

12-2001

Bangor-Trenton Transportation Alternatives Study, Phase 1. Final Report. 2001

SYSTRA Consulting

KKO and Associates, L.L.C.

Dyer Associates

Economic Planning Group

Maine Department of Transportation

Follow this and additional works at: https://digitalmaine.com/mdot_docs

Recommended Citation

SYSTRA Consulting; KKO and Associates, L.L.C.; Dyer Associates; Economic Planning Group; and Maine Department of Transportation, "Bangor-Trenton Transportation Alternatives Study, Phase 1. Final Report. 2001" (2001). *Transportation Documents*. 79.

https://digitalmaine.com/mdot_docs/79

This Text is brought to you for free and open access by the Transportation at Digital Maine. It has been accepted for inclusion in Transportation Documents by an authorized administrator of Digital Maine. For more information, please contact statedocs@maine.gov.

Bangor – Trenton Transportation Alternatives Study, Phase 1

Final Report



December, 2001

MDOT Agreement #9610.00/STD-9610(00)X



In association with

KKO and Associates, L.L.C.
Dyer Associates
Economic Planning Group

Acknowledgements

In appreciation of the participating members and organizations who contributed to this study. Their involvement provided valuable input to the creation of this document.

Federal Transit Administration
Federal Highway Administration
Maine Department of Transportation
State of Maine Planning Office
Maine Office of Tourism
Maine Publicity Bureau
National Park Service, Acadia National Park
Downeast Transportation/Island Explorer
Bangor International Airport
Trenton/Bar Harbor Airport
The Bus (Bangor)
Concord Trailways
City of Bangor
City of Brewer
City of Ellsworth

The consultant team included SYSTRA Consulting, Inc., KKO & Associates, L.L.C., Dyer Associates, Warner Transportation Consulting and The Economic Planning Group of Canada.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1

Purpose of the Bangor –Trenton Transportation Alternatives Study, Phase 1 1

Study Area 1

Public Involvement and Market Research..... 2

Alternatives Considered 3

Ridership Forecasts 5

Conclusion and Next Steps..... 6

1 INTRODUCTION..... 1

1.1 PURPOSE OF REPORT 1

1.2 NEED FOR THE STUDY 1

1.3 STUDY AREA AND PLANNING CONTEXT 2

2 DISCUSSION OF ALTERNATIVES 6

2.1 ALTERNATIVE 1/RAIL/BUS 8

2.2 ALTERNATIVE 2/BUS 10

2.3 ALTERNATIVE 3/BUSWAY BYPASS..... 11

2.4 ALTERNATIVE 4/LIGHT RAIL A 12

2.5 ALTERNATIVE 5/LIGHT RAIL B 13

2.6 ALTERNATIVE 6/FERRY 14

3 EXISTING AND FUTURE TRAVEL MARKETS 15

3.1 LESSONS LEARNED FROM SIMILAR RECREATIONAL MARKETS 16

National Parks..... 16

Other Recreational Areas 16

3.2 EXISTING VISITOR TRAVEL MARKET 17

3.3 EXISTING RESIDENT TRAVEL MARKET 18

3.4 YEAR 2020 TRAVEL MARKET 20

4 DEMAND ESTIMATION METHODOLOGY AND RIDERSHIP FORECASTS BY ALTERNATIVE 23

4.1 SUMMARY OF RIDERSHIP FORECASTS 23

Visitor Ridership..... 24

Resident Ridership..... 25

Major Markets for Bangor to Bar Harbor Service..... 25

4.2 PROJECTED RIDERSHIP BY ALTERNATIVE 26

Alternative 1/Rail-Bus 26

Alternative 2/Bus 29

Alternative 3/Busway Bypass..... 30

Alternative 4/LRT A..... 32

Alternative 5/LRT B..... 34

Alternative 6/Ferry..... 36

4.3 SENSITIVITY OF RIDERSHIP FORECASTS TO MARKET AND SERVICE CHANGES 36

Availability of Other Transit Services 37

Overall Market Size..... 38

Fare Levels..... 38

Service Frequency..... 39

Transit Travel Times..... 40

Traffic Congestion..... 40

Changes in Market Characteristics..... 41

5 CONCLUSIONS AND NEXT STEPS 43

5.1 CONCLUSIONS	43
<i>Potential Market Conclusions</i>	43
<i>Conclusions about the Conceptual Alternatives</i>	44
<i>Conclusions About the Demand for the Alternatives</i>	44
5.2 NEXT STEPS	45

