



# Final Report

## 2021 – Beaver Island Transportation Plan Update



Submitted to: Beaver  
Island Transportation  
Authority

Submitted by:  
Mp2planning, LLC,

in association with

JDrury Consulting, LLC  
The Corradino Group

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## 1. INTRODUCTION

The Beaver Island Transportation Authority (BITA), with funding from the Michigan Department of Transportation (MDOT), engaged Mp2planning, llc to conduct a master plan and transportation study to address the following issues regarding the provision of ferryboat services for Beaver Island through the partnership between BITA and the Beaver Island Boat Company (BIBCO):

1. Examine the current private/public partnership's effectiveness. What recommended changes should be made to the operational agreement to reflect current and future needs. Is the current operator the best option? Is a public option a possibility?
2. Why have passenger numbers declined? Are passenger fares and freight rates equitable or should they be reduced?
3. What does the Authority need to update in terms of vessels and infrastructure, based on economic forecasts for Beaver Island?
4. What are the Authority's best options for revenue enhancements?

These questions and others that arise during the study are addressed through the work done in a series of tasks described below which resulted in an update of the 2004 study with a focus on the future. This report documents the study effort. It should be recognized that this study was conducted during the COVID-19 pandemic, which had an effect on travel and living patterns across the world. Beaver Island is no different. There is evidence that travel to and from the island increased significantly from April 2019 to December 2021. The real estate market was very busy with people apparently buying properties over the phone and internet unseen.



## 2. EXISTING DATA AND STATISTICS

This chapter provides information on the existing ferry and air services providing transportation to Beaver Island and general demographic and development trends.

### Existing Marine Transportation Services

Ferry service between the mainland and Beaver Island has existed since the late 1800's. In the mid-1980's, a group of residents and property owners purchased the privately held Beaver Island Boat Company (BIBCO), which had been created in about 1955. It continues to be the sole operator of ferry service on the island and currently operates the Emerald Isle (its primary boat) through an operating agreement with the Beaver Island Transportation Authority (BITA). More information on the operating agreement and how it works for the island is presented later in this report. A history of ferry service on Beaver Island is presented in the appendix.

Beaver Island is the largest island in Lake Michigan and is further from the mainland than any other permanently inhabited island in Lake Michigan, or the United States for that matter. Currently, publicly available ferry service for passengers, passenger vehicles, freight, semi-trailers and other trucks is provided by the Beaver Island Boat Company. The BIBCO operates two boats, the 130-foot Emerald Isle (passenger capacity including crew – 295; vehicle capacity 20/includes one heavy truck) and the 98-foot Beaver Islander (passenger capacity including crew – 172; vehicle capacity 12 cars/no heavy trucks). The Beaver Islander was launched in 1962 and is owned by BIBCO. The Emerald Isle was launched in 1997 and is owned by BITA. Information about these vessels is provided in Table 2-1.

Table 2-1: Vessel Characteristics

	Emerald Isle		Beaver Islander	
Capital Cost	\$3.5 million		n/a	
Year Launched	1997		1962	
Capacity				
Passengers	295		172	
Cars	20		12	
Semi-trucks	1		None	
Cargo	95 gross tons			
Trailers	Max length 46', max height 13'6"		Max height 10'	
Operating speed	14.5 knots		14 knots	
Size	Length	130'	Length	96' 3"
	Beam	39'	Beam	27'
	Draft	8'6"	Draft	7' 3"

Size of Crew	4	4
Rough Water Capable	Yes	Yes
Ice Capable	Rated for modest ice but not typically used in ice	n/a
Current Operations	Daily trips to Beaver Island and Charlevoix April-Dec. (32 miles)	Daily trips to Beaver Island and Charlevoix April-Dec. (32 miles)
Builder	Washburn & Doughty Associates	Sturgeon Bay Shipbuilders

Source: JDrury Consulting, LLC

Table 2-2 presents historical passenger data. Table 2-3 presents passenger and vehicle statistics by month for the years 2016 through 2020.

Table 2-2: Historical Beaver Island Ferry Historical Passenger Data

Year	Passengers	% Change	Cumulative % Change	Population Beaver Island
2001	36,938	NA	NA	551
2002	44,339	20.04%	20.04%	
2003	39,601	-10.69%	9.35%	
2004	40,088	1.23%	10.58%	
2005	41,915	4.56%	15.14%	
2006	43,308	3.32%	18.46%	
2007	38,816	-10.37%	8.09%	
2008	36,868	-5.02%	3.07%	
2009	34,761	-5.71%	-2.64%	
2010	34,753	-0.02%	-2.67%	526
2011	34,958	0.59%	-2.08%	
2012	34,429	-1.51%	-3.59%	
2013	31,341	-8.97%	-12.56%	
2014	30,806	-1.71%	-14.27%	
2015	31,232	1.38%	-12.88%	
2016	31,191	-0.13%	-13.02%	
2017	30,165	-3.29%	-16.31%	
2018	30,601	1.45%	-14.86%	
2019	30,045	-1.82%	-16.68%	
2020	24,977	-16.87%	-33.54%	577
2021	33,925	35.82%	2.28%	

Source: JDrury Consulting, LLC and Mp2planning (Fiscal year counts 10/1-9/30)

Table 2-3: Monthly Historical Passenger and Vehicle Statistics (2016-2020)

	2016		2017		2018		2019		2020		2021	
Month	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.
April	314	135	310	165	199	113	202	126	0	0	330	206
May	2,049	425	1,952	506	2,019	474	1,804	560	795	417	1,979	703
June	4,218	795	4,335	812	4,656	929	4,364	902	3,030	859	5,911	1,239
July	11,233	1,623	10,850	1,675	10,180	1,593	10,158	1,672	8,539	1,642	10,774	1,897
August	8,307	1,327	7,790	1,310	8,622	1,435	8,769	1,439	8,065	1,669	8,999	1,592
September	2,930	518	3,054	640	2,853	606	2,719	568	3,515	823	3,562	771
October	1,331	398	1,331	435	1,350	479	977	305	1,584	562	2,252	570
November	464	232	563	248	560	265	326	194	672	390	987	394
December	79	72	178	89	119	74	108	81	114	133	293	172
Total	30,925	5,525	30,363	5,880	30,558	5,968	29,427	5,817	26,314	6,496	35,087	7,544
Difference	-	-	-562	355	195	88	-1131	-151	-3113	679	8,783	1048
% Difference	-	-	-2%	6%	1%	1%	-4%	-3%	-11%	12%	33%	16%

Source: JDrury Consulting LLC, BITA and BIBCO

\*Table is calendar year figures

BIBCO operates the ferry service from mid-April to just before Christmas. There are up to four trips per day (two each way) during the peak season of June through August. Otherwise, there is generally one trip per day. The 2021 schedule is presented in Figure 2-1.



Heading to Charlevoix on a Red run (fuel trucks/no passengers, no vehicles)

Figure 2-1: Ferry Schedule



Fares for the ferryboat service in 2021 are as follows:

PEAK SEASON: MAY 24 – SEP 7

NON-PEAK: APRIL 14 – MAY 23 & SEP 8 – DEC 21

Passenger Fares

Prices indicated as a One-Way fee

Adult (ages 13+) Peak \$32.50 — Non-Peak \$27.50 Roundtrip: Peak \$65.00 — Non-Peak \$55.00

Adult (book of 20) Peak \$630 — Non-Peak \$530

Child (ages 5-12) Peak \$20 — Non-Peak \$15 Roundtrip: Peak \$40.00 — Non-Peak \$30.00

Child (4 & Under) FREE

Pet Ticket \$12.00

Parking \$5 per night / \$25 per week

Vehicles & Trailers (Passenger Fare not Included)

\* ALL VEHICLES & TRAILERS REQUIRE RESERVATIONS

Prices indicated as a One-Way fee

Vehicle (less than 7'6" high, up to 16' long) \* Peak \$105 — Non-Peak \$100  
Vehicle (less than 7'6" high, 16'1" to 19' long) \* Peak \$115 — Non-Peak \$110  
Vehicle (less than 7'6" high, 19'1" long & up) Please call with overall dimensions  
\*

Vehicle (greater than 7'6" high) Please call with overall dimensions \*  
Trailer Please call with overall dimensions \*

Recreation and Smaller Transportation

Prices indicated as a One-Way fee

Bicycle \$12  
Moped (up to 90cc) \$20  
Motorcycle (91-349cc) \*\* \$35  
Motorcycle (350cc & up) \* \$50  
Kayak or canoe (must be empty) \*\* \$25  
Snowmobile or waverunner/jet ski (on pallet) \*\* \$60  
Golf Cart, Gator, etc... Side by Side ATV Please call with overall dimensions \*  
ATV (3&4 wheeler) \*\* (up to 349CC) under 8 feet long \$30  
ATV (3&4 wheeler) \*\* (349CC and up) under 8 feet long \$50

\* Requires reservations. Call with overall dimensions for accurate price (include items on outside, e.g. bike racks, luggage carriers.)

\*\* To guarantee shipping on a particular departure, reservations are required. Otherwise, all items are shipped as space becomes available. We do not hold vehicles without reservations until space becomes available.

All measurements are rounded to the next higher foot.

Vessel Beaver Islander requires height restriction of 6'4".

Vessel Emerald Isle large vehicle size restrictions:

Restrictions on Vehicles Over 7'6" High

The ferry loads from the stern (back) and has space for a vehicle up to 13'6" high and 46' long.



Forward of that 46', the height restriction drops down to a maximum of 7'6" high.

If you need us to unload bunks of lumber from the back of a trailer to meet this restriction, let us know so that we can save space for the lumber we lift off.

Vessel Emerald Isle requires maximum of 50 tons GVW and no more than 4500 pounds per tire.

Passenger fares and freight rates are recommended by BIBCO and approved by BITA under the terms of their management and fuel purchasing agreement and as mandated by federal regulations.<sup>1</sup> An analysis of BIBCO fares conducted as part of the 2004 study found that "...BIBCO fares are reasonable, if not lower than other ferry operations."<sup>2</sup>

Many people transport personal freight on the ferry, which can include anything from a letter to a large container. People are allowed to bring two pieces of personal luggage on the ferry at no charge. There is a charge for food, groceries, fish, ice cream, coolers, dry cleaning and laundry, etc. Passengers can also pay for a cage or a wooden box. There are rate sheets for construction materials (i.e., doors, drywall, lumber), recreational equipment and machines (i.e., motorcycles, snowmobiles, kayaks) as well as seasonal items such as lawn mowers and bags of deer bait.

### Comparable Marine Ferry Systems

There are a number of ferry operations in the United States that have fairly comparable route distances to the Beaver Island operation. Table 2-4 presents a selection of these systems. One example is the Cape May – Lewes Ferry. This system provides service between Cape May, New Jersey and Lewes Delaware. The ferry crosses the Delaware Bay and is guided by a two-state transportation authority (the Delaware River and Bay Authority, DRBA). The ferry system is currently working on a Marine Master Plan that will guide future capital and operating decisions. The system operates three vessels. The DRBA is undergoing a master plan process similar to Beaver Island and, as part of that plan, is considering a high-speed ferry.

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<sup>1</sup> 23 U.S.C. 129c and 147

<sup>2</sup> Beaver Island Transportation Coordination Study, Final Report, submitted to the Beaver Island Transportation Authority Board of Directors, prepared by The Corradino Group, Inc., December 2004



Day trippers with bicycles exiting the Cape May – Lewes Ferry.

Table 2-4: Comparable Ferry Systems

System	Location-Destination	Publicly subsidized?	Distance	Passage Duration	Vessel Size	Propulsion	Passenger/Vehicle Capacity
Inter-Island Ferry Authority	Ketchikan, AK-Hollis, AK	Yes	48.6 miles	3 hours	198' long, 51' beam	Diesel	MV Prince of Wales: 160/30 MV Stikine: 190/30
Cape May-Lewes Ferry	Cape May, NJ-Lewes, NJ	Yes	17 miles	85 minutes	320' long, 69' beam	Diesel	800/100
Washington State Ferries	Anacortes-San Juan Islands	Yes	18.4 miles	73 minutes (non-stop)	328' long, 78'8" beam	Diesel	1200/124
Matinicus Ferry	Rockland, ME to Matinicus Island	Yes	23 miles	2 hours 15 minutes	105' long, 27' 11" beam	Diesel	175/12
Ocrakoke Island Ferry	Hatteras, NC to Ocrakoke Island, NC	Yes	17.95 miles	1 hour	176' long, 46' beam	Diesel	300/40
Lake Chelan Boat Company	Chelan, WA to Stehekin, WA	No	50 miles	4 hours: Lady of the Lake	100' long, 24' beam	Diesel	285/0
				2.5 hours: Lady Express	65' long, 21' beam	Diesel	145/0
				1.5 hours: Lady Cat	51' long, 17' beam	Diesel	43/0
Catalina Island Ferry	Los Angeles, CA to Catalina Island, CA	No	22 miles	1 hour by multiple vessels	144' length, 39' beam	Diesel	450/0
Alaska Marine Highway	Hoonah, AK to Juneau, AK	Yes	55 miles	3 hours 15 minutes	235' long, 57' beam	Diesel	225/33
Beaver Island Ferry	Charlevoix, MI to Beaver Island, MI	Yes	32 miles	2 hours 10 minutes	130' long, 39' beam	Diesel	294/20

Source: JDrury Consulting, 2021

## Ferryboat Technology Assessment

The 2004 study reviewed several boat types as options to the Emerald Isle and Beaver Islander, which are monohull boats. In addition to monohulls (and monohull open deck ferries), catamarans and hovercrafts were evaluated. It was concluded that due to cost and operational feasibility, continuing with a monohull type boat is the best option in the future for Beaver Island. There does not seem to be in the literature or practical application around the country information to suggest that another type of boat makes more sense than the monohull to meet the island's needs. The issue of engine type is discussed next.

As can be seen in the analysis of comparable ferry systems, diesel is the universal engine of choice. The question is should diesel be the technology of choice for the Beaver Island ferries going forward. In 2023 and 2024, BITA will have an engine overhaul (at a cost of approximately \$1 million) as part of a \$2 million project to include work on transmissions and dry-docking costs). BITA has a new boat design for eventual replacement of the Emerald Isle (which would become the backup boat). As some ferry systems are building or exploring diesel electric powered ferries and as other modes of transportation continue to move toward alternative fuel sources (hybrid-electric, natural gas, full electric, etc.) technology planning for a vessel that will likely be in service for multiple decades is considered in this report.

## Air Travel

There are two airlines that provide service to the island: Island Airways and Fresh Air Aviation. Both have offices at the Charlevoix Airport. Island Airways operates from a private airport located on the north side of the island off King's Highway. Fresh Air operates from the public airport off Donnel Mor's Lane. Fares are approximately \$57 for a one-way trip and \$114 for a round trip. The trip duration for both operators is about 15 minutes. Both airlines operate year-round weather permitting.



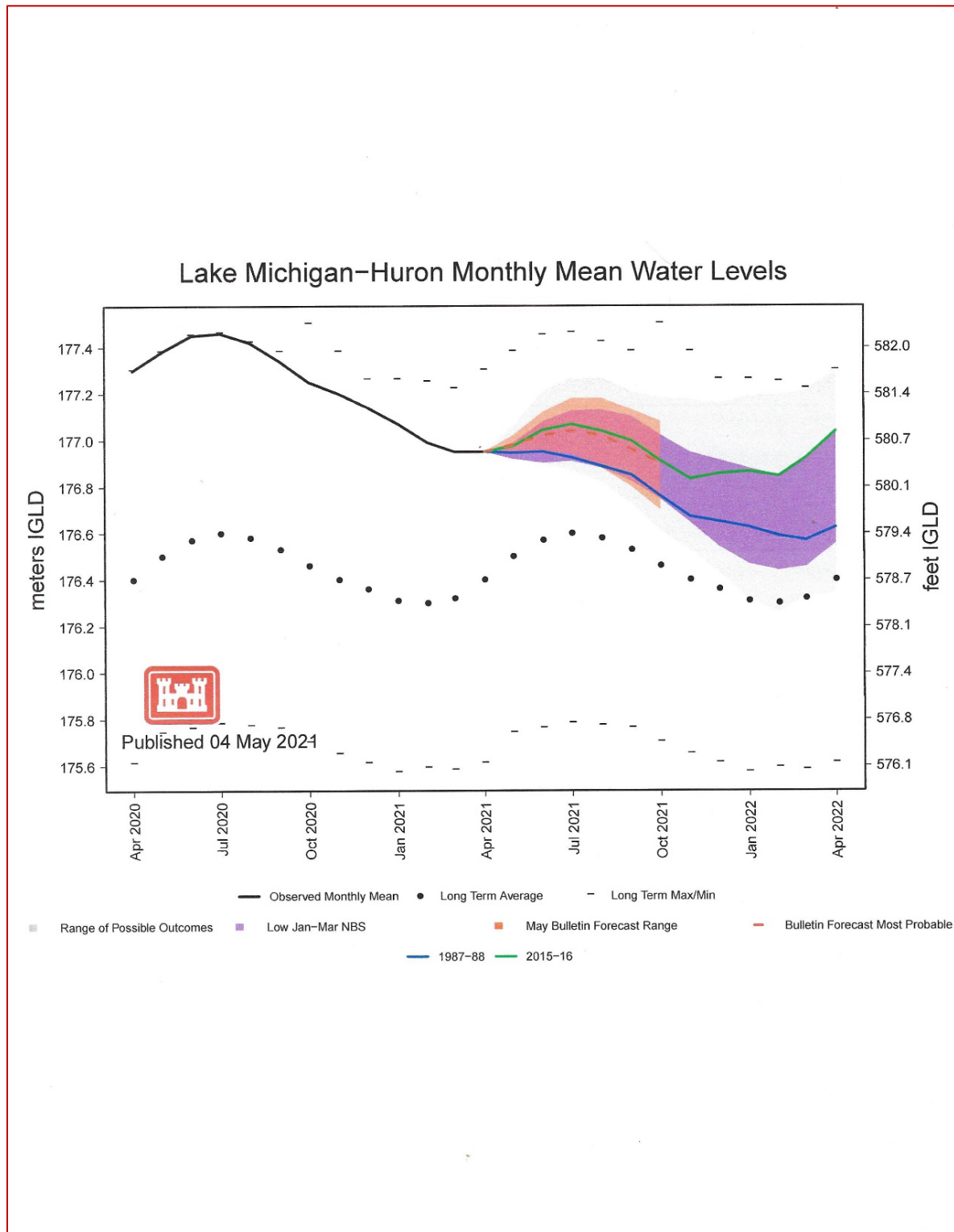
Discussions with staff and others on the island indicated air travel as an important option to the ferry. Given that the costs are comparable and the fact that many residents have vehicles on both the island and the mainland, people will tend to fly to save time. This obviously impacts the number of riders on the ferry as many trips that formerly were made on the ferry have now shifted to air service.

