TECHNICAL MEMORANDUM

Little Traverse Lake Water Levels & Beaver Dam Modifications

To:	David Skjaerlund & LTLPOA	Date:	June 25, 2020
From:	Robert Verschaeve, P.E., Doug Coates, P.E.	Re:	Little Traverse Lake Water Levels & Beaver Dam Modifications
cc:			

1.0 INTRODUCTION

This memorandum is being provided as requested by you and Little Traverse Lake Property Owners Association (LTLPOA) to present to the National Park Service (NPS) for their consideration to allow a modification of a re-established beaver dam within Shalda Creek. This beaver dam is located between CR 669 and West Traverse Lake Road. GPS coordinates of the dam are: 44° 55' 30" N, 85° 52' 16" W. This memo presents the data and effects of water levels within the system from the modification of this beaver dam.

LTL residents are currently experiencing some of the highest recorded water levels similar to the levels surrounding the two separate dam modifications presented in this memorandum. Those modifications occurred just prior and during a yearlong data collection period from fall 2016 to fall 2017 for which a final report is currently being prepared. One of the goals of the larger study was to observe system water levels as beaver dams were modified downstream of the CR 669 culvert. This dam is the farthest upstream observed dam in the system and modification of it was necessary to access effects of the downstream dam modifications during the study. The data presented for the modifications of this beaver dam between CR 669 and West Traverse Lake Road provide a reasonable basis for the NPS to allow additional modifications of the beaver dam located within the Sleeping Bear Dunes National Lakeshore by LTLPOA.

