

WATERSHED RESPONSES JUNE – JULY 2026

Influence of Shalda Creek beaver dams and removal



EXECUTIVE SUMMARY

Two dams were documented in Shalda Creek during June 2026: the “Tweener Dam” located between Traverse Lake Road and CR 669 and the “669 Dam” located downstream of CR 669. The watershed was still clearing out water from the April flooding and high water levels when beaver dam construction commenced. With beaver dam construction, water levels were elevated upstream. During June and July, the water level at 669 Bridge increased 8” and reached the bottom of 669 Bridge, leaving no air gap. Shalda Creek levels at TLR Stream Outlet rose 4” and LTL at TLR Lake Inlet rose 4.4”. Meanwhile, Lime Lake water level, which serves as a “control comparison” and as an indicator of the typical watershed response, only increased 1.2” during this same time frame. In comparison to Lime Lake, Shalda Creek at 669 Bridge and at TLR Stream Outlet, as well as LTL at TLR Lake Inlet, were demonstrating non-typical watershed responses and were headed in the opposition direction of reaching summer lows.

LTL level reached 595.5 by end of July, 10” higher than normal summer lows. This is a level of concern for potential impact on shoreline erosion, elevated water tables, low lying property, crawl spaces of residential structures, root saturation, and water breaching banks with high wind and waves. Shalda Creek at 669 Bridge reached 595.9, well above the normal high of 594.3 that occurs without the presence of beaver dams, and 12-15” higher than normal summer lows. During the last rain, levels increased 2” above the bottom of the bridge. Sustained high water levels can impact road infrastructure. Measured flow rates (fps) with the presence of beaver dams were much slower than flow rates previously documented at similar water levels without the presence of beaver dams.

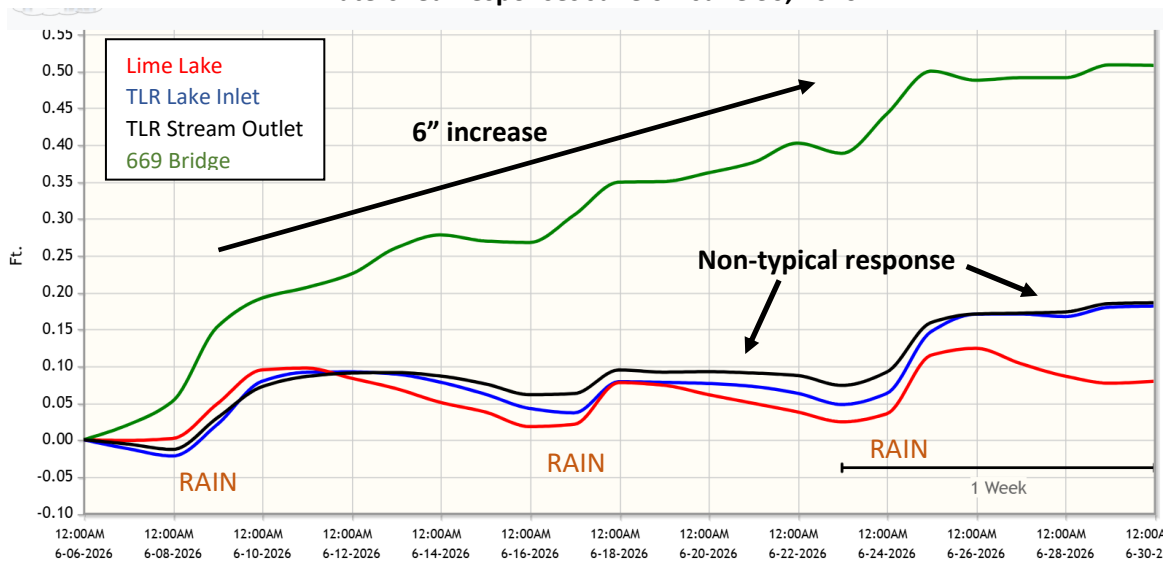
Permission was granted by NPS to remove the dams and both dams were removed July 26, 2026. The water level at 669 Bridge quickly dropped 5” over the course of 24 hours. A significant decrease in Shalda Creek at TLR Stream Outlet was also observed. Watershed responses for Shalda Creek and LTL then returned to a typical response pattern, decreasing in a similar fashion as observed in Lime Lake following a large 3” rain event. Measured flow rates (fps) at 669 Bridge and TLR Culvert also increased 66% and 18% respectively following beaver dam removal.

Elevation of water levels for prolonged periods of time can alter watershed dynamics and characteristics. The sustained elevation of water levels also reduces the capacity of the watershed to absorb additional rain events. The establishment of a beaver dam maintenance policy using appropriate water level thresholds (e.g. 594.3 at 669 Bridge and 594.3 at TLR Lake Inlet) for dam removal BEFORE higher levels are reached is essential to minimize the watershed impacts upstream.