#### Lake Levels

As part of the review of the docks, staff from the Beaver Island Boat Company pointed out high water levels in the past years as part of the reason there are several washouts in the parking area that need to be addressed (see photo). These potentially could destabilize the dock and much of the surrounding pavement. Part of the issue is the perennially high lake levels for the past several years which flood as much as 50 percent of the dock area. This year the lake has dropped several inches. While it is beyond the scope of this study to develop lake level forecasts, it is important from a planning perspective to try and understand what the future holds for Lake Michigan. Figure 2-2 presents information that shows while lake levels in Lakes Michigan and Huron are down this year they are still well above the long-term average (black dots on graphic).



Figure 2-2: Lake Levels



Source: U.S. Army Corps of Engineers, May 2021, Monthly Bulletin of the Great Lakes

## Demographics

Beaver Island has a population of permanent residents and an influx of seasonal residents and tourists (somebody who visits the island for recreation but does not own property there). According to staff of BITA and based on conversations with others on the island, there has been a surge in real estate and development activity, as well as increases since COVID of passenger traffic to and from the island, but this is anecdotal and the extent to which it was influenced by COVID-19 is not determined. The information in this section will be used to help generate ridership forecasts for future travel to the island. Table 2-4 presents basic demographic information for the island.

Table 2-4  
Demographic Characteristics

Population				
	2010	2015	2019	2020 (New census)
Peaine Township	268	272	266	266
St. James Township	258	312	311	259
Total Beaver Island	526	584	577	525
Charlevoix County	26,228	26,134	26,188	26,054
Michigan	9,952,687	9,900,571	9,965,265	10,077,331
Household				
	2010	2015	2019	2020 (New census)
Peaine Township	124	128	133	141
St. James Township	109	141	161	135
Total Beaver Island	233	269	294	276
Charlevoix County	11,355	10,794	11,503	11,274
Michigan	3,843,997	3,841,148	3,935,041	4,041,760
Employment <sup>1</sup>				
	2010	2015	2019	2020 (Not available)
Charlevoix County	14,212	15,586	15,677	
Michigan	5,038,194	5,501,549	5,772,831	

Source: American Community Survey (2010-2019); Bureau of Economic Analysis; data compiled by The Corradino Group; 2020 census data compiled from US Census by The Corradino Group.

1) Employment data from Bureau of Economic Analysis is only available at the county- and state-level.

Table 2-5 presents a comparison of demographic trends on Beaver Island with the County, State of Michigan, and surrounding states.

Table 2-5: Comparison of Demographic Trends

Population				
	2010	2015	2019	2010 - 2019 Change
Peaine Township	268	272	266	-1%
St. James Township	258	312	311	21%
Total Beaver Island	526	584	577	10%
Charlevoix County	26,228	26,134	26,188	-0.2%
Michigan	9,952,687	9,900,571	9,965,265	0.1%
Wisconsin	5,637,947	5,742,117	5,790,716	2%
Illinois	12,745,359	12,873,761	12,770,631	1%
Indiana	6,417,398	6,568,645	6,665,703	2%
Ohio	11,512,431	11,575,977	11,655,397	1%
Households				
	2010	2015	2019	2010 - 2019 Change
Peaine Township	124	128	133	7%
St. James Township	109	141	161	48%
Total Beaver Island	233	269	294	26%
Charlevoix County	11,355	10,794	11,503	1%
Michigan	3,843,997	3,841,148	3,935,041	2%
Wisconsin	2,274,611	2,299,107	2,358,156	4%
Illinois	4,769,951	4,786,388	4,846,134	2%
Indiana	2,465,402	2,501,937	2,570,419	4%
Ohio	4,552,270	4,585,084	4,676,358	3%
Employment				
	2010	2015	2019	2010 - 2019 Change
Charlevoix County	14,212	15,586	15,677	10%
Michigan	5,038,194	5,501,549	5,772,831	15%
Wisconsin	3,426,438	3,624,584	3,753,460	10%
Illinois	7,251,002	7,748,868	7,962,884	10%
Indiana	3,525,335	3,796,419	4,006,907	14%
Ohio	6,418,162	6,862,127	7,142,330	11%

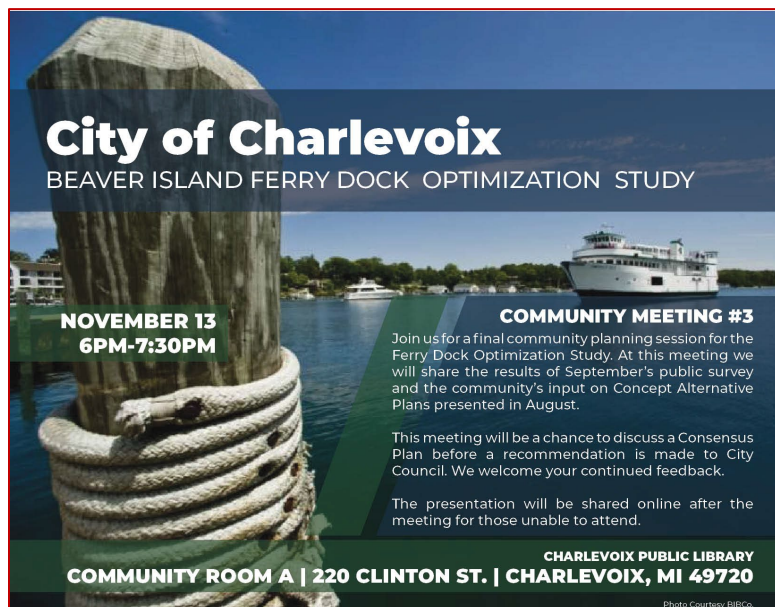
Source: American Community Survey (2010-2019); Bureau of Economic Analysis; data compiled by The Corradino Group



## Local Planning Efforts

There have been a number of recent planning efforts conducted that directly relate to this study. These include the Beaver Island Master Plan, 2017; the Charlevoix County Master Plan; and the Beaver Island Dock Optimization Study. In summary, the master plans paint a similar picture of a thriving, sustainable community that is an attractive place to live, work, and recreate. On Beaver Island, the master plan predicts a small increase in population but notes that the aging population on the island plus the lack of new families moving to the island are among many issues that must be addressed. Clearly, there will always be a need for ferry boat transportation. The Beaver Island plan identified exploring funding options for the Emerald Isle and development of a “deep” harbor suitable for U.S. Coast Guard vessels, cruise ships, etc.

The City of Charlevoix sponsored a study to examine alternate locations in Charlevoix for the Beaver Island Boat Company dock and operations. This study, conducted in 2019, was sponsored by Charlevoix City Council to determine if there was an alternative to the current location of the BIBCO operations in downtown Charlevoix, which has issues with congestion downtown, operational functionality of loading cargo and vehicles, and the potential for a new larger ferry. The study was conducted by a consulting firm, Edgewater Resources, and concluded that a downtown option with some localized improvements and an off-site shared parking garage was the best option given the various locations, community sentiment, and the fact that the owner of the St. Mary’s site did not want to move forward.



### 3. Organizational Analysis

The Beaver Island Transportation Authority (BITA) is an Act 196 Public Transportation Authority formed in 1992 by St. James Township on Beaver Island, MI. The Beaver Island Boat Company (BIBCO) requested that the St. James Township to form the Authority as a public entity was required to apply for state and federal funds. The intent was to apply for Federal and State funds to build a new Ferryboat and upgrade the docks on Beaver Island. Federal funding was secured in 1994 via a Federal earmark from FHWA's Ferryboat Discretionary Program.

In preparation of receiving federal and state funding the Boat Company (BIBCO) drafted a 30-year management agreement with BITA. This agreement allowed them to operate a vessel which BITA would procure and own. BIBCO also entered into a dock lease agreement with BITA for the dock which BIBCO owned so the dock could be reconfigured for a new vessel with state and federal funds. Over the years, BIBCO requested that BITA pursue other facility projects, and with each project a lease or license agreement was entered into to allow the projects to be constructed on BIBCO owned property. These license agreements were added to the original management agreement. BIBCO has a lease agreement with the City of Charlevoix for the mainland docking operation.

In 2002, the BITA board asked MDOT to intervene on their behalf with BIBCO to amend the management agreement as BITA there were several important federal requirements with which BITA needed to comply that were missing. The management agreement was revised in 2003, and as BITA was not receiving operating assistance for vessel operations MDOT did not formally approve the agreement but signed off on the revision.

BITA's local match on their state operating assistance (50%) is provided by BIBCO, and any local match on capital items is also provided by BIBCO (10%)

BITA Assets:  
Emerald Isle Ferry

All ancillary operational equipment on the docks (all operational equipment: forklifts, service trucks, access stairs, shuttle buses, etc.), vessel upgrades.

Assets constructed on BIBCO Property

- Office Building (BIBCO owned property with license agreement to BITA)
- Storage Building/Paving/Fencing (BIBCO owned property with license agreement to BITA)
- Dock improvements (BIBCO owned property with license agreement to BITA)

BIBCO Assets:

- Beaver Islander Ferry
- Ticket office/storage building at the dock
- Real estate on which BITA's facility projects are located

The Ferry dock in Charlevoix and BIBCO office in Charlevoix is owned by the City of Charlevoix and BIBCO has a lease agreement with the City of Charlevoix. The consultant met with BITA and BIBCO representatives to kick off the study. Among the items discussed was BITA's perception of future capital needs. These are presented later in the document. BITA's Request for Proposals tasked the consultant to: "Examine the current private/public partnership's effectiveness. What recommended changes need to be made to the operational agreement to reflect current and future needs. Is the current operator the best option? Is a public option a possibility?" The consultant team examined these questions. The question concerning BITA's ability to take over direct operations of the ferry system (a public option), or, obtaining a new operator of the service through a request for proposals. There are some impediments to those options that arise out of the various agreements between the parties.

- The management Services Agreement – Expires on 12/21/2023.
  - ✓ Termination is only allowed in response to breach of contract or at contract expiration
- Transportation Building Agreement – Expires on 12/21/2023.
  - ✓ Runs in connection with the Management Services Agreement
  - ✓ BIBCO owns the property
  - ✓ BITA owns the building which was funded through an MDOT grant
- Dock License Agreement – Expires May 31, 2026.
  - ✓ May be terminated by 120 Days' notice from BIBCO to BITA if the Management agreement terminates or if BITA fails to meet its obligations under the license
  - ✓ Dock owned by BIBCO
  - ✓ Dock has many improvements made using state and federal dollars.
- Memorandum of Understanding – Fuel – Expires December 31, 2021 (this is renewed on an annual basis).

If BITA determines to terminate the management services agreement with BIBCO, the property upon which BITA's transportation building is located is owned by BIBCO. The Transportation Building Agreement does not address how the building (which was built with a grant to BITA from MDOT) was erected on BIBCO's property, nor does it address what happens to the building if the agreement is terminated. As the building may not be fully depreciated if a termination occurs it could become an issue as State funds were used for the building's construction.

#### 4. Conditions Of Operational Assets And Future Needs/Replacement Plan

BITA receives operational funds and capital funds through the Michigan Department of Transportation (MDOT). MDOT provides operating assistance to eligible ferry systems at 50% of eligible expenses. MDOT also provides ferry capital funding via state funds at 90% State and 10% local. BITA also receives Federal Ferryboat Formula funds yearly which are for capital. BITA is eligible for Federal STP funds via the Rural Task Force for capital items. The distribution of Ferryboat Formula funds is based on the following percentages: 35% by the number of passengers carried; 35% by the number of vehicles carried; and 30% by total nautical route miles serviced. The amount of the allocation varies yearly based on the above percentages as reported to the National Census of Ferryboat Operators. The funds are distributed and require a 20% match. These funds are distributed through MDOT and at present MDOT provides the 20% match. Federal STP Funds are available to projects selected by the Rural Task Force. BITA can present projects and approval is up to the Rural Task Force members. STP Funded projects is at 80% Federal and 20% State (MDOT). Funding for the Rural Task Force is limited.

Since 1998, BITA has received Marine Capital Funding from MDOT. That program, until the advent of the Federal Ferryboat Formula funding, was BITA's only source for capital items. During this period BITA constructed two facilities (Transportation Building and the Donegal Bay Storage building) and purchased a significant number of capital equipment used to support the operations of the ferry system.

BITA and BIBCO have a management agreement for operation of the Emerald Isle ferry, which expires on 12/21/2023. BIBCO provides 50% of BITA's local portion for operating assistance and the local capital match at whatever percent is required for State and Federal capital funds. BITA's annual eligible expenses include salary and benefits for an Executive Director, fuel for the Emerald Isle and BIBCO's Beaver Islander, vessel insurance, and \$50,000 in maintenance costs yearly for upkeep of the Emerald Isle.

This section of the study will separate Operational Assets into three categories and examine each. The categories are separated as follows:

- 1) The Emerald Isle ferryboat and vessel systems and equipment owned by BITA.
- 2) The facilities BITA owns which are on BIBCO property and governed by a license (lease) agreement.
- 3) Dock support equipment owned by BITA.

- 1) Ferryboat, vessel systems and equipment.

BITA's main operational asset is the Emerald Isle Ferry. The Emerald Isle was commissioned in 1997 after being built in East Boothbay, Maine. The

ferry's construction was funded by a Congressional earmark from the Federal Highway Administration's Ferryboat Discretionary Program. The ferry was funded with 80% Federal Highway funds, 10% Michigan Department of Transportation Funds, and 10% local funds. She is now 25 years old and will need a number of items rebuilt or upgraded. As vessels which operate in the Great Lakes (freshwater) only are not subjected to salt corrosion, their lifespan is considered 'indefinite' provided required maintenance and mechanical upgrades are performed on a regular, consistent basis. The Emerald Isle is scheduled for engines and transmission rebuild in 2023. The engines, generators and transmissions have been rebuilt and repaired a number of times in the last 25 years. BITA and BIBCO keep track of hours and usage and have a replacement schedule for these items as well as other items related to the vessel operation (i.e. keel coolers, drive shaft and coupling, radar and GPS). Other items require replacement per Coast Guard regulations such as safety equipment such as IBA's (Inflatable Buoyant Apparatus) and cold-water suits and float coats.

The Emerald Isle is required by Coast Guard regulations to have a hull inspection every five years. This is accomplished by a dry docking at a marine maintenance facility. During dry docking other issues which require repairs are discovered when the vessel is out of the water, so the cost for a dry docking can be extremely costly, depending on what items are found that require repair/replacement. BITA has generally incorporated engine/transmission/generator rebuilds while the vessel is out of service as a measure to prevent breakdowns and follow their preventative maintenance schedule. Dry docking is an expense which must be planned and budgeted for. BITA and BIBCO have cooperated in funding past vessel repairs, replacements and upgrades.

The current backup vessel for the ferry system is the Beaver Islander, which is owned by BIBCO. The Beaver Islander is almost 60 years old and is not ADA compliant. Though it is still operational and does provide complementary service to the Emerald Isle, it cannot transport the same number of passengers or vehicles and freight as the Emerald Isle. It also cannot accommodate a semi-truck trailer. Due to its age and capacity limitations, BITA and BIBCO agreed to explore a design for a new ferry which would eventually replace the Beaver Islander. BITA had a design for a new ferry funded by MDOT, and the design was completed in 2012. To this point, no funding has been identified or secured to finance the construction. As part of this study, an updated cost for the proposed new ferry was secured.

- 2) BITA owns facilities which are on property leased from BIBCO. BITA and BIBCO's license (lease) agreements have occurred as facilities were needed by BITA. They are listed as amendments to the Management

Agreement, and most cover a period to coincide with the Agreement's expiration date in 2023 but cover a period of 30 years. These facilities are the dock, the Transportation Authority office, and the Donegal Bay storage facility. The lease agreement on the dock expires on 5/31/2026. The lease agreements for the Transportation Building and the Donegal Bay Storage building expire on 12/21/2023, the same date as the expiration of the Management Agreement.

The dock structure was existing and accommodated the Beaver Islander Ferry. Once the Emerald Isle was under construction, the existing dock needed modifications to accommodate the new vessel. The dock design was funded by MDOT, and construction was funded with remaining funds from the Federal Ferryboat Discretionary grant, MDOT and local funds, and Federal and state funds through an Economic Development grant. The dock as reconstructed is 25 years old. The dock area has had upgrades since completion such as security fencing (required by Homeland Security), repaving, and pile cluster replacements. The dock is currently experiencing some sinkage and needs repair. The specific cause is unknown but is surmised that it is due to high water levels which has undermined the structure. The rest of the improvements are in good condition and are part of BITA's facility maintenance plan. An engineering firm has not been retained to examine the dock structure to determine cause of deterioration and the remedy. Also, should funding for a new vessel be secured the dock will require modifications to accommodate it. Due to the nature of wood pilings and their tendency to break off or become bent along with the frequency of replacement, BITA should consider another option when dock reconstruction occurs. A redesigned dock should also incorporate energy efficient bubblers that will accommodate a future vessel and the Emerald Isle.

- 3) BITA owns numerous dock support equipment items. These items include forklifts, vehicles (plow truck and buses), boarding stairs, vending machines, security cameras, power washer, trailer and many other items purchased either using State Marine capital funds or Federal Ferryboat Formula funds. All of these items are currently listed in inventory on MDOT's Passenger Transportation Management System (PTMS) along with their useful life and replacement schedule. BITA should adhere to its practice of requesting replacement of these specific items as needed as their useful life approaches. Due to the cost to replace items and the limited amount of MDOT and Ferryboat Formula funds, BITA will be unable to fund all of the items. BITA will need to continue to prioritize the most needed items as it has in the past to allow for service continuation.

