.6	1.400	0.6000	0.840	Large SNR Variation
34	1:17 PM	36.000	0.6	1.450	0.6000	0.870	SNR Threshold Variation
35	1:18 PM	38.000	0.6	1.200	0.6000	0.720	SNR Threshold Variation
36	1:19 PM	40.100	None	0.000	0.0000	0.000	Water Depth > QC

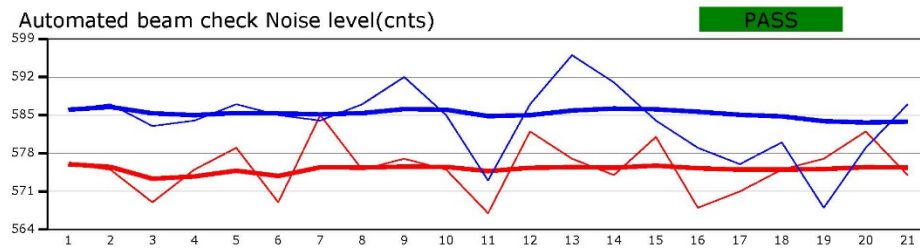
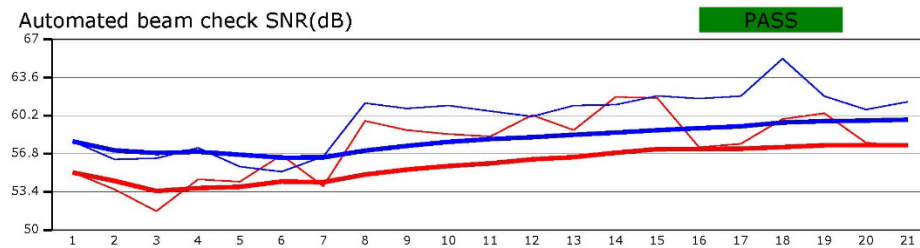
9/11/2025 8:27:30 AM

Discharge Measurement Summary

Site name	CRCKSR
Site number	1
Operator(s)	DM
File name	CRCKSR_20250910-135549.ft
Comment	

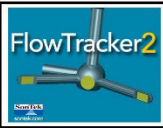
Beam 1	
Beam 2	

Automated beam check Start time 9/10/2025 12:53:19 PM



Automated beam check Quality control warnings No quality control warnings

9/11/2025 8:27:30 AM

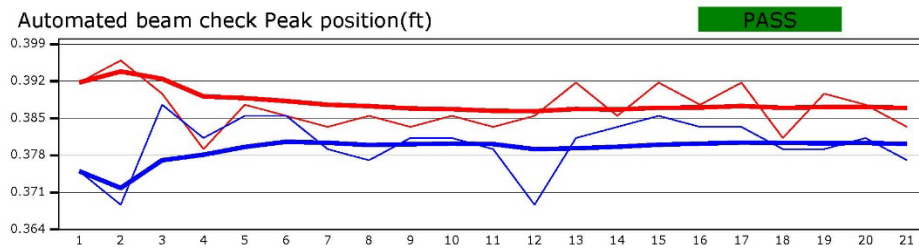
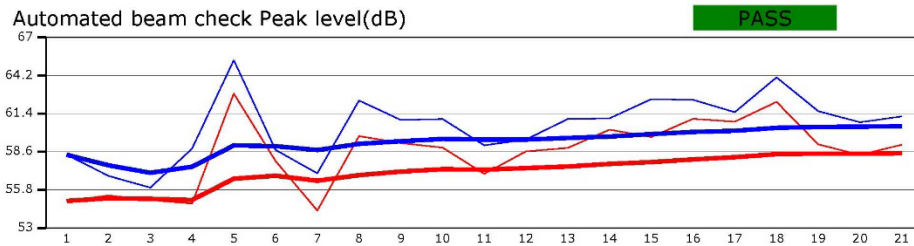


Discharge Measurement Summary

Site name CRCKSR
Site number 1
Operator(s) DM
File name CRCKSR_20250910-135549.ft
Comment

Beam 1	
Beam 2	

Automated beam check Start time 9/10/2025 12:53:19 PM



Automated beam check Quality control warnings
 No quality control warnings

9/11/2025 8:27:30 AM



Discharge Measurement Summary

Site name	CRCKSR
Site number	
Operator(s)	JGO
File name	CRCKSC_20251002-112046.ft
Comment	

Start time	10/2/2025 10:01 AM	Sensor type	Top Setting
End time	10/2/2025 11:11 AM	Handheld serial number	FT2H2126012
Start location latitude	40.139	Probe serial number	FT2P2127007
Start location longitude	-122.141	Probe firmware	1.30
Calculations engine	FlowTracker2	Handheld software	2.0

# Stations	Avg interval (s)	Total discharge (ft³/s)
41	40	27.3407

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
42.500	50.9655	43.028

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
40	1.199	0.5365

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
64.027	1.800	1.4012

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.1%	1.4%
Velocity	0.5%	3.8%
Width	0.1%	0.1%
Method	1.4%	
# Stations	1.3%	
Overall	2.2%	4.2%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

