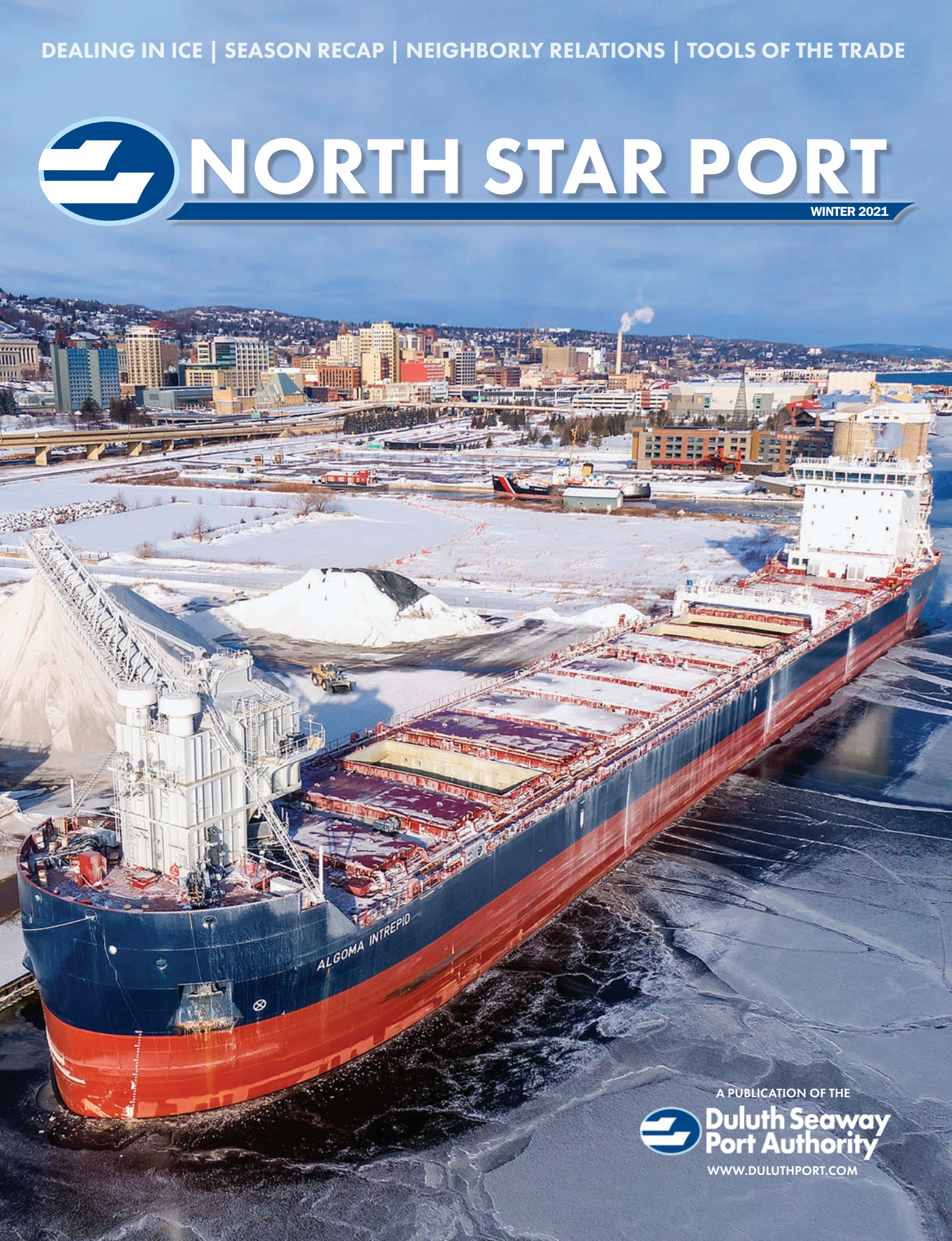
DEALING IN ICE | SEASON RECAP | NEIGHBORLY RELATIONS | TOOLS OF THE TRADE

NORTH STAR PORT

WINTER 2021



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THE HARBOR LINE

Deb DeLuca, Port Director

Great Lakes shipping fared extraordinarily well in the 2020 federal legislative season, as further detailed on Page 6 of this issue. The passage of the Water Resources Development Act (WRDA) of 2020 is the win that resonated for me on a personal level. It also serves as a master class in the importance of stakeholder group mobilization and effective trade associations, and illustrates what ports can accomplish when they work together nationwide.

As background, or as a reminder, the U.S. Army Corps of Engineers is responsible for operation and maintenance of the federal navigation channel, including maintenance dredging, operation of locks, and upkeep of structures such as breakwaters and jetties. These critical activities are supported by transfers from the Harbor Maintenance Trust Fund (HMTF), which is financed by the Harbor Maintenance Tax (HMT), a levy on the value of cargo moved through the nation's ports. This process was created by WRDA 1986, which contained a serious flaw: it failed to create a requirement that Congress fully spend the collected HMTF funds on these critical activities. Over the years, as Congress chose to appear budget-minded by not funding maintenance activities, the unspent HMTF balance ballooned to more than $10 billion, and the backlog of deferred dredging and maintenance projects grew in parallel fashion. For the Great Lakes region alone, there is a total of $545 million in deferred dredging and maintenance projects ($150 million for dredging, $320 million for breakwater and jetty repairs, and $75 million for repair of the existing Soo Locks).

Huge strides were made with the passage of WRRDA 2014 (the second "R" was for "Reform"), which established a schedule of annual targets for HMTF spending, arriving at full expenditure in 2025. WRRDA 2014 passed in early June 2014, just a month and a half before I started work at the Duluth Seaway Port Authority as its government and environmental affairs director.

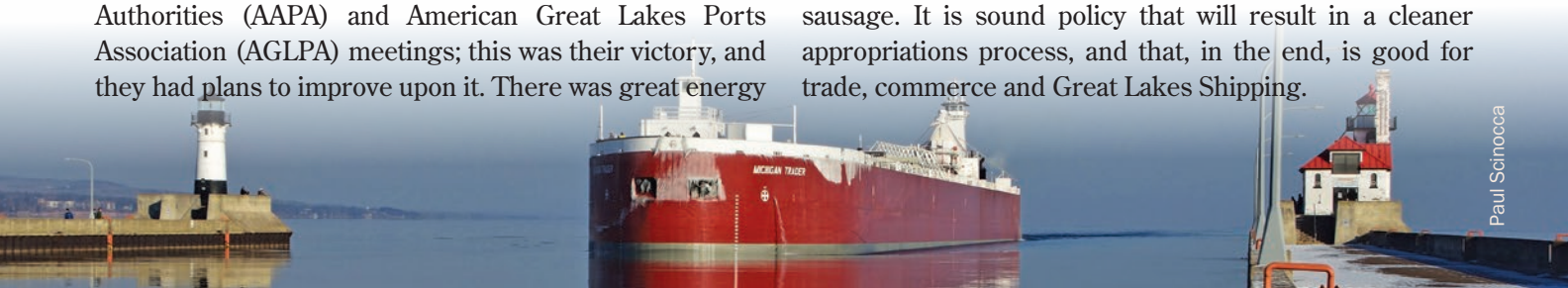
This victory, right at the time I entered the maritime industry, made a big impression on me. Not only was this new subject matter and a whole new corpus of acronyms, I was impressed by the effective organization amongst a broad array of maritime industry stakeholders who had worked together to successfully educate and influence Congress. This outcome had real meaning for Great Lakes shipping and our regional economy. WRRDA 2014 was the big news at my first American Association of Port Authorities (AAPA) and American Great Lakes Ports Association (AGLPA) meetings; this was their victory, and they had plans to improve upon it. There was great energy and commitment to continued pressure on Congress to "Hit the HMT target" each year.

