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Portland North Transportation Study : Results of the Freeport Visitor Survey

Warner Transportation Consulting, Inc.

Portland North Transportation Study

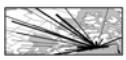
Results of the Freeport Visitor Survey

October 20, 2008

Prepared for:

Maine Department of Transportation

Prepared by:



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The Portland North transportation alternatives aim primarily at people commuting or otherwise traveling for business to Portland or elsewhere in the corridor. There is another large group of travelers who could also use the line: shoppers in Freeport. LL Bean, a hundred other stores, and dozens of restaurants and hotels draw visitors to downtown Freeport from all over Maine and beyond. It is the state's biggest tourist destination. It is also walkable, and the Portland North Brunswick line would have a station two blocks from the heart of the retail district.

In August 2008, Warner Transportation Consulting, Inc. conducted a survey of Freeport area visitors to help gauge how many of these travelers might use the Brunswick line. Over three weekdays, passersby at the corner of Main and Bow Streets and in front of the main entrance to the principal LL Bean store received a questionnaire and a small pencil. Prominent signs at the perimeter of these areas notified the pedestrians of the intent of the survey and that the effort was for Maine DOT. With this advanced notice, someone from at least half of all groups approaching the LL Bean store took the survey. The participation rate at Main and Bow Streets was lower, but there is nothing to suggest that characteristics of the respondents introduced a bias into the relevant results of the survey. Survey respondents generally filled out the questionnaire on the spot, and returned the completed form to the marked boxes. The survey generated 439 completed and useable responses.

Survey description

The survey asked travelers about their trip origin, mode of travel, group composition, and whether this trip to Freeport included stops elsewhere around the state or region. The questionnaire also presented two possible changes to the transportation system:

- Extension of the Amtrak Downeaster service to Freeport and Brunswick; and
- A commuter rail or Bus Rapid Transit (BRT) option serving Freeport and other corridor communities.

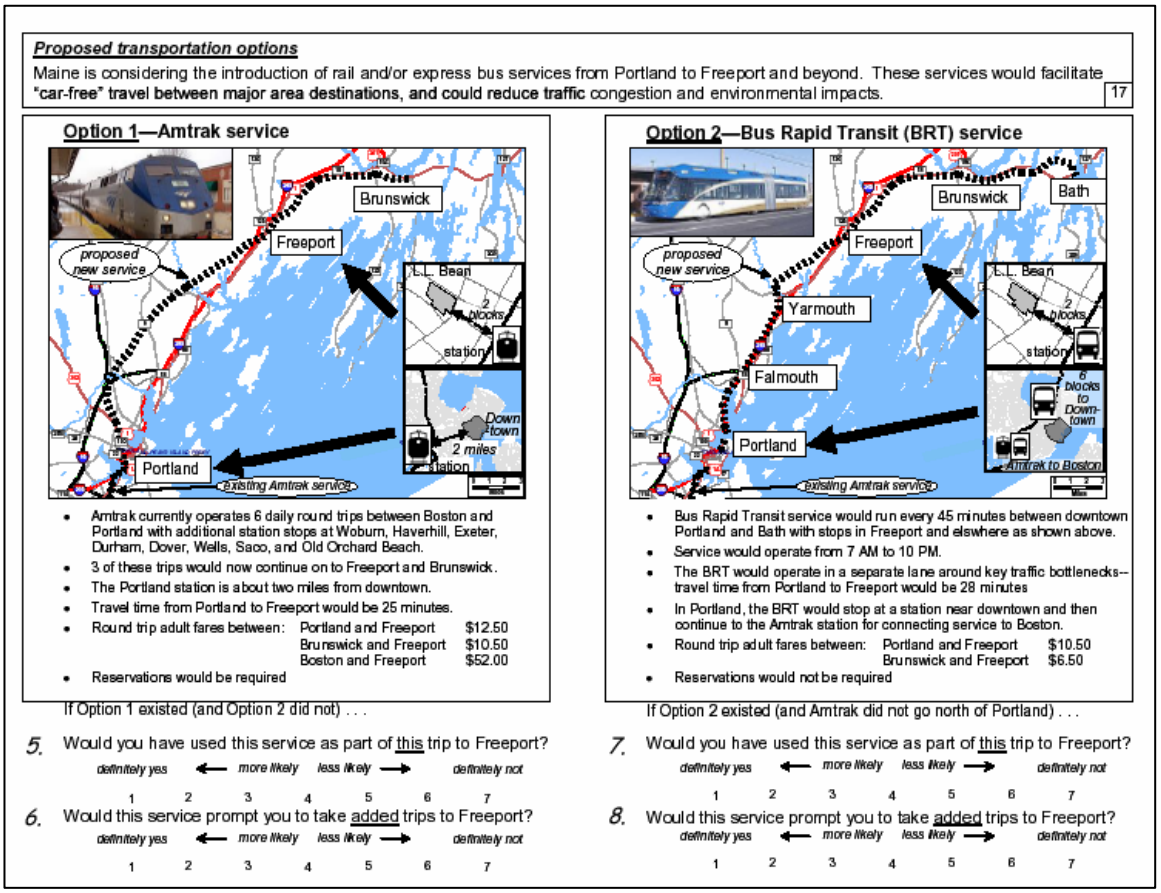
The Amtrak proposal used the service characteristics as defined by Patricia Quinn of the Northern New England Passenger Rail Authority, the organization that coordinates the existing Downeaster service. This plan called for three of six daily Downeaster trains to continue north of the current Portland Amtrak station, and a round trip adult fare of $12.50 for the 25 minute trip between Portland and Freeport. The survey included other fares for trips between Freeport and Brunswick, and between Freeport and Boston.

There were 18 versions of the survey. They differed in the combination of attributes for the proposed Portland North alternative. Exhibit 1 shows the attributes tested in each version, and Exhibit 2 shows one version of the inside page of the Freeport survey. Each version used a similar method to illustrate the service concept, route, mode, and stop location. The version presented shows a graphic of the BRT; the aim here was to help convey an image of BRT as different from an ordinary bus.