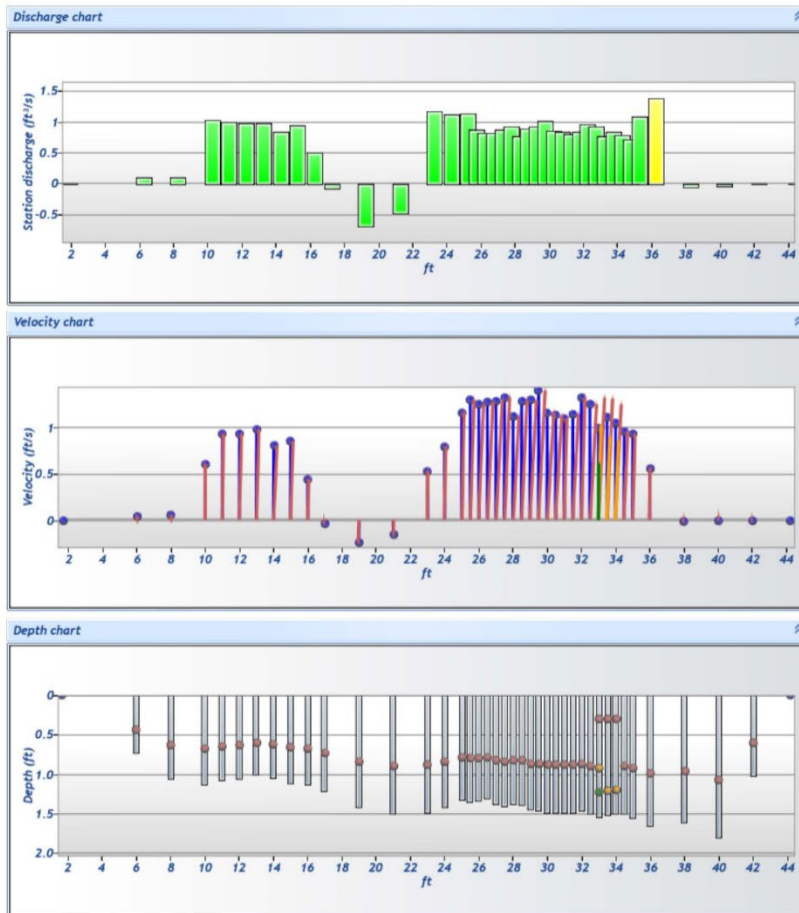
Summary overview
No changes were made to this file
Quality control warnings

3/19/2026 11:18:02 AM

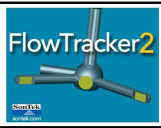
Discharge Measurement Summary

Site name CRCKSR
Site number
Operator(s) JGO
File name CRCKSC_20251002-112046.ft
Comment

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



3/19/2026 11:18:02 AM

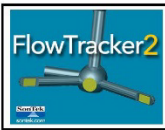


Discharge Measurement Summary

Site name CRCKSR
Site number
Operator(s) JGO
File name CRCKSC_20251002-112046.ft
Comment