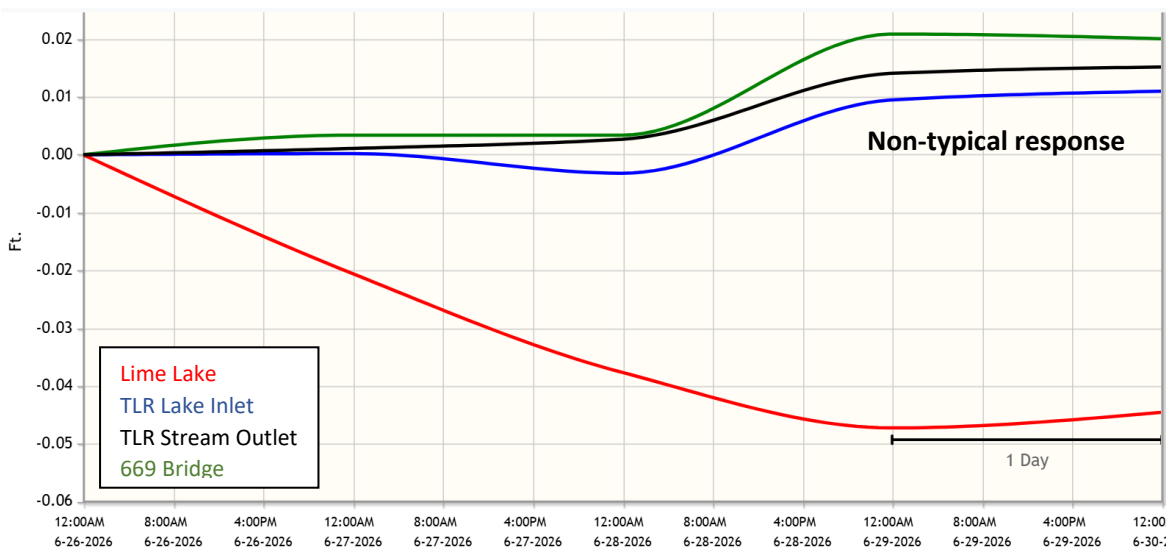
WATERSHED RESPONSES – JUNE 2026

Lime Lake serves as a good control for observing typical watershed responses. During the month of June, levels at Lime Lake increased during rain events followed by a subsequent decline in levels. Beaver dams were documented at Tweener Dam and 669 Dam locations, each holding back significant water upstream. Non-typical watershed responses were observed for Shalda Creek at 669 Bridge with levels increasing 6" from June 6-June 30, 2026 and an additional 2" increase during July. Water level reached 594.7 by end of June with only a 2.5" air gap from bottom of 669 Bridge. By end of July, there was no air gap below 669 Bridge. Non-typical watershed responses were observed at Shalda Creek at TLR Stream Outlet and also for LTL at TLR Lake inlet where levels plateaued after rain events and did not decrease. LTL water levels rose to a concerning 594.4 by end of June, with the potential of a larger rain event pushing levels higher. Measured flow rates (fps) were significantly less than normal in comparison to documented flow rates at similar water levels without stream blockage. Shalda Conifer Swamp was significantly elevated with high water standing throughout and flat surface water. Water levels were abnormally and significantly high and not headed in a direction towards summer lows.

Watershed Responses June 6 – June 30, 2026



Watershed Responses June 26 – June 30, 2026



WATER LEVELS

	June 6	June 30	Difference	July 25	Difference
Lime Lake	617.66	617.73	0.07' (0.8")	617.76	.10 (1.2")
Shalda Creek at 669	594.17	594.66	0.5' (6.0")	594.85	.68 (8.2")
Shalda Creek at TLR Stream Outlet	594.02	594.22	0.2' (2.4")	594.35	.33 (4.0")
Little Traverse Lake at TLR Lake Inlet	594.17	594.36	0.2' (2.4")	594.54	.37 (4.4")

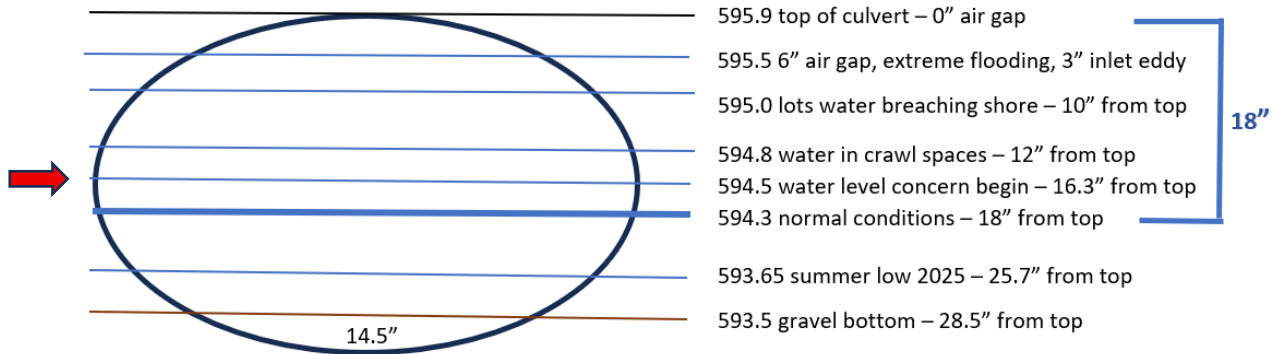
When beaver dams are not present, watershed responses are similar at all four measurement points. All measurement locations rise in a similar amount during rain event and then decrease in a similar fashion after the rain event ends. From June 6 to June 30, Lime Lake increased 0.07' (0.8") due to three rain events. Little Traverse Lake at TLR Stream Inlet and Shalda Creek at TLR Stream Outlet both increased 0.2' (2.4") with water levels no longer decreasing after the last rain event. By the end of July, Shalda Creeks levels at 669 Bridge had increased more than 8" and increased 4" at TLR Stream Outlet. LTL increased 4.4" while Lime Lake in contrast had 1.2" change in water levels June 6 - July 25. Levels are high in the LTL-Shalda Creek watershed, even if during rainy seasons, but abnormally high for summer season, without any direction heading towards reaching summer lows for Shalda Creek (which would be 12-15" lower) or LTL (which would be 10" lower).

Flow rates are measured using a hand-held flow meter as described in previous reports (Skjaerlund March 2026, Skjaerlund April 2026). Flow rates (fps) are slower in comparison to flow rates at similar levels without stream blockage. Flow rates at TLR Culvert were 1.85 fps on June 30, 2026 with water level at 594.36. Typical flow rate for TLR Culvert at 594.4 is usually 2.3 fps (Skjaerlund March 2026, Skjaerlund April 2026), approximately 25% higher. Flow rates at 669 Bridge were 0.15 fps on June 30, 2026 with water level at 594.66. Typical flow rate for 669 Bridge at 594.7 is usually 0.5 fps (Skjaerlund March 2026, Skjaerlund April 2026), approximately 3x higher. Beaver dams reduce Shalda Creek flow and elevated water levels.