Exhibit 1
Portland North characteristics tested in each survey version

version	mode	headway	fare	Portland stops
1	rail	30	7.5	Bayside only
2	rail	30	9	Bayside only
3	rail	45	7.5	Bayside only
4	rail	45	10.5	Bayside only
5	rail	60	9	Bayside only
6	rail	60	10.5	Bayside only
7	rail	30	10.5	Bayside only
8	rail	45	9	Bayside only
9	rail	60	7.5	Bayside only
10	BRT	30	9	Bayside only
11	BRT	30	10.5	Bayside only
12	BRT	45	7.5	Bayside only
13	BRT	45	9	Bayside only
14	BRT	60	7.5	Bayside only
15	BRT	60	10.5	Bayside only
16	BRT	30	7.5	Bayside and Amtrak station
17	BRT	45	10.5	Bayside and Amtrak station
18	BRT	60	9	Bayside and Amtrak station

Exhibit 2
Inside page of the Freeport visitor survey
(version 17—reduced to 54% of actual size)



Questions related to the Amtrak and Portland North alternative (option 2 in the survey) asked respondents about their likelihood to use the proposed service. A follow-up question on the back page (not shown) asked which option—Amtrak or the Portland North alternative—they preferred.

Survey findings about Freeport travelers

We now examine several general characteristics about Freeport visitors revealed by the survey. Each of these characteristics would affect the traveler's ability to use the proposed transportation alternatives.

Freeport visitor origin

Freeport lives up to its reputation as attracting travelers from far beyond the local area. Only one third of visitors come from Maine. Another 19 percent come from Massachusetts or New Hampshire, and 52 percent come from beyond that. Exhibits 3 and 4 show this distribution. "Corridor" refers to the communities within a few miles of the proposed Portland North stations.

Exhibit 3
Residence of visitors surveyed

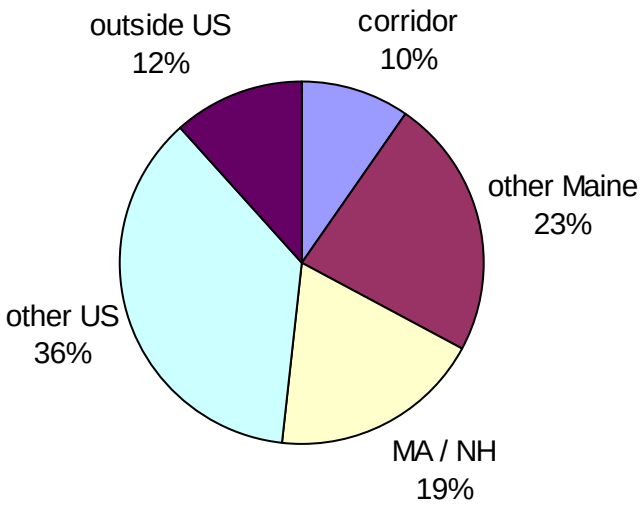


Exhibit 4
Number of respondents by community, state and province

Maine corridor communities

city/town	respondents	city/town	respondents	city/town	respondents
Freeport*	9	Westbrook	4	West Bath	2
Brunswick	7	Cape Elizabeth	3	Yarmouth	2
Portland	6	Cumberland	3	Bath	1
South Portland	5	North Yarmouth	3	Falmouth	1
Topsham	5				

Other Maine

city/town	respondents	city/town	respondents	city/town	respondents
Auburn	4	Chapman	1	Mount Desert	1
Gray	4	Cherryfield	1	Naples	1
Brewer	3	China	1	Newport	1
Kennebunkport	3	Dennysville	1	Orland	1
Lewiston	3	Durham	1	Orono	1
Rockland	3	East Boothbay	1	Palermo	1
Scarborough	3	East Machias	1	Peaks Island	1
Winthrop	3	Edgecomb	1	Peru	1
Biddeford	2	Eliot	1	Rockport	1
Boothbay	2	Fairfield	1	South China	1
Dresden	2	Farmington	1	South Paris	1
Saco	2	Gardiner	1	South Thomaston	1
Skowhegan	2	Gorham	1	Sullivan	1
Wilton	2	Greene	1	Trevett	1
Winterport	2	Harpswell	1	Turner	1
Alfred	1	Hermon	1	Waldoboro	1
Augusta	1	Holden	1	Waterville	1
Bangor	1	Industry	1	West Baldwin	1
Belfast	1	Jefferson	1	West Paris	1
Belgrade	1	Kennebunk	1	Wiscasset	1
Bridgton	1	Kittery	1	Woodstock	1
Bristol	1	Lovell	1	Woolwich	1
Bryant Pond	1	Milford	1	York	1
Calais	1				