Very quickly, the target-hitting drive led to bigger, more permanent plans. The port community started thinking about how the HMT could be taken "off budget" so that collected funds would be spent for their intended purpose each year, and would be walled off from the Congress' annual budgeting process. Early discussions in the halls of Congress about taking the HMT off budget were not encouraging, and yet the maritime coalition, headed by the AAPA, persevered and pressed for some mechanism to fully use HMT revenues for their intended purpose annually. Their first big reward came when the CARES Act passed in March 2020, with provisions for an incentive to the appropriations committee to provide up to the full prior year's HMT revenues to the Corps of Engineers as a "budget cap adjustment." But further work remained.

After WRRDA 2014, perhaps inevitably, the various regions were concerned about getting their fair share of the HMTF annual pot. The AAPA worked with its members to create a plan for distributing the funds in a way that all of the regions' needs were met, and those ports that don't require dredging felt fairly treated. Early versions of these talks were a tad, shall we say, divisive. But inevitably, the group came together with an excellent solution.

Fast forward to the end of December 2020 and passage of the Consolidated Appropriations Act of 2021, which encompassed WRDA 2020 and included language to allow Congress to spend down the $10 billion excess balance of HMTF over time. It also included a modified version of the AAPA regional distribution plan, including the stipulation that 13 percent of HMTF allocations go to the Great Lakes Navigation System, a clear upgrade from the historic 10 percent position.

This chain of events illustrates the strength of trade associations and the value of active stakeholder group engagement. The final result was built on years of hard work and foundation forging, as well as hours upon hours of uncomfortable discussions and problem solving. The practical nature of the Great Lakes Congressional delegation must also be credited. The result is not political sausage. It is sound policy that will result in a cleaner appropriations process, and that, in the end, is good for trade, commerce and Great Lakes Shipping.



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About *North Star Port*

This magazine was produced by the Duluth Seaway Port Authority, Jayson Hron, publisher. Editorial assistance provided by Julie Zenner; graphic design by Erin Makela.

Paul Scinocca

The ice-covered *Great Lakes Trader* signals winter in the Duluth-Superior Harbor.

Inside your

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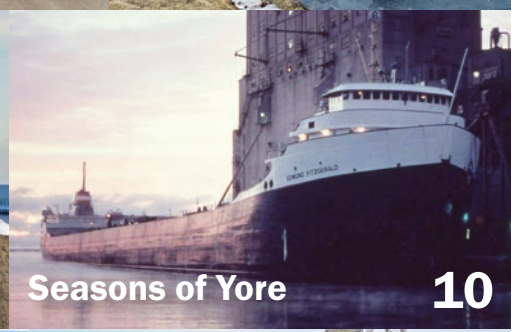


On the covers

Gus Schauer

On the front:

Algoma Intrepid visits the Compass Minerals dock in Duluth during the new ship's first visit to the Twin Ports in late December. Algoma Central took delivery of the Croatian-built vessel in October 2020.

On the back:

The *Arthur M. Anderson* welcomes a late-night load of iron ore at Duluth's CN dock on Dec. 13, 2020.

Nick Stenstrup

Printed on 10% post-consumer waste paper. PRINTED WITH SOY INK

DEALING IN ICE:
The Twin Ports' clear commodity

BY JAYSON HRON

Demand spiked for natural ice early this winter, especially in Minnesota, as hockey players and skating enthusiasts sought outdoor alternatives to pandemic-locked indoor rinks. Fortunately, Duluth offers natural ice in abundance, so there was no shortage to be carved by the locals' flashing blades. Southerly cities were less fortunate, or at the very least, less gelid, making Duluth an ice supplier of sorts. It wasn't the first time.

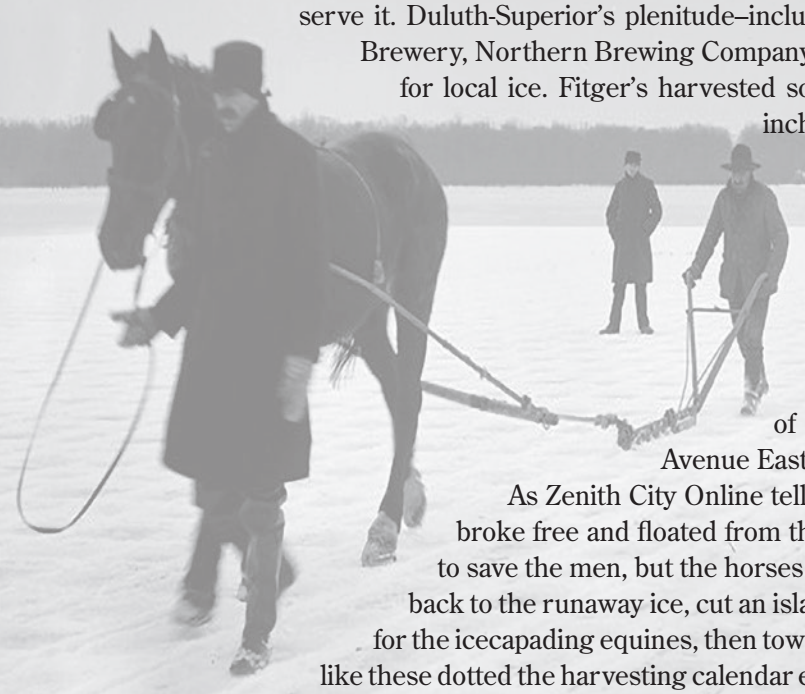
THE ICE TRADE

During the late 1800s and early 1900s, skates weren't the only blades cutting ice in the Twin Ports of Duluth and Superior. Saw blades sliced it too, with ice harvesting crews hauling hefty cakes from Lake Superior and its St. Louis River inlet.

Essential for a range of uses prior to the advent and perfection of mechanical refrigeration, this natural ice sold and shipped as a precious commodity, not unlike iron ore, coal and grain. By 1880, some American towns were spending as much for ice as for fuel, and the total United States ice harvest neared 8 million tons.

In Duluth-Superior, this ice provided primarily for food preservation and industrial cooling, including aboard ships traversing the Great Lakes and rail cars moving throughout the Upper Midwest. It was also crucial to local breweries, which needed ice in mass quantities to age, manufacture and preserve their lagers, and also for cooling beverages to the temperature popular with Americans, a preference Europeans regarded as curious, according to historian Lee Lawrence, whose mid-1960s exploration of the topic contributed to this story.