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
40	10:55 AM	1.700	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.0429	0.0000	0.0000	0.00	✓
39	10:54 AM	6.000	0.6	0.730	0.6000	0.438	80	0.0429	1.0000	0.0429	2.2995	0.0988	0.36	✓
38	10:52 AM	8.000	0.6	1.060	0.6000	0.636	80	0.0497	1.0000	0.0497	2.1200	0.1054	0.39	✓
37	10:51 AM	10.000	0.6	1.130	0.6000	0.678	80	0.6062	1.0000	0.6062	1.6950	1.0275	3.76	✓
36	10:50 AM	11.000	0.6	1.070	0.6000	0.642	80	0.9313	1.0000	0.9313	1.0700	0.9965	3.64	✓
35	10:49 AM	12.000	0.6	1.050	0.6000	0.630	80	0.9308	1.0000	0.9308	1.0500	0.9773	3.57	✓
34	10:47 AM	13.000	0.6	1.000	0.6000	0.600	80	0.9777	1.0000	0.9777	1.0000	0.9777	3.58	✓
33	10:46 AM	14.000	0.6	1.040	0.6000	0.624	80	0.8039	1.0000	0.8039	1.0400	0.8361	3.06	✓
32	10:44 AM	15.000	0.6	1.110	0.6000	0.666	80	0.8502	1.0000	0.8502	1.1100	0.9437	3.45	✓
31	10:43 AM	16.000	0.6	1.130	0.6000	0.678	80	0.4433	1.0000	0.4433	1.1300	0.5010	1.83	✓
30	10:41 AM	17.000	0.6	1.210	0.6000	0.726	80	-0.0440	1.0000	-0.0440	1.8150	-0.0798	-0.29	✓
29	10:40 AM	19.000	0.6	1.410	0.6000	0.846	80	-0.2434	1.0000	-0.2434	2.8200	-0.6863	-2.51	✓
28	10:38 AM	21.000	0.6	1.500	0.6000	0.900	80	-0.1610	1.0000	-0.1610	3.0000	-0.4830	-1.77	✓
27	10:37 AM	23.000	0.6	1.480	0.6000	0.888	80	0.5262	1.0000	0.5262	2.2200	1.1682	4.27	✓
26	10:36 AM	24.000	0.6	1.410	0.6000	0.846	80	0.7937	1.0000	0.7937	1.4100	1.1191	4.09	✓
25	10:34 AM	25.000	0.6	1.310	0.6000	0.786	80	1.1620	1.0000	1.1620	0.9825	1.1417	4.18	✓
24	10:56 AM	25.500	0.6	1.340	0.6000	0.804	80	1.2974	1.0000	1.2974	0.6700	0.8693	3.18	✓
23	10:33 AM	26.000	0.6	1.330	0.6000	0.798	80	1.2495	1.0000	1.2495	0.6650	0.8309	3.04	✓
22	10:58 AM	26.500	0.6	1.300	0.6000	0.780	80	1.2771	1.0000	1.2771	0.6500	0.8301	3.04	✓
21	10:31 AM	27.000	0.6	1.370	0.6000	0.822	80	1.2887	1.0000	1.2887	0.6850	0.8827	3.23	✓
20	10:59 AM	27.500	0.6	1.400	0.6000	0.840	80	1.3277	1.0000	1.3277	0.7000	0.9294	3.40	✓
19	10:30 AM	28.000	0.6	1.370	0.6000	0.822	80	1.1253	1.0000	1.1253	0.6850	0.7708	2.82	✓
18	11:00 AM	28.500	0.6	1.380	0.6000	0.828	80	1.2919	1.0000	1.2919	0.6900	0.8914	3.26	✓
17	10:27 AM	29.000	0.6	1.440	0.6000	0.864	80	1.2958	1.0000	1.2958	0.7200	0.9329	3.41	✓
16	11:01 AM	29.500	0.6	1.450	0.6000	0.870	80	1.4012	1.0000	1.4012	0.7250	1.0159	3.72	✓
15	10:23 AM	30.000	0.6	1.480	0.6000	0.888	80	1.1618	1.0000	1.1618	0.7400	0.8597	3.14	✓
14	11:04 AM	30.500	0.6	1.480	0.6000	0.888	80	1.1321	1.0000	1.1321	0.7400	0.8377	3.06	✓
13	10:22 AM	31.000	0.6	1.480	0.6000	0.888	80	1.0987	1.0000	1.0987	0.7400	0.8130	2.97	✓
12	11:05 AM	31.500	0.6	1.480	0.6000	0.888	80	1.1447	1.0000	1.1447	0.7400	0.8470	3.10	✓
11	10:20 AM	32.000	0.6	1.450	0.6000	0.870	80	1.3264	1.0000	1.3264	0.7250	0.9617	3.52	✓
10	11:06 AM	32.500	0.6	1.490	0.6000	0.894	80	1.2523	1.0000	1.2523	0.7450	0.9330	3.41	✓
9	10:15 AM	33.000	0.2/0.6/0.8	1.540	0.2000	0.308	80	1.3240	1.0000	0.9970	0.7700	0.7677	2.81	✓
9	10:15 AM	33.000	0.2/0.6/0.8	1.540	0.6000	0.924	80	1.0257	1.0000	0.9970	0.7700	0.7677	2.81	✓
9	10:15 AM	33.000	0.2/0.6/0.8	1.540	0.8000	1.232	80	0.6126	1.0000	0.9970	0.7700	0.7677	2.81	✓
8	11:08 AM	33.500	0.2/0.8	1.510	0.2000	0.302	80	1.3129	1.0000	1.1068	0.7550	0.8356	3.06	✓
8	11:08 AM	33.500	0.2/0.8	1.510	0.8000	1.208	80	0.9006	1.0000	1.1068	0.7550	0.8356	3.06	✓
7	10:12 AM	34.000	0.2/0.8	1.500	0.2000	0.300	80	1.2520	1.0000	1.0524	0.7500	0.7893	2.89	✓
7	10:12 AM	34.000	0.2/0.8	1.500	0.8000	1.200	80	0.8528	1.0000	1.0524	0.7500	0.7893	2.89	✓
6	11:11 AM	34.500	0.6	1.500	0.6000	0.900	80	0.9614	1.0000	0.9614	0.7500	0.7210	2.64	✓
5	10:10 AM	35.000	0.6	1.550	0.6000	0.930	80	0.9292	1.0000	0.9292	1.1625	1.0802	3.95	✓
4	10:08 AM	36.000	0.6	1.650	0.6000	0.990	80	0.5622	1.0000	0.5622	2.4750	1.3915	5.09	✓
3	10:06 AM	38.000	0.6	1.600	0.6000	0.960	80	-0.0167	1.0000	-0.0167	3.2000	-0.0533	-0.19	✓
2	10:04 AM	40.000	0.6	1.800	0.6000	1.080	80	-0.0100	1.0000	-0.0100	3.6000	-0.0360	-0.13	✓
1	10:02 AM	42.000	0.6	1.010	0.6000	0.606	80	-0.0023	1.0000	-0.0023	2.1210	-0.0050	-0.02	✓
0	10:01 AM	44.200	None	0.000	0.0000	0.000	0	0.0000	1.0000	-0.0023	0.0000	0.0000	0.00	✓

