



THE BEACHCOMBER

DUNE ACRES, INDIANA

WWW.DUNEACRES.ORG

May, 2016

The Rise and Fall of Lake Michigan

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Part One

(Parts Two & Three will appear in future Beachcomber issues)

Lake Michigan's Enormous Destructive Power

Lake Michigan is 300 miles long, averages 75 miles wide, encompasses 22,300 square miles, and has a maximum depth of 961 feet. Lakes Michigan and Huron hydrologically constitute a single lake called Lake Michigan-Huron. Connected by the Straits of Mackinac, each has the identical water level. The combined surface of Lake Michigan-Huron is 45,300 square miles which makes it the largest single body of freshwater in the United States. The five Great Lakes, including their watersheds, comprise the largest surface freshwater system on the planet.

Of the named Great Lakes -- Superior, Michigan, Huron, Erie and Ontario -- Lake Michigan is the most dangerous. Data from Great Lakes Shipwreck Museum at Whitefish Point, Michigan, support the estimate that at least 6,000 ships have sunk on the Great Lakes. Roughly half went down in Lake Michigan, due mostly to intensive, cyclonic, low-pressure storms. Not only have ships and lives been lost, Lake Michigan storms have destroyed homes, commercial buildings, municipal infrastructures, docks, harbors and boats. But, that's not all. When the Lake's water levels are above the mean datum, strong storms are more likely to propel powerful waves that impact beaches, foredunes, and dune bluffs; harm natural habitats and recreational areas; and affect the natural environment's unique geologic and ecological features.

This article discusses why and how this intermittent process occurs, describes the consequences of low-pressure atmospheric disturbances that transform the often gentle waters of Lake Michigan into tumultuous seas, and explores how these episodes affected Dune Acres, a small lake front community located in the heart of the Indiana dunes on the southern shore of Lake Michigan.

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A Glorious Day for a Clean-Up

We had one of the warmest, most glorious, amazingly team building days ever for our Town Clean up. Everyone who turned out had a fantastic time working and catching up with neighbors.

On Town Park near the Tennis Courts were Kathy and Bob Lauer, Sara Masloroff and myself working on the invasive plants.



Jan Bapst, Bruce Riffle, Sara Masloroff and Robin Tennant.

Sue and Ivan Chermel picked up litter on East Road from the Town Hall to the end of Beach Drive. Literally, a long way to go!

Dick Taylor, along with Bob Lauer and Mark Taylor, moved grass and large logs out of the wooded areas to be chipped.

The ice skating rink clean up team led by Todd Klein and Rob Carstens included Mike Lapinsky, Michael Yetnikoff, Kelley and Cole Klein, Lou Mellen, Mark and Jan Bapst. Bill Tutlewski put in a great effort.

Pete and Cathy Bomberger cut burning bush on Crest Drive. The Bombergers also delivered the artfully designed brochures about Natural Landscaping by Rich Hawksworth to all homes in Dune Acres.

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Fitness Fun

from Sharon Tutlewski, Town Wellness Coordinator



Join us for wine and yoga at sunset on the East Beach Deck May 18th at 6:30pm. Yoga will be a gentle stretch followed by a few glasses of wine during the sunset. Class cost is \$6/per person Wine will be donated by Bill Tutlewski. Any questions? Please Contact Ashley Hall ahall@dunelandymca.org or text to (219)841-2496.

For Our Health . . .

3 Updates You Need to Know About Zika:

- 1** Zika has been confirmed to be transmittable from mother to child, and through sexual contact.
- 2** There is now a confirmed link between Zika and birth defects in babies born to mothers while infected.
- 3** There is no vaccine. Prevention is key: avoid mosquito bites and use repellent.