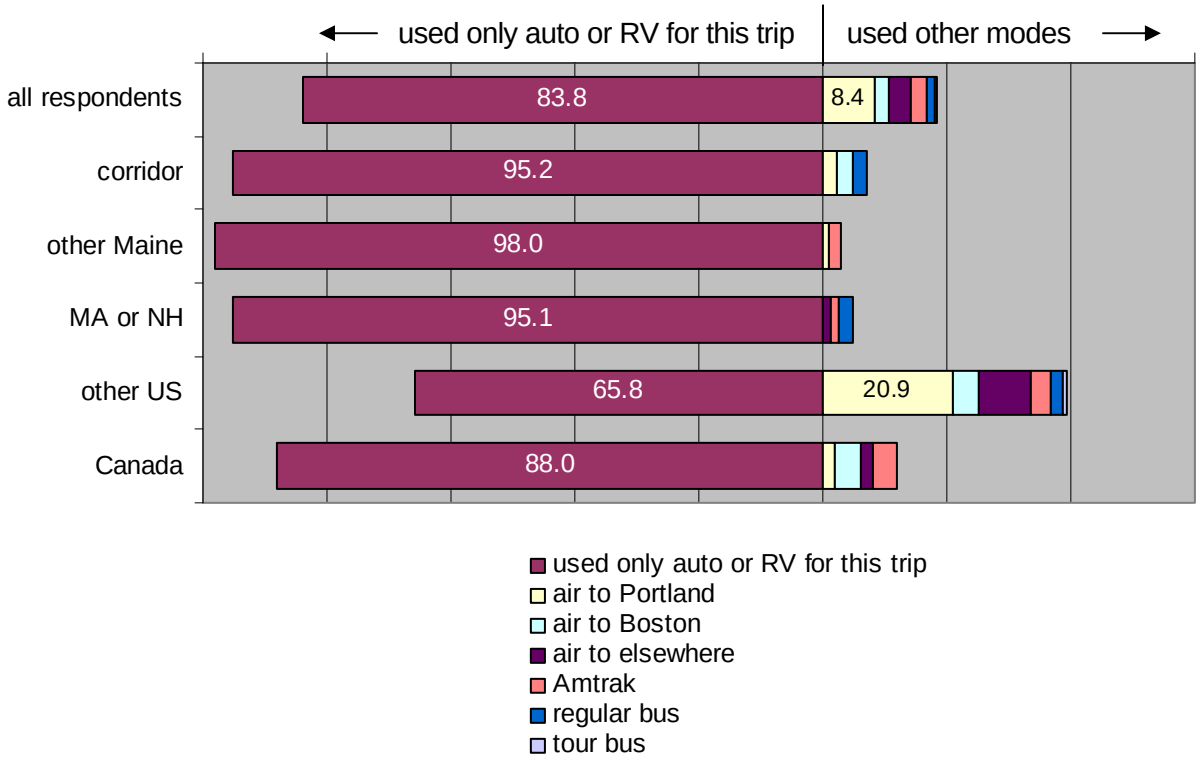
Other States	respondents		respondents		respondents
Massachusetts	71	Kentucky	4	Tennessee	2
New York	34	Wisconsin	4	Texas	2
New Jersey	23	Georgia	3	Vermont	2
Pennsylvania	15	Michigan	3	Alabama	1
Connecticut	11	Ohio	3	Arizona	1
New Hampshire	10	Rhode Island	3	Indiana	1
Florida	9	South Carolina	3	Minnesota	1
North Carolina	7	Colorado	2	Nebraska	1
California	6	Illinois	2	Oklahoma	1
Virginia	6	Montana	2	Oregon	1
Maryland	5				

Canadian provinces		Other countries	
New Brunswick	17	Italy	1
Newfoundland	1	Saudi Arabia	1
Nova Scotia	12	Sweden	1
Ontario	8		
Prince Edward Islan	2		
Quebec	7		

Modes of travel used for trip

There are currently no regularly scheduled public transportation services to Freeport. Except for tour buses used for organized groups, travelers to Freeport can currently get there only by a car or other private means of transportation. Overall, 83.8 percent of all Freeport visitors drove all the way from home, and this includes 65.8 percent coming from states other than Maine, Massachusetts, or New Hampshire. Among those using other modes, 14.1 percent traveled by plane, and most of these flew to Portland. Exhibit 5 shows the distribution by traveler origin.

Exhibit 5
Modes used as part of trip to Freeport



	used only auto or RV for this trip	auto or RV with other modes	air to Portland	air to Boston	air to elsewhere	Amtrak	regular bus	tour bus
all respondents	83.8	95.7	8.4	2.3	3.4	2.5	1.6	0.2
corridor	95.2	88.1	2.4	2.4	0.0	0.0	2.4	0.0
other Maine	98.0	96.0	1.0	0.0	0.0	2.0	0.0	0.0
MA or NH	95.1	100.0	0.0	0.0	1.2	1.2	2.5	0.0
other US	65.8	95.6	20.9	4.4	8.2	3.2	1.9	0.6
Canada	88.0	100.0	2.0	4.0	2.0	4.0	0.0	0.0

Other places visited on this trip

A visit to Freeport is usually part of a longer trip. Only 14.8 percent of all survey respondents were traveling *only* to go to Freeport. For 61.7 percent of travelers, it was a detour or side trip on a longer journey from home. Exhibit 6 shows this by traveler origin. Exhibit 7 shows certain other locations visited as part of this trip away from home. Just over 40 percent of all respondents stopped in Portland.

