



THURSTON COUNTY PUBLIC HEALTH AND SOCIAL
SERVICES – ENVIRONMENTAL HEALTH DIVISION –
WATER QUALITY PROGRAM

Continuous Temperature Monitoring of Ambient Streams

May 1, 2020 thru September 30, 2020



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Introduction

The mission of Thurston County Environmental Health (TCEH) is to achieve the highest well-being for all the residents of Thurston County by protecting public health and environmental quality. To accomplish this mission, TCEH has monitored the ambient water quality of Thurston County streams since 1983. Ambient data is useful for assessing the water quality of streams, advising the public of health risks, and tracking pollution and trends.

This report summarizes Thurston County's continuous temperature data for May 1, 2020 to September 30, 2020. This work was funded by Thurston County Community Planning and Economic Development (CPED), and the Cities of Lacey, Olympia, and Tumwater.

Data Collection and Analysis

TCEH used a Washington Department of Ecology SOP (Ward, 2018) to calibrate and deploy temperature loggers and to check the data quality (Appendix B contains QA/QC information). In late April 2020, TCEH deployed over 30 Onset HOBO TidbiT MX Temp 400 temperature loggers set to log every 30 minutes at or near stream ambient sites (Appendix C shows deployment locations). TCEH measured temperature with a YSI EXO1 at each temperature logger location monthly. Inaccurate data, such as known air temperatures, were eliminated from data set used for the graphs and calculations in this report. Such values are flagged in the raw data set. The 7-day average of daily maximum temperature (7-DADMax) was calculated for 5/1/2020 to 9/30/2020. The record of temperatures collected at Schneider Head, Scatter Creek (both sites), and Prairie Creek contain periods of stagnation. Scatter at James became ephemeral in July, affecting calculation of the 7-day average of daily maximum temperature. The 7-day period was pushed back one day due to the stream drying up. No air temperature loggers were deployed, but the raw data could likely be cleaned up further for sites (particularly those with intermittent flow) with nearby weather stations and stream gages.

Surface Water Quality Standards and Designated Uses

Surface water quality standards are described in Chapter 173-201A of the Washington Administrative Code (WAC, 2016). Water bodies are classified based on designated uses Freshwater aquatic life use categories are described using key fish species (salmonids versus warm-water species) and life-stage conditions (spawning versus rearing). Two aquatic life use (ALU) categories apply to Thurston County freshwater streams (Table 1):

- Spawning, Rearing, and Migration salmonid habitat
- Core Summer salmonid habitat

Table 1 – ALUs for Freshwater Sites

Table 1. ALUs for freshwater sites.

Aquatic Life Use		
Parameter	Salmonid Spawning, Rearing and Migration Habitat	Core Summer Salmonid Habitat
Temperature	Highest 7-DADMax is 17.5° C	Highest 7-DADMax is 16.0° C

The 7-DADMax (7-day average of daily maximum) is the arithmetic average of seven consecutive measures of daily maximum temperatures.

A different water quality standard applies to marine water. McAllister Creek at I-5, which is near the creek's mouth, is tidally influenced. The ALU for this site is Extraordinary Quality for Marine Water,

which protects fish migration, rearing, and spawning, as well as rearing and spawning for shellfish such as crustaceans, oysters, and mussels. The 1-day maximum temperature for Extraordinary Quality Marine Water is 13° C.

Water temperature affects many physical, chemical, and biological processes in aquatic systems. Surface water quality standards are based on the 7-day average of daily maximum temperature (7-DADMax). Table 2 lists the 7-DADMax for each site.

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Table 2. 7-DADMax for Thurston County Stream Sites

ALU	Watershed	Site	Start Date	End Date	7-DAD MAX Temp, °C	Max Temp, °C	Comments
Core	Budd	Percival mouth	7/17/2020	7/23/2020	21.794	22.498	8/1-8/18 removed from water, likely by campers
Core	Chehalis	Prairie	6/23/2020	7/2/2020	23.773	27.807	data from 5/1/20 - 7/10/20, dry at logger 7/11/20
Core	Deschutes	Deschutes @ Vail Lp	7/24/2020	7/30/2020	19.780	20.868	8/16/2020 removed shallow water measurements
Core	Deschutes	Deschutes @ Waldrick	7/17/2020	7/23/2020	21.149	22.938	
Core	Deschutes	Deschutes Falls	7/24/2020	7/30/2020	16.434	17.404	data from 5/11/20 - 9/30/2020
Core	Deschutes	Reichel	7/28/2020	8/3/2020	18.783	19.463	
Core	Henderson	Dobbs @ Cross Creek	8/14/2020	8/20/2020	15.763	16.546	
Core	Henderson	Fleming @ JP	8/14/2020	8/20/2020	15.009	15.602	start 5/14/20
Core	Henderson	Woodard @ Libby	7/24/2020	7/30/2020	16.247	17.168	data lost 6/2 to 7/14/20
Core	Henderson	Woodland @ Draham	7/24/2020	7/30/2020	14.602	15.098	start 7/14/20; first logger vandalized
Core	Henderson	Woodland @ PG	5/7/2020	5/13/2020	14.315	15.463	
Core	Nisqually	Eaton	7/2/2020	7/8/2020	14.139	16.685	
Core	Nisqually	Thompson	9/21/2020	9/27/2020	9.884	10.068	
Core	Nisqually	Yelm mouth	7/24/2020	7/30/2020	13.457	14.358	
Core	Skookumchuck	Skookumchuck (Skook)	7/24/2020	7/30/2020	18.827	20.375	
Core	Totten	Kennedy	7/17/2020	7/23/2020	18.035	19.088	
Core	Totten	Schneider Head	8/14/2020	8/20/2020	20.450	23.217	includes period of stagnation; 7-day ave starts 8/14/20 because logger removed 8/20/20
Core	Totten	Schneider T	8/14/2020	8/20/2020	17.847	18.981	
Marine	Nisqually	McAllister @ I-5	7/17/2020	7/23/2020	20.381	22.370	
Spawn	Black	Beaver @ LR	7/17/2020	7/23/2020	19.489	20.858	
Spawn	Black	Black @ 128th	7/27/2020	8/2/2020	22.221	23.356	starts 6/16/20; first logger lost during flood event
Spawn	Black	Black @ Moon	7/17/2020	7/23/2020	21.472	23.560	
Spawn	Black	Blooms Ditch @ 110th	8/14/2020	8/20/2020	18.792	20.160	data gap 6/17/20 - 7/17/20
Spawn	Black	Salmon	8/14/2020	8/20/2020	19.620	20.933	
Spawn	Budd	Indian mouth	8/18/2020	8/24/2020	15.921	16.889	
Spawn	Budd	Black Lake Ditch	7/17/2020	7/23/2020	23.787	24.354	
Spawn	Chehalis	Chehalis	7/17/2020	7/23/2020	23.364	25.437	
Spawn	Chehalis	Scatter @ Gibson	8/2/2020	8/8/2020	22.046	23.249	stagnant by end of July
Spawn	Chehalis	Scatter @ James	6/16/2020	6/22/2020	22.479	26.059	5/1/20 - 6/22/20 before intermittent flow
Spawn	Deschutes	Chambers	8/31/2020	9/6/2020	17.499	19.721	
Spawn	Deschutes	Deschutes @ Tumwater	7/18/2020	7/24/2020	19.899	21.115	start 5/28/2020
Spawn	Deschutes	Spurgeon @ Rich	7/17/2020	7/23/2020	21.518	23.174	
Spawn	Eld	Green Cove	7/17/2020	7/23/2020	16.462	17.458	
Spawn	Eld	McLane	7/18/2020	7/24/2020	16.963	17.812	
Spawn	Eld	Perry	8/19/2020	8/25/2020	20.450	22.166	

Figure 1 – Temperature – ALU Spawning, Rearing, and Migration

Figure 1 displays the distribution of temperate data for streams sites in the first ALU category listed above, Salmon Spawning, Rearing, and Migration. The dashed green line shows the standard at 17.5°C.

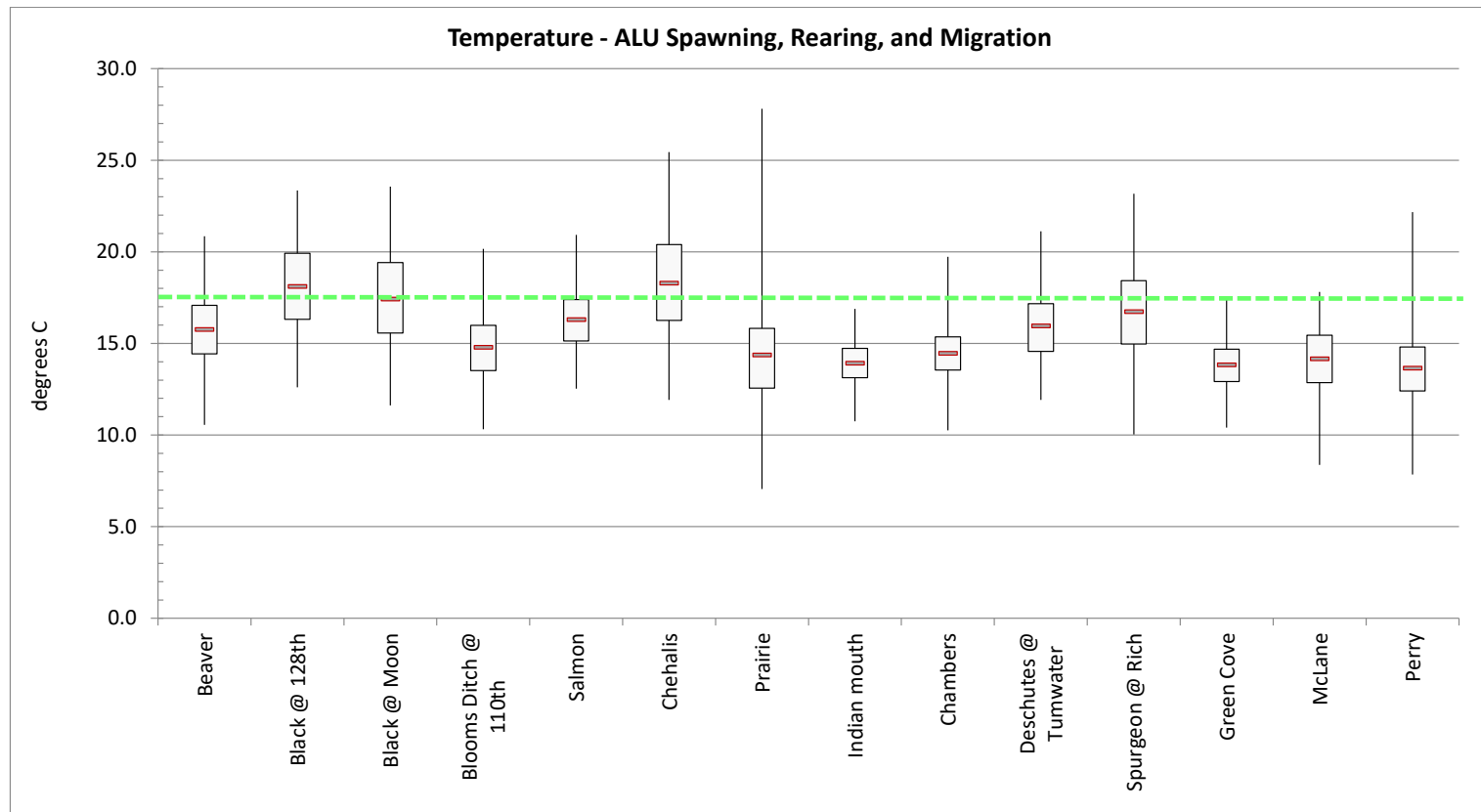


Figure 1. Temperature at sites designated as Spawning, Rearing, and Migration ALU for salmonids. The dashed green line at 17.5° C is the highest 7-day average of daily maximum temperature recommended for this ALU category.

Figure 2 – Temperature – ALU Core Summer Habitat

The second ALU standard for temperature (Figure 2) is Core Summer habitat. Streams with this classification have habitat used by salmonids from June 15 to September 15 for spawning, emergence, summer rearing, foraging, and/or adult holding areas. The temperatures standard is 16.0°C.

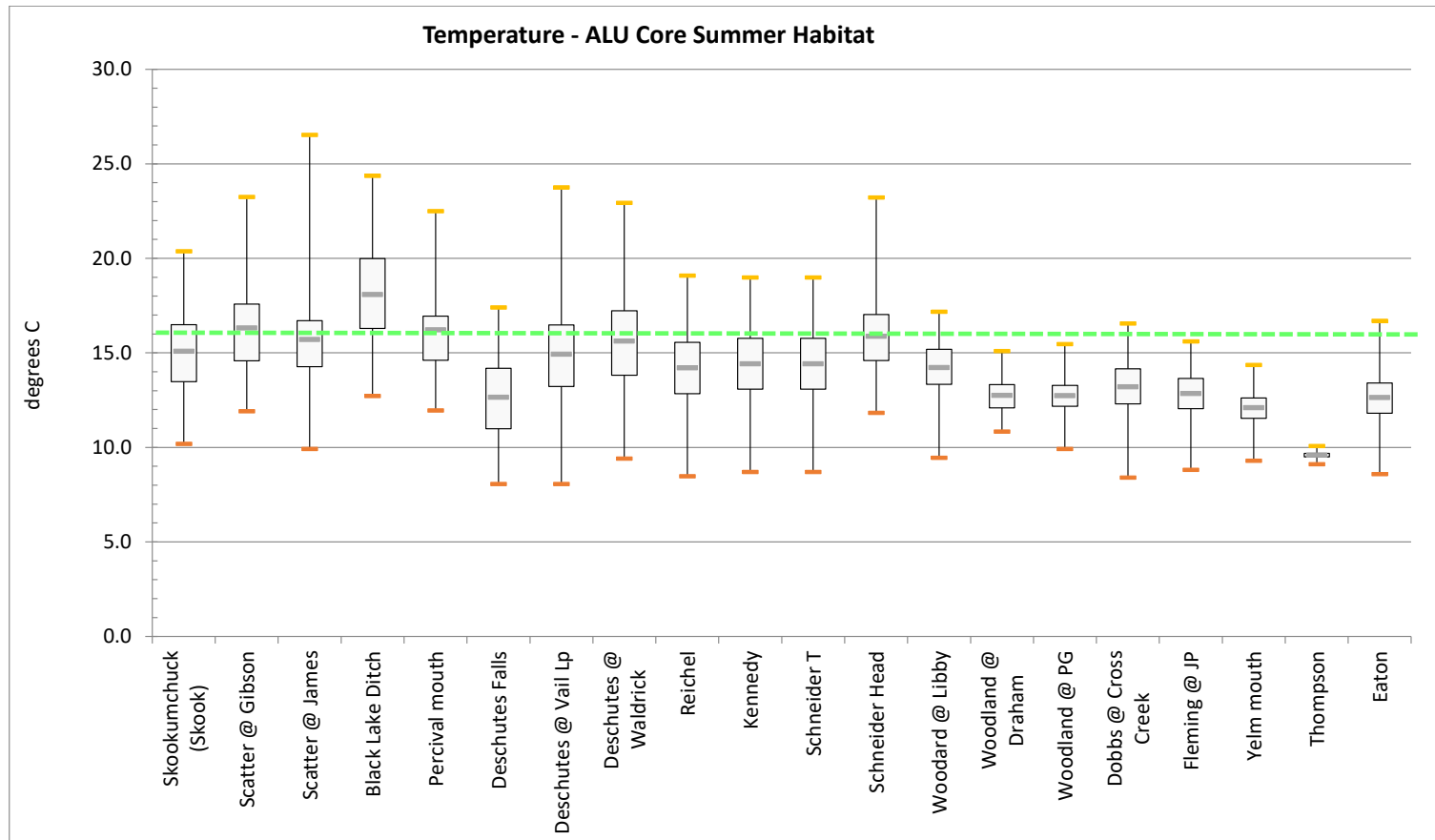


Figure 2. Temperature at sites designated as Core Summer habitat for salmonids. The dashed green line at 16.0°C is the highest 7-day average of daily maximum temperature recommended for this ALU category.

Conclusion

The maximum water temperature exceeded the designated ALU temperature standards at 24 of 35 stream sites (69%). For Salmon Spawning, Rearing, and Migration streams, 12 out of 16 sites (75%) exceeded the temperature standard. For Core Habitat streams, the 7-DADMax exceeded the standard at 11 out of 18 sites (61%). The 1-day maximum temperature exceeded the Marine standard at McAllister Creek at I-5.

Five temperature loggers at sites with supplemental spawning periods continue to log temperature every thirty minutes (as of the date of this report (12/2020): Scatter at Gibson and James, Chehalis River, and the Skookumchuck River.

For raw data in digital form, please contact: 360-867-2626, enhealth@co.thurston.wa.us

J. Renee Fields (formerly TCEH) managed this project and wrote this data summary.

Thanks to Nat Kale (formerly CPED) for providing the temperature loggers that made this study possible. Thanks to many people at TCEH who kept the ambient program and this project going during the 2020 pandemic. Thanks to Tamara Cowles and her brother for making the shade covers. Thanks to Andrew Voyles and Tamara for their work on this project and all their help with ambient water quality monitoring. Thanks to Theresa Hauser for help retrieving those last temperature loggers. Thanks to Jane Mountjoy-Venning for allowing staff time to support this project. Thanks to Sarah Ashworth for breaking away from COVID-19 response when possible to help. As always, thanks to Kathy Patton for review of this document and assistance with its completion during this period of change.

References

Thurston County Public Health and Social Services. 2009. Standard Operating Procedures and Analysis Methods for Water Quality Monitoring. Environmental Health Division.