Table 4-1: Upcoming Capital Needs

BITA Operational Assets and Replacement Schedule

Item	Remaining service life (years)	Timeframe for Replacement
Dodge Pickup Truck	-17	Overdue
Road Runner trailer	-11	Overdue
SC-50 Satellite Compass and AIS	-10	Overdue
2 Paint Cabinets	-10	Overdue
5 Cameras, monitors and speakers for Emerald Isle	-10	Overdue
Outdoor wireless radio	-10	Overdue
Phone system	-10	Overdue
Computer	-9	Overdue
Fog Signal with automatic timer	-8	Overdue
Bin Blocks for Emerald Isle	-8	Overdue
GPS for Emerald Isle	-8	Overdue
Roof Mounted Security Camera	-8	Overdue
2 Vending Machines	-8	Overdue
Radar	-7	Overdue
Cold Water suits and float coats	-6	Overdue
Impact Wrench	-6	Overdue
Boca Printer	-5	Overdue
CAT diagnostic adapter, mechanics tool set and air compressor	-5	Overdue
Caterpillar Fork Truck	-4	Overdue

2 Keel Coolers	-3	Overdue
Polycom SoundStation	-3	Overdue
2 Sliding doors for upper deck	-3	Overdue
9 Computers	-3	Overdue
Misc. tools	-3	Overdue
Power Washer	-3	Overdue
2013 Ford 4x4	-3	Overdue
Gould Shallow Well jet pump	-3	Overdue
8' Western plow	-3	Overdue
Rugged computer	-3	Overdue
Oxygen monitoring system	-3	Overdue
Crane Hanging scale	-3	Overdue
Ramp stairs for Emerald Isle	-3	Overdue
Victor Welder	-3	Overdue
Artica Incline platform lift	-2	Overdue
Brute Flatbed aluminum body	-1	Overdue
Toilet flush valves	-1	Overdue
Xlerator hand dryer	-1	Overdue
Bathroom faucet	-1	Overdue
2013 Haulmark Trailer	-1	Overdue
CAT fork truck	0	Immediate
6 Elliot 50 person IBA's	0	Immediate
Rand air starters	0	Immediate
5 Timco Watertight doors	2	2023
4 flanged expanders	2	2023



Emerald Isle Engines and transmissions (overhaul)	2	2023
Eldorado bus	2	2023
Port and starboard upper engine rebuilds	3	2024
Stave and cutlass bearings	3	2024
4 Foam Fenders	3	2024
Van with lift	3	2024
Emerald Isle Fuel tank clean	4	2025
Dock hydraulic cylinders	4	2025
Security Fence for luggage area	4	2025
Eldorado bus	5	2026
Ingersoll starters	5	2026
Elliot IBA's	5	2026
Anchor windlass	5	2026
Furuno radar equipment	6	2027
CAT spare turbo	6	2027
Pilings	6	2027
Pilings (11)	7	2028
Heat shields	7	2028
CAT generators	7	2028
Emerald Isle shaft and coupling	7	2028
Renovation of South Finger pier	9	2030
CAT turbo	16	2037
BITA office building	21	2042

Donegal Bay Road Building	24	2045
MV Emerald Isle	25*	2046

\*The lifespan of vessels that operate in fresh water is indefinite provided that regular maintenance is performed.

#### M/V Emerald Isle

- Maintenance as needed
- 2023 and 2024 - total engine rebuild, transmission rebuild, five-year hull inspection
- Passenger areas pilot house – renovations including replace seating, tables, carpeting, bathroom redone
- Security equipment
- Basic maintenance
- Marine electronic equipment (keeping updated)
- Computers
- IBAs
- Service lift
- Audio/visual equipment (tv screens- safety announcements)
- Replacement tools (existing are wearing)

#### BIBCO Island Dock – leased:

- High water damage – should be evaluated by an engineer and from there determine how to proceed
- Surface work
- Fixed bubbler system
- Upgrade shore power, pump out station
- Car charging station
- Additional slip for another vessel
- Pilings
- Ramp maintenance
- Freight cages
- Fork trucks
- Maintenance as needed
- A&E for dock design/rehabilitation/construction

#### BITA Building

- Driveway and parking area and sidewalks-maintenance and/or replace
- Landscaping timbers redone
- Siding, new exterior doors and windows

- Carpeting
- Redo front of building
- Maintenance as needed

#### Storage Building and parking lot

- Satisfactory condition
- Maintenance as needed

#### Miscellaneous items (New):

- Reservation system
- Ticketing system
- Phone system
- Additional support equipment procured as needed
- Maintenance as needed

#### Vehicles:

- 2 Plow trucks
- Flatbed truck
- Golf cart
- Lawn mower
- Fork trucks

The engine rebuild of the Emerald Isle needs to occur in 2023. This is critical because of the past history of the vessel having engine issues and also because it is required to allow BIBCO to maintain the current level of operations. It has been noted that BITA has a design for a new vessel that would replace the Emerald Isle, which would become the backup boat. This new vessel, which would cost \$17.5-\$19.4 million per the design engineer, has not been funded so it is difficult to estimate when it might come into service. If BITA decides to pursue an alternative propulsion system for the new ferry (i.e electric, diesel hybrid, or other) the aforementioned construction cost estimates could be 40% more or higher.

## 5. Survey Results

The consultant conducted a survey as part of the transportation study update. This survey was conducted in two parts – one a mail back survey of property owners on the island, and second an email survey to a mailing list maintained by the Beaver Island Boat Company of its passengers. The following discussion presents the methodology and results of these surveys.

### Methodology

The purpose of the survey was to get feedback from island residents and boat company patrons about the ferry service to gain insight into the need and demand for future services. The mail back survey instrument (appendix) was developed with input from the board of the Beaver Island Transportation Authority, the chair of the Beaver Island Boat Company, and through a pilot survey test where random individuals on the island were asked to complete the survey. The survey form as used is presented in the appendix. The consultant obtained addresses for properties on the island from the Charlevoix County Equalization Office. Following editing for duplicates, surveys were mailed to every property on Beaver Island. In addition, a separate survey using the same instrument was conducted by an email from BIBCO to its current customer email list. These two surveys are analyzed separately due to the different means of distribution. Table 5-1 shows the distribution and response facts of the survey. It is followed by charts that show the response to individual questions.

Table 5-1: Survey Distribution and Results Summary

Survey	Distribution	Completed Surveys	Response Percent
Mail back survey			
Mailed to property owners in Peiane Township	1,076	384	0.36
Mailed to property owners in St. James Township	862	217	0.25
Total Mail back	1,938	601	
Boat Company email distribution	8,500	902	

Source: Mp2planning

## Mailback Survey Results Summary

The overall responses to the mailback survey reveal the following:

- There has been a major shift in people identifying themselves as “seasonal” residents versus permanent residents. When looking at the data from the survey in detail, there was also a smaller group who checked both seasonal and permanent, indicating some confusion about what defined a permanent resident. Regardless, assuming this smaller group is essentially seasonal, an even larger group of people now seem to be using Beaver Island as a vacation retreat or a location for a rental property.
- People are using air taxi service more to travel between the island and mainland;
- A similar shift to air taxi is seen in freight;
- Respondents seem generally satisfied with the service and fares;
- Over 70% stated it would be a minor/moderate to major impact/hardship if the Emerald Isle went out of service; and,
- There is no clear preference or consensus about the location of the mainland dock in downtown Charlevoix.

## BIBCO Email List Survey Results Summary

The survey to the BIBCO email list was slightly different than the mailback surveys in that because of the survey platform used for the distribution multiple responses were not an option on the first five questions. Seventy percent of the respondents were from visitors, with 23 percent of respondents being seasonal. Few respondents to this survey identified as residents. Most respondents (70%) said they used the ferry for service to the island. Most cited making less than nine one-way trips per year. Over seventy percent believe the fares are reasonable and about 60 percent thought the freight and vehicle rates were reasonable. Thirty-seven percent of respondents were unsure about future technology while 37 percent thought future vessels should be powered by alternative energy sources. Twenty-four percent of respondents thought moving the downtown Charlevoix operation was a good idea while 35 percent said it would make no difference and 24 percent believe the downtown location is a good location.

## Cross-tabulation Analysis of Mailback Survey

The consultant developed a cross-tabulation analysis of the mailback survey looking at how the results from several questions were addressed by the three primary respondent groups to the mailback survey: seasonal resident; permanent resident; and, visitor. Table 5-2 presents the results. In general, the results of the cross-tab review indicated that there was some difference between the perceptions of the various groups. For example. In terms of “typical” mode of

travel, permanent residents were more likely than seasonal residents or visitors to use the air service. Permanent residents are also more likely to use air service for their freight. Permanent residents are more likely to think passenger fares and freight rates are not reasonable (although a majority still believe they are reasonable). Seasonal residents are more likely to consider the loss of the Emerald Isle due to a service disruption as having a moderate or major impact than visitors. In terms of relocating the downtown Charlevoix ferry boat operation, almost 50 percent of permanent residents think it is a good idea as opposed to about 30 percent of seasonal respondents. The seasonal group also had a higher percentage of respondents thinking downtown is a good location for the operation.

Table 5-2: Cross-tab Analysis

Beaver Island Transportation Survey (Mailback - 2021)

Question 2 Crosstabulation						
		Q1. Which of the following applies to you?				
			Seasonal Resident of Beaver Island	Permanent Resident of Beaver Island	Visitor	Total
Q2. How do you typically get to and from Beaver Island? <sup>a</sup>	Ferry	Count	217	39	73	329
		% within Q1. Which of the following applies to you?	59.5%	33.9%	77.7%	
	Air Service	Count	230	102	39	371
		% within Q1. Which of the following applies to you?	63.0%	88.7%	41.5%	
	Personal Boat	Count	8	2	6	16
		% within Q1. Which of the following applies to you?	2.2%	1.7%	6.4%	
	Personal Plane	Count	19	3	2	24
		% within Q1. Which of the following applies to you?	5.2%	2.6%	2.1%	
	No response	Count	1	0	1	2

	% within Q1. Which of the following applies to you?	0.3%	0.0%	1.1%	
Total	Count	365	115	94	574

Percentages and totals are based on respondents.

a. Group

#### Question 4 Crosstabulation

			Q1. Which of the following applies to you?			
			Seasonal Resident of Beaver Island	Permanent Resident of Beaver Island	Visitor	Total
Q4. How do you typically get your personal freight to and from Beaver Island? <sup>a</sup>	Ferry	Count	318	75	76	469
		% within Q1. Which of the following applies to you?	87.1%	65.2%	80.9%	
	Air Service	Count	161	96	25	282
		% within Q1. Which of the following applies to you?	44.1%	83.5%	26.6%	
	Personal Boat	Count	5	2	3	10
		% within Q1. Which of the following applies to you?	1.4%	1.7%	3.2%	
	Personal Plane	Count	12	3	2	17
		% within Q1. Which of the following applies to you?				



	% within Q1. Which of the following applies to you?	3.3%	2.6%	2.1%	
Other	Count	6	2	3	11
	% within Q1. Which of the following applies to you?	1.6%	1.7%	3.2%	
No Response	Count	2	0	7	9
	% within Q1. Which of the following applies to you?	0.5%	0.0%	7.4%	
Total	Count	365	115	94	574

Percentages and totals are based on respondents.

a. Group

Q5. Do you think passenger fares on the ferry are reasonable? \* Q1. Which of the following applies to you? Crosstabulation

		Q1. Which of the following applies to you?			
		Seasonal Resident of Beaver Island	Permanent Resident of Beaver Island	Visitor	Total
Yes	Count	267	63	71	401

		% within Q1. Which of the following applies to you?	73.2%	54.8%	75.5%	69.9%
Q5. Do you think passenger fares on the ferry are reasonable?	No	Count	83	46	15	144
		% within Q1. Which of the following applies to you?	22.7%	40.0%	16.0%	25.1%
	No response	Count	15	6	8	29
		% within Q1. Which of the following applies to you?	4.1%	5.2%	8.5%	5.1%
	Total	Count	365	115	94	574
		% within Q1. Which of the following applies to you?	100.0%	100.0%	100.0%	100.0%

Q6. Do you think freight rates and vehicle prices on the ferry are reasonable? \* Q1. Which of the following applies to you? Crosstabulation

			Q1. Which of the following applies to you?			
			Seasonal Resident of Beaver Island	Permanent Resident of Beaver Island	Visitor	Total
Q6. Do you think freight rates and vehicle prices on the ferry are reasonable?	Yes	Count	229	47	54	330
		% within Q1. Which of the following applies to you?	62.7%	40.9%	57.4%	57.5%
	No	Count	119	64	26	209
		% within Q1. Which of the following applies to you?	32.6%	55.7%	27.7%	36.4%
	No response	Count	17	4	14	35
		% within Q1. Which of the following applies to you?	4.7%	3.5%	14.9%	6.1%
Total		Count	365	115	94	574
		% within Q1. Which of the following applies to you?	100.0%	100.0%	100.0%	100.0%

Q11. How would it impact you if the Emerald Isle ferry was out of service for an extended period of time?

\* Q1. Which of the following applies to you? Crosstabulation

			Q1. Which of the following applies to you?			
			Seasonal Resident of Beaver Island	Permanent Resident of Beaver Island	Visitor	Total
Q11. How would it impact you if the Emerald Isle ferry was out of service for an extended period of time?	No impact / not applicable	Count	12	6	16	34
		% within Q1. Which of the following applies to you?	3.3%	5.2%	17.0%	5.9%
	Minor impact	Count	61	26	31	118
		% within Q1. Which of the following applies to you?	16.7%	22.6%	33.0%	20.6%
	Moderate impact	Count	111	30	15	156
		% within Q1. Which of the following applies to you?	30.4%	26.1%	16.0%	27.2%
	Major impact	Count	122	36	24	182
		% within Q1. Which of the following applies to you?	33.4%	31.3%	25.5%	31.7%
	Severe impact	Count	49	17	7	73
		% within Q1. Which of the following applies to you?	13.4%	14.8%	7.4%	12.7%
No Response	Count	10	0	1	11	

	% within Q1. Which of the following applies to you?	2.7%	0.0%	1.1%	1.9%
Total	Count	365	115	94	574
	% within Q1. Which of the following applies to you?	100.0%	100.0%	100.0%	100.0%

Q12. What do you think about an alternate location in Charlevoix where you would park, buy your ticket, check your luggage and freight, and then board the boat (possibly via shuttle)? \* Q1. Which of the following applies to you? Crosstabulation

			Q1. Which of the following applies to you?			
			Seasonal Resident of Beaver Island	Permanent Resident of Beaver Island	Visitor	Total
Q12. What do you think about an alternate location in Charlevoix where you would park, buy your ticket,	Not a good idea – I like having the office and boat downtown	Count	131	26	19	176
		% within Q1. Which of the following applies to you?	35.9%	22.6%	20.2%	30.7%
	Would not make a difference to me	Count	109	32	41	182
		% within Q1. Which of the following applies to you?	29.9%	27.8%	43.6%	31.7%
		Count	113	56	29	198

check your luggage and freight, and then board the boat (possibly via shuttle)?	Sounds like a good idea	% within Q1. Which of the following applies to you?	31.0%	48.7%	30.9%	34.5%
	No Response	Count	12	1	5	18
		% within Q1. Which of the following applies to you?	3.3%	0.9%	5.3%	3.1%
Total		Count	365	115	94	574
		% within Q1. Which of the following applies to you?	100.0%	100.0%	100.0%	100.0%

## Comparison with 2004 Survey

As part of the 2004 Master Plan, the consultant surveyed property owners on Beaver Island by mail, and also distributed surveys on the Emerald Isle. 258 responses were returned by property owners, and received 253 responses from passengers aboard the Emerald Isle. Only responses were recorded.

For the current study, property owners were surveyed via mail and instead of a passenger survey, the survey was emailed to customers of the Beaver Island Boat Company. A total of 1,938 surveys were mailed to property owners, and 601 were completed. A total of 8,500 customers of the Beaver Island Boat Company were emailed and 902 were completed.

The similar survey questions are listed in the tables below. The first section deals with surveys returned by mail in both years.

Question: Are you a ?:

	2004	2021	Difference 2004-2021
Seasonal Resident	32%	61%	29%
Permanent Resident	59.8%	21%	-38.8%
Visitor	7.8%	19%	11.2%
Owner or employee of a business on the Island	N/A	8%	8%
Here on business	.4%	1%	.6%
No response	NA/	3%	3%

Question: How do you typically get to and from the Island?

	2004	2021	Difference 2004-2021
Air Service	29.8%	64%	34.2%
Ferry	64.3%	56%	-8.3%
Personal plane	2%	4%	2%
Personal boat	.4%	3%	2.6%
No response	N/A	1%	1%

Question: How do you typically get your personal freight to and from the Island?

	2004	2021	Difference 2004-2021
Ferry	87%	80%	-7%
Air Service	8.7%	49%	40.3%
Personal plane	.4%	3%	2.6%
Personal boat	.8%	2%	1.2%
No response	N/A	3%	3%

Question: If you are traveling to the Island did you spend money while on Beaver Island?

	2004	2021	Difference 2004-2021
Yes	47.4%	98%	50.6%
No	4%	2%	-2%
Does not apply	48.6%	0%	-48.6%
No response	N/A	0%	0%

Question: If you did spend money while on Beaver Island, how much did you spend?

	2004	2021	Difference 2004-2021
\$10-\$50 (Less than \$50)	7.8%	2%	-5.8%
\$51-\$100	9.5%	12%	2.5%
Over \$100/Over \$150*	82.8%	86%	3.2%
No response	N/A	0%	0%

\*2004's survey only asked the question over \$100. 2021's over \$100 and over \$150 percentages were combined.

Question: Did you spend money in Charlevoix while traveling to/from Beaver Island?

	2004	2021	Difference 2004-2021
Yes	80.1%	79%	-1.1%
No	12.9%	16%	3.1%
Does not apply	7%	4%	-3%
No response	N/A	1%	1%

Question: If you did spend money while in Charlevoix, how much did you spend?

	2004	2021	Difference 2004-2021
\$10-\$50 (Less than \$50)	28.9%	21%	-6.9%
\$51-\$100	26%	35%	40.3%
Over \$100/ Over \$150*	45.1%	42%	-2.9%
No response	N/A	2%	2%

\*2004's survey only asked the question over \$100. 2021's over \$100 and over \$150 percentages were combined.

Question: If the Emerald Isle were out of service for an extended period of time, how would it impact you?

	2004	2021	Difference 2004-2021
Not at all; no impact	28.6%	7%	-21.6%



Somewhat; minor to moderate impact	39.2%	46%	6.8%
Major impact/hardship	22.7%	31%	8.3%
Very difficult/severe impact	9.4%	13%	3.6%
No response	N/A	3%	3%

Question: What do you think about an alternative location in Charlevoix where you can park, buy your ticket, check your luggage and freight, and take a shuttle to the boat?

	2004	2021	Difference 2004-2021
Not a good idea, I like having the office by the boat	39.7%	30%	-9.7%
It doesn't matter	17.1%	32%	14.9%
Sounds like a good idea	43.3%	34%	-9.3%
No response	N/A	4%	4%

Question: What is your age?

	2004	2021	Difference 2004-2021
Under 18	.4%	0%	-.4%
19-55	40.6%	18%	-22.6%
56-65	28.9%	26%	-2.9%
Over 65	30.1%	55%	34.9%
No response	N/A	1%	1%

The following tables detail the surveys of passengers on the Emerald Isle (2004) and customers of the Beaver Island Boat Company who responded via email in 2021. The questions which are similar in scope are included for comparison.

Question: Are you a ?:

	2004	2021	Difference 2004-2021
Seasonal Resident	26%	23%	-3.0%
Permanent Resident	8.4%	5%	-3.4%
Visitor	63.2%	70%	11.2%
Owner or employee of a business on the Island	N/A	3%	NA
Here on business	2.4%	1%	-.6%
No response	N/A	1%	NA

Question: How do you typically get to and from the Island?

	2004	2021	Difference 2004-2021
Air Service	10.1%	18%	7.9%
Ferry	79.8%	70%	-9.8%
Personal plane	1.2%	0%	-1.2%
Personal boat	.8%	1%	.2%
No response	N/A	11%	11%

Question: How do you typically get your personal freight to and from the Island?

