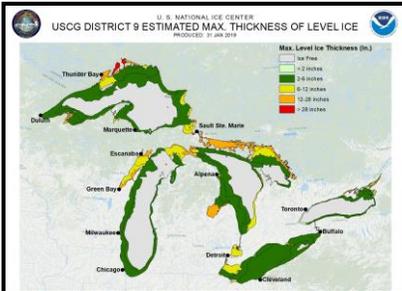


**GREAT LAKES ICE COVER**  
US Coast Guard - Jan 31, 2019.



[https://www.glerl.noaa.gov/res/glcfs-fvcom/erie/nc/thick\\_latest.png](https://www.glerl.noaa.gov/res/glcfs-fvcom/erie/nc/thick_latest.png)

**TODAY'S WEATHER:**

[www.wunderground.com/us/mi/kewadin](http://www.wunderground.com/us/mi/kewadin)

**STORM CENTRAL**

[www.gtlakes.com/storm-central/](http://www.gtlakes.com/storm-central/)



**ICE COVER TUTORIAL - U.S. ACE**

<https://www.lre.usace.army.mil/Missions/Gr eat-Lakes-Information/Coastal-Program/Coastal-Processes/>

**ICE FOOT** - Wave driven slush forms an ice-foot on beaches. Ice extends lake-ward from the ice-foot containing smooth sheets of ice. Ice ridges form where waves break.

**ICE SHOVE** - Waves break against grounded ice ridges to scour the lake bed. Anchored ice released from the bottom incorporates sand which is transported away from the shore. Coastal property can be significantly damaged by ice shove.



**ICE COVER ON THE SHORE - AFFECTS FLOODING AND EROSION**

Sources: U.S. Army Corps of Engineers - Photo by TNN - East GT Bay-shore in late January 2019  
[http://greatlakescoast.org/pubs/reports/Great\\_Lakes\\_Coastal\\_Guidelines\\_Update\\_Jan2014.pdf](http://greatlakescoast.org/pubs/reports/Great_Lakes_Coastal_Guidelines_Update_Jan2014.pdf)



Ice cover alongshore affects flooding (and erosion). Extent and duration of winter ice cover varies year by year. Ice cover reaches its maximum extent in late February and is most consistently observed within shallow enclosed or semi-enclosed bays.

**Stable shore-fast ice cover along the coastline limits or wholly prevents wave energy from eroding the shoreline (see photo above).**

Less ice increases wind stress that acts on the water surface – e.g. waves. Heavy ice cover reduces the amount of evaporation from the Great Lakes, and in turn leads to higher water the following spring. Conversely, ice-free winters and dry Arctic air passing over the lakes can increase evaporation to reduce winter water levels. There is minimal ice cover this winter.

**EAST ARM SUBWATERSHED OF TRAVERSE BAY - - - YOU'RE INVITED.**



*TNN Board of Directors invites East GT Bay coastal and inland residents from Norwood to Elk Rapids – full time & seasonal - to join a community team that will shape objectives/content of East GT Bay Plan for Coastal and Watershed Protection shown in the map. Supervisors in Elk Rapids, Milton, Torch Lake and Banks Townships support a local team, as does Antrim Conservation District and the Watershed Center – GT Bay. Meetings will be local starting when snowbirds return. If you are willing to participate, **RSVP by Email April 15** to [TNN.Mich@gmail.com](mailto:TNN.Mich@gmail.com) – Include name, local address, cell phone. You may also submit concerns and/or success stories which prevented runoff, reduced excess water use or corrected prior pollution.*

The full Grand Traverse Bay Plan is being updated by the Watershed Center in Traverse City, which agrees to include coastal priorities and to participation by the TNN organized team.

**E.A.S.T.B SUB- WATERSHED**

Along the Bay; Elk Rapids to  
Norwood (purple) bounded by Elk  
River, Chain of Lakes Watershed



Join the Team to set  
objectives/content for  
E.A.S.T.B

**DRAFT OUTLINE FOR E.A.S.T.B  
Watershed Plan**

**ECONOMY, COMMUNITY, PROPERTY  
VALUES**

**THREATS TO GREAT LAKES COAST  
POLICY – LOCALLY DEVELOPED**

**ALONGSHORE TREK – ELK RAPIDS  
TO EASTPORT**

**CONSERVATION & ENVIRONMENT –  
COASTAL AND WATERSHED**

Coastal processes

Relationship between Great Lakes water  
levels, wave energies, coastal damage

Transport of septic-derived nutrients to  
the Great Lakes through a beach aquifer

Reef assessment and rebuilding from Elk  
Rapids to Creswell Road

Sand loss assessment and replacement

Shore bird population assessment.