Stay up to date on the latest, verified information on Zika and what nurses need to know at: bit.ly/ZikaResources.

submitted by Sharon Tutlewski

. . .and the Health of our Environment



This photo is the treasure removed from the beach during town cleanup day! The theme of the problem as expected was plastic! Plastic: A Toxic Love Story, by Suan Freinkel is a good book about why plastic is problematic. Here's a link:

<http://goo.gl/sDyYn6>

If you are thinking about reducing business plastic use, here's a good resource <http://goo.gl/KwSyle>

Here is a fun blog about living without plastic! <http://goo.gl/WZQPlc>

How to use less plastic ourselves! <http://goo.gl/eVC4pZ>

submitted by Leah Harp

DA Walking Club

Group walking is a boon for the body and mind

Read more in this article from the Chicago Tribune <http://goo.gl/xdfhgL>

Saturday Mornings

Contact Sharon Tutlewski for more information. Email stutlewski@comcast.net or call 734-6219.

Also coming soon

Pickle Ball

Beach and Fire Safety Classes offered by Porter Rescue Diver and his dog

Dates to be announced

Makeup yoga classes for those who prepaid:

May 7, May 28 and June 4th

@ 10am. Or, 9 am if you prefer 9am.

Please contact Ashley Hall @ (219) 926-4204

Town Clean-Up

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We worked on reducing the invasive Burning Bush on Town Park A located on East Road to Fern and Oak. The team consisted of Lynn and Mary Boeke, Sara Masloroff, Marie Slaughter, Katerin Pryvine, Debbie Franczek, Terry Traux, Marti Belluschi (joined by her brother-in-law and nephew Richard and Justin Mull), Rich Hawksworth, and Sandy O'Brien. Also pitching in were Bruce Riffle. Mike Konopacki, and Pat McGinn.



Marti Belluschi, Richard and Justin Mull

The Harp family worked like fiends moving fallen branches on two town parks to the edge of the wooded area. The branches will be broken down and chipped.

We were generously supported by Tony Schirripa, Bill and Sherry Quinn, Barbara Plampin, Mary Ann and John Crayton, Rachel Gajos, Fredrick Reindel and Kenneth Warren.

Delectable food donations for hungry workers included lovely fruit cups from Jan Bapst, an abundant veggie tray from Sheryl and Chip Lesch and yummy cookies from Vicki Konopacki.

It was a magical day in Dune Acres! Everyone working harmoniously for the benefit of our special town.

I am so grateful for all who joined us.

*by Robin Tennant, Environmental Commissioner
photos by Michael Yetnikoff*

Thanks to the following people who made this issue happen:

- | | |
|-----------------|-------------------|
| Jan Bapst | Mike Swygert |
| Jenny Carey | Robin Tennant |
| Leah Harp | Sharon Tutlewski |
| Rich Hawksworth | Mary Jo Wilkins |
| Irene Newman | Michael Yetnikoff |



Carolyn Mellen with daughter Cori Boland and grandchildren Oliver and Violet Boland.



The Harp family



Mary Boeke



Sue Chermel



Lake Michigan

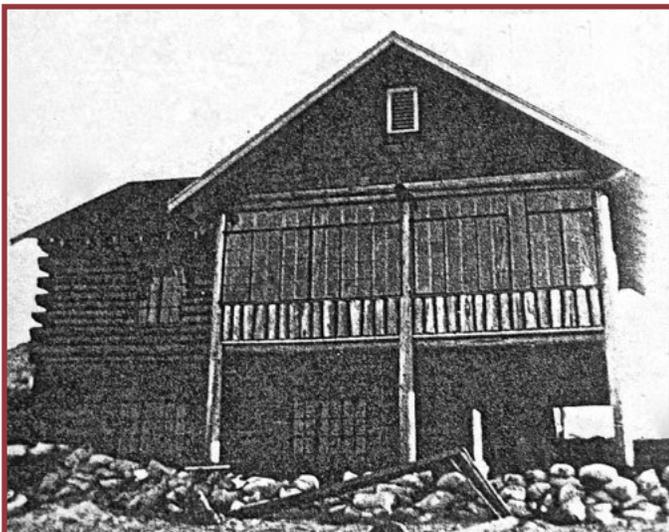
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1929 Lake Storm; Home Lost; Beaches and Dunes Damaged

In the fall of 1929, when the level of Lake Michigan was abnormally high, a ferocious storm came ashore at Dune Acres, Indiana. An observer described the waves as "40 feet high." Angry waves destroyed one house, threatened others, sank small boats, eroded the dunes, eliminated much of the beach, and pushed the shoreline dune bluff inward. The suddenness of the storm and the extent of damage caught everyone by surprise, including the Town's leaders, who only a few years earlier had platted Dune Acres featuring a two-mile long, 250-foot wide beach.