Exhibit 6
Freeport as part of a longer trip

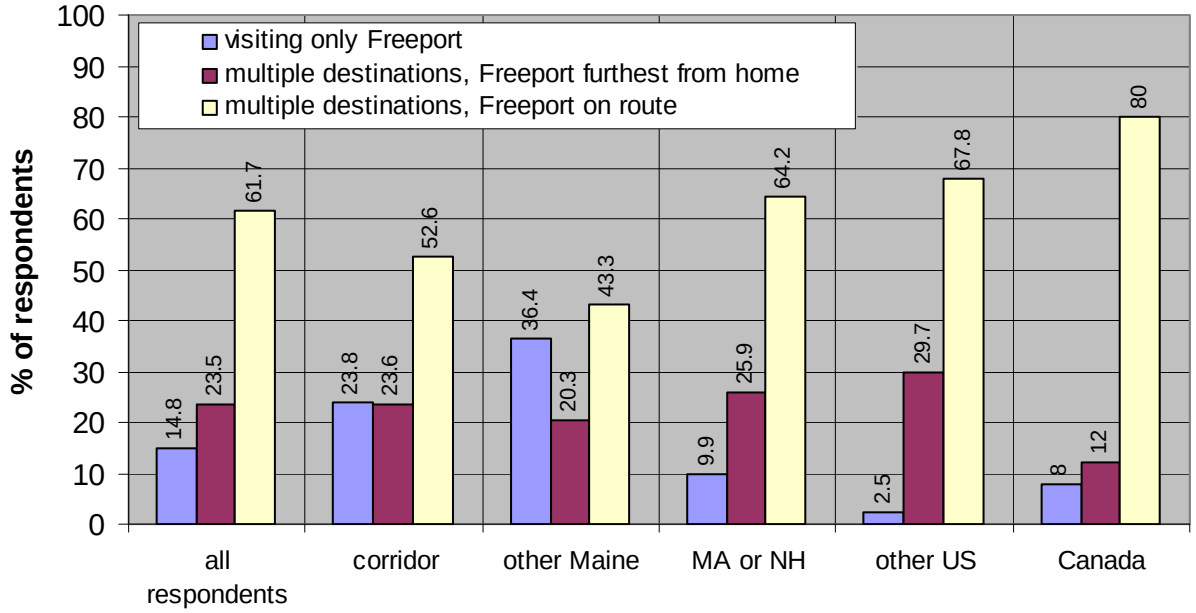
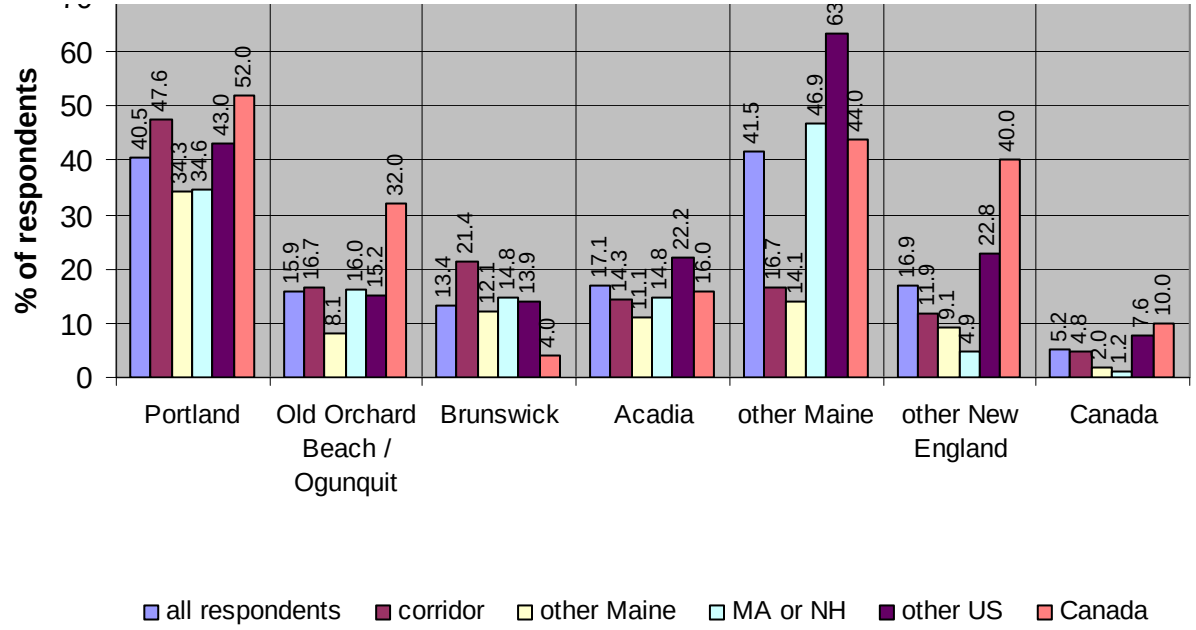


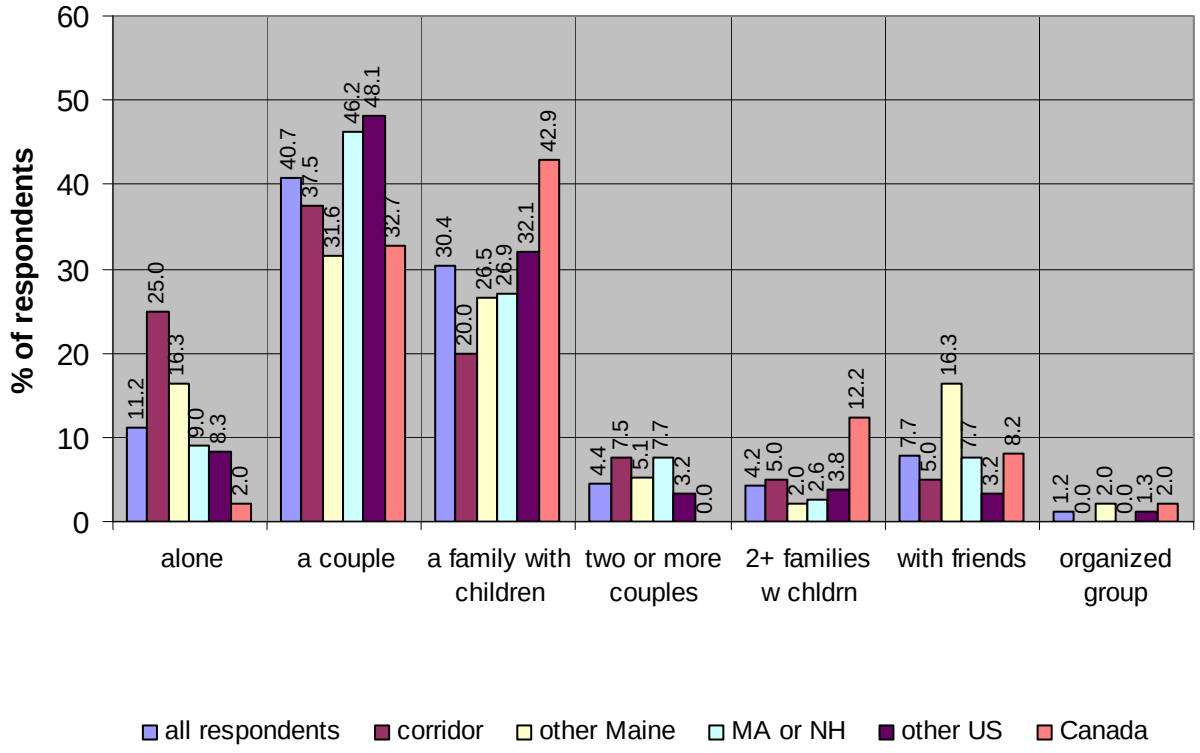
Exhibit 7
Other places visited on this trip from home



Group composition

Shopping in Freeport is a group activity. Only 11.2 percent of respondents came to town alone, as shown in Exhibit 8.

