



TODAY'S WEATHER:

www.wunderground.com/us/mi/kewadin

STORM CENTRAL

www.gtlakes.com/storm-central/

**DEAR DONOR AND SUPPORTER,
TNN 2019 Donation Outreach**

Together we advance watershed prosperity with less intrusion on life style values of shore owners - the bedrock of natural stewardship. TNN delivers.

TNN Leadership Keeps Broadening

Two new TNN Directors, a 20 year senior member of Victory Capital Institutional Markets, and the CEO of the Kalkaska Memorial Health Center.

Kids Joy of Life and Play Alongshore

Kill or remove Quagga Mussels which destroy kids' joy of fish, birds, critters

Treat Human Waste-NOT Land Dispose

End land disposed human waste in our water-rich townships. Frequent pumping with land disposal is the wrong answer.

Ease GT Bay High Water Erosion

Water levels are artificially high. TNN seeks reduced discharge from Lake Superior by its Board of Control

TNN 8th Annual Tri-Twp Fiscal Study

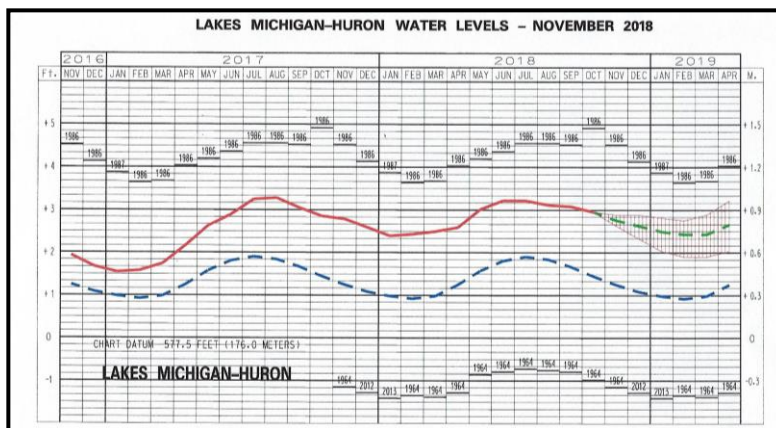
This Edition Compares local townships' spending which is down but overhead is up. Townships share best practices.

**Please make a Tax deductible
Donation to TNN**

Your gift in any amount is valued - \$50, \$75, \$100 or \$200 really helps.

Please use the attached form

GT BAY AUTUMN WATER LEVELS STAYED THE SAME – BUT NO MORE



Lake Superior Board of Control has announced substantially higher water discharges from the St. Mary's River beginning in November.

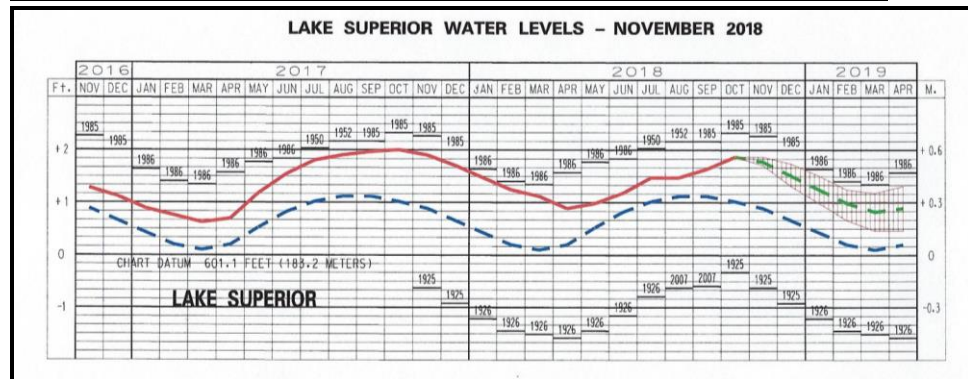
**WHAT HAPPENS WHEN LAKE SUPERIOR HAS TOO MUCH WATER?
IT DUMPS IT INTO AN ALREADY OVERFLOWING LAKE MICHIGAN.**

BY: Tony Briscoe Contact Reporter Chicago Tribune July 13, 2108

Please read complete story at:

<http://www.chicagotribune.com/news/ct-met-lake-michigan-superior-water-levels-20180709-story.html>