Nationwide, breweries constituted the largest group of natural ice consumers, according to the *Ice Trade Journal*, using an estimated 1 million tons annually to make and distribute their product, plus another 2 million tons to cool and serve it. Duluth-Superior's plenitude–including heavyweights like Duluth Brewing & Malt, Fitger's Brewery, Northern Brewing Company and People's Brewing Company–provided ample appetite for local ice. Fitger's harvested some of its own from Lake Superior ("Fine quality and 16 inches in thickness," according to the 1911 *Ice Trade Journal*), but mostly the work went to two primary competitors: the Duluth Ice Company and the East End Ice Company.



BRAVING THE ELEMENTS

Harvest season in the Port of Duluth-Superior was adventurous. Cold, slippery mishaps of every kind were common, some bordering on spectacular. One such example occurred Feb. 19, 1902, when thousands of Duluthians gathered alongside Lake Superior, near 21st Avenue East, to witness the rescue of a stranded ice harvesting team.

As Zenith City Online tells it, six men and two horses of the East End Ice Company broke free and floated from their ice field into the great Gitche Gumee. Boats launched to save the men, but the horses were another matter. Crew members eventually navigated back to the runaway ice, cut an island nearly the size of a hockey rink to provide calm pasture for the icecapading equines, then towed it safely back to shore with ropes and rowboats. Rescues like these dotted the harvesting calendar each season, combined with countless slips, falls and follies.

In the best of times, or coldest, depending on your perspective, the harvesting season began in January. The winter of 1904-05 qualified, as the Duluth weather bureau office called it the coldest since its establishment 35 years earlier. Ice-clearing started early that season, followed by horse-drawn plows which scored the ice, marking the size of cakes to be cut. These cakes were sized to fit wagons that delivered them in the summertime. After the initial scoring, the horses

Northeast Minnesota Historical Collections

Lake County Historical Society

At left: Regional breweries, like Fitger's, used massive amounts of ice from Lake Superior and surrounding waters. Above: An ice-harvesting crew works the edges of Lake Superior near Two Harbors, Minn.

returned with a larger plow that cut two-thirds of the ice's depth. Then men sawed the final cut and harvested each ice cake.

According to the *Ice Trade Journal*, "Ice of good quality is 16-18 inches thick … 10 or 12 days of real cold weather is required to perfect the formation … Lake Superior usually freezes five inches during the first 24 hours of the cold wave which imprisons it, then the ice forms an inch or more per day until it is of required thickness."

In total, the Duluth Ice Company harvested 25,000 tons of ice between January and March 1905, comprised of 10,000 tons from Lake Superior and 15,000 tons from Spirit Lake, a pool formed by the St. Louis River on its way into the bay. The East End Company tipped the scales at 21,000 tons. Said to be "of extra fine quality" that season, the Lake Superior ice measured 16 inches in thickness.

Some seasons, like 1905, yielded an early bumper crop. Others did not. In fact, the following winter (1905-06) was plagued by warm conditions throughout the Upper Midwest that threatened an "ice famine." Delayed but undeterred, the Duluth Ice Company finally began cutting in late February, several weeks later than the previous winter. Company President James Hart told the *Ice Trade Journal* that he'd seen worse years, when "merchantable ice did not form until March 10."

BANNER YEARS

Hart's company enjoyed good success through the 1910s, as the region's ice appetites increased. In 1911, he employed nearly 90 men in the ice trade, primarily working the company's Spirit Lake cut. They filled four storage houses, each with the capacity of approximately 30,000 tons of ice. The East End Company also thrived, employing 70 men who carved 1,500 tons of ice daily from the St. Louis River for its warehouses in New Duluth.

By 1914, the two companies were lifting nearly 300,000 tons of ice each season. The *Duluth Herald* estimated that the city consumed more than 200,000 tons each year. A small share of the difference was hauled elsewhere on steamships or trains, but most was simply the unavoidable loss from summer melting.

Ice cravings increased further in 1915 when the United States Steel Duluth Works opened. By 1916, Hart's Duluth Ice Company opened an artificial ice plant with a 100-tons-per-day capacity. But the technology that made artificial ice possible also made obsolete the natural ice trade. When World War I ended in 1919, mechanical cooling and freezing became more attainable and more widespread. Ice-cutting on the lakes continued for some years to come, but on a rapidly diminishing scale.

NEW-AGE ICE

Today, keen-eyed observers might see the progeny of that earlier ice age at Duluth's Clure Public Marine Terminal. Refrigerated boxcars occasionally ride the Clure's rails, more efficiently serving an identical purpose to the ice-filled trains of the early 20th century. Refrigerated intermodal containers also can move through the Duluth Cargo Connect freight hub, fortified with technology providing real-time internal climate reports to cargo owners. Gone are the days when they hoped only that their product wouldn't spoil in transit. Now, because of advances in refrigeration, they can ensure that their product arrives at the peak of freshness, thanks to fully mechanized and adjustable climate control. It's a brave new frontier for cooling and cargo, one that leaves plenty of natural ice for skating and only distant memories of the frigid crystal harvests from yesteryear.

Jayson Hron

Federal funds flow to assist Great Lakes shipping

BY JULIE ZENNER

Good things came in a large package for the Great Lakes maritime industry, which found a bundle of welcome surprises in the $2.3 trillion Consolidated Appropriations Act 2021 passed by Congress and signed by President Trump in late December 2020.

The massive spending bill contained significant resources for construction projects at the Soo Locks, major funding for a new heavy icebreaker on the Great Lakes, and a substantial revenue stream to complete harbor maintenance projects throughout the Great Lakes Navigation System.

"It was much more than we expected," said Jeff Stollenwerk, director of government and environmental affairs at the Duluth Seaway Port Authority, as he unpacked pertinent details of the 5,593-page bill. "I'd call it a phenomenal win."

Soo Lock Construction

In approving these appropriations, lawmakers acknowledged the vital role the Great Lakes maritime industry plays in the nation's economic security. This is particularly evident in major funding for a second large lock and other improvements at the Soo Locks in Sault Ste Marie, Michigan. The package included multiple funding sources that could advance the $900 million, 10-year construction project.

Currently there is just one large lock (the Poe Lock) capable of accommodating 1,000-foot vessels that transport much of the iron ore needed for domestic steelmaking. A 2015 United States Department of Homeland Security Study called *The Perils of Efficiency* determined 11 million U.S. jobs and $1.1 trillion in gross domestic product depend on the largest lock at the Soo. It also warned the Poe Lock was the single point of failure in the Great Lakes

Navigation System, meaning, if it fails, it would stop the entire system from working. A second large lock would create redundancy for improved security and flow of commerce.

The appropriations bill included $123 million specifically earmarked for ongoing construction of a second large navigation lock at the Soo Locks. Resources from a separate $59 million appropriation and $390 million in discretionary construction funding could allow the U.S. Army Corps of Engineers to direct even more money to the new lock and critical upgrades to the Poe.

"Once the U. S. Army Corps of Engineers commits to a project, they make it a high priority for funding," Stollenwerk said. "Receiving funds on such a good pace assures continued construction and avoids costly delays."

Heavy Icebreaker

Also included in the Consolidated Appropriations Act 2021 is $4 million for the U.S. Coast Guard to continue design work on what the Lake Carriers' Association calls a "desperately needed" heavy icebreaker to keep commerce moving safely on the Great Lakes through the winter months. The trade organization estimates that inadequate icebreaking on the Great Lakes has cost the U.S. economy more than $2 billion and over 10,000 jobs since 2014. The new allocation brings total funding in the past five years to $18 million and will keep plans for the new icebreaker moving forward.

"It is obvious Congress has a vested interest in protecting our mariners from dangerous ice conditions, coastal communities from devastating floods caused by ice jams, and the economy from major disruptions," stated Jim Weakley, president of the Lake Carriers' Association. He thanked members of the Great Lakes Congressional Delegation for their significant efforts.

Even with the new funding, completion and commissioning of a new USCG heavy icebreaker similar to the USCGC *Mackinaw* in size and capabilities is years away. According to Stollenwerk, it would take seven to eight years for construction once the new vessel is authorized, and no decisions have been made about where it would be stationed—but Duluth-Superior would be among those considered.

> **"Our port, like many others, has a backlog of dredging that potentially could be reduced or eliminated thanks to this funding."**
>
> —Jeff Stollenwerk, Duluth Seaway Port Authority

Harbor Maintenance Trust Fund

A third key provision in the federal spending bill will direct additional resources from the Harbor Maintenance Trust Fund toward projects in the Great Lakes region. The HMTF holds taxes collected on maritime cargoes. It is designed to fund operation and maintenance activities of the U.S. Army Corps of Engineers, but restricted spending in recent years has resulted in a balance of almost $10 billion.

The 2020 Water Resource Development Act, wrapped into the Consolidated Appropriations Act 2021, releases those resources. Furthermore, it stipulates that 13 percent of Harbor Maintenance Trust Fund allocations go to the Great Lakes Navigation System (typically it was only 8-10 percent). This added funding will support critical projects such as dredging of harbors, maintenance of breakwaters and operation of the Soo Locks.

"Our port, like many others, has a backlog of dredging that potentially could be reduced or eliminated thanks to this funding," said Stollenwerk, who has worked with port officials across the country on a plan and strategies for Congress to better utilize the HMTF. "Looking at the whole package of appropriations, we are exceptionally grateful to Congress for acknowledging the importance of shipping on the Great Lakes."

SEASON RECAP

The 2020 maritime shipping season will be remembered for early promise crushed by the worldwide coronavirus outbreak.

Pandemic-induced shutdowns and closures withered previously booming North American demand and production, which subsequently affected the entire supply chain, most grievously iron ore and coal. As a result, total tonnage through the Port of Duluth-Superior dropped to 25.8 million short tons, the port's lowest total since 1938.

Duluth-Superior's most prominent cargo, iron ore, dipped 22 percent below the 2019 total, finishing at 15.4 million short tons. It's worth noting, however, that the 2020 iron ore tonnage still exceeded the 2015 and 2016 totals, when illegal foreign steel dumping hampered the market.

Coal tonnage, which peaked at 22.1 million short tons in 2008, slipped to 5.4 million short tons in 2020.

The silver lining in 2020 was wind cargo, which sailed into Duluth's Clure Public Marine Terminal at a record-setting pace.

For the season, Duluth Cargo Connect welcomed 525,000 freight tons of wind energy cargo, easily surpassing the previous record of 306,000 freight tons set in 2019. Looking beyond the numbers, the port's emergence as a wind energy cargo hub was an important win for cargo diversity and also for the expansion of renewable energy nationwide.

Additionally, grain tonnage finished slightly above the five-season average in 2020, closing in on 1.4 million short tons. For the Great Lakes-St. Lawrence Seaway System as a whole, grain tonnage jumped 27 percent season-over-season, helping offset drops in other cargo categories and keeping 2020 Seaway tonnage nearly level with its 2019 total.

Another Duluth-Superior bright spot was the progressive tonnage improvements of the season's final months.

In August 2020, total tonnage was nearly 31 percent behind the 2019 pace. That deficit steadily declined through the fall and early winter, boosted further by a robust January sprint to the finish during which total tonnage jumped 66 percent over the Jan. 2019 total.

As the calendar turned, the season finished with mines reopening, steel demand rising and COVID vaccinations beginning, all of which hint at hope for 2021.

FIRSTS & LASTS OF 2020-2021 SEASON

Noteable	Ship Name	Built	Company or Country	Departure Date	Time
First laker out	*Burns Harbor*	1980	American Steamship Company	March 22, 2020	1:53 a.m.
First laker in	*H. Lee White*	1974	American Steamship Company	March 26, 2020	9:41 a.m.
First Canadian in	*Saginaw*	1953	Lower Lakes Towing	March 28, 2020	9:24 a.m.
First saltie in	*Federal Churchill*	2016	Fednav	April 18, 2020	7:55 p.m.
Last saltie out	*Federal Oshima*	1999	Fednav	December 18, 2020	1:03 a.m.
Last laker out	*American Mariner*	1980	American Steamship Company	January 14, 2021	3:27 p.m.
Last traffic in	*Burns Harbor*	1980	American Steamship Company	January 16, 2021	10:17 a.m.

Nick Stenstrup

Paul Scinocca

ON SEAFARER HEALTH AMIDST A PANDEMIC ...

While COVID-19 adversely affected maritime cargo tonnage in the Port of Duluth-Superior, the pandemic's health impact was minimal on seafarers visiting the port. The U.S. Coast Guard reported zero positive cases on ships transiting Duluth-Superior during the 2020 shipping season, which is in part attributable to the planning, protocols and diligence displayed by maritime agencies, shipping companies and crews who maintained the flow of essential goods into and out of North America's heartland.

Paul Scinocca

NEW ARRIVAL IN 2020

In the photo below, the tug/barge combo *Dirk S. VanEnkevort/Michigan Trader* sails beneath Duluth's Aerial Lift Bridge on Dec. 17, 2020, en route to the Clure Public Marine Terminal andthen a loading stop at the CN iron ore docks.

Launched last fall from Fincantieri Bay Shipbuilding in Sturgeon Bay, Wis., the *Michigan Trader* self-unloading barge completed her maiden voyage to Duluth in late November 2020, the first of her several calls on the western edge of Lake Superior during the season's final months. The *VanEnkevort* tug is not new, and is in fact the former *Joseph H. Thompson Jr.*, built in 1990.

In its Dec. 2020 issue, *Marine Log* named the newly built *Michigan Trader* among its best vessels of 2020, saluting its Midwestern materials, parts and systems sourcing.

"We are happy to have supported the Great Lakes economy during the challenging times of the COVID-19 pandemic," said Todd Thayse, vice president and general manager of Fincantieri Bay Shipbuilding. "From boom to hatch crane, and everything in between, this vessel shows the greatness of Wisconsin and Midwest manufacturing and our Fincantieri Bay Shipbuilding employees."

The *Michigan Trader* measures 740 feet in length and can haul nearly 40,000 tons of cargo.

Gus Schauer

SEASONS OF YORE — CENTURY'S LAST SHIP

With the conclusion of each Great Lakes maritime shipping season, the Duluth Seaway Port Authority compiles a list of the port's firsts and lasts. This compilation dates back to the St. Lawrence Seaway opening in 1959. It's a helpful reference, especially when we receive reader inquiries like this:

"Which was the last saltie to depart the Port of Duluth-Superior in the 20th Century?"

Before we could answer that question, the inquisitor reminded us that the 20th Century actually ended on Dec. 31, 2000, not 1999. That subtlety disqualified *Lady Hamilton* from consideration, though she was a fine ship and remains so yet today, but under the slightly more familiar *Kaministiqua* moniker.

Instead, it was another Canadian ship that gained the distinction of being Duluth-Superior's last saltie of the 20th Century, a ship whose multiple names once included an eerie interlude as the *Edmund Fitzgerald*.

Papachristidis' flagship

Christened *Don-De-Dieu* on June 9, 1965, this straight deck bulk carrier shared the name of explorer Samuel de Champlain's famous ship that carried him from France to Quebec in 1608. Unlike that vessel, the *Don-De-Dieu* would never cross the Atlantic Ocean, which makes her not really a saltie in the specific sense of the term, but more on that later.

For two seasons, the *Don-De-Dieu* sailed as the flagship of Montreal-based Papachristidis Maritime Inc., primarily carrying grain and iron ore in her six cargo holds. Her first name change came in 1967, when Labrador Steamship Company acquired the vessel and relaunched her as *V.W. Scully* in honor of Vincent William Scully who was then chairman of the board and CEO of the Steel Company of Canada. According to George Wharton's BoatNerd.com profile of the vessel, she continued in the grain and iron ore trade, often hauling Labrador ore from Port Cartier and Pointe Noire, Quebec, to American blast furnaces along Lake Erie and Lake Michigan.

Putting on the Fitz

After another sale in April 1971, *V.W. Scully* joined the Diamond Shamrock Canada operation, which eventually led her to Algoma Central ownership in 1973. She continued sailing her typical cargoes, but more often to Canadian ports, and leading a rather pedestrian existence until 1978. Then things got weird, as she was chosen to portray the *Edmund Fitzgerald* in a film made about the ship's 1975 sinking. This led to the *V.W. Scully* eventually working for a time with the *Fitzgerald* name emblazoned on her bow. Reportedly and some of the

Algoma Central's *Algosound* was originally launched as the *Don-De-Dieu* in 1965.

Roger LeLievre

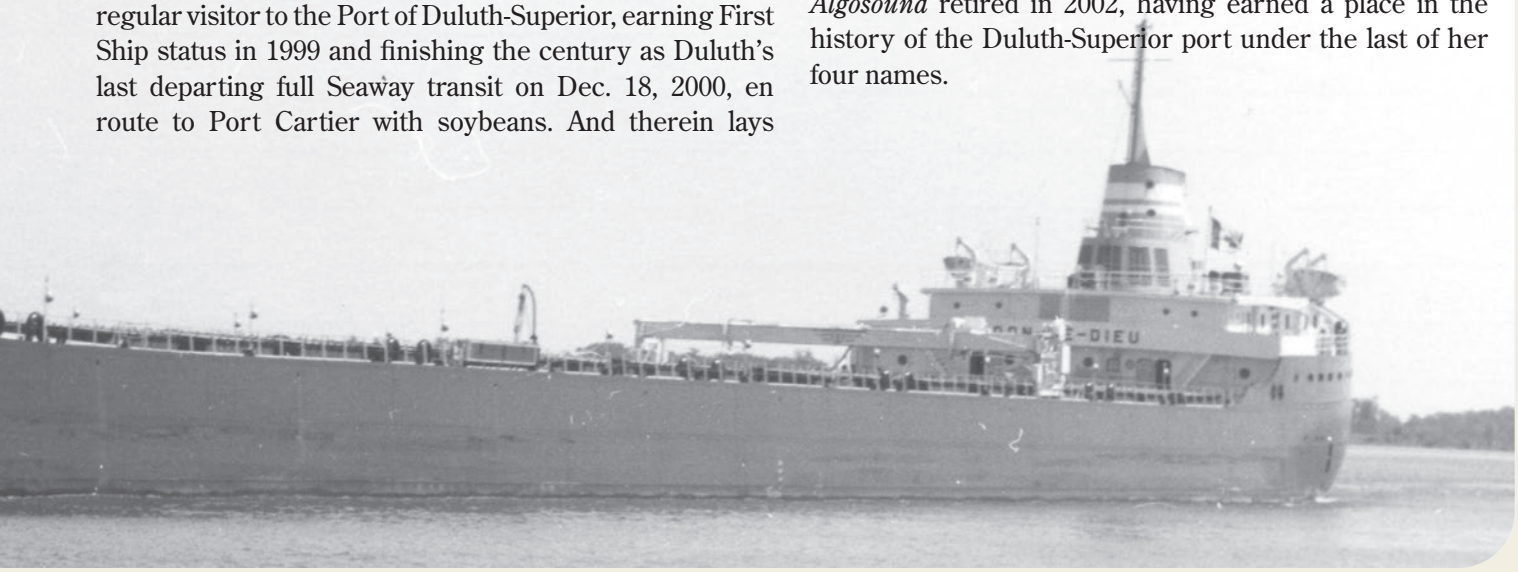
The *V.W. Scully* dressed as the *Edmund Fitzgerald* for a film role in the late 1970s.

ship's more superstitious crewmembers expressed discomfort with sailing under the lost laker's name. Soon, however, the *Scully* recovered her previous name and the familiar Algoma Central look.

What's in a name?

Algoma Central renamed the *Scully* in 1987, retaining the "S" in her new moniker: *Algosound*. She remained a regular visitor to the Port of Duluth-Superior, earning First Ship status in 1999 and finishing the century as Duluth's last departing full Seaway transit on Dec. 18, 2000, en route to Port Cartier with soybeans. And therein lays the subtlety of her saltie status. Though not a true ocean vessel, she sailed the entire Seaway, past the easternmost Seaway lock, to where the St. Lawrence River mixes with the Gulf of St. Lawrence, the Labrador Sea and the Atlantic Ocean. By record-keeping standards, that makes her the century's last saltie, and the answer to our reader's inquiry.

According to Algoma Central's Rebecca Gauvin, *Algosound* retired in 2002, having earned a place in the history of the Duluth-Superior port under the last of her four names.



Historical Collections of the Great Lakes, Bowling Green State University

Neighborly relations

BY DREW COMBS
EXECUTIVE DIRECTOR, NORTH DAKOTA TRADE OFFICE

Nothing has fascinated me more than big water. As a kid, I enjoyed many summers on the Gulf Coast, watching in fascination as ships moved in and out of the ports. Many hours were spent daydreaming of exotic destinations and guessing where the ships were coming from or going. One of my favorite memories was meeting the crew of a Dole Food Company ship, who entertained me with a few minutes of sea tales and hooked me for life. That was about the time I knew I would build my life either on or near the water.

Forest Gump reminded us all that "Life is like a box of chocolates, you never know what you are going to get," and I am proud to say that life has allowed me to sample a relatively big box of chocolates. I am truly blessed to have circled the globe dozens of times. I have lived and worked in some amazing places and stood witness to the best and worst of humanity. For the most part, I kept true to my sentiment of staying close to the water. I even lived and sailed on her from time to time.

One of the interesting things about North Dakota is that it plays host to the geographic center of North America. There is some debate about where it is exactly, but the one thing everyone seems to agree upon is that it is somewhere in the vicinity of my current location (Bismarck, N.D.). I am no scientist, however, it is not a great leap to conclude, I could not be further away from Neptune's domain if I tried. When I tell friends I live in North Dakota, I am often asked, after the inevitable "freezing to death" comments, "What about your water thing?" My default answer has always been, "It's perfect, 2,000 miles in any direction, and I can hit some big water." Many of you will immediately see the error in this statement, as I can drive to our neighboring state, as I frequently do, and hit America's furthest inland seaport, the Port of Duluth-Superior.

You might be wondering how this card-carrying Navy League "salty dog" (and yes, I completely understand that the Great Lakes are not saltwater) ended up in the dead center of the continent. The answer is easy: opportunities. North Dakota is booming! As director of the North Dakota Trade Office (NDTO), my favorite activity is showcasing North Dakota and all it has to offer in the way of industry, commerce and plenty of room to grow. It's an easy sell, with world-class agriculture, a thriving energy industry, and a burgeoning agriculture and unmanned aerial systems (UAS) tech corridor.

For agriculture, North Dakota is home to nearly 40 million acres dedicated to the production of agricultural products. It leads the nation in several commodities, including dry edible beans, navy beans, pinto beans, flaxseed, canola, dry edible peas, spring wheat, durum wheat, oats and honey. The state ranks second in lentils, black beans, cranberry beans, and sunflowers; third in barley and sugar beets; and fifth in potatoes. We are also in the top 10 for several types of livestock, including beef cattle and bison. The NDTO, being the chief international trade organization for the state, is consistently fielding

inquiries and promoting our agriculture products and the inevitable dilemma of how to get those products from the center of North America to customers abroad. This is where the Port of Duluth-Superior enters the story.

Let's look at durum wheat for an example. North Dakota is the leading durum producer in the United States, and the North Dakota Wheat Commission reports that 36 percent of the state's exported durum is transported through the Great Lakes-St. Lawrence Seaway System, destined for customers in North Africa and Europe. As with all commodities, rails and roads can only get you so far, making the Port of Duluth-Superior a viable logistics option for many of North Dakota's exports.

Over the past year, the NDTO has been in constant communication with partners worldwide, discussing their issues in dealing with the pandemic situation. Many of those partners are from regions that do not have the blessing of living in areas of agricultural plenty. While we have our own concerns, we tend to forget that food security is the No. 1 priority for many nations. These countries do not have the capabilities to feed their citizens in the best of times, let alone when their regular supply of agricultural products is disrupted. Logistically, the port plays a key role in these types of transactions, as many of these countries are in regions that could be supplied by sea and seaports like Duluth-Superior. Overall, these ports play key roles in the supply chain.

Another way we connect with the Port of Duluth-Superior is in the renewable energy arena, in the form of wind turbines, which continue to play an ever-increasing role in North Dakota's "all-the-above" energy policy. According to the Great Plains Energy Corridor, "North Dakota has more than 3,000 MW of wind energy capacity installed throughout the state, consisting of more than 1,500 wind turbines. North Dakota's wind resource is ranked sixth in the country, and the state ranks 11th for installed wind capacity, getting more than 20 percent of its power from wind resources." Along with our equally windy neighboring states, North Dakota imports and, in recent years, exports components through the Port of Duluth-Superior. This movement plays a vital role in the energy industry throughout the Upper Midwest.

Turbine components and agriculture products are just a few examples of what is coming and going through the port from the Dakotas. We consider the Port of Duluth-Superior our port as well, because it plays an essential role in the economic success of the region. The Dakotas are proud of having the port as a resource and look forward to expanding our usage of the port facilities.

On a personal note, I would also like to thank the countless people who directly and indirectly support the movement of freight through the Great Lakes system. They work hard, and I don't think they get the credit they deserve. We need you. The world needs you! Keep on doing your thing!

Drew Combs,
North Dakota Trade Office

Tools of the Trade
Spike Maul

With four miles of Port Authority-operated railroad track on Rice's Point in Duluth, there's plenty of use for a spike maul. It's an oft-used tool in the North Shore Track Services arsenal, one that sometimes provides a humorous challenge for rookie track maintenance workers. We asked Dean Torgersen and Bjorn Ojard of North Shore Track for their spike maul insights and tool highlights.

Dean Torgersen

North Star Port: Spike mauls have been in existence for a long time, but have there been any important changes to the tool through the years?
North Shore Track: We've seen nominal improvements in hardened steel metallurgy and attempts at improving the hickory handle with anti-vibratory or fiberglass materials, but frankly, these have been a limited success. The tool, while still important for routine maintenance work and initial spike-setting in production, has been largely replaced in larger jobs with hydraulic or pneumatic jack hammers or on-track spiking machines to improve efficiency and safety in track production.

North Star Port: Describe an average day's use of the spike maul along Rice's Point.
North Shore Track: The spike maul's primary job is setting spikes in tie plates to act as the connection between the rail and the tie. It's also used in a variety of other ways as a striking tool, like a typical sledge hammer might be used, since it's usually available on the job site. The longer nose on a spike maul compared to a sledge hammer is beneficial in clearing the hammer's handle over the rail, offering a superior angle for vertically driving the spike into the tie. This also requires substantial skill to perform rapidly and accurately, due to the small cross section and the laborer's view of the driven spike being obstructed by the rail. The ability of a track worker to "windmill" a maul in driving a spike down in continuous, unbroken hammer swings is a sign of an experienced maul operator and is generally achieved only by many hours of continuous practice, broken hammer handles and teeth-jarring misstrikes.

North Star Port: How long does a spike maul last?
North Shore Track: Maul heads can last several years with proper maintenance, but wooden handles are routinely broken and replaced several times during a construction season. Handles normally break when there is a miss swing and the maul head misses the tie entirely. This results in the wooden handle striking the rail and breaking.

North Star Port: What's your most memorable story with a spike maul?
North Shore Track: Initiating a new track worker into the proper use of a spike maul and the required technique generally leads to much amusement of the experienced track crew while the new worker swings, misses, swings, stumbles, swings, then delivers a glancing blow to the spike, causing it to ricochet off the tie and launch unpredictably like shrapnel at the onlookers. Eventually, when the new worker gets the general hang of striking the spike, they become overly confident in their ability and challenge a grizzled veteran to a driving contest in which they are quickly shown that there is much to be learned in spike-driving aside from being nominally adept at occasionally striking the spike with poor technique.

Alexander Eglinton Jr., 91, of Duluth, died June 19, 2020. Eglinton was born in 1929 and spent his childhood in Detroit, Mich. He entered the United States Navy at the age of 17 and was honorably discharged two years later. Eglinton spent several years as a carpenter before joining the federal government in his mid 30s as an estimator and data analyst—a career he continued until retirement. A member of the Duluth-Superior Maritime Club (nee Propeller Club), he enjoyed sailing on Lake Superior, Lake Michigan and in the Puget Sound. Other life interests shared with his wife, Betsy, included canoeing, skiing, long-distance biking and traveling. He is survived by his children, stepchildren, grandchildren and extended family in Minnesota and Michigan.

Troy Johnson, 92, a Superior, Wis., businessman who founded Reuben Johnson & Son and formerly headed Fraser Shipyards and Northern Engineering, died Dec. 29, 2020. Johnson graduated from Superior Central High School in 1947 and at the age of 17 spent the summer sailing the Great Lakes as a fireman on the *Rufus P. Raney*. In 1948, the family moved to Richland, Wash., where Johnson worked as an ironworker on the Hanford Project, the nuclear facility that produced plutonium for the first atomic bomb. In 1950, during the Korean Conflict, he was drafted into Company A, 114th Army Battalion of Combat Engineers. After his United States Army discharge, he joined his parents in Ohio, where he met his wife, Mary. They settled in Superior, and, in 1956, he started the construction company, naming it after his father. As the St. Lawrence Seaway opened and the Twin Ports housing market flourished, the company built many houses and duplexes. Reuben Johnson & Son later shifted to general contracting and began building churches, banks, grain elevators, commercial buildings and roads, completing more than 5,000 projects. In 1977, Johnson bought Fraser Shipyards and Northern Engineering, converting ships to self-unloaders and lengthening several vessels. Among numerous other business ventures, Johnson was a founder of Charter Films, a blown extrusion film producer in Superior, and he and his son, Murray, developed Exodus Global, a manufacturer and distributor for machinery in the scrap, recycling, demolition and construction industries. Until last year, he managed dozens of apartment units in Superior. Johnson is survived by three adult children, seven grandchildren, two siblings and many nieces and nephews.

Chris Mazzella

Corrosion of freshwater steel occurs beyond Lake Superior harbors

BY MARIE ZHUIKOV, WISCONSIN SEA GRANT

Owners of steel structures on inland lakes and a river in northern Minnesota are reporting the same kind of corrosion seen in the Duluth-Superior Harbor and other harbors along Lake Superior.

A structural engineering firm reported that it has designed and overseen replacement of corroded gates on dams along the St. Louis River, far removed from Lake Superior water.

Along with partners, Gene Clark, retired Wisconsin Sea Grant coastal engineer, devoted considerable energy into ferreting out the causes of and ways to mitigate this corrosion, which can lead to costly harbor infrastructure replacement.

Researchers funded in part by the Wisconsin and Minnesota Sea Grant programs identified microbes as the culprit, combined with a complicated interaction between water and the steel. Bacteria form small lumps, or tubercles, on the steel. The lumps limit oxygen and allow small amounts of copper in the water to interact with and dissolve the steel, which results in pockmarks and holes that compromise steel structures.

Experts blamed water chemistry specific to Lake Superior, however, those still tracking the issue have discovered this microbially influenced corrosion problem is more widespread.

Chad Scott, principal at AMI Consulting Engineers, initially alerted harbor industries about the corrosion issue in 1998 when he was a diver inspecting structures in the Duluth-Superior Harbor. During the past few years, his company has worked with the U.S. Army Corps of Engineers to place steel samples (or coupons) in the St. Louis River at locations like the Thompson Dam, Scanlon, Cloquet and near Cotton.

"At every location along the river, the steel had the same tubercles on them," said Scott. "So, what that tells me is, what's coming to the harbor is coming down naturally from inland in Minnesota."

Scott said his firm designed and oversaw replacement of gates on the Fond du Lac Dam and the Sappi Dam in Cloquet.

"They were all heavily pitted. It looked just like harbor corrosion," Scott said.

He's also had friends report biocorrosion on docks at Fish Lake, Island Lake and Grand Lake. He's seen firsthand the dock posts covered by corrosive tubercles on those lakes.

Randall Hicks, professor emeritus at the University of Minnesota Duluth, has worked for years to understand the microbiology behind the corrosion. He's witnessed the tubercles on his own dock on Barrs Lake near Two Harbors, Minn. He also identified them in photos from a dock on Wilson Lake near Cotton.

"I don't think it's just a regional problem," Hicks said. "I think it's been happening for a long time in places where conditions are right."

Those conditions include the presence of sulfate-reducing bacteria and iron-oxidizing bacteria, a source of dissolved sulfate and iron, and low-oxygen conditions such as those sometimes found in spring water.

Hicks described how the process begins when a clean sheet of steel is placed in water.

"Different bacteria will attach to the surface and form a biofilm first," he said.

Dental plaque is a common example of a biofilm. Micro-organisms multiply and create a thin but tight layer on teeth. In this case, the biofilm layer is on steel.

Marie Zhuikov

"As that biofilm grows, we see a lot of iron-oxidizing bacteria–they're aerobic microorganisms," Hicks said.

As the iron-oxidizing bacteria next to the steel surface consume oxygen, sulfate-reducing bacteria (bacteria that can live without oxygen) become common.

"It's really their activities in combination with activities of the iron-oxidizers in the biofilm that accelerate the loss of steel from the surface of the metal," said Hicks.

Jim Sharrow, retired director of planning and resiliency with the Duluth Seaway Port Authority, said the corrosion bacteria are not an invasive species, rather "they're indigenous to this area. They're all over."

Previous research identified coatings that can be used to protect steel. Hicks is now working on ways to fool the bacteria in the first place. Hicks and Mikael Elias, associate professor from the University of Minnesota, have found that adding a lactonase enzyme into a steel coating can reduce the biofilm produced, change the biofilm community and reduce the amount of corrosion. The

lactonase enzyme works by destroying signaling molecules that the bacteria on steel produce to sense each other – in essence, fooling the bacteria into thinking they are alone, so "they don't turn on genes to produce a biofilm," Hicks said.

The nontoxic coating enzymes only last a month or two before degrading or diffusing out of the coating, but Hicks said, compared to untreated steel, the enzymes have reduced corrosion by 50 percent for at least two years, which was the length of their study.

"Hopefully, these enzymes can have an impact even farther out," he added. "If you're in the shipping business and you expect a steel structure to last 100 years, then all of a sudden you have to replace it every 50 years because of the corrosion, that's a big economic impact–and that's just with doubling the corrosion rate. If we can reduce the rate, we don't need to have a big impact to really extend the lifetime of structures quite a ways down the road."

The University of Minnesota applied for a patent for the lactonase enzyme coating. Hicks and Elias also conducted tests in Lake Minnetonka and the Mississippi River to see if the same mechanism in the enzymes that inhibits biofilms from forming on steel inhibits invasive and nuisance organisms like zebra mussels and barnacles from attaching to underwater structures.

Elias said their experiments, funded by the Minnesota Environment and Natural Resources Trust Fund, were successful. More recently, they added sites in sea water. Their pilot experiments in Florida show promise.

Until the lactonase enzyme coating becomes commercially available, what should cabin dock owners do to protect their steel from biocorrosion? Sharrow suggests paint, adding, "You need to keep the water from touching the steel. You can use epoxy, but if you take your dock out every fall, you could probably use Rustoleum or something like that."

Beyond docks, enzyme technology might also work on farm crops and in people. Elias said he is testing whether a lactonase enzyme spray can protect corn from a common bacterial infection. Cystic fibrosis patients are prone to bacterial pneumonia, which forms in a biofilm.

Elias said, "One of our goals is to potentially use this enzyme as an aerosol to prevent biofilms in the lungs. It appears from our experiments that everywhere microbes are creating some sort of nuisance, this enzyme, because it changes the behavior of bacteria, can be helpful."

"This all grew out of those initial corrosion studies funded by Sea Grant and the work we did with Gene Clark and the other people in the corrosion study group," Hicks said.

New websites launch into cyberspace

A quartet of new maritime websites debuted in December 2020, each connected to various Lake Superior water interests.

DuluthPort.com

The primary source of news and views from the Port of Duluth-Superior and beyond, the new Duluth Seaway Port Authority website launched Dec. 22. Design and development agency: Giant Voices.

StLouisRiverQuest.org

After years on the Minnesota Sea Grant server, a completely rebuilt St. Louis River Quest website launched on its own platform with a modernized logo and trove of resources for the annual educational event. Design and development agency: The Cultural North.

PaddleSafeTwinPorts.org

A collaborative effort of the Harbor Technical Advisory Committee Navigation Subcommittee led by U.S. Coast Guard Commander Frances Smith, this new website launched as the go-to source for real time paddling/recreational water activity conditions in the Twin Ports. It includes weather and wave forecasts, shipping traffic updates and more. Design and development: Minnesota Sea Grant.

SeaGrant.UMN.edu

Last but not least, Minnesota Sea Grant itself launched a new website on the University of Minnesota servers. It's a fantastic source of information on Sea Grant's efforts to enhance the practical use and conservation of Great Lakes resources to help create sustainable communities, environments and economies.

Great Lakes ship tests semi-autonomous sailing technology

An occasional visitor to the Port of Duluth-Superior, the 636-foot M/V *American Courage* made news recently for becoming the largest ship ever to perform automatic dock-to-dock operation, according to *Marine Log*.

Built in 1979, the American Steamship Company vessel gained this new capability after being retrofitted with Wärtsilä SmartMove technology, which it began testing in March 2020. The trial was deemed successful after a season on the Great Lakes, including a noteworthy mid-January visit to Duluth during which her fleetmate, *Sam Laud*, shared a partial load of iron ore pellets with her while the vessels sat abreast at the CN Duluth Ore Dock.

The Wärtsilä SmartMove system provides semi-autonomous sailing features with advanced sensors and ship controls. These tools can automate certain repetitive sailing and docking tasks, freeing ship captains and crew to focus on other aspects of the operation. The primary benefits are efficiency gains and reductions in ship operating costs.

David Schauer

Carlson retires from CHS Superior grain terminal

In 1978, at the dizzying height of the federal Food for Peace program, the Port of Duluth-Superior set a single-season grain tonnage record that still stands: 10,171,188. Not unrelated, the season was also Dick (Richard) Carlson's first at the Farmers Union GTA grain terminal in Superior, Wis.

A third-generation grain man in the port, Carlson had a choice of job offers in May 1978 amidst the port's grain boom and concurrent hiring spree. The Superior native, then 18 years old, picked Farmers Union GTA–the largest waterside grain terminal in North America. Beginning as a union laborer, he shifted to company employment after 13 years and remained there until his retirement in Dec. 2020.

"My dad worked in the port at the Great Northern grain elevator, which was ADM at the time and is now General Mills, next to Midwest Energy. My grandfather, his dad, worked there from the 1930s on. My uncle also worked at CHS, which was then Farmers Union GTA," explained Carlson.

Dick Carlson

Eventually ascending to the facility manager role, Carlson spent more than 42 years at the CHS Superior terminal, which connects wheat, canola and flax growers to destination markets in Europe and North Africa.

Succeeding Carlson as CHS Superior terminal manager is Daniel Vandenhouten, who valued Carlson's focus on safety, efficiency and building relationships.

"I'm a better manager today because I worked with Dick, first as a trainee and then as part of his management team," said Vandenhouten. "Dick's experience and connections throughout the Twin Ports will be missed by many."

Terry White

The vessel *Solina* loads grain at the CHS Superior terminal in 2017. Dick Carlson retired from the CHS Superior terminal in December 2020 after more than four decades of service.

IN FOCUS: Kent Rengo

Our In Focus series profiles the photographers whose images bring the port's working waterfront to life.


Kent Rengo

How did you first get into photography, specifically the shipping scene?

I started getting serious about taking photos around 1986, when I bought a Minolta 35mm point-and-shoot camera. My main focus was trains at that time, but other transportation subjects, such as planes and ships, were worthy of capturing. In the early days before I had a driver's license, friend and fellow photographer David Schauer would haul me around to favorite Twin Ports locations to photograph ships and trains.

Is photography your primary profession?

Photography is strictly a hobby. I am a locomotive engineer and have been in that profession for 25-plus years. Most of those years have been with the Canadian National Railway out of Superior, Wis.

What draws you to ships and working waterfront images?

The variety of ships we get into our region is a big draw. I find that I focus on the classic laker types mainly because they won't be around forever. Many photographers forget about the human element of the shipping industry. Working for the railroad, I work in all types of weather. Same for shipping. Capturing images of the people in adverse conditions can result in stunning images.

Do you have a personal connection to Lake Superior from growing up in the region?

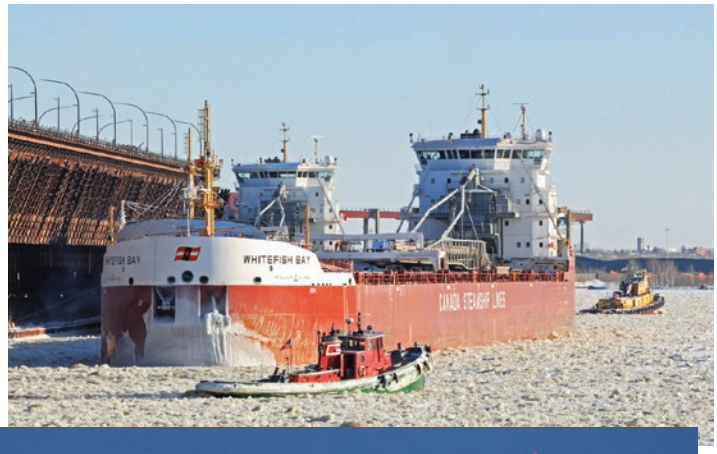
My late grandfather, Hilding Shogren, sailed on Lake Superior in his 20s. He was a deckhand on the SS *America*. Most who follow Great Lakes shipping history know of the *America*. On June 7, 1928, the *America* went aground in Washington Harbor at Isle Royale and sank. My grandfather was aboard that day when it went aground!

Do you have other specialty focus areas, as well?

Taking pictures of subjects after the sun goes down. Digital photography has helped me take the guesswork out of photography after dark. I was extremely satisfied with capturing images of Comet Neowise, which was visible after sunset this past year.

Are most of your shots planned or spontaneous?

Many are spontaneous. With public access getting more restricted around the port in recent years, you have to get creative for planned shots. I try to capture images of subjects in lesser-known public locations. Sometimes the results can be surprising.



Photos by Kent Rengo

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