KEY BENCHMARKS WITH EXISTING TRAVERSE LAKE ROAD CULVERT – 64" x 43"

LTL Lake Inlet side (east)

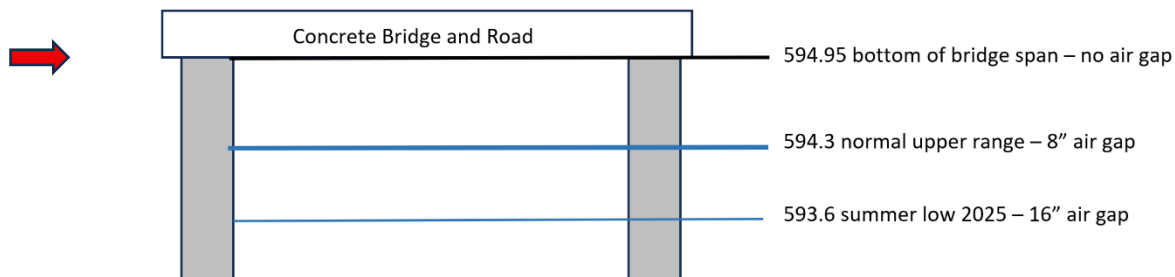
(not to vertical scale)



KEY BENCHMARKS WITH EXISTING CR 669 BRIDGE – 30' span

Upstream measurements (east)

(Not to vertical scale)





June 30, 2026



IMPACTS OF CONTINUED HIGH WATER LEVELS

Beaver dam maintenance is critical for the following reasons:

1. Reaching summer lows are important to drain the “bathtub” so that it has capacity to absorb additional rain events, including heading into the fall rainy season. Water tables need to be lowered in the watershed and reduces shoreline erosion. Higher water tables impact tree root systems, performance of septic systems, crawl spaces of residential structures, and road infrastructure.
2. Additional culvert area is planned to be installed later this summer as part of TLR reconstruction. Having water levels as low as possible is critical for water management during installation. Having to manage higher water levels becomes an expensive proposition.

BEAVER DAM STATUS – JUNE 30, 2026

Tweener Dam



The tweener dam is approximately 3' high from the bottom of Shalda Creek and is holding back 4" of water upstream. The downstream levels are elevated considerably as compared to normal conditions without blockage. The side stream diversion around the southern debris pile is also block by beaver debris and is holding back similar amounts of water.



669 DAM



The 669 Dam is holding back more than 1.7' (20") of water upstream. The depth of the dam in the middle of the creek is more than 3'. There is significant sediment accumulation towards the sides of the creek.

FISH CAMP DAM

There is no beaver dam activity at Fish Camp Dam.

SHALDA CONIFER SWAMP

The Shalda Conifer Swamp has standing water throughout the wetlands surrounding the stream channel. Surface water is flat. Water table is elevated into surrounding areas.