Washington Administrative Code (WAC), Chapter 173-201A. 2016.
<http://apps.leg.wa.gov/WAC/default.aspx?cite=173-201a>

Ward, W. 2018. Standard Operating Procedure EAP080, Version 2.1. Continuous temperature monitoring of freshwater rivers and streams. Washington Department of Ecology

Appendices

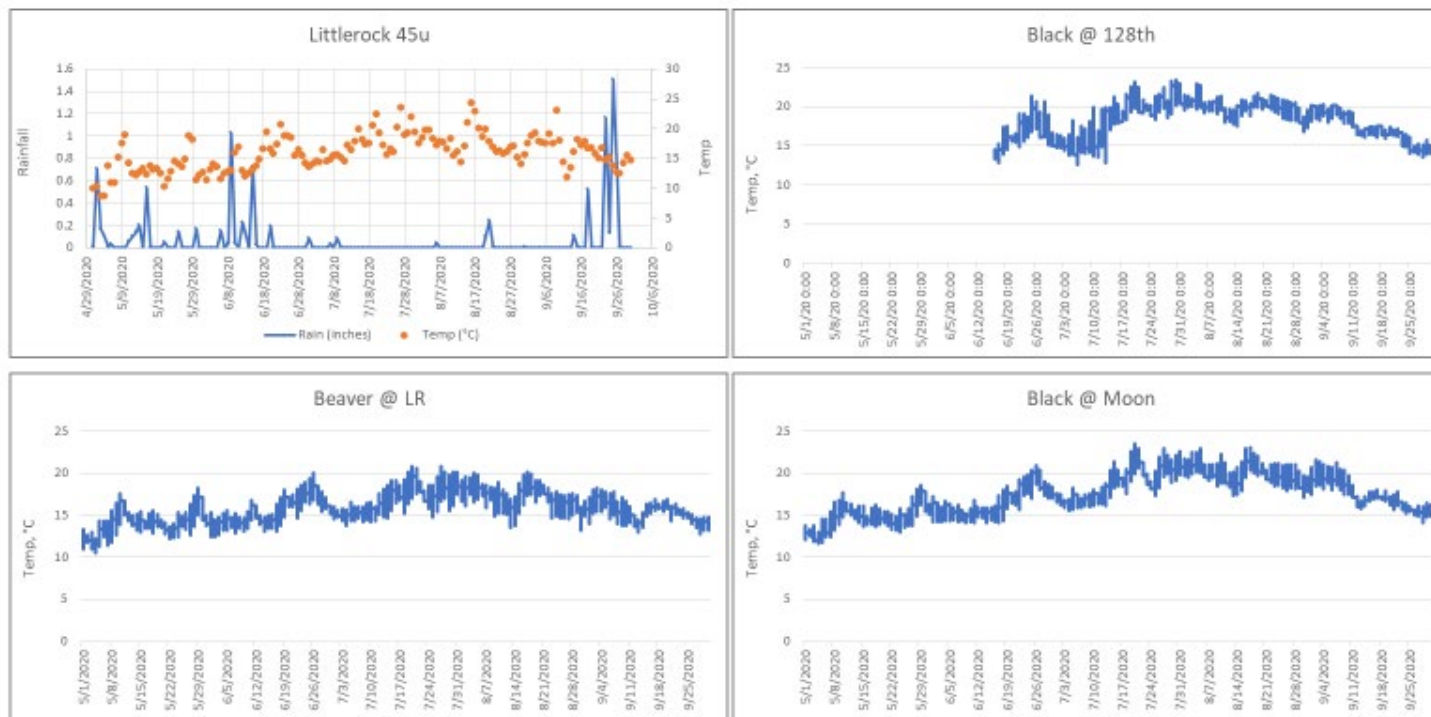
Appendix A – Temperature Charts

Appendix B – QA/QC

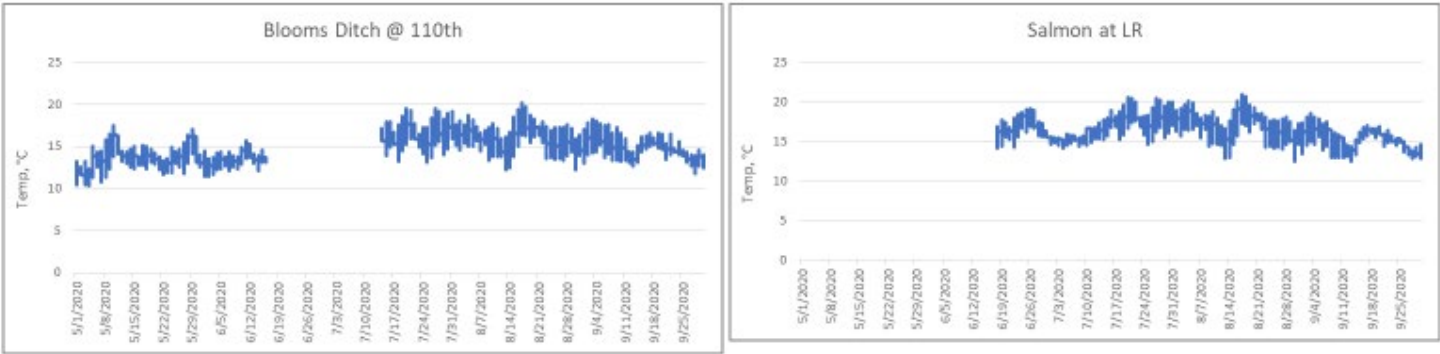
Appendix C – Temperature Logger Site Locations

Appendix A. Temperature Charts

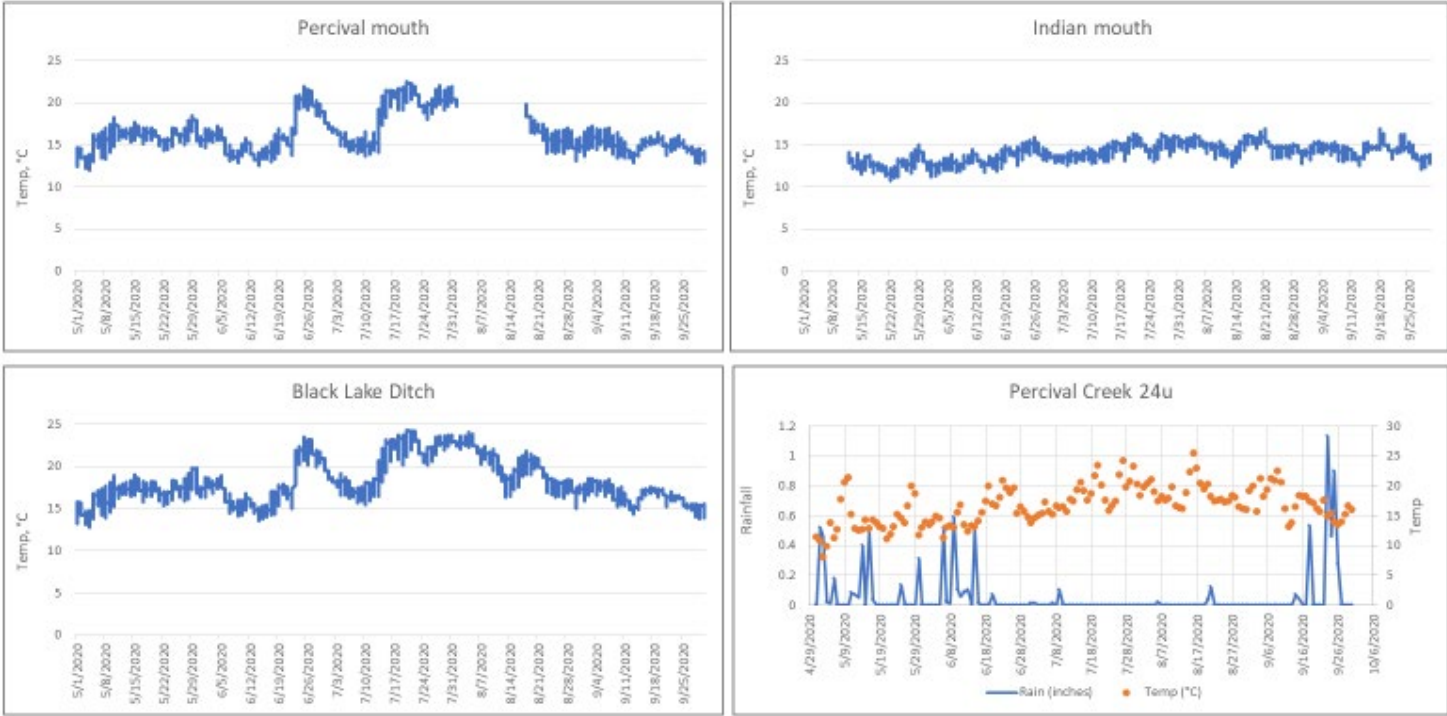
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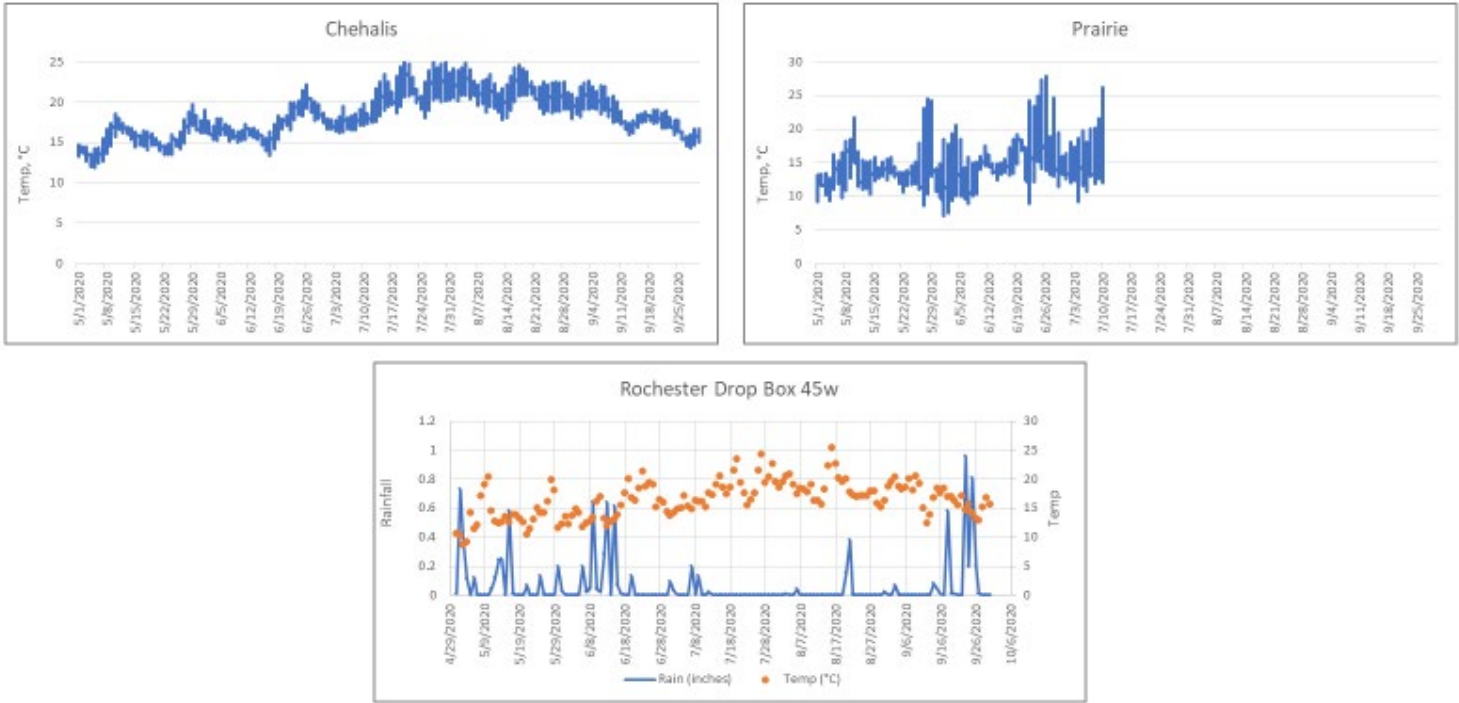
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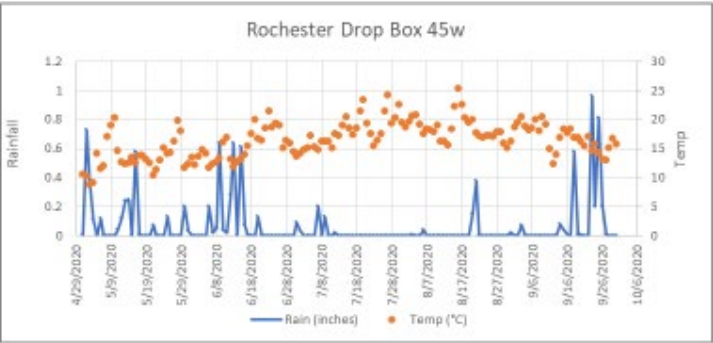
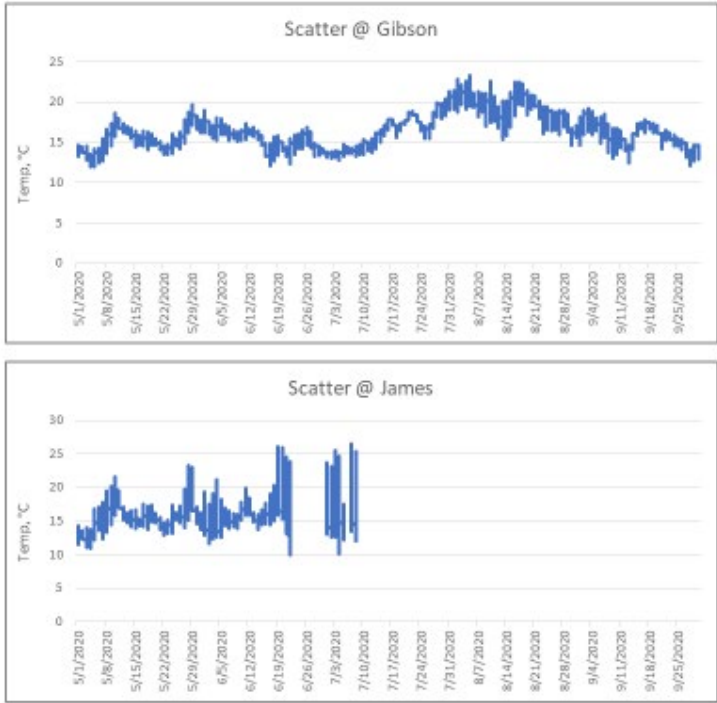
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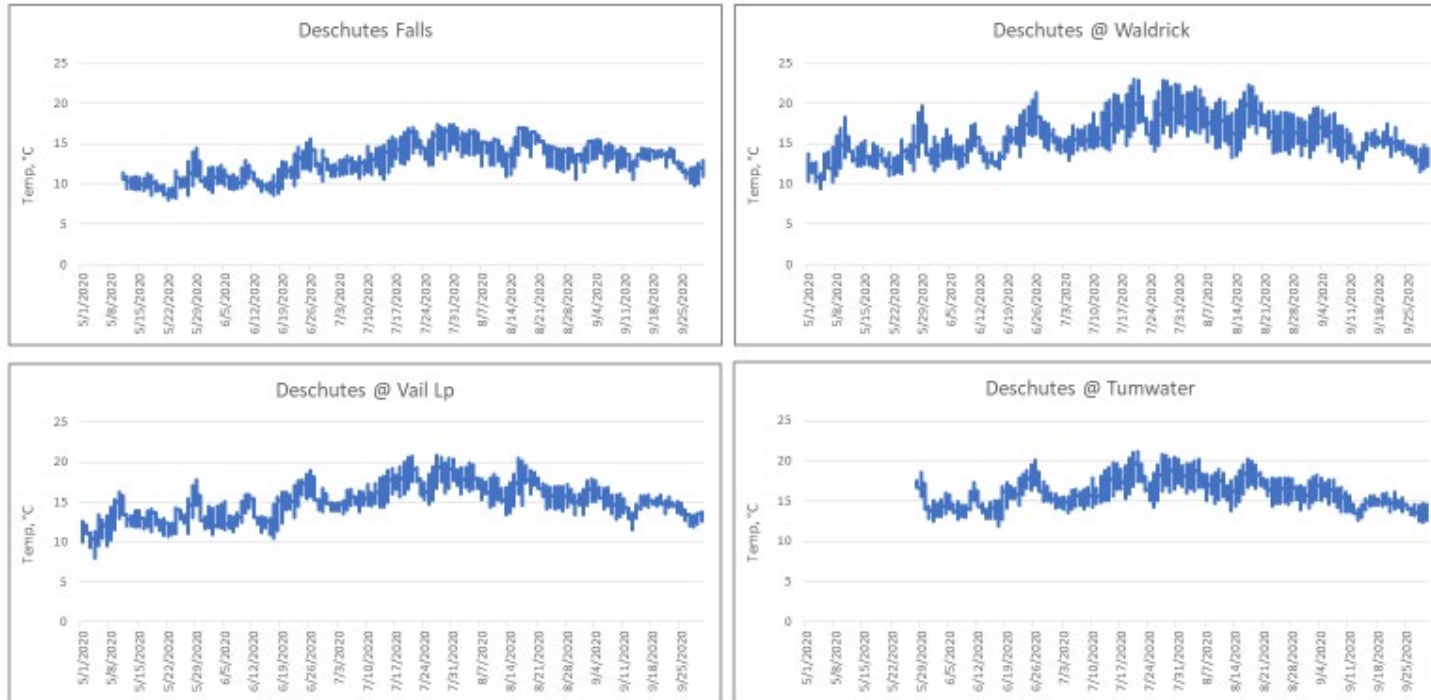
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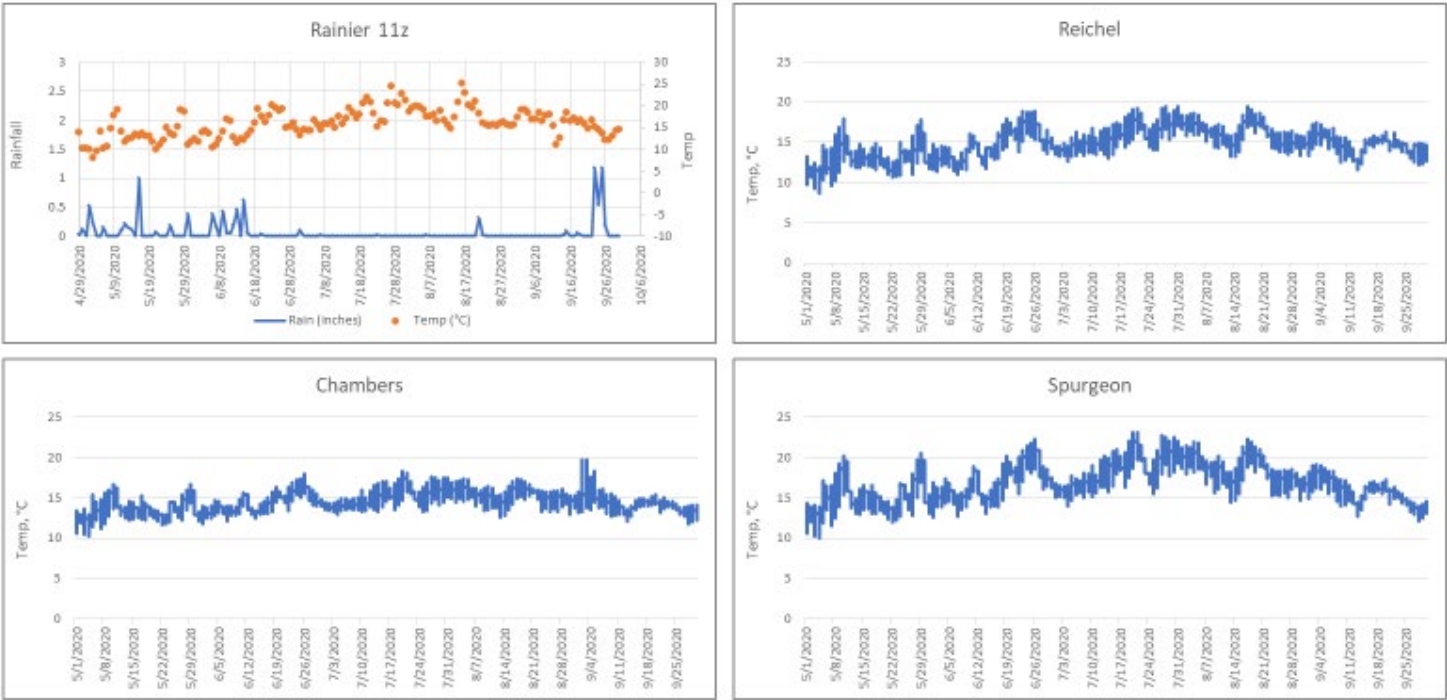
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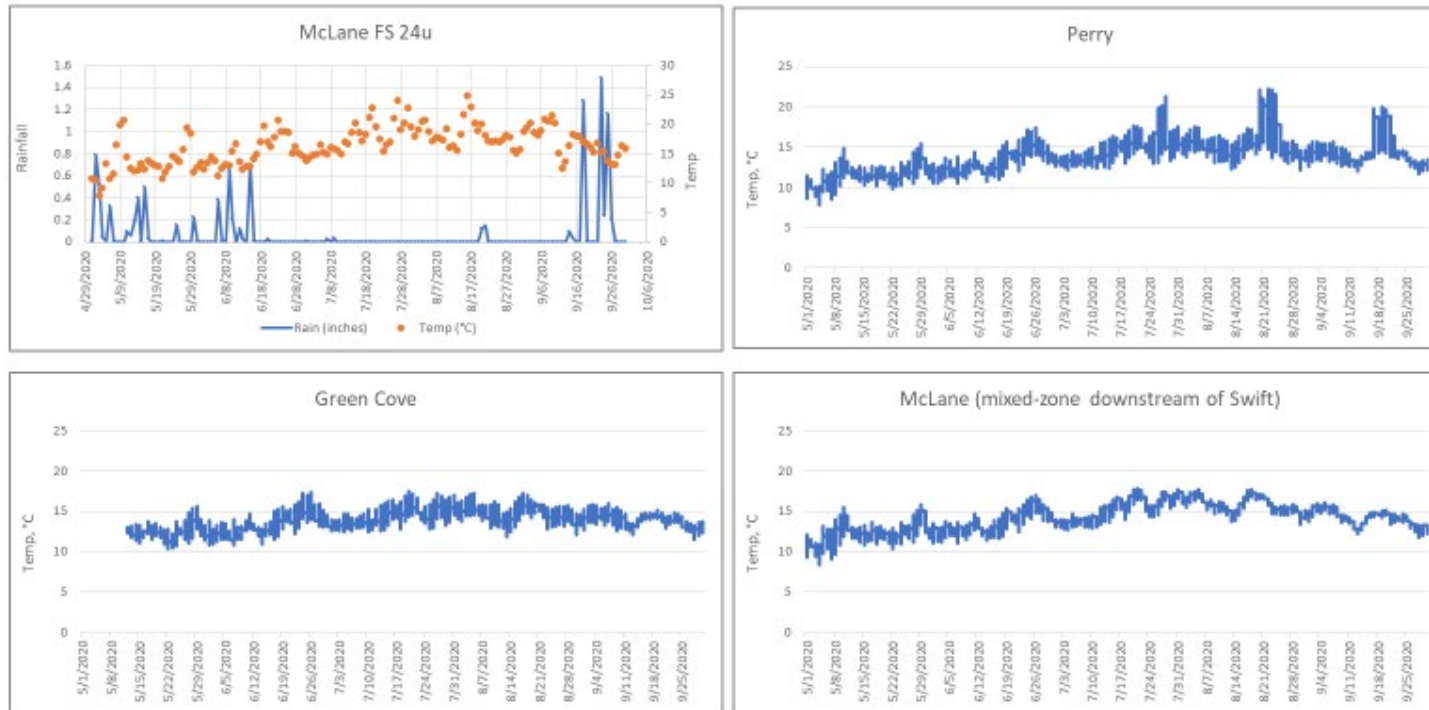
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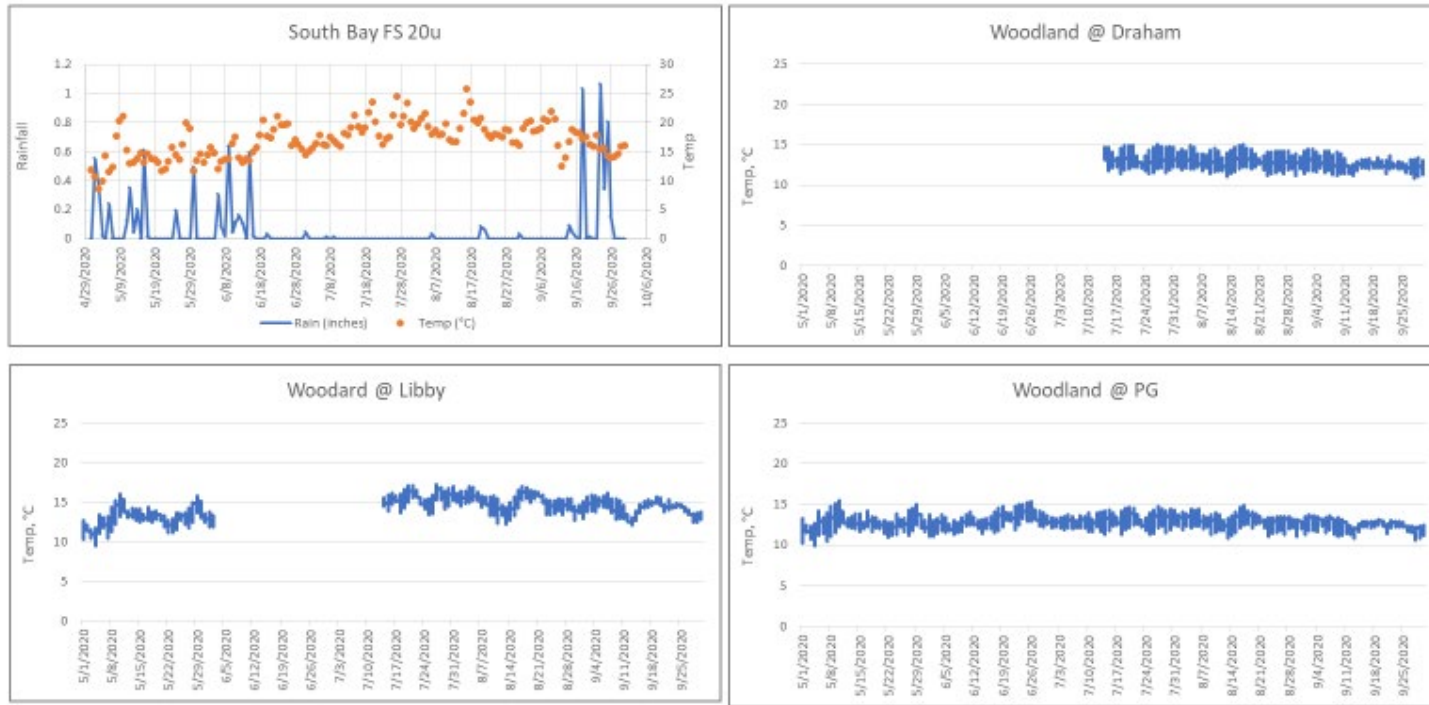
DESCHUTES TRIBUTARIES



