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October 13, 2026

To: Tim Stein, Supervisor, Cleveland Township
From: Robert Verschaeve, P.E., Senior Project Manager

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Date: 2026.10.13 10:21:28 -04'00'

Re: Shalda Creek & Little Traverse Lake Water Levels Maintenance Thresholds

PURPOSE

This memo is provided at your request to recommend water-level thresholds for Little Traverse Lake and Shalda Creek that could trigger National Park Service authorization to remove naturally occurring obstructions within Shalda Creek flowing through the Sleeping Bear Dunes National Lakeshore. Cleveland Township, the Leelanau County Road Commission (LCRC), and the National Park Service (NPS) are working to establish these thresholds and a corresponding creek maintenance procedure. The Little Traverse Lake Association (LTLA), representing Little Traverse Lake riparian owners, supports this collaborative effort.

BACKGROUND

Gosling Czubak Engineering Sciences (GCES) has previously worked with the LTLA dating back to January 2014 when we were initially engaged to investigate high water levels that lake residents had been experiencing and actions that might have been taken to alleviate high water conditions. We were subsequently engaged in 2015 by Cleveland Township to investigate options for replacing culverts at Traverse Lake Road and County Road 669 crossings of Shalda Creek. Our current work scope with Cleveland Township was developing plans for upgrades to the Traverse Lake Road culvert crossing.

The County Road 669 culvert was replaced in 2020 with a much larger 30-foot concrete structure. The majority of the funding for this work came from federal sources with local matches provided by the LCRC and Cleveland Township. The federal investment in this infrastructure with contributions by LCRC represents an initial commitment to a collaborative partnership working towards improving Shalda Creek drainage issues. The water level thresholds discussed in this memo represents the next step.

DISCUSSION

GCES's previous analysis and reports of water levels, rainfall, culvert conditions, and beaver-dam activity support the following conclusions:

- Beaver dams significantly reduce creek flow and the ability of Little Traverse Lake (LTL) to drain naturally.
- LTL and Shalda Creek water levels respond (increase) significantly during dam construction.
- LTL and Shalda Creek water levels respond (decline) significantly to dam removal.
- Flow rates through the system increase or decrease depending on the absence or presence of obstructions in Shalda Creek.
- The normal water level seasonal fluctuations without obstructions in Shalda Creek are important to provide buffer capacity in the Lake and Shalda Creek to absorb rainy season inputs.
- Dam activity and obstructions downstream of CR 669 impact water levels at the newer high-capacity culvert crossing.

It is important to recognize that Shalda Creek is the only stream outlet from the area containing Little Traverse Lake, Shetland Creek, Lime Lake, and thousands of surrounding acres within the larger Good Harbor Bay Watershed. Although the creek lies entirely within the Sleeping Bear Dunes National Lakeshore, most of the watershed lies outside the Lakeshore. A watershed map is included at the end of this memorandum.

The larger interconnected watershed system around Shalda Creek also includes ecologically important wetlands, conifer swamps, upland areas, Little Traverse and Lime Lakes and associated shoreline environments. Each of these ecological systems work together to absorb water from storms and snow melt throughout the seasons as Shalda Creek functions as the critical drainage outlet. The creek's relatively flat longitudinal profile and limited topographic relief significantly reduce the watershed's ability to rapidly convey and discharge runoff following precipitation events. As a result, maintaining unrestricted stream flow is essential to preserve the watershed's natural hydrologic function and to prevent prolonged inundation of wetlands, uplands, and developed properties.

Seasonal drawdown cycles are particularly important in the watershed system. Achieving normal summer low water levels provides the storage capacity needed to accommodate fall rainfall events, while reaching normal winter low levels creates the capacity necessary to absorb snowmelt and spring precipitation without causing widespread flooding. Any condition that

prevents the watershed from returning to these seasonal baseline elevations diminishes its flood-storage capability and increases the likelihood of elevated water levels persisting throughout the system.

Obstructions and debris accumulations create substantial hydraulic impediments within Shalda Creek and restrict the stream's ability to discharge water from the watershed. As these obstructions collect sediment, woody debris, and vegetation, they further narrow the stream channel, reduce flow velocities, and elevate upstream water surface elevations. The resulting increase in water levels can saturate adjacent soils, raise groundwater elevations, inundate wetlands beyond their natural extent, and alter established drainage patterns throughout the watershed. Prolonged impoundment also impairs aquatic habitat connectivity by restricting fish passage and may contribute to long-term geomorphic changes that permanently modify channel conditions.

Previous reports produced by GCES provided recommended action items which included:

1. Allow the section of Shalda Creek between LTL and CR669 to be maintained free of obstructions at all times.
2. Monitor water level elevations at the County Road 669 crossing. If water levels at this culvert rise above 594.0, allow obstructions downstream to “Fishcamp” to be cleared.
3. Consider a partnership with a local conservation organization to relocate nuisance beaver that may be encountered between Little Traverse Lake and Fishcamp and investigate natural deterrent measures that could be used in this area.
4. Allow creek maintenance and restoration at inactive and problem dam locations between Little Traverse Lake and Fishcamp.

RECOMMENDATIONS

Establishing a defined water level elevation as previously identified and noted above as a management trigger for downstream impediment removal provides an objective and measurable standard for watershed maintenance action. Such a trigger would help ensure the natural watershed functions as intended to provide capacity to absorb stormwater and snowmelt. Recent hydraulic analysis completed by GCES also established that the performance standards of culverts are highly contingent on no downstream obstructions being present in Shalda Creek.