3/19/2026 11:18:02 AM



Discharge Measurement Summary

Site name CRCKSR
Site number
Operator(s) JGO
File name CRCKSC_20251002-112046.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	15.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
30	10:41 AM	17.000	0.6	1.210	0.6000	0.726	SNR Threshold Variation
29	10:40 AM	19.000	0.6	1.410	0.6000	0.846	Velocity Angle > QC
28	10:38 AM	21.000	0.6	1.500	0.6000	0.900	Velocity Angle > QC
21	10:31 AM	27.000	0.6	1.370	0.6000	0.822	Velocity Angle > QC
19	10:30 AM	28.000	0.6	1.370	0.6000	0.822	Velocity Angle > QC
17	10:27 AM	29.000	0.6	1.440	0.6000	0.864	Velocity Angle > QC
16	11:01 AM	29.500	0.6	1.450	0.6000	0.870	Velocity Angle > QC
15	10:23 AM	30.000	0.6	1.480	0.6000	0.888	Velocity Angle > QC
14	11:04 AM	30.500	0.6	1.480	0.6000	0.888	Velocity Angle > QC
12	11:05 AM	31.500	0.6	1.480	0.6000	0.888	Velocity Angle > QC
10	11:06 AM	32.500	0.6	1.490	0.6000	0.894	Velocity Angle > QC
9	10:15 AM	33.000	0.2/0.6/0.8	1.540	0.2000	0.308	Velocity Angle > QC
9	10:15 AM	33.000	0.2/0.6/0.8	1.540	0.6000	0.924	Velocity Angle > QC
9	10:15 AM	33.000	0.2/0.6/0.8	1.540	0.8000	1.232	Velocity Angle > QC
7	10:12 AM	34.000	0.2/0.8	1.500	0.2000	0.300	Velocity Angle > QC
7	10:12 AM	34.000	0.2/0.8	1.500	0.8000	1.200	Velocity Angle > QC
2	10:04 AM	40.000	0.6	1.800	0.6000	1.080	SNR Threshold Variation
1	10:02 AM	42.000	0.6	1.010	0.6000	0.606	SNR Threshold Variation
0	10:01 AM	44.200	None	0.000	0.0000	0.000	Water Depth > QC

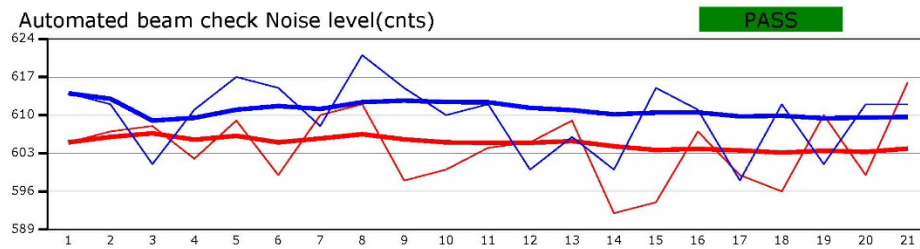
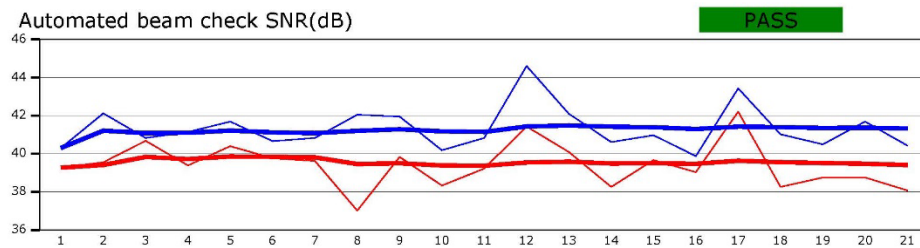
3/19/2026 11:18:02 AM

Discharge Measurement Summary

Site name	CRCKSR
Site number	
Operator(s)	JGO
File name	CRCKSC_20251002-112046.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 10/2/2025 10:00:40 AM



Automated beam check Quality control warnings No quality control warnings

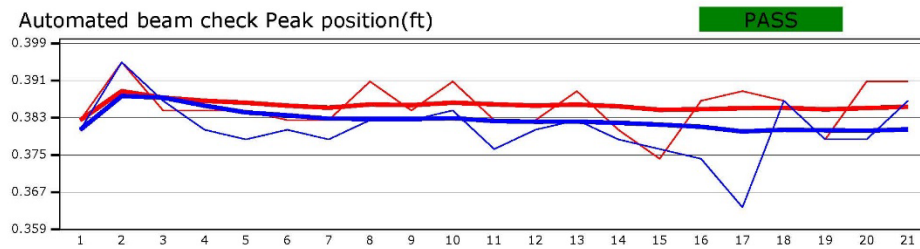
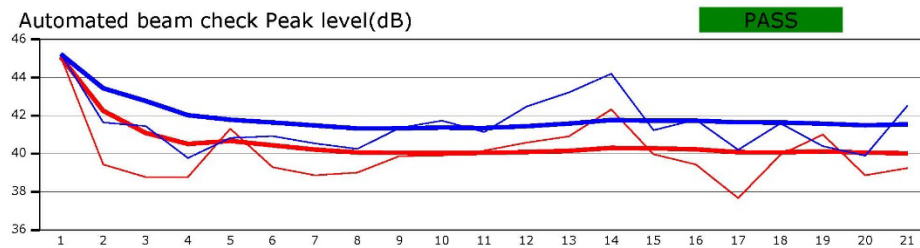
3/19/2026 11:18:02 AM

Discharge Measurement Summary

Site name	CRCKSR
Site number	
Operator(s)	JGO
File name	CRCKSC_20251002-112046.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 10/2/2025 10:00:40 AM



Automated beam check Quality control warnings No quality control warnings

3/19/2026 11:18:02 AM

Discharge Measurement Summary

Site name	CRCKSR
Site number	
Operator(s)	DM
File name	CRCKSR_20251202-153540.ft
Comment	

Start time	12/2/2025 2:29 PM	Sensor type	Top Setting
End time	12/2/2025 3:31 PM	Handheld serial number	FT2H2126012
Start location latitude	40.138	Probe serial number	FT2P2127007
Start location longitude	-122.141	Probe firmware	1.30
Calculations engine	FlowTracker2	Handheld software	2.0