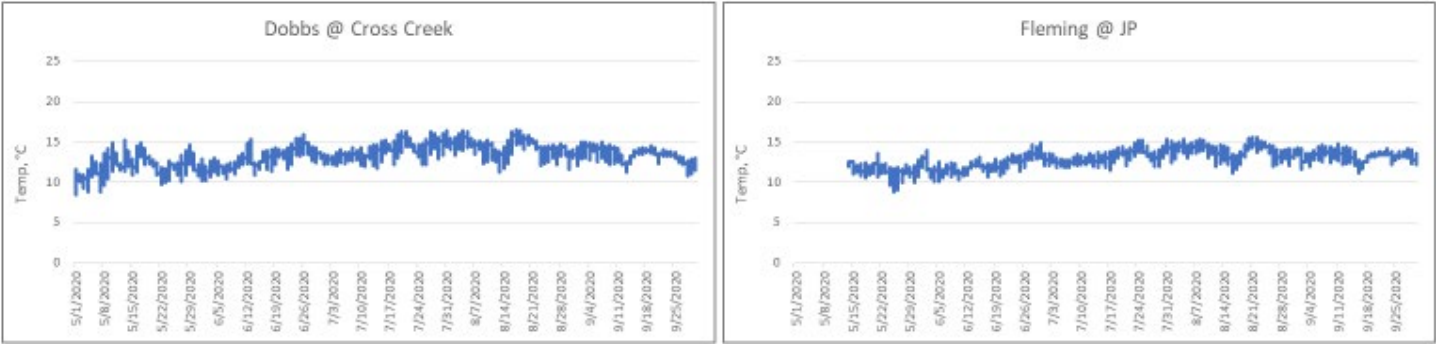
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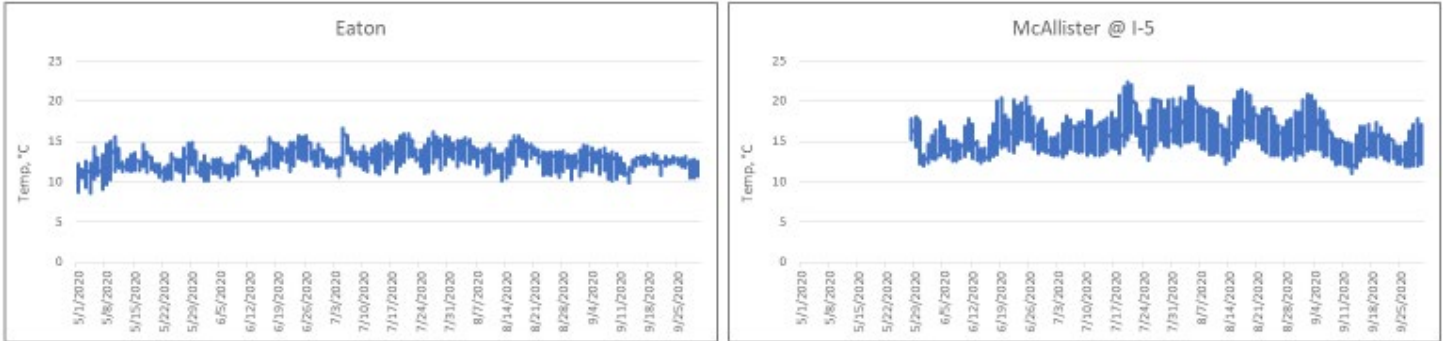
HENDERSON



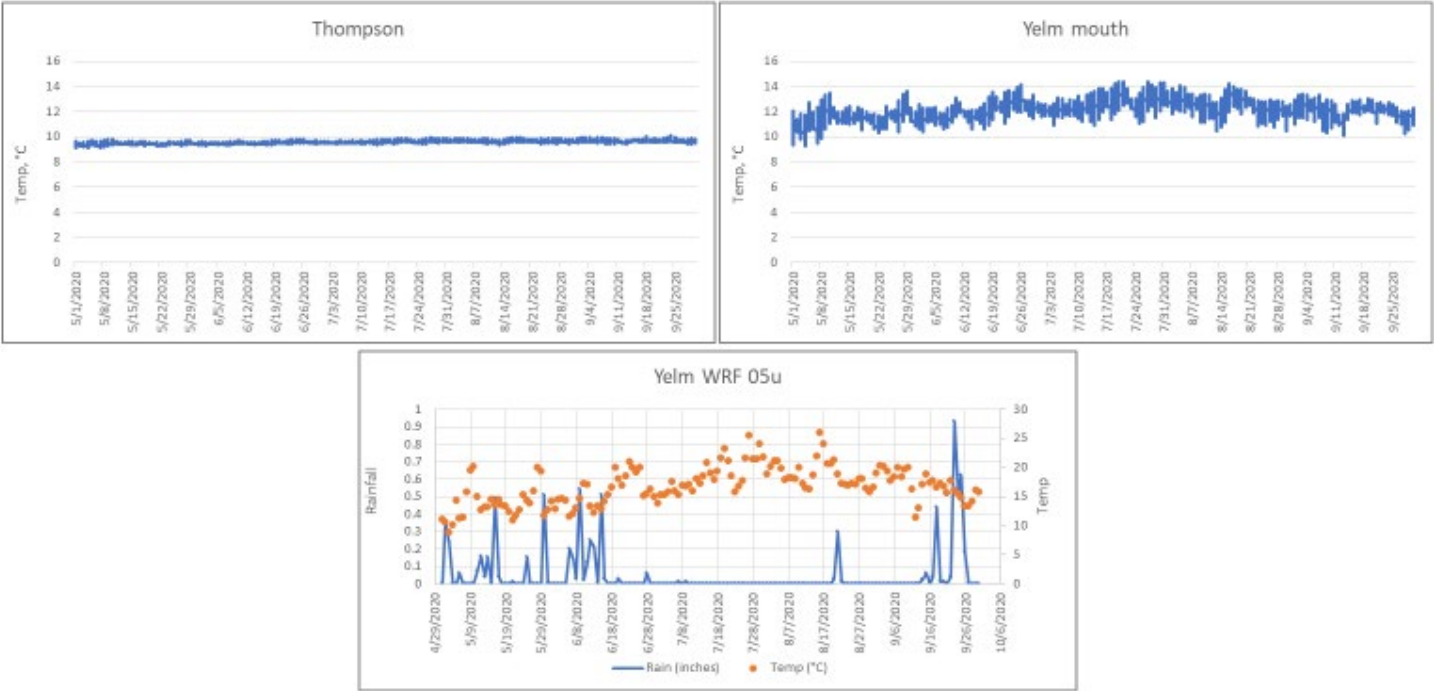
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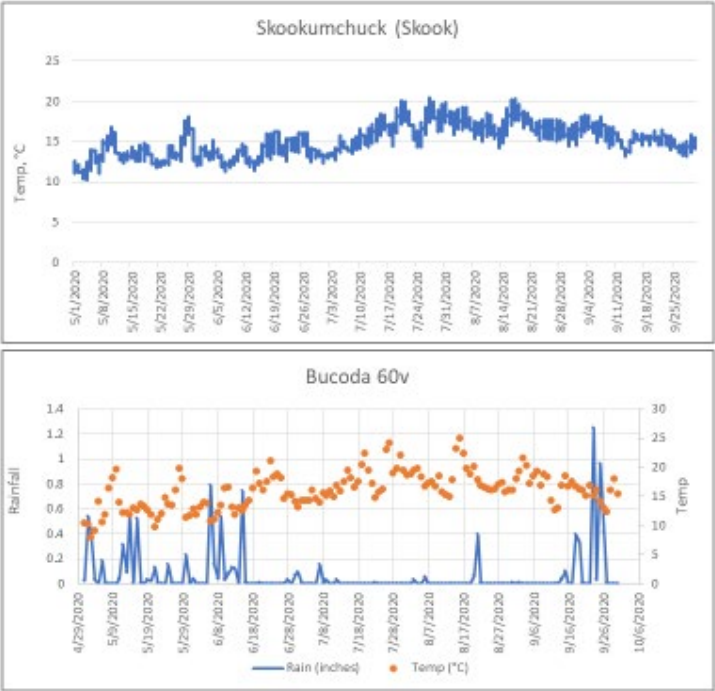
NISQUALLY



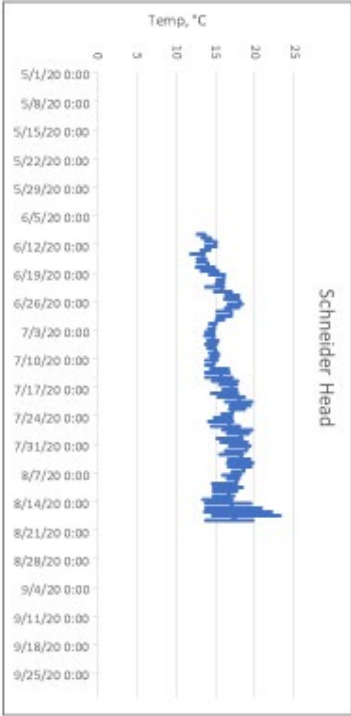
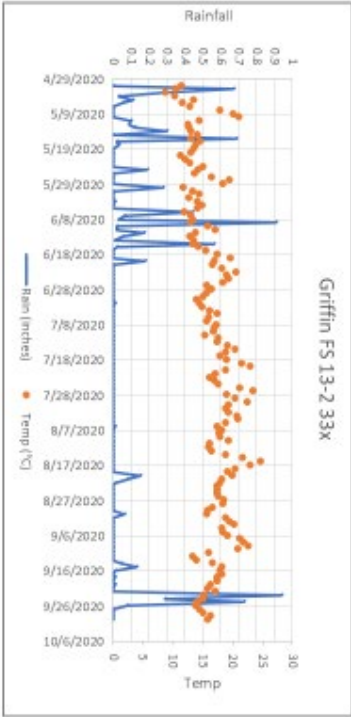
NISQUALLY



SKOOKUMCHUCK



TOTTEN



Appendix B. QA/QC

Temp Logger ID 20693-	Temp Check	Mean Difference (EXO/NIST-Temp Logger)		
		YSI EXO1	TCWL NIST	RTD digital NIST
491	cold test	0.042	0.0	-0.1
491	warm test	0.050	0.0	-0.3
492	cold test	0.002	0.0	-0.2
492	warm test	-0.003	0.0	-0.3
493	cold test	-0.041	0.0	-0.2
493	warm test	-0.051	0.1	-0.4
494	cold test	0.057	0.0	-0.3
494	warm test	-0.015	-0.1	-0.4
495	cold test	-0.011	0.0	-0.2
495	warm test	-0.007	0.0	-0.3
496	cold test	0.055	0.1	-0.3
496	warm test	0.004	0.0	-0.4
497	cold test	0.024	0.0	-0.2
497	warm test	0.030	0.0	-0.3
498	cold test	-0.024	0.0	-0.2
498	warm test	-0.030	0.0	-0.3
499	cold test	0.026	0.0	-0.3
499	warm test	0.032	-0.1	-0.3
500	cold test	0.004	0.0	-0.1
500	warm test	-0.003	0.0	-0.4
501	cold test	-0.015	0.0	-0.3
501	warm test	-0.006	0.0	-0.3
502	cold test	-0.004	0.0	-0.4
502	warm test	0.029	0.0	-0.4
503	cold test	-0.001	0.0	-0.3
503	warm test	0.004	0.0	-0.3
504	cold test	0.032	0.1	-0.2
504	warm test	0.012	0.0	-0.3
505	cold test	-0.014	0.0	-0.2
505	warm test	0.016	0.0	-0.4
506	cold test	-0.002	0.0	-0.3
506	warm test	0.028	0.0	-0.3
507	cold test	0.005	0.0	-0.3
507	warm test	0.025	0.1	-0.2
508	cold test	0.004	0.0	-0.3
508	warm test	0.043	0.0	-0.4
509	cold test	0.060	0.0	-0.1
509	warm test	0.033	0.0	-0.3
510	cold test	-0.005	0.0	-0.3
510	warm test	0.017	0.0	-0.4
511	cold test	0.034	0.0	-0.3
511	warm test	0.050	0.0	-0.3
512	cold test	0.012	0.1	-0.2
512	warm test	0.029	0.0	-0.3
513	cold test	0.003	0.0	-0.2
513	warm test	0.001	0.0	-0.4
514	cold test	-0.013	0.0	-0.3
514	warm test	0.016	-0.1	-0.3
515	cold test	0.004	0.0	-0.2
515	warm test	0.031	0.0	-0.2
516	cold test	0.050	0.0	-0.3
516	warm test	-0.007	0.0	-0.3
517	cold test	0.061	0.0	-0.2
517	warm test	0.026	0.1	-0.4
518	cold test	0.029	0.0	-0.3
518	warm test	0.028	0.0	-0.3
519	cold test	0.025	0.0	-0.3
519	warm test	0.006	0.1	-0.2
520	cold test	0.015	0.0	-0.3
520	warm test	0.027	-0.1	-0.4