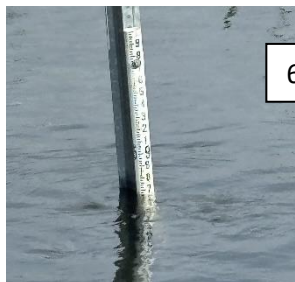


TLR Lake Inlet

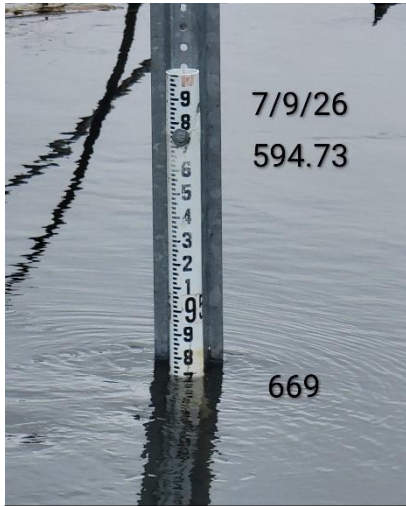
June 30, 2026



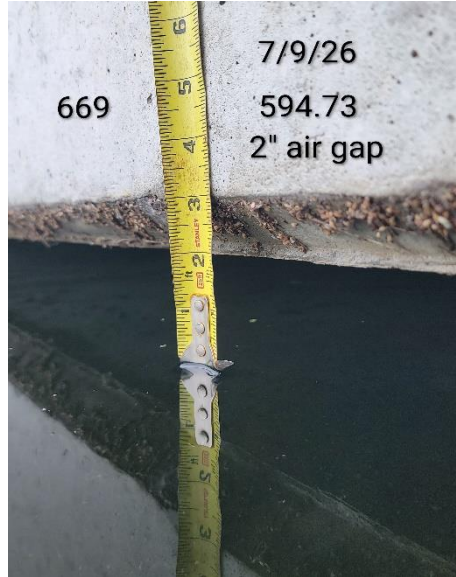
669 Bridge Upstream



WATER LEVELS – JULY 9, 2026



Aug 2024 – 593.9 10" lower
Aug 2025 – 593.6 13.5" lower



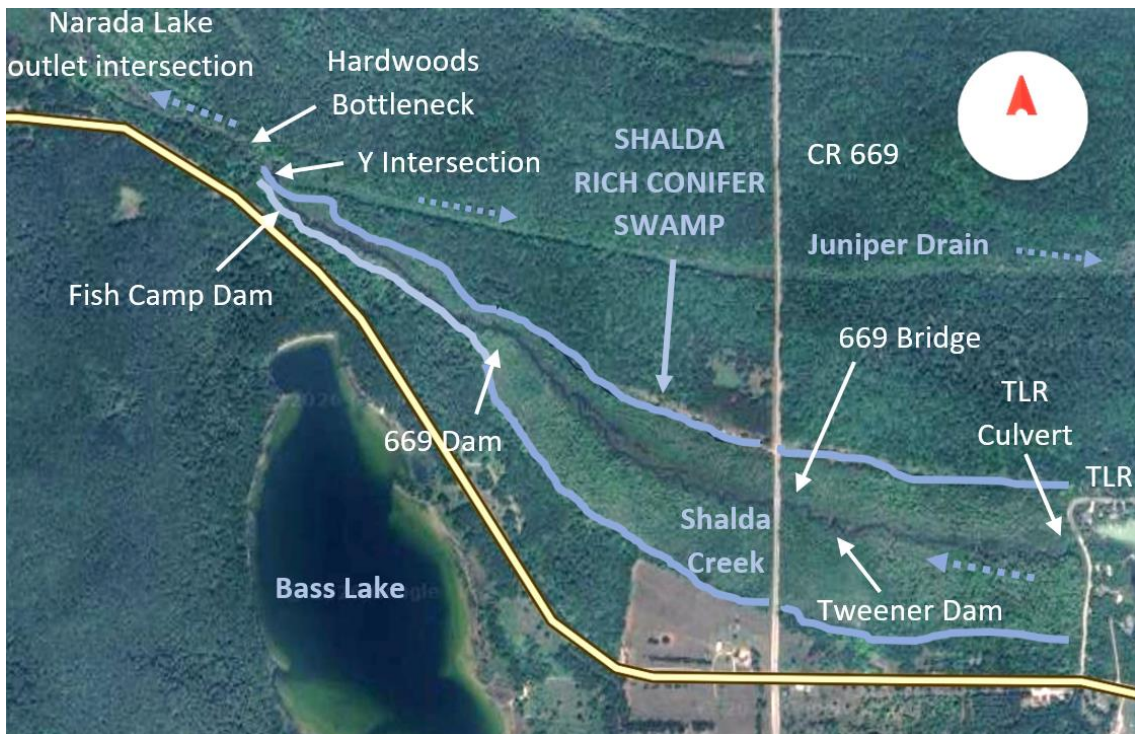
Sept 2024 – 593.7 9" lower
Aug 2025 – 593.7 9" lower



Other lake properties have lower shoreline banks



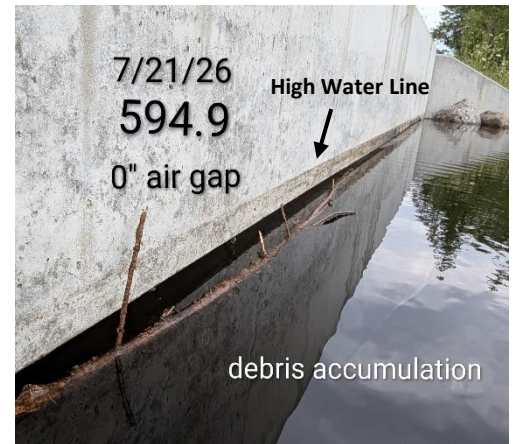
July 9 Photos of "669 Dam"



WATER LEVELS – JULY 21, 2026 AFTER 3" RAIN EVENT



Aug 2024 – 593.9 12" lower
Aug 2025 – 593.6 15.5" lower



Night prior reached 595.13
2.5" above bottom of bridge



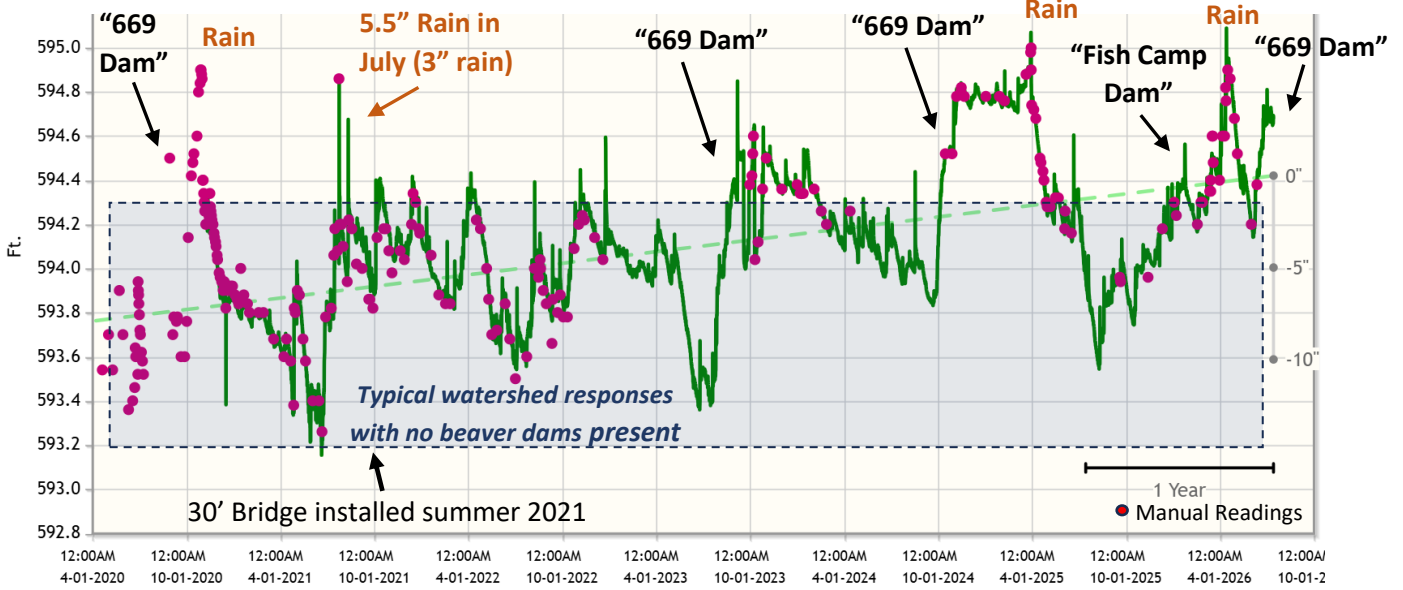
Sept 2024 – 593.7 10" lower
Aug 2025 – 593.7 10" lower



