



Lake Michigan Chapter For Shoreline Preservation Newsletter – Summer 2010

UPDATE ON THE INTERNATIONAL UPPER GREAT LAKES STUDY

By Roger J. Smith

Readers of these newsletters know that the International Joint Commission (1) has tentatively decided not to restrict the flow in the St. Clair River, and (2) is continuing to study the possibility of changing Plan 1977-A that determines the relative levels of Lake Superior and Lakes Michigan and Huron, by opening or closing gates at the Soo. The study is supposed to find the best formula to benefit all of the “stakeholders.” The rest of this article will tell who the “stakeholders” are and what they would like to see in lake levels. There are six stakeholders:

U.S. SHORELINE PROPERTY OWNERS. We don’t ever want to see extremely high levels again, like they were in 1986 and again in 1997. We like the beaches the way they are now. However, we would not argue that levels should be extremely low – at or near the record lows, because that would cause a hardship to those who have boats and it would require excessive dredging.

COMMERCIAL SHIPPING. Great Lakes ore, grain, coal, etc. carriers. They do not want extreme lows because they can’t carry full loads. They want levels above chart datum. Datum is a straight line shown on the Corps Monthly Bulletin of lake levels. Datum on Lake Michigan is about a foot below long term average and about where levels have been lately. However, shippers would not want extremely high levels either because then a few docks that might be flooded.

RECREATIONAL BOATING. The Georgian Bay folks are the most vocal, but this group includes marina operators and boaters all around the Lakes. They are pretty much like Shippers. They want levels above datum, but would not want extremely high levels because marinas would be flooded.

POWER COMPANIES. The power plants at the Soo. They just want a steady supply of water, without any water being released from Lake Superior into Lakes Michigan-Huron that is not used to make electricity.

MUNICIPAL WATER SUPPLY. Cities that get their drinking water supply from the Great Lakes, like Chicago and Milwaukee. They don’t want extreme lows, because some water intakes could be out of the water. However, they also don’t care for extreme highs because their shore facilities could be flooded.

So far, these five stakeholders would probably agree that it would be nice to have levels that ranged a foot, maybe two around the long term average, without the extreme highs or extreme lows.

ENVIRONMENTAL. Especially wetlands people. They want levels to fluctuate because it is good for wetlands. It creates cycles of maturity and renewal. There is solid evidence to support that. It is not clear how great the fluctuations need to be, and that will be an important point of the study.

However, all of this may not matter because the reality is that nature is the force that really counts. If there is a lot of rain, levels will be high on all lakes – unless some action is taken to let the extra water out, down the Niagara River; and unfortunately that is not a part of the study. Maybe it can be brought into play as part of Adaptive Management (more on that in the next letter).

So don’t expect too much from the study. For now, it looks like any changes to formula 1977-A will only make a difference of a few inches in what water levels would be if nothing were done.

SIMPLE SCIENCE – COASTAL COLLOQUIALISMS

By John Ehret

Cohesive refers to the compaction of fine sand, silt and clay into a layer of material which is resistant to littoral transport along the shore due to its compressed condition. The compacted or compressed state is the result of the glacial weight pressing down. A mile high ice glacier would have a downward force of over 300,000 pounds per square foot or over 2,000 pounds per square inch. If there is enough sand it protects the cohesive layer from fracture and erosion.

Depth of closure, or point of no return, is the lake depth at which the maximum wave height likely to occur on Lake Michigan is capable of reaching down to the lake bed and moving sand toward the shore. The depth is thought to be about 20 feet (or 6.1 meters) on Lake Michigan.

Fetch is the approximate distance from a certain direction over open water from which a wave can build up as a result of sustained winds. Fetch on Lake Michigan from the north is considered to be about 300 miles and from the west is about 55 miles as measured from St. Joseph harbor.

Equilibrium beach consists of a straight line lake bed profile extending from the depth of closure to the base of the bluff at the back of the visible, subaerial beach. The subaqueous portion is about 1,500 feet long whereas the visible beach can be from zero to over 100 feet depending on the continuousness of the sand supply.