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Site Name	Temp Logger ID	#	Date Time, PDT	Temp Logger Temp, °F	Temp Logger Temp, °C	EXO1 Temp, °C	EXO time, PDT	comment
Beaver	20693504 Beaver	336	2020-05-05 9:51:29	52.98	11.655407	11.702	10:00:58	
Beaver	20693504 Beaver	2354	2020-06-16 10:51:29	57.00	13.8862271	13.877	10:38:01	
Beaver	20693504 Beaver	3652	2020-07-13 11:51:29	60.55	15.8596463	15.913	11:46:06	
Beaver	20693504 Beaver	4995	2020-08-10 11:21:29	60.41	15.7845709	15.876	11:23:00	
Beaver	20693504 Beaver	6435	2020-09-09 11:21:29	57.27	14.0363799	14.118	11:20:35	
Beaver	20693504 Beaver	8070	2020-10-13 12:51:29	55.32	12.9531436	12.976	12:55:00	
Black @ 128th	20693503 BLK 128							lost due to flooding
Black @ 128th	20693495 black 128	1	2020-06-16 10:00:00	59.37	15.2054151	15.219	10:00:00	
Black @ 128th	20693495 black 128	1299	2020-07-13 11:00:00	61.80	16.556778	16.591	11:00:00	
Black @ 128th	20693495 black 128	2506	2020-08-07 14:30:00	68.40	20.224762	20.238	13:35:22	
Black @ 128th	20693495 black 128	4083	2020-09-09 11:00:00	64.37	17.9832162	17.992	10:41:09	
Black @ 128th	20693495 black 128	5718	2020-10-13 12:30:00	53.50	11.9449849	12.045	12:25:50	
Black @ 128th	20693495 black 128		2020-10-22 13:25:00					removed from water 13:25:00
Black @ Moon	20693505 Moon	338	2020-05-05 10:52:42	54.27	12.37399	12.586	11:04:18	
Black @ Moon	20693505 Moon	2356	2020-06-16 11:52:42	59.50	15.2804905	15.341	11:43:40	
Black @ Moon	20693505 Moon	3656	2020-07-13 13:52:42	64.22	17.8974152	17.852	13:30:48	
Black @ Moon	20693505 Moon	4857	2020-08-07 14:22:42	69.10	20.6108644	20.744	14:27:18	
Black @ Moon	20693505 Moon	6437	2020-09-09 12:22:42	65.99	18.8841248	18.94	12:13:04	
Black @ Moon	20693505 Moon	8072	2020-10-13 13:52:42	55.88	13.2641729	13.389	13:56:12	

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Black @ Moon	20693505 Moon	8505	2020-10-22 14:22:42	53.62	12.0093367	12.096	14:18:00	2:23:00 PM removed from water for 1 minute
Black Lk Ditch	20693497 BLD	1015	2020-05-18 15:30:14	63.56	17.5327619	17.54	15:42:14	
Black Lk Ditch	20693497 BLD	2070	2020-06-09 15:00:14	59.27	15.1517889	15.170	14:45:00	moved to deeper water
Black Lk Ditch	20693497 BLD	3415	2020-07-07 15:30:14	62.11	16.7283779	16.849	15:39:00	stream channel alterations observed: woody debris and substate moved to create deep hole and impound flow "bathtub;" furniture and logs placed in stream downstream of logger
Black Lk Ditch	20693497 BLD	4855	2020-08-06 15:30:14	72.36	22.4234051	22.477	15:25:00	
Black Lk Ditch	20693497 BLD	7782	2020-10-06 15:00:14	58.42	14.6798854	14.771	15:08:09	removed from water 15:01:00
Blooms Ditch	20693501 Blooms	334	2020-05-05 8:47:18	52.86	11.5910572	11.540	8:45:58	
Blooms Ditch	20693501 Blooms	2351	2020-06-16 9:17:18	55.89	13.2748964	13.237	9:17:17	did not download in the field during ambient run, replaced with #494
Blooms Ditch	20693494 Blooms 2	2	2020-07-14 15:30:00	62.52	16.9536061	17.023	15:45:00	
Blooms Ditch	20693494 Blooms 2	1149	2020-08-07 13:0000	59.89	15.494993	15.684	13:10:00	
Blooms Ditch	20693494 Blooms 2	2726	2020-09-09 9:30:00	56.49	13.6073748	13.766	9:33:33	
Blooms Ditch	20693494 Blooms 2	4362	2020-10-13 11:30:00	54.06	12.2560141	12.278	11:33:00	
Blooms Ditch	20693494 Blooms 2	4797	2020-10-22 13:00:00	49.02	9.45676168			removed from water at 13:07:00
Chambers	20693517 Chambers	539	2020-05-11 13:42:09	58.04	14.4653829	14.565	13:49:51	
Chambers	20693517 Chambers	1882	2020-06-08 13:12:09	56.32	13.5108503	13.549	13:14:07	
Chambers	20693517 Chambers	3507	2020-07-12 9:42:09	57.79	14.3259578	14.317	10:09:57	
Chambers	20693517 Chambers	5245	2020-08-17 14:42:09	62.73	17.0715819	17.167	14:36:34	

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Chambers	20693517 Chambers	7933	2020-10-12 14:42:09	54.95	12.7493668	12.825	14:41:30	removed from water 14:45:00
Chehalis	20693508 Chehalis 1 (originally named Gibson)	294	2020-05-05 11:41:02	54.62	12.5670412	12.637	11:34:37	
Chehalis	20693508 Chehalis 1 (originally named Gibson)	2311	2020-06-16 12:11:02	58.69	14.8300362	14.864	12:09:56	
Chehalis	20693508 chehalis	1	2020-07-13 15:00:00	69.91	21.0613166	21.113	15:00:00	starts after logger removed from pier to cinderblock in river off base of trail/large tree
Chehalis	20693508 chehalis	1390	2020-08-11 13:30:00	69.54	20.8575397		20.989	13:30:00
Chehalis	20693508 chehalis	4417	2020-10-13 15:00:00	55.55	13.0818452	13.102	14:45:00	
Deschutes @ Tumwater	20693518 DesTumwater	4	2020-05-28 17:00:00	63.66	17.5863859	17.592	0:00:00	
Deschutes @ Tumwater	20693518 DesTumwater	1336	2020-06-25 11:00:00	62.01	16.6747538	16.691	11:00:00	
Deschutes @ Tumwater	20693518 DesTumwater	2344	2020-07-16 11:00:00	62.11	16.7283779	16.842	11:10:00	
Deschutes @ Tumwater	20693518 DesTumwater	3362	2020-08-06 16:00:00	64.68	18.1548182	18.206	16:00:00	moved deeper
Deschutes @ Tumwater	20693518 DesTumwater	5750	2020-09-25 10:00:00	57.28	14.0471035	14.071	10:00:00	
Deschutes @ Tumwater	20693518 DesTumwater	7056	2020-10-22 15:00:00	49.93	9.96084213	9.975	15:12:00	
Deschutes @ Vail Lp	20693514 DesVail	489	2020-05-10 12:44:37	57.32	14.0685548	14.057	12:35:00	
Deschutes @ Vail Lp	20693514 DesVail	1879	2020-06-08 11:44:37	54.79	12.6635679	12.695	11:36:31	
Deschutes @ Vail Lp	20693514 DesVail	3322	2020-07-08 13:14:37	59.00	15.0016382	15.063	13:23:47	
Deschutes @ Vail Lp	20693514 DesVail	5241	2020-08-17 12:44:37	65.93	18.8519499	18.757	12:58:18	
Deschutes @ Vail Lp	20693514 DesVail	7928	2020-10-12 12:14:37	52.75	11.5267075	11.519	12:14:02	
Deschutes @ Waldrick	20693515 DesWaldrick	537	2020-05-11 12:46:41	59.62	15.3448423	15.318	12:51:28	

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Deschutes @ Waldrick	20693515 DesWaldrick	1879	2020-06-08 11:46:41	55.86	13.2534472	13.263	11:46:00	
Deschutes @ Waldrick	20693515 DesWaldrick	3323	2020-07-08 13:46:41	60.99	16.1063237	16.151	13:53:52	
Deschutes @ Waldrick	20693515 DesWaldrick	5242	2020-08-17 13:16:41	68.91	20.5036121	20.652	13:20:00	
Deschutes @ Waldrick	20693515 DesWaldrick	7929	2020-10-12 12:46:41	54.68	12.599216	12.626	12:50:21	
Deschutes Falls	20693512 Des Falls	2	2020-05-11 11:05:14	51.38	10.765224	10.665	10:45:00	
Deschutes Falls	20693512 Des Falls	1344	2020-06-08 10:05:14	49.22	9.56401401	9.597	10:11:48	
Deschutes Falls	20693512 Des Falls	2787	2020-07-08 11:35:14	52.79	11.5481567	11.576	11:42:44	
Deschutes Falls	20693512 Des Falls	4707	2020-08-17 11:35:14	60.01	15.5593427	15.425	11:35:00	moved deeper after quality check
Deschutes Falls	20693512 Des Falls	7392	2020-10-12 10:05:14	50.22	10.1217185	10.132	10:08:30	
Dobbs @ Cross Creek (Dobbs_mainstem_RM_0.71)	20693527 Dobbs CC	658	2020-05-11 8:00:50	54.12	12.2881889	12.316	7:57:59	
Dobbs @ Cross Creek (Dobbs_mainstem_RM_0.71)	20693527 Dobbs CC	2016	2020-06-08 15:00:50	54.22	12.341813	12.413	14:55:00	
Dobbs @ Cross Creek (Dobbs_mainstem_RM_0.71)	20693527 Dobbs CC	3445	2020-07-08 9:30:50	54.87	12.7064663	12.738	9:16:00	
Dobbs @ Cross Creek (Dobbs_mainstem_RM_0.71)	20693527 Dobbs CC	4838	2020-08-06 10:00:50	58.02	14.4546572	14.496	10:00:00	
Dobbs @ Cross Creek (Dobbs_mainstem_RM_0.71)	20693527 Dobbs CC	8102	2020-10-13 10:00:50	53.89	12.1594874	12.311	9:47:04	
Eaton	20693526 Eaton	241	2020-05-04 11:37:18	48.83	9.34951146	9.356	11:40:00	
Eaton	20693526 Eaton	1635	2020-06-02 12:37:18	52.15	11.1942291	11.144	11:47:26	

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Eaton	20693526 Eaton	3260	2020-07-06 9:07:18	56.18	13.4357749	13.526	9:16:32	
Eaton	20693526 Eaton	4998	2020-08-11 14:07:18	55.45	13.0282211	13.020	13:57:00	
Eaton	20693526 Eaton	7638	2020-10-05 14:07:18	52.98	11.655407	11.713	14:07:00	removed from water 14:34:00
Fleming @ JP	20693525 Fleming	2	2020-05-11 9:17:43	54.14	12.2989146	12.019	9:03:00	
Fleming @ JP	20693525 Fleming	1358	2020-06-08 15:17:43	53.11	11.7304844	11.656	15:19:48	moved deeper
Fleming @ JP	20693525 Fleming	2788	2020-07-08 10:17:43	54.35	12.4168905	12.410	9:57:13	
Fleming @ JP	20693525 Fleming	4179	2020-08-06 9:47:43	57.05	13.918404	13.918	09:47:00	
Fleming @ JP	20693525 Fleming	7441	2020-10-13 8:47:43	54.79	12.6635679	12.646	8:48:01	
Green Cove	20693520 GC	1348	2020-06-09 13:20:40	54.31	12.3954391	12.376	13:22:08	failed to download during ambient run (downloaded after dry); replaced with #521
Green Cove	20693521 green cove	2	2020-06-09 14:23:00	54.81	12.6742914	12.696	14:15:00	
Green Cove	20693521 green cove	1344	2020-07-07 13:23:00	56.65	13.6931758	13.757	13:33:57	
Green Cove	20693521 green cove	3360	2020-08-18 13:23:00	60.62	15.9025468	15.960	13:22:55	
Green Cove	20693521 green cove	5712	2020-10-06 13:23:00	55.32	12.9531436	13.012	13:35:00	
Indian mouth	20693499 Indian							lost when channel disturbed, vegetation cut in stream reach
Indian mouth	20693498	2	2020-05-12 15:46:59	55.22	12.8995196	12.884	15:46:00	
Indian mouth	20693498	1008	2020-06-02 14:46:59	54.50	12.5026915	12.481	14:47:00	
Indian mouth	20693498	2643	2020-07-06 16:16:59	57.09	13.9398532	13.904	16:14:56	
Indian mouth	20693498	4132	2020-08-06 16:46:59	59.37	15.2054151	15.192	16:46:00	
Indian mouth	20693498	7011	2020-10-05 16:16:59	56.76	13.7575277	13.736	15:55:23	
Kennedy	20693491 Kennedy	1103	2020-05-20 9:00:42	52.83	11.5696059	11.512	09:02:00	
Kennedy	20693491 Kennedy	2066	2020-06-09 10:30:42	53.11	11.7304844	11.734	10:30:37	

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Kennedy	20693491 Kennedy	3410	2020-07-07 10:30:42	56.49	13.6073748	13.587	10:31:56	
Kennedy	20693491 Kennedy	4856	2020-08-06 13:30:42	62.25	16.8034554	16.811	13:29:12	
Kennedy	20693491 Kennedy	7777	2020-10-06 10:00:42	54.04	12.2452884	12.28	10:00:26	
McAllister @ I-5	20693519 McAllister	232	2020-06-02 11:30:00	56.51	13.6181005	13.640	11:12:08	
McAllister @ I-5	20693519 McAllister	1872	2020-07-06 15:30:00	58.48	14.7120603	14.834	15:30:00	
McAllister @ I-5	20693519 McAllister	3598	2020-08-11 14:30:00	58.66	14.808587	14.903	14:34:00	
McAllister @ I-5	20693519 McAllister	6239	2020-10-05 15:00:00	54.89	12.7171919	12.852	15:17:23	
McLane	20693524 McLaneMixed	721	2020-05-12 11:05:51	53.33	11.8484603	11.856	10:48:21	
McLane	20693524 McLaneMixed	2068	2020-06-09 12:35:51	53.91	12.1702131	12.153	12:27:38	
McLane	20693524 McLaneMixed	3412	2020-07-07 12:35:51	56.18	13.4357749	13.477	12:28:59	
McLane	20693524 McLaneMixed	4856	2020-08-06 14:35:51	62.27	16.8141789	16.928	14:35:00	
McLane	20693524 McLaneMixed	7780	2020-10-06 12:35:51	54.85	12.6957427	12.732	12:21:01	
Percival mouth	20693496 PercM	724	2020-05-12 14:00:59	61.61	16.4495256	16.508	13:48:46	
Percival mouth	20693496 PercM	2071	2020-06-09 15:30:59	57.61	14.2294312	14.246	15:23:00	
Percival mouth	20693496 PercM	3414	2020-07-07 15:00:59	59.60	15.3341166	15.336	14:53:46	
Percival mouth	20693496 PercM	5429	2020-08-18 14:30:59	66.59	19.2166011	19.155	14:48:45	
Percival mouth	20693496 PercM	7784	2020-10-06 16:00:59	57.54	14.1865306	14.119	16:16:39	
Perry	20693522 Perry	719	2020-05-12 10:07:13	52.52	11.398006	11.400	10:00:00	
Perry	20693522 Perry	2066	2020-06-09 11:37:13	53.08	11.7090331	11.76	11:34:19	
Perry	20693522 Perry	3411	2020-07-07 12:07:13	55.82	13.231998	13.246	11:48:00	
Perry	20693522 Perry	4856	2020-08-06 14:37:13	60.51	15.838195	15.878	14:24:11	

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Prairie	20693509 Prairie	336	2020-05-05 12:41:14	56.65	13.6931758	13.691	12:25:23	
Prairie	20693509 Prairie	2354	2020-06-16 13:41:14	58.46	14.7013346	14.722	13:34:55	
Prairie	20693509 Prairie	NA	7/13/2020	dry	dry	dry	dry	Dry/ No pools at site; retrieved TB
Prairie	20693509 Prairie		8/10/2020	dry	dry	dry	dry	Dry/ No pools at site; retrieved TB
Prairie	20693509 Prairie		9/9/2020	dry	dry	dry	dry	Dry/ No pools at site; retrieved TB
Reichel	20693513 Reichel	535	2020-05-11 11:43:00	58.35	14.6369849	14.640	11:39:03	
Reichel	20693513 Reichel	1878	2020-06-08 11:13:00	54.22	12.341813	12.343	11:11:55	
Reichel	20693513 Reichel	3321	2020-07-08 12:43:00	58.33	14.6262593	14.639	12:37:34	
Reichel	20693513 Reichel	5241	2020-08-17 12:43:00	63.23	17.3504342	17.411	12:40:00	
Reichel	20693513 Reichel	7926	2020-10-12 11:13:00	54.20	12.3310894	12.355	11:14:17	
Salmon	20693500 Salmon							lost due to flooding
Salmon	20693520 Salmon2	2	2020-06-18 12:30:00	57.46	14.1436301	14.182	12:30:00	
Salmon	20693520 Salmon2	1197	2020-07-13 10:00:00	60.14	15.6344181	15.67	9:51:25	
Salmon	20693520 Salmon2	1689	2020-07-23 16:00:00	64.29	17.9403136	17.993	16:19:00	near gage
Salmon	20693520 Salmon2	1690	2020-07-23 16:30:00	64.29	17.9403136	17.985	16:30:00	at deeper location upstream
Salmon	20693520 Salmon2	2539	2020-08-10 9:00:00	58.81	14.894388	14.912	09:03:00	
Salmon	20693520 Salmon2	2403	2020-08-07 13:00:00	62.94	17.1895578	17.121	12:50:00	
Salmon	20693520 Salmon2	3980	2020-09-09 9:30:00	55.74	13.1890975	13.094	9:15:25	
Salmon	20693520 Salmon2	5615	2020-10-13 11:00:00	53.83	12.1273126	12.103	11:00:07	
Scatter @ Gibson	20693508 Gibson	296	2020-05-05 12:41:02	55.35	12.974595	12.629	13:25:00	
Scatter @ Gibson	20693506 gibson	2	2020-06-16 15:10:00	55.88	13.2641729	13.132	14:45:00	