Exhibit 8
Composition of Freeport travel groups



Response to proposed transportation alternatives

This section presents our analysis of how Freeport visitors would respond to the proposed transportation alternatives. We examined this in regard to each of the mode and service characteristics of the Portland North alternatives, and looked also at how demand for these services would change if the travel options included the proposed extension of the Amtrak Downeaster to Freeport and Brunswick. It is clear, however, that the primary determinant of demand for these services would not be a function of the headway, fare or mode, but rather of the nature of the traveler's trip. As noted above, the Freeport visitors surveyed tended to visit Freeport as part of a trip to somewhere else. We can summarize this again as follows:

	respondents	Simple trip (%)	Complex trip (%)
All respondents	439	14.8	85.2
Residents of the corridor	47	23.8	76.2
Residents elsewhere	392	14.5	85.5

Here, a "simple trip" refers to someone for whom Freeport is the only destination on the trip to or from home. Only 14.8 percent of Freeport visitors surveyed were in this category, and the rate was just 23.8 percent for those travelers who lived in the corridor.

This fundamental trip characteristic limits the potential of the Portland North (or Amtrak) alternatives to serve most of the existing Freeport visitors. For these travelers, it is not just an issue of changing their travel mode; it is an issue of changing their entire trip. We can, of course, imagine exceptions to this. A Canadian family vacationing at Old Orchard Beach, for example, could split up for a day, with half the family using the car locally, while the other half uses Amtrak and perhaps the new Portland North for a few hours of shopping in Freeport.

Induced or future trips could constitute greater demand by Freeport visitors for the proposed transportation alternatives. The survey asked about whether the new services would motivate the respondent to take *added* trips to Freeport. This question is also a proxy for gauging the effect of the new services on current non-travelers to Freeport. These potential travelers to Freeport were not otherwise a part of any survey effort.

General stated responses

The survey asked respondents to indicate their likelihood of using the proposed new services on a 1 to 7 scale. A "1" indicated "definitely yes" to the questions of whether they would have used the service as part of the current trip or whether the service would induce the respondent to take added trips to Freeport. A "7" indicated that the service would "definitely not" affect their travel plans. Exhibits 9, 10, and 11 summarize these stated

responses according to certain traveler characteristics, and in regard to the mode of the proposed transportation service. The symbols for each service type are, horizontally, at the average score for the particular traveler group. The relative positions are generally where you might expect them: the rail option for Portland North is generally more attractive than the BRT options, although the BRT option that included stops at downtown Portland *and* at the Amtrak station made this in some cases more attractive than the rail option that only stopped at the Portland Bayside station. Similarly, the stop at Bayside, high frequency and low fare of the Portland North alternatives are in some cases more attractive than the through service offered by Amtrak.

Exhibit 9
Would you have taken the proposed new service for this trip to Freeport?