LAKE SUPERIOR WATER LEVEL HAD BEEN RISING - BUT NO MORE

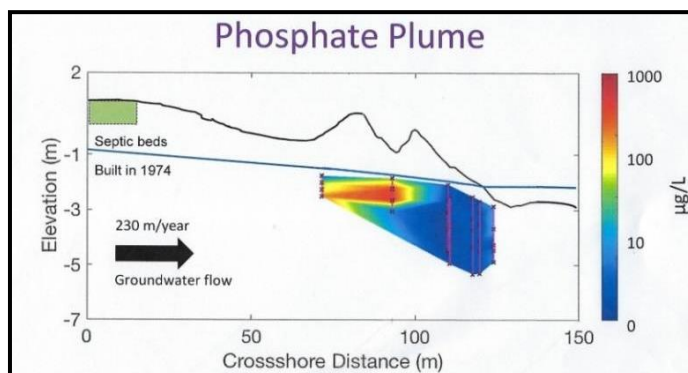


SEASONAL SEPTIC SYSTEM NUTRIENTS DO NOT REACH THE LAKE

Study: **Phosphate hot spot did not reach a Great Lake in 40 years of seasonal use.**

Image - Phosphate plume measured down-slope of septic system.

“Phosphate migrates towards lake slowed by natural chemical reactions. At migration rate from 1974, will take 13 (more) years to reach the shore (53 years total)”

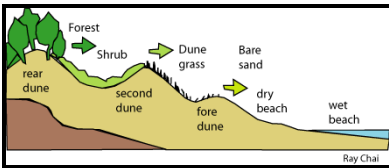


Please read entire scientific study on weblink Page 2 Sidebar.

NUTRIENT MIGRATION – Cont'd

“Nitrate is transported closer to septic system tile beds. Nitrate transforms in reaction zone near shore limiting discharge to lake”
“Wave induced groundwater flows are crucial to understand geochemical conditions governing nutrient transport.”

Source: Transport of septic-derived nutrients to the Great Lakes through a beach aquifer. BY: Sabina Rakhimbekova, Denis O’Carroll, Clare Robinson. http://www.michigan.gov/document/s/deq/deq-oea-tou-GLBA-nutrientTransport-Rakhimbekova_538687_7.pdf



DUNES AND FORE-DUNES PRIMER

EAST Watershed Protection Plan Draft
Forested residential areas along Bay beaches extend south from Norwood to Elk Rapids. This dune-like setting has beach ridges and large wetlands east of residential roads. A few wetlands lie between beach and bluff. Wetlands water fluctuates seasonally and yearly as Bay water level changes.

Inland dune ridges repeat; they might have started as a fore-dune that grew in height and stabilized by vegetation. Between these ridges lie large wetlands kept wet by upland farm creeks, surface run-off, rain and snow.

Inland dune ridges are older than the active fore-dune at the beach. A greater variety of vegetation shows that there has been time for tree species to move into dune areas first stabilized by beach grass.

Tree cores in cottonwoods and poplars on an inland dune ridge measure 25-40 years. Cores from hardwoods on a forested dune ridge measure ages of 50-150 years. The dune ridge is older than the ages of the trees on it.

8th ANNUAL TNN TRI-TOWNSHIP FISCAL COMPARISON

Elk Rapids, Milton, and Torch Lake Townships

Three Townships Spent \$3.25 Million for Fiscal 2017-18

12 Months FY 2017-18	Elk Rapids Township	Milton Township	Torch Lake Township	Three Townships
OVERHEAD COST	\$339,522	\$473,404	\$333,870	\$1,146,796
Overhead % of Total	36%	35%	34%	35%
Building Related	27,144	56,593	21,607	105,344
Discretionary Expenses	8,496	5,879	12,079	26,453
Elected Officials	83,457	135,018	103,453	321,928
Gen Admin & Personnel	102,475	160,952	110,480	373,908
Professional Support	77,343	27,415	34,672	139,430
Taxation Related	40,608	87,547	51,578	179,732
PUBLIC SAFETY/SERVICE	\$460,832	\$752,931	\$575,162	\$1,788,925
Safety & Service % of Total	49%	56%	59%	55%
EMS	258,592	225,000	369,056	852,648
Fire	171,552	198,407	140,764	510,723
Roads, Parks, Elections	30,689	329,523	65,342	425,554
CAPITAL EXPENDITURES	\$148,009	\$108,199	\$60,733	\$316,941
Cap. Expense % of Total	16%	8%	6%	10%
Fire	148,009		60,733	208,741
Land Purchase		50,000		50,000
Mortgage		58,199		58,199
GRAND TOTAL	\$948,363	\$1,334,534	\$969,764	\$3,252,661

OBSERVATIONS:

- Total Spending – Down 21% in Torch Lake Township, 12% in Milton; Up 17.5% in Elk Rapids Township for a fire truck pay-off \$116,000 and \$58,000 in legal fees for Maple Harbor sewer project, which was paid back to general fund.
- Overhead – Tri-Township up 13%. Largest increase in Torch Lake Township; primarily cost of elected officials and General and Administrative personnel.
- Public Safety – Tri-Township down 10% from prior year primarily in Milton.
- Capital Expense – Tri-Township down 42%; principally in Torch Lake Township which paid off fire equipment.

