



## Monitoring Water Quality Response of a Pheasant Branch Creek Tributary to Restoration of the Acker Farm

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This report summarizes water quality, rainfall, and streamflow data collected during the period August 30, 2019 – July 21, 2022 at Pheasant Branch Conservancy downstream of the Acker Farm in Dane County, Wisconsin.

Following demolition of the farmstead, two berms and a sedimentation pond were constructed on the former Acker parcel in October 2020. Each berm has three culverts through it at its low point. The culverts have chambers in the middle where stop logs may be added to hold back water. As of July 2022, the stop logs are at an elevation of 882 ft, which will hold back approximately 3 ft of water behind the berms.

Rainfall has been below average since fall 2020, but there were two events of approximately 2 inches, and 11 events of 1-1.5 inches (Figure 1). None of these events produced enough runoff to produce measureable flow through the south berm. There was a small amount of flow through the south berm culverts during snowmelt in 2022, but this was likely stored by the ponds downstream. Therefore, there has been no phosphorus loading to Lake Mendota from the former Acker Farm for the last two years. All water quality sample results for this project are reported in tables 1 and 2.

A new monitoring setup was started on July 21, 2022. A pressure transducer is now located just upstream of the inlets of the culverts through the south berm. This unit will record water pressure whenever enough runoff is produced to pool behind the south berm, even if it doesn't exceed the elevation of the stop logs. If water does pass the stop logs, its elevation can be converted to discharge with the weir equation and the elevation and dimensions of the stop log chamber. In addition, water samples for nutrient analysis will be collected from the pool behind the south berm whenever there is significant runoff, and at the culvert outlets whenever there is flow at that point.



Table 1. Water quality sample results for site PB3.

Date/Time	Q	TP	DOP	TKN	NO3	TSS
9/10/2019 8:45	0.30	4.70	4.02	8.31	10.1	15
9/12/2019 9:20	0.44	4.97	4.36	6.03	0.37	19
9/13/2019 8:50	0.12	4.15	3.67	3.12	0.21	11
9/22/2019 10:30	3.40	5.00	3.81	8.62	2.26	65
9/29/2019 10:30	1.08	4.52	3.70	5.44	3.24	28
10/1/2019 11:45	7.07	5.01	2.76	6.90	1.32	716
10/2/2019 8:30	6.19	3.18	2.21	2.47	0.52	166
10/2/2019 13:30	5.72	2.88	1.87	2.80	0.47	142
12/29/2019 9:00	0.06	2.40	2.11	3.25	7.64	21
3/2/2020 16:25	7.55	1.03	0.92	1.74	0.47	12
3/3/2020 16:42	7.56	1.28	1.07	1.95	0.36	43
3/4/2020 15:40	3.55	1.45	1.23	2.06	0.40	45
3/29/2020 8:30	0.15	2.75	2.32	2.62	1.89	67
5/17/2020 15:30	0.51	2.28	1.99	2.12	4.26	13
5/28/2020 17:05	0.03	3.53		2.7	0.27	77
6/29/2020 15:50	0.09	3.07	2.70	3.23	4.55	25
7/10/2020 7:45	0.12	2.54	2.38	1.36	0.32	5
3/6/2022 9:00	<0.1 (est)	5.11		6.61	1.19	18

Table 2. Water quality sample results for site PB4.

Date/Time	TP	DOP	TKN	NO3	TSS
9/12/2019 9:55	2.87	1.71	6.32	13.20	258
9/13/2019 9:45	4.19	3.32	4.12	0.46	21
9/22/2019 10:45	2.82	2.39	4.15	1.67	159
9/29/2019 11:00	4.15	3.25	3.38	0.70	30
10/1/2019 12:05	5.48	3.88	5.45	0.34	28
10/1/2019 15:45	5.24	3.28	4.31	1.16	386
10/2/2019 9:30	3.14	2.07	2.87	0.51	218
10/2/2019 14:00	3.01	2.02	2.64	0.49	112
11/21/2019 9:00	1.46	0.91	1.27	3.18	20
11/21/2019 9:30	4.20	3.00	1.27	6.60	56
3/2/2020 16:45	1.12	0.97	1.76	0.793	15
3/3/2020 16:59	1.40	1.08	2.99	0.526	108
3/4/2020 16:00	1.36	1.14	2.53	0.565	41
3/29/2020 8:45	3.42	2.31	5.74	0.954	600
5/17/2020 16:00	2.32	1.81	2.53	3.30	16
7/10/2020 8:20	2.83	2.28	2.22	0.129	13