When the storm slammed ashore in 1929, William and Francis Ray owned a small wood home (painted purple) that sat on the Dune Acres beach. Waves demolished the structure and carried it into the lake. Years later, the Rays' daughter -- Ruth Ray Bremner -- told members of the Dune Acres Historic Commission that days after the home was lost, she saw purple boards floating in the lake, knowing they had come from her parents' home.

In 1929, Alden Studebaker, Dune Acres' engineer and builder of homes, owned a log house along the lakefront section of East Road. (William Wirt, Dune Acres' principal founder, had given Studebaker the lot in lieu of cash for Studebaker's overseeing construction of the Clubhouse.) Now, Studebaker's sturdy home stood in harm's way as Lake Michigan's water levels rose, and waves intensified. Realizing his home was being threatened, Studebaker took action. He and his friends worked for hours filling burlap bags with sand. Wrapping ropes around themselves, the men walked into the



Sandbags in front of Alden Studebaker's home in 1929.

turbulent waters, carrying the heavy bags of sand and stacking them in rows, one on top of another, in front of the house. Their efforts succeeded; the home was spared. The intensity of the 1929 storm eroded and reconfigured the Dune Acres beach, especially along the Town's eastern shore. That's where the Town's founders had planned to build a boat harbor, but they realized it could not be done, frustrating their hope that the harbor would attract affluent buyers. Time heals all (well, many) wounds, and so it was with Dune Acres: the beach, foredunes and, to a lesser degree, the eroded beach bluffs were restored. The severe storm that struck Dune Acres in 1929 was only the first of several to hit the Town following its 1923 incorporation.

1951-52 Dune Acres Storm: Remembrances of a Frightened Boy

Twenty years later, Lake Michigan's water level was raising again and in 1951 a storm stronger than 1929's slammed the Dune Acres shoreline. A scientist wrote: *"The effects of high-water levels and storms were obvious to anyone who visited the Indiana Dunes beaches in years of rapidly rising levels such as 1951-1952. In a few hours during major storms, one could see surging waves crumble the dunes."*

In November 1951, the author of this article witnessed surging waves crumble the dunes. I was 12-years old at the time and today, 64 years later, still remember vividly the ferocious winds and thundering waves and the dune bluffs collapsing in front of our Dune Acres house. Only years later did I understand what had happened.

The storm lasted two days. It began on Wednesday, Nov. 7th with heavy snow, some areas near Chicago receiving 12 inches or more. By Thursday afternoon, Nov. 8th, the snows had largely abated, but the winds were stronger than ever. (The following day, the Chicago Tribune reported that the sustained winds over the southern end of Lake Michigan had exceeded 60 miles per hour). Sweeping down Lake Michigan's 300-mile north-south corridor, the near-hurricane force gale created and energized humungous waves. On Thursday afternoon, the Halley brothers and I stepped off our school bus at Mineral Springs and East roads and were instantly plummeted by punishing winds. Bending over with our heads down, we struggled up Shore Drive step by step toward our homes. Approaching my home I was overwhelmed by the thunderous noise of the winds and waves.

Shortly after arriving home and warming up, I ventured outdoors and stood at the edge of our yard, looking below at the fury. Flabbergasted, I could not believe that the foredunes and Marram

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grass that had been there that morning had vanished. Then, I was shocked to see that the flagstone stairway to the beach had collapsed, its supporting dunes having been washed out. My attention turned to the lake. Brown-colored waves were breaking and advancing toward the zone of destruction below. I learned later that the dark waves contained tons of sand.