Other lake properties have lower shoreline banks
Wind and waves push water over dock and shoreline bank

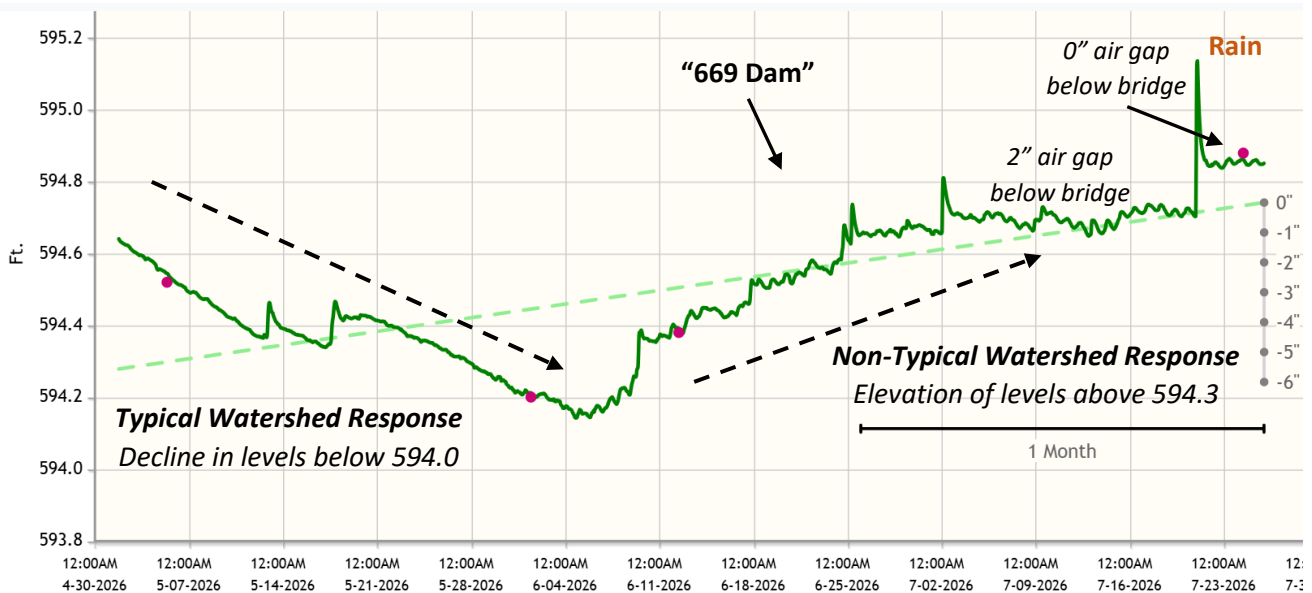


WATER LEVELS AT 669 BRIDGE DURING 2020-2026



Normal range of water levels at 669, without beaver dams present, is 593.2 to 594.3. There have been five instances where beaver dams were present downstream. On all five occasions, non-typical responses were observed which included rapid elevation of water levels above 594.3. Levels quickly decreased after dam removal. Due to the presence of dams for prolonged periods of time, the Shalda watershed trendline of water levels (dashed green line), has increased 7" higher the past 6 years. When rain events are added on top of dam-elevated water levels, water quickly can reach bottom of bridge. Flooding of LTL shoreline occurred 2020, 2025, and 2026 – in all three instances, beaver dams had already elevated water levels prior to significant rain events. High water levels in Shalda Creek, including elevated levels at TLR outlet, can impede watershed clearance.

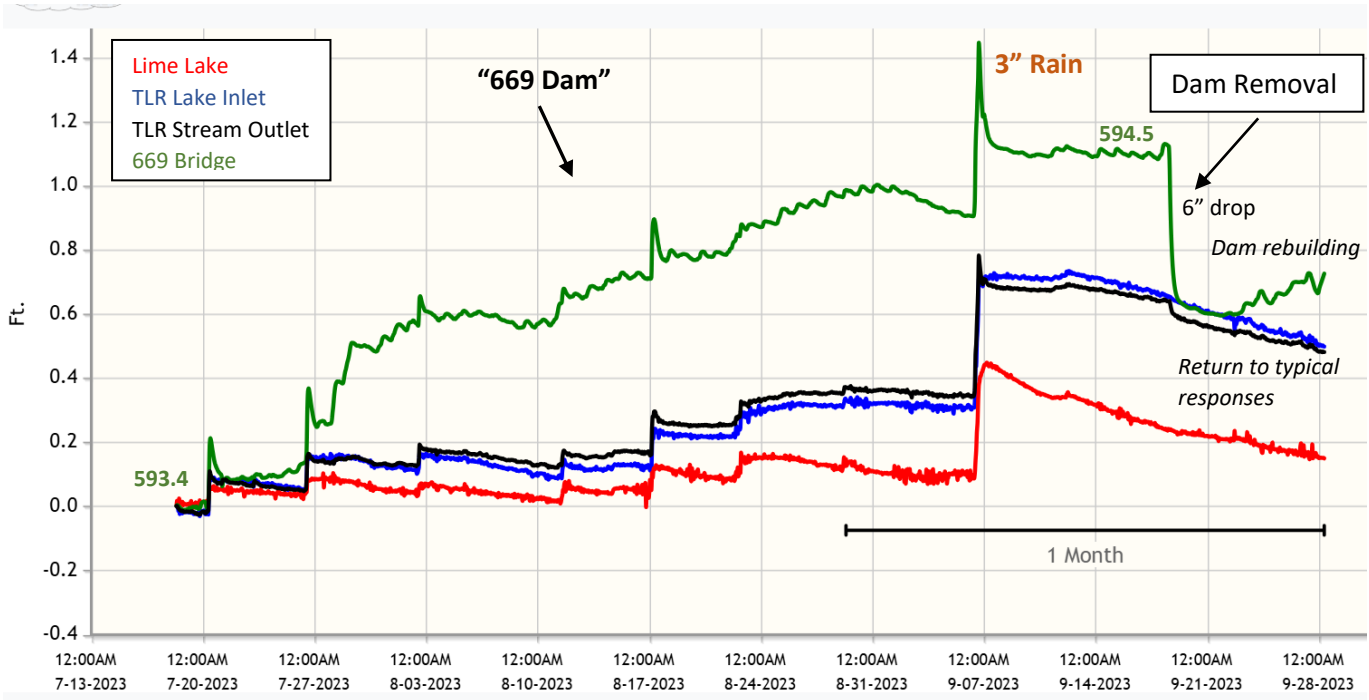
Water Levels at 669 Bridge April – July 2026