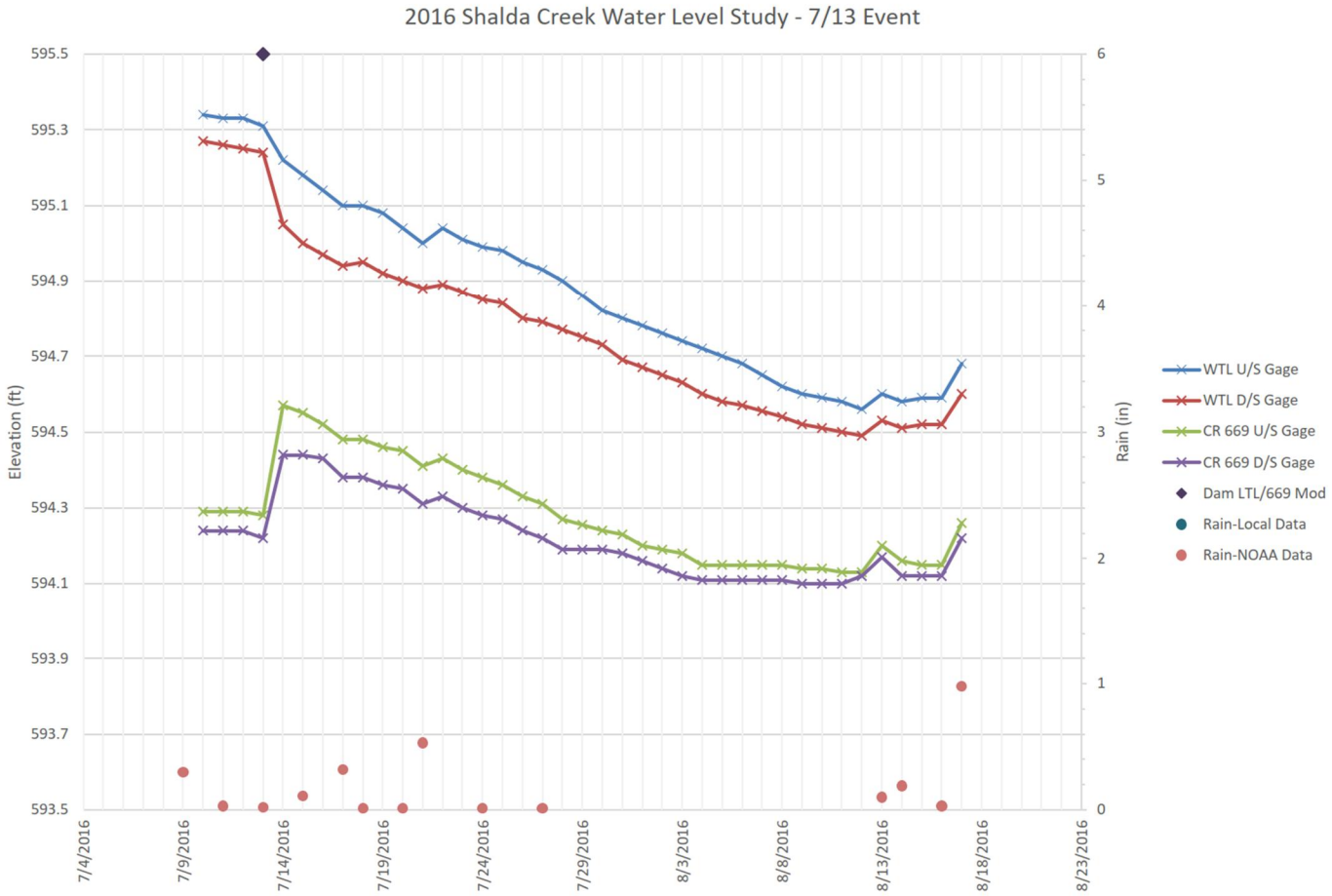
2.0 DATA

Prior to deploying data loggers throughout the Shalda Creek system for the larger study period, LTLPOA had recorded water levels from staff gauges located upstream and downstream of the culverts at CR 669 and West Traverse Lake Road. These gauges had been previously correlated to NAVD 88 vertical datum when Gosling Czubak first began studying the Shalda Creek system with LTLPOA.

On June 27, 2016 permission was received from SLBE Chief of Natural Resources Kevin Skerl to install a staff gauge at the dam located between CR 669 and West Traverse Lake Road, collect data for at least a week, and then modify the dam.

A modification of this dam was completed on 7/13/2016. This modification event and water level measurements following the modification area shown in the following Figure 1. At the time of this modification, the water level of LTL was at a relatively high level of 595.3. Following the removal of the dam, it steadily dropped .75 feet (9 inches) over 30 days to 594.56.