Seeing the dunes collapse, I became frightened, believing our house was in danger, but my father assured me that it would not happen. As it turned out, not a single Dune Acres house was lost. But that was not the case elsewhere as the Lake Michigan's waves destroyed or severely damaged homes from Lake Forest, Illinois, through Porter Beach and Beverly Shores, Indiana, up to New Buffalo, Michigan. The Chicago Tribune reported that in Beverly Shores, the waves undermined "200 feet of a concrete roadway" that collapsed. The newspaper also reported that Lake Michigan's water level was the highest since the 1929 storm, 22 years earlier.

Similar to the '29 storm, after the 1951 upheaval, the lake receded as did the memories of its destruction. Though Dune Acres beaches and foredunes were restored, that was not the case with the dune bluffs that had been literally sliced in half by the waves, resulting in steep ten-foot or higher drop offs.

Lake Level Fluctuations, Storms, Beach Erosion, Accretion, Avulsion, Dune Bluff Recession, and Littoral Drift

Water levels of the Great Lakes have risen and fallen since the Ice Age. The U.S. Geological Survey notes that over the past century, high water levels and storms over the Great Lakes have caused hundreds of millions of dollars in damages to property owners, industries, infrastructure, and natural and recreational assets. How does this happen?

During periods of high lake levels, waves can attack with such ferocity that beaches and foredunes may be obliterated, beachfront property and homes lost, and dune bluffs pushed inward, followed by the slow process of re-nourishment -- all part of the beach-erosion/sand-replenishment cycle.

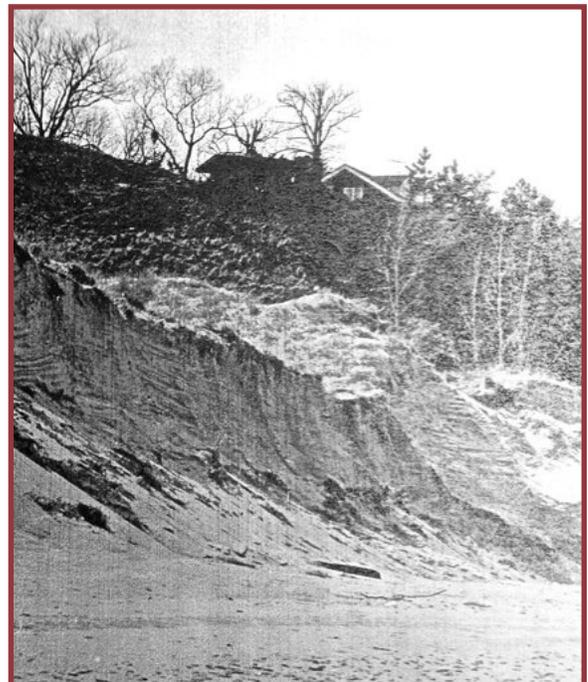
Interestingly, Lake Michigan has the largest range of water-level fluctuations of any of the Great Lakes -- 6.6 feet. Its highest level occurred in June 1986 at 582.6 ft. IGLD (International Great Lakes Datum) -- and the lowest in March-April 1964, at 576.0 ft. IGLD (an elevation reference point which all water-gauging stations



Homes fallen or about to fall into the lake in Highland Park, IL after the 1951 storm. Photo appeared in Chicago Tribune in November, 1951



Vertical railroad ties installed as a breakwater after the 1929 storm were exposed after the 1951 storm.



The collapsed sand bluffs in front of the Clubhouse blowout after the 1951 storm.

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in the Great Lakes use). Agencies that monitor and keep records of the Great Lakes water levels include: U.S. Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), Great Lakes Environmental Research Laboratories (CLERL), National Park Service, (NPS), and Indiana Dept. of Natural Resources (IDNR). The USACE Detroit division releases weekly and monthly reports of the Great Lakes' water levels on its website and in printed publications including The Monthly Bulletin of Lake Levels for the Great Lakes.