Instead of the typical response of declining water levels towards summer lows below 594.0, beaver construction of “669 Dam” caused a rapid increase in water levels during June-July 2026, leading to having zero air gap below the bottom of the 30’ bridge. Flow rates (fps) have been documented to be significantly less than flow rates at

similar levels with no beaver dams in place. Over time, the dam will continue to increase in size as beavers add more debris, increasing levels further. Large rain events and seasonal rain events (fall) will push the levels at 669 Bridge upward further with little capacity for watershed to absorb the rain events. Elevation of water levels upstream occurs as well.

Comparison to 669 Dam in August 2023



The presence of a 669 Dam had similar influences on the watershed in 2023 and 2026. During August 2023, water levels at 669 Bridge increased significantly with beaver dam construction in a non-typical fashion when compared to Lime Lake levels. Water levels in Shalda Creek at TLR Stream Outlet increased as well as levels in LTL at TLR Stream Inlet. After dam removal, water levels quickly dropped 6" at 669 Bridge followed by return to typical responses with a decrease at TLR Stream Outlet and TLR Lake Inlet.

The biggest difference is the water levels themselves, with 2023 levels being 10" lower than in 2026 when beaver dams began to increase water levels. In 2026, the watershed was still clearing water from the April 2026 flooding and levels were not allowed to reach lower levels before the dams were constructed.

- 2023 Water had reached 593.4 in June before dam started to increase water level and dam was pulled at 594.5.
- 2026 Water had reached 594.2 in June before dam started to increase water level and dam was pulled at 594.9.

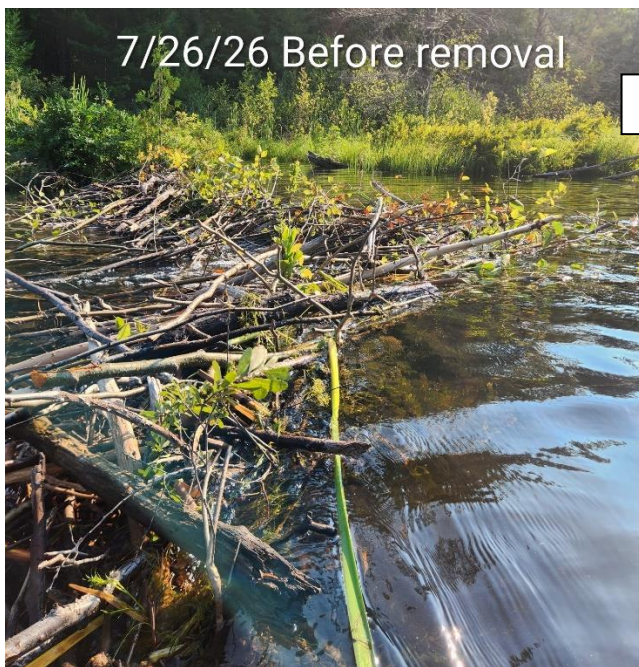
WATERSHED CHANGES

	Lime Lake	TLR Lake Inlet	TLR Stream Outlet	669 Bridge
7/19/2023	617.58	593.70	593.57	593.4
8/31/2023	617.67	594.05	593.95	594.4
Net change	.09 (1.1")	.35 (4.2")	.38 (4.5")	1.0 (12")
6/6/2026	617.66	594.17	594.02	594.17
7/25/2026	617.76	594.54	594.35	594.85
Net change	.1 (1.2")	.37 (4.4")	.33 (4.0")	.68 (8.2")

