BUFFALO RISING

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Threats to the Great Lakes

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Buffalo Rising

The Great Lakes were the gateway to the interior of North America. Samuel de Champlain was the first of the European explorers to navigate the Great Lakes with Louis Jolliet, the first European to find Lake Erie. They were the lead guard of settlers that followed the waterways and settled in areas like Buffalo.

Over time, these settlements grew and changed the nature of the Great Lakes. Over the years, discharges from industry and from residential sewage created the conditions that turned Lake Erie into a "dead lake" in the late 1960s. Legislation like the Clean Water Act brought Lake Erie back from the dead, but the threat to Western New York's largest potable water source has not abated since that time.

Protections to prevent waters of the Great Lakes from being diverted to other areas of the country have been codified in the Great Lakes Compact, celebrating its 15th anniversary on December 8th. Ironically, this compact came about due to a water diversion of a different sort. In 1998, a Canadian company announced that it was planning to ship 158 million gallons of Lake Superior water to Asia, but it served as the alarm bell showing how vulnerable the Great Lakes were in an increasingly thirsty world. The Compact only allows for waters to be diverted if a community (or the county that the community is located) is partially within a Great Lakes watershed and has exhausted all other available options for getting water. So far, only the City of Wakesha, WI has been granted this waiver, and to do so, they had to agree to return all of the diverted water back to Lake Michigan. These waivers need to be unanimously approved by all 8 states and the province of Ontario that border the Great Lakes, meaning that New York has a say in these decisions.

Now that we have protected the volume of water in the Great Lakes, we should consider the future threats to one-fifth of the world's liquid fresh water. Here are 5 to watch for in 2024 and beyond:

Flying Fish (and other exotics)

It may be a bold statement (considering the legacy of pollution from industry ringing the Great Lakes), but the zebra and quagga mussels may be the greatest current threat to the Great Lakes. Invasive species from Black Sea lagoons and Caspian Sea drainage basins, these mussels lived in a highly salty and sediment laden habitat and do their job too well as filter feeders in their new Great Lakes home. It's amazing that something as small as a pistachio could be a threat, but it is estimated that there are 750 trillion zebra mussels in the Great Lakes and there could be 10 times as many quagga mussels in the lakes as they can inhabit the colder, deeper waters.

Dan Egan, author of the Pulitzer Prize finalist "The Death and Life of the Great Lakes," describes zebra mussels as cancer cells. Both outcompete native mussels in the lakes, and are so efficient at filtering water that they are removing the bottom of the food chain (phytoplankton and zooplankton) leaving the waters of the Lakes clearer than they have ever been but starving the next levels of the food chain that depend on the plankton as a food source.

As scientists and communities around the Great Lakes start to view this as the "new normal," zebra and quagga mussels threaten the food sources of the top predators in the lake, but there is a threat knocking on the doors to the top of the food chain as we speak. Asian carp were imported to the US for aquaculture, but escaped into the wild. They have quickly moved northwards in the Mississippi River basin and can be found in Illinois. This is an issue as the Des Plaines River (a Mississippi tributary) is linked to Lake Michigan via the Chicago Sanitary and Ship Canal. These voracious eaters are currently being held back by an electric barrier system and it is unlikely that there will be a permanent closure of this canal to hold back the scariest invasive threat to the Great Lakes since the opening of the St. Lawrence Seaway.

The barrier is holding the threat 8 miles away from Lake Michigan, but researchers are alarmed that traces of Asian Carp DNA have been found in lake water samples. As the lakes currently freeze during the winter, it is unlikely that any damage will be done directly to the lakes. It would be more likely that the fish would move along the shoreline and populate the tributaries and decimate the spawning grounds used for many Great Lakes fish. During the summer months, fish would follow the shore to more tributaries north and east eventually entering Lakes Huron, Erie, and Ontario.

Plastic Production (and Pollution)

90 miles southwest of Buffalo is the home of the largest center of plastic injection molding in the United States. Erie, PA has been producing plastic goods since 1935 and now produce 10% of all molded plastic products in this country. It is also home to Penn State Behrend, which has one of the largest college plastics programs in the United States.

The Director of Sustainability for the college is Dr. Sherri Mason. She is better known in Western New York for her research in the Great Lakes. Her studies in Lake Erie while with SUNY Fredonia, coming soon after the Great Pacific Garbage Patch was identified, found microbeads and smaller microplastics in quantities that rivaled the plastic levels found in the ocean. This research lead to Erie County's law banning microbeads in personal care products. This first in the nation law lead to the Microbead-Free Waters Act, the only national legislation on plastics.

It is not surprising that microplastics have been found in all of the waterways around Erie, PA. Dr. Mason notes that "now is the time to really face this and regulate it so that we can be making changes for future generations." This could be challenging as plans for a "SuperPRF" (plastics recovery facility) in the city are underway. This facility would take an estimated 250,000 tons (400 trucks a day) of mixed plastics annually. Even with this volume, the International Recycling Group (IRG) is only planning on sorting out the PET ♳ and Polypropylene ♷ plastics and flaking the rest of the plastics, creating a product they call "Clean Red" to be burned in industrial facilities. This has the potential to be a ticking environmental time bomb if it follows the path of virgin plastic plants that create the pre-production nurdle pellets. Due to their small size (about a third of the size of a pea), spills occur at both the creation and end use production site entering waterways and the surrounding landscape. The time bomb is not only from the toxins that leach out of the plastic fragments, but also increasingly as a base for bacterial and algal growths. With Buffalo downstream from this proposed facility, more plastic is sure to find its way to our drinking water supply.