Continuous Temperature Monitoring of Ambient Streams Report

Scatter @ Gibson	20693506 gibson	1299	2020-07-13 15:40:00	60.26	15.6987699	15.492	15:27:38	pools with no discernable surface flow downstream
Scatter @ Gibson	20693506 gibson	2499	2020-08-07 15:40:00	69.49	20.8253649	20.881	15:40:00	stagnant; 5 dead fingerling salmon (5-6" total length); DO 6.13 mg/L
Scatter @ Gibson	20693506 gibson	4079	2020-09-09 13:40:00	59.10	15.0552644	14.987	13:53:26	
Scatter @ Gibson	20693506 gibson	5716	2020-10-13 16:10:00	55.61	13.11402	13.113	16:24:07	
Scatter @ James	20693507 James	335	2020-05-05 12:10:25	57.50	14.1650814	14.021	11:56:02	
Scatter @ James	20693507 James	2352	2020-06-16 12:40:25	59.79	15.4413668	15.528	12:55:38	
Scatter @ James	20693507 James	3652	2020-07-13 14:40:25	dry	NA	NA	NA	no surface flow/no pools near deployment site; dry during site visits 8/10/20, 9/9/20, 10/13/20, and 11/30/20
Scatter @ James	20693507 James	NA	8/10/2020	dry	NA	NA	NA	no surface flow/no pools near deployment site; dry during site visits 8/10/20, 9/9/20, 10/13/20, and 11/30/21
Scatter @ James	20693507 James	NA	9/9/2020	dry	NA	NA	NA	no surface flow/no pools near deployment site; dry during site visits 8/10/20, 9/9/20, 10/13/20, and 11/30/22
Schneider Head	20693493							lost due to vandalism
Schneider Head	20693523 schn head	2	2020-06-09 11:45:00	54.85	12.6957427	12.677	11:25:00	
Schneider Head	20693523 schn head	1345	2020-07-07 11:15:00	57.69	14.2723317	14.25	11:10:43	
Schneider Head	20693523 schn head	2790	2020-08-06 13:45:00	64.85	18.2513428	18.295	14:00:00	

Continuous Temperature Monitoring of Ambient Streams Report

Schneider Head	20693523 schn head	3363	2020-08-18 12:15:00	66.65	19.2487759	19.264	12:10:00	no surface flow/pools only at deployment site
Schneider Head	20693523 schn head	NA	2020-10-06 12:45:00			NA	NA	no surface flow or pools
Schneider T	20693492 SchnT	719	2020-05-12 8:01:30	53.79	12.1058612	12.154	8:00:59	
Schneider T	20693492 SchnT	2066	2020-06-09 9:31:30	52.96	11.6446834	11.723	9:42:53	
Schneider T	20693492 SchnT	3411	2020-07-07 10:01:30	56.63	13.6824502	13.748	9:55:59	
Schneider T	20693492 SchnT	4857	2020-08-06 13:01:30	62.05	16.696203	16.731	12:57:16	
Schneider T	20693492 SchnT	7777	2020-10-06 9:01:30	54.54	12.5241407	12.575	9:01:22	
Skook	20693511 Skook	251	2020-05-05 13:51:46	54.93	12.7386432	12.778	13:54:26	
Skook	20693511 Skook	2270	2020-06-16 15:21:46	57.54	14.1865306	14.191	15:16:11	
Skook	20693511 Skook	3568	2020-07-13 16:21:46	62.61	17.0072322	17.016	16:13:42	
Skook	20693511 Skook	4768	2020-08-07 16:21:46	63.21	17.3397085	17.368	16:20:48	
Skook	20693511 Skook	6349	2020-09-09 14:51:46	60.24	15.6880442	15.571	14:35:00	
Skook	20693511 Skook	7985	2020-10-13 16:51:46	55.28	12.9316945	12.95	16:56:35	
Spurgeon	20693516 Spurgeon	538	2020-05-11 13:10:11	61.59	16.4388021	16.506	13:15:34	
Spurgeon	20693516 Spurgeon	1881	2020-06-08 12:40:11	57.81	14.3366814	14.391	12:33:00	
Spurgeon	20693516 Spurgeon	3325	2020-07-08 14:40:11	63.02	17.2324583	17.182	14:23:14	
Spurgeon	20693516 Spurgeon	5244	2020-08-17 14:10:11	69.81	21.0076947	21.021	13:57:43	
Spurgeon	20693516 Spurgeon	7930	2020-10-12 13:10:11	54.41	12.4490653	12.498	13:10:00	
Thompson	20693531 Thompson	243	2020-05-04 12:38:39	49.20	9.55328835	9.652	12:40:00	
Thompson	20693531 Thompson	1635	2020-06-02 12:38:39	49.23	9.57473967	9.597	12:26:53	
Thompson	20693531 Thompson	3262	2020-07-06 10:08:39	49.25	9.58546321	9.619	10:14:27	

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Thompson	20693531 Thompson	4992	2020-08-11 11:08:39	49.45	9.69271554	9.703	11:08:00	
Thompson	20693531 Thompson	7633	2020-10-05 11:38:39	49.37	9.64981503	9.701	11:40:00	
Woodard @ Libby	20693502 LIBBY	324	2020-05-04 8:57:59	49.16	9.53183916	9.586	8:55:16	
Woodard @ Libby	20693502 LIBBY	1717	2020-06-02 9:27:59	53.64	12.0200602	12.145	9:36:25	
Woodard @ Libby	20693502 LIBBY		date?					lost due to flood event
Woodard @ Libby	20693509 Libby2	1099	2020-08-06 9:05:00	59.31	15.1732402	15.162	8:59:47	
Woodard @ Libby	20693509 Libby2	3979	2020-10-05 9:05:00	55.70	13.1676462	13.159	9:01:30	
Woodland @ Draham	20693507 Draham	229	2020-05-04 9:56:20	51.80	11.0011758	11.058	10:03:15	
Woodland @ Draham	20693507 Draham	3	2020-07-14 14:00:00	58.52	14.7335116	14.771	14:00:00	
Woodland @ Draham	20693507 Draham		date?					lost due to vandalism
Woodland @ Draham	20693529 Draham	1101	2020-08-06 11:00:00	54.52	12.513415	12.521	10:58:24	
Woodland @ Draham	20693529 Draham	3979	2020-10-05 10:00:00	53.10	11.7197588	11.729	10:10:00	moved into culvert
Woodland @ PG	20693528 PG	229	2020-05-04 9:57:36	50.61	10.3362211	10.359	9:41:07	
Woodland @ PG	20693528 PG	1620	2020-06-02 9:27:36	52.48	11.3765547	11.417	9:12:50	
Woodland @ PG	20693528 PG	3260	2020-07-06 13:27:36	55.22	12.8995196	12.952	13:12:13	
Woodland @ PG	20693528 PG	4741	2020-08-06 9:57:36	54.52	12.513415	12.621	10:00:00	
Woodland @ PG	20693528 PG	7621	2020-10-05 9:57:36	52.84	11.5803316	11.672	10:00:00	
Yelm	20693530 Yelm	246	2020-05-04 14:09:44	52.67	11.483807	11.489	14:15:00	
Yelm	20693530 Yelm	1637	2020-06-02 13:39:44	53.75	12.084412	12.031	13:29:29	
Yelm	20693530 Yelm	3264	2020-07-06 11:09:44	53.67	12.0415115	12.092	11:10:54	
Yelm	20693530 Yelm	4995	2020-08-11 12:39:44	54.70	12.6099417	12.648	1238	
Yelm	20693530 Yelm	7637	2020-10-05 13:39:44	53.27	11.8162833	11.646	13:10:52	

Appendix C. Temperature Logger Site Locations

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Salmon

Station Name: Salmon

Samplers: JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 500

Water Depth 1.4 ft Deployment Depth 0.7 ft

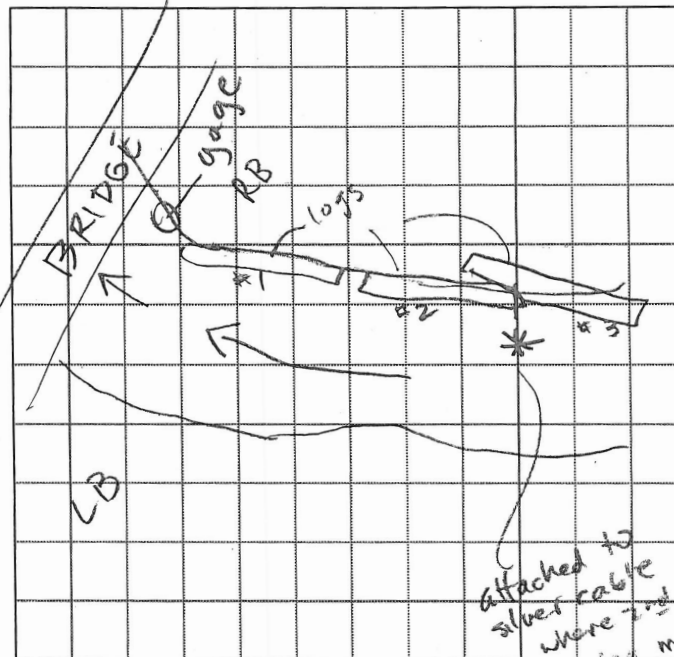
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/Comments
4-28 2020	1004	10.409	54.0F	mostly cloudy



attached to
silver cable
where 2nd & 3rd
log meet

Air Temperature Logger Location:

Water Temperature Logger Location:





D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Blooms

Station Name:

Blooms @ 110th

Samplers:

JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20653 501

Water Depth 2.9 ft

Deployment Depth

1.5 ft

Height (Abv Bottom) _____ ft

Retrieval Depth

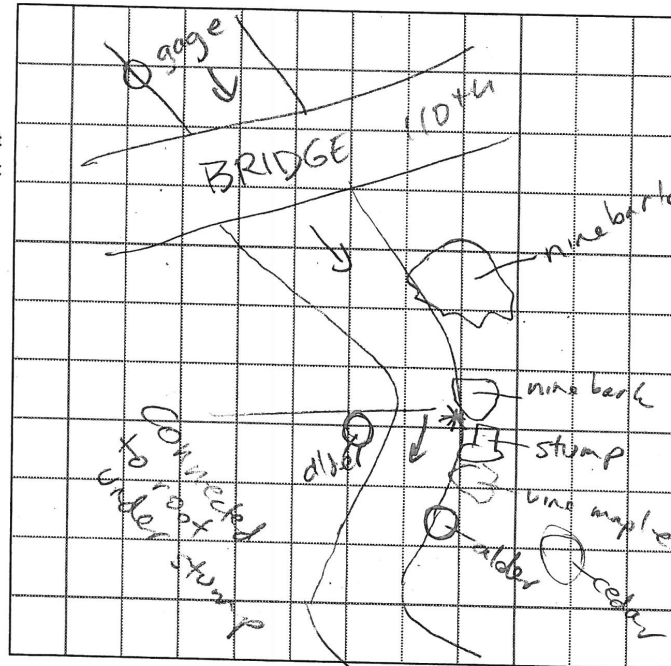
ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4.28 2020		11.587	54.0F	mostly cloudy



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Beaver Station Name: Beaver @ LR Samplers: TZ, JRF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 504

Water Depth 1.2 ft Deployment Depth 0.7 ft

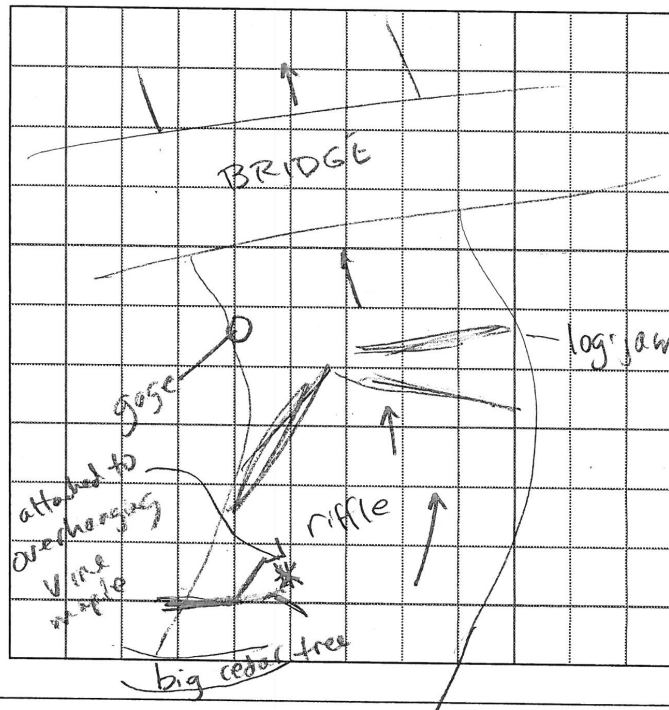
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-28 2020	1158	12.49	55°F	mostly cloudy SW 0-3mph



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: BK128

Station Name: Black @ 128

Samplers: JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 503

Water Depth 3.0 ft Deployment Depth 1.5 ft

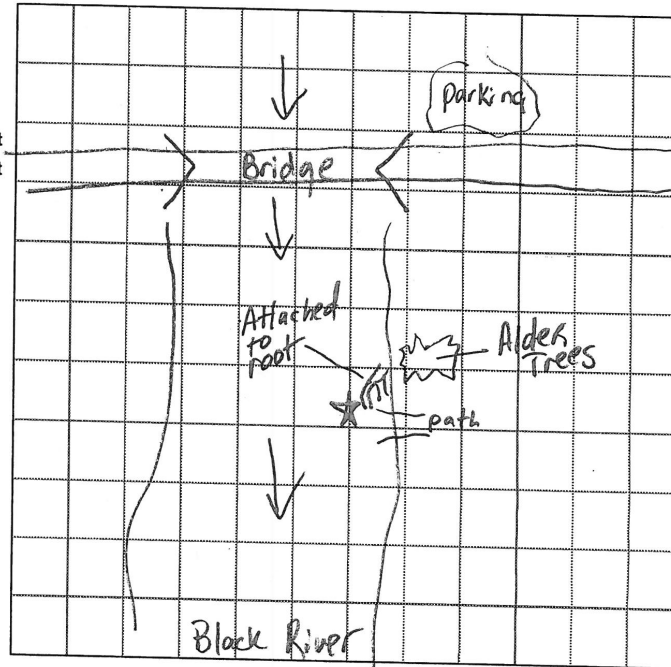
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

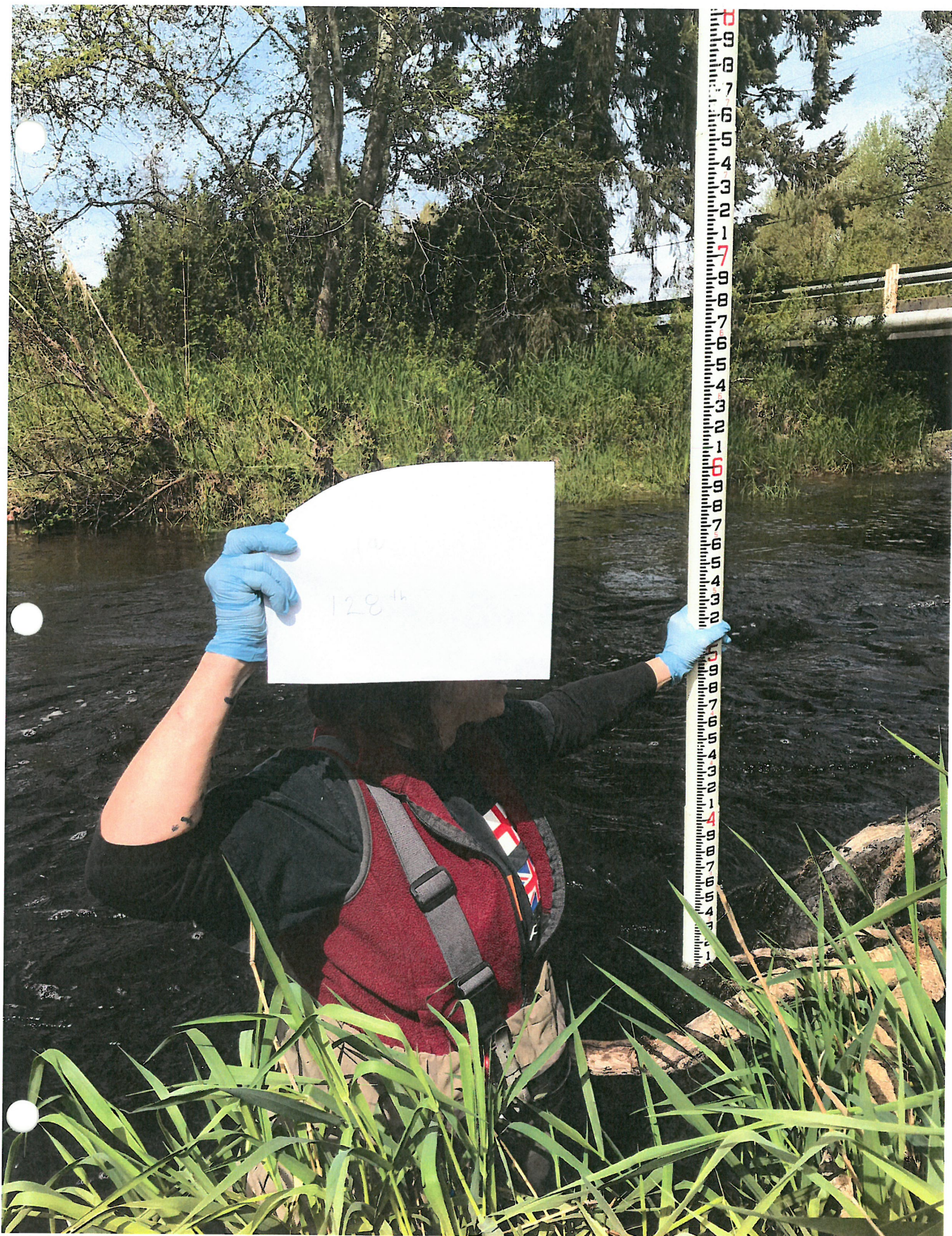
Date	Time	Water Temp	Air Temp	Weather/ Comments
4/20	11:15	11.975	55°F	cloudy 0-3mph wind



Air Temperature Logger Location:

Water Temperature Logger Location:





D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Blk Moon Station Name: Black @ Moon Samplers: TC, JPF

Interval Frequency 00:30

Water Temperature Logger

I.D. # _____

Water Depth 2.8 ft Deployment Depth 1.8 ft

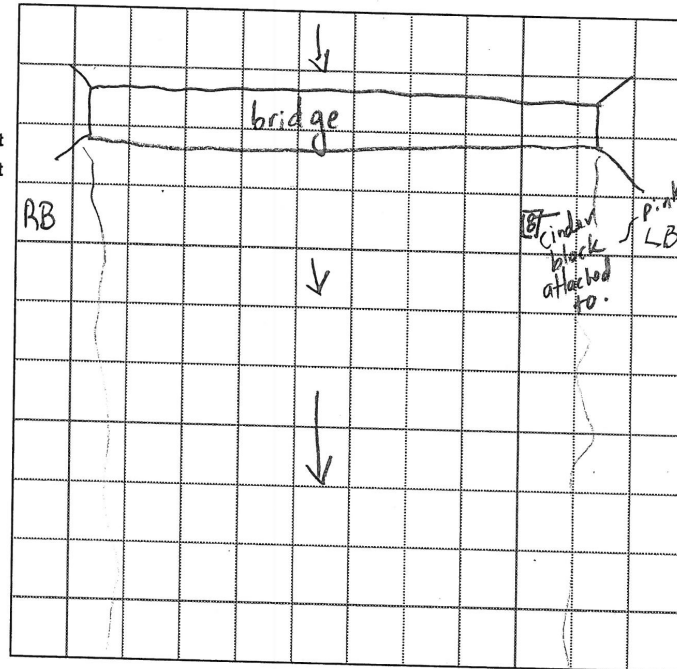
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # 206 93 505