Coastal macro-biotic loss from invasive  
Quagga mussels

Non-point source watershed pollution –  
required per EPA 319 grant.

**APPENDICES**

**KNOW YOUR WATERFRONT PROPERTY RIGHTS**

BY: Bill Hall - May 4, 2018 - Grand Rapids Business Journal [whall@wnj.com](mailto:whall@wnj.com)  
<https://www.grbj.com/articles/90591-know-your-waterfront-property-rights>

EXCERPT - Please read the entire article on-line at the web link above.

Summer is on the horizon. In Michigan, thoughts may soon turn to spending time at your waterfront cottage, ready to enjoy a season on the beach and water.

Often, you will find yourself sharing that beach, and the adjacent lake, stream or river, with your neighbors or the public. So, it's important to know what your rights are as the owner of waterfront property and what rights your neighbors and the public might have to share use of "your" beach or shore and the neighboring body of water.



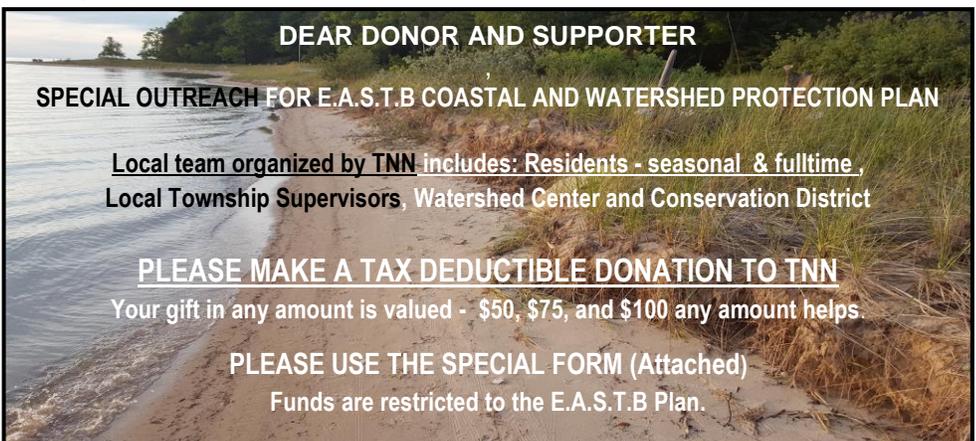
This beach walker on L. Superior just east of Marquette is probably in the right

In Michigan, different rules apply depending upon whether your waterfront property is located on the Great Lakes - Michigan, Huron, Superior and Erie - or an inland lake, stream or river. The State of Michigan owns and controls Great Lakes "bottomlands", the land beneath the water to the water's edge as shown on the original 19<sup>th</sup>-century government survey. A private Great Lakes waterfront owner owns to that water's edge, as it may have been extended outward by accretion, and that ownership is subject to the public's right to walk along the beach (or in the water, as the case may be) between that water's edge and the ordinary high water mark on the owner's property.

While a private Great Lakes waterfront owner has full use of the beach to the water's edge, because the state owns the bottomlands, the owner would need to obtain a lease from the state to build a permanent boathouse, dock or other structure on the bottomlands. In addition, the owner may use the lake to the same extent as any member of the public for recreational activities, such as swimming, boating and fishing.

Much different rules apply to privately owned waterfront property located on natural inland lakes, streams or rivers. A detailed discussion of inland lake rights may be found at the web link to Grand Rapids Business Journal.

*Bill Hall is a partner with the law firm of Warner Norcross & Judd, where he often assists in the planning, acquisition and development of waterfront commercial and residential properties..*



**DEAR DONOR AND SUPPORTER**

**SPECIAL OUTREACH FOR E.A.S.T.B COASTAL AND WATERSHED PROTECTION PLAN**

**Local team organized by TNN includes: Residents - seasonal & fulltime, Local Township Supervisors, Watershed Center and Conservation District**

**PLEASE MAKE A TAX DEDUCTIBLE DONATION TO TNN**  
Your gift in any amount is valued - \$50, \$75, and \$100 any amount helps.