# Stations	Avg interval (s)	Total discharge (ft³/s)
28	40	45.9534

Total width (ft)	Total area (ft²)	Wetted Perimeter (ft)
41.200	54.1600	41.787

Mean SNR (dB)	Mean depth (ft)	Mean velocity (ft/s)
29	1.315	0.8485

Mean temp (°F)	Max depth (ft)	Max velocity (ft/s)
45.008	1.830	1.9481

Discharge Uncertainty		
Category	ISO	IVE
Accuracy	1.0%	1.0%
Depth	0.1%	1.6%
Velocity	0.5%	3.7%
Width	0.1%	0.1%
Method	1.2%	
# Stations	1.8%	
Overall	2.4%	4.2%

Discharge equation	Mid Section
Discharge uncertainty	IVE
Discharge reference	Rated

Data Collection Settings	
Salinity	0.000 PSS-78
Temperature	-
Sound speed	-
Mounting correction	0.000 %

Summary overview
No changes were made to this file
Quality control warnings

12/3/2025 3:25:35 PM

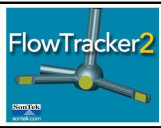
Discharge Measurement Summary

Site name	CRCKSR
Site number	
Operator(s)	DM
File name	CRCKSR_20251202-153540.ft
Comment	

Station Warning Settings	
Station discharge OK	Station discharge < 5.00%
Station discharge caution	5.00% >= Station discharge < 10.00%
Station discharge warning	Station discharge >= 10.00%



12/3/2025 3:25:35 PM



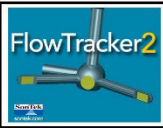
Discharge Measurement Summary

Site name CRCKSR
Site number
Operator(s) DM
File name CRCKSR_20251202-153540.ft
Comment

Measurement results

St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Samples	Velocity (ft/s)	Correction	Mean Velocity (ft/s)	Area (ft ²)	Flow (ft ³ /s)	%Q	
0	2:29 PM	7.900	None	0.000	0.0000	0.000	0	0.0000	1.0000	0.0015	0.0000	0.0000	0.00	✓
1	2:29 PM	9.000	0.6	0.550	0.6000	0.330	80	0.0015	1.0000	0.0015	0.8525	0.0013	0.00	✓
2	2:32 PM	11.000	0.6	0.750	0.6000	0.450	80	0.0434	1.0000	0.0434	1.5000	0.0651	0.14	✓
3	2:35 PM	13.000	0.6	1.000	0.6000	0.600	80	0.2364	1.0000	0.2364	2.0000	0.4728	1.03	✓
4	2:36 PM	15.000	0.6	1.300	0.6000	0.780	80	0.7731	1.0000	0.7731	2.6000	2.0101	4.37	✓
5	2:38 PM	17.000	0.6	1.080	0.6000	0.648	80	1.0596	1.0000	1.0596	2.1600	2.2888	4.98	✓
6	2:39 PM	19.000	0.6	1.200	0.6000	0.720	80	1.0894	1.0000	1.0894	2.4000	2.6145	5.69	✓
7	2:40 PM	21.000	0.6	1.300	0.6000	0.780	80	1.1165	1.0000	1.1165	2.6000	2.9028	6.32	✓
8	2:42 PM	23.000	0.6	1.300	0.6000	0.780	80	0.6949	1.0000	0.6949	2.6000	1.8068	3.93	✓
9	2:43 PM	25.000	0.2/0.6/0.8	1.600	0.2000	0.320	80	-0.1883	1.0000	-0.2122	3.2000	-0.6789	-1.48	✓
9	2:43 PM	25.000	0.2/0.6/0.8	1.600	0.6000	0.960	80	-0.2226	1.0000	-0.2122	3.2000	-0.6789	-1.48	✓
9	2:43 PM	25.000	0.2/0.6/0.8	1.600	0.8000	1.280	80	-0.2152	1.0000	-0.2122	3.2000	-0.6789	-1.48	✓
10	2:46 PM	27.000	0.2/0.6/0.8	1.740	0.2000	0.348	80	-0.1644	1.0000	-0.0702	3.4800	-0.2442	-0.53	✓
10	2:46 PM	27.000	0.2/0.6/0.8	1.740	0.6000	1.044	80	-0.0476	1.0000	-0.0702	3.4800	-0.2442	-0.53	✓
10	2:46 PM	27.000	0.2/0.6/0.8	1.740	0.8000	1.392	80	-0.0212	1.0000	-0.0702	3.4800	-0.2442	-0.53	✓