Line 5 (or the worst place to put an oil pipeline)

If you have ever been to the Straits of Mackinac (the connection between Lake Michigan and Lake Huron), you probably noticed two things. First, the Mackinac Bridge is one big bridge, with a span of over 5 miles in length. Second (if you are a passenger), the water underneath can look really angry. What you aren't seeing is a 70-year-old oil and gas pipeline owned by the Canadian company Enbridge. Line 5 has been in the news over the past few years as previous Michigan Governor Rick Scott approved a new pipeline housed in a tunnel under the Straits. The decision on the pipeline, opposed by indigenous and environmental groups, is undergoing court challenges. Despite the opposition of the current Governor, Gretchen Whitmer, the Michigan Public Service Commission approved the construction of the tunnel to house a new pipeline citing the need for the light crude oil and natural gas that the pipeline transports and noted other transport methods pose an increased risk of a spill.

According to Governor Whitmer, Enbridge is "an oil company with an abysmal environmental track record," and she has a long track record to base that claim on. Another Enbridge owned pipeline was in the news in 2010, when millions of gallons of oil were spilled into a tributary of the Kalamazoo River. That cleanup took years in a river setting. Imagine what the cleanup would look like in the Great Lakes. In a September, 2023 article, 'We can't drink oil': how a 70-year-old pipeline imperils the Great Lakes, the Guardian did that work, and in their article have a simulation of the dispersal of an oil spill in the Straits of Mackinac that would be across most of Lake Huron within 60 days (assuming that the leak is quickly identified). With two boat anchors denting the pipeline in the last 5 years, and the lakebed below the pipeline eroded over 70 years, the current situation is a when, not if, something catastrophic happens. Add to that, the Line 5 pipeline has had multiple spills that have added up to over a million gallons over the past 50 years. And this is all to move oil from Western Alberta to refineries in Sarnia, Ontario.

Canadian Nuclear Waste Repository (potentially the worst place to put radioactive waste)

Western New York is familiar with the problems of storing nuclear waste near the Great Lakes. The West Valley Nuclear Waste Facility was built prior to federal and state environmental laws. As noted in an October, 2021 Buffalo Rising article "the site itself is far more dangerous than other sites that were constructed at later dates, which were beholden to environmental laws or standards." West Valley was constructed on loose glacial till and has steep slopes that are prone to severe erosion after saturating rains.

These rains are becoming more frequent due to climate change. Plans for the facility expected to continue historical trends. That type of thinking makes plans for a Canadian Nuclear Waste Repository near Lake Huron concerning. The Saugeen Ojibway Nation-South Bruce area site in southern Ontario is one of two being considered to store used nuclear fuel with a decision expected to be made later in 2024. The government likes to point out that the storage facility will be as far below ground as the CN Tower is above, but their claims that this is best international practice falls flat when there are no other deep storage nuclear facilities operating anywhere. Like the local critics say, the whole thing would be a grand experiment.

Vanishing Ice Cover

When CNN has a story on the Great Lakes, they are often following the news pack in their reporting. That makes their recent story asking Where is the ice? all that more alarming. In the first sentence, it notes that the Great Lakes are virtually ice-free and with their lowest ice cover at the start of the new year in at least 50 years.

Ice coverage is variable across the Great Lakes from year to year, but since detailed records have been kept, the peak ice coverage has been dropping about 5% each decade. This matches up with the earlier spring weather and later summer-like fall temperatures that we are becoming accustomed to. But those warmer temperatures also prevent the lakes from freezing, setting up for more extreme weather like our Christmas 2022 blizzard.

As the Great Lakes slowly lose their protective winter coating, we are entering into uncharted territory for the wildlife that inhabits its waters. Ice fishermen will feel the crunch first as the lake fails to create a stable ice layer. That same ice also serves as a protective barrier from waves for fish eggs. Larger numbers of young fish that now mature to adulthood because of the protection in the colder winters will be at risk in ice-free waters.

Earlier warming temperatures have other impacts. With the previously mentioned zebra and quagga mussels filtering out the bottom of the food chain and other particulates, the clear warm water will lead to longer and more frequent harmful algal blooms (HABs). HABs are not only harmful for the life in the lakes (including the creation of oxygen-starved dead zones), it also has impacts on the source of drinking water for communities around the Great Lakes. HABs in Lake Erie were concentrated in the shallow and warmer western basin but the past few years have seen outbreaks as far east as Cleveland.

The threats from Ice-free waters don't stop with the life in the water. Winter winds are generally stronger and more sustained than in the remainder of the year so coastal erosion along the shorelines due to increased (and stronger) wave activity is a certainty. Another hit on land would be the moderating effects our lakes have on the local climate. Ice coverage keeps vineyards and orchards from having their crops flower too early, and Buffalo's streak of never having a recorded 100° day is partially due to having a cooler lake during the peak heat of summer.

Climate change may make an ice-covered Lake Erie a thing of the past, but it will take a political leader to ensure that the other man-made threats to the waters upstream from our region never become a reality. We have seen how much it has cost to remediate the damages done by the region's industrial growth prior to 1970. The best way to ensure the health of our inland seas future for our grandchildren's grandkids is to act now to stop these and future threats.