	2004	2021	Difference 2004-2021
Ferry	87.3%	79%	-8.3%
Air Service	4.2%	16%	11.8%
Personal plane	.4%	0%	-.4%
Personal boat	1.7%	0%	-1.7%
Other	N/A	2%	2%
No response	N/A	14%	14%

Question: If you are traveling to the Island did you spend money while on Beaver Island?

	2004	2021	Difference 2004-2021
Yes	58.8%	85%	26.2%
No	4.5%	1%	-3.5%
Does not apply	36.7%	0%	-36.7%
No response	N/A	14%	14%

Question: If you did spend money while on Beaver Island, how much did you spend?

	2004	2021	Difference 2004-2021
\$10-\$50 (Less than \$50)	10.8%	0%	-10.8%
\$51-\$100	11.8%	6%	-5.8%
Over \$100/ Over \$150*	77.4%	93%	15.6%
No response	N/A	0%	0%

\*2004's survey only asked the question over \$100. 2021's over \$100 and over \$150 percentages were combined.

Question: Did you spend money in Charlevoix while traveling to/from Beaver Island?

	2004	2021	Difference 2004-2021
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Yes	77%	74%	-3%
No	16.3%	9%	-7.3%
Does not apply	6.7%	2%	-4.7%
No response	N/A	15%	15%

Question: If you did spend money while in Charlevoix, how much did you spend?

	2004	2021	Difference 2004-2021
\$10-\$50 (Less than \$50)	38.8%	25%	-13.8%
\$51-\$100	26%	39%	13%
Over \$100/ Over \$150*	35.2%	35%	-.2%
No response	N/A	1%	1%

\*2004's survey only asked the question over \$100. 2021's over \$100 and over \$150 percentages were combined.

Question: If the Emerald Isle were out of service for an extended period of time, how would it impact you?

	2004	2021	Difference 2004-2021
Not at all; no impact	35.9%	13%	-22.9%
Somewhat; minor to moderate impact	37.1%	51%	13.9%
Major impact/hardship	19.5%	21%	1.5%
Very difficult/severe impact	7.5%	9%	1.5%
No response	N/A	0%	0%

Question: What do you think about an alternative location in Charlevoix where you can park, buy your ticket, check your luggage and freight, and take a shuttle to the boat?

	2004	2021	Difference 2004-2021
Not a good idea, I like having the office by the boat	33.5%	27%	-6.5%
It doesn't matter	25.4%	35%	9.6%
Sounds like a good idea	41.1%	24%	-17.1%
No response	N/A	14%	14%

Question: What is your age?

	2004	2021	Difference 2004-2021
Under 18	2.8%	14%	-4%
19-55	49.1%	32%	-22.6%
56-65	25.5%	23%	-2.9%

Over 65	22.6%	31%	34.9%
No response	N/A	0%	0%

## Conclusions

The biggest changes on Beaver Island as it relates to the transportation study update is the shift from those identifying as permanent residents to seasonal residents and the shift of mode of travel from ferry to air service. These facts support the design decision made by the Board and BIBCO when considering a new vessel to lower the passenger load threshold to below 150 to allow for the vessel to be classified at a lower cost rate. Based on the information developed as part of the ridership forecast detailed elsewhere in this report we do not expect the ridership to increase but we also do not expect it to decrease at the same rate as the prior to decades.

## 6. Passenger Fare Analysis

The consultant team has selected eight ferry systems to compare and contrast with the fares of BITA's operator, the Beaver Island Boat Company (BIBCO). These systems were selected based on style of vessel as well as comparable route lengths. Though these systems are similar in regard to route distance, none of them have the same relationship as do BITA and BIBCO. Of the eight systems, six are publicly subsidized and publicly operated, while the other two are privately owned and operated ferry systems.

The consultant team has reviewed costs for common fare elements with all of the systems, including passenger fares, vehicle fares, bicycle fares, and freight fares. The tables below summarize those fares (all fares are one way).

Table 6-1: Fare Comparison

System	Location-Destination	Passenger (Adult)	Passenger (Senior)	Passenger (Child)	Vehicle (19')	Bicycle	Freight
Inter-Island Ferry Authority	Ketchikan, AK to Hollis, AK	\$52 (12+)	\$28.50 (65+).	\$23.50 (2-11). Infants free	\$126	Free	\$10 per box in excess of 1
Cape May-Lewes Ferry	Cape May, NJ to Lewes, NJ	\$10 (14-61)	\$8 (62+)	\$5 (6-13) Free under 6	\$35	Free with passenger fare	N/A
Washington State Ferries	Anacortes to San Juan Islands	\$14.50 (19-64)	\$7.25 (65+)	\$7.25 (6-18)	\$70.90 (Includes driver fare)	\$18.50 (includes rider fare)	N/A
Matinicus Ferry	Rockland, ME to Matinicus Island	\$25 (18+)	\$25 (18+)	\$12.50 (6-17) Free 5 & under	\$90	\$30 (includes passenger ticket)	N/A
Ocracoke Island Ferry	Hatteras, NC to Ocracoke Island, NC	Express- \$5 (3+) Non-Express \$1 (3+)	\$5 \$1	\$5 (under 3 free) \$1 (free under 3)	\$15	\$1 \$3 (includes passenger fare)	N/A
Lake Chelan Boat Company	Chelan, WA to Stehekin, WA	\$25 \$43 \$49	\$25 \$43 \$49	\$25 \$43 \$49	N/A	\$20	2 bags or boxes per passenger free <100 lbs. Excess is \$.25 per lb. up to \$15. All

							other freight minimum of \$15 or \$.25 per pound whichever is greater.
Catalina Island Ferry	Los Angeles, CA to Catalina Island, CA	\$38 (12-54)	\$34.50 (55+)	\$32.50 (2-11)	N/A	\$3.50	Two pieces of baggage. 50 lbs. maximum each bag. 23"x23"x37" maximum bag dimension. One carry-on to be stowed at the seat.
Alaska Marine Highway	Hoonah, AK to Juneau, AK	\$49 (12+)	\$37 (65+)	\$25 (6-11) Free under 6	\$118	\$28	Most freight is carried on vans or other vehicles. Vehicles are charged by length/width
Beaver Island Ferry	Charlevoix, MI to Beaver Island, MI	\$32.50 (13+)	\$32.50	\$20 (5-12) Free 4 & under	\$115	\$12	Box – Medium (Banana Box) \$3.60 each Box – Small \$1.85 each Cage – 1/4 full \$25.00 each Cage – 1/3 full \$35.00 each Cage – 1/2 full \$45.00 each Cage – 2/3 full \$55.00 each Cage – 3/4 full \$65.00 each Cage – full (96 cu. feet) \$72.50 each

							Price per pound \$0.13 1 to 699 pounds (minimum freight charge is \$5.00) Bulk Rate 700-2,000 lbs. \$90.00 flat rate Tonnage – more than 2,000 pounds \$90.00 per ton
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Source: JDrury Consulting, LLC

As Table 6-1 above indicates, the majority of the comparison ferry systems do not have specific rates for freight. The majority of the systems charge a fare based on vehicle size/length, not the freight items that are transported on/in them. The remainder allow a maximum weight for gear/luggage/supplies per passenger.

The comparison ferry systems do not have the level of specificity and charges that BIBCO utilizes for freight services. The following table (6-2) illustrates other items that are similarly transported on the comparison ferry systems along with their associated rates.

Table 6-2: Fare Comparison: Recreational Vehicles

System/Fare	Kayak or Canoe	Motorcycle	Snowmobile or Jet Ski	ATV (3 or 4 wheel)	Golf Cart, Side by Side ATV
Inter-Island Ferry Authority	\$30 (requires 2 owner supplied tie downs)	\$30 (requires 2 owner supplied tie downs)	\$30 (requires 2 owner supplied tie downs)	\$30 (requires 2 owner supplied tie downs)	\$30 (requires 2 owner supplied tie downs)
Cape May- Lewes Ferry	Not available	\$24	Not available	\$25	Not available
Washington State Ferries	Not available	\$29.75 (includes driver fare)	Not available	\$56.45 <14' (Includes driver fare)	\$56.45 <14' (includes rider fare)
Matinicus Ferry	Not available	\$50	Not available	Not available	Not available
Ocracoke Island Ferry	Not available	\$10	N/A	\$10	\$10

Lake Chelan Boat Company	Small Kayak (up to 12 ft): \$25.00 Large Kayak (over 12 ft): \$35.00 Only 3 per trip allowed	N/A (No motorized vehicles)	N/A (No motorized vehicles)	N/A (No motorized vehicles)	N/A (No motorized vehicles)
Catalina Island Ferry	\$3.50 (surfboards)	N/A	N/A	N/A	N/A
Alaska Marine Highway	\$25	\$96 (8')	\$98 (10')	\$94 (6')	\$98 (10')
BIBCO	\$25	\$50 (over 349 cc)	\$60	\$30 <8' \$50 >8'	Cost depends on size

Source: JDrury Consulting, LLC

BIBCO's fares for motorcycles and ATV's is based on engine displacement and/or length, while the comparison systems that allow motorcycles and ATV's charge simply on length or a flat fee per category.

Table 6-3 summarizes the average fares for the comparison systems' passengers and similarly transported vehicles compared to BIBCO.

Table 6-3: All Systems Average Fare Comparison

Fare type	Adult	Senior	Child	Car/truck	Bicycle	Motorcycle
Average fare Comparison Systems	\$29	\$23	\$18	\$76	\$9	\$38
BIBCO	\$32.50	\$32.50	\$20	\$115	\$12	\$50
Cost Differential	+\$3.50	+\$9.50	+\$2.00	+\$39.00	+\$3.00	+\$12

Source: JDrury Consulting, LLC



Of the comparison ferry systems used, two out of the eight are private, unsubsidized systems (Lake Chelan and Catalina). In comparing just those private systems with BIBCO the comparisons are much closer, and BIBCO in fact, has lower rates.

Table 6-4: Private System Fares Compared to BIBCO

System/ Fare	Adult	Senior	Child	Car/truck	Bicycle	Motorcycle
Lake Chelan Boat Company	\$39 (avg)	\$39	\$39	N/A	\$20	N/A
Catalina Island Ferry	\$38	\$34.50	\$32.50	N/A	\$3.50	N/A
Average fare	\$38.50	\$36.75	\$35.75	N/A	\$11.75	N/A
BIBCO	\$32.50	\$32.50	\$20	\$115	\$12	\$50
Fare Differential	-\$6.00	-\$4.25	-\$15.75	N/A	+\$0.25	N/A

It should be noted that though BIBCO is a private company like the above two systems, their operation is partially subsidized as BITA is reimbursed for fuel costs, vessel insurance, and \$50,000 of BIBCO's annual maintenance costs for the M/V Emerald Isle ferry. The following table illustrates the fares for only the systems that are subsidized.

Table 6-5: Public System Fares Compared to BIBCO

System/Fare	Adult	Senior	Child	Car/Truck	Bicycle	Motorcycle
Inter-Island	\$52	\$28.50	\$23.50	\$126	Free	\$30
Cape May-Lewes	\$10	\$8	\$5	\$35	Free (w/pass. Fare)	\$24
Washington State Ferries	\$14.50	\$7.25	\$7.25	\$70.90 (includes pass. Fare)	\$18.50 (includes pass. Fare)	\$29.75 (includes pass. Fare)
Matinicus	\$25	\$25	\$12.50	\$90	\$30 (includes pass. Fare)	\$50
Ocracoke	Express-\$5 (3+)  Non-Express \$1 (3+)	\$5  \$1	\$5 (under 3 free)	N/A  \$15	\$1	N/A  \$10

			\$1 (free under 3)		\$3 (includes passenger fare)	
Alaska Marine Hwy	\$49	\$37	\$25	\$118	\$28	\$96
Public Average*	\$22	\$16	\$11	\$76	\$12	\$40
Beaver Island Ferry	\$32.50	\$32.50	\$20	\$115	\$12	\$50
Fare Differential to BIBCO	-\$9.50	-\$16.50	-\$9	-\$39	\$0	-\$10

\*Amounts rounded to nearest dollar  
Source: JDrury Consulting, LLC

As Table 6-5 illustrates, BIBCO's fares versus average fares for the comparison categories are higher in all categories except one (bicycles).

As the comparison systems do not deal with freight fares as does BIBCO, the consultant team looked at the freight fares for regional private ferry companies that serve Mackinac Island. Shepler's Ferry's freight service and Arnold Freight Company consolidated freight service in September of 2020 under Arnold Freight Company. Arnold Freight Company transports similar freight items to Mackinac Island, MI from St. Ignace, MI, as does Star Line, who also operates passenger ferries. Arnold Freight has dedicated vessels for freight and do not operate passenger ferries. As the following chart (Table 6-6) displays, Arnold Freight and Star Line break down the costs for items in a similar manner to BIBCO.

Table 6-6: Freight Rates

Ferry System	BIBCO	Arnold Freight/Shepler's	Star Line
Item			
Bulk Freight	1-699 lbs \$0.13 per lb. (minimum \$5.50) 700-2,000 lbs \$90 flat rate More than 2,000 lbs: \$90 per ton	Pro-rated per 100 lbs of freight: \$5.50 <100 lbs. \$5.65 101-5000 lbs., \$3.40 over 1000 lbs.	\$5.25 per 100 lbs.
Semi trailer	\$1,350 round trip	N/A	N/A
Propane semi	\$1,143 round trip	\$550 round trip (British Landing Fee \$300)	N/A

The bulk freight rates are similar, even though the distance of passage (32 miles vs. 5 miles) is not. Though the rate for a propane truck is less for Arnold's, their passage distance is disproportionate to BIBCO's passage distance.

## Conclusions

Following are the consultant team's conclusions.

- BIBCO's fares are more complex than the comparison systems (i.e. fares are charged per item, engine size vs. length or category of item) and especially for freight.
- BIBCO's fares are higher than the average of the comparison systems for passengers and similar cargo items (vehicles, equipment).
- BIBCO's fares compared to the public, subsidized systems are, in all but one case, higher than those systems' average.
- BIBCO's fares compared to the private, non-subsidized systems are, in all but one case, lower than those systems' average.
- BIBCO's freight fares are similar to regional systems (Freight service to Mackinac Island) in both fare rates and specificity and complexity of fare types.
- BIBCO's overall fares do not seem to be significantly out of proportion with the rates charged by the average of all comparison systems, though they are, on average, higher.

BITA and BIBCO's operational relationship is unique among the comparison systems as those comparison systems are either: a) public or b) private. Since BITA receives state operating funds for partial operation of the ferry service, the consultant team suggests that the passenger/vehicle/recreational item fares charged by the comparison public systems are more of an appropriate starting point for comparison. Those six comparison public systems' fares (with the exclusion of the two Alaskan systems) are overall lower due to the existence of the public operation, ownership and subsidies. BIBCO, as a private company, also has a profit motive. Though the amount of subsidy provided via BITA is known, BIBCO's overall costs are not. The consultant team cannot provide a definitive statement on the suitability of fares since BIBCO's operational costs and profit margin are unknown. However, given that they are close or, in some instances, below those of the private systems and somewhat higher than the fully subsidized systems, they appear reasonable. Regardless, because the Beaver Island Transportation Authority is legislatively mandated to set fares for the operation because they are receiving state funding, they should receive sufficient information from the Boat Company to make that determination. At a minimum, it is recommended that information include a periodic review of the fares and the Boat Company costs based on accepted accounting principles as would be set up in a mutual agreement between the Boat Company and the Beaver Island Transportation Authority.

## 7. Passenger Ridership Forecast

The consultant was charged with the task of developing passenger ridership forecasts for travel to and from Beaver Island on the ferry system. The Corradino Group, a subconsultant to Mp2planning, prepared the forecasts.

While the number of ferry passengers has generally decreased over the years, anecdotal information indicates that air taxi passengers are increasing. This is further supported by comparisons of mode choice by respondents to the mail-back survey for this study as compared to a similar survey conducted in 2004. Since the study in 2004, a second airline began operations increasing the supply of air service available. This availability plus the time savings in using the air taxi service rather than the ferry is viewed to be substantial enough to have exerted a gradual shift of ferry passengers to air, a shift that has likely matured as ferry ridership has been relatively stable the last decade.

Ridership and operational data were provided for the ferries operated by the Beaver Island Boat Company, as shown in Tables 7-1 and 7-2 below.

Table 7-1: Historical Beaver Island Ferry Annual Passengers

Year	Passengers	% Change	Cumulative % Change	Population Beaver Island
2001	36,938	NA	NA	551
2002	44,339	20.04%	20.04%	
2003	39,601	-10.69%	9.35%	
2004	40,088	1.23%	10.58%	
2005	41,915	4.56%	15.14%	
2006	43,308	3.32%	18.46%	
2007	38,816	-10.37%	8.09%	
2008	36,868	-5.02%	3.07%	
2009	34,761	-5.71%	-2.64%	
2010	34,753	-0.2%	-2.67%	526
2011	34,958	0.59%	-2.06%	
2012	34,429	-1.51%	-3.59%	
2013	31,341	-8.97%	-12.56%	
2014	30,806	-1.71%	-14.27%	
2015	31,232	1.38%	-12.88%	
2016	31,191	-0.13%	-13.02%	
2017	30,156	-3.29%	-16.31%	
2018	30,601	1.45%	-14.86%	
2019	30,045	-1.82%	-16.68%	
2020	24,977	-16.87%	-33.54%	577
2021	33,925	35.82%	-8.16%	

Source: JDrury Consulting, LLC

Table 7-2: Monthly Historical Passenger and Vehicle Statistics (2016-2020)

	2016		2017		2018		2019		2020	
Month	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.	Pass.	Veh.
April	314	135	310	165	199	113	202	126	0	1
May	2,049	425	1,952	506	2,019	474	1,804	560	795	417
June	4,218	795	4,335	812	4,656	929	4,364	902	3,030	859
July	11,233	1,623	10,850	1,675	10,180	1,593	10,158	1,672	8,539	1,642
August	8,307	1,327	7,790	1,310	8,622	1,435	8,769	1,439	8,065	1,669
September	2,930	518	3,054	640	2,853	606	2,719	568	3,515	823
October	1,331	398	1,331	435	1,350	479	977	305	1,584	562
November	464	232	563	248	560	265	326	194	672	390
December	79	72	178	89	119	74	108	81	114	133
Total	30,925	5,525	30,363	5,880	30,558	5,968	29,427	5,817	26,314	6,496
Difference	-	-	-562	355	195	88	-1131	-151	-3113	679
% Difference	-	-	-2%	6%	1%	1%	-4%	-3%	-11%	12%

Source: JDrury Consulting, LLC

Note that Table 7-1 lists Beaver Island population for 2001, 2010, and 2020. The population is stable, ranging between 526 to 577 over 20 years. Interestingly, the low point is a population of 526 at 2010. During this same time, annual ferry passengers have ranged from 30,045 in 2019 to 44,339 in 2002. The low number of 24,977 in 2020 is an anomaly, most likely related to the COVID-19 pandemic, so it was omitted from the analysis.