11	2:51 PM	29.000	0.2/0.6/0.8	1.830	0.2000	0.366	80	0.3848	1.0000	0.7410	3.6600	2.7119	5.90	✓
11	2:51 PM	29.000	0.2/0.6/0.8	1.830	0.6000	1.098	80	0.8448	1.0000	0.7410	3.6600	2.7119	5.90	✓
11	2:51 PM	29.000	0.2/0.6/0.8	1.830	0.8000	1.464	80	0.8894	1.0000	0.7410	3.6600	2.7119	5.90	✓
12	2:54 PM	31.000	0.2/0.8	1.500	0.2000	0.300	80	1.4357	1.0000	1.3631	2.2500	3.0669	6.67	✓
12	2:54 PM	31.000	0.2/0.8	1.500	0.8000	1.200	80	1.2905	1.0000	1.3631	2.2500	3.0669	6.67	✓
13	3:31 PM	32.000	0.2/0.8	1.500	0.2000	0.300	80	1.9481	1.0000	1.6209	1.5000	2.4314	5.29	✓
13	3:31 PM	32.000	0.2/0.8	1.500	0.8000	1.200	80	1.2937	1.0000	1.6209	1.5000	2.4314	5.29	✓
14	2:56 PM	33.000	0.6	1.450	0.6000	0.870	80	1.7079	1.0000	1.7079	1.4500	2.4765	5.39	✓
15	3:27 PM	34.000	0.2/0.8	1.500	0.2000	0.300	80	1.9060	1.0000	1.7201	1.5000	2.5802	5.61	✓
15	3:27 PM	34.000	0.2/0.8	1.500	0.8000	1.200	80	1.5342	1.0000	1.7201	1.5000	2.5802	5.61	✓
16	2:58 PM	35.000	0.2/0.8	1.600	0.2000	0.320	80	1.8464	1.0000	1.6139	1.6000	2.5823	5.62	✓
16	2:58 PM	35.000	0.2/0.8	1.600	0.8000	1.280	80	1.3814	1.0000	1.6139	1.6000	2.5823	5.62	✓
17	3:25 PM	36.000	0.2/0.8	1.650	0.2000	0.330	80	1.8842	1.0000	1.6154	1.6500	2.6655	5.80	✓
17	3:25 PM	36.000	0.2/0.8	1.650	0.8000	1.320	80	1.3467	1.0000	1.6154	1.6500	2.6655	5.80	✓
18	3:00 PM	37.000	0.2/0.8	1.650	0.2000	0.330	80	1.7588	1.0000	1.4787	1.6500	2.4398	5.31	✓
18	3:00 PM	37.000	0.2/0.8	1.650	0.8000	1.320	80	1.1985	1.0000	1.4787	1.6500	2.4398	5.31	✓
19	3:22 PM	38.000	0.2/0.8	1.650	0.2000	0.330	80	1.7681	1.0000	1.5277	1.6500	2.5207	5.49	✓
19	3:22 PM	38.000	0.2/0.8	1.650	0.8000	1.320	80	1.2873	1.0000	1.5277	1.6500	2.5207	5.49	✓
20	3:03 PM	39.000	0.2/0.8	1.600	0.2000	0.320	80	1.7428	1.0000	1.5352	1.6000	2.4563	5.35	✓
20	3:03 PM	39.000	0.2/0.8	1.600	0.8000	1.280	80	1.3275	1.0000	1.5352	1.6000	2.4563	5.35	✓
21	3:19 PM	40.000	0.2/0.8	1.600	0.2000	0.320	80	1.6356	1.0000	1.3124	1.6000	2.0998	4.57	✓
21	3:19 PM	40.000	0.2/0.8	1.600	0.8000	1.280	80	0.9891	1.0000	1.3124	1.6000	2.0998	4.57	✓
22	3:05 PM	41.000	0.2/0.8	1.550	0.2000	0.310	80	1.6232	1.0000	1.2628	1.5500	1.9574	4.26	✓
22	3:05 PM	41.000	0.2/0.8	1.550	0.8000	1.240	80	0.9024	1.0000	1.2628	1.5500	1.9574	4.26	✓
23	3:16 PM	42.000	0.2/0.8	1.600	0.2000	0.320	80	1.5086	1.0000	1.1649	1.6000	1.8638	4.06	✓
23	3:16 PM	42.000	0.2/0.8	1.600	0.8000	1.280	80	0.8211	1.0000	1.1649	1.6000	1.8638	4.06	✓
24	3:08 PM	43.000	0.2/0.8	1.500	0.2000	0.300	80	1.2655	1.0000	1.0671	2.2500	2.4009	5.22	✓
24	3:08 PM	43.000	0.2/0.8	1.500	0.8000	1.200	80	0.8686	1.0000	1.0671	2.2500	2.4009	5.22	✓
25	3:11 PM	45.000	0.6	1.450	0.6000	0.870	80	0.1599	1.0000	0.1599	2.9000	0.4637	1.01	✓
26	3:12 PM	47.000	0.6	1.150	0.6000	0.690	80	-0.0011	1.0000	-0.0011	2.3575	-0.0025	-0.01	✓
27	3:15 PM	49.100	None	0.000	0.0000	0.000	0	0.0000	1.0000	-0.0011	0.0000	0.0000	0.00	✓