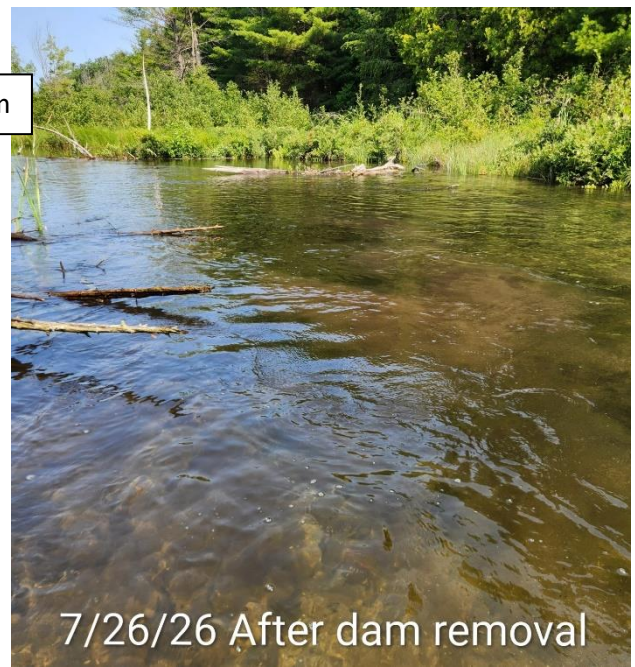
BEAVER DAM REMOVAL – JULY 26, 2026



Tweener Dam

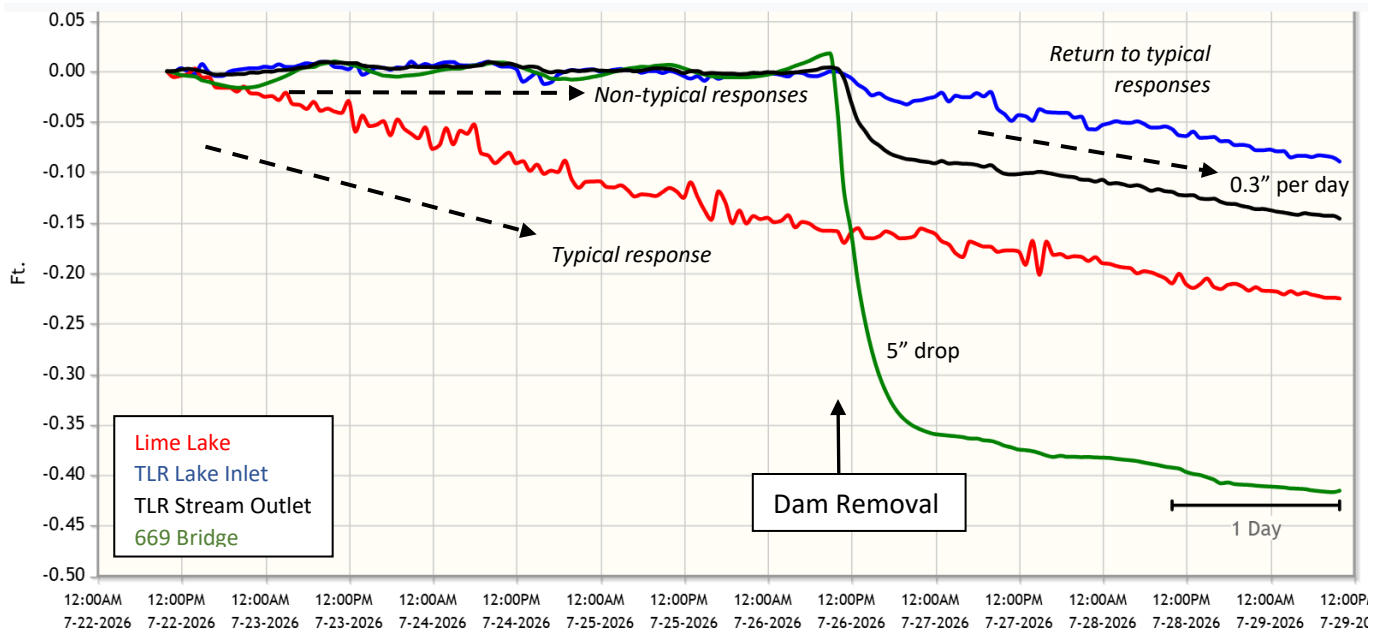


669 Dam



Cleveland Township and Leelanau County Road Commission received permission by NPS to remove dams in order to help lower water levels before the potential installation of additional culvert area across TLR in late September. The Tweener and the 669 Dam were removed by a LTLA contractor on the morning of July 26, 2026. Water levels quickly dropped 5" at 669 Bridge. Shalda Creek at TLR Stream Outlet and LTL at TLR Lake Inlet returned to typical watershed responses with a continued decrease in water levels (approximately 0.3" per day). It is expected water levels will decrease further and as the standing water and elevated water table is cleared in the Shalda Conifer Swamp. More accurate insights into the water level changes will be gained in the days and weeks to come (beyond the timing of this report), as water levels decline towards a summer low without the stream restrictions presented by beaver dams. Reaching lower water levels is critical to provide additional watershed capacity to absorb seasonal fall rains, in addition to minimizing the impact of prolonged elevated water levels on shoreline erosion, root structure saturation, and elevated water tables.

WATERSHED RESPONSES AFTER DAM REMOVAL JULY 26, 2026



MEASURED FLOW RATES (fps)

No beaver dams present

	TLR Lake Inlet Level	TLR Flow Rate (fps)	669 Upstream Level	669 Flow Rate (fps)
5/5/26 9:30	594.78	2.78	574.52	.425

Presence of beaver dams

	TLR Lake Inlet Level	TLR Flow Rate (fps)	669 Upstream Level	669 Flow Rate (fps)
6/30/26 9:00	594.36	1.85	594.66	.15
7/24/26 11:00	594.52	1.88	594.88	.18
7/26/26 7:15	594.52	1.85	594.88	.15

After removal of beaver dams

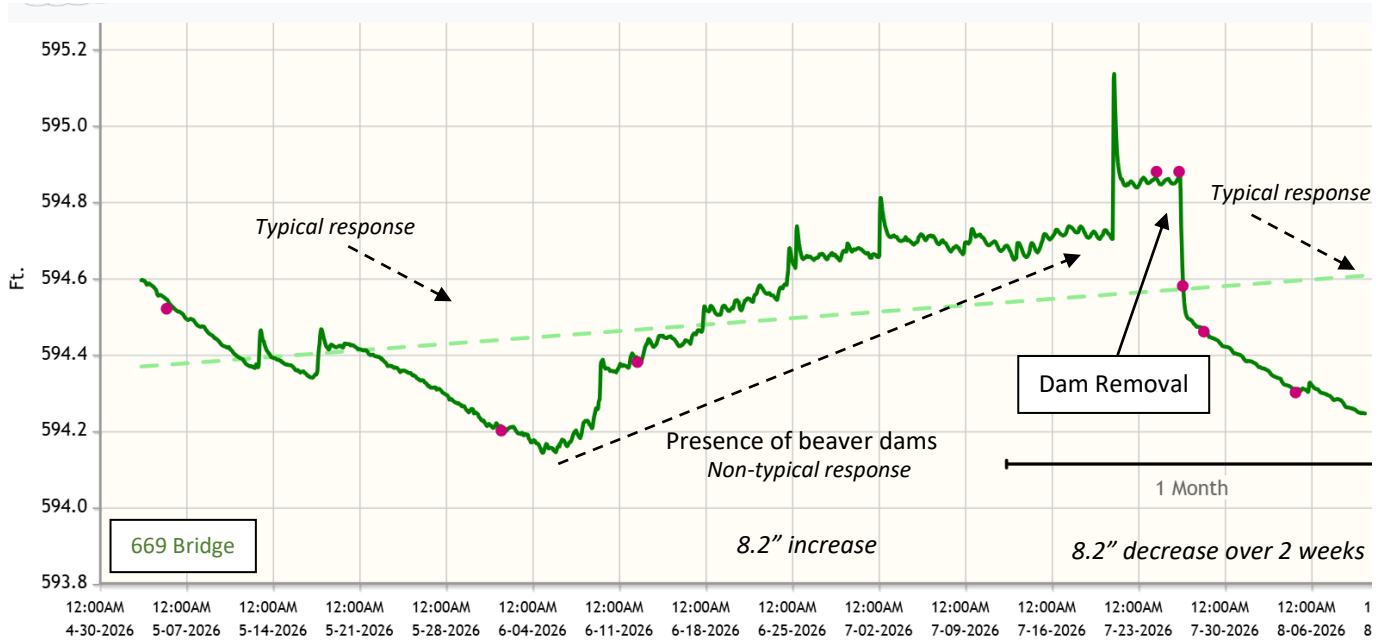
	TLR Lake Inlet Level	TLR Flow Rate (fps)	669 Upstream Level	669 Flow Rate (fps)
7/26/26 14:30	594.50	2.1	594.58	.24
7/28/26 7:00	594.48	2.23	594.46	.26
8/4/26 17:00	594.25	2.0	594.3	.25