Based on the very limited available data, the Consultant offers these estimates for future passengers between Charlevoix and Beaver Island:

- Total annual ferry passenger levels are likely to remain constant at current levels, 30,000 annual passengers (boardings or one-way trips) in each of the coming years.
- Levels for freight and ferried autos also are expected to be constant.
- The difference in travel time between air taxi (15 minutes) and ferry (about 2.25 hours) is large. Thus, within practical limits, the air/boat shares are likely to be inelastic with respect to travel time. Air travel time is not likely to change very much, and a faster boat would still be much slower than air taxi.
- Air fare is \$110-\$117 round trip. Ferry fares range between \$65 and \$55 for a round trip. Ferry parking is \$5/night. Round trip auto fare averages \$220 (plus passenger fares). While air fare and ferry fare are on average \$48 different, it is unlikely that the choice of mode is greatly affected by

fare. It is more likely that the choice is due to unobserved and unmonitored circumstances:

- ✓ Need for an auto on the island.
  - ✓ Length of stay.
  - ✓ Composition of the travel party.
  - ✓ Amount of luggage and goods needed to be transported.
  - ✓ Traveler desire to experience sightseeing from a boat or the air.
  - ✓ Traveler predisposition to fly on small planes, versus a ferry.
  - ✓ Weather, affecting both air and boat travel.
  - ✓ Trip purpose.
- This section assumes the estimates will not be significantly affected by the COVID-19 pandemic. While a comparison of ridership pre- (2019) and post (2021) ferry ridership (Table 7-3) shows that there has been a jump in activity this year (2021) but at this point it is not possible to draw any conclusions from that fact.

Table 7-3: Pre- and Post-Pandemic Ferry Ridership Comparison

Month/Year	Passengers	Passengers % Increase/Decrease	Vehicles	Vehicles % Increase/Decrease
April 2019	202		126	
April 2021	330	63.3%	206	63.5%
May 2019	1,804		560	
May 2021	1,979	9.7%	703	25.5%
June 2019	4,364		902	
June 2021	5,911	35.4%	1,239	37.4%
July 2019	10,158		1,672	
July 2021	10,774	6.1%	1,897	13.4%
August 2019	8,769		1,439	
August 2021	8,999	2.6%	1,592	10.6%
September 2019	2,719		568	
September 2021	3,562	31%	771	35.7%

There is not enough data from existing air taxi and ferry service to Beaver Island to reliably estimate elasticities to fare and travel time. Thus, we resorted to an

elasticity analysis similar to those use in urban bus transit studies. But here again, data or assumptions were needed. We identified a study of ferry fare elasticities from Sydney, Australia (Estimation of Public Transport Fare Elasticities in the Sydney Region, Independent Pricing and Regulatory Tribunal of New South Wales, 1996). This study found the elasticity of commuters on ferries to be -0.183, and the elasticity for non-commuters to be -0.092. This is a very low value, and it is unknown whether it transfers well to Beaver Island. Thus, to illustrate the general insensitivity to fares and times, we chose a much higher value of -0.50 and created a sensitivity test. The sensitivity tests were designed to demonstrate what might happen if conditions change. The results are shown in Table 7-4. The column labeled “Annual Passenger” is the most likely estimate using the -0.50-elasticity estimate, and the “Temp” column shows the upper limit of the estimate. It assumes that higher speeds and lower fares would increase the size of the overall travel market, which we believe to be unlikely.

Table 7-4: Sensitivity to Fares and Boat Time

		distance (miles)	avg speed (mph)	time (hours)	time change %	Fare	fare change %	Passenger Change (time)	Passenger Change (fare)	Temp	Annual Passengers	Fare Elasticity	Time Elasticity
Base	air taxi	32	128	0.25		\$ 34.00				20,000	<b>20,000</b>		
	ferry	32	15	2.13		\$ 30.00				30,000	<b>30,000</b>		
Increase ferry speed by 25 % (CASE 1)	air taxi	32	128	0.25	0.00	\$ 34.00	0.00	-	-	20,000	<b>18,868</b>	-50%	-50%
	ferry	32	18.75	1.71	-0.20	\$ 30.00	0.00	3,000	-	33,000	<b>31,132</b>	-50%	-50%
Decrease ferry fare by 25 % (CASE 2)	air taxi	32	128	0.25	0.00	\$ 34.00	0.00	-	-	20,000	<b>18,605</b>	-50%	-50%
	ferry	32	15	2.13	0.00	\$ 22.50	-0.25	-	3,750	33,750	<b>31,395</b>	-50%	-50%
Decrease ferry fare by 25 % Increase ferry speed by 25 % (CASE 3)	air taxi	32	128	0.25	0.00	\$ 34.00	0.00	-	-	20,000	<b>17,621</b>	-50%	-50%
	ferry	32	18.75	1.71	-0.20	\$ 22.50	-0.25	3,000	3,750	36,750	<b>32,379</b>	-50%	-50%

\* Assume total market is proportional to Beaver Island Population

Source: The Corradino Group, Inc.

The tests were conducted as shown below. Please keep in mind that these are not expected changes, they are just illustrations of what might happen if conditions change.

- The base case was the existing estimate presented earlier: 20,000 annual air taxi passengers and 30,000 annual ferry passengers.
- If the population of Beaver Island increases substantially, the increases should be applied proportionally to the air taxi and ferry passenger estimates. But, historical data does not support assumptions that the population of the island will substantially increase over the next 20 years, but local planning conditions could change that.
- The Case 1 test assumed the ferry speed would increase by 25%, and everything else would remain the same. This results in an annual ferry increase of 1,132 passengers and an equal decrease in air taxi.

- The Case 2 test assumed the ferry speed would increase by 25%, and everything else would remain the same. This results in an annual ferry increase of 1,395 passengers and an equal decrease in air taxi.
- The Case 3 test assumed a ferry fare reduction of 25% and speed increase of 25%, and everything else would remain the same. This results in an annual ferry increase of 2,379 passengers and an equal decrease in air taxi.

The analysis demonstrated that changes in ferry and air taxi passengers are more likely to be impacted by external circumstances, like COVID-19, than by changes in fares or boat speed.



## 8. Recommendations

### Legal

The overall organization issues were reviewed by an attorney familiar with public transportation in Michigan and are summarized here. Ultimately, it is possible for BITA to terminate the agreements with BIBCO and pursue operation of the ferry system itself through a public option on December 21, 2023, the time at which the various agreements terminate. Depending on the route BITA chooses (taking over operations, bidding the service out, or maintaining the current relationship with BIBCO), various new agreements would need to be drafted, which could include a request for proposals for bidding, along with various legal agreements covering operation of the ferry system. If BITA decides to continue its relationship with BIBCO, the consultant team recommends that several issues in the current Management Agreement be addressed. There are items in the agreement that have no defined method of enforcement and allows BITA no recourse for remedy. There are also no options present in the agreement to revisit the agreement other than the 30-year timeframe. In addition, the requirements that BITA must meet per Act 51 and Federal Ferryboat regulations should be addressed where applicable in the agreement.

There is a separate Memorandum of Understanding, where BITA purchase fuel for the operation of the Emerald Isle and M/V Beaver Islander, however, it references “Operating Management Agreement,” which is incorrect as the agreement it is referring to is the Management Services Agreement. Ultimately, if the Management Services Agreement is re-negotiated with BIBCO, then the terms of the memorandum of understanding should be incorporated into the master Management Agreement.

It is the consultant team’s observation that the current arrangement between BITA and BIBCO is working (and that is supported by discussions with MDOT), but the issues mentioned above should be incorporated in a new management agreement. While a public option is certainly an option for BITA to pursue, the impediments (BIBCO’s ownership of the property and docks) to achieving that option may be more than BITA desires to pursue.

### Capital Needs

#### Vessel and Vessel Systems

The consultant recommends that BITA continue to follow its maintenance and replacement schedule for engines, generators, transmissions and other vessel related items. All those items are listed on MDOT’s Passenger Transportation Management System (and Table 4-1) their useful life is prorated for replacement. BITA should continue its practice of applying for capital items through MDOT

Marine capital and via Ferryboat Formula funds while continuing the prioritization of equipment most crucial to sustain the operation of the ferry.

The consultant recommends that BITA and BIBCO pursue financing options for the new ferry and the dock repairs. Ideally funding that is secured would finance both a vessel and dock upgrades and construction could coincide to ensure that service continues without interruptions. In the short term, BITA should explore retaining an architectural/engineering firm to evaluate the dock and develop plans for reconstruction that includes modifications for the future vessel which can also continue to accommodate the Emerald Isle. Due to the age of both vessels along with the decreased capacity of the Beaver Islander should the Emerald Isle experience a breakdown, a new vessel is needed to maintain the current level of service. As this report was being completed, a cost analysis for a new ferryboat along with an alternative technology assessment was being conducted, which concluded the current cost for vessel replacement was \$17.5 million.

### Facilities

The consultant recommends that BITA continue following its facility maintenance schedule and due to funding constraints, continue to prioritize the maintenance and replacement items to maintain the facilities for operational efficiency. Both the Transportation Building and the Donegal Bay Storage building are in adequate to good condition, but the dock facility is currently in most need of repair. It is recommended that BITA prioritize the dock reconstruction as it most impacts current and future service to the Island. It is recommended that BITA discuss the dock issue with MDOT and request funding for an engineering evaluation, design, and construction to correct the current issues, prevent the cause of the condition in the future, and accommodate the designed vessel. Should the dock continue to deteriorate, it is doubtful that service can be maintained at the current level.

### Dock Support Equipment

The consultant recommends that BITA continue to prioritize dock support equipment replacement by its relative importance to maintaining service levels as capital funds available are limited. BITA's dock support equipment is on a replacement schedule as all State or Federal funded equipment is on the PTMS database. Due to other issues (breakdowns, operational inefficiencies) one or more items of equipment may need to be replaced prior to another prioritized item. As always, BITA will need to continue to prioritize equipment replacement with available funding.

All Operational Assets have a limited useful lifespan and will need replacement at some point. Some, like the ferry and the facilities have a much longer lifespan. The critical issue with asset replacement is funding. BITA, like the other publicly

subsidized ferry and transit systems in Michigan, does not receive enough capital funding to replace all of its equipment that is eligible for replacement. A replacement schedule is usually 'juggled' to replace the items most critical to maintaining service operations. BITA has done this over the years as equipment needs and operational needs have changed. Unfortunately, the funding has not been available to meet all the need.

### Future Needs

BITA's most critical future need at present is repair/reconstruction of the dock. In the consultant's opinion, BITA should discuss engineering/design/construction funding with MDOT and explain the need for repairs to maintain current and future service. Secondly, the need for a new vessel is very important. BITA should continue to work with MDOT to secure funding for a new ferry. Current Federal Ferryboat programs do not provide adequate funds to construct a new ferry (which was originally projected at \$13.5 Million, but has recently been updated to \$17.5 Million). New funding avenues may be available if the proposed Infrastructure Bill or other legislation is implemented. The boat is currently designed to be powered by diesel engines. If an alternative energy source is found feasible and entertained, there may be a need for a re-design or partial re-design of the new vessel. The consultant recommends that BITA secure funding to update the original engineer's estimate for vessel construction.

Equipment needs will continue to change, and new technologies may change the way operations function in the future. BITA should be open to accepting new technologies and use Federal and State grants for new technology or Green Energy to replace support equipment as needed.

### Fares

The consultant team recommends that BITA continue their fare oversight as required by Federal Ferryboat regulations. BIBCO's current fares are not out of line with other ferry providers that the consultant team compared them to, but due to BITA's inability to determine the profit/loss of BIBCO, the reasonableness of the fares cannot be determined. The consultant team also recommends that BITA include freight and vehicle fare rates in their oversight/approval process, as Federal regulations state: "The operating authority and the amount of fares charged for passage on the ferry must be under the control of the State or other public entity, and all revenues derived therefrom must be applied to actual and necessary costs of operation, maintenance and repair, debt service, negotiated management fees, and, in the case of a privately-operated toll ferry, for a reasonable rate of return;"

### Additional Revenue Sources

The consultant team examined other revenue options for BITA such as advertising and local millage. Both of those options are currently not possible as

BITA and St. James Township agreed that no millage for operation or capital would be pursued, and BIBCO does advertising on the Emerald Isle and retains that and fare revenue under the Management Agreement. The current Management Agreement states that BIBCO will provide BITA funding for operational funding at 50% and capital funding at 10%, so essentially all of BITA's non-Federal and State funds come from BIBCO. BITA's only options for local revenue are currently constrained and controlled by the Management Agreement, which allows BIBCO to collect and keep the fares and advertising revenue. Since a local millage is not an option there are realistically no other local funding options for BITA.

## Conclusions

The Request for Proposals specified four key questions to be addressed by this study, which were defined in Chapter 1 and repeated here for clarity. The answers to those questions are detailed in the preceding discussion and succinctly summarized here.

1. Examine the current private/public partnership's effectiveness. What recommended changes should be made to the operational agreement to reflect current and future needs. Is the current operator the best option? Is a public option a possibility?

The current operation, as we have detailed in the report, is unique and been in existence for decades. From all practical perspectives it has worked well and continues to work well. The overriding issue is the transparency of the financial picture from BIBCO, which as we have stated, could be overcome by an agreement that allows for a periodic audit that conforms to standard accounting principles and is provided by BIBCO to BITA. Realistically, we propose that, on a mutually agreed upon interval (for example, every three years), BIBCO provides to BITA reviewed financial statements, including statement of financial position, statement of operations, and statement of cash flows for the most recent fiscal year end. As to the question of whether the current operator is the best option, following conversations with staff and MDOT, and observation of operations, we believe the current operator is the best option from both a practical and community standpoint. We believe the suggestion outlined above could remedy many of the perception issues associated with the operation. As to a public option<sup>3</sup> being a possibility, it is always a possibility if the current agreement cannot be renewed

2. Why have passenger numbers declined? Are passenger fares and freight rates equitable or should they be reduced?

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<sup>3</sup> For this analysis, public option is considered a situation where BITA would take over all operations and operate the service itself or contract the operation with all capital and operating revenues and expenditures flowing through BITA.

Clearly, the biggest impact on ferry boat traffic has been the shift between ferry boat passenger activity and air taxi. Comparison of the 2004 and 2021 surveys clearly demonstrate this shift. The reasons for the shift have been outlined in earlier sections of this report but generally are associated with the reduction of travel time and the general competitiveness of fares for air service.

3. What does the Authority need to update in terms of vessels and infrastructure, based on economic forecasts for Beaver Island?

The ferry services are a lifeline for not only passenger traffic but also for the various cargo and freight services required for the island to thrive in the 21<sup>st</sup> century. While real growth (per the census) has not been experienced in terms of population there are very real indicators of increased economic and tourism activity, particularly as the country, state, and island emerge from the initial COVID 19 pandemic. We believe the most important priority from a long-range planning standpoint, is for BITA to firmly get situated to obtain a new vessel to replace the Emerald Isle, which would then become the back-up vessel, replacing the Beaver Islander, which will be nearly 100 years old before mid-century. Other priorities include the Beaver Island docks and continuing to examine alternatives for the mainland (Charlevoix) dock operations.

4. What are the Authority's best options for revenue enhancements?

As an Act 196 Authority, BITA has the power to generate local funds through levy of a millage of up to 5 mils for property taxes, to provide for the issuance of bonds and notes, to borrow money, and to purchase and sell property. As it was agreed with St. James Township when BITA was formed that BITA would not levy a millage or sell bonds to raise revenues, these avenues are not an option unless that arrangement is renegotiated with the township. Likewise, arrangements with BIBCO that limit BITA's to generate revenue could be renegotiated.

## Appendix A: History of Ferry Service On Beaver Island

Beaver Island is located in Lake Michigan about 32 miles northwest of the City of Charlevoix, Michigan. The island has been inhabited for centuries and currently has a population of about 600 year-round residents and a significant summer population. Ferries traveling to the island from Charlevoix date to the late 19<sup>th</sup> century. Since the 1950's the Beaver Island Boat Company has provided service. Following is a brief chronology of some of the boats that have been used for transportation to the island.

- Nellie – 1890's
- Erie L. Hackley – 1896 – 1902
- Oval Agitator – Renamed Beaver – 1914 – 1915
- City of Boyne
- Columbia – 1916 – 1917
- Bruce – 1917 – 1920
- James E. Sanford – 1920 – 1930
- Marold II – 1931
- Ossian Bedell – 1932 – 1933
- Marold II – 1934 – 1936
- Mary Margaret – 1937 – 1945
- North Shore – 1945 – 1954
- Emerald Isle – 1954 – 1962
- Beaver Islander – 1962 – Present
- South Shore 1973
- Emerald Isle – 1997 – Present

Ferries were generally owned and operated by individuals and sometimes traveled to and from other ports than Charlevoix. The vessel used would often change from year to year. From 1945 to 1954 the ferry boat used was the "North Shore." It was damaged late in the season and the Coast Guard would no longer approve it for passengers.

At that point, some of the inhabitants of Beaver Island and Charlevoix formed the Beaver Island Boat Company through a stock offering. Thus, a ferry service specifically for the run from Charlevoix to Beaver Island and controlled by persons having a direct connection to the ferry was started. The first "Emerald

Isle,” a 65-foot vessel with a capacity of 115 passengers and eight automobiles was built. It was the first ferry designed and built specifically for the Beaver Island to Charlevoix run.

The success of the Beaver Island Boat Company showed the need for a larger and faster vessel, and in 1962 the “Beaver Islander” was built. It remains in operation today (2021) and serves as the back-up to the Emerald Isle. It has a 98-foot length with a capacity of 200 passengers and 12 automobiles. The “South Shore,” an older vessel, was bought in 1974 to be used as a backup boat. The South Shore was sold when the Emerald Isle went into service.

In 1981, the ferry operation was taken over by an unrelated entity titled “The Beaver Island Navigation Company,” a subsidiary of Global Communications Corporation. It operated the ferry service until 1984.

In 1984, the present Beaver Island Boat Company was formed to return control of the ferry service to people who lived or owned property on the island. Stock sales were discouraged to people not directly with Beaver Island or Charlevoix, and the ownership of large blocks of stock was also discouraged. Over the years, the boat company, or BIBCO, has purchased additional dock space and substantially improved the dock facilities with funding through BITA.

In 1992, the St. James Township Board created the Beaver Island Transportation Authority to provide an opportunity to get assistance with capital funding. Funds were requested from State and Federal sources for a new ferry to serve the island community and the traveling public. The M/V Emerald Isle was purchased and now serves as the primary ferry. It is a 130-foot vessel with a capacity of 295 passengers, 20 vehicles, and one semi tractor-trailer truck. It was launched in 1997 and was placed in full service in 1998. BITA oversees marine capital funding and ferry transportation services, including regulation of fares, schedules, and capital investments for major improvements. The Beaver Island Boat Company, a private entity, operates the ferries under an operating agreement with BITA. The Michigan Department of Transportation continues to provide capital assistance to BITA but only operating funds for Administration, fuel, and maintenance. Revenues from the Emerald Isle serve as matching funding for capital grants and BITA operations.