How This Study Was Done:

All Townships supplied data in Excel spreadsheet by E-mail for this report. The 12 month totals may differ from Townships actuals because of reporting variances.

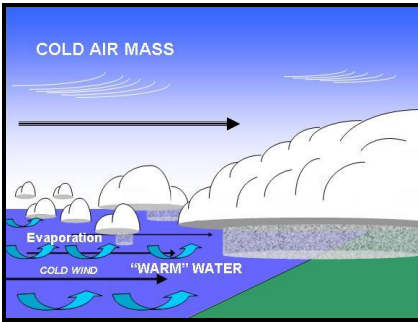
Analyst: Jim Welsh – Data: Mike Szymanski, Elk Rapids Township; Liz Atkinson, Milton Township; Kathy Windiate, Torch Lake Township

Goal: Cut Overhead, Cut Spending - Efficiency for Direct Public Benefit

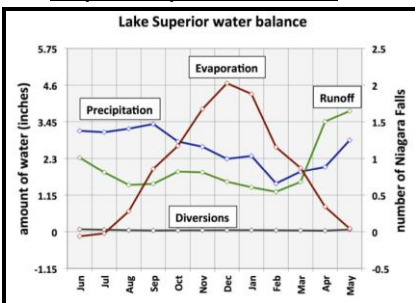
GRAND TRAVERSE BAY WATERSHED PLAN STEERING TEAM IS NOT REPRESENTATIVE

A steering team for watersheds connecting directly to the Bay, including Antrim, has been organized by others. Team make-up is 54% governments – **just one from Antrim** - and 4% Antrim shore-owner group (TNN). In contrast, the fair and balanced Elk River Chain of Lakes Watershed Plan was shaped 55% shore-owner groups and 25% local governments. Similarly, the watershed plan for the East Arm of GT Bay must be shaped by people living there, not out-of-county government entities.

**Lake Effect Snow
WINTER SCHEMATIC**



**SEASONAL WATER BALANCE
Evaporation peaks in Nov. Dec**



NOTE: L. Superior shown - L. Michigan - Huron is similar.

LAKE EFFECT IN SUMMER

WHY DO THUNDERSTORMS DIE OVER THE (GREAT) LAKES

BY: Chuck Doswell,
Research Meteorologist Jun 29, 2016

There is some tendency for storms to dissipate over very large lakes when the water temperatures are relatively cold.

A layer of cold air has relatively high density and so is often resistant to being lifted into the thunderstorm clouds, which removes the “fuel” (warm, moist and buoyant air) needed to sustain thunderstorms.

However, if the lake waters are warm, then the air over the lake is just what it needs to be in order to sustain thunderstorms.

Therefore, the dissipation referred to depends on the temperature of the lake waters.

WHAT CAUSES LAKE EFFECT SNOW?

BY: WeatherQuestions.com, a service of WeatherStreet.com Copyright © 2013 WeatherStreet.com. Reprinted by Permission - http://www.weatherquestions.com/What_causes_lake_effect_snow.htm

Lake effect snow is caused when a very cold winter air mass flows over the relatively warmer waters of a large lake. Intense evaporation from the lake surface under these conditions forms convective clouds that cannot contain all of this water, and some of it falls back to the surface as snow.

Lake effect snow showers often organize themselves into bands or lines only a few miles across, with abrupt edges to the falling snow. The organization into lines is the result of wind shear (a change in wind speed or wind direction with height). If there is no wind shear, then the snow showers organize into individual snow shower clouds. The following satellite image shows lake effect snow bands flowing off Lake Superior and Lake Michigan.

Because lake effect snow occurs downwind of lakes, one location can receive large snowfall accumulations, while another location just a few miles away receives little or no snow. Buffalo, New York is probably the most famous location for receiving large amounts of lake effect snow.

The convective clouds of lake effect snow showers do not reach the heights attained by thunderstorms, with tops seldom exceeding 12,000 feet in altitude compared to 40,000 to 60,000 feet for thunderstorms. This is because cold winter air masses are quite stable, and the warm lake waters are able to destabilize the atmosphere only over a limited depth.

The largest lake effect snow accumulations typically occur early in winter, before the lake waters have cooled very much. The warmer the lake water, the greater the rate of evaporation, and so the greater the supply of water vapor to the snow shower clouds. Once the lake surface cools to near 32 degrees F in the late winter, the lake effect snow mechanism weakens considerably, and if the lake surface freezes, lake effect snow activity stops altogether.