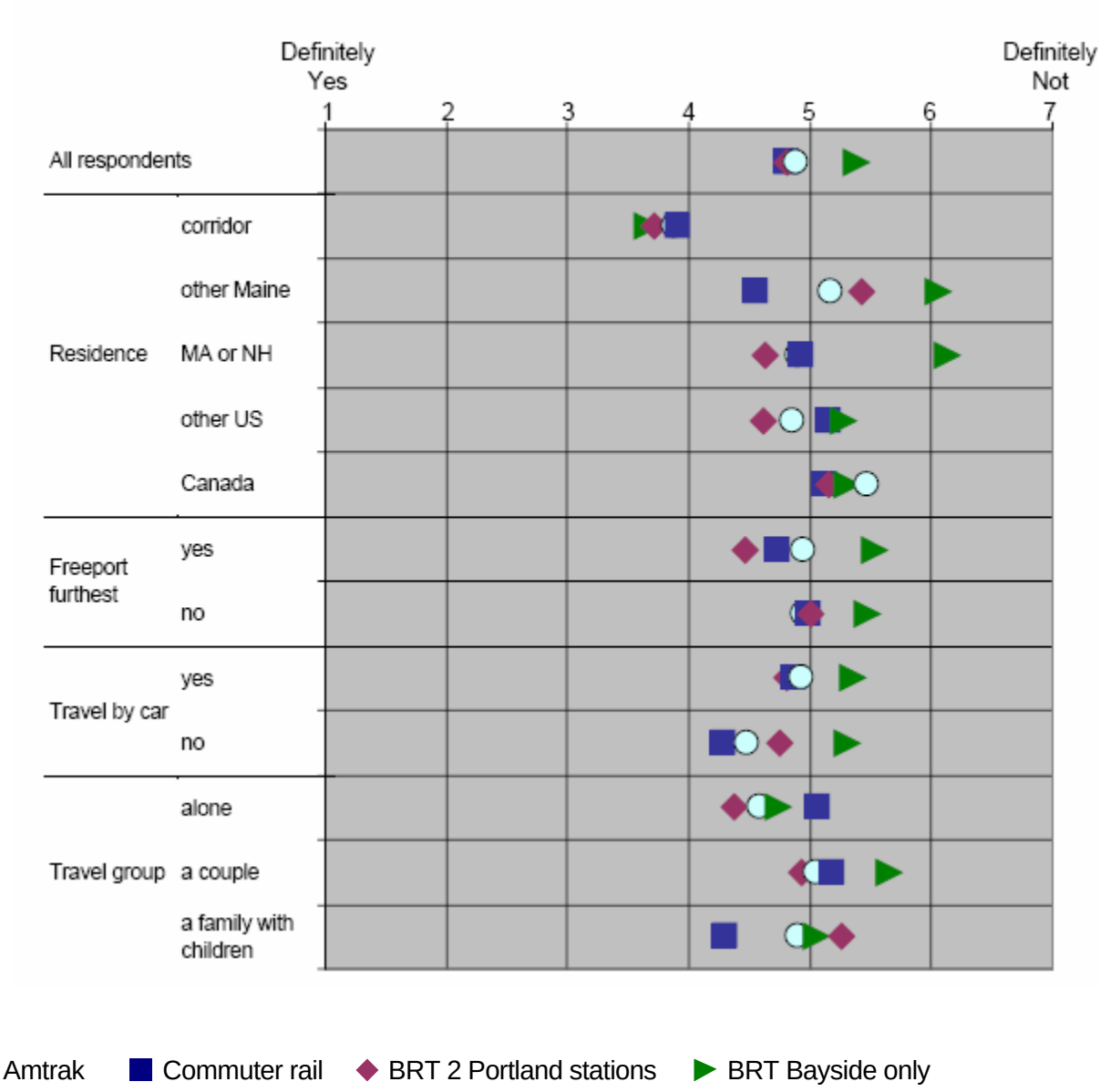
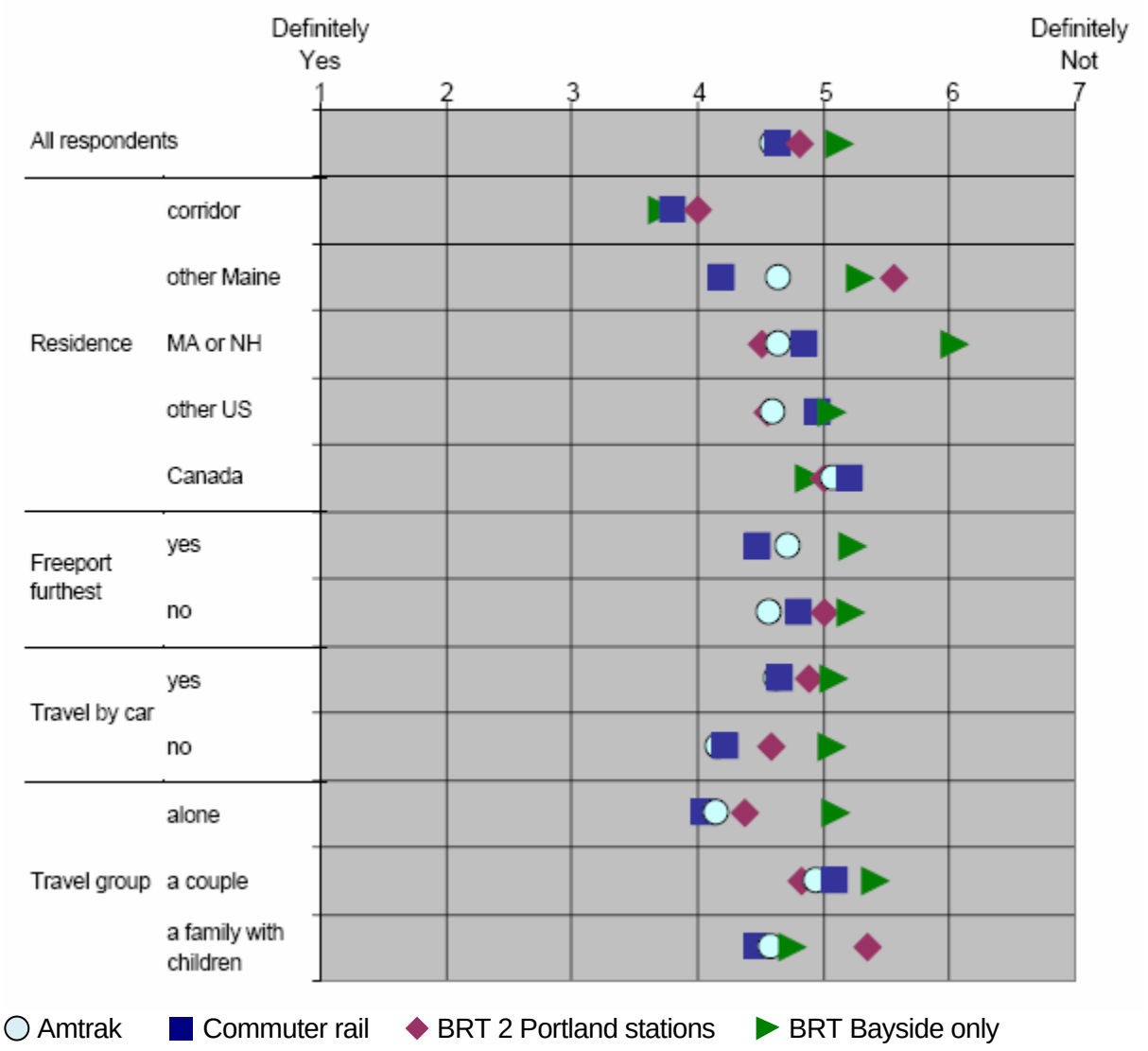
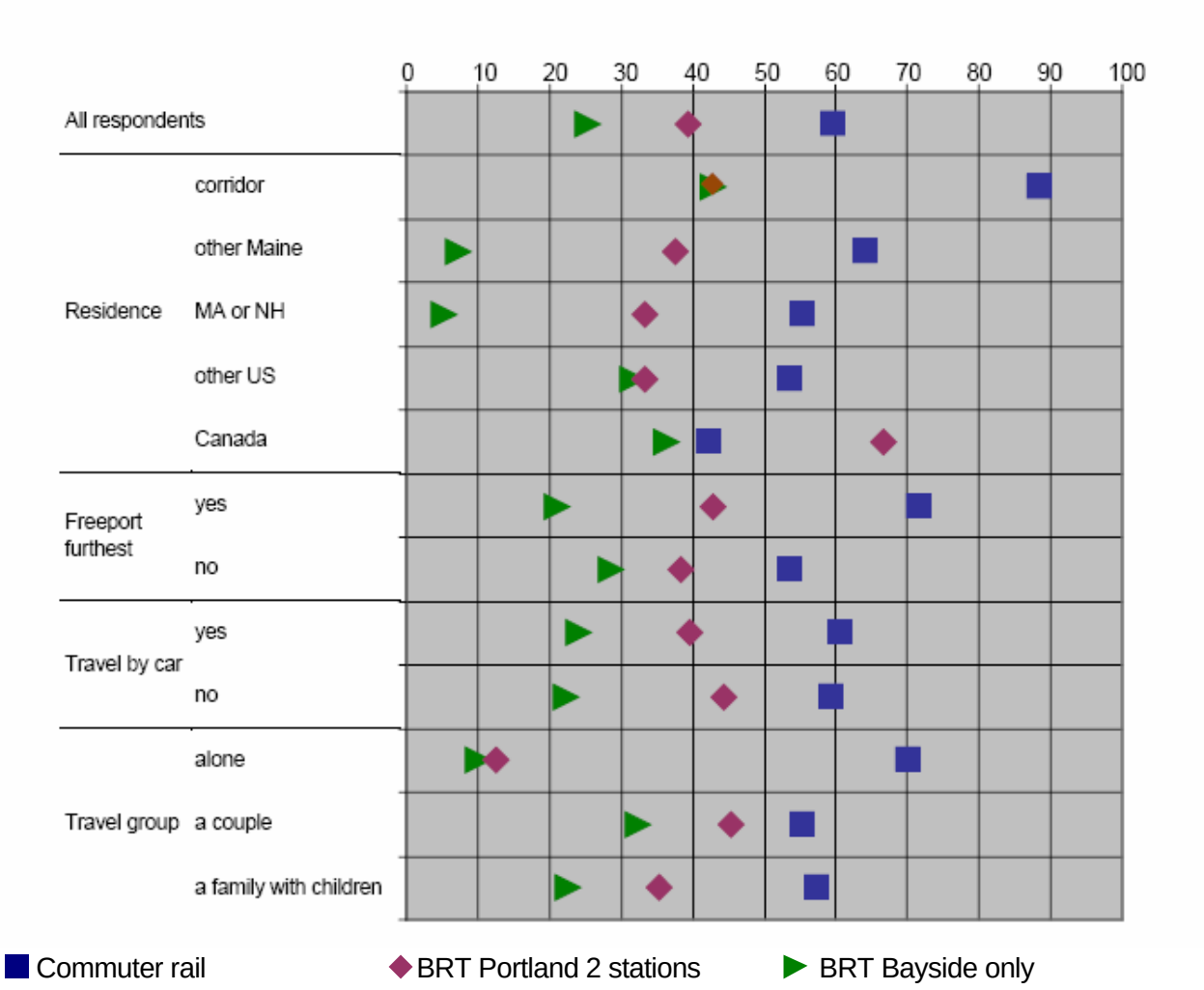