## Appendix B: Survey Form

### Beaver Island Transportation Survey (2021)

We have been retained by the Beaver Island Transportation Authority (BITA) to conduct this survey of ferry transportation needs for Beaver Island. Your responses will remain anonymous to the BITA and combined with the responses of other participants. If you prefer to take this survey online, please go to [{ }{ }](#) and enter the passcode below. Please note that this passcode may only be used once. If you have questions, please contact Mary Cook at BITA (231-448-3049)

Passcode: { }

1. Which of the following applies to you? (Check all that apply.)
  - a. Seasonal Resident of Beaver Island
  - b. Permanent Resident of Beaver Island
  - c. Owner or employee of business on Beaver Island
  - d. Visitor
  - e. Here on Business
2. How do you typically get to and from Beaver Island?
  - a. Ferry
  - b. Air Service
  - c. Personal Boat
  - d. Personal Plane
3. About how many one-way trips per year do you make to/from the island? (Check all that apply.)
  - a. Ferry – 1 – 9
  - b. Ferry – 10 or more
  - c. Air Service – 1 - 9
  - d. Air Service – 10 or more
4. How do you typically get your personal freight to and from Beaver Island? (Check all that apply.)
  - a. Ferry
  - b. Air Service
  - c. Personal Boat
  - d. Personal Plane
  - e. Other
5. Do you think passenger fares on the ferry are reasonable?
  - a. Yes
  - b. No
6. Do you think freight rates and vehicle prices on the ferry are reasonable?



- a. Yes
  - b. No
7. Do you spend money in Charlevoix when traveling to Beaver Island?
- a. Yes
  - b. No
  - c. Does not apply

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8. If you answered "Yes" to the question above, how much do you typically spend in Charlevoix during your trips to Beaver Island?
- a. Less than \$50
  - b. \$51 - 100
  - c. \$101 - \$150
  - d. Over \$150
9. If you are a visitor to the island, do you spend money when you are on Beaver Island?
- a. Yes
  - b. No
  - c. Does not apply
10. If you answered "Yes" to the question above, how much do you typically spend during your stays on Beaver Island?
- a. Less than \$50
  - b. \$51 - 100
  - c. \$101 - \$150
  - d. Over \$150
11. How would it impact you if the Emerald Isle ferry was out of service for an extended period of time?
- a. No impact / not applicable
  - b. Minor impact
  - c. Moderate impact
  - d. Major impact
  - e. Severe impact
12. What do you think about an alternate location in Charlevoix where you would park, buy your ticket, check your luggage and freight, and then board the boat (possibly via shuttle)?
- a. Not a good idea – I like having the office and boat downtown
  - b. Would not make a difference to me
  - c. Sounds like a good idea

**13.** Should any future vessels be powered by alternative energy sources, such as electric, electric diesel, or compressed natural gas?

- a. Yes
- b. No
- c. Unsure

**14.** What is your age?

- a. Under 18
- b. 19 to 55
- c. 56 to 65
- d. Over 65

**15.** Do you have any comments about the future of ferry transportation service for Beaver Island?

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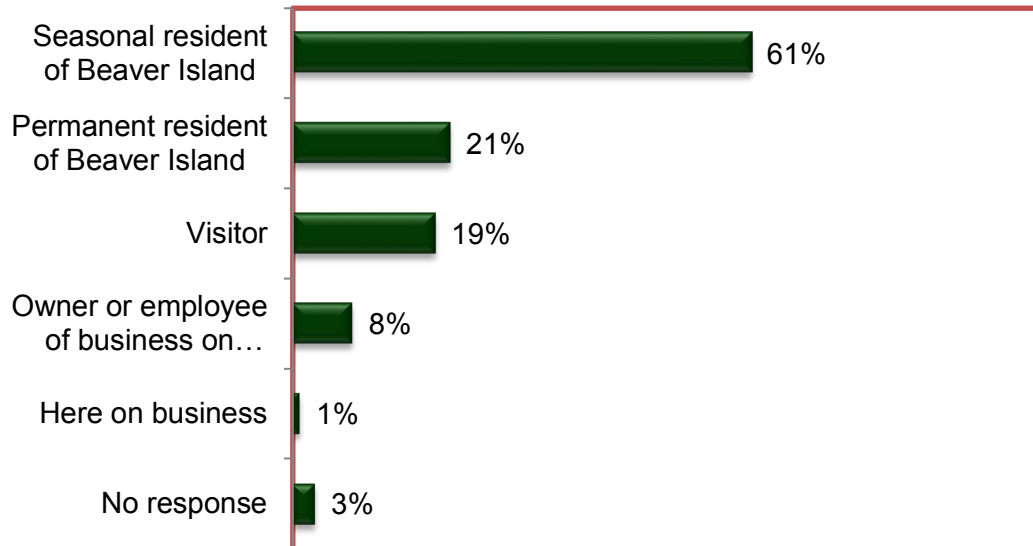
Thank you for your participation. We value your input!

## Appendix C: Survey Results

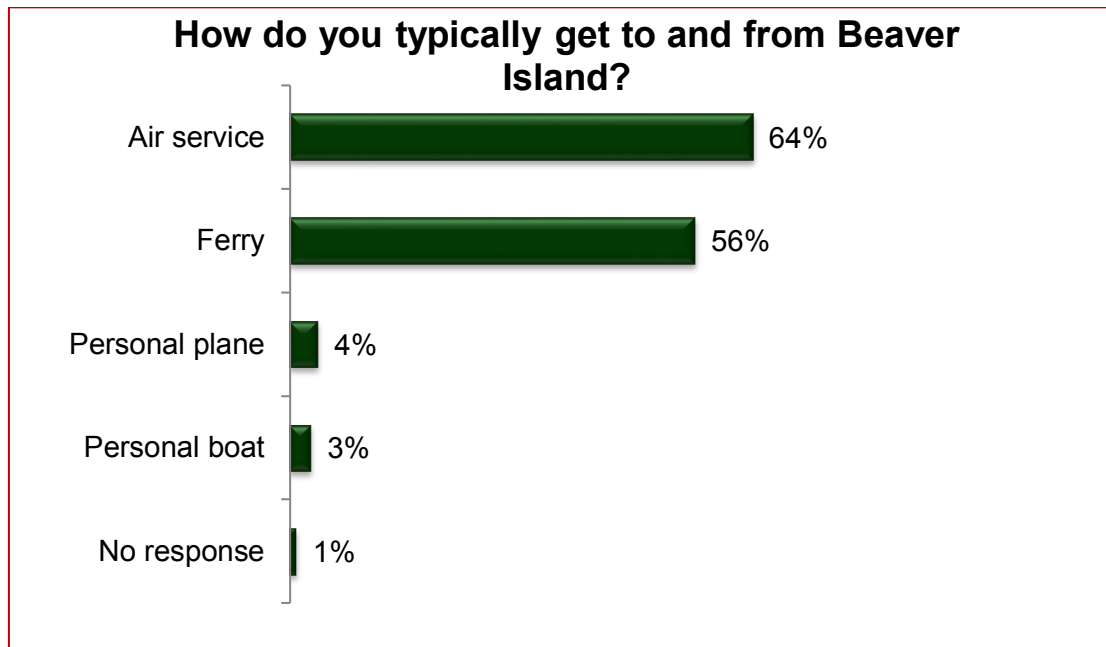
### Survey Results (Mail back)

Question 1 (check all that apply)

#### Which of the following applies to you?

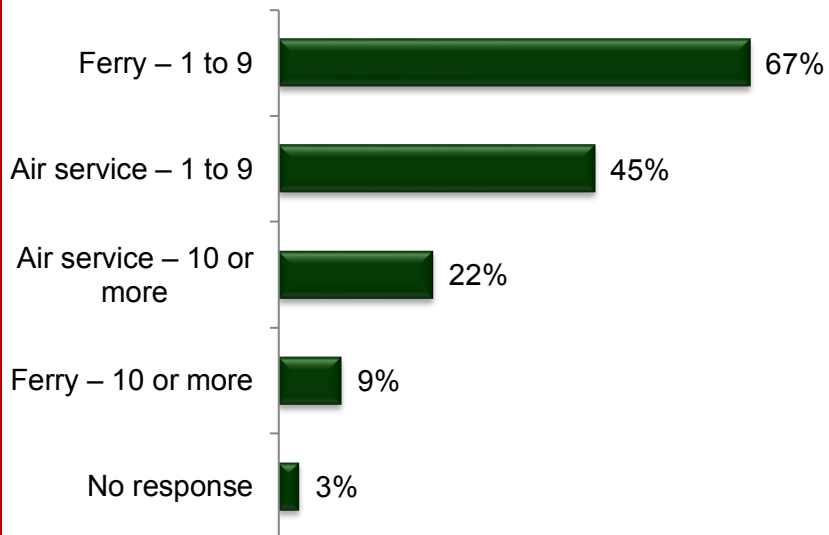


Question 2 (check all that apply)



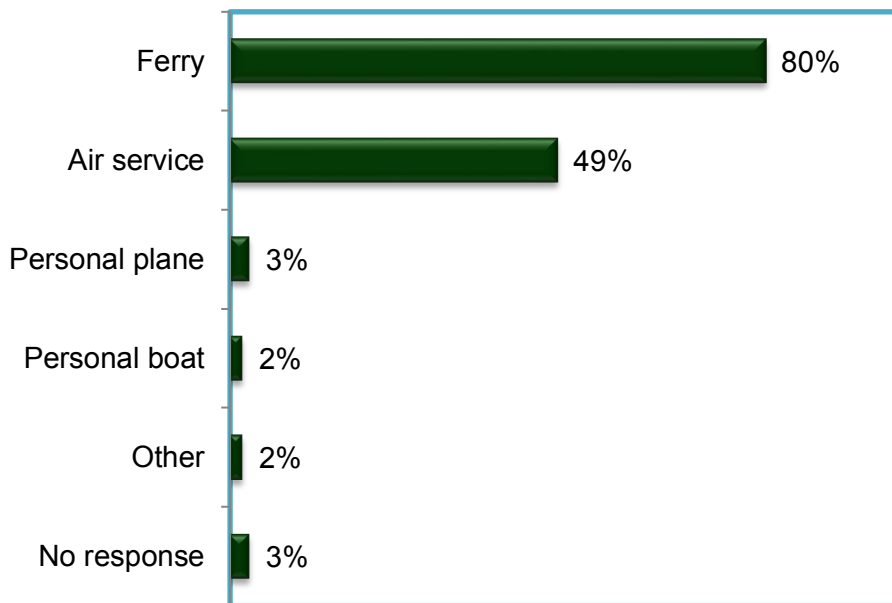
Question 3 (check all that apply)

**About how many one-way trips per year do you make to/from the island?**



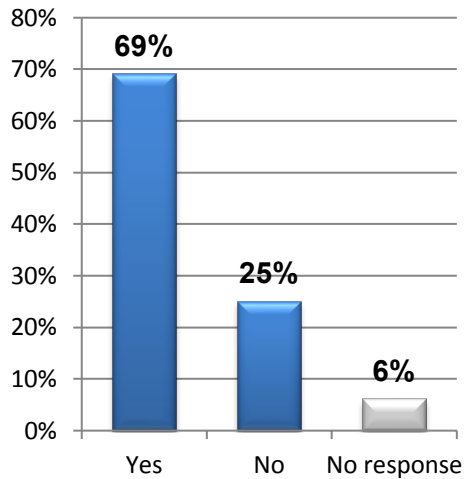
Question 4 (check all that apply)

**How do you typically get your personal freight to and from Beaver Island?**



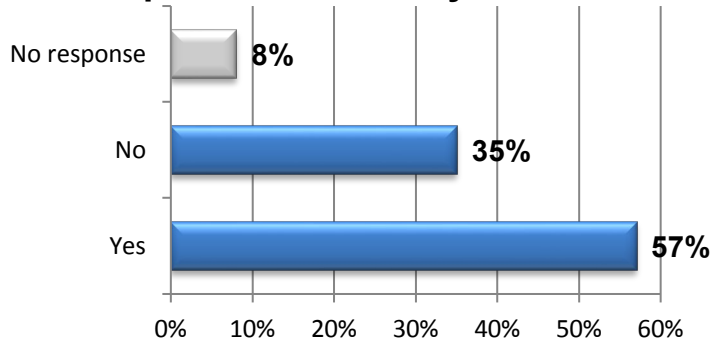
Question 5

**Do you think passenger fares on the ferry are reasonable?**

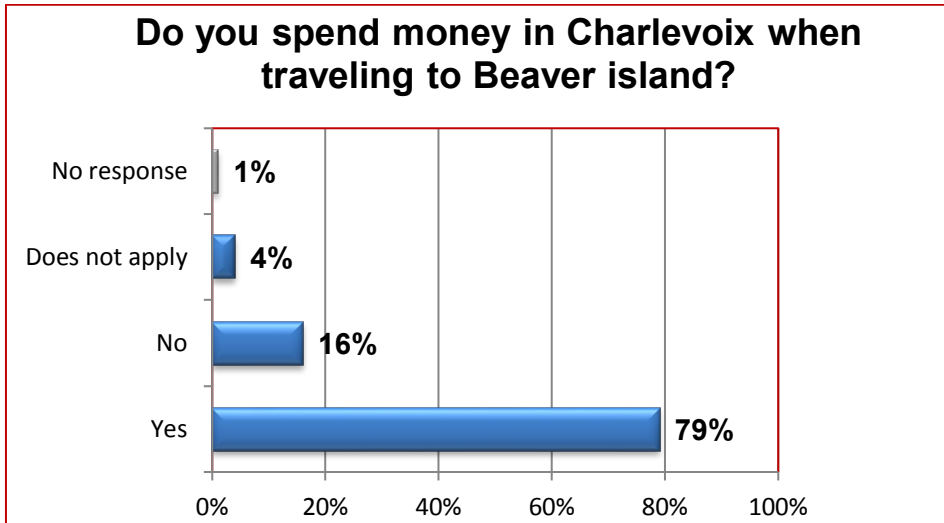


**Question 6**

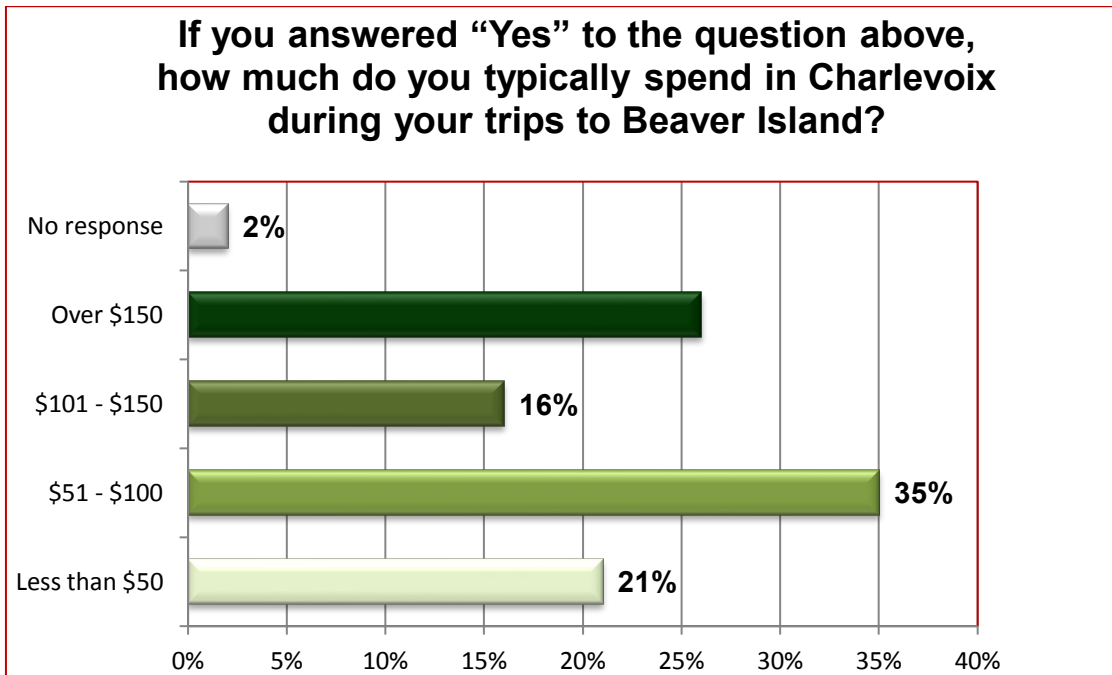
**Do you think freight rates and vehicle prices on the ferry are reasonable?**