12/3/2025 3:25:35 PM



Discharge Measurement Summary

Site name CRCKSR
Site number
Operator(s) DM
File name CRCKSR_20251202-153540.ft
Comment

Quality Control Settings	
Maximum depth change	50.00%
Maximum spacing change	100.00%
SNR threshold	10 dB
Standard error threshold	0.0328 ft/s
Spike threshold	10.00%
Maximum velocity angle	15.0 deg
Maximum tilt angle	5.0 deg

Quality control warnings							
St#	Time	Location (ft)	Method	Depth (ft)	%Depth	Measured Depth (ft)	Warnings
1	2:29 PM	9.000	0.6	0.550	0.6000	0.330	Beam SNRs Not Similar, SNR Threshold Variation
3	2:35 PM	13.000	0.6	1.000	0.6000	0.600	Large SNR Variation
8	2:42 PM	23.000	0.6	1.300	0.6000	0.780	Standard Error > QC
9	2:43 PM	25.000	0.2/0.6/0.8	1.600	0.2000	0.320	Velocity Angle > QC
9	2:43 PM	25.000	0.2/0.6/0.8	1.600	0.6000	0.960	Velocity Angle > QC
9	2:43 PM	25.000	0.2/0.6/0.8	1.600	0.8000	1.280	Velocity Angle > QC
10	2:46 PM	27.000	0.2/0.6/0.8	1.740	0.2000	0.348	Velocity Angle > QC
10	2:46 PM	27.000	0.2/0.6/0.8	1.740	0.6000	1.044	Velocity Angle > QC
10	2:46 PM	27.000	0.2/0.6/0.8	1.740	0.8000	1.392	Velocity Angle > QC
11	2:51 PM	29.000	0.2/0.6/0.8	1.830	0.2000	0.366	Standard Error > QC
11	2:51 PM	29.000	0.2/0.6/0.8	1.830	0.6000	1.098	Standard Error > QC
11	2:51 PM	29.000	0.2/0.6/0.8	1.830	0.8000	1.464	Standard Error > QC
12	2:54 PM	31.000	0.2/0.8	1.500	0.2000	0.300	Standard Error > QC
12	2:54 PM	31.000	0.2/0.8	1.500	0.8000	1.200	Standard Error > QC
13	3:31 PM	32.000	0.2/0.8	1.500	0.2000	0.300	Standard Error > QC
13	3:31 PM	32.000	0.2/0.8	1.500	0.8000	1.200	Standard Error > QC
16	2:58 PM	35.000	0.2/0.8	1.600	0.2000	0.320	Velocity Angle > QC
16	2:58 PM	35.000	0.2/0.8	1.600	0.8000	1.280	Velocity Angle > QC
17	3:25 PM	36.000	0.2/0.8	1.650	0.2000	0.330	Velocity Angle > QC
17	3:25 PM	36.000	0.2/0.8	1.650	0.8000	1.320	Velocity Angle > QC
20	3:03 PM	39.000	0.2/0.8	1.600	0.2000	0.320	Velocity Angle > QC
20	3:03 PM	39.000	0.2/0.8	1.600	0.8000	1.280	Velocity Angle > QC
21	3:19 PM	40.000	0.2/0.8	1.600	0.2000	0.320	Velocity Angle > QC
21	3:19 PM	40.000	0.2/0.8	1.600	0.8000	1.280	Velocity Angle > QC
23	3:16 PM	42.000	0.2/0.8	1.600	0.2000	0.320	Standard Error > QC, Velocity Angle > QC
23	3:16 PM	42.000	0.2/0.8	1.600	0.8000	1.280	Standard Error > QC, Velocity Angle > QC
27	3:15 PM	49.100	None	0.000	0.0000	0.000	Water Depth > QC

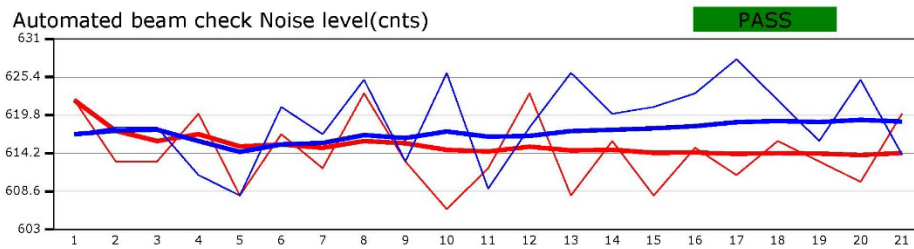
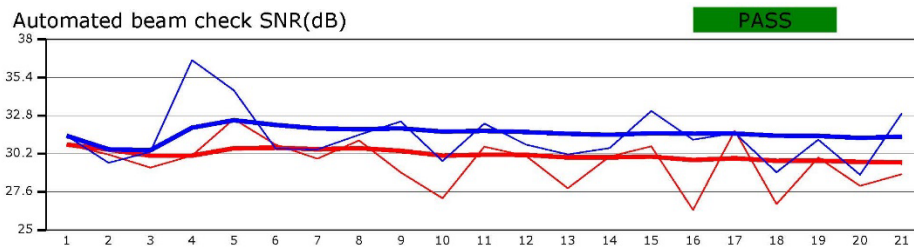
12/3/2025 3:25:35 PM

Discharge Measurement Summary

Site name	CRCKSR
Site number	
Operator(s)	DM
File name	CRCKSR_20251202-153540.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 2:28:02 PM



Automated beam check Quality control warnings No quality control warnings

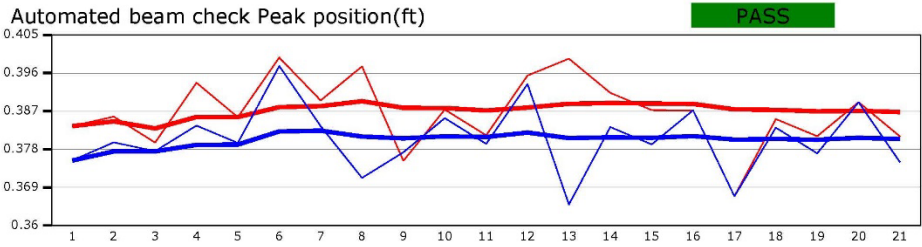
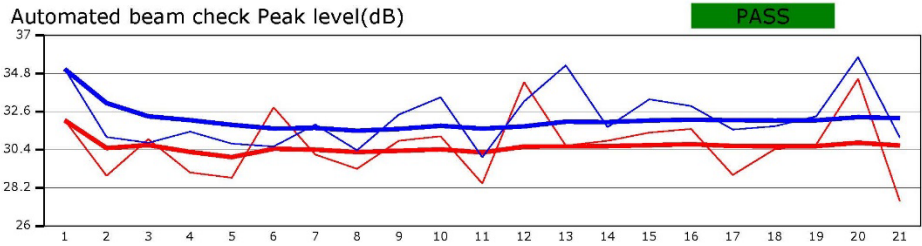
12/3/2025 3:25:35 PM