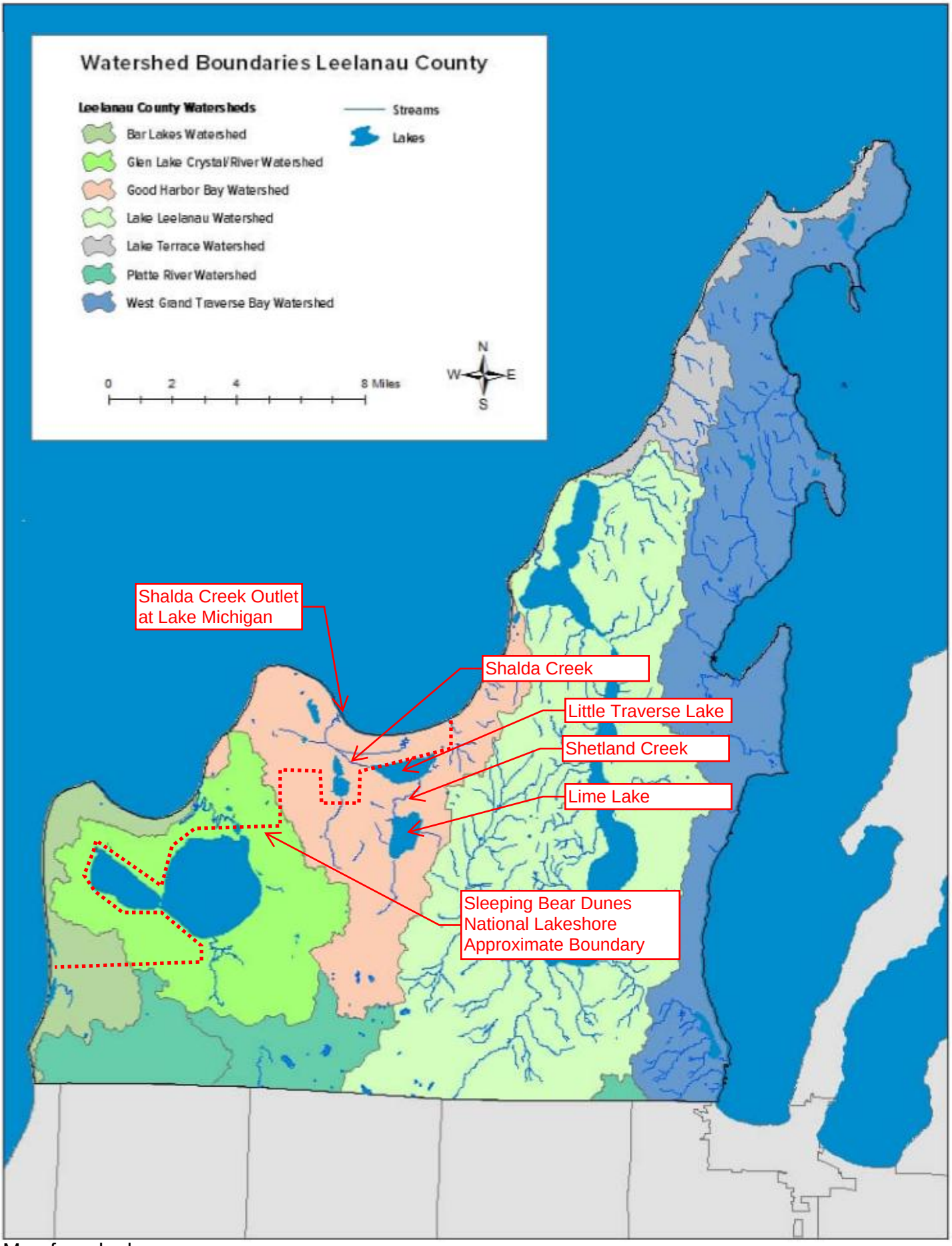
The following elevations, based on existing staff gauges installed in Shalda Creek, are slightly above the normal summer low-water level of Little Traverse Lake and Shalda Creek and recommended as proactive water level thresholds when any of these levels are reached for obstruction removal and maintenance action to keep Shalda Creek free of impediments:

- **Traverse Lake Road inlet: elevation 593.9**
- **Traverse Lake Road outlet: elevation 593.75**
- **County Road 669 inlet: elevation 593.8**

Using these elevations as action levels for the removal of obstructions as they occur will help maintain Shalda Creek flow, culvert capacity, and storage buffer capacity of the surrounding swamps and wetlands.

It is understood that the LTLA invested in automated sensors installed to collect and transmit water level data following GCES's work in 2020. In addition to data collected at the CR 669 and Traverse Lake Road locations, a location at the Lime Lake outlet where Shetland Creek is included. Including this location in the data collection is important and helpful to understand and track water level movements within the larger watershed area. These sensors can also be used to provide all agencies and organizations with valuable real time water level data. Staff gauges historically used at each location to document water levels are also still present.

Going forward with the formal establishment of these water level action levels as part of a watershed maintenance plan, two additional recommendations are noted. Firstly, it is recommended that surveyed monumentation be established at each culvert location. Each gauge or sensor would then be calibrated to the monumentation and the common North American Vertical Datum of 1988 (NAVD 88). Gauges and sensors could also be regularly checked and re-calibrated if needed. Secondly, consideration should also be given to the complete removal of existing drainage constrictions within Shalda Creek that have previously been partially removed. Removal of these partial obstructions and restoring the natural creek width is also necessary to restore watershed function.



Map from leelanauconservancy.org