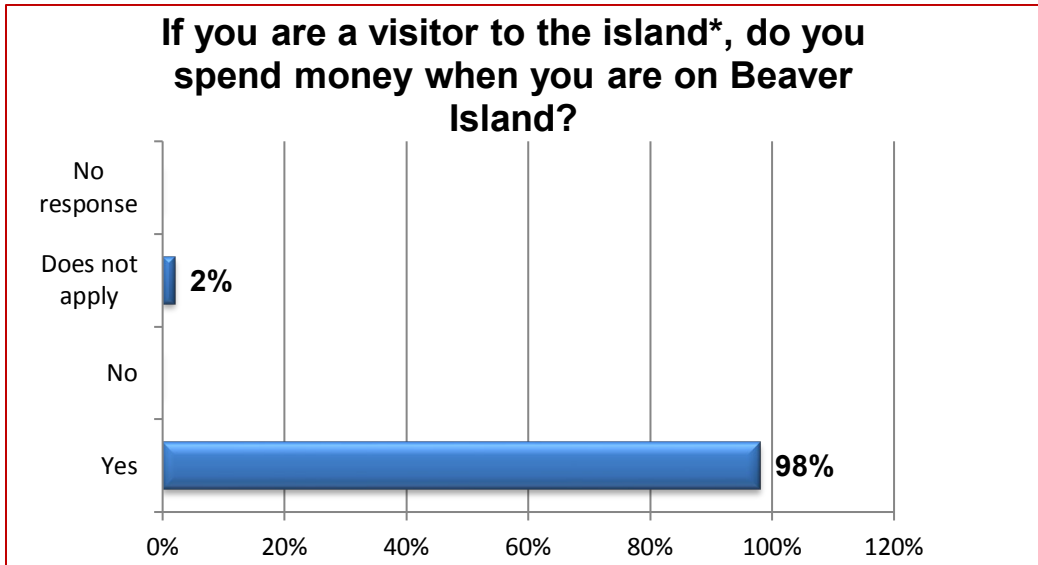
**Question 7**



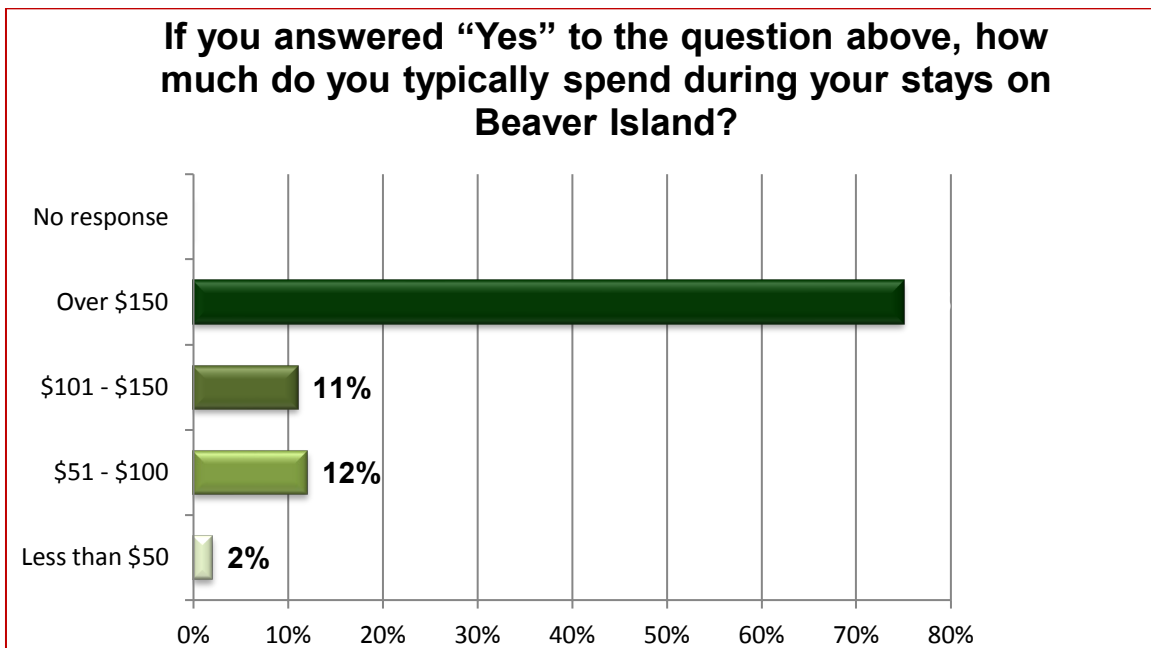
Question 8



Question 9

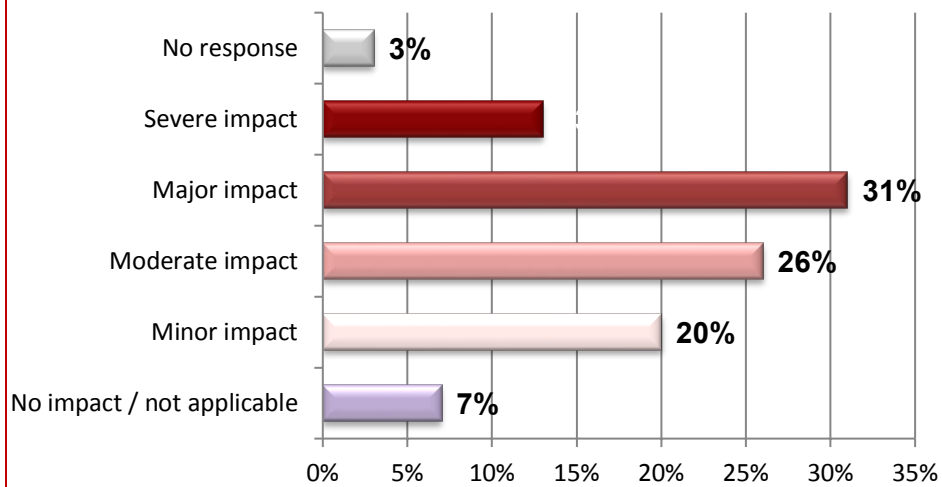


Question 10



Question 11

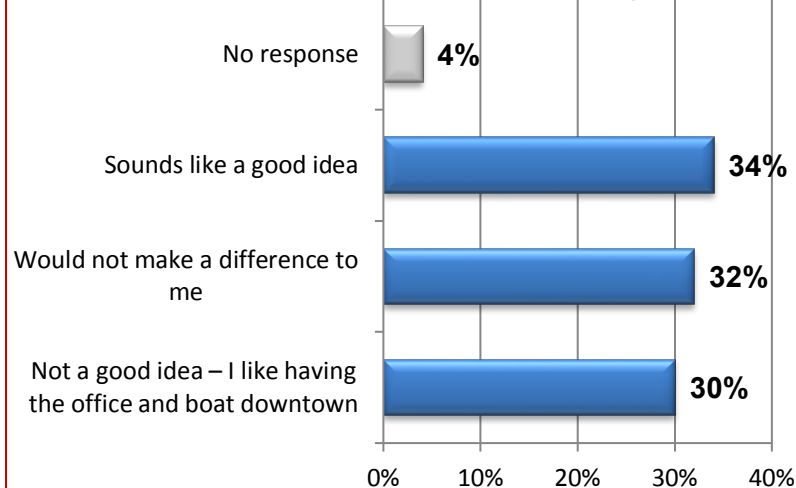
**How would it impact you if the Emerald Isle ferry was out of service for an extended period of time?**



Question 12

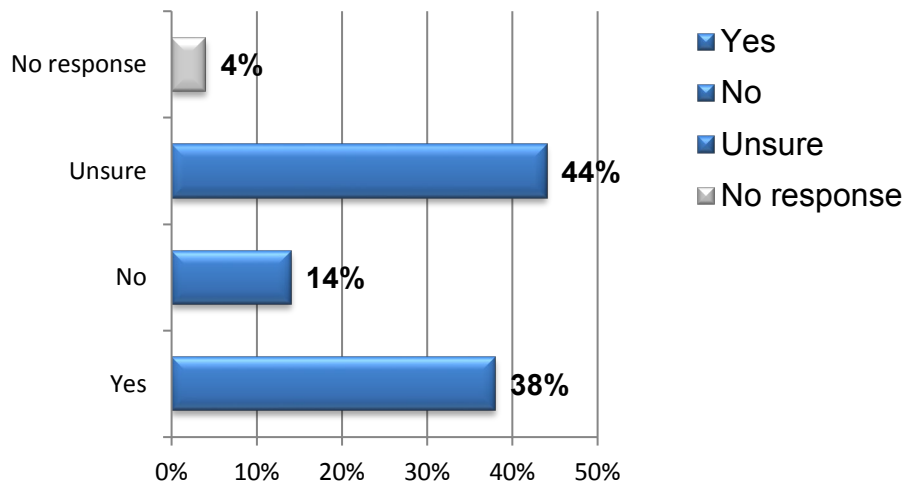


**What do you think about an alternate location in Charlevoix where you would park, buy your ticket, check your luggage and freight, and then board the boat (possibly via shuttle)?**

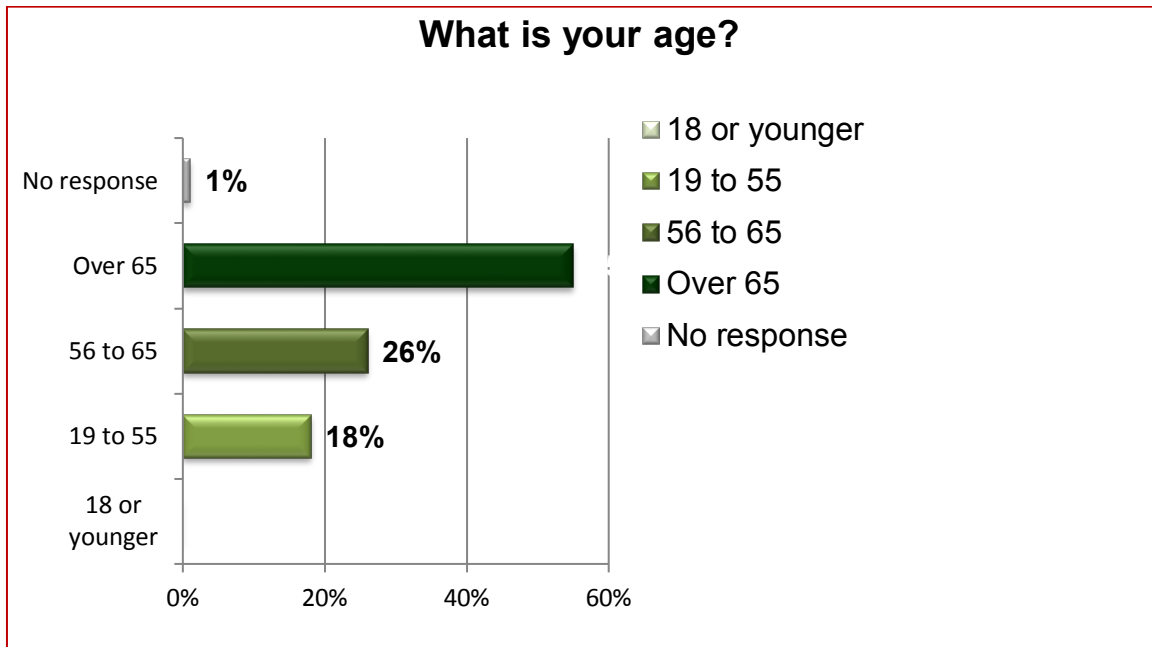


Question 13

**Should any future vessels be powered by alternative energy sources, such as electric, electric diesel, or compressed natural gas?**