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/25	12:46	13.733	64.09	mostly cloudy 0-3 mph



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Schn H

Station Name: Schneider Head

Samplers: JRF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20693493

Water Depth 1.3 ft Deployment Depth 0.9 ft

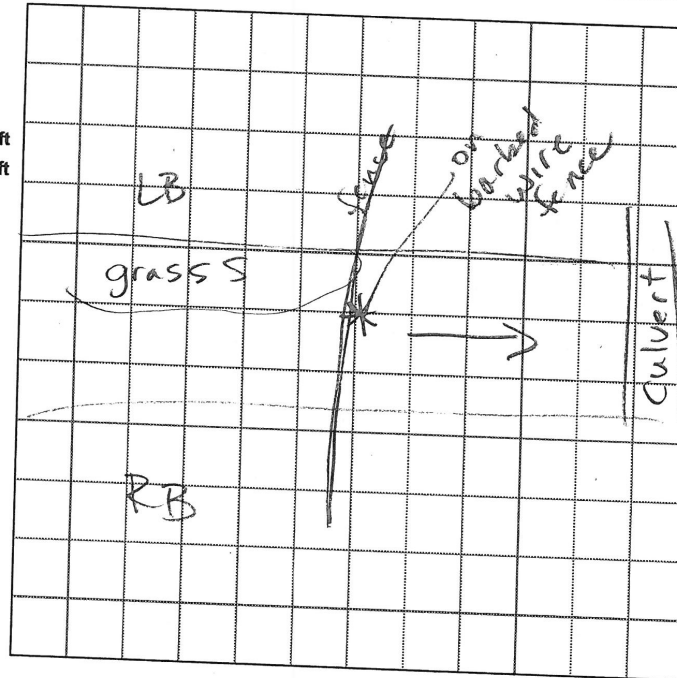
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-27-2010	1050	11.905		



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Kennedy

Station Name: Kennedy

Samplers: JIF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20613491

Water Depth 1.9 ft Deployment Depth 1.9 ft

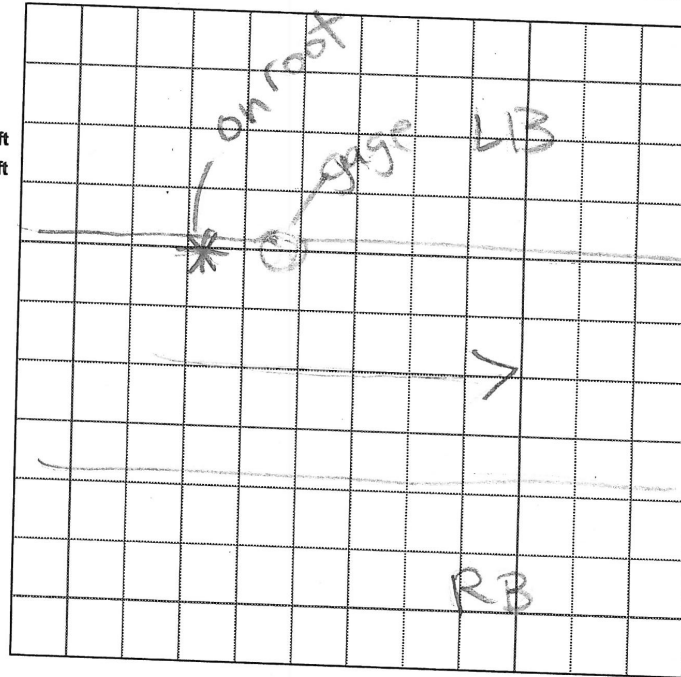
Height (Abv Bottom) ft Retrieval Depth ft

Air Temperature Logger

I.D. #

Height (Abv Stream) ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
8/23/2018	10:00	68.5	68.5	Cloudy 50-65



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: SchnT

Station Name: SchnT

Samplers: 307

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 492

Water Depth 3.85 ft Deployment Depth 2.3 ft

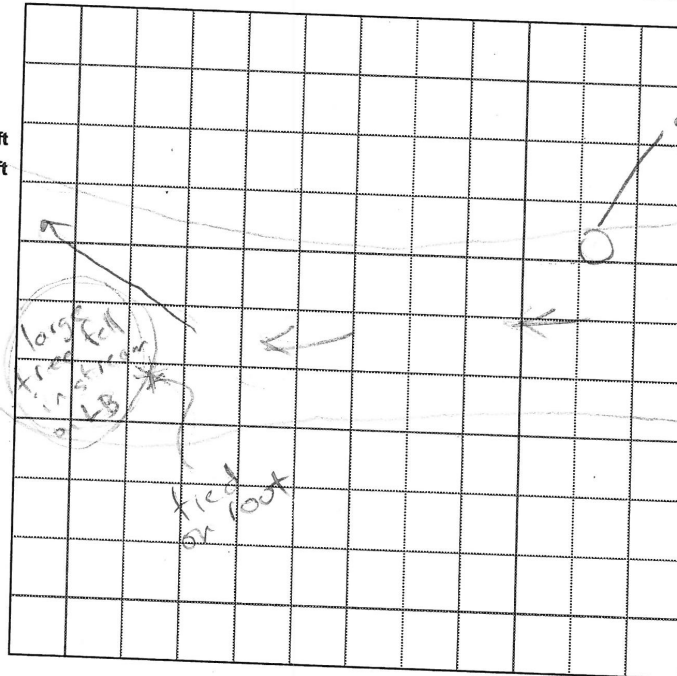
Height (Abv Bottom) ft Retrieval Depth ft

Air Temperature Logger

I.D. #

Height (Abv Stream) ft

Date	Time	Water Temp	Air Temp	Weather/Comments
4/27/20	10:16	53°F		PC, SSW 3-5 mph



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: GC Station Name: Green Cove Samplers: SUA, JRF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 520 GC

Water Depth 0.8 ft Deployment Depth 0.4 ft

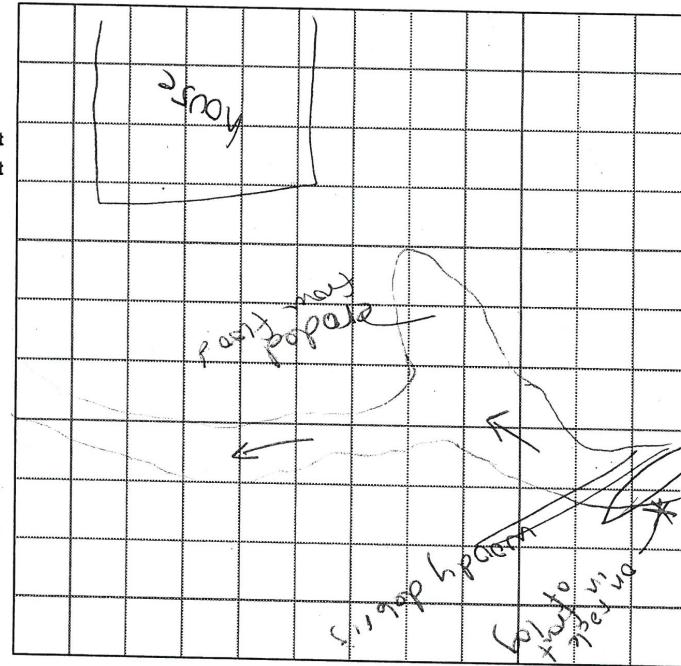
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
5-12 2010	1200	12.503	63°F	OC, rain showers



Air Temperature Logger Location:

Water Temperature Logger Location:

configured 1150



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Perry

Station Name: Perry

Samplers: JPF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 522

Water Depth 2.8 ft

Deployment Depth 1.8 ft

Height (Abv Bottom) _____ ft

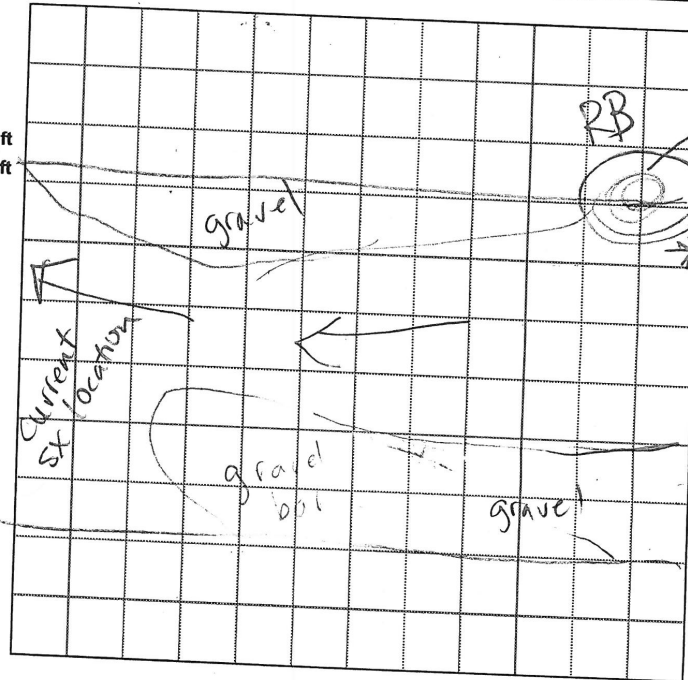
Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-27-2010	10:05	54°F	PL	SW 0-5 mph



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: McLane Mixed Station Name: McLane - mixed

Samplers: JF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 524

Water Depth 2.85 ft Deployment Depth 1.8 ft

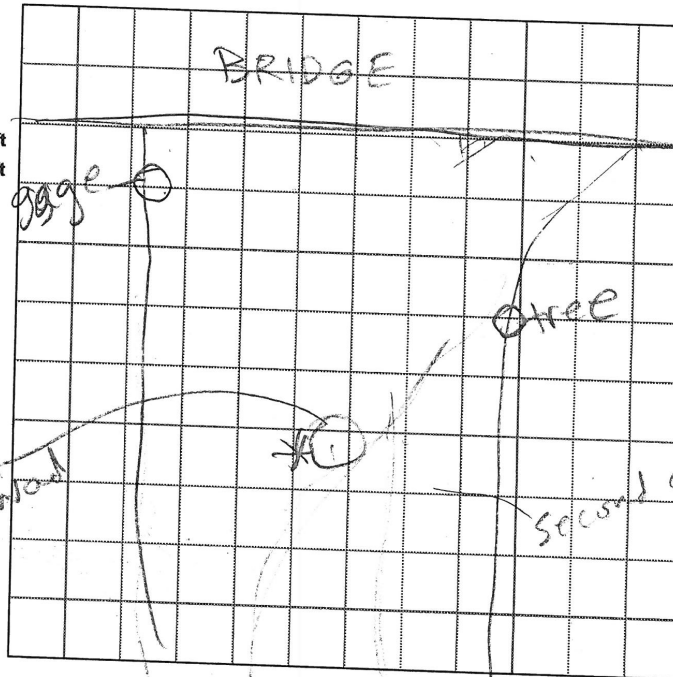
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-27	11:59	11.227	54°F	PC SSW 0-3



Air Temperature Logger Location:

Water Temperature Logger Location:





D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: BLD Station Name: Black Lake Ditch Samplers: JRF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20693497

Water Depth 0.8 ft Deployment Depth 0.4 ft

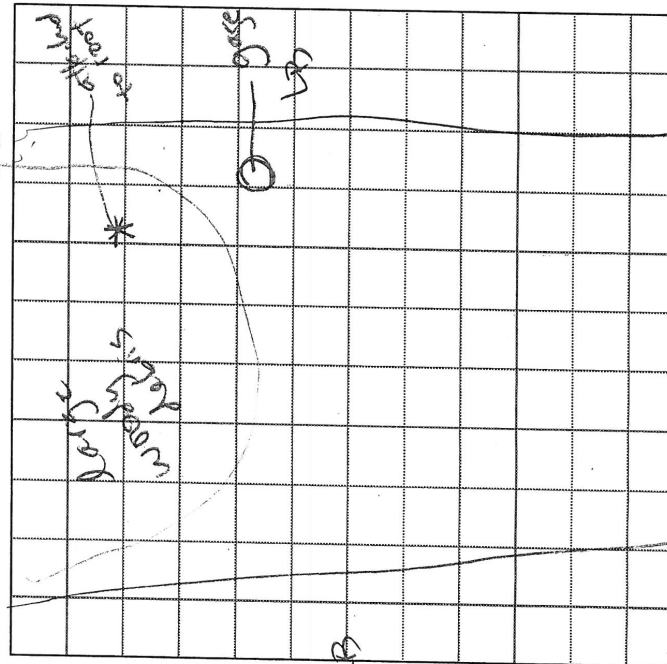
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-27 2020	1243	14.485	59°F	gage 1.10



Air Temperature Logger Location:

Water Temperature Logger Location:





D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: PercM Station Name: Percival Mouth Samplers: JRP

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93496

Water Depth 2.0 ft Deployment Depth 1.0 ft

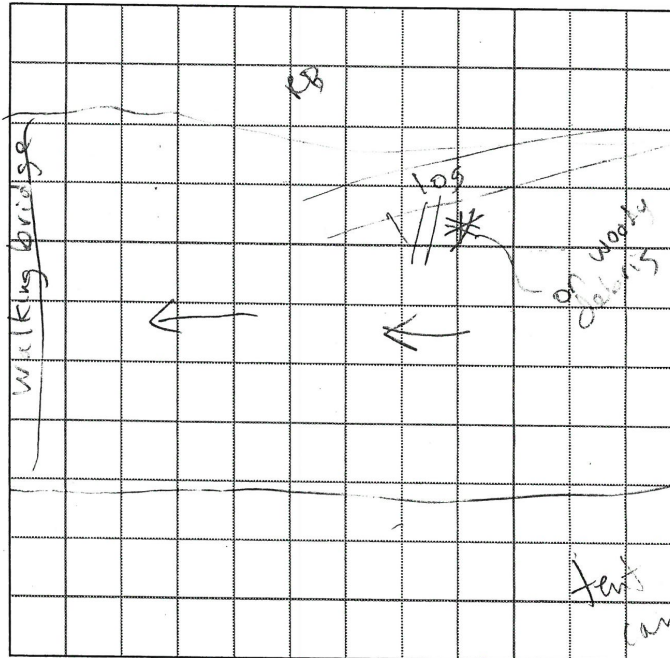
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-27-2020	1320	13.889	60F	



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey FormStation #: Indian Station Name: Indian Samplers: JRFInterval Frequency 00:30**Water Temperature Logger**I.D. # 206 93 499Water Depth 1.0 ft Deployment Depth 0.5 ft

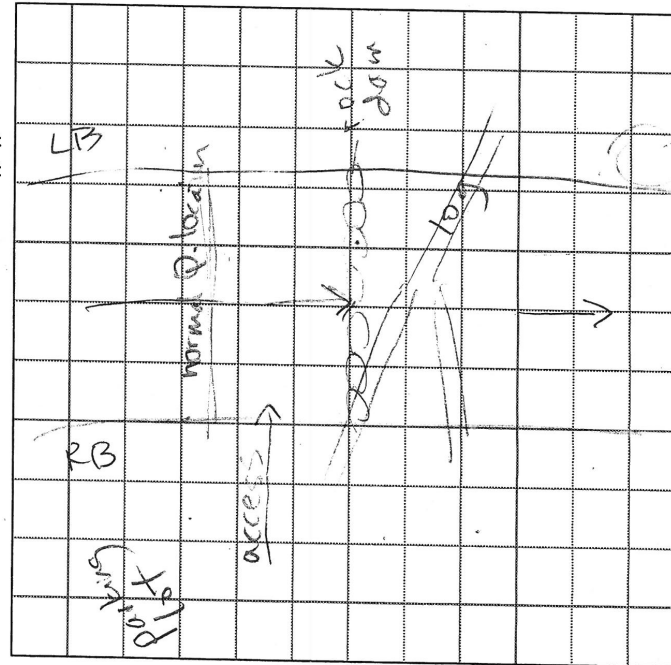
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
5-12-20	12:34	63°F		

**Air Temperature Logger Location:****Water Temperature Logger Location:**

5-12-20 Indian vegetation/streambed trimmed/cleared - tid bit gone

EAP080 – Standard Operating Procedures for Continuous Temperature Monitoring of Freshwater Rivers and Streams – 3/25/2018 – Page 23 of 24
Uncontrolled copy when printed

20693 498 - 5-12-20 1520 replaced original



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: _____ Station Name: Deschutes Falls Samplers: SUA, JRF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20693 512

Water Depth 0.8 ft Deployment Depth 0.4 ft

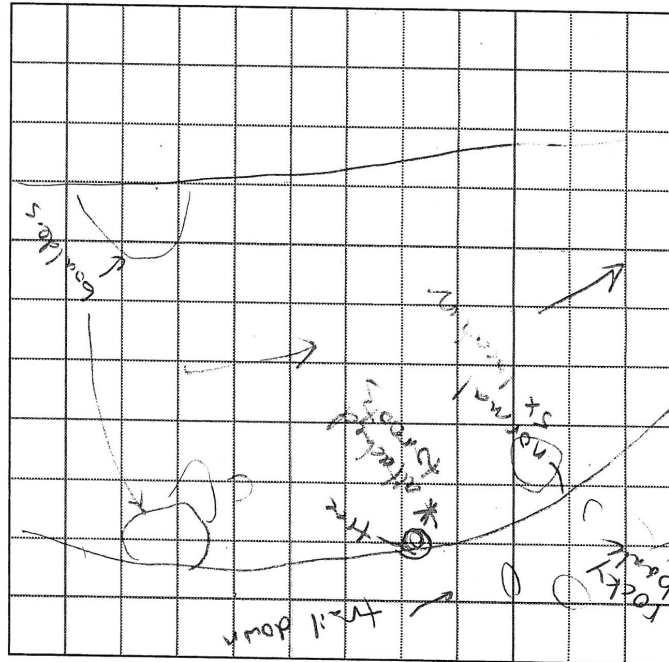
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
5-11 2020	1041	10.7°F	65.5°F	PC



Air Temperature Logger Location:

Water Temperature Logger Location:

configured 1035



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: 20693513 Station Name: Reichel