Flow rates (fps) were measured using a hand-held flowmeter and data collected by LTL resident Jerry Leanderson. Flow velocity (fps) at 669 Bridge was 66% higher following dam removal. Flow velocity (fps) at TLR Culvert were 18% higher following dam removal.

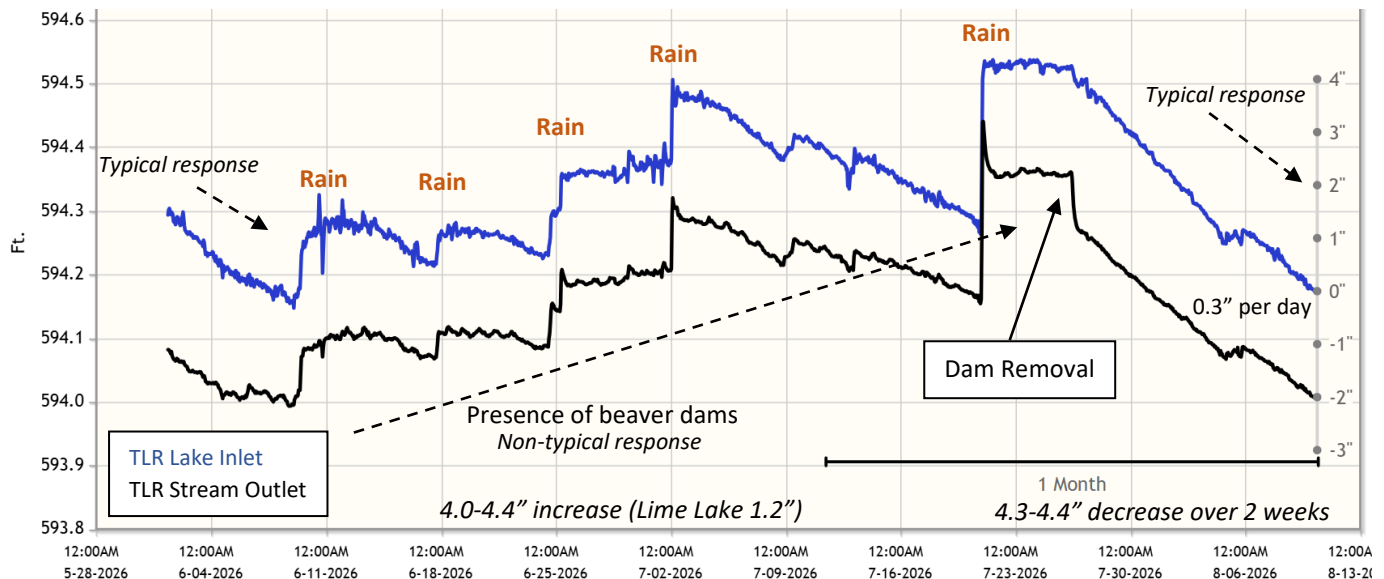
CONSIDERATIONS

The establishment of a beaver dam maintenance policy using water level thresholds for dam removal is encouraged. When non-typical responses are observed, such as water levels increasing in contrast to the Lime Lake response pattern, beaver dams are altering normal watershed dynamics. When water levels increase above the normal high of 594.3 at 669 Bridge, consideration should be given to removing beaver dams downstream. When water levels of LTL increase above 594.3 at TLR Lake Inlet, consideration should be given to removing beaver dams downstream. The removal of beaver dams BEFORE high water levels are reached is important as rain events can quickly elevate water levels to a level where they become even more of a concern or a problem.

SHALDA CREEK WATER LEVELS AT BRIDGE May-August 2026



SHALDA CREEK AT TLR AND LTL WATER LEVELS June-August 2026



During the two weeks following dam removal, water levels in Shalda Creek at 669 Bridge dropped 8.2" and Shalda Creek at TLR Stream Outlet dropped 4.4" while water levels in LTL at TLR Lake Inlet dropped 4.3". Beaver dams alter typical watershed responses and return to typical watershed responses after dam removal. Typically, a decrease in water levels occurs after rain events. With the presence of beaver dams, water levels continue to increase over time. Even without the presence of beaver dams, clearance of water from Shalda Conifer Swamp takes time (roughly 0.3" per day). Removal of beaver dams before high water reached allows the watershed to clear out water ahead of rain events.

David Skjaerlund, PhD August 2026