Exhibit 10
Would the proposed new service have prompted added trips to Freeport?



Overall, there is a generally higher willingness to use the proposed new services for future trips than as part of the current trip. You can see this by noting that the average likelihood is further the left (closer to 1—definitely use) in Exhibit 10 for each of the specified groups of travelers.

Exhibit 11
Percent of respondents preferring the Portland North alternative over the proposed Amtrak service to Freeport



In this exhibit, the more attractive alternative is on the right. For every market group of Freeport travelers, the Portland North alternative using commuter rail is more competitive with the Amtrak service than are those options with the BRT. Overall, 59 percent of respondents whose survey scenario included Portland North commuter rail preferred this over the proposed extension of the Amtrak Downeaster. This compares with 39 percent for the BRT that made two stops in Portland, and only 25 percent for the BRT that only stopped at Bayside. Note that the commuter rail option also only stopped at Bayside.

Statistical analysis of responses

The preceding discussion and charts convey general attitudes and information about traveler preferences. A statistical analysis adds to this understanding by more specifically measuring the influence of individual characteristics about the traveler or transportation option on the decision to use the proposed service. Our interest is ultimately in the aggregate ridership demand for the new transportation options, but the aggregate demand is itself a reflection of individual decisions. The statistical techniques of discrete choice models aim at understanding these individual decisions.

For the analysis of the factors affecting likelihood to use the proposed services or to prompt added trips to Freeport, the discrete choice technique was ordered probit. Here, the deterministic elements of the model include the mode, headway, fare, and station stops of the scenario; and certain characteristics of the individual and the trip. The probit model assumes that these attributes, once weighted in a way that reflects their significance to the decision making process, can be added to define a single, net "utility" for each particular index of likelihood—1 (definitely would use) to 7 (definitely would not use)

For the statistical analysis of the preference for Amtrak or Portland North, we again examined characteristics of the alternative and of the traveler. The choice, however, was simpler. It is not a rating on a 1 to 7 scale, but rather a choice of one option or the other. The statistical technique we used here is binomial logit.

In each of these statistical efforts, we tested linear, exponential, and several combination forms of the variables. Alternative forms are appropriate when there is reason to believe that travelers would view the variables in a other than a linear way. The headway, for example, might have a non-linear effect—a traveler might become particularly unwilling to use the new mode when the time between trains or BRTs gets beyond a certain threshold.

Most of the alternative forms did not have the effect expected. Few of the forms added significantly to the predictive power of the models, and in those cases where it did improve the model statistically, it also made the interpretation of the results more confusing. We concluded that the added gains in most cases were not worth this cost of clarity. The variable transformations that we did use involved mostly the questions on the survey about traveler attitudes.

Our estimation of the best fit model also included an iterative process of removing one independent variable with the most negligible effect on the stated likelihood of the respondents to use the new service. This effect was measured statistically by the t-statistic. Dropping these variables from consideration in the model can strengthen the effects of other variables and may be critical for cases of multi-collinearity, i.e., when two independent variables themselves tend to have their own correlation. In these cases the effect of each variable on the stated likelihood to use the new service might only be visible by removing one of the two from the model. (Subsequent tests, however, confirmed that multi-collinearity was not present in the set up of the variables.)

Exhibit 12 shows the "best fit" model specifications. The results are logical. Variables which we expected to be statistically significant generally are significant, the signs are in the right direction, and the relative values among the independent variables are reasonable. The one exception to this is for fare of the Portland North alternative. We tested round trip fares between Portland and Freeport at $7.50, $9.00 and $10.50. These differences were not significant in affecting any measure of demand for Portland North.