Samplers: R. Fields, S. Ashworth

Interval Frequency 00:30

Water Temperature Logger

I.D. # _____

Water Depth 2.12 ft Deployment Depth 0.91 ft

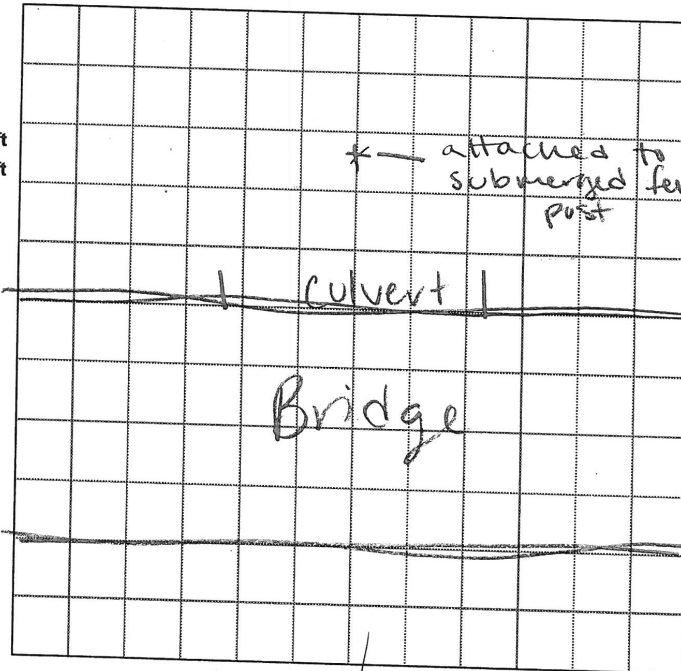
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/30	11:16	12.5 ³³	55 ⁸	Partly Cloudy



Air Temperature Logger Location:

Water Temperature Logger Location:



Reichel

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: DesVail Station Name: Deschutes @ Vail Lp Samplers: R. Fields, S. Ashworth

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20693514

Water Depth 0.80 ft Deployment Depth 0.40 ft

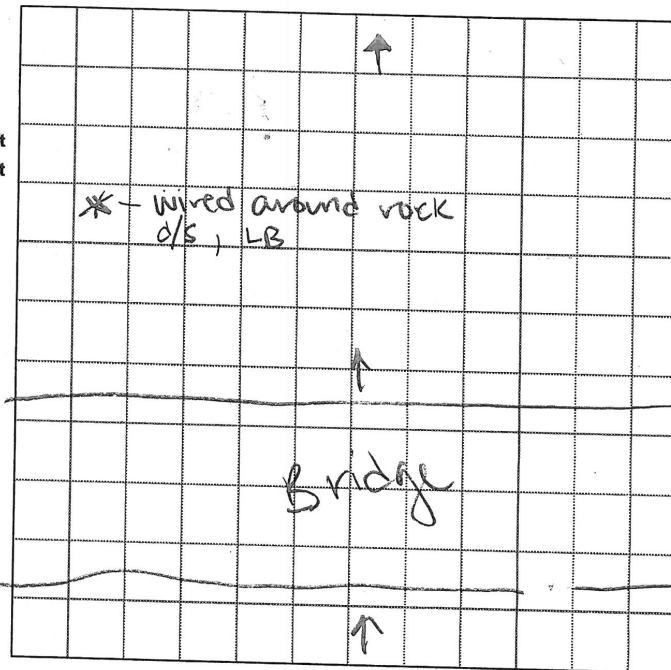
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/30	1143	11.9/19	55F	Mostly Sunny



Air Temperature Logger Location:

Water Temperature Logger Location:



Des @ Vail

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: 206 93 515 Station Name: Deschutes @ Walden Samplers: R. Fields, S. Ashworth

Interval Frequency 00:30

Water Temperature Logger

I.D. # _____

Water Depth 1.00 ft Deployment Depth 0.90 ft

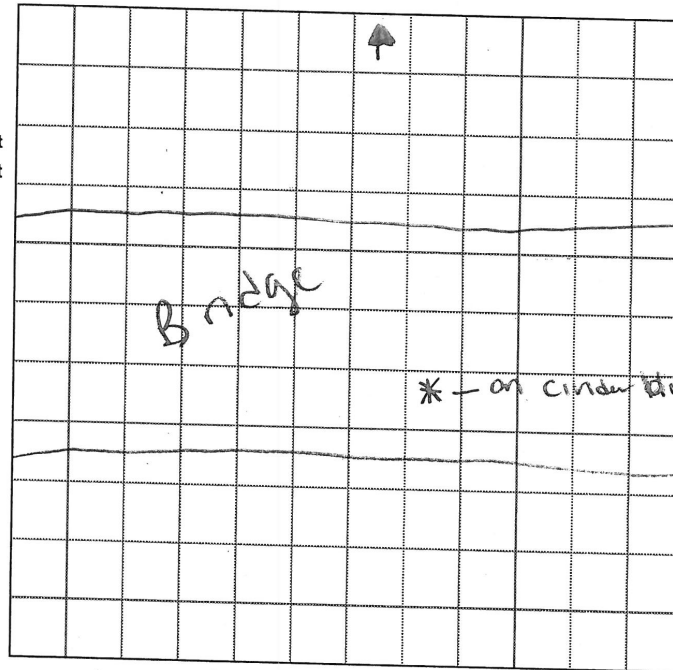
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/30	1225	12.88	52F	Raining



Air Temperature Logger Location:

Water Temperature Logger Location:



Waldrick

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Chambers

Station Name: Chambers

Samplers: R. Fields, S. Ashworth

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 517

Water Depth 1.30 ft Deployment Depth 0.92 ft

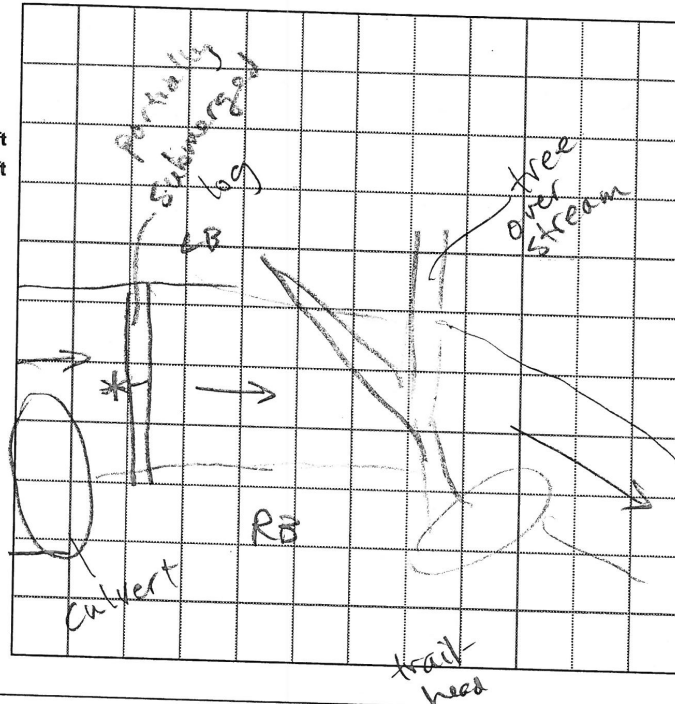
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/30	1340	13.74		overcast / raining



Air Temperature Logger Location:

< map drawn from memory >

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Spurgeon Station Name: Spurgeon@ Rich Samplers: R. Fields, S. Ashworth

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 516

Water Depth 1.55 ft Deployment Depth 1.00 ft

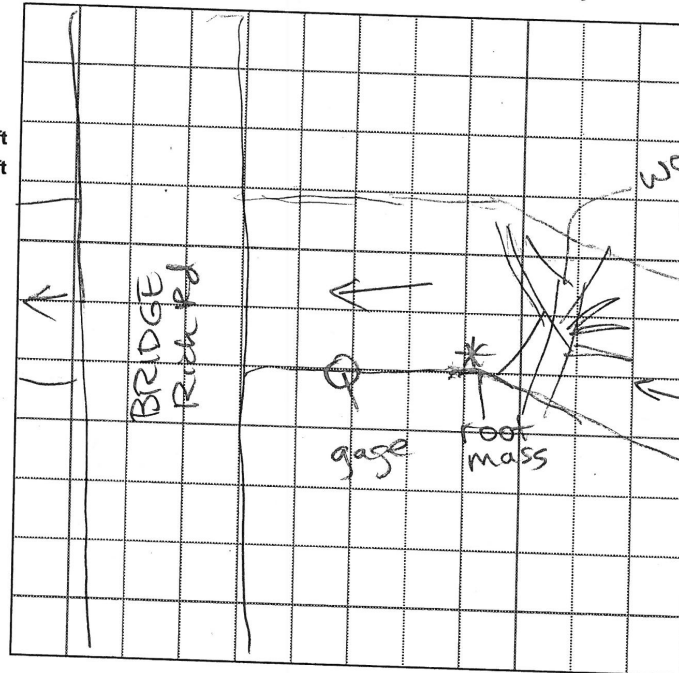
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/29	1309	13.60		overcast



Air Temperature Logger Location:

(map drawn from memory)

Water Temperature Logger Location:



Spurgeon

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: _____ Station Name: Deschutes @ Turnwater Samplers: JRF, SLA

Interval Frequency 00:30

Water Temperature Logger

I.D. # _____

Water Depth 0.8 ft Deployment Depth 0.5 ft

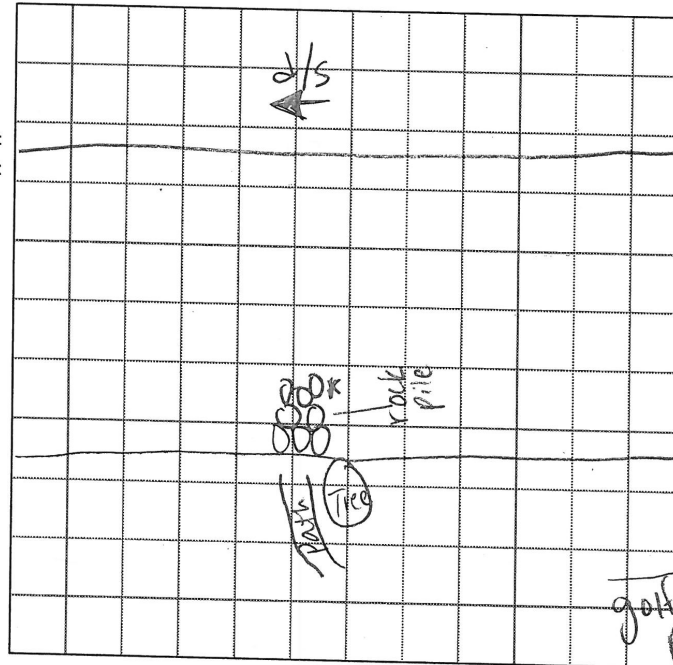
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
5-22-24	1645	not taken		configured to start Sunny @ 1630



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Prairie

Station Name: Prairie

Samplers: JRF TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 509

Water Depth 1.2 ft Deployment Depth 0.5 ft

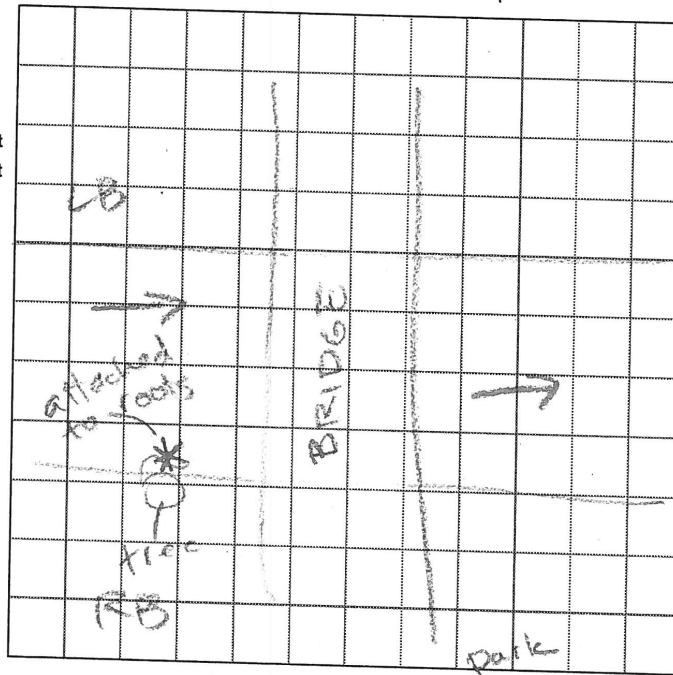
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/28	14:05	14.76	64°F	Overcast



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: James

Station Name: Scatter @ James

Samplers: JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 507

Water Depth 0.95 ft Deployment Depth 0.45 ft

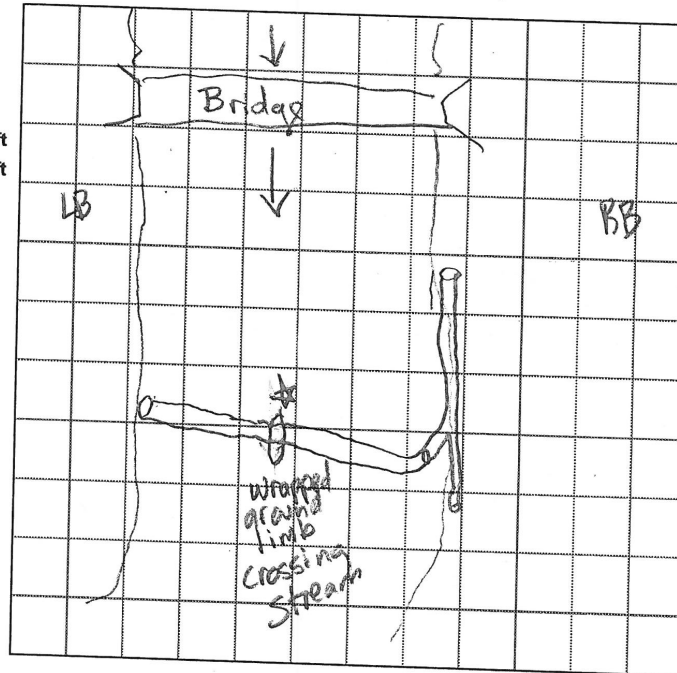
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # 206 93 507

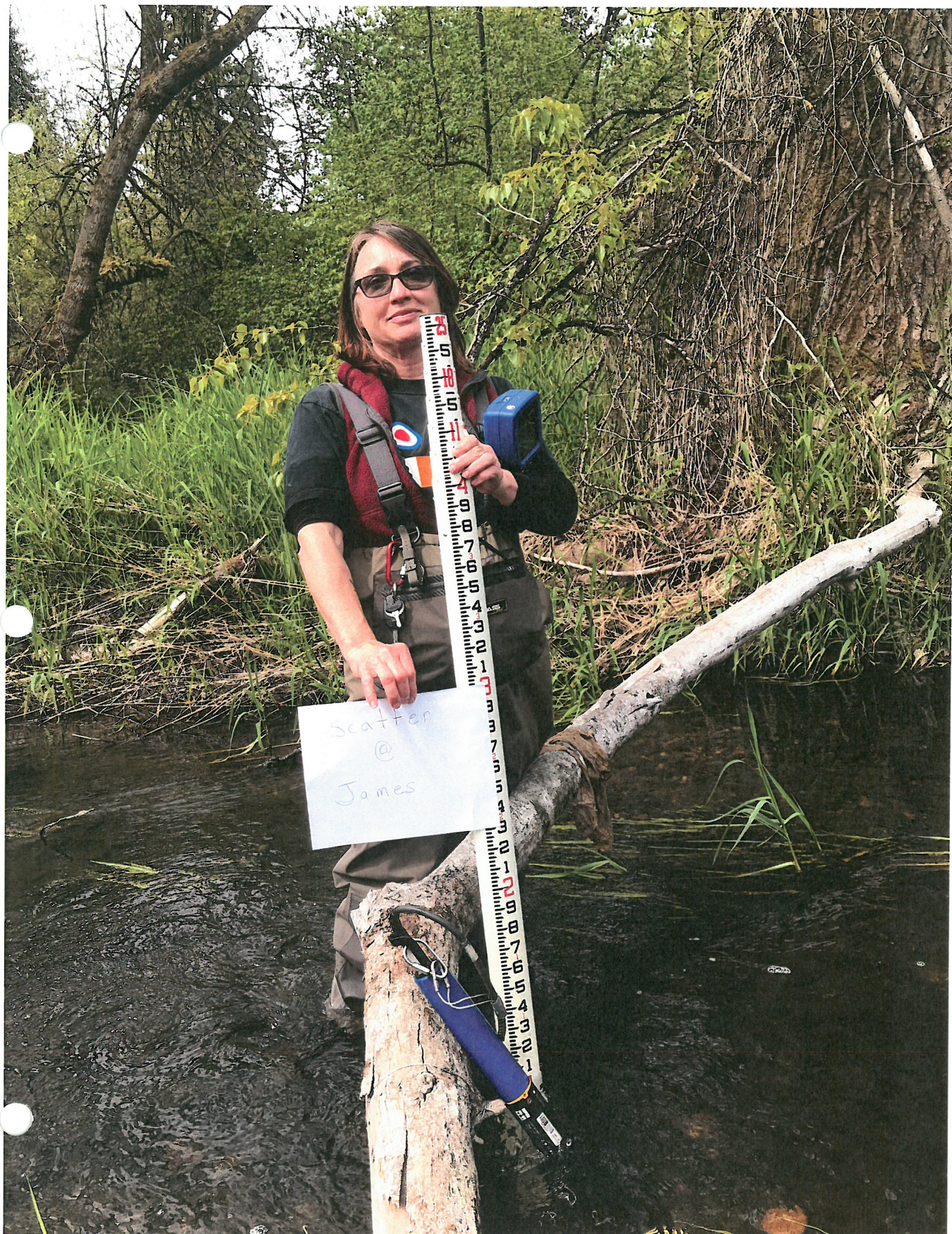
Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/Comments
4/29	13:34	14.782	64°	overcast



Air Temperature Logger Location:

Water Temperature Logger Location:



* Chehalis tidbit at this location

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Gibson Station Name: Scatter @ Gibson Samplers: JFR, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20693508

Water Depth 3.1 ft Deployment Depth 2.2 ft

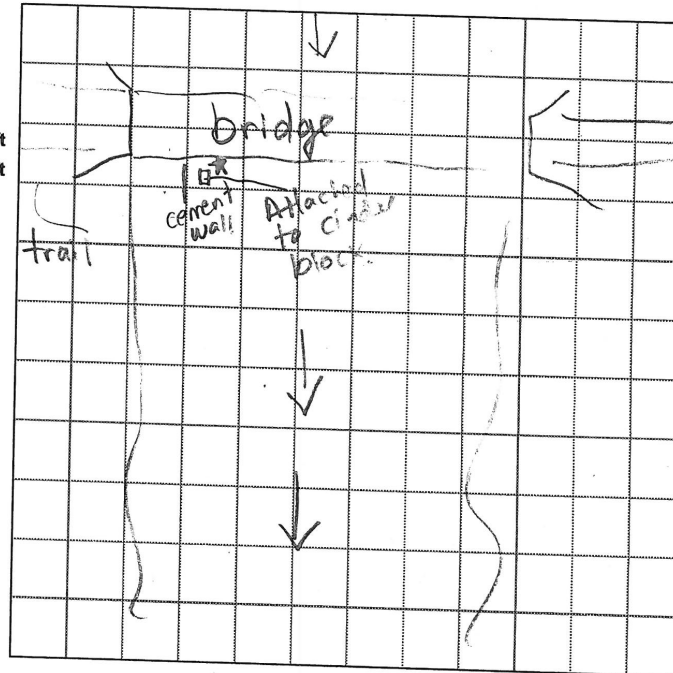
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/29	11:25	11.8	47	61°F cloudy



Air Temperature Logger Location:

Water Temperature Logger Location:



Scatter @
Gibson

* Scatter @ Gibson - 100' at this location

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: _____ Station Name: Chehalis Samplers: JRF TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 506

Water Depth 2.6 ft Deployment Depth 1.3 ft

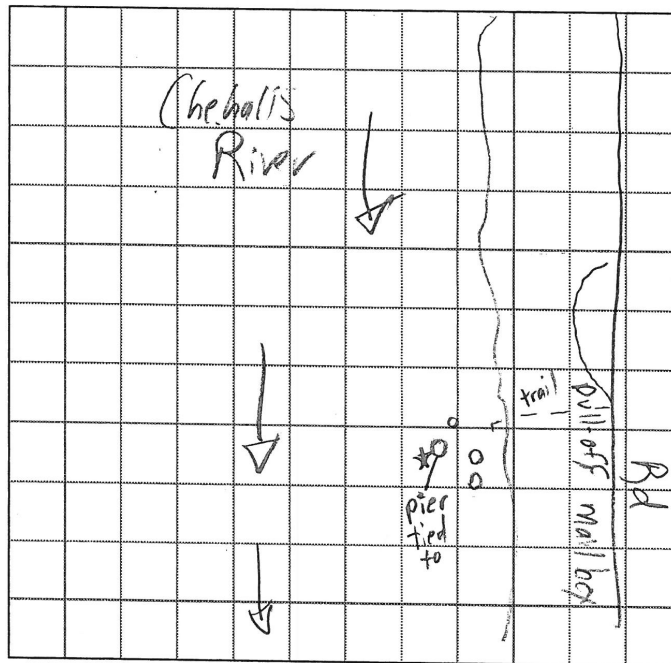
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/29	10:30	13.855	59° F	cloudy



purple mailbox
12331
Independence Rd.