Impacts of Weather and Water Diversions

Weather is the primary factor that influences Lake Michigan's water levels. The precipitation that falls directly on the lake is far more significant than the inflows from rivers and streams within the lake's catchment basin. Evaporation is the second in importance in affecting lake levels. Evaporation is a natural process whereby water molecules vaporize into the air. The rate of evaporation varies. During the sun-intensity months of July and August, the lake may lower by 6 to 14 inches through evaporation. Both ambient air and lake water temperatures as well as humidity levels impact the evaporation rate. Low humidity promotes a higher rate, while high humidity slows down the rate. In addition, ice also affects evaporation. In cold winters (such as 2014), ice may cover most of Lake Michigan's surface, precluding evaporation.

Great Lake water levels are also affected by deliberate water diversions that are ordered pursuant to international agreements and implementing regulations. For example, engineers open and close valves that permit a higher or lower outflow from Lake Superior waters into Lakes Michigan and Huron; or from Lake Erie into Lake Ontario; or from Lake Michigan into the Chicago River. One rationale for regulating inter-lake water flows is to cause lake levels to be as close to mean datum norms as possible, but that is easier said than done. Another reason is to divert waters from one lake into a lake or lakes that are experiencing far-below normal water levels so ships will have sufficient water depth to navigate in and out of ports and through shallow straits or, conversely, to divert waters out of lakes with above norm levels in an attempt to mitigate possible high-water level storm damage. Notwithstanding laudable objectives, regulating inter-lake water flows has had minimal impacts on preventing serious erosion and avulsion processes. For one, when Lake Superior is high, in most cases so are lakes Michigan and Huron. Still, it is important to authorize inter-lake diversions for legitimate reasons, but don't expect that opening and closing valves will protect beaches and minimize dune erosion.

Erosion; Avulsion; Accretion; Littoral Drift; Dune-Bluff Recession

Of the several variables that affect shoreline erosion along Lake Michigan, wind is the most important. Wind factors include distance travelled, direction, speed, duration, and barometric pressure. Depending on the synergy of these factors, winds transfer their energy into waves (called the wave-energizing process).

Powerful winds also push massive amounts of lake water from the windward side to the shore where the storm hits, thereby raising the lake's water level at the impact area and magnifying the storm's destructive potential. This is true even if the lake's level is at or close to its mean datum.

The level of a storm's damage can vary enormously based on the storm's intensity. Powerful storms produce powerful towering waves that are more likely to cause major beach erosion, including dredging of the beach's upward slope, while abolishing foredunes and collapsing dune bluffs, thereby radically changing the configuration of the pre-storm landscape. Such a scenario is called avulsion: the sudden and perceptible changes to the shoreline's beaches and adjacent dunes. Repeated avulsions result in long-term dune-bluff recession, meaning that over years, dune bluffs are eroded and the base of the first ridge of dunes is pushed further back.

In contrast to avulsion, erosion occurs when Lake Michigan water levels remain below the mean datum for several years, and wind and wave actions accrete sand slowly over time up the beach. In years when lake levels are above the mean datum, the wind and wave actions may slowly erode the beach over years and cause the slope to become less steep as the beach becomes more flattened.

Nearshore ice makes accretion, erosion and avulsion processes interesting. Lake waters near the shore usually are the first to freeze when air temperatures are below 32 degrees. As temperatures remain low and fall, the nearshore ice grows, in time becoming ice ridges running horizontal to the shoreline. Ridges block waves from reaching the beach, inhibiting the accretion and littoral drift processes. But in many winters, there will be few or short-lived ice ridges. In these circumstances either accretion or erosion will likely occur. During fall and winter, predominantly north and northwest winds come over the southern shore, blowing sand up the beach that augments both the nearshore beach and upward slope while building foredunes.



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The Importance of the Littoral (Longshore) Drift

Lake Michigan in effect, has two littoral, or longshore drifts, one that comes down the lake's western shore and the other that comes down the length of the eastern shore. They come together off Gary. The littoral or longshore drift process involves several iterations. First, inflowing breaking waves scrape the lakebed where they pick up sand sediment, carrying it up the beach in what is called the swash. The swash of a wave nearly always comes on shore at an angle. However, the down-swash (water moving back into the lake) always moves at a 90-degree angle. The net effect is that sand granules in the down-swash return end up either left or right of where they entered.