**PLEASE USE THE SPECIAL FORM (Attached)**  
Funds are restricted to the E.A.S.T.B Plan.



**E.A.S.T.B DUNE & FORE-DUNE PRIMER**

<http://geo.msu.edu/extra/geogmich/dunes.html>

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.

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.

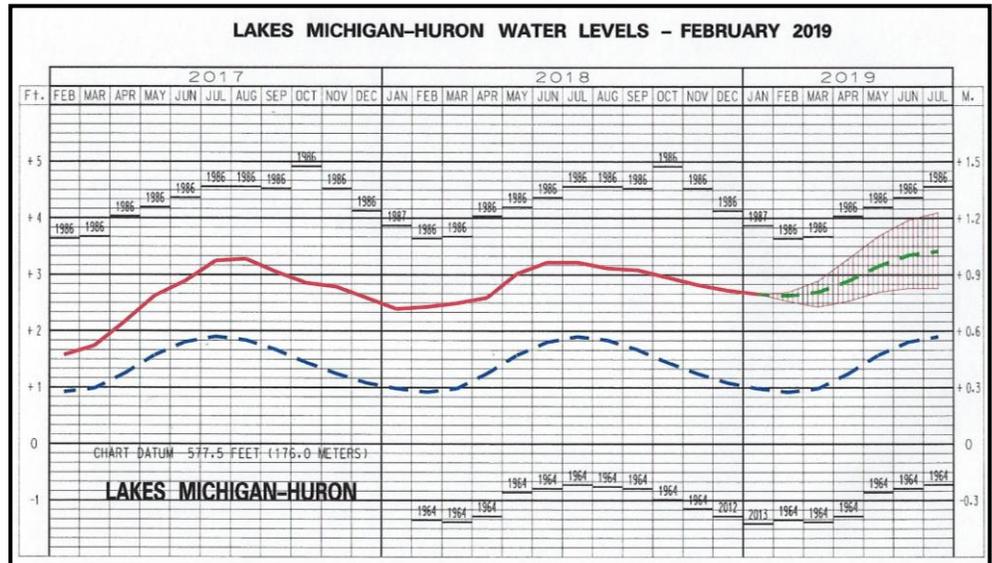


**WHAT HAPPENS WHEN LAKE SUPERIOR HAS TOO MUCH WATER?  
IT DUMPS IT INTO AN ALREADY OVERFLOWING LAKE MICHIGAN.**

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

Please read complete article at:

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



**ARMY CORPS OF ENGINEERS REPORT - WATER IS UP 4 INCHES FROM LAST WINTER**

Lake Superior Board of Control continues excess water discharges from the St. Mary's River at Sault St. Marie, which began last Nov. Per ROWI: Lake Superior water levels would be 8 inches lower if the Canadian Long Lac & Ogiki diversions into lake Superior were restored to flow to the Arctic through Hudson Bay.

**EAST ARM SUB-WATERSHED TRAVERSE BAY E.A.S.T.B - OVERVIEW**

Located in Antrim County and a bit of Charlevoix County from Elk Rapids to Norwood with a population of 7,000 year-round -18,000 including seasonal.

Watershed is about 50 Square Miles: 4% of Grand Traverse Bay water inflows; twenty-four ephemeral streams plus Elk River over the dam. Uplands drain through three perennial creeks; Mitchell Creek incl. Mud Lake in Its 12 sq. mile basin, Paradine-McGuire Creek, Creswell Creek.

Forested residential living along East Bay beaches, inland living in dune settings, rural homes, Villages of Elk Rapids, Torch Lake, Eastport and Norwood, farms and businesses. Upland farms feature orchards, vineyards, row crops, hay, and confined or pastured cows, game birds and chickens.

Abundant water and land recreation opportunities and abundant wildlife.

Diverse economy - recreation and boating, tourism, agriculture and food processing, forestry, natural gas, and services.

Please read dune formation primer and photos in side-bar