7. Tables

Table 1: List of stream sites, locations and data availability, all geographic coordinates use NAD 83 datum. Order matches supplemental material, from upstream to downstream. Although 95% confidence intervals are provided for discharge at all sites except Budd Creek and Hetch Hetchy, we provide here a qualitative rating of the relative quality of the discharge data at each site, where A = our best sites; B = intermediate-quality sites; C= our poorest sites. ** Tuolumne precipitation is provided at an hourly time-step along with the meteorological data at the Dana station. The provided data is scaled to the Dana location as documented in the text and metadata files.

Site Code	Site Name	Latitude	Longitude	Basin Area	Elevation	Water Years with Data (X=data available)														Data Time-step	Raw Data Available	Quality	Type of installation
		Degrees	Degrees	km^2	m	02	03	04	05	06	07	08	09	10	11	12	13	14	15	hr			
Q01	Lyell below Maclure	37.777	-119.261	15	2940				X	X	X		X	X	X	X	X	X	X	0.5	Yes	B	Solinst, Stilling tube
																	X	X	X				Vented Transducer
Q02a	Lyell Fork, upstream	37.869	-119.331	109	2640					X	X	X	X	X	X	X	X	X	X	0.5	Yes	A	Solinst, Stilling tube; Vented transducer installed 7/16/2015
Q02b	Lyell Fork, downstream	37.869	-119.331	109	2640	X	X	X	X	X	X	X		X	X					0.5	Yes	B	Solinst, anchor
Q03a	Dana	37.876	-119.333	74	2650	X	X	X	X	X										0.5	Yes	C	Solinst,

	Fork, lodge																						anchor
Q03b	Dana Fork, Bug Camp	37.877	-119.338	75	2640					X	X	X	X	X	X	X	X	X	X	0.5	Yes	A	Solinst, Stilling tube; Vented transducer (6/12/2015-present)
Q04	Tuolumne 120	37.876	-119.355	186	2600	X	X	X	X											0.5	Yes	A	Solinst, anchor
										X	X		X	X	X	X	X	X	X				Solinst, Stilling tube
																	X	X	X				Vented Transducer installed 10/2012.
Q05	Delaney Creek, meadow	37.883	-119.381	16	2600							X	X	X	X	X	X	X	X	0.5	Yes	B	Solinst, Stilling tube
Q06a	Budd Creek upstream	37.873	-119.382	7	2600						X	X	X	X	X		X	X	X	0.5	Yes	C	Solinst, Stilling tube
Q06b	Budd Creek downstream	37.874	-119.382			X	X	X	X	X			X			X	X	X	X	0.5	Yes	C	Solinst, anchor
Q07	Hetch Hetchy Reservoir	37.9708	-119.7883	1181	1162	X	X	X	X	X	X	X	X	X	X	X	X	X	X	24	No	A	See text
TUM	Tuolumne Snow Pillow & Precip	37.8730	-119.3500	NA	2600	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1	No		Precipitation**
						X	X	X	X	X	X	X	X	X		X			X	24			SWE (pillow)
						X	X	X	X	X	X	X	X	X	X	X	X	X	X	Available			SWE

																				approximately monthly in the spring			(snow course)
DAN	Dana Snow Pillow & Met	37.896	-119.257	NA	3000	X	X	X	X	X	X	X	X	X	X	X	X	X	X	1	No		Tair, RH, wind, incoming shortwave
						X	X	X	X	X				X	X	X	X	X	X	24	No		SWE (pillow)
						X	X	X	X	X	X	X	X	X	X	X	X	X	X	Available approximately monthly in the spring			SWE (snow course)
	Distributed Tmean, Tmin, Tmax	62 sites, see metadata				X	X	X	X											24	No		Air temperature

Table 2. Stream Sensor Instrument Installations: types and accuracy

*Note that the Levelogger Gold reports water level equivalent above the datalogger's pressure zero point of 950 cm (the Edge models do not have such an offset.) [1]Druck was used at Delaney Cr above PCT from 2012-2015; [2]Campbell Scientific CS450 was used at Lyell below Maclure 2012-present; Tuolumne at 120 2012-present; Dana at Bug Camp 2014-present; Lyell above Twin Bridges 2015-present.

Installation Type	Anchored Solinst*	Solinst in Stilling Tube	Vented Pressure Transducer	Barometric Pressure
Description	Instrument in a PVC pipe inside a concrete anchor, which is cabled to a tree, bridge, or culvert.	Instrument in PVC pipe inserted in vertical pipe attached to the streambed and bank with rebar; with cord for downloading instrument.	Same as stilling tube but with data cord connected to a data logger box (typically hidden in a tree) and another cord open to the atmosphere.	Instrument in a building or in a tree or in a dry groundwater well
Instrument Used	Solinst Levelogger	Solinst Levelogger	Druck[1] Or Campbell Scientific CS450 PT[2]	Solinst Barologger
Instrument Specs/Accuracy	Levelogger Model 3001: 0.1°C temp accuracy, ±0.5 cm pressure/depth accuracy; temperature compensated over the range of -10 to 40°C; drift of 0.1% of the full range (±0.5 cm for a 5 m model, used here).	Levelogger Edge and Gold: Temp accuracy ± 0.05°C Pressure ± 0.05% of FS (for 5 m model, this would be ±0.25 cm); Manufacturer states clock accurate to 1 minute per year, but 20 minutes of drift per year was typically observed in practice	Druck: 0-5 PSI Range, 0.25% accuracy; CS450: 0-7.25 PSI Range, 0.1% accuracy;	Edge: ± 0.05 kPa, with temperature compensation, temperature accuracy ± 0.05°C Gold: 0.01 cm and ± 0.05°C (also has temp compensation); Model 3001 same as 5 m Levelogger.
Processing steps	1) subtract off	1, 3, and 4	3 and 4	3, and 5) adjust

required	atmospheric pressure; 2) correct for offsets in instrument location; 3) check for instrument drift; 4) develop rating curve			for temperature dependencies
Total error estimates in stage (Note that these are worst case scenarios – errors for most sites are believed to be less.)	Up to ± 3 to 4 cm, with ± 2 cm due to summed instrument accuracy and drift for both stream and barometric instruments; and ± 1 to 2 cm more due to uncertainty in instrument location	Up to ± 2 cm due to summed instrument accuracy and potential drift for both stream and barometric instruments	Up to ± 0.5 cm due to summed instrument accuracy and potential drift	Up to ± 1 cm due to summed instrument accuracy and potential drift
Error propagation into estimated discharge (using Lyell Fork above Twin Bridges at 0.7 m, typical summer flow, as an example)	± 0.92 $m^3 s^{-1}$ to ± 1.24 $m^3 s^{-1}$ (14-19%)	± 0.61 $m^3 s^{-1}$ (9%)	± 0.15 $m^3 s^{-1}$ (2%)	± 0.30 $m^3 s^{-1}$ (5%)
Pros	Easy installation, lowest visible impact	Low visible impact; stable location and datum	Stable location and datum; lowest processing time required (saves ~8 hours of desk work per year); can reference instrument stage to field datum at each visit	
Cons	Instrument location moves through time; Most processing time	Error increases with atmospheric adjustment; hard to reference	More work required to reduce visible impact (e.g., hiding conduit and annual	

	required (~8 hours of desk work per year per site by trained person + ~2 weeks additional time training for new person);	instrument reading to field datum while in the field	battery swap from a hidden battery enclosure); higher instrument cost	