In Dune Acres, the littoral drift moves predominantly westward, and in doing so, transports huge quantities of sand, a large portion of which ends up on what might be the widest beach on Lake Michigan today – the beach area in front of the Indiana Dunes National Lakeshore that lies just east of the NIPSCO power plant, the ArcelorMittal steel mill and the Port of Indiana.

In closing, perhaps the most important fact concerning Lake Michigan's littoral drift is that it is a critical process for beach nourishment and shore protection for the southern shore of Lake Michigan, and has been for hundreds of year; but, unfortunately, not during the past fifty.

In Part Two of The Rise and Fall of Lake Michigan, the story continues, first by focusing on man-made disruptions of the littoral drift and their consequences; then on both the 1970's and the 1980's storms that struck Dune Acre and resulted in extensive and costly damage. The responses of Dune Acres property owners and Town officials to the crisis are interesting.

Part Three will discuss current beach conditions as they affect Dune Acres. Concerns include safety issues; affects on zoning; future lake conditions; measures to protect lakefront property beyond those taken. References to studies on Lake Michigan beach erosion will be mentioned including: a 2014 National Park Service Management Plan for Shoreline Restoration that covers most of the beaches from Trail Creek, Michigan City, to U.S. Steel in Gary; and a National Oceanic and Atmospheric Administration (NOAA) study on lake flooding.

The Natural World in Dune Acres



A barrel owl spotted just off the trail at the end of Pine Lane.

photo by Ryan Carey



A snake that we saw April 17 on the stairs down to Hill drive beach!!!!!!

submitted by Leah Harp



May 5 -8, 2016

Hosted by the Indiana Audubon Society

Information and registration at

<http://www.indunesbirdingfestival.com/>



Spring Cocktail Party

The Spring Cocktail Party will be on Saturday, May 28th from 6:00 – 9:00pm at the Dune Acres Clubhouse.

The cost is \$25.00 per person. Payment can be dropped off at the guardhouse by May 18th.

This year’s theme is **Flags & Flip Flops** and will be catered by Bartlett’s. For further information please contact

Kathy Lauer at 312-405-5887 klauer4564@aol.com
 or
 Mary Jo Wilkins at 219-689-0897
maryjo@wilkins5.com



Independence Day Fireworks

Saturday July 2nd 2016

For the 16th year in a row, we will have a professionally produced fireworks display as part of our annual Independence Day Celebration. This year we will be doing the fireworks on Saturday July 2nd 2016 just after sunset.

This will be a safe, spectacular display produced by Melrose Pyrotechnics. They are involved in producing many major displays in the Chicago area. Our production will last about 30 minutes. It is approved by the Coast Guard, the Indiana Fire Marshall and monitored by the Porter Fire Department.

With the availability of a professionally produced display in town, it is our intent to eliminate illegal fireworks and to promote a safer event for all residents and guests.

As in the past, we are asking for individual contributions to cover the costs. If you are willing and able to contribute to this Dune Acres tradition, please fill out the form below and return along with your check to the security officer at the gatehouse.

Thank you

Rich, Peter and Alex
 Dune Acres Town Council

Fireworks Contribution

I/We enclose _____ Payable to the Town of Dune Acres*

Name: _____

Address: _____

*According to IRS Publication 17, page 171, money given to local governments for public purposes is deductible as a charitable contribution.

The Fine Print: *The Beachcomber* is published on-line monthly during the summer and periodically during the winter. All information, news, creative contributions, articles, reports, corrections, suggestions, Letters to the Editor, art work, comments and otherwise are welcomed and encouraged. *The Beachcomber* is a grass roots publication not officially affiliated with either the Town of Dune Acres or the Dune Acres Civic Improvement Foundation, Inc. (DACIF). All content is believed to be reasonably accurate and reliable but not "guaranteed!"