Exhibit 12
"Best fit" model specifications

dependent variable	Portland North for this trip (1 to 7 scale)		would Portland North prompt more trips to Freeport? (1 to 7 scale)		Amtrak for this trip (1 to 7 scale)		would Amtrak prompt more trips to Freeport? (1 to 7 scale)	
Model type	Ordered probit		Ordered probit		Ordered probit		Ordered probit	
	estimated coefficient	t-statistic	estimated coefficient	t-statistic	estimated coefficient	t-statistic	estimated coefficient	t-statistic
current trip by car					0.2302	1.1456		
Maine resident			-0.2846	-2.1446			-0.1732	-1.3133
corridor resident	-0.6913	-3.6463	-0.2813	-1.3464	-0.5867	-3.0072	-0.2366	-1.1183
group size (1=traveling alone; 2= 2 people; 3= 3 or more)	-0.2035	-2.5899	-0.1073	-1.4087	-0.0851	-1.1242	-0.0844	-1.1677
first time in Freeport (1=yes, 2=no)	0.1709	1.5402	0.1587	1.4169			0.1347	1.2818
Portland North mode (1=rail, 2=BRT)	0.2945	2.3666	0.1903	1.7693				
Headway (in minutes)			0.0068	1.5359				
Portland to Freeport round trip fare (in dollars)	-0.0595	-1.3335						
bus connection at Amtrak terminal (1=yes)	-0.3086	-1.8641						
Constant	1.5696	3.0328	0.7236	1.9543	1.0006	3.8830	1.1815	5.0200
Thresh 1	0.2706	7.3058	0.2976	7.3196	0.1379	4.8060	0.2934	7.4064
Thresh 2	0.6079	19.1704	0.7289	21.3990	0.4527	16.3192	0.7658	22.2049
Thresh 3	0.8357	29.5589	0.9939	33.3270	0.6224	23.1129	1.0598	34.7381
Thresh 4	1.0807	36.4441	1.2772	40.9930	0.9414	31.8015	1.3674	44.7843
Thresh 5	1.3874	33.0607	1.6073	36.8851	1.1939	31.5583	1.6485	40.3434
Auxiliary statistics								
initial log	-838.29		-864.63		-812.49		-877.73	
Convergence log	-676.38		-710.17		-676.61		-741.84	
rho bar squared	0.178828		0.164764		0.15247		0.141148	

Exhibit 12 (continued)
"Best fit" model specifications

dependent variable	Preference for Amtrak or Portland North (utility is for prob(Amtrak)	
Model type	Binomial logit	
	estimated coefficient	t-statistic
MA or NH resident	-0.4628	-1.4731
corridor resident	0.5689	1.4389
Portland North mode (1=rail, 2=BRT)	-1.5054	-5.3296
bus connection at Amtrak terminal (1=yes)	0.7142	1.9651
Constant	1.9132	4.8885
Auxiliary statistics		
initial log	-230.12	
Convergence log	-210.5	
rho bar squared	0.0635	

Applying the model

The choice models developed in prior steps predict *individual* likelihood of survey respondents to use the new service presented in the survey scenarios. Estimates of demand for the proposed alternatives require predictions of *aggregate* behavior. There are several techniques available for performing this aggregation and making predictions for the larger population. The projections and calculations here are based on applying the coefficients estimated in the models to the survey sample with the attributes of the scenarios replaced by the attributes (mode, frequency, etc.) of the particular proposed alternative. We then use sample enumeration to determine the predicted share of the sample choosing each level of likelihood of use.

An important step here is to translate the stated expression of "likelihood" into some estimate of actual use. In other words, how likely is a "4" and how much more likely is this compared to someone who rated the new service as a "6." Moreover, there is a complication of non-commitment bias; i.e., the tendency of some people to exaggerate their intentions beyond what they would truly do if faced with similar conditions in reality.

We have come across this before. In 2003, we surveyed visitors to Acadia National Park about their possible response to (among other things) proposed new rail service between Bangor and Trenton (at the top of Mount Desert Island near the entrance to the park). In that case, we had an existing service to which we could compare the survey results. According to the stated preference survey results, 5 of the survey respondents should have used the existing Concord Trailways service between Bangor and Mount Desert Island. In reality (as revealed elsewhere in the survey), none actually did use this mode. Only by setting the stated "very likely" to an actual rate of 33 percent, could we match the expected level of Concord Trailways ridership. The values assigned to the other stated probabilities were proportionately lower than that assigned to "1—definitely yes."

For the Portland North and Amtrak stated likelihood of use and potential to induce added trips, we have applied this same 33 percent top probability rate. For the assessment of the use of the new mode on the *current* trip, we also applied a second adjustment factor to account for complex trips. This factor says that if the traveler stopped elsewhere or was heading to a destination beyond Freeport, the opportunity to use the proposed service was only 33 percent of the otherwise assigned probability.

The results of this analysis are shown in Exhibit 13. The values shown here indicate the effect of the Portland North mode and stops in Portland. The headway and fares for the options as shown in the table are set at the rates tested for each respondent in the surveys. As noted earlier, the effect of fare was not a significant determinant of use. The headway did matter. Replacing the headway in the survey version scenario with ta uniform 30 minute frequency would increase the mode share of the Portland North alternative by 11 percent (e.g., the Portland North rail option mode share would rise from 4.18 to 4.62 percent). A uniform frequency of 60 minutes would lead to a drop in Portland North mode share by

Exhibit 13
Percent of Freeport visitor trips that would use the proposed service

about 9 percent (e.g., the Portland North mode share would drop from 4.18 to 3.78 percent). The effect on the BRT services would be of a similar magnitude.

Portland North alternative	without Downeaster extension	with Downeaster extension
Rail—Portland Bayside only		
Portland North for this trip	4.18	2.53
take more trips to Freeport	4.59	
BRT—Portland Bayside only		
Portland North for this trip	2.98	0.77
take more trips to Freeport	3.55	
BRT—Portland Bayside and Amtrak connection		
Portland North for this trip	4.25	1.75
take more trips to Freeport	4.15	

		With Portland North		
Downeaster extension	without Portland North	Rail—Portland Bayside only rail	BRT—Portland Bayside only	BRT—Portland Bayside and Amtrak connection
Amtrak for this trip	4.17	1.65	3.09	2.45
take more trips to Freeport	4.56			