Beach sand is generally recognized to be clean, white or tan, and made of silicon dioxide particles which are about .3 to .2 millimeters in diameter (.012 inches to .008 inches).

St. Joseph River is about 220 miles long and flows downward from an elevation of approximately 1,100 feet above sea level at Hillsdale, Michigan to South Bend, Indiana and then back to St. Joseph, Michigan at an elevation of 576 feet above sea level. The river flow annually averages about 5,000 cubic feet per second. Episodic events are not calculated in the computer models of river transport of silt and bed load sand which provides most of the beaches of our Michigan shores.

Wave absorbers are 200-foot to 400-foot pockets or recesses carved out of concrete steel-encased shore perpendicular piers and filled with 2- to 10-ton boulders. The steel piers have proven to be hazards to navigation because the waves bounce off the smooth hard walls and resonate with following waves creating pier exaggerated wave heights instead of blocking wave energy. The directionality of the parallel piers results in their opening capturing 30 to 50% of annual wave energy and aiming it at the very channel the piers were expected to shield. I understand wave absorbers have been installed at the following Lake Michigan harbors: Charlevoix, Portage Lake, Pentwater, White Lake, Saugatuck, Two Rivers, and Grand Haven. Boaters using the harbors know the absorbers are sorely needed.

Lake Levels. The range of lake levels in Lake Michigan is about 5.8 feet over the last 110 years. The most recent high of 581.33 feet occurred in August of 1997. The current level of 578.2 feet (June 2010) was about 2.1 feet above the all-time low of 576.1 feet, or about 36% up in the range of 5.8 feet.

Avulsion refers to a sudden change to littoral property as opposed to **accretion** which occurs gradually and imperceptibly. On June 17, 2010 the Supreme Court of the United States ruled that Florida's restoration and nourishment of sand to the shore (*Stop the Beach Nourishment v. Florida*) was an **avulsion** and once the state entity fixed "an erosion control line (ECL), the state became the titleholder of the avulsive material and all subsequent accretions seaward of the ECL which now replaces the mean high-water line as the boundary between littoral and state property. The case has multiple ramifications for Great Lakes Coalition property owners but, most importantly, Justice Scalia reaffirmed that littoral owners have certain special rights regarding the water and foreshore including the upland owner's core right of access to the water and the right to an unobstructed view.

Subjacent Support is the equivalent to lateral support in normal city circumstances. You must not withdraw lateral support to your neighbor's property. By sand starving the equilibrium beach profile the government of the United States denies **subjacent support** to shoreline property. In *Banks v. USA* we maintain that this **subjacent support** is a core property right.

WIND TURBINES IN LAKE MICHIGAN?

WE REPORT – YOU DECIDE

Analysis by our Technical Director John H. Boyd

At the Coalition's April meeting, a representative from the Lake Michigan P.O.W.E.R. Coalition (Protect our Water, Economy and Resources) made a presentation to our Board members. A Scandinavian company is proposing to build an offshore wind factory in Lake Michigan. No project of this size has ever been constructed in Lake Michigan, or any body of fresh water. Very little regulation of wind turbines exists at this time. Concerns include ice flow, freezing, hazard to navigation as well as several environmental issues. The Board approved sending a letter of support and a donation of \$250 to the P.O.W.E.R. group to aid in their efforts. For more information on the group and their position, visit their website at <http://www.protectwithpower.org>.

Large Wind Turbines

- 450' base to blade
- Each blade 112'
- Span greater than 747
- 163+ tons total
- Foundation 20+ feet deep
- Rated at 1.5 – 5 megawatt
- Supply at least 350 homes

A report by the European Wind Energy Association

Power Cost (cents/kwhr) :

	Generation	Homeowner
Nuclear	4.0	10.0
Coal	4.4	
Gas	5.6	11.6
Wind (coastal)	7.5	13.5
Wind (inland)	8.8	14.8

Additional costs for transmission lines and power company overheads adds about 6.0 cents.

Typical home uses \$100 per month and could see an increase of \$35 per month (over \$400 per year) with wind power!

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