Discharge Measurement Summary

Site name	CRCKSR
Site number	
Operator(s)	DM
File name	CRCKSR_20251202-153540.ft
Comment	

Beam 1	
Beam 2	

Automated beam check Start time 12/2/2025 2:28:02 PM

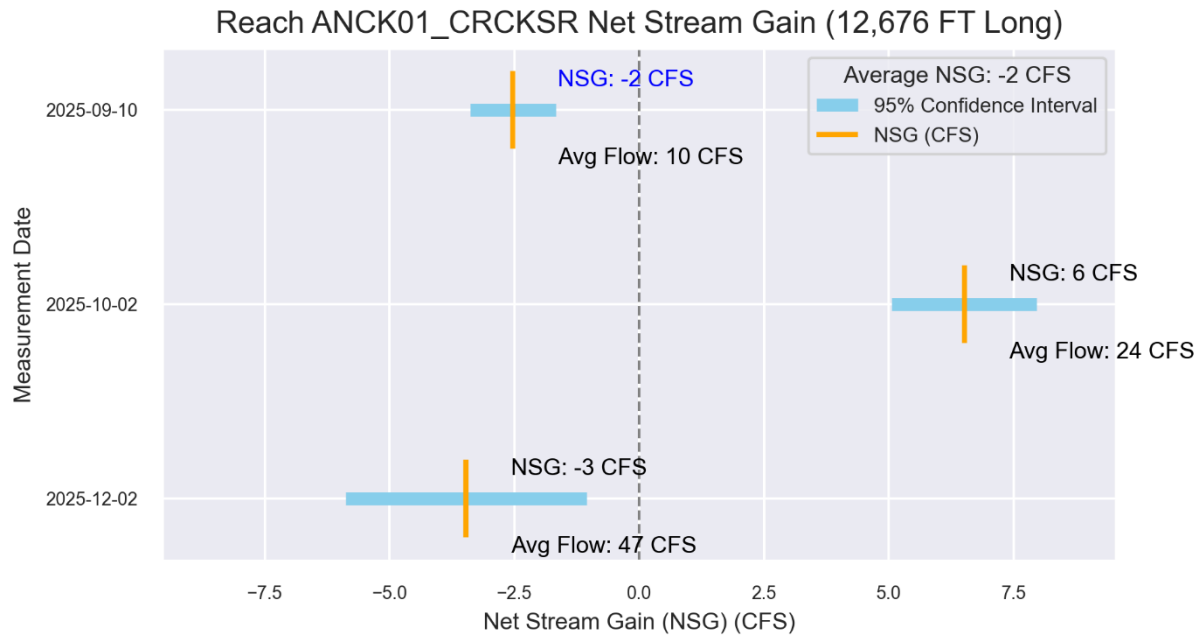


Automated beam check Quality control warnings No quality control warnings

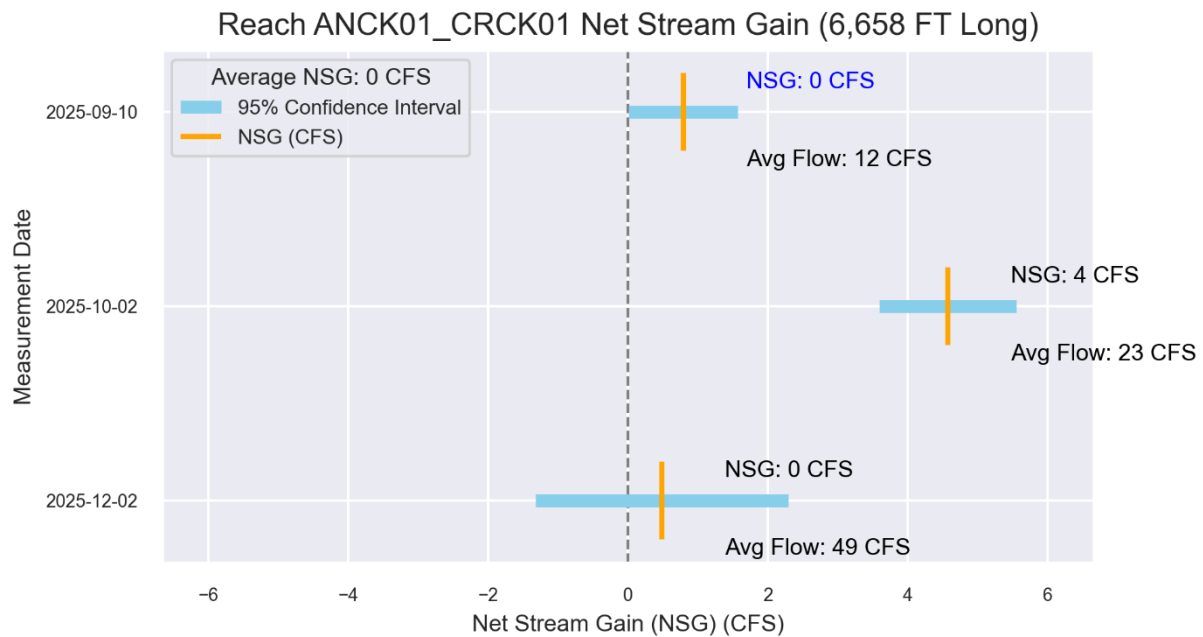
12/3/2025 3:25:35 PM

6.2 Stream Reach Water Budget Plots

6.2.1 ANCK01_CRCKSR



6.2.2 ANCK01_CRCK01



6.2.3 CRCK01_CRCKSR