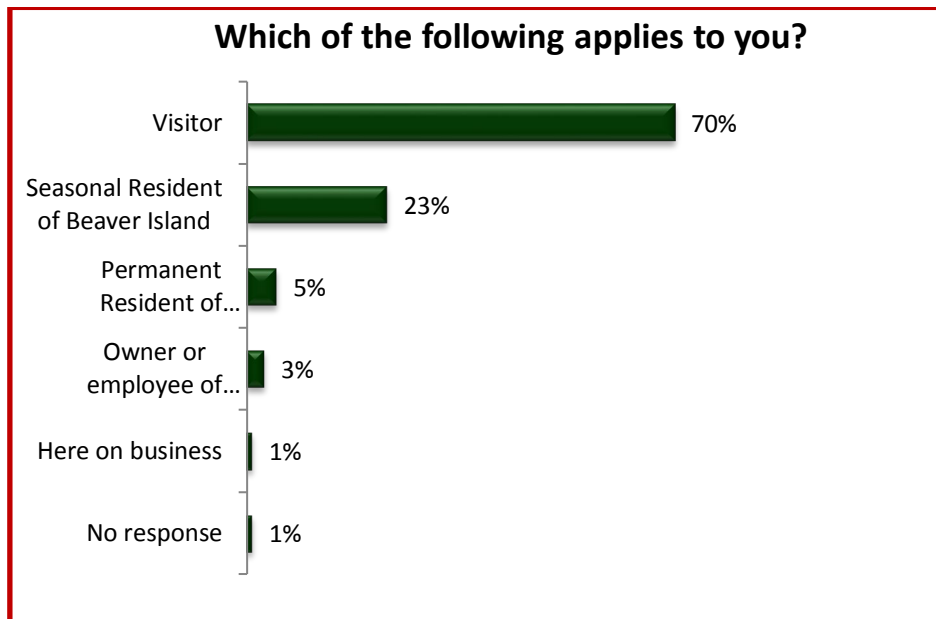


#### Question 14

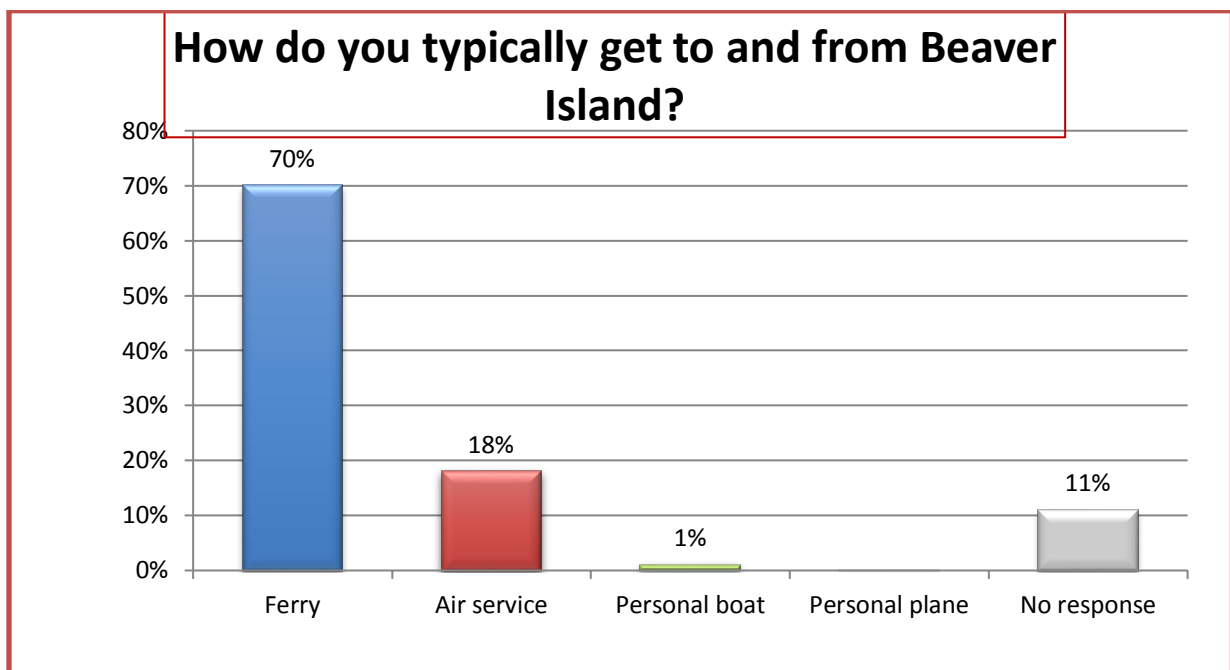


## Survey Results (Email to BIBCO passengers)

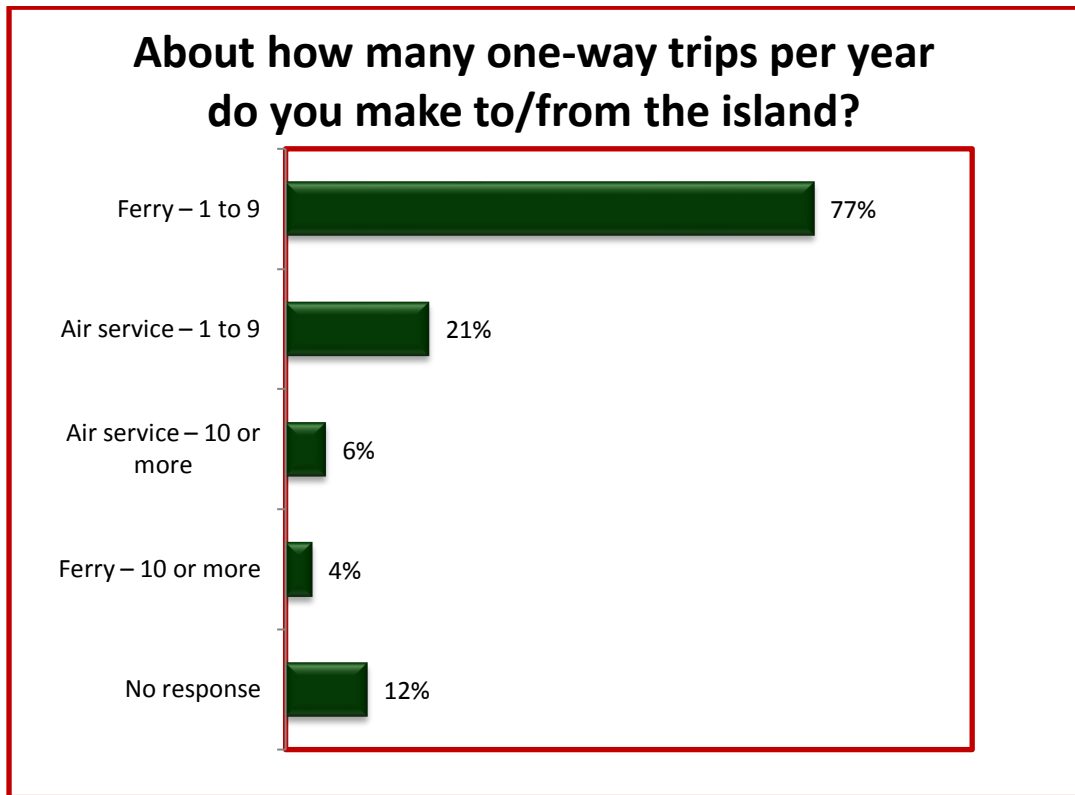
### Question 1



### Question 2

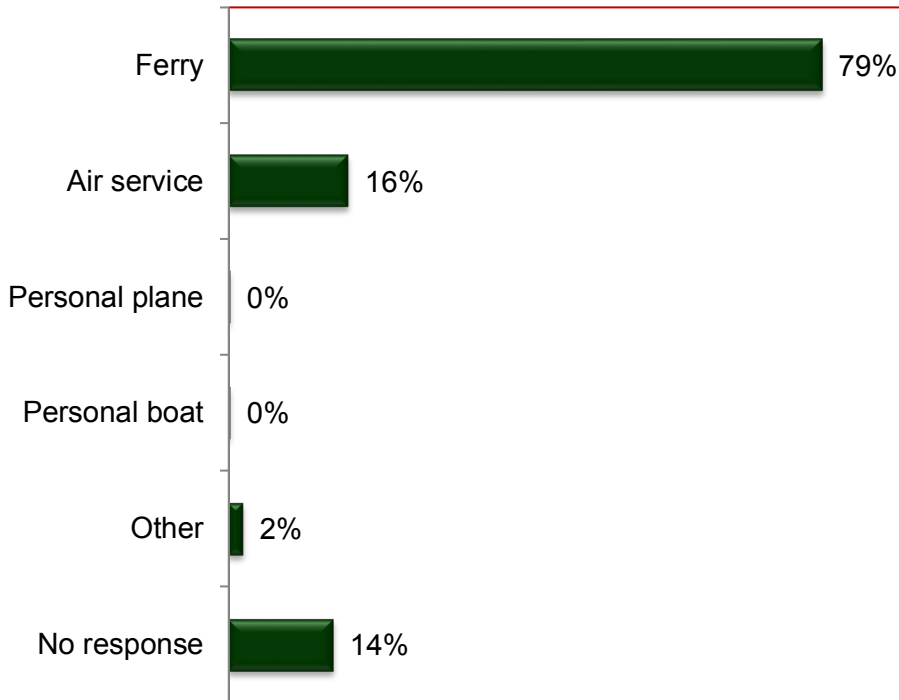


Question 3



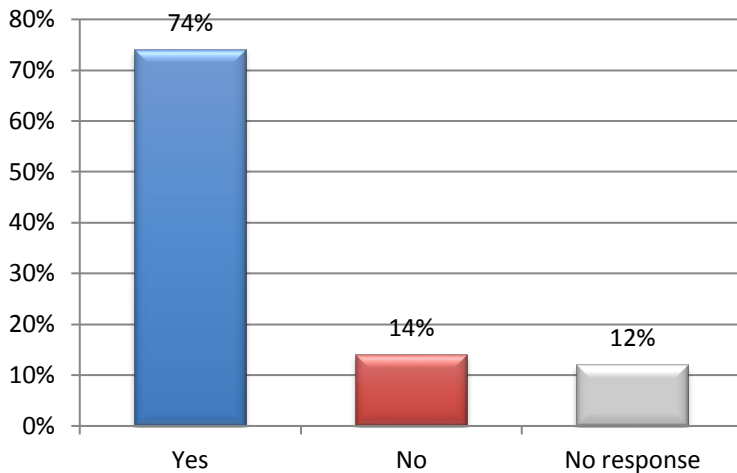
#### Question 4

**How do you typically get your personal freight to and from Beaver Island?**

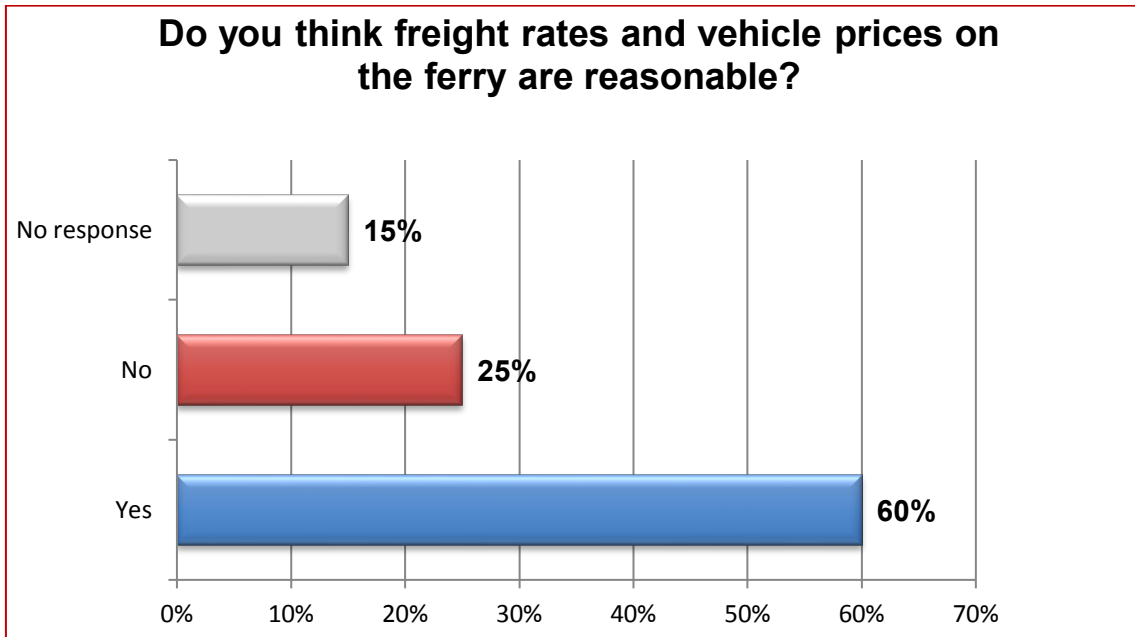


#### Question 5

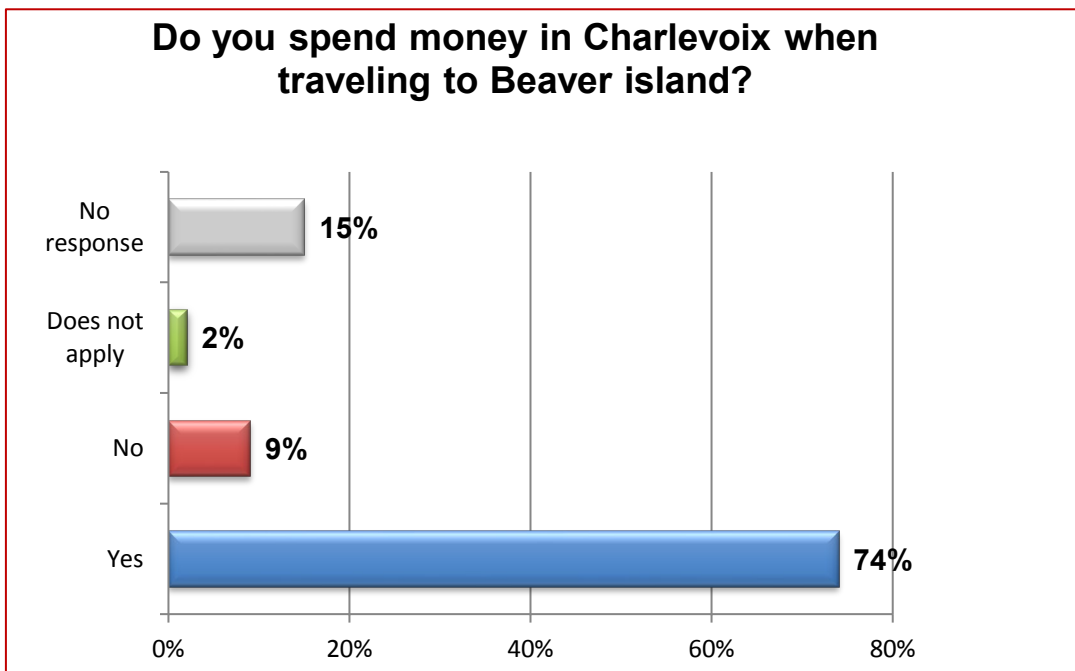
**Do you think passenger fares on the ferry are reasonable?**



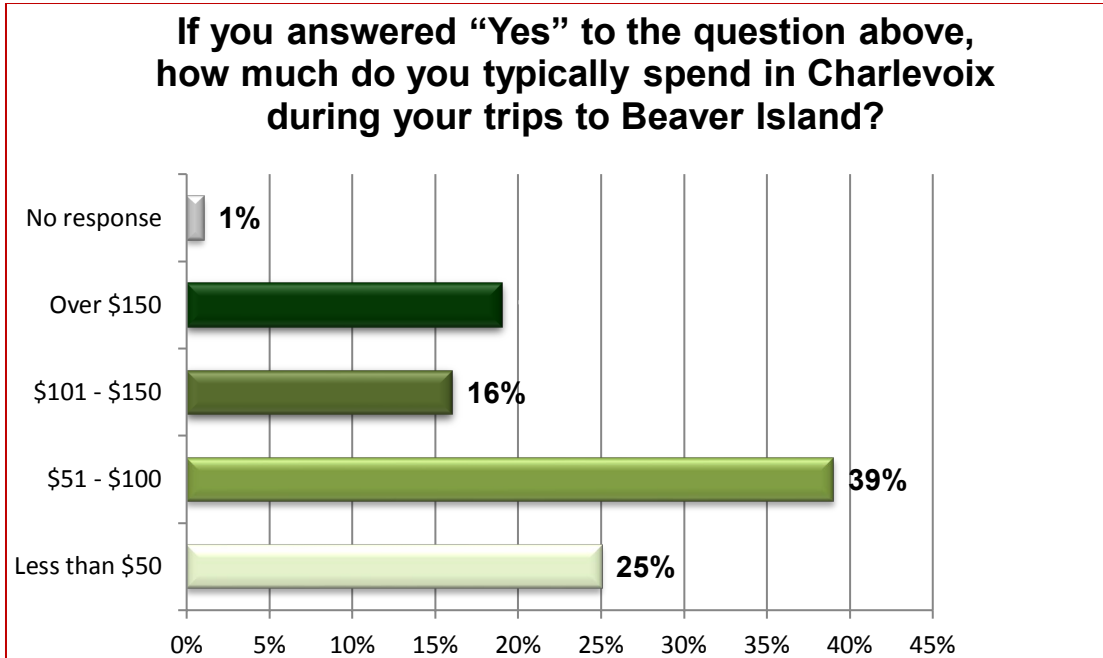
Question 6



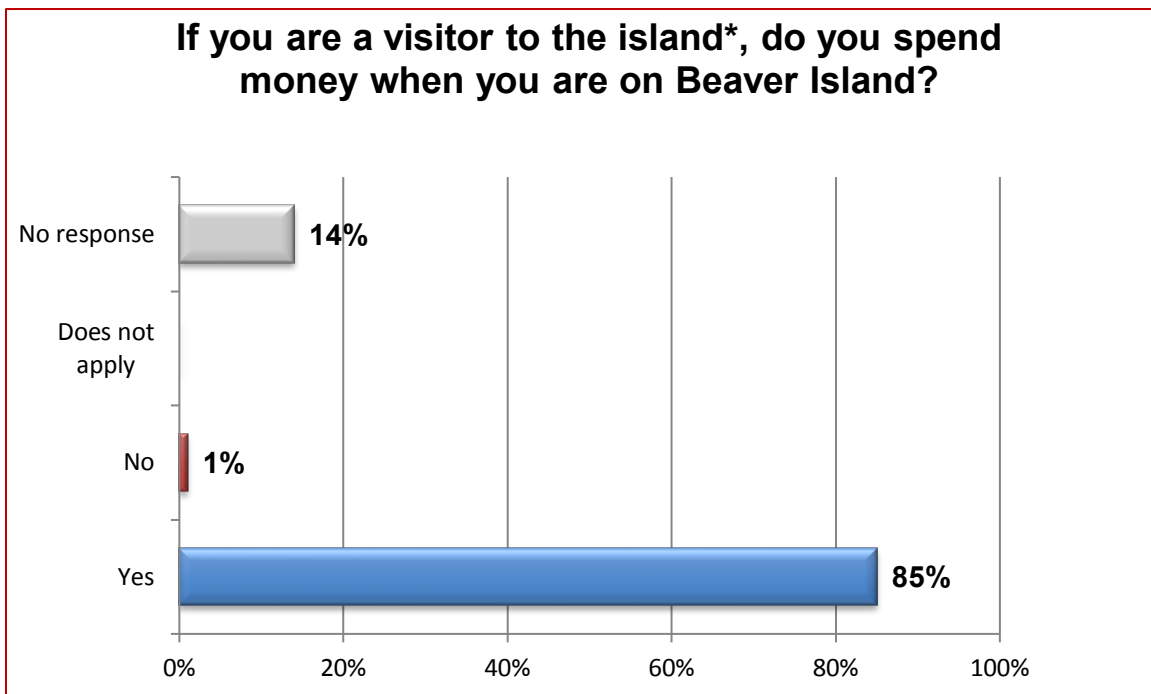
Question 7



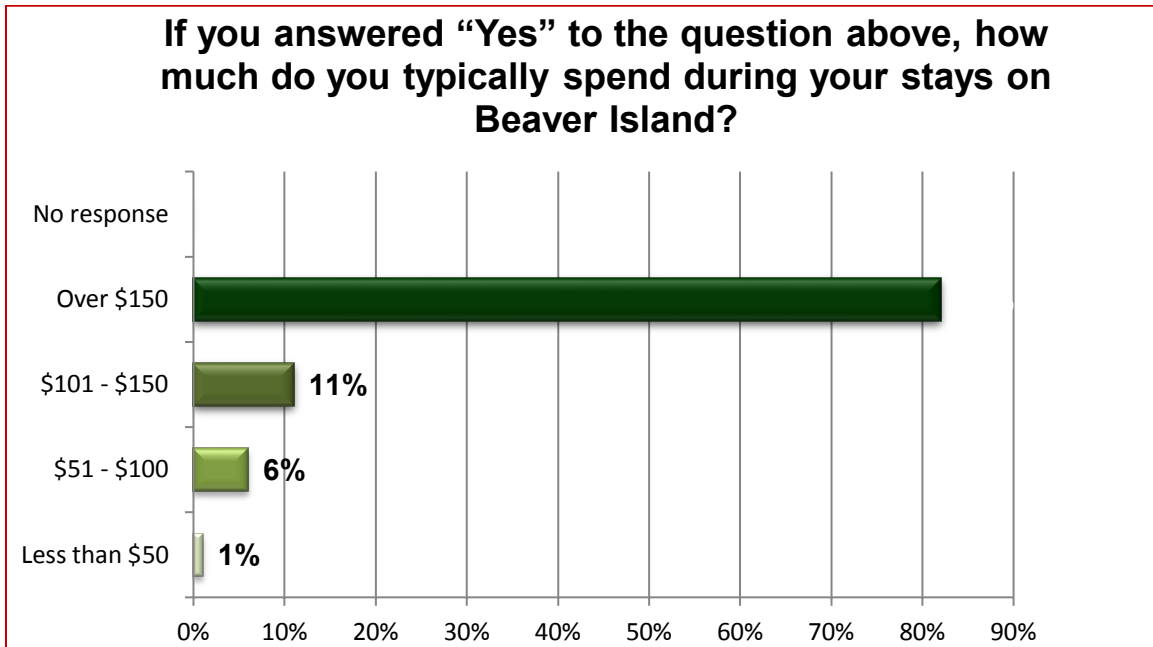
### Question 8



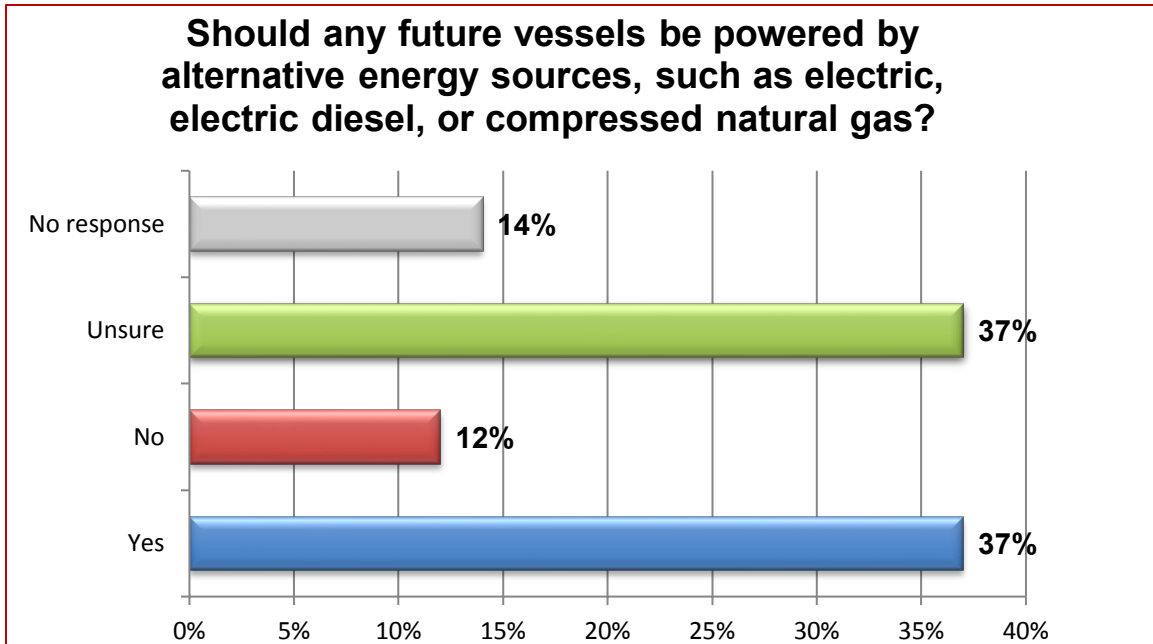
### Question 9



#### Question 10



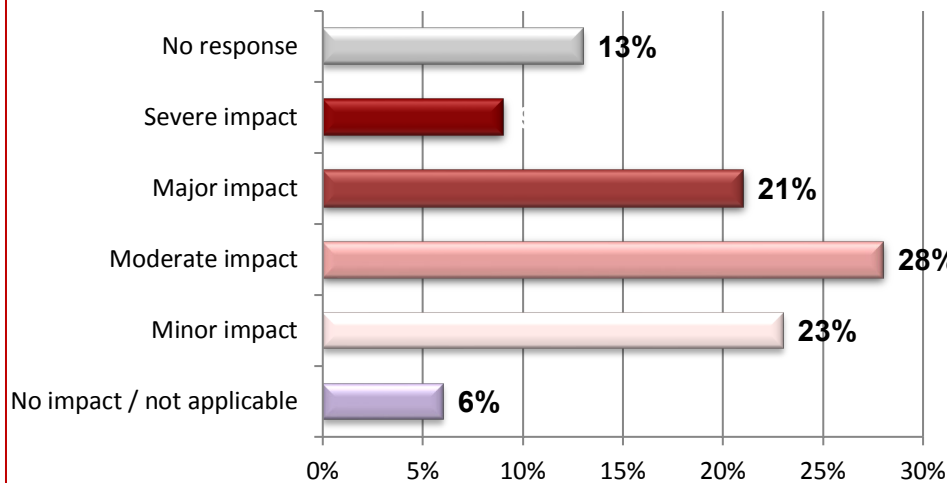
#### Question 11



#### Question 12

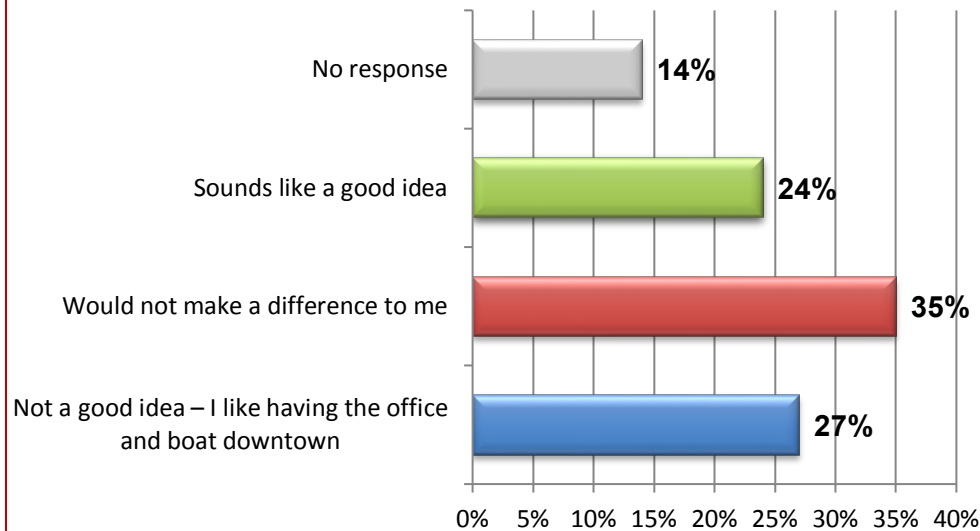


**How would it impact you if the Emerald Isle ferry was out of service for an extended period of time?**



**Question 13**

**What do you think about an alternate location in Charlevoix where you would park, buy your ticket, check your luggage and freight, and then board the boat (possibly via shuttle)?**



#### Question 14