Air Temperature Logger Location:

Water Temperature Logger Location:





D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Skook

Station Name: Skook

Samplers: SLA, JRF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 51

Water Depth 1.96 ft

Height (Abv Bottom) _____ ft

Deployment Depth 1.7 ft

Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

on cinderblock
on LB under
bridge

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-30-2012	1020	62.3°F	54°F	overcast, sprinkling

BRIDGE

on cinderblock
in rocks on u/s side of
bridge LB

Air Temperature Logger Location:

Water Temperature Logger Location:



← bank

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: _____ Station Name: McAllister @ I-5 Samplers: JRF, SLA

Interval Frequency 00:30

Water Temperature Logger

I.D. # _____

Water Depth 1.45 ft Deployment Depth 1.0 ft

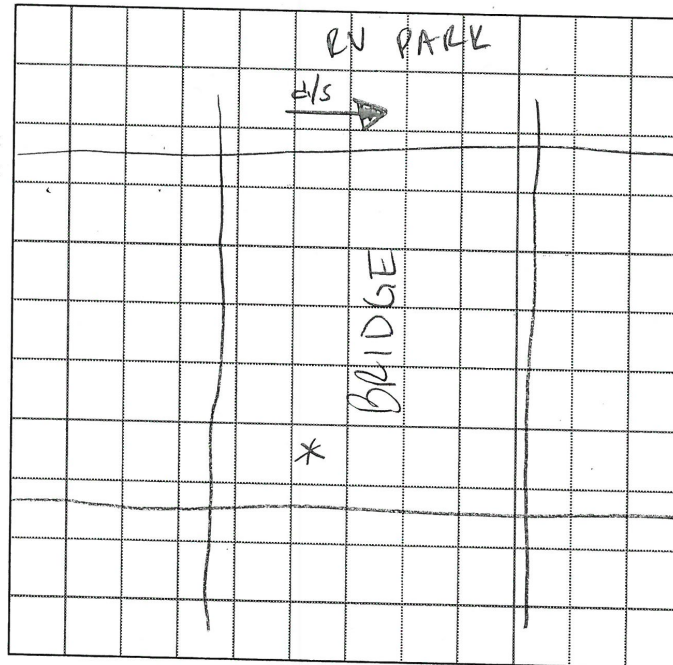
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
9/24/18	1715	NOT TAKEN		configured to start @ sunny 1700



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Eaton

Station Name: Eaton

Samplers: JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # _____

Water Depth 1.0 ft Deployment Depth 1.0 ft

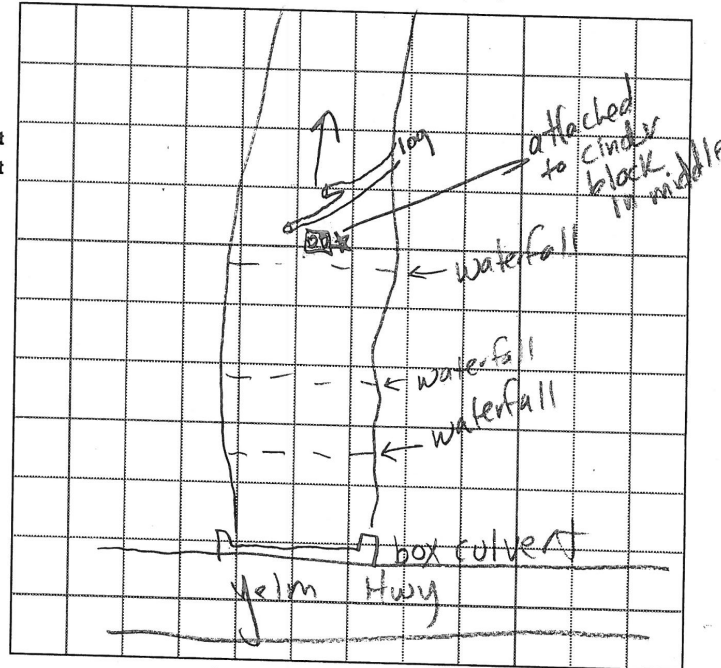
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # 206 93 526

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/29	15:07	13.02	77	cloudy, overcast



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Thomp

Station Name: Thompson

Samplers: JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # _____

Water Depth 0.6 ft Deployment Depth 0.3 ft

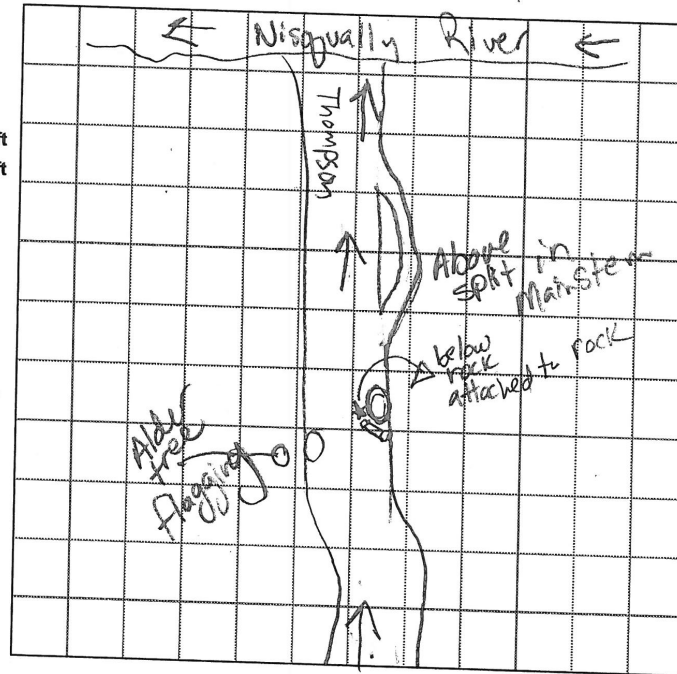
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # 206 93 531

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/29	14:11	9.789	12.1	cloudy



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Yelm Station Name: Yelm Mouth Samplers: JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 530

Water Depth 0.9 ft Deployment Depth 0.65 ft

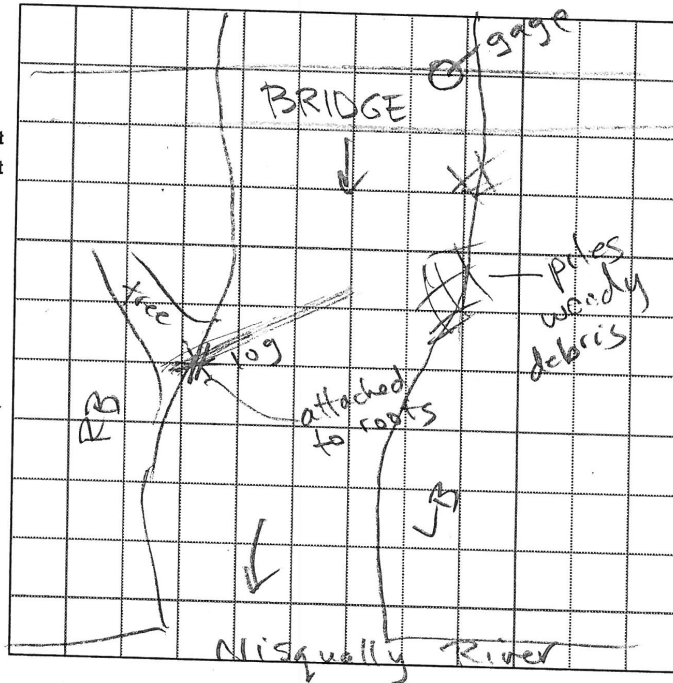
Height (Abv Bottom) ft Retrieval Depth ft

Air Temperature Logger

I.D. #

Height (Abv Stream) ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/29	13:18	12.26	75°F	cloudy/overcast



Air Temperature Logger Location:

(map drawn from memory)

Water Temperature Logger Location:



Yelm north

D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Dobbs CC Station Name: Dobbs @ Cross Creek Samplers: JRF

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20693527

Water Depth 0.95 ft Deployment Depth 0.5 ft

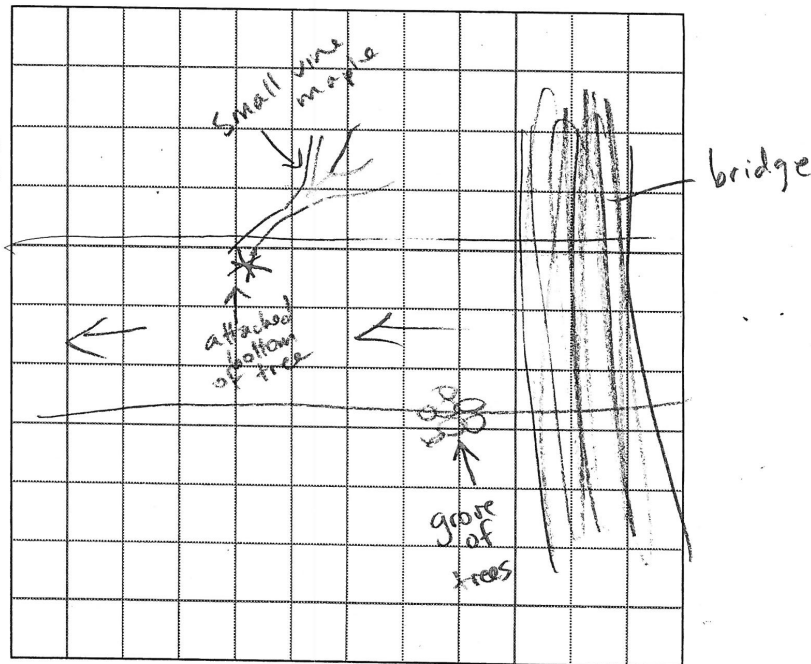
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-29 2010	1639	12.842	63°F	PC SSW 0-3 mph



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: _____ Station Name: Fleming @ JP Samplers: JRF, SLA

Interval Frequency 00:30

Water Temperature Logger

I.D. # 20693 525

Water Depth 0.4 ft Deployment Depth 0.2 ft

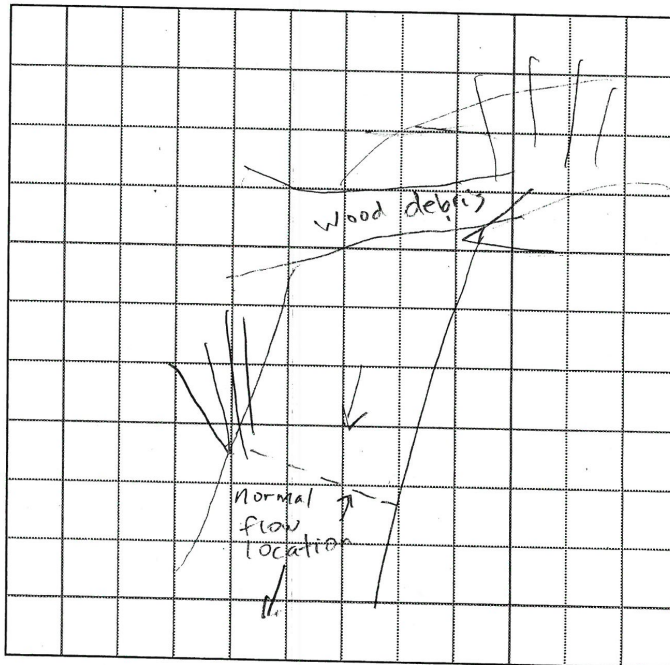
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
5/11/2020	0900	11.879	63°F	PC



Air Temperature Logger Location:

Water Temperature Logger Location:

Configured 0848



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Libby Station Name: Woodard @ Libby

Samplers: VR

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 502

Water Depth 1.7 ft Deployment Depth 1.0 ft

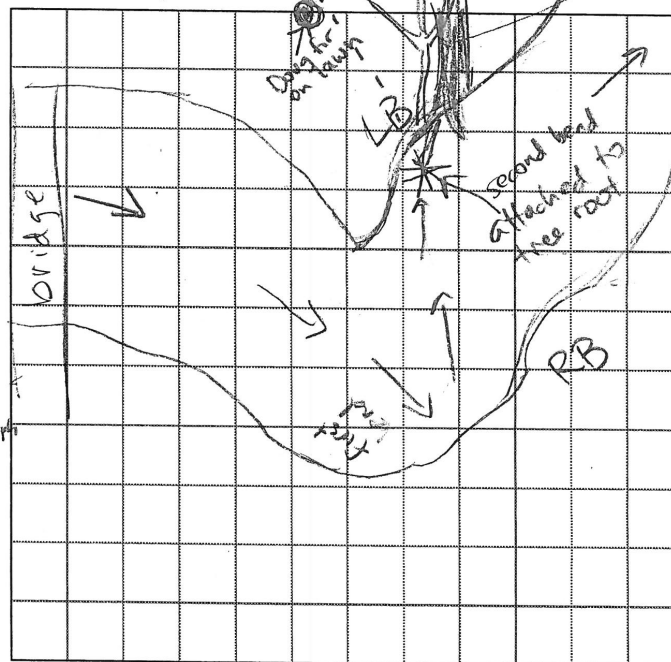
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4-27 2020	1558	13.236	61°F	temp logger deployed ~10 min before photo PC/SSW & 10 mph



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: Drahan

Station Name: Woodland @ Drahan

Samplers: JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # 206 93 529

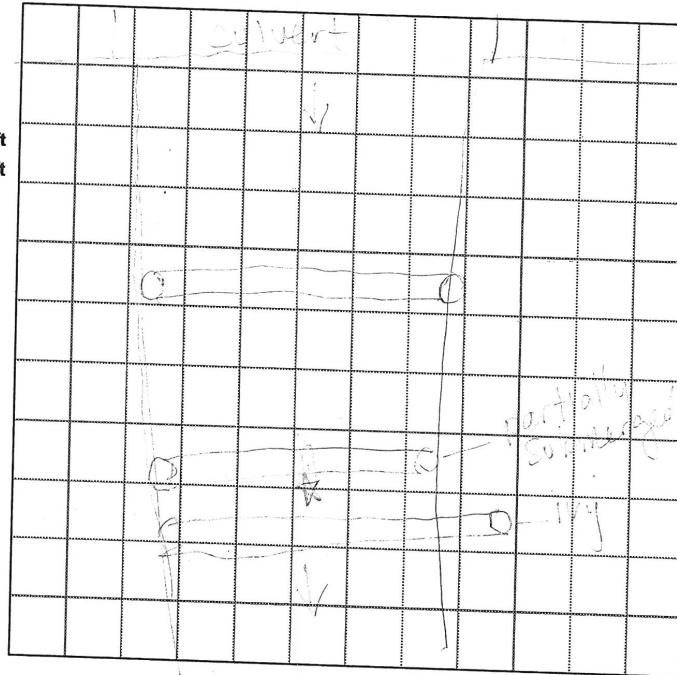
Water Depth 1.7 ft Deployment Depth 1.25 ft

Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # _____
Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/29	16:08	14.285	68°F	Cloudy overcast



Air Temperature Logger Location:

Water Temperature Logger Location:



D-1. Blank Survey Form

Continuous Temperature Survey Form

Station #: PG

Station Name: Woodland @ PG

Samplers: JRF, TC

Interval Frequency 00:30

Water Temperature Logger

I.D. # _____

Water Depth 0.85 ft Deployment Depth 0.45 ft

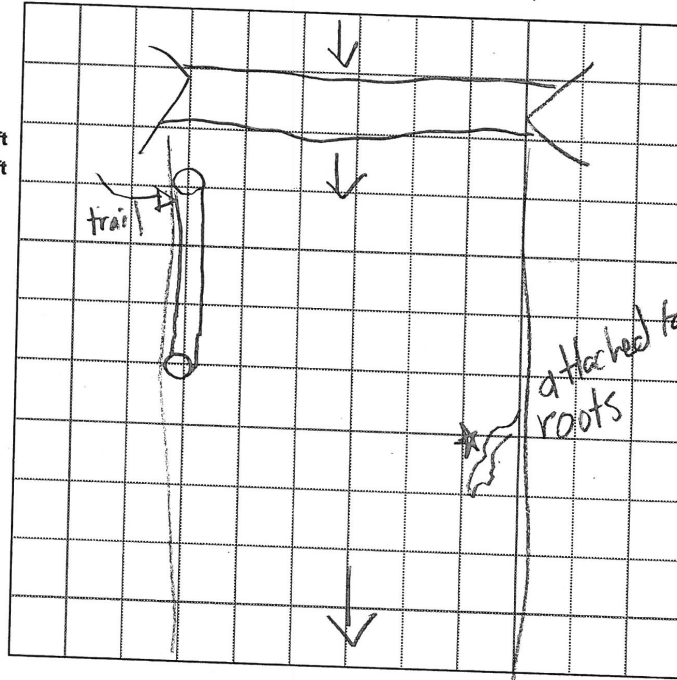
Height (Abv Bottom) _____ ft Retrieval Depth _____ ft

Air Temperature Logger

I.D. # 206 93 528

Height (Abv Stream) _____ ft

Date	Time	Water Temp	Air Temp	Weather/ Comments
4/29	16:42	13.678	13.8	cloudy, overcast



Air Temperature Logger Location:

Water Temperature Logger Location:

