The Economic Value of the Cruise Industry to the Duluth-Superior Metropolitan Statistical Area

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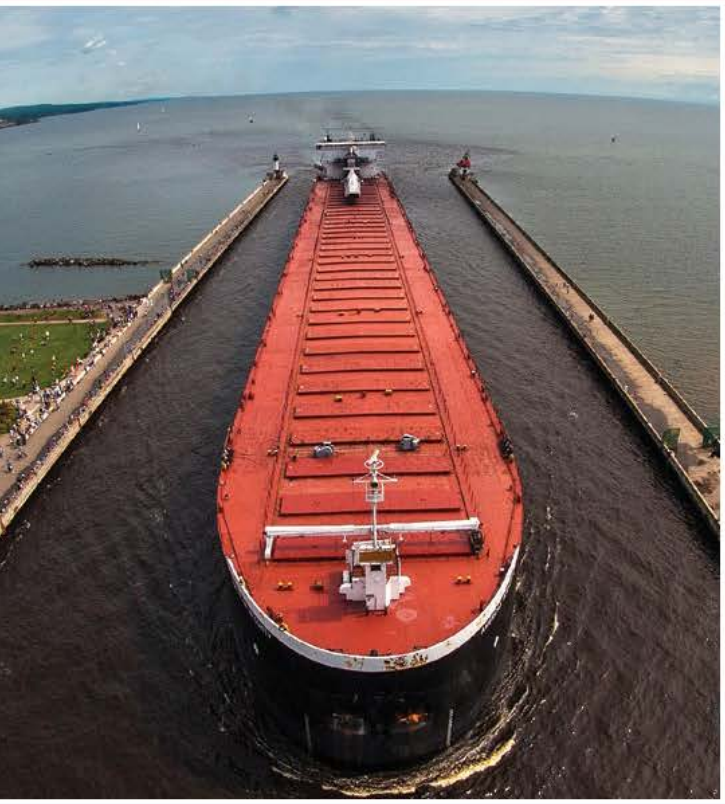



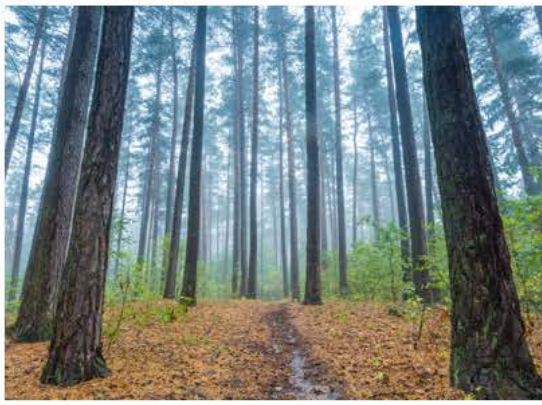

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UMD University of Minnesota Duluth
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Research Team

UMD Labovitz School of Business and Economics
Bureau of Business and Economic Research
Monica Haynes, Director
Gina Chiodi Grensing, Editor/Writer
Nathan Brand, Undergraduate Research Assistant
Haakan Thorsgard, Undergraduate Research Assistant
Ben Palmquist, Undergraduate Research Assistant
Daniel Ye, Undergraduate Research Assistant
Bureau of Business and Economic Research
11 East Superior Street, Suite 210
Duluth, MN 55802
(218) 726-7895
z.umn.edu/bber

Project Contact
John Downing
Director of Minnesota Sea Grant
University of Minnesota Duluth
31 West College Street
Duluth, MN 55812
218-726-8715
downing@d.umn.edu

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Table of Contents

Table of Figures

Table of Tables

Executive Summary

In the past, the Port of Duluth-Superior, located at the westernmost tip of the Great Lakes, has hosted a handful of cruise ships but always with the use of a temporary U.S. Customs and Border Protection facility. However, increased interest in cruising on Lake Superior has caused some cruise lines to consider adding Duluth as a regular port of call on some of its cruise offerings. This would require the Port of Duluth-Superior to construct a dedicated U.S. Customs and Border Protection preclearance facility and cruise terminal.

Through this study, the Bureau of Business and Economic Research (BBER) estimates the direct benefits to the city of Duluth and the surrounding region from the development of a cruise industry using data from similar studies on the cruise industry nationwide as well as from interviews with subject matter experts and online research. The direct economic benefits are also used to model the economic impacts—direct, indirect, and induced—of the cruise industry on other supporting local industries.

The results of this study will help the Duluth Seaway Port Authority, and the City of Duluth make an informed decision on the potential economic impacts of the cruise industry on the city.

Subject matter experts highlighted many of Duluth's unique characteristics (mid-sized city, remote destination, small vessels, northern climate, and emerging destination) that make it both desirable and challenging as a cruise destination. Many local subject matter experts also mentioned their hope that, eventually, Duluth may achieve that distinction of being a home port.

Although this paper was prepared during the COVID-19 pandemic, which has presented an enormous negative influence on the tourism sector, especially the cruising industry, trends documented in the literature and among other Great Lakes ports point to increasing cruise travel and describe the potential for additional ports of call among the Great Lakes.

For example, in their 2018 study, Bermello Ajamil & Partners note that, between 2009 and 2018, the cruising industry of Ontario's Great Lakes ports grew by roughly 5% annually, from 6,452 to just over 10,000 passengers during the ten-year period. Similarly, Parran (2020) predicts that the Great Lakes cruise industry has the "potential to grow to roughly 180,000 passengers served a year by 2028."

The direct economic benefits that Duluth could see from the introduction of cruise ships include passenger, crew, and cruise ship expenditures. Passengers' and crew members' expenditures most commonly include tours, food and beverage, and souvenirs, whereas cruise ship expenditures include items such as fuel costs, port dues, port agency fees, pilotage, and other related items (Gouveia and Eusebio 2019).

Using information from the interviews, literature, and surveys, the BBER identified 13 ports with similarities to Duluth. Nine of the cities included are located on the Great Lakes St. Lawrence Seaway, and the remaining four are located in one of the other geographic areas of focus included in the study (e.g. River cruising, Pacific Northwest/Canada, Baltic Sea).

On average, for the thirteen ports included in this sample, passengers spent $111 during their visit, while crew members spent $49. The average spending per passenger at a home port was estimated to be $188. In addition, cruise ships are expected to spend roughly $19,000 per call on items such as dockage, wharfage, line handlers, pilotage, and shipping agency services as well as $70 per passenger on a guided excursion.

Using the information gathered on the other ports

similar to Duluth, the research team developed three scenarios that reflect the range of potential benefits for Duluth as a cruise destination in the coming years. They are:

- Early Adoption (Scenario 1)
- Expanding Interest (Scenario 2)
- Premier Destination (Scenario 3)

Scenario 1, Early Adoption, assumes a small number of cruise calls (n=7) per year. Scenario 2, Expanding Interest, assumes that Duluth could see somewhere between 10 and 20 cruise calls annually, with an average of 15 per year. Scenario 3, Premier Destination, assumes robust growth in Great Lakes cruising in the coming years and growing interest in Duluth as a destination. In Scenario 3, Duluth could see somewhere between 30 and 50 cruise calls annually, averaging 40 per year. This scenario would likely require significant investments in cruise tourism infrastructure in the Duluth harbor, as it would mean hosting two to three cruise ships each week throughout the summer months. Scenario 3 also assumes expanded interest in Duluth as a destination for Viking as well as the other Great Lakes cruise companies, such as Victory, Pearl Seas, Ponant, and Hapag-Lloyd.

Scenario 1, Early Adoption, provides the smallest direct benefits to the city and the port. In this Scenario, passenger, crew, and cruise ship spending could total roughly $677,000 per year from seven Viking cruise calls. These impacts, however, will be felt immediately when Viking begins its tours to Duluth. Direct benefits grow increasingly larger for each of the other scenarios. Scenario 2 could bring between $1.2 million and $3.0 million in direct benefits to the city, depending on whether the city serves as a port of call or a home port. Scenario 3 could bring between $3.1 million and $8.1 million in economic benefits, depending on its port status (home port versus port of call).

Economic impact analysis tracks an initial economic shock or activity (like the direct spending of cruise passengers and crew members) through multiple rounds of industry and consumer spending to show the multiplier or ripple effects through a local economy. The initial shock or activity is considered the direct effect, the resulting increase in industry spending is the indirect effect, and the resulting increase in consumer spending is the induced effect.

In terms of economic impacts, Scenario 1, which assumes seven cruise calls, 2,520 passengers, and 1,785 crew members per year, could create 12 additional jobs in the study area, through direct, indirect, and induced effects. Scenario 2A (port of call), which assumes 15 cruise calls, 4,125 passengers, and 2,400 crew members per year, could create about sixteen additional jobs in the study area. The most ambitious scenario could add roughly 61 jobs to the local economy.

Depending on Duluth's future growth in the cruise industry and whether the city serves as a port of call or home port, the study area of the Duluth-Superior metro area could see between $392 thousand and $2.3 million in additional labor income, between $630,000 and $5.2 million in additional value added to the economy, and between 12 and 61 new jobs. If the cruise industry were to expand to 40 cruise calls per year and Duluth serves as a home port, the cruise industry could add more than $10.9 million in additional output (or spending) to the Duluth-Superior metro area.

The Economic Value of the Cruise Industry to the Duluth-Superior Metropolitan Statistical Area

Chapter 1. Introduction

Great Lakes cruising has been steadily increasing in popularity in recent years, due to the relatively easy access and low costs of the Great Lakes as compared to other cruise destinations (Parran 2020). In the past, the Port of Duluth-Superior, located at the westernmost tip of Lake Superior, has hosted a handful of cruise ships but always with the use of a temporary U.S. Customs and Border Protection preclearance facility. However, increased interest in cruising on Lake Superior has caused some cruise lines to consider adding Duluth as a regular port of call[1] on some of its cruise offerings. This would require the City of Duluth to construct a dedicated U.S. Customs and Border Protection preclearance facility to process international cruise passengers disembarking in the city.

The purpose of this study is to estimate the direct benefits to the city of Duluth and the surrounding region from the development of a cruise industry using data from similar studies on the cruise industry nationwide as well as from interviews with subject matter experts and online research.

The results of this study will help the Duluth Seaway Port Authority and the City of Duluth make informed decisions about the potential economic impacts of the cruise industry on the city. This study will help inform decision makers as to whether the benefits outweigh the added costs.

Chapter 2, Background, includes a thorough literature review of relevant benefits-transfer studies, supplemented with feedback from local subject matter experts. The literature review includes studies specific to the Great Lakes region as well as research from far-reaching areas with similarities to Duluth. The purpose of the literature review is to help determine the principal variables driving economic benefits in places similar to Duluth, determine what those variables might be in current and future states for Duluth and the region, and calculate the direct benefits for the region if a cruise industry developed here.

The direct benefits that Duluth could see from the introduction of cruise ships are presented in Chapter 3 for three scenarios:

- Early Adoption (Scenario 1)
- Expanding Interest (Scenario 2)
- Premier Destination (Scenario 3)

Direct benefits are also used to model the economic impacts – direct, indirect, and induced – of the cruise industry on other supporting local industries. Economic impact analysis tracks an initial economic shock or activity (like the direct spending of cruise passengers and crew members) through multiple rounds of industry and consumer spending to show the multiplier or ripple effects through a local economy.

[1] For a complete list of terms and definitions used in this report, see Appendix A.

Chapter 2. Background

According to Statista, a market and consumer data company, the global cruise industry generated roughly 37.8 billion (USD) in revenue in 2017, with worldwide revenue projected to reach $57 billion by 2027 (Statista 2020). Similarly, the number of ocean cruise passengers worldwide has risen steadily since 2009, peaking at 29.7 million in 2019 (Statista 2021). While Caribbean and Mediterranean destinations hold the largest share of the market (with 32% and 17% respectively of total market share in 2019) (Statista 2021), new travel destinations and a wider range of experiences have opened up new markets across the globe.

One of these new markets is the Great Lakes region, which includes lakes Superior, Michigan, Huron, Erie, and Ontario. These five lakes, which together contain 21% of the world's surface fresh water, are located on the Canadian-U.S. border and connect to the Atlantic Ocean via the Saint Lawrence River (Wikipedia 2021).

Although this paper was prepared during the 2020-2021 COVID-19 pandemic, which has presented an enormous burden on the tourism sector, especially the cruising industry, trends documented in the literature and from other Great Lakes ports point to increasing cruise travel and describe the potential for additional ports of call among the Great Lakes.

For example, according to the Great Lakes Seaway Partnership, Great Lakes cruising has experienced a renaissance in recent years, with new ships added annually and a growing number of passengers sailing the waters every year (Great Lakes Seaway Partnership 2019). Ports of call, too, have been added and expanded.

In their 2018 study, Bermello Ajamil & Partners (B&A) note that, between 2009 and 2018, the cruising industry of Ontario's Great Lakes ports grew by roughly 5% annually. Similarly, Parran (2020) predicts that the Great Lakes cruise industry has the "potential to grow to roughly 180,000 passengers served a year by 2028."

In the past, the Duluth Seaway Port Authority has hosted a handful of cruise ships but always with the use of a temporary U.S. Customs and Border Protection facility. However, increased interest in cruising on Lake Superior has caused some cruise lines to consider adding Duluth as a regular port of call on some of its cruise offerings. This would require the City of Duluth to construct a dedicated U.S. Customs and Border Protection clearance facility and cruise terminal.

> "Great Lakes cruising has experienced a renaissance in recent years, with new ships added annually and a growing number of passengers sailing the waters every year."
>
> (Great Lakes Seaway Partnership, 2019)

In order to estimate the potential economic benefits of making Duluth a regular port of call, the Bureau of Business and Economic Research (BBER) conducted interviews with a number of subject matter experts to better understand what the passenger cruise industry may look like in Duluth in the near future as well as long-term. The entities and their representatives who were interviewed are noted below, followed by summaries of the key findings from those interviews.

In addition, the BBER conducted a thorough review of literature related to the economic benefits of the pleasure cruise industry. The purpose of the literature review was to help determine the principal variables driving economic benefits in places similar to Duluth, determine those variables in current and future states for Duluth and the region, and calculate the direct benefits for the region if a cruise industry developed in

Duluth. The main themes from the literature review are summarized in the second section of this chapter.

Finally, the BBER surveyed other Great Lakes ports to better understand what is typical for them in terms of cruise calls, passengers, and spending in a given year.

Subject Matter Experts

The BBER made inquiries to numerous entities regarding their experience with the cruising industry. Interviews with subject matter experts focused on the potential benefits and costs for Duluth of becoming a port of call, the characteristics that make Duluth a unique cruise destination, and the short- and long-term outlook for the city as it relates to the pleasure cruise industry. The entities and their representatives are noted below, followed by a summary of the key results from the interviews with these experts.

City of Duluth
: Chad Ronchetti, Economic Developer (as of 2/21 Director of Project Planning and Development at Kraus-Anderson)

City of Milwaukee
: Jazmine Jurkiewicz, Trade Development Representative

Duluth Entertainment Convention Center
: Roger Reinert, Interim Executive Director

Duluth Airport Authority
: Tom Werner, Executive Director

Duluth Seaway Port Authority
: Kate Ferguson, Director of Trade and Business Development

Muskegon Michigan Lakeshore Chamber
: Cindy Larsen, President

Tourism Thunder Bay
: Paul Anthony Pepe, Manager

University of Wisconsin Superior
: Dr. Richard Stewart, Professor of Transportation and Logistics (T&L) Management and Director of the T &L Research Center

Viking Cruises
: Matt Grimes, Vice President, Maritime Operations

Visit Duluth
: Anna Tanski, President/CEO

Interviews with subject matter experts focused on the potential benefits and costs for Duluth of becoming a port of call, the characteristics that make Duluth a unique cruise destination, and the short- and long-term outlook for the city as it relates to the pleasure cruise industry.

Characteristics of Duluth

Duluth has numerous characteristics that make it a desirable destination for cruise ships and visitors. Throughout their interviews, subject matter experts noted six characteristics that were particularly important in terms of Duluth's potential as a cruise destination. These characteristics are:

- Great Lakes location
- small-vessel cruise ships
- size and tourism infrastructure
- out-of-the-way location
- northern climate
- emerging cruise destination

Any Great Lakes port is limited to small vessel cruising due to the maximum dimensions of the Great Lakes locks. Generally speaking, there are four categories of vessels that are capable of offering multiday cruises within the Great Lakes region: small ships, expedition ships, yachts, and sailing ships (B&A 2018). According to Kate Ferguson, Director of Trade and Business Development at the Duluth Seaway Port Authority, "The ships that would be docking in Duluth have a maximum capacity of roughly 450 passengers."

According to Anna Tanski, President and CEO of Visit Duluth, "Small vessel cruising is gaining in popularity for a lot of tourists. These types of cruises are more intimate, luxury, high-end cruising that are focused on experiential travel. As the baby boom contingent has been moving into retirement, a surge in the popularity of experiential travel has been created."

Duluth's size (population 86,000) and tourism infrastructure would make it a very appealing destination for small vessel tourism. Duluth has the infrastructure to accommodate a large number of visitors–the city's waterfront is attractive and functional for cruise lines, offers walkability for guests adjacent to the dock facilities, and is highly visible to the community.

According to Paul Pepe, Manager at Tourism Thunder Bay, Duluth "offers the advantages of being an urban hub to the region's many outdoor attractions. It boasts both state and national parks, waterfalls, and scenic vistas as well as urban attractions like the Great Lakes Aquarium; notable museums like the Depot, the Lake Superior Marine museum and the Glensheen mansion; and a large variety of shopping venues."

The city is also home to the Duluth International Airport, Sky Harbor Airport and Seaplane Base (adjacent to the Duluth-Superior Harbor) and is only a two-and-a-half-hour drive to an international air gateway (Minneapolis-St. Paul). Tom Werner, Executive Director of the Duluth Airport Authority, the entity that operates the Duluth International Airport, has long been interested in the Great Lakes cruising industry.

"Duluth has a lot of natural assets that lend themselves to synergies of aviation and cruising," said Werner. For example, U.S. Customs and Border Protection services are available 24-7 at the Duluth International Airport. "That provides a competitive advantage over other locations; not many airports in the U.S. have this distinction." All of these traits could help position Duluth as a home port (also commonly referred to as a port of embarkation/disembarkation or turnaround port).

But while Ferguson of the Duluth Seaway Port Authority said that, "the number of passengers [on a cruise ship] doesn't seem daunting given the city's experience hosting large events," she cautioned that having a ship docked right in downtown during an already busy festival weekend (e.g. Grandma's Marathon, Tall Ships Festival) could bring concerns. Most of these concerns could likely be avoided through careful scheduling to ensure ship visits happened mid-week or on less busy weekends.

> "Now we're the new and fresh itinerary. People are demanding a unique experience, and Lake Superior is a completely different cruising opportunity."
>
> — Anna Tanski

Of course, Duluth's remote location poses some potential challenges when it comes to attracting cruise lines and passengers. As Ferguson noted, "all vessels pass by Cleveland as they enter the Great Lakes, but vessels don't just pass by Duluth."

"While the four lower lakes have benefited from Great Lakes cruising because of their close proximity to each other—Cleveland [Erie], Muskegon [Michigan], Bay City [Michigan], Milwaukee, Chicago, Green Bay, Traverse City [Michigan], Makinaw City [Michigan], and Toronto —Lake Superior is the furthest west tip," stated Tanski. "The Soo Locks are cool, but then it's a really long journey."

Refueling is also of concern said Dr. Richard Stewart, Professor of Transportation and Logistics (T&L) Management and Director of the T &L Research Center at the University of Wisconsin Superior. "There is only one spot on the U.S. side of the border on Lake Superior where ships can get fuel—Duluth." This could be a double-edged sword, either bringing ships here to get fuel or deterring them since it's such a distance to refuel.

While all of the Great Lakes have a short cruising season due to their northern location, Lake Superior's is even shorter. "The Great Lakes is a wonderful untapped market for cruising," said Stewart, "though it's typically only open from mid-May through the first of October"—before the storms. "And it would be mainly mid-June through mid-August on Lake Superior."

Finally, Duluth is a new, emerging destination for the cruise market. As Tanski of Visit Duluth put it, "Now we're the new and fresh itinerary. People are demanding a unique experience, and Lake Superior is a completely different cruising opportunity. That's what Viking is trying to capitalize on—expedition cruising. That's why the time is so right."

Matt Grimes, Vice President of Maritime Operations at Viking Cruises, shared a similar sentiment. According to Grimes, cruise ship consumers tend to be very loyal to their brand and are constantly "looking for new places to go—new destinations." For this reason, cruise operators are always looking for new itineraries to satisfy their customer base. As an example, Grimes cited the city of Aalborg, Denmark (population 211,000). In 2014, Viking added Aalborg to its cruise itinerary, beginning with 5 or 6 cruise calls per year. In 2020, the company booked 45 cruise calls to Aalborg's port. In July 2019, Port Aalborg introduced a new policy that limits the number of daily visiting cruise ships (calls) to one per day, in response to the increasing number of cruise vessels visiting the port (Cruise mapper website 2021).

Benefits and costs

Among subject matter experts, potential benefits typically fell into one of two categories: the economic benefits associated with increased tourism and the opportunity to enhance and promote the city's image.

Nearly every subject matter expert mentioned the economic benefits associated with introducing cruise ships into the Port of Duluth-Superior. Cindy Larsen, Muskegon Michigan Lakeshore Chamber President, listed numerous economic benefits that come from cruise passengers. "On the excursion side, passengers are spending money on museum tickets, tour buses, guide services, refreshments, and souvenirs; the ships often need supplies and maintenance; sometimes crew and passengers need healthcare; and crews enjoy the community in their free time."

> "Beyond economic benefits, there are the benefits of introducing new visitors to our community and hopefully encouraging them to return."
>
> — Anna Tanski

The city of Milwaukee, which recently introduced pleasure cruising, has experienced similar benefits. According to Jazmine Jurkiewicz, Trade Development Representative for the City of Milwaukee, the largest benefits from cruising are the "economic benefits to the city from the tourism dollars spent." She stated that while Milwaukee does not anticipate cruising to be a major revenue generator for the city via dockage and wharfage, city administration wants to support the city overall with the economic impact of bringing more tourism to the area. Jurkiewicz also noted that cruise guests are typically "affluent passengers looking for a luxurious experience, so they are eager to spend in order to enjoy their trip."

But beyond increased revenue from tourism and the cruise ships themselves, subject matter experts mentioned numerous benefits related to enhancing and promoting a city's image from the introduction of cruise lines. Roger Reinert, Interim Executive Director at the Duluth Entertainment Convention Center felt that the cruise ship industry would "add to Duluth's image and mystique. People come here to see ships."

Tanski from Visit Duluth put it this way, "Beyond economic benefits, there are the benefits of introducing new visitors to our community and hopefully encouraging them to return. We'd get affluent travelers, and Duluth's business leaders and city government could make social and business connections. Duluth would have opportunities to really impress individuals, and you never know where that could lead."

Larsen noted a similar benefit for Muskegon. She states that "a huge benefit is the international marketing done by the cruise ship companies themselves. Muskegon's history was deeply associated with manufacturing. That image overshadowed our 26 miles of freshwater beaches, our dunes and forested state parks, our world class art collection, Victorian architecture … everything. Cruise ships have helped to enhance our image."

According to Jurkiewicz, "cruising has been an effective tool to use in marketing the commercial port. When people hear about cruise ships visiting, they are typically surprised and want to learn more. Cruising has created a greater overall awareness of the port and its benefits that we offer to the region outside of tourism."

When asked about costs or concerns associated with cruising, responses were more varied and included costs associated with the infrastructure, the construction of the facility, concerns about COVID-19, the Jones

Act,[2] and more. For example, Pepe from Tourism Thunder Bay noted, "In a post COVID-19 recovery period, onboard health and safety and the arrival of international guests is a strong consideration to keep resident sentiment towards cruising positive."

However, in general, none of the subject matter experts felt that the potential costs or concerns were so large as to overwhelm the benefits previously mentioned.

Long-Term outlook

Jurkiewicz, the Trade Development Representative, noted the added benefits that Milwaukee has seen from its status as a home port. "As a turnaround port of call, meaning passengers end their cruise and disembark for home while new passengers arrive and begin their cruise, we see additional economic impact from the hotel stays, restaurant visits, and pre- or post- cruise packages that are offered through the cruise line."

Many local subject matter experts mentioned their hope that, eventually, Duluth may achieve the distinction of being a home port. "In the past, Duluth has had cruise ships visit for one-day scheduled stops," said Ferguson from the Duluth Seaway Port Authority. "Our hope is to become a disembarkation and embarkation facility. That has a much greater economic impact. A lot of the people will make repeat visits, not just on cruise ships. Then we're talking about hotel rooms, cars, and flights."

"As a turnaround port of call, we see additional economic impact from the hotel stays, restaurant visits, and pre- or post-cruise packages that are offered through the cruise line."

— Jazmine Jurkiewicz

"People would spend time here if we were a port of embarkation/disembarkation for cruises," stated Werner from the Duluth Airport Authority. "With this kind of a port, there are longer stays, more meals, and more discretionary money spent to keep people busy while they're here. There are many indirect benefits."

However, according to Grimes, from Viking, a home port should have direct flights to major coastal cities such as Los Angeles and New York. Cruise operators work on a four-year planning cycle for their itineraries and prefer to have the air service infrastructure in place before committing to a city as a home port. "We can put a ship there in the hopes that the airlines will react, but that does not always prove to be the case."

[2] The Jones Act prohibits any foreign flag ship from picking up passengers in one U.S. port and dropping them in another U.S. port. If using a foreign-built ship, the operator must call at a foreign port between U.S. ports. This is a significant issue because it can make planning cruise itineraries much more challenging.

Literature Review

The purpose of the literature review was to help determine the principal variables driving economic benefits in places similar to Duluth, determine those variables in current and future states for Duluth and the region, and calculate the direct benefits for the region if a cruise industry developed in Duluth.

As noted by the subject matter experts interviewed for this study, Duluth has a number of characteristics that make it desirable as a cruise destination. First, Duluth (population 86,000) has a fairly strong retail and dining scene, many cultural opportunities, and is considered the gateway to the remote wilderness of Northern Minnesota, making it an attractive destination for tourists. However, because Duluth is located at the westernmost tip of the Great Lakes, it would be an out-of-the-way cruise destination. Due to the size of the Soo locks, cruise ships entering the Port of Duluth-Superior would be exclusively small, luxury vessels. And given Duluth's extreme climate, it would have a very short window for a cruise season, with peak time most likely from mid-June through mid-August. Finally, while the immediate plan is for Duluth to be a port of call, there may be opportunities long-term to expand its designation to a home port.

Therefore, the research team attempted to identify economic benefits for ports with some similarities to Duluth: Great Lakes location, small vessel cruise ships, small- and mid-sized cities, remote destinations, northern climate, emerging cruise destinations.

As the Great Lakes is a relatively new addition to the passenger cruise industry and represents a small share of the industry overall, very little literature exists on Great Lakes cruising specifically. The BBER identified only a handful of papers that focused on Great Lakes cruising.

Two recent studies, Gouveia and Eusebio (2019) and Jaszberenyi and Miskolczi (2020), included very thorough literature reviews of cruise tourism and were, therefore, very helpful to the research team in understanding the research that currently exists on the topic of cruise tourism. The findings from the two studies supported the notion that little research currently exists on cruise tourism beyond the primary markets. Gouveia and Eusebio reviewed nearly 80 studies and concluded that while a large number of studies have been published that focused on the Caribbean and Mediterranean regions and, more recently, Asia, very little research has been carried out in other geographic regions. Similarly, Jaszberenyi and Miskolczi reviewed 55 articles and found that research on cruise tourism has focused primarily on ocean-going cruises.

Due to the general lack of research on Great Lakes and small vessel cruising, the research team expanded its search to include some additional geographic regions with similarities with Duluth. These include the Baltic Sea in northern Europe, Canadian and Alaskan ports, river cruise destinations, and emerging ports of call.

According to Gouveia and Eusebio's review of the literature, there are three categories of expenditures that determine direct economic benefits for a port of call. These include passenger expenses, crew member expenditures, and cruise company expenditures. Gouveia and Eusebio found that passengers' and crews' expenditures tended to fall into one of three categories—tours, food and beverage, and souvenirs—whereas cruise company expenditures tended to be much more broad and included items such as fuel costs, port dues, port agency fees, pilotage, water, garbage, stevedoring, towage, and other related items.

A list of key search terms used in identifying relevant literature is shown in Table 2-1, on the following page. For any given search, the research team used some combination of terms from the first column (key terms), along with keywords from one or both of the other two columns to broaden or narrow the results given.

Table 2-1. Search Terms Used in Literature Review

Key terms	*Alternate terms*	*Geographic terms*
cruise tourism	small vessel	Great Lakes
cruise industry	small ship	Baltic Sea
passenger cruise	economic benefits	Danube River
pleasure cruise	economic impacts	Alaska
cruising industry	river	Canada
	tourism	small cities
	economic	
	spending	

SOURCE: BBER

Using the method described above, the BBER identified roughly thirty reports or articles with some relevance to this study. These included mostly scholarly literature, some trade publications, and a handful of news articles. From that initial selection, the research team identified studies with measures of direct economic benefits for a port of call. These measures included ones that would allow the research team to calculate the average number of visitors a port sees in a given year (e.g. number of cruise calls, number of passengers per cruise, number of crew members per cruise), the total amount of spending per cruise call (e.g. passenger, crew, or ship spending totals), or total spending broken down by type of expenditure (e.g. passenger, crew, or ship spending patterns). Using this criteria, the team identified 14 studies that provided one or more of these measures. These studies are shown in Table 2-2 on the following page.

"There is robust growth potential for tourism in the Great Lakes and for the cruise industry in particular."

(Parren, 2020)

These 14 studies were the primary source of information used to determine economic benefits of pleasure cruising in current and future scenarios for Duluth and the region and to calculate the direct benefits for the region if a cruise industry developed in Duluth. The following section summarizes some of the key findings from these studies. In addition, a small number of studies that did not demonstrate measurable economic benefits for a port of call, but provided information that was particularly relevant to Great Lakes cruising or to emerging ports of call, are included. These are noted wherever relevant.

Great Lakes

As the Great Lakes is a relatively new addition to the passenger cruise industry and represents a small share of the industry overall, very little literature exists on Great Lakes cruising specifically. However, the BBER identified two studies with measures of direct economic benefits for ports within the Great Lakes (see Table 2-2) as well as a handful of other reports and news articles with helpful information on the current and future state of cruising in the Great Lakes region.

In his 2020 study, "Cruising the Great Lakes: A Report on the United States and Canadian Regulations for the Commercial Cruise Industry on the Great Lakes," Parran examined the regulatory hurdles and opportunities associated with expanding the cruise industry in the Great Lakes. While his study does not focus specifically on the economic benefits of cruising on the region, he concluded that there is "robust growth potential for tourism in the Great Lakes and for the cruise industry in particular." Parran notes that the Great Lakes cruise industry has the "potential to grow to roughly 180,000 passengers served a year by 2028."

Table 2-2. Literature with Demonstrated Direct Economic Benefits

Region	*Study*	*Location*	*Visitors Per Year*			*Spending Totals*			*Types of Expenditures*		
			Cruise calls	Passenger Counts	Crew Counts	Passenger Spending Totals	Crew Spending Totals	Ship Spending Totals	Passenger Spending Patterns	Crew Spending Patterns	Ship Spending Patterns
Great Lakes	Bermello Ajamil & Partners (2018)	Ontario	Yes	Yes		Yes	Yes				
	Business Research & Economic Advisors (2017)	Canada		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	The Great Lakes Seaway Partnership (2019)	Cleveland	Yes	Yes							
Pacific NW/ Canada	Scarfe (2011)	Victoria, B.C.		Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Federal Maritime Commission (2020)	Pacific NW	Yes	Yes					Yes		
	Van Blarcom, Kayahan, and Ross (2018)	Atlantic Canada				Yes					
Baltic Sea	Kowalczyk (2018)	Baltic Sea	Yes	Yes		Yes	Yes		Yes	Yes	
	Serry (2014)	Baltic Sea	Yes	Yes		Yes	Yes				
	Urbanyi-Popiolek (2019)	Baltic Sea	Yes	Yes							
Europe	Gouveia and Eusebio (2019)	Madeira, Portugal	Yes			Yes	Yes	Yes	Yes	Yes	Yes
	Torbianelli (2012)	Europe		Yes		Yes			Yes		
	CLIA Cruise Lines (2018)	Europe	Yes	Yes							
Danube River	Hristic, Stefanovic, and Milijic (2020)	Danube	Yes	Yes							
	Dragin, Jovicic, and Lukic (2010)	Danube		Yes							

SOURCE: BBER

According to Parran, the Great Lakes are increasing in popularity due to their easy access and lower costs associated when compared to other cruises. In his report, he identifies a number of European cruise lines—French luxury cruise line Ponant, German Hapag-Lloyd Cruises, and Viking cruise line among them—that were expected to enter the Great Lakes market in the 2019-2020 season.

In terms of economic benefits, the 2018 study "Great Lakes Cruise Strategy for Ontario's Ports" provides the most relevance to this research. The study was prepared for the town of Midland, Ontario, by B&A and was meant to help the Ontario ports develop a cruise strategy. The research describes the current status and future prospects of the cruise ship industry in Ontario, outlines a strategy to develop that industry, and details infrastructure improvements necessary to enact the strategy. Because the study includes detailed information on nearly every port in Ontario, including Duluth's neighbor to the north, Thunder Bay, this study is extremely helpful in determining what the short- and long-term outlook for cruising might look like in Duluth as well.

According to the authors, between 2009 and 2018, the cruising industry of Ontario's Great Lakes ports grew by roughly 5% annually, from 6,452 to just over 10,000 passengers during the ten-year period. This growth was due primarily to the deployment of the Hamburg (420 passenger), Pearl Mist (210), and Victory I (202) cruise vessels in 2014 and 2015. Thunder Bay was not anticipated to receive any cruise ship calls in 2018, but the report predicted that Thunder Bay would see three calls for a total passenger count of 606 in 2019 and that would increase to five calls and 1,049 passengers by 2028.

According to the study's projections, Ontario's ports could see a compound annual growth rate of between 3% and 7% over the next ten years (between 180,000 and 230,000 passengers, and 1,000 to 1,250 cruise calls annually by the year 2028), depending on the region's level of effort to the expansion of the cruise tourism industry.

Between 2009 and 2018, the cruising industry of Ontario's Great Lakes ports grew by roughly 5% annually, from 6,452 to just over 10,000 passengers during the ten-year period.

(Bermello Ajamil & Partners, 2018)

The authors' estimates are based on two alternate projection models. The first model assumes the development of the North American cruise market and focuses primarily on non-expedition cruising, while the second model builds on the North American focus but expands to increase the European adventure and exploration markets. "If cruise operators approach the market in a similar fashion as that of the [European] river cruise market—with substantial, annual small-ship deployments generating more sailings and passengers overall" the potential for growth in the Great Lakes could be substantial.

Despite predicting relatively modest growth for Thunder Bay in their analysis, the authors state that Thunder Bay could provide a substantial tourism product with a focus on active exploration, especially with the addition of new itinerary options along the North Shore of Minnesota, as well as along the Ontario coastline back to Sault Ste. Marie. "Providing for additional ports in this zone may provide for a greater opportunity to deploy more ships here, such as the Port of Grand Marais, Minnesota, or another port along the Ontario coastline." This suggests that Duluth's expansion to a permanent port of call could have the potential to benefit both ports significantly.

However, the study also states that "in theory, due to the limiting factors of the Great Lakes that no other

competing region has, it is possible that the region may lose new traffic prospects as brands choose to go elsewhere where there are less restrictions and more revenue opportunities."

Another study with clearly demonstrated economic benefits was conducted in 2017 by the Business Research & Economic Advisors (BREA). Their study is a comprehensive analysis of the economic impacts of cruising in Canadian provinces. While most of the study focused on large-vessel ocean cruises in British Columbia and Atlantic Canada, the report also examined economic benefits for ports in the St. Lawrence Seaway and some small ports in Newfoundland and Labrador that are visited primarily by smaller expedition cruise ships. The study's estimates for these ports are helpful in determining the appropriate range of spending by passengers and crew members at the port of Duluth.

The cruise calls numbers, passengers and crew member counts, and spending estimates varies widely depending on the port in question. For example, the smaller ports in the Canadian provinces of Newfoundland and Labrador saw roughly 20,000 passenger arrivals in 2016. Meanwhile, destinations that serve primarily as home ports had very high estimates of spending per passenger. For example, Montreal, with its 70,000 passenger arrivals, saw an average spending per passenger visit of $189. These high expenditure rates are primarily due to the lodging and dining expenditures generated by overnight stays.

A study by Van Blarcom, Kayahan, and Ross (2018), however, criticized the BREA's estimates of cruise passenger spending, stating that "economic impact estimates reported by the cruise lines suffer from a variety of theoretical and empirical problems." The authors found that "spending was significantly greater for mass market cruise visitors ($70.44) than visitors on premium lines ($60.02), luxury lines ($57.84) and European lines ($52.79)" and that the BREA's study overestimated the direct effects from cruise tourism due to an oversampling of mass market cruise visitors. The authors also caution that, when conducting any economic impact study, it should be assumed that 20 to 40% of passengers do not leave the ship during a stop-over and that expenses will depend greatly on the type of port function (home port versus port of call), market segment, and attractions at the port.

Pacific Northwest and Canada

Due to the general lack of research on Great Lakes and small vessel cruising, the BBER research team expanded its search to include some additional geographic regions with similarities with Duluth. These include ports in the Pacific Northwest and Canada, the Baltic Sea in northern Europe, and other cruise ports in Europe (with a special focus on river cruising). The literature is grouped by geography and described in order of relevance to this study. While there are some important caveats to mention about these locations in terms of their similarity to Duluth (especially the size of vessels that can travel to destinations on the coasts), much can be learned from the studies about these markets.

A comprehensive study conducted by Scarfe in 2011 examined the costs and benefits (economic and environmental) of cruise ship visits in the Pacific Northwest, including ports in British Columbia and Seattle. The study is particularly useful for this research as it includes detailed breakdowns of expenditures by passengers, crew, and cruise ships for Vancouver, Victoria, and "other BC ports." The study also provides spending comparisons for home ports versus ports of call.

According to the study's findings, port of call visits generate far less direct economic output than home-port visits, as spending on ship provisioning and accommodations generate about 8.5 times the economic output at home ports than at ports of call. The authors also caution that, in some cases, call visits are very short. For example, a high proportion of cruise calls at the Victoria port were less than six hours long.

Another recent study, conducted by the Federal Maritime Commission (2020), examined the economic impacts of COVID-19 on the cruise industry of the Pacific Northwest. While most of the study focuses on the

economic impacts from very large ocean-going cruise vessels, the report also provides some helpful information on small vessel cruising, which is of interest to our research. For example, the study states that, "small cruise ships, though not bringing in thousands of passengers on each ship, still bring in a sizeable number of cruise visitors to Alaska. The Alaska Visitor Statistics Report estimates that in 2016, 14,400 visitors traveled in Alaska on small ships of 250 people or less. Further, it is not uncommon for small ships to have their home port in Alaska."

The study also has detailed descriptions of a number of ports in the region, some of which appear to have some clear similarities to Duluth. For example, while the towns of Petersburg and Wrangell in Alaska are both much smaller communities than Duluth (populations of 3,100 and 2,369, respectively), both destinations are out of the way even by Alaska standards and can be reached only by small vessels. The study describes Petersburg as being "a quieter port than those that have large cruise ships." Petersburg is both a port of call and home port for cruise lines with smaller ships. The city has about 20,000 visitors each year and was supposed to have over 50 ship calls during 2020. Meanwhile, Wrangell typically sees between 13,000 and 17,000 cruise passengers each year and was supposed to have 46 ship calls in 2020. Lastly, Astoria, Oregon, frequently has small cruise ships visiting its port, which generally continue along the Columbia River, making stops at Oregon's other cruise ports at Cascade Locks, The Dalles, and Arlington. Some of these ports anticipated 16,000 to 17,000 cruise visitors in 2020.

The FMC study is also useful as it contains sample passenger spending patterns for some of the Alaskan ports included in the study, although unfortunately not for those described previously (Petersburg, Wrangell, and Columbia River ports).

Baltic Sea

While a much larger global market, the Baltic Sea does have some similarities to the Great Lakes and Duluth in terms of its far northern climate that make it an interesting market to examine. For example, in a 2014 study on the pleasure cruise industry in the Baltic Sea, Serry (2014) noted that the Baltic market, like the Great Lakes, is prone to seasonality. The Baltic cruise season "stretches from April to September with a peak in mid-summer. In the wintertime, there is hardly any offer of cruising at all in the Baltic Sea area."

Serry divided the Baltic cruise tourism market into four main segments: the extra-large (over 200 calls), large (50 to 199 calls), medium (25 to 49 calls), and small (0 to 24 calls). He also classified ports of call into three categories: destination, gateway, and balanced cruise ports. Destination ports are world-class attractions, and passengers rarely choose to take day trips away from the destination. These tend to be homeports. Gateway ports (e.g. Malmo, Sweden) offer very few amenities or attractions. Passengers might use these as jumping off points to travel to inland destinations. Balanced ports are a mixture of the first two—not a main destination but attractive to tourists. Serry classifies Gothenburg, Sweden, as an example of a balanced port.

Based on Serry's descriptions, Duluth would most likely fall into the "small balanced" port classification. In addition to Gothenburg, other Baltic ports that might fit this classification include Riga, Latvia or Gdynia, Poland. In addition to the helpful port classifications, Serry's study also provides spending ranges per passenger for each of the ports in the Baltic region.

In a 2018 study Kowalczyk examined the development potentials for the Baltic Sea cruise market. Kowalczyk noted that the market drivers of the cruise industry are "similar to those of tourism in the world, particularly the rising affluence of the global population and the growing popularity of exotic and resort destinations." Of particular interest to this BBER study is the number of cruise calls and passenger counts for every Baltic port from 2000 through 2018, as well as passenger and crew spending totals and spending breakdowns.

A study conducted by Urbanyi-Popiolek in 2019 focuses on challenges faced by ports hosting cruise vessels.

While the study is not specifically focused on the economic benefits of cruise tourism on a port of call, it does have helpful metrics related to the numbers of passengers and calls for each Baltic port in 2017, ranging from the very large (Copenhagen, Denmark, had 325 calls and 850,000 passengers) to the very small (Turku, Finland, saw seven calls and 3,300 total passengers).

Finally, one additional study, conducted by Forss in 2019, examined growth possibilities for the Port of Turku, Finland, on the Baltic Sea. While her study did not focus on the economic benefits of cruise tourism and did not include any specific metrics for the port, it is helpful because Turku has certain characteristics similar to Duluth that make the study relevant to this one. According to Forss, the "Port of Turku is located slightly further away from the open sea [so] it needs more time for piloting. However, its uniqueness and off-the-beaten-path experience could be the key to faster pace of calls."

In her study, Forss conducts an analysis on the port's strengths, weaknesses, opportunities, and threats (SWOT) and concludes that, in order to compete with the larger, more popular ports on the Baltic Sea, Turku should market itself in trade shows and in industry magazines; collaborate with other ports and travel companies to draw positive attention to the city; improve the tourist experience that the port and the city of Turku have to offer; and offer the highest level of customer service for cruise operators.

"To maximize its economic benefits, each port should develop a formalized strategy that establishes goals, educates local people involved, and ensures the best services for cruise passengers."

(Torbianelli, 2012)

Greater Europe

Ports in other parts of Europe tend to have less direct similarities to the Great Lakes. Europe is the second most popular cruise destination worldwide, after the Caribbean, and is dominated by large, ocean-going vessels. According to a study commissioned by the Cruise Lines International Association (CLIA) in 2018, direct expenditures from the cruise industry reached 19.7 billion euros ($23.8 billion USD). However, the BBER did find a handful of studies from Greater Europe (outside the Baltic Sea) that provided some helpful information for this research.

In 2012, Torbianelli conducted a comparative study of a number of European cruise ports to better understand how harbor-city strategies affect the economic multipliers that come from cruise tourism. His study, primarily focused on case studies and examples, provides guidelines to support harbor cities in fully exploiting the economic and social development opportunities offered by cruise traffic. Most of the cities included in the study host large, ocean-going cruise ships, so the results are slightly less relevant to this research. However, for the cities he examines, he includes a wide variety of helpful metrics including: direct cruise line port expenses; direct expenses per passenger; port charges; and daily passenger spending for passengers who stay zero nights, one night, two nights, and more than two nights. He also provides the distribution of passenger expenses for ports where the data is available.

His research found that "cities (as cruise destinations but also as efficient services bases for the ships) are becoming more important in cruise marketing" and that the size of the economic impact in the city greatly depends on "underlying structure of the local economy (sectors involved, interconnectivity of the local economy, etc.) and the type of activity that takes place at the cruise harbor." He concludes that, to maximize its economic benefits, each port should develop a formalized strategy that establishes goals, educates local

people involved (e.g. taxi drivers, retail business owners), and ensures the best services for cruise passengers.

A study by Gouveia and Eusebio (2019) was mentioned earlier in this chapter for its incredibly thorough literature review. But that study was also useful for the BBER's research in that it has detailed measures of spending per passenger, spending per crew member, and breakdowns of common expenditures for passengers and crew members. According to the authors, "transport (e.g. taxis, buses), tour operators (comprising guides), tourism attractions, and local shops (e.g. jewelers' shops, craft shops, and souvenir shops) are the economic activities most likely to benefit from this type of tourism. Hotels, restaurants, and casinos are examples of economic activities that do not obtain significant advantages from cruise tourism in a port of call. In the majority of cruise trips, meals are included in the cruise price. Thus, the tourists generally return to the ship to have their meals."

While the geography of focus for Gouveia and Eusebio's study (Madeira, Portugal) is less relevant to Duluth than many of the others studies included in this literature review, the study provides strategies for increasing the direct economic value generated by cruise tourism. This partnerships between local businesses and cruise companies to include meals in local restaurants as part of the cruise tour and increasing the amount of time spent outside the ship by passengers and crew.

River cruising

One reason for the increased interest in small vessel cruising is due to the growing popularity of the river cruise industry. While the BBER did not find any studies that provided estimates of economic benefits to a port from river cruising specifically, the research team did identify two studies that provided estimates for numbers of cruise calls and passenger counts for various ports along the Danube River. In addition, the research team identified a number of studies that focused on the demographics of river cruise passengers or the growth potential for emerging ports of call. These studies are summarized below.

River cruising has many similarities to Great Lakes cruising. For example, Bosnic and Gasic (2019) examined the river cruise industry worldwide and found that the main distinctions of river cruises are that river cruise vessels are considerably smaller than sea cruise vessels, and they do not typically offer a wide range of leisure and entertainment facilities on board. Instead river cruises place greater emphasis on sightseeing and experiential travel. Both of these characteristics are very similar to Great Lakes cruising. In addition, it appears that the market for river cruising is similar demographically to the market for Great Lakes cruising. Bosnic and Gasic find that baby boomers represent the dominant demographic, due to their preference for comfortable accommodation, good food, and entertaining/educational attractions. The authors also predict growth in the demand for river cruises in the future (citing an annual growth rate of 10 to 15%) and note that river cruising in the U.S. is also gaining in importance (e.g. the Columbia and Mississippi rivers).

In their recent study, Hristic, Stefanovic, and Milijic (2020) examined the Danube River cruise industry in Serbia. Their research primarily focused on the importance of developing new tourist offerings in Serbia and of investing in new locations for passenger ports. In their research, they provide the number of dockings and passengers per year for five Serbian ports from 2015 to 2019. One of the ports included in the study was Veliko Gradiste (population 6,204), a town in eastern Serbia. Despite its international location, Veliko Gradiste has a number of similarities to Duluth with its focus on small vessels, its northern climate, and its distinction as an emerging cruise destination. Notably, Veliko Gradiste saw significant growth in its cruise industry between 2015 and 2019. According to the study, the port had four cruise dockings in 2015, six in 2017, and 15 in 2019. Similarly, the number of passengers the city saw during that time grew from 203 in 2015 to 1,275 in 2019. Dragin et al. conducted a similar study on Serbian ports in 2010 and reported similar growth in cruise tourism in the Corridor VII, although their focus was on the much more established ports of Belgrade and Novi Sad.

Hristic, Stefanovic, and Milijic also have some helpful insights regarding the long-term impacts of COVID-19 on the cruise industry overall. They write, "Although being negatively influenced by the COVID-19 pandemic, with river fleets presently remaining anchored in European ports with no prediction of when it will be possible to travel again, it is expected that, in the future, the conditions will normalize and the increasing trend in the number of cruise ships will continue."

A recent article by Jaszberenyi and Miskolczi (2020) provides a comprehensive picture of the most important characteristics of cruise tourism on the Danube. The study includes a literature review and content analysis to examine trends in the inland waterway cruise sector, which the authors referred to as "niche tourism." According to the study, river cruises on the Danube contributed at least 110.7 million euros ($133.7 million USD) to the regional economy in 2019 and is among the fastest developing sub-areas of leisure travel.

Given its focus on Europe, the article does not explicitly mention Great Lakes cruising. However, many of the findings are relevant to this study. As previously noted, Jaszberenyi and Miskolczi's study identified senior travelers as the primary demographic for river cruise tourism and noted that this group tends to book their trips well in advance, with 32% of trips booked 14 to 18 months before departure. The study also noted that river cruise travelers prefer to book their voyages through travel agencies to avoid any kind of omissions and that the primary motivation for river cruising is for an "authentic experience, to immerse themselves in the adventure, and to explore alternative attractions."

"Although being negatively influenced by the COVID-19 pandemic… it is expected that, in the future, the conditions will normalize and the increasing trend in the number of cruise ships will continue."

(Hristic, Stefanovic, and Milijic, 2020)

The authors also suggest four strategies for meeting the needs of the target market (as well as attracting new markets). These are: diversifying opportunities for travelers (e.g. local people, traditional activities, storytelling); expanding operations in untapped geographic areas (e.g. lower Danube, Black Sea); targeting new consumer groups (e.g. younger travelers, solo travelers, families); emphasizing eco-tourism opportunities (e.g. close-to-nature experiences, hiking, kayaking, cycling). These strategies, especially those focused on untapped geographic areas and eco-tourism, seem particularly relevant to Duluth.

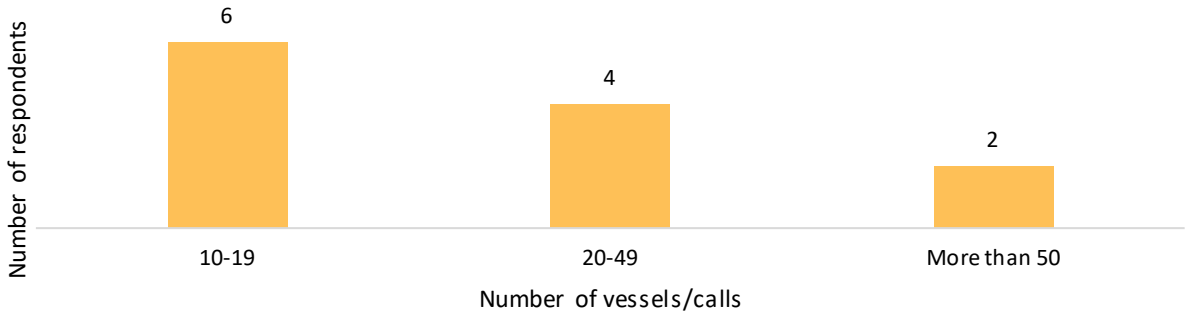
Survey of Great Lakes Ports

Due to a general lack of literature on Great Lakes cruising, the BBER conducted a survey of Great Lakes port cities, requesting data on the number of vessels; number of passengers; and estimated passenger, crew member, and ship spending in a typical year, prior to COVID-19.

The research team was able to find contact information for 31 of the 37 ports located on the Great Lakes. A link to complete the survey was sent to this list, and those that did not respond within 10 days were contacted again via phone. In total, 15 of the ports completed the survey,[3] although not every question.

As shown in Figure 2-1, when asked about the number of cruise vessels that dock in their port annually, six ports indicated they saw between 10 to 19 ships per year, four ports indicated they saw between 20 and 49, and two ports reported hosting more than 50 ships in an average year.

Figure 2-1. In a typical year, how many cruise vessels dock in your port annually? (n=12)



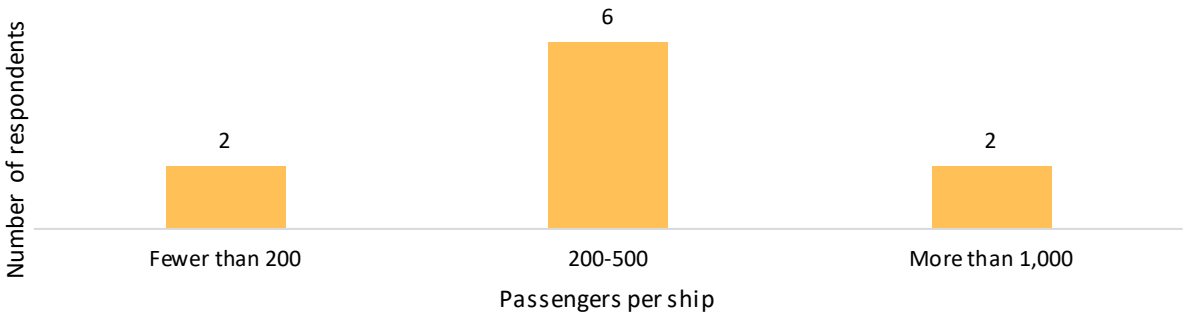
SOURCE: BBER PORT SURVEY

Port representatives were then asked to report, on average, the number of hours that a cruise ship stayed docked. On average, respondents reported that ships docked for roughly 12 hours, although responses ranged from a mere eight hours to 24, depending on the port.

Next, ports were asked to estimate the average number of passengers on board each ship (see Figure 2-2 on the following page). Two ports reported fewer than 200 guests per ship, and another two reported having more than 1,000 per ship. These ports were located near the Atlantic Coast, close to the entrance of the St. Lawrence Seaway, and therefore, have the ability to host larger cruise vessels. The remaining six ports reported average passenger totals between 200 and 500 guests per vessel.

[3] Ports that responded to the survey included: Baie-Comeau, QC; Houghton, MI; Lunenburg, NS; Mackinac Island, MI; Marquette, MI; Midland, ON; Montreal, QC; Parry Sound, ON; Saquenay, QC; South Portland, ME; and Trois-Rivieres, QC. The ports of Cleveland, Ohio; Milwaukee, Wisconsin; Muskegon, Michigan; and Thunder Bay, Ontario did not respond to the survey, but they provided information on their ports via subject matter expert interviews. This data was used as a proxy for survey responses. Three of the ports that responded to the survey indicated that they do not currently host cruise vessels. Their responses are, therefore, not included in Figures 2-1 and 2-2.

Figure 2-2. In a typical year, what is the average number of passengers aboard each ship? (n=10)



SOURCE: BBER PORT SURVEY

Finally, port representatives were asked to estimate daily spending per cruise passenger and crew member. Five port representatives provided estimates. According to the ports' responses, passengers tend to spend more than the crew members overall, averaging more than $150 of spending while in port. The largest purchases among passengers is on retail, followed by tours and transportation. Crew members spend less than passengers overall (averaging $64 per visit), and their spending is primarily on retail and food/drink.

Based on these survey results, the BBER identified nine Great Lakes ports that could serve examples for estimating the economic benefits of cruising in Duluth. More information on these nine ports, along with a handful of ports from other parts of the globe, is described in the following chapter.

Chapter 3. Economic Benefits

As noted previously, the purpose of this study is to help determine the principal variables driving economic benefits in places with similar characteristics to Duluth, determine those variables in current and future scenarios for Duluth and the region, and calculate the direct benefits for the region if a cruise industry developed in Duluth.

To accomplish this, the BBER first conducted subject matter expert interviews to determine the characteristics of Duluth (mid-sized city, remote destination, small vessels, northern climate, and emerging destination) that make it both desirable and challenging as a cruise destination. In addition, the experts also provided feedback on their vision for Duluth as a cruise destination to help guide the BBER in determining the long-term outlook for cruising in Duluth.

Next, the team reviewed relevant literature to identify studies with measureable economic benefits for Great Lakes ports as well as international port destinations with similarities to the Great Lakes (e.g. Pacific Northwest/Canada, Baltic Sea, river cruise destinations).

According to the findings from the literature review, the direct economic benefits that Duluth could see from the introduction of cruise ships include passenger, crew member, and cruise ship expenditures. Passengers' and crew members' expenditures most commonly include tours, food and beverage, and souvenirs, whereas cruise ship expenditures include items such as fuel costs, port dues, port agency fees, pilotage, and other related items (Gouveia and Eusebio 2019).

Due to a general lack of literature on Great Lakes cruising, the BBER conducted a survey of Great Lakes port cities, requesting data on the number of vessels and number of passengers, and estimated passenger and crew member spending in a typical year. In addition, the BBER conducted numerous interviews with representatives from Viking Cruise, Duluth Seaway Port Authority, and local businesses for data from which to estimate cruise ship spending.

This chapter synthesizes all of the information collected in Chapter 2 for ports similar to Duluth (located within the Great Lakes region and beyond) and estimates the direct benefits that the Port of Duluth-Superior could see with its further foray into the cruise industry. Those direct economic benefits are then used as input data for modeling the indirect and induced economic impacts of the cruise industry on other supportive local industries.

Economic benefits and economic impacts are shown for three potential scenarios:

- Early Adoption (Scenario 1)
- Expanding Interest (Scenario 2)
- Premier Destination (Scenario 3)

More details on each of these three scenarios, along with the assumptions used to develop each scenario, are described later in the chapter.

Similar Ports

Table 3-1 includes a list of 13 ports that the research team identified as having similarities to Duluth. These cities were selected because they were identified in the literature or by subject matter experts as sharing one or more characteristics with Duluth (e.g. small- and mid-sized cities, remote destinations, Great Lakes region, small vessel cruise ships, northern climates, emerging destinations) and because the research team was able to identify one or more metrics on the city's cruise industry (e.g. number of visitors per year, spending totals for passengers and crew members, types of expenditures). The table includes the location of the port, the city's population, whether it serves as a home port, the number of cruise calls per year, and the number of cruise visitors per year. Figures 3-1 and 3-2 on the following pages show the locations of Great Lakes and Baltic Sea ports, respectively.

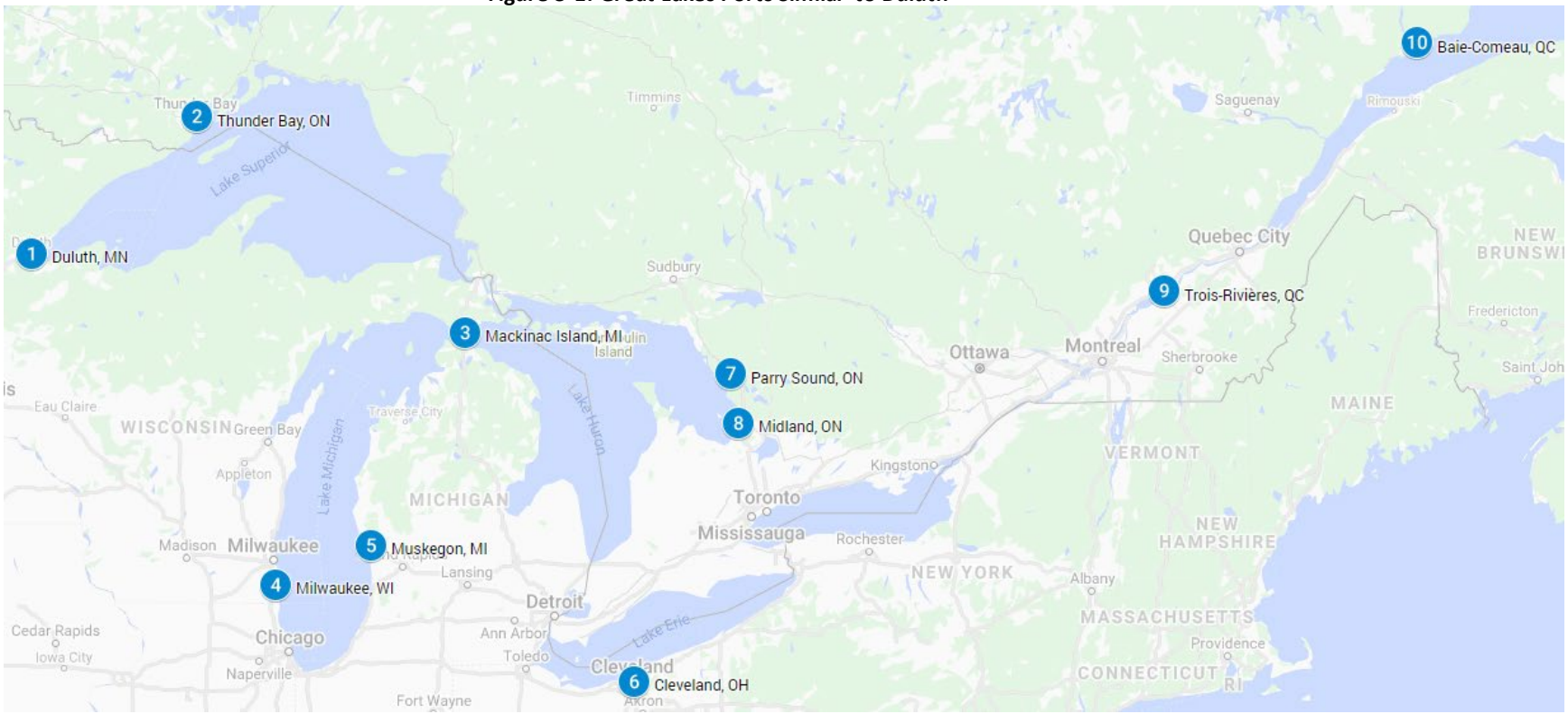
Table 3-1. Ports with Similarities to Duluth, in Order of Cruise Calls per Year

Port Geography	*City*	*State/Province Country*	*Population*	*Home Port*	*Port Type*	*Cruise calls per year*	*Cruise visitors per year*	*Source*
Great Lakes	Midland	Ontario (CA)	16,864	Yes	Small (0-24 calls)	10	2,050	Bermello Ajamil & Partners (B&A), BBER Port Survey
Great Lakes	Thunder Bay	Ontario (CA)	110,172	Yes	Small (0-24 calls)	11	606	B&A, BBER Port Survey
Great Lakes	Trois-Rivieres	Quebec (CA)	139,618	No	Small (0-24 calls)	11	2,200	BBER Port Survey
Great Lakes	Parry Sound	Ontario (CA)	6,408	No	Small (0-24 calls)	12	2,250	B&A, BBER Port Survey
Great Lakes	Baie-Comeau	Quebec (CA)	21,536	No	Small (0-24 calls)	12	5,400	BBER Port Survey
Great Lakes	Milwaukee	Wisconsin (US)	594,548	Yes	Small (0-24 calls)	13	3,214	BBER Port Survey
River Cruising	Veliko Gradiste	Serbia	17,610	No	Small (0-24 calls)	15	1,275	Hristic-Stefanovic
Pacific NW/Canada	Wrangell	Alaska (US)	2,502	No	Small (0-24 calls)	20	17,300	Federal Maritime Commission, Crew Center website
Great Lakes	Muskegon	Michigan (US)	37,633	No	Medium (25-49 calls)	25	2,000	BBER Port Survey
Great Lakes	Mackinac Island	Michigan (US)	1,072	No	Medium (25-49 calls)	38	5,700	BBER Port Survey
Baltic Sea	Aalborg	Denmark	211,684	No	Medium (25-49 calls)	45	33,000	Cruise Mapper website
Great Lakes	Cleveland	Ohio (US)	385,282	No	Medium (25-49 calls)	45	8,500	BBER Port Survey
Baltic Sea	Gothenburg	Sweden	579,281	No	Large (50-199 calls)	52.5	70,500	Kowalczyk

SOURCE: BBER

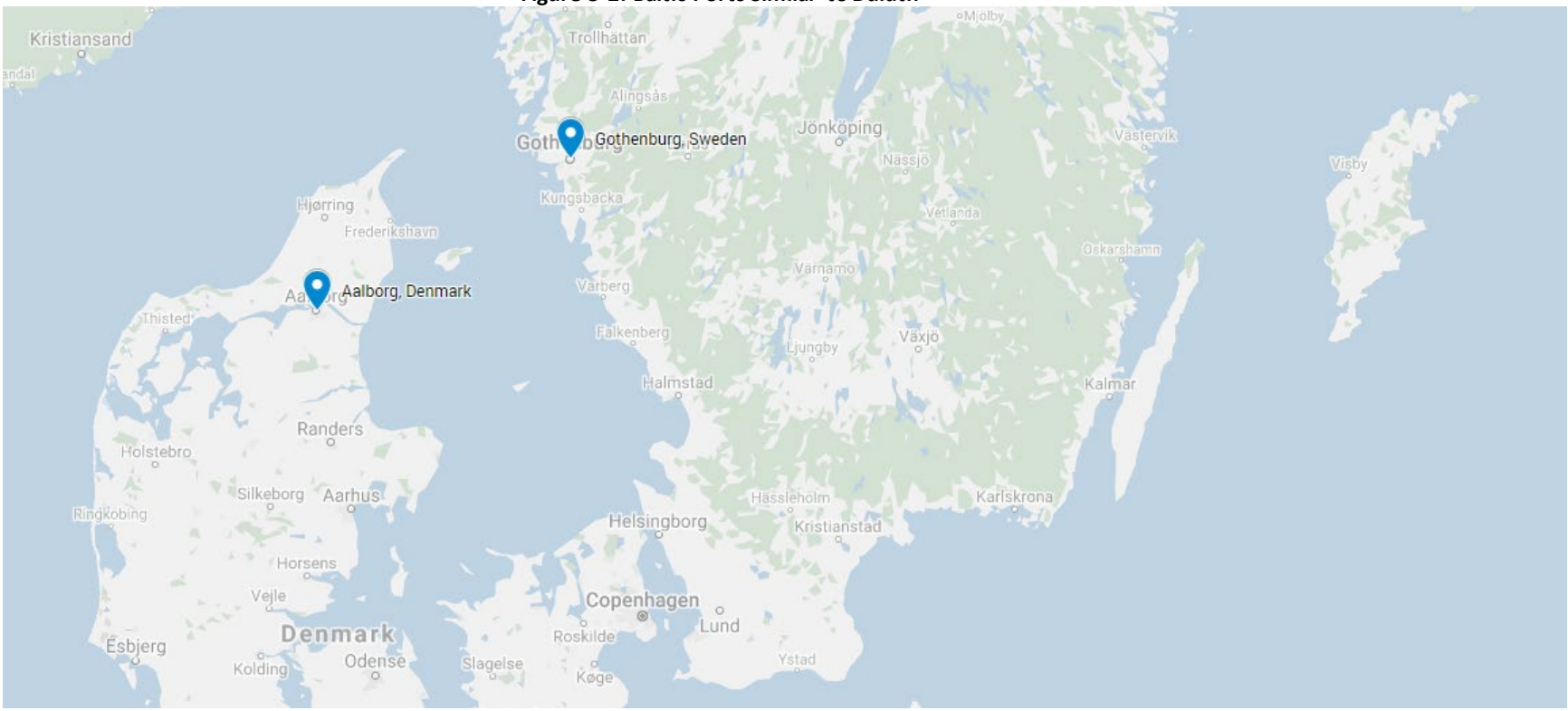
Nine of the cities included in the table are located on the Great Lakes-St. Lawrence Seaway, and the remaining four are located in one of the other geographic areas of focus included in the study (e.g. River cruising, Pacific Northwest/Canada, Baltic Sea). The cities vary widely with regard to their population, the smallest being Mackinac Island, Michigan, and the largest Milwaukee, Wisconsin. Midland and Milwaukee occasionally serve home ports, and Thunder Bay in Ontario, Canada, is expected to serve as one in the near future, according to cruise itinerary information found online, while the others serve only as ports of call. Of the ports shown, most would be considered small, seeing fewer than 24 cruise calls in a typical year. And only a handful of those included in the list see more than 6,000 passengers per year.

Figure 3-1. Great Lakes Ports Similar to Duluth



SOURCE: GOOGLE MAPS, BBER

Figure 3-2. Baltic Ports Similar to Duluth



SOURCE: GOOGLE MAPS, BBER

Direct Benefits

Using the information gathered on the other ports similar to Duluth, the research team developed three scenarios that reflect the range of potential for Duluth as a cruise destination in the coming years. They are:

- Early Adoption (Scenario 1)
- Expanding Interest (Scenario 2)
- Premier Destination (Scenario 3)

Table 3-2, on the following page, summarizes the key assumptions used in developing each of the three scenarios.

Scenario 1, Early Adoption, assumes a small number of cruise calls (n=7) per year, based on information gathered from Viking Cruise Line representatives. Ports that fit this scenario description most closely include Midland, Ontario (CA); Thunder Bay, Ontario (CA); Trois-Rivieres, Quebec (CA); and Parry Sound, Ontario (CA).

According to the company, Viking intends to visit Duluth seven times per year beginning in 2022. Its chosen ship, an expedition vessel, has a capacity of 378 passengers, and it typically runs tours at 96% occupancy, meaning that it anticipates bringing 360 to 365 passengers to Duluth for each call. The company also reports having 255 crew members on board each ship. Viking ships would typically dock at 8:00 a.m. and leave at 6:00 p.m. each day, giving passengers a full day to experience Duluth. Like most cruise lines, Viking provides one excursion per call for its passengers. These excursions typically include transportation to and from some local attraction, a tour, and a meal. According to Visit Duluth, Duluth's local convention and visitor's bureau, the price can range from $50-$100 per passenger, depending on the excursion. The BBER assumed a cost of $70 per passenger.

The estimated spending per cruise ship ($19,095 per call, spent on items such as dockage, wharfage, line handlers, pilotage, and shipping agency services) is based on feedback from Viking representatives, the Port of Milwaukee, and conversations with local businesses and subject matter experts. Passenger and crew member spending estimates for Scenario 1 ($111 per passenger and $49 per crew member) are based on the average spending per passenger and crew member from the BBER port survey and relevant literature. For a detailed list of assumptions and data sources used to calculate passenger, crew member, and cruise ship spending, see Appendix B.

Scenario 2, Expanding Interest, assumes an increase in the number of cruise ships over Scenario 1. In this scenario, the research team assumes Duluth could see somewhere between 10 and 20 cruise calls annually, with an average of 15 per year. Ports that fit this scenario description most closely include Baie-Comeau, Quebec (CA); Milwaukee, Wisconsin (US); Veliko Gradiste, Serbia; Wrangell, Alaska (US); and Muskegon, Michigan (US).

According to Viking, "If Lake Superior has more cache or pull than other lakes, the company may be able to increase the number of calls it makes to Duluth in the future." For now, however, the company expects to retain a fairly stable number of cruise calls to Duluth in the coming years. Therefore, this scenario assumes expanding interest among other cruise companies, such as Victory, Pearl Seas, Ponant, and Hapag-Lloyd, all of which have sailed the Great Lakes in recent years and are, therefore, the most likely to expand into the Duluth market (B&A 2018).

Table 3-2. Assumptions Used in Estimating Direct Economic Benefits for Current and Future States of Cruise Tourism in Duluth, Minnesota

Scenario	*1 - Early Adoption*	*2 - Expanding Interest*	*3 - Premier Destination*
Description	Assumes a small number of cruise ships each year. Based on feedback from Viking Cruise Lines.	Assumes an increase in the number of cruise ships over Scenario 1 and includes the potential for Duluth as a home port (Scenario 2B).	Assumes robust growth in Great Lakes cruising and includes the potential for Duluth as a home port (Scenario 3B).
Examples	Midland, Ontario (CA); Thunder Bay, Ontario (CA); Trois-Rivieres, Quebec (CA); Parry Sound, Ontario (CA)	Baie-Comeau, Quebec (CA); Milwaukee, Wisconsin (US); Veliko Gradiste, Serbia; Wrangell, Alaska (US); Muskegon, Michigan (US)	Mackinac Island, Michigan (US); Aalborg, Denmark; Cleveland, Ohio (US); Gothenburg, Sweden
Cruise calls per year	7	15	40
Passengers per call	360	275	275
Crew per call	255	160	160
Passengers per year	2,520	4,125	11,000
Crew per year	1,785	2,400	6,400
Excursion spending per passenger	$70	$70	$70
Cruise ship expenditures (minus excursions)	$19,095	$19,095	$19,095
Spending per passenger (port of call)	$111	$111	$111
Spending per crew member	$49	$49	$49
Spending per passenger (home port)		$188	$188
Airport spending per passenger (home port)		$29.50	$29.50
Fuel spending per cruise ship (home port)		$100,000	$100,000
Other assumptions		For home port, assumes 50% of travelers are flying into or out of the Duluth International Airport	For home port, assumes 50% of travelers are flying into or out of the Duluth International Airport

SOURCE: BBER

The average number of passengers per call (n=275) for Scenario 2 is based on a trimmed mean[4] for the 13 port cities. There was very little data on the number of crew members per call, so the research team used the table shown in Appendix C, "Cruise Ships Most Likely to Visit Great Lakes" (adapted from B&A 2018), to calculate the value. This table includes passenger and crew capacity for cruise ships that are physically able to transit the Great Lakes and that have been noted in the Great Lakes literature and by subject matter experts (Hapag Lloyd, Pearl Seas Cruises, Ponant, Ritz Carlton, and Victory Cruise Lines). According to the data shown in the table, the average ratio of passengers to crew is 1.72. Assuming 275 passengers per call, this could equate to roughly 160 crew per call.

Spending estimates for Scenario 2 are identical to those used in Scenario 1, with a few exceptions. For Scenarios 2 and 3, the research team considered the possibility that Duluth could serve as a home port for cruise lines. Given this, the research team adjusted passenger spending to account for passengers' lodging, dining, retail, and airfare expenses. Scenario 2A assumes passenger spending of $111 per call (port of call), and Scenario 2B assumes passenger spending of $188 per call (home port). Because of the small number of cities similar to Duluth-Superior that serve as home ports, the research team using spending estimates for all home port cities provided in the literature[5] to estimate the average spending per passenger at a home port.

For Scenario 2B (home port scenario), the research team assumed that 50% of travelers are purchasing tickets directly into or out of Duluth, equating to an additional $29.50 per passenger in revenue for the Duluth International Airport.[6] Also, according to local experts, it is likely that some vessels could choose to fuel prior to embarkation or after disembarkation if Duluth-Superior served as a home port. Fuel capacity on a small cruise vessel can range anywhere from 100,000-250,000 gallons[7] and current fuel costs (6-month average for Americas) range from $550 per ton for VLSFO 0.5% to $640 per ton for MGO fuel.[8] Therefore, the cost to completely refuel a vessel (from empty) could range from $250,000-$600,000. However, the research team assumes that not all ships will refuel in Duluth-Superior and those that do refuel will not be filling their tanks from empty, for an average cost per ship of $100,000 on fuel expenses.

Scenario 3, Premier Destination, assumes robust growth in Great Lakes cruising in the coming years and growing interest in Duluth as a destination. Ports that fit this scenario description most closely include Mackinac Island, Michigan (US); Aalborg, Denmark; Cleveland, Ohio (US); Gothenburg, Sweden.

In Scenario 3, Duluth could see somewhere between 30 and 50 cruise calls annually, averaging 40 per year. This scenario would likely require significant investments in cruise tourism infrastructure in the Duluth harbor, as it would mean hosting two to three cruise ships each week throughout the summer months.

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[4] To calculate the trimmed mean, the highest and lowest values were eliminated.

[5] Port cities used in calculating spending at a home port were: Copenhagen, Denmark; Helsinki, Finland; St. Petersburg, Russia; Stockholm, Sweden; Tallinn, Estonia (Serry 2014); "Turnaround Port" (Kowalczyk 2018); Montreal, Quebec; Vancouver, British Columbia (BREA 2017); Vancouver, British Columbia (Scarfe 2011). All home port spending estimates were converted and inflated to 2021 USD.

[6] According to email communication with Tom Werner, Executive Director of the Duluth Airport Authority, the revenue per enplanement (i.e. operating revenue) for 2020 was $25. In addition, the airport receives a $4.50 passenger facility charge per enplanement, which is a fee attached to tickets sold (remitted to the airport by the airline) for eligible infrastructure projects. In total, the airport estimates $29.50 per passenger flying in or out of Duluth International Airport.

[7] https://www.quora.com/How-much-does-it-cost-a-cruise-ship-to-fill-up-with-fuel; https://response.restoration.noaa.gov/about/media/how-much-oil-ship.html; https://acruisingcouple.com/2020/11/this-is-how-long-it-takes-to-fuel-a-cruise-ship/

[8] https://shipandbunker.com/prices/av/region/av-am-americas-average#MGO

Scenario 3 assumes expanded interest in Duluth as a destination for Viking as well as the other Great Lakes cruise companies, such as Victory, Pearl Seas, Ponant, and Hapag-Lloyd.

Scenario 3 assumes 275 passengers per call and 160 crew per call. Spending estimates for Scenario 3 are identical to those used in Scenario 2 and includes the possibility that Duluth could serve as a home port for cruise lines. Like Scenario 2, Scenario 3A assumes passenger spending of $111 per call (port of call), and Scenario 3B assumes passenger spending of $188 per call (home port). The same assumptions regarding airline travel (50% of travelers flying into or out of Duluth International Airport, spending $29.50) and fuel bunkering also hold.

Table 3-3 summarizes the direct benefits that Duluth could see for each of the three scenarios, as well as the alternate scenarios 2A/2B and 3A/3B in which Duluth acts as a port of call/home port.

Table 3-3. Direct Benefits for Scenarios 1-3

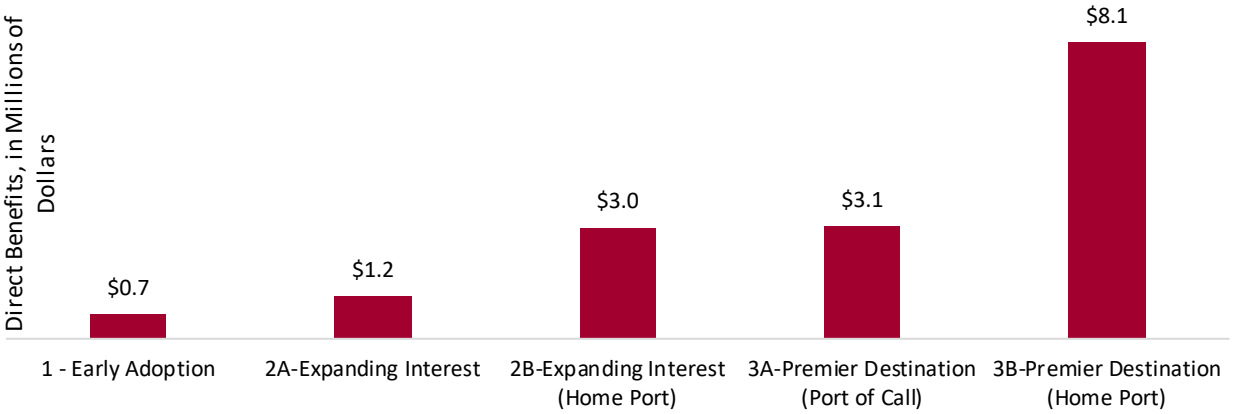
Benefit	*1 - Early Adoption*	*2A-Expanding Interest (Port of Call)*	*2B-Expanding Interest (Home Port)*	*3A-Premier Destination (Port of Call)*	*3B-Premier Destination (Home Port)*
Direct passenger spending	$279,720	$457,875	$775,500	$1,221,000	$2,068,000
Direct spending from excursions	$176,400	$288,750	$288,750	$770,000	$770,000
Direct cruise ship spending	$133,665	$286,425	$286,425	$763,800	$763,800
Direct crew spending	$87,220	$117,600	$117,600	$313,600	$313,600
Direct benefits from fuel bunkering	$0	$0	$1,500,000	$0	$4,000,000
Direct benefits to local airport	$0	$0	$60,844	$0	$162,250
Total direct benefits	$677,005	$1,150,650	$3,029,119	$3,068,400	$8,077,650

SOURCE: BBER

As shown in the table, Scenario 1, Early Adoption, represents the smallest direct benefits to the city and the port. In this scenario, passenger, crew member, and cruise ship spending could total roughly $677,000 per year from seven Viking cruise calls. These impacts will occur immediately, however, when Viking begins its tours to Duluth in 2022. Direct benefits grow increasingly larger for each of the other scenarios. Scenario 2 could bring between $1.2 and $3.0 million in direct benefits to the city, depending on whether the city serves as a port of call or a home port. Scenario 3 could bring between $3.1 and $8.1 million in economic benefits, depending on Duluth's port status (home port versus port of call). For most scenarios, the largest benefits come from passenger spending, followed by excursions, and cruise ship spending. The exception is fuel, which could provide the largest direct benefits, assuming cruise ships were to fuel prior to embarkation or upon disembarkation in Scenarios 2B and 3B.

Direct economic benefits for each scenario are also shown in Figure 3-3, on the next page.

Figure 3-3. Direct Economic Benefits for Scenarios 1-3



SOURCE: BBER

Economic Impacts

The direct economic benefits described in the previous section were also used to model the economic impacts[9]—direct, indirect, and induced—of the cruise industry on other supporting local industries.

Economic impact analysis tracks an initial economic shock or activity (like the direct spending of cruise passengers and crew members) through multiple rounds of industry and consumer spending to show the multiplier or ripple effects through a local economy. The initial shock or activity is considered the direct effect, the resulting increase in industry spending is the indirect effect, and the resulting increase in consumer spending is the induced effect. This section summarizes the economic impacts for each of the scenarios developed for this study, using the spending by cruise passengers, crew members, and ships as inputs for modeling. Results are measured in employment, output, labor income, and value added.

Economic impact analysis requires the analyst to select a study area—the boundary of the "local" economy. Though most of the direct effects of the cruise industry will likely be felt in the city of Duluth, the indirect and induced effects that arise from increased business spending and household spending are often distributed more broadly and are based on the location of local suppliers, the labor market, and other factors.

Figure 3-4. Duluth-Superior MSA

SOURCE: WIKIPEDIA, BBER

The geographic scope for the economic impact analysis is the Duluth-Superior MSA, which includes the counties of St. Louis and Carlton in Minnesota and Douglas in Wisconsin, shown in Figure 3-4.

The research team used the IMPLAN Group's input-output modeling data and software (IMPLAN version 3.1) for modeling economic impacts. The data used was the most recent IMPLAN data available, which is for the year 2020. All data were modeled in the year 2022. All results are shown in thousands of dollars for the year 2022.

To model the economic impacts of passenger, crew member, and excursion spending, the research team identified literature that included sample passenger and crew member spending patterns, converted those spending

[9] For more details on the assumptions and methodology used in input-output modeling, see Appendix D.

estimates into percentages, and distributed them among the appropriate IMPLAN sectors. Cruise ship expenditures were modeled using IMPLAN's "bill of goods" method—classifying each spending item into the appropriate IMPLAN sector and modeling each spending item as an industry change activity. A complete list of all IMPLAN sectors used in modeling the economic impacts of the Duluth-Superior cruise industry can be found in Appendix E.

Table 3-4 shows the total economic effects for each of the scenarios developed for this study. The column labeled employment shows the number of jobs that the cruise industry could create both directly and through indirect and induced effects. For example, Scenario 1, which assumes seven cruise calls, 2,520 passengers, and 1,785 crew members per year, could create 12 additional jobs in the study area. Scenario 2A (port of call), which assumes 15 cruise calls, 4,125 passengers, and 2,400 crew members per year, could create about 16 additional jobs in the study area. The most ambitious scenario, Premier Destination (Home Port) could add roughly 61 jobs to the local economy.[10]

Table 3-4. Total Economic Impacts by Scenario (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Scenario 1: Early Adoption	12	$392.1	$630.4	$1,154.7
Scenario 2A: Expanding Interest (Port of Call)	16	$567.0	$874.3	$1,634.6
Scenario 2B: Expanding Interest (Home Port)	23	$872.4	$1,975.6	$4,106.3
Scenario 3A: Premier Destination (Port of Call)	42	$1,519.7	$2,343.8	$4,383.3
Scenario 3B: Premier Destination (Home Port)	61	$2,326.6	$5,268.5	$10,949.0

SOURCE: BBER

The column labeled labor income is the total of all employee compensation. This includes wages, benefits, and payroll taxes for full- and part-time workers. Depending on the growth in the cruise industry in Duluth in the coming years, the area could see between $392,100 and $2.3 million in additional labor income.

The column labeled value added refers to the contribution to the GDP made by an individual producer, industry, or sector. In this case, it's the cruise industry. Value added includes employee compensation, proprietor income, and other property income and taxes. Depending on the scenario, the cruise industry in Duluth could add between $630,400 thousand and $5.2 million in additional value added to the study area's economy.

Output, the last column in the table, is the total value of all local production required to sustain activities. According to the results of modeling, Duluth and the surrounding area could see nearly $1.2 million in additional output as a result of the introduction of cruising to the city, even with only seven cruise calls per year. If the industry were to expand to 15 calls per year, total output could range from $1.6 million to $4.1 million in additional output, depending on whether the city served as a port of call or home port. Finally, if the cruise industry were to expand to 40 cruise calls per year and Duluth were to serve as a home port, total output in the study area could be as large as $10.9 million.

Detailed economic impact results for each of the scenarios can be found in Appendix F.

[10] It should be noted that the employment effects estimated here do not include the crew members employed by the ships themselves. As noted previously, each cruise call would bring hundreds of crew members to the Port of Duluth-Superior. Because the home location of the crew members is not known, it is assumed they would not be local and, therefore, not included as part of the economic impacts.

Chapter 4. Conclusions

Using feedback from subject matter experts, relevant literature, and a survey of Great Lakes ports, the BBER estimated the economic benefits and economic impacts for three potential scenarios.

Early Adoption (Scenario 1), assumes a small number of cruise calls (n=7) per year, based on information gathered from Viking Cruise Line representatives. According to the company, Viking intends to visit Duluth seven times per year beginning in 2022. Its chosen ship, an expedition vessel, has a passenger capacity of 378, and it typically runs tours at 96% occupancy, meaning that Viking anticipates bringing 360 to 365 passengers to Duluth for each call. The company also reports having 255 crew members on board each ship.

Expanding Interest (Scenario 2), assumes Duluth could average 15 cruise calls per year. This scenario assumes expanding interest among other cruise companies, such as Victory, Pearl Seas, Ponant, and Hapag-Lloyd, all of which have sailed the Great Lakes in recent years and are, therefore, the most likely to expand into the Duluth market (B&A 2018).

Scenario 3, Premier Destination, assumes robust growth in Great Lakes cruising in the coming years and growing interest in Duluth as a destination. In this scenario, Duluth could see 40 cruise calls per year. Scenario 3 would likely require significant investments in cruise tourism infrastructure in the Duluth harbor, as it would mean hosting two to three cruise ships each week throughout the summer months. Scenarios 2B and 3B also include the potential for Duluth as a home port.

According to the findings from the literature review, the direct economic benefits from the introduction of cruise ships include passenger, crew, and cruise ship expenditures. The BBER estimated these expenditures for Duluth using values from 13 similar port cities located in the Great Lakes and beyond. These cities were selected because they were identified in the literature or by subject matter experts as sharing one or more characteristics with Duluth (e.g. small- and mid-sized cities, remote destinations, Great Lakes region, small vessel cruise ships, northern climates, emerging destinations) and because the research team was able to identify one or more metrics on the city's cruise industry (e.g. number of visitors per year, spending totals for passengers and crew, types of expenditures).

On average, for the 13 ports included in this sample, each cruise call brought 275 passengers and 160 crew members. Passengers spent $111 during their visit, while crew members spent $49. In addition, the research team estimated average spending per passenger at a home port to be $188.

Scenario 1, Early Adoption, represents the smallest direct benefits to the city and the port. In this scenario, passenger, crew member, and cruise ship spending could total roughly $677,000 per year from seven Viking cruise calls. These impacts will occur immediately, however, when Viking begins its tours to Duluth in 2022. Direct benefits grow increasingly larger for each of the other scenarios. Scenario 2 could bring between $1.2 million and $3.0 million in direct benefits to the city, depending on whether the city serves as a port of call or a home port. Scenario 3 could bring between $3.1 million and $8.1 million in economic benefits, depending on its port status (home port versus port of call).

Economic impact analysis tracks an initial economic shock or activity (like the direct spending of cruise passengers and crew members) through multiple rounds of industry and consumer spending to show the multiplier or ripple effects through a local economy. The initial shock or activity is considered the direct effect, the resulting increase in industry spending is the indirect effect, and the resulting increase in consumer spending is the induced effect. According to the results of economic impact modeling, Duluth and the surrounding area could see about $1.2 million in additional output as a result of the introduction of cruising to the city, even with only seven cruise calls per year. If the industry were to expand to 15 calls per year, total output could range from $1.6 million to $4.1 million in additional output, depending on whether

the city served as a port of call or home port. Finally, if the cruise industry were to expand to 40 cruise calls per year and Duluth serve as a home port, total output in the study area could be as large as $10.9 million.

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Appendix A. Definitions Used in this Report

Adventure cruise: Use smaller ships that can go where larger ships cannot. They offer passengers more personal, hands-on experiences with their destinations. Also called expedition cruises

Chandler services: A ship chandler is a person (or sometimes a group/agency) that supplies required commodities for a shipping vessel and its crew.

Compound annual growth: Smooths annual gains in revenue, returns, customers, and other business metrics over a specific number of years as if the growth had happened steadily each year over that time period.

Customs and border protection: The Homeland Security Department agency charged with preventing entry of terrorists and terrorist weapons, collecting import revenues, and enforcing customs and related laws.

Debarkation: The act of passengers and crew getting off a ship or aircraft. Also known as disembarkation.

Direct effect: Initial new spending in the study area resulting from the project

Disembarkation: The act of passengers and crew getting off a ship or aircraft. Also known as debarkation.

Dockage: A charge for the use of a dock

Eco-Tourism: Responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education

Economic impact: The effect of an event on the economy in a specified area, ranging from a single neighborhood to the entire globe. It usually measures changes in business revenue, business profits, personal wages, and/or jobs.

Employment: Estimates (from U.S. Department of Commerce secondary data) that are in terms of jobs, not in terms of full-time equivalent employees. Therefore, these jobs may be temporary, part-time, or short-term.

Embarkation: The act of passengers and crew boarding a ship or aircraft

Expedition cruise: Use smaller ships that can go where larger ships cannot. They offer passengers more personal, hands-on experiences with their destinations. Also called adventure cruises

Fuel bunkering: Bunkering is the supplying of fuel for use by ships, and includes the shipboard logistics of loading fuel and distributing it among available bunker tanks.

Home port: Port from which a cruise ship loads passengers and begins its itinerary, and to which it returns to disembark passengers upon conclusion of voyage. Sometimes referred to as embarkation port and turnaround port.

Indirect effect: The additional inter-industry spending from the direct impact. For example, increased sales in linen supply firms resulting from more motel sales would be an indirect effect of visitor spending.

Induced effect: The impact of additional household expenditures resulting from the direct and indirect impact. For example, motel employees spend the income they earn from increased tourism on housing, utilities, groceries, and other consumer goods.

Industry: A group of businesses based on their related primary business activities

Journeyman: A worker who has learned a trade and works for another person usually by the day

Labor income: All forms of employment income, including employee compensation (wages and benefits) and proprietor income

Leakages: Any payments made to imports or value added sectors that do not in turn re-spend the dollars within the region

Line handlers: Line handlers are responsible for the handling of vessel mooring lines in the connection with the docking (tie-up) or undocking (let go) of a vessel.

Metropolitan Statistical Area (MSA): A geographical region with a relatively high population density at its core and close economic ties throughout the area. MSAs are defined by the U.S. Census Bureau.

Multipliers: Total production requirements within the study area for every unit of production sold to final demand. Total production will vary depending on whether induced effects are included and the method of inclusion. Multipliers may be constructed for output, employment, and every component of value added.

Output: The value of local production required to sustain activities

Pilotage: The act or business of piloting

Pleasure cruise: A trip aboard a ship for recreational purposes

Port of call: A port where ships customarily stop for supplies, repairs or transfers of cargo or that which is designated on an itinerary

Sector: A hierarchical structure of business categories that typically follows the North American Industry Classification System (NAICS)

Shipping agent: A licensed agent in a port who transacts or supervises a ship's business, such as customs and immigration procedures, insurance, or documentation, on behalf of the owner.

Soo Locks: A set of parallel locks that enable ships to travel between Lake Superior and Lake Huron, thereby enabling a connection between Lake Superior with the Atlantic Ocean

Stevedoring: The act of loading or offloading cargo to and/or from a ship

USD: The abbreviation for U.S. dollars

Value added: A measure of the impacting industry's contribution to the local community; it includes wages, rents, interest, and profits

Wharf: A structure on the harbor shore where ships are docked for the purpose of loading and unloading cargo or passengers

Wharfage: A tax paid for the privilege of using a wharf

Appendix B. Assumptions for Calculating Passenger, Crew, Ship Spending

Table B-1 shows the average number of passengers per call, spending per passenger, and spending per crew member for the 13 similar ports, along with the corresponding data source(s) for each. These estimates were used to calculate the average out-of-pocket spending per passenger and crew member while visiting the Port of Duluth-Superior. Whenever multiple spending estimates were available, the team used the average value. For consistency, all spending estimates were converted into 2021 USD.

Table B-1. Passenger Counts and Spending Estimates per Cruise Call for Selected Ports

City, State or Country	*Passengers per call*	*Spending per passenger*	*Spending per crew member*	*Source*
Aalborg, Denmark	750	--	--	
Baie-Comeau, Quebec	450	$58	$34	Business Research & Economic Advisors (BREA)
Cleveland, Ohio	215	--	--	
Gothenburg, Sweden	--	$96	$34	Serry, Kowalczyk
Mackinac Island, Michigan	150	$150	$200	BBER Port Survey
Midland, Ontario	200	$172	$15	BBER Port Survey, B&A
Milwaukee, Wisconsin	250	--	--	
Muskegon, Michigan	80	--	--	
Parry Sound, Ontario	200	$67	$15	BBER Port Survey, B&A
Thunder Bay, Ontario	--	$54	$15	B&A
Trois-Rivieres, Quebec	200	$129	$34	BREA, BBER Port Survey
Veliko Gradiste, Serbia	85	--	--	
Wrangell, Alaska	450	$160	--	Federal Maritime Commission
Average	275	$111	$49	

SOURCE: BBER

On average, for the 13 ports included in this sample, passengers spent $111 during their visit, while crew members spent $49.

Of the cities shown in the table, only Midland, Ontario has served as a home port and provided passenger/crew spending estimates. Therefore, the research team using spending estimates for all home port cities identified in the literature[11] to estimate the average spending per passenger at a home port ($188 per passenger).

Table B-2 on the following page includes a complete list of all cruise ship expenditures anticipated for vessels visiting the Port of Duluth-Superior, along with a description of each item and any assumptions used to determine the estimate given.

[11] Port cities used in calculating spending at a home port were: Copenhagen, Denmark; Helsinki, Finland; St. Petersburg, Russia; Stockholm, Sweden; Tallinn, Estonia (Serry 2014); "Turnaround Port" (Kowalczyk 2018); Montreal, Quebec; Vancouver, British Columbia (BREA 2017); Vancouver, British Columbia (Scarfe 2011). All home port spending estimates were converted and inflated to 2021 USD.

Table B-2. Detailed Cruise Ship Expenses

Service or Expense	*Estimate*	*Description/Assumptions*
DECC Services		
Wharfage	$2,850	Costs to disembark passengers; based on the Port of Milwaukee's wharfage and labor charges
Garbage fee	$2,500	Estimate derived from conversations with local businesses
Dockage	$2,000	Cost to dock ship in harbor. Estimate derived by Duluth Seaway Port Authority
Security guards	$2,000	Estimate derived by Duluth Seaway Port Authority
Customs fee	$1,250	Assuming 4.5 officers for 6 hours for each visit. According to local sources, most customs and border protection officers working in Duluth are Grade 12 (Journeyman) and fall between Step 8 or 9 on the general services administration pay scale.[12] This would equate to an average wage of $45.96 per hour.
Line Handlers	$1,200	Costs associated with the handling of vessel mooring lines in docking and undocking. Estimate derived from conversations with local businesses.
Pilotage fee	$850	Pilotage fees in and out of Duluth. Based on an hourly pilotage fee of $337 per hour.[13] Assumes 14 hours of pilotage services in and out of Duluth. There are 21 pilots[14] in Western Great Lakes Pilot Association. Assumes 4 local pilots.
Water	$50	Based on the Port of Milwaukee's water expenses.
Shore Side Services		
Excursions	$19,250-$25,200	Costs derived from conversations with Visit Duluth, and assumes roughly $70 per passenger in excursion-related expenses. Scenario 1 estimate assumes 360 passengers per ship, Scenarios 2 and 3 assumes 275 passengers per ship.
Shipping agency service	$4,600	Estimate derived from conversations with local businesses
Crew Shifting	$1,795	Refers to crew coming in and out. Assumes 10 crew would "shift" in port. Assumes a cost of $150 per crew member for crew shifting and another $29.50 per crew member for airline expenses
Chandler services	$0	According to Viking, vessels would not be purchasing groceries while in Duluth
Spending per ship (Port of Call)	$38,345-$44,095	
Fuel		
Fuel bunkering (home port only)	$100,000	According to a variety of sources, fuel capacity on a small cruise vessel could range anywhere from 100,000-250,000 gallons. Current fuel costs (6-month average for Americas) range from $550 per ton for VLSFO 0.5% to $640 per ton for MGO fuel. Based on these values, the cost to completely refuel a vessel (from empty) could range from$250,000-$600,000. If Duluth-Superior served as a home port, this estimate assumes some share of vessels would choose to fuel prior to embarkation or after disembarkation, and those that refuel would be refueling only some portion of their fuel reserves.
Spending per ship (Home port)	$138,345-$144,095	

SOURCE: BBER

[12] https://www.opm.gov/policy-data-oversight/pay-leave/salaries-wages/salary-tables/pdf/2020/rus.pdf
[13] https://www.joc.com/sites/default/files/u48801/Analysis%20of%20Great%20Lakes%20Pilotage%20Costs.pdf
[14] https://www.wglpa.com/about-us/

Appendix C. Great Lakes Cruise Ships Dimensions and Capacity

Table C-1. Cruise Ships Most Likely to Visit Great Lakes

Cruise Operator	*Vessel*	*GRT*	*LOA (ft)*	*Beam (ft)*	*Draft (ft)*	*PAX (cap)*	*Crew*	*PAX/ Crew Ratio*
Hapag Lloyd	Hanseatic Inspiration	16,100	452.8	72.2	17.7	230	170	1.4
Hapag Lloyd	Hanseatic	8,378	402.9	59.1	15.4	184	122	1.5
Hapag Lloyd	Hanseatic Nature	16,100	452.8	72.2	17.7	230	170	1.4
Hapag Lloyd	Bremen	6,752	365.8	55.8	15.7	164	80	2.1
Pearl Seas Cruises	Pearl Mist	4,985	335.0	56.1	12.1	210		
Ponant	Le Champlain	10,000	419.9	59.1	14.4	180	110	1.6
Ponant	Le Boreal	10,700	466.2	59.1	16.1	264	138	1.9
Ponant	Le Bougainville	10,000	419.9	59.1	14.4	180	110	1.6
Ponant	Le Kerguelen	10,000	419.9	59.1	14.4	180	110	1.6
Ponant	Le Laperouse	10,000	419.9	59.1	14.4	180	110	1.6
Ponant	Le Lyrial	10,700	465.9	59.1	15.7	262	139	1.9
Ponant	Le Ponant	1,489	288.7	39.4	13.1	64	32	2.0
Ponant	Le Soleal	10,600	465.9	59.1	16.1	264	139	1.9
Ponant	L'Austral	10,700	465.9	59.1	15.4	264	138	1.9
Ritz Carlton	TBD	TBD	623.4	TBD	TBD	298		
Ritz Carlton	TBD	TBD	623.4	TBD	TBD	298		
Ritz Carlton	TBD	TBD	623.4	TBD	TBD	298		
Victory Cruise Lines	Victory I	4,954	285.4	49.2	13.1	202		
Victory Cruise Lines	Victory II	4,954	285.4	49.2	13.1	202		
Average		9,151	401	58	15	219	121	1.72

SOURCE: BBER, ADAPTED FROM "CRUISE SHIPS ABLE TO TRANSIT GREAT LAKES LOCKS (2020)" IN BERMELLLO AJAMIL & PARTNERS (B&A) (2018)

Appendix D. Input-Output Modeling

Data Sources

This study uses the IMPLAN Group's input-output modeling data and software (IMPLAN version 3.1). The IMPLAN database contains county, state, zip code, and federal economic statistics, which are specialized by region, not estimated from national averages. Using classic input-output analysis in combination with region-specific Social Accounting Matrices and Multiplier Models, IMPLAN provides a highly accurate and adaptable model for its users. IMPLAN data files use the following federal government data sources:

- U.S. Bureau of Economic Analysis Benchmark Input-Output Accounts of the U.S.
- U.S. Bureau of Economic Analysis Output Estimates
- U.S. Bureau of Economic Analysis Regional Economic Information Systems (REIS) Program
- U.S. Bureau of Labor Statistics Covered Employment and Wages (CEW) Program
- U.S. Bureau of Labor Statistics Consumer Expenditure Survey
- U.S. Census Bureau County Business Patterns
- U.S. Census Bureau Decennial Census and Population Surveys
- U.S. Census Bureau Economic Censuses and Surveys
- U.S. Department of Agriculture Census

IMPLAN data files consist of the following components: employment, industry output, value added, institutional demands, national structural matrices, and inter-institutional transfers. Economic impacts are made up of direct, indirect, and induced impacts. The data used was the most recent IMPLAN data available, which is for the year 2017. All data are reported in 2018 dollars.

Economic impacts are made up of direct, indirect, and induced impacts. The following are suggested assumptions for accepting the impact model: IMPLAN input/output is a production-based model, and employment numbers (from U.S. Department of Commerce secondary data) treat both full- and part-time individuals as being employed.

Regional data for the impact models for value added, employment, and output are supplied by IMPLAN for this impact. Employment assumptions were provided to the model to enable construction of the impact model. From these data, social accounts, production, absorption, and byproducts information were generated from the national level data and was incorporated into the model. All region study definitions and impact model assumptions were agreed on before work with the models began.

Modeling Assumptions

The following are suggested assumptions for accepting the impact model:[15]

Backward-Linkages: IMPLAN is a backward-linkage model, meaning that it measures the increased demand on industries that produce intermediate inputs as a result of increases in production. However, if an industry increases production, there will also be an increased supply of output for other industries to use in their production. Models that measure this type of relationship are called forward-linkage models. To highlight this

[15] Bureau of Economic Analysis https://www.bea.gov/papers/pdf/WP_IOMIA_RIMSII_020612.pdf

concept, consider the example of a new sawmill beginning its operations in a state. The increased production as a result of the sawmill's operations will increase the demand for lumber, creating an increase in activity in the logging industry, as well as other supporting industries such as electric transmission and distribution. IMPLAN's results will include those impacts but will exclude effects on any wood product manufacturers located nearby that might be impacted by the newly available supply of lumber.

Employment: IMPLAN input-output is a production-based model, and employment numbers (from U.S. Department of Commerce secondary data) treat both full- and part-time individuals as being employed.

Fixed prices and no supply constraints: IMPLAN is a fixed-price model. This means that the modeling software assumes no price adjustment in response to supply constraints or other factors. In other words, the model assumes that firms can increase their production as needed and are not limited by availability of labor or inputs and that firms in the local economy are not operating at full capacity.

Fixed production patterns: Input-output (I-O) models assume inputs are used in fixed proportion, without any substitution of inputs, across a wide range of production levels. This assumption assumes that an industry must double its inputs (including both purchases and employment) to double its output. In many instances, an industry will increase output by offering overtime, improving productivity, or improvements in technology.

Industry homogeneity: I-O models typically assume that all firms within an industry have similar production processes. Any industries that fall outside the typical spending pattern for an industry should be adjusted using IMPLAN's Analysis-by-Parts technique.

Leakages: A small area can have a high level of leakage. Leakages are any payments made to imports or value added sectors, which do not in turn re-spend the dollars within the region. What's more, a study area that is actually part of a larger functional economic region will likely miss some important linkages. For example, workers who live and spend outside the study area may actually hold local jobs.

Appendix E. IMPLAN Sectors Used in Modeling

Table E-1. Percentage of Passenger and Crew Spending by Category (Average per Cruise Call)

Spending category	*Passenger Spending (Port of Call)*	*Passenger Spending (Home Port)*	*Crew Spending*	*Excursion Spending*
Activities/tours	46%	25%	6%	73%
Retail spending	37%	16%	53%	0%
Food/beverage	14%	20%	36%	23%
Other spending	3%	2%	5%	5%
Lodging	0%	38%	0%	0%

SOURCE: BBER

Table E-2. IMPLAN Sectors Used in Modeling Passenger and Crew Spending Impacts

IMPLAN Sector Description	*Passenger Spending (Port of Call)*	*Passenger Spending (Home Port)*	*Crew Spending*	*Excursion Spending*
404 - Electronics and appliance stores	✓	✓	✓	✗
406 - Food and beverage stores	✓	✓	✓	✓
407 - Health and personal care stores	✓	✓	✓	✗
409 - Clothing and clothing accessories stores	✓	✓	✓	✗
410 - Sporting goods, hobby, & musical instruments	✓	✓	✓	✗
411 - General merchandise stores	✓	✓	✓	✗
412 - Miscellaneous store retailers	✓	✓	✓	✗
413 - Non-store retailers	✓	✓	✓	✗
415 - Rail transportation services	✓	✓	✓	✓
416 - Water transportation services	✓	✓	✓	✗
418 - Transit and ground passenger transportation services	✓	✓	✓	✓
473 - Business support services	✓	✓	✓	✓
474 - Travel arrangement and reservation services	✗	✓	✗	✗
501 - Museum, heritage, zoo, and recreational services	✓	✓	✓	✓
502 - Amusement parks and arcades	✓	✓	✓	✓
504 - Other amusement and recreation	✓	✓	✓	✓
507 - Hotels and motel services, including casino hotel	✗	✓	✗	✗
508 - Other accommodation services	✗	✓	✗	✗
509 - Full-service restaurant services	✓	✓	✓	✓
510 - Limited-service restaurant services	✓	✓	✓	✓
511 - All other food and drinking place services	✓	✓	✓	✓
520 - Other personal services	✓	✓	✓	✓

SOURCE: IMPLAN, BBER

Table E-3. IMPLAN Sectors Used in Modeling Cruise Ship Spending Impacts

IMPLAN Sector
Water, sewage and other systems
Scenic and sightseeing transportation and support activities for transportation
Other amusement and recreation industries
Wholesale – Petroleum and petroleum products
Investigation and security services
Waste management and remediation services
Employment and payroll of federal govt, non-military

SOURCE: IMPLAN

Appendix F: Detailed Economic Impacts Results

The tables in this section show the detailed economic impacts for each of the scenarios used in modeling. For each scenario, total effects are shown by type of spending (e.g. passenger, crew, cruise ship, airport) and then by direct,[16] indirect, and induced effects for all spending types. For more information on the terms used in the tables, see Appendix A.

Scenario 1: Early adoption

Economic Impacts by Type of Spending, Scenario 1 (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Passenger Spending Effects	6	$184.6	$312.0	$570.1
Crew Spending Effects	1	$29.5	$46.3	$89.9
Excursions Effects	3	$87.1	$148.0	$265.7
Cruise Ship Effects	2	$90.9	$124.2	$228.9
Total Effects	12	$392.7	$630.4	$1,154.7

*Totals may not sum due to rounding

SOURCE: BBER

Economic Impacts by Type of Effect, Scenario 1 (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	6	$184.6	$312.0	$570.1
Indirect Effect	1	$29.5	$46.1	$89.7
Induced Effect	3	$87.1	$148.0	$265.7
Total Effect	2	$90.9	$124.2	$228.9

*Totals may not sum due to rounding

SOURCE: BBER

Scenario 2A: Expanding interest (port of call)

Economic Impacts by Type of Spending, Scenario 2A (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Passenger Spending Effects	6	$182.7	$293.3	$569.8
Crew Spending Effects	1	$39.7	$62.2	$120.9
Excursions Effects	5	$149.9	$252.7	$453.3
Cruise Ship Effects	4	$194.7	$266.1	$490.5
Total Effects	16	$567.0	$874.3	$1,634.6

*Totals may not sum due to rounding

SOURCE: BBER

[16] Due to margining, the actual direct effects shown in these tables is somewhat lower than the direct economic benefits shown in Chapter 3. In the IMPLAN model, retail industries have margins on their goods, and only a portion of each sale is introduced into the local economy. See the full definition of margining in Appendix A for more information.

Economic Impacts by Type of Effect, Scenario 2A (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	12	$382.9	$551.0	$1,002.7
Indirect Effect	2	$78.0	$128.1	$280.0
Induced Effect	2	$106.1	$195.2	$351.9
Total Effect	16	$567.0	$874.3	$1,634.6

*Totals may not sum due to rounding

SOURCE: BBER

Scenario 2B: Expanding interest (home port)

Economic Impacts by Type of Spending, Scenario 2B (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Passenger Spending Effects	11	$361.7	$577.7	$1,116.1
Crew Spending Effects	1	$39.7	$62.2	$120.9
Excursions Effects	5	$149.9	$252.7	$453.3
Cruise Ship Effects	4	$194.7	$266.1	$490.5
Airport Effects	0	$25.1	$51.2	$95.0
Fuel Effects	1	$101.1	$765.7	$1,830.5
Total Effects	23	$872.4	$1,975.6	$4,106.3

*Totals may not sum due to rounding

SOURCE: BBER

Economic Impacts by Type of Effect, Scenario 2B (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	16	$549.5	$1,379.5	$2,901.7
Indirect Effect	3	$159.6	$296.0	$663.4
Induced Effect	4	$163.3	$300.2	$541.2
Total Effect	23	$872.4	$1,975.6	$4,106.3

*Totals may not sum due to rounding

SOURCE: BBER

Scenario 3A: Premier destination: (port of call)

Economic Impacts by Type of Spending, Scenario 3A (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Passenger Spending Effects	15	$493.4	$792.4	$1,540.3
Crew Spending Effects	4	$107.2	$167.9	$326.1
Excursions Effects	13	$399.8	$674.0	$1,208.9
Cruise Ship Effects	10	$519.3	$709.5	$1,308.0
Total Effects	42	$1,519.7	$2,343.8	$4,383.3

*Totals may not sum due to rounding

SOURCE: BBER

Economic Impacts by Type of Effect, Scenario 3A (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	31	$1,026.0	$1,477.0	$2,689.1
Indirect Effect	4	$209.2	$343.7	$751.1
Induced Effect	6	$284.5	$523.1	$943.1
Total Effect	42	$1,519.7	$2,343.8	$4,383.3

*Totals may not sum due to rounding

SOURCE: BBER

Scenario 3B: Premier destination (home port)

Economic Impacts by Type of Spending, Scenario 3B (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Passenger Spending Effects	29	$964.6	$1,540.6	$2,976.3
Crew Spending Effects	4	$107.2	$167.9	$326.1
Excursions Effects	13	$399.8	$674.0	$1,208.9
Cruise Ship Effects	10	$519.3	$709.5	$1,308.0
Airport Effects	1	$66.1	$134.6	$248.4
Fuel Effects	4	$269.6	$2,041.9	$4,881.2
Total Effects	61	$2,326.6	$5,268.5	$10,949.0

*Totals may not sum due to rounding

SOURCE: BBER

Economic Impacts by Type of Effect, Scenario 3B (Thousands of 2022 USD)

Impact Type	*Employment*	*Labor Income*	*Value Added*	*Output*
Direct Effect	42	$1,465.6	$3,678.7	$7,736.7
Indirect Effect	8	$425.6	$789.1	$1,768.7
Induced Effect	10	$435.4	$800.6	$1,443.5
Total Effect	61	$2,326.6	$5,268.5	$10,949.0

*Totals may not sum due to rounding

SOURCE: BBER