BIBLIOGRAPHY

GLOSSARY

APPENDIX 1: OPERATING PLAN METHODOLOGY

APPENDIX 2: ALTERNATIVE FACT SHEETS

APPENDIX 3: RIDERSHIP FORECASTING METHODOLOGY

INDEX OF TABLES

Table 1: Alternative Routes	7
Table 2: Key Operating Characteristics By Alternative.....	8
Table 3: Recreational Areas To Which Rail Service Is Currently Or Was Recently Provided.....	17
Table 4: Summer 2000 Market For Bangor – Trenton Services	18
Table 5: Summer 2000 Average Daily Resident Travel	19
Table 6: Estimated 2000 Corridor Work Trips	20
Table 7: Estimated 2020 Corridor Work Trips	21
Table 8: Summer 2020 Market For Bangor – Trenton Services	22
Table 9: 2020 Peak Month Daily Ridership By Alternative	24
Table 10: 2020 Average Daily Ridership, By Alternative And Month.....	24
Table 11: Percent Of Current Visitors Who Would Use Bangor To Bar Harbor Transit Service.....	26
Table 12: Alternative 1/Rail-Bus: Average Daily Ridership By Trip Type And Month	27
Table 13: Alternative 1 (Rail/Bus) 2020 Average Daily Ridership By Station (August)	28
Table 14: Alternative 2/ Bus: Average Daily Ridership By Trip Type And Month	29
Table 15: Alternative 2/Bus 2020 Average Daily Ridership By Station (August)	30
Table 16: Alternative 3/ Busway Bypass: Average Daily Ridership By Trip Type And Month	31
Table 17: Alternative 3/Busway Bypass 2020 Average Daily Ridership By Station (August)	31
Table 18: Alternative 4/LRT A: Average Daily Ridership By Trip Type And Month	32
Table 19: Alternative 4/LRT A 2020 Average Daily Ridership By Station (August)	33
Table 20: Alternative 5/LRT B: Average Daily Ridership By Trip Type And Month	34
Table 21: Alternative 5/LRT B 2020 Average Daily Ridership By Station (August).....	35
Table 22: Alternative 6/Ferry: Average Daily Ridership By Trip Type And Month.....	36
Table 23: Impact Of Availability Of Maine Strategic Passenger Transportation Plan Services.....	37
Table 24: Fare Sensitivity: Alternative 4/LRT A.....	39
Table 25: Level Of Service Sensitivity: Alternative 4/LRT A.....	39
Table 26: Sensitivity To Increased Levels Of Traffic Congestion: Alternative 4/Lrt A.....	41
Table 27: Impact Of A 10% Increase In Visitation Levels On Bangor To Bar Harbor Transit Ridership By Market Segment.....	42

EXECUTIVE SUMMARY

Purpose of the Bangor –Trenton Transportation Alternatives Study, Phase 1

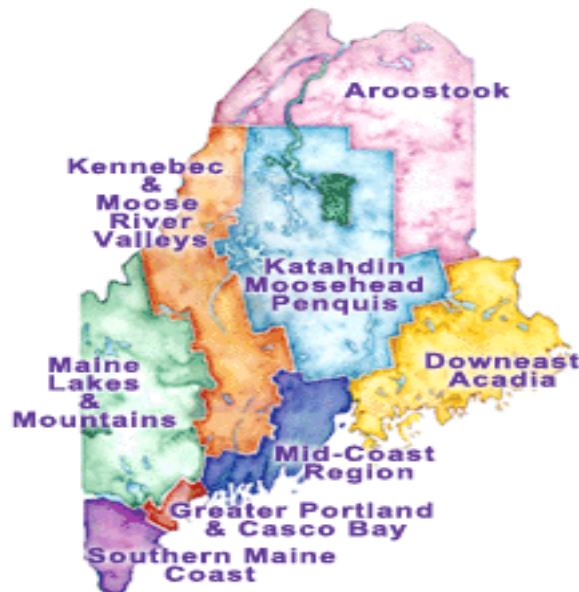
Millions of people travel to Maine each year to enjoy the attractions of Mount Desert Island, including Acadia National Park and Bar Harbor. However, traffic congestion, parking shortages, and inconvenient airport connections can undermine the attractiveness of these destinations.