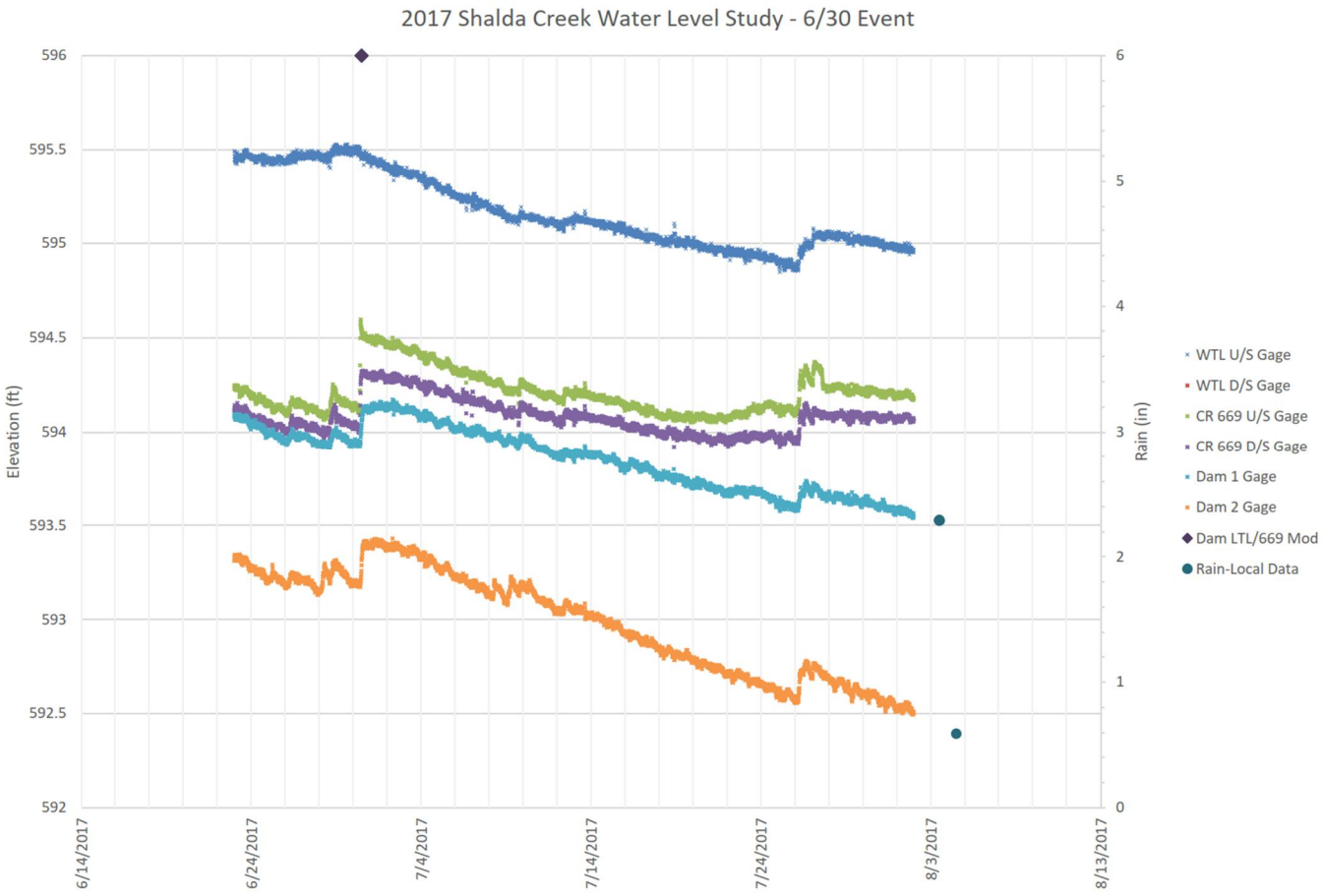
Figure 1



Another data set graph is shown in Figure 2 from data collected following a modification of the dam between LTL and CR 669 nearly a year later on 6/30/2017. This data was recorded by the data loggers that were deployed by NPS in August 2016. Once again, the water surface elevation at LTL was relatively high at 595.5 when the dam was modified. After the dam modification, there were quick upticks in elevation at

the gauges downstream of the dam followed by steady decline of water levels over approximately 1 month. During this period, the LTL level declined .65 feet (7.8 inches).

Figure 2



The water level readings from the staff gauges have been periodically read by LTLPOA members and logged in a spreadsheet available from the "Current & Historical Lake Levels" link on the LTLPOA website page at this address: http://www.littletraverselake.org/lake-levels.html. The levels noted in this spreadsheet are gauge readings and require a correlation factor added to be on the NAVD 88 datum of all other presented data. The gauge readings and converted NAVD 88 elevations for 6/24/2020 from this spreadsheet along with the readings before the 2016 and 2017 dam modifications are:

Current Water Level Readings - 6/24/2020

	TLR Inlet	TLR Outlet	669 Inlet	669 Outlet
Gauge Reading	594.98	594.8	593.6	593.44
NAVD 88 conversion	0.8	0.8	0.7	0.7
NAVD 88 Elevation	595.78	595.6	594.3	594.14
7/13/2016 (NAVD 88)	595.31	595.24	594.28	594.22
6/30/2017 (NAVD 88)	594.47	*	594.53	594.3

** The TLR Outlet data logger was not deployed until August 2017.*

It is noted that the LTL water elevation at the West Traverse Lake Road culvert inlet is nearly 6" higher now than the water surface elevation prior to the 7/13/2016 dam modification event and just over 3" higher now than the 6/30/2017 dam modification event. The current water elevations at the CR 669 culvert inlet location are nearly the same as prior to the 7/13/2016 dam modification event and 2.76" (.23 feet) lower than just prior to the 6/30/2017 dam modification event. This LTL water level corresponds to the highest recently recorded levels and suggests the re-established beaver dam is a significant contributing factor.

3.0 CONCLUSIONS

Modifications to the beaver dam located between CR 669 and West Traverse Lake Road that were completed as part of the larger Shalda Creek study have repeatedly shown a noticeable decrease in water level at Little Traverse Lake. The current water levels at Little Traverse Lake upstream of the beaver dam are greater than they were prior the past modifications while the downstream water levels are at or below the levels prior to the modifications. It is expected that similar changes to the water levels would occur with an allowed modification of the same dam by the National Park Service at this time. Water level readings of the staff gauges would still need to be recorded daily and added to the data set to document the water level changes if modification is permitted by the National Park Service.

Respectfully Submitted,

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