The Maine Department of Transportation undertook the *Bangor to Trenton Transportation Alternatives Study, Phase 1* to evaluate alternatives to automobile travel between Bangor and Trenton, one of the corridors that leads to Mount Desert Island, and to assess whether any rail service (freight or passenger) should be activated in this corridor. In 1987, the State acquired a rail right-of-way called the Calais Branch. A piece of this line parallels the primary access route to Mount Desert Island for 26 miles between Brewer and Ellsworth. In 1998, the State evaluated the potential for freight service on the complete Calais Branch and determined that the revenue collected from its use would not be enough to cover operating costs or capital improvements on the line. However, if a passenger rail service could be implemented for a portion or all of the line then perhaps the added passenger revenues combined with potential freight revenues would make an investment in the line worthwhile.

In summary, the purpose of the first phase of the study, and this report, is to estimate the demand for several potential alternatives. If the Maine Department of Transportation believes that demand is promising, then a second phase will be undertaken to define the feasibility and financing of a preferred alternative and to refine the operating plan and ridership forecasts.

Study Area

The study area includes the Downeast Acadia region of the State of Maine. The endpoints are defined as Bangor and Trenton, however, Mount Desert Island, located east of Trenton, is the perceived destination because of its tourist attractions. A Study Area Map is included on page 4 of this report. The study area includes eleven cities and towns: Bangor, Brewer, Holden, Dedham, Ellsworth, Lamoine, and Trenton on the mainland and Bar Harbor, Mount Desert, Southwest Harbor and Tremont on Mount Desert Island. Data for Orono was collected for purposes of the demand forecasting analysis.



The Bangor to Mount Desert Island travel corridor is 50 miles in length. This corridor includes interstate highways, active freight rail right-of-way between Bangor and Brewer, state-owned inactive rail right-of-way between Brewer and Ellsworth (the Calais Branch), and the Penobscot River, a navigable waterway. Interstate highways and state roads are the primary

travel option in the corridor. A trip from Bangor to Mount Desert Island is made via Interstates 95 and 395 from Bangor to Brewer, Route 1A from Brewer to Ellsworth, and Route 3 from Ellsworth to Mount Desert Island. During the peak tourist season this highway route is fairly congested, particularly between Ellsworth and Mount Desert Island.

While the automobile is the primary mode of access, some transit service is available to and within the study area. Within Bangor and serving the Bangor International Airport (BGR), “The Bus” provides local transit service. Additionally, Concord Trailways provides intercity bus service, including service from Boston, MA to Bangor. In Bangor, transfers are available to Concord Trailways Airport Shuttle to Bar Harbor during the summer. Vermont Transit offers one bus per day from Boston direct to Bar Harbor during the summer and early fall. The free, seasonal, Island Explorer bus serves destinations throughout Mount Desert Island, enabling successful car-free travel to many of the Island’s destinations. The Bay Ferries service, The Cat, also serves Mount Desert Island, providing seasonal service from Nova Scotia.

As mentioned above, the study area includes existing freight rights-of-way. From the BGR-area of Bangor, through and north of the Bangor waterfront and into Brewer, Guilford Transportation Industries operates active freight service. A single freight bridge over the Penobscot River connects rail alignments in Bangor and Brewer. A portion of the Calais Branch parallels the major roadways that provide access to Mount Desert Island from Bangor.

Public Involvement and Market Research

Public meetings were held in Brewer and Ellsworth in June 2001 to advise the public that the study was underway and that a survey would be conducted on Mount Desert Island to collect information about the travel market. The public meeting provided an opportunity for individuals to offer opinions about the study, the alternatives under consideration, and anything else relevant to the analysis. Members of the public expressed a range of sentiments, and in particular, urged the study team to give all the alternatives equal treatment.

Market research was conducted for this study to support the development of the ridership forecasting model. Residents and visitors were surveyed to determine the types of choices that they currently make and the hypothetical choices that they believe they would make if different choices were available. Two surveys were used, as described below:

- *Visitor Induced Demand Survey*: Induced demand refers to new trips that would be made as a result of proposed services. This survey was designed to test if new interest in visiting the region would exist because of the new transportation choices that were available. The Visitor Induced Demand Survey was mailed to 950 households in the U.S. and Canada drawn from a Maine Department of Tourism database containing names and addresses of people who had previously requested information about the study area.
- *Mode Shift Survey*: Mode shift refers to existing trips that would be made using new services if they were available. The Mode Shift Survey was designed to test traveler interest in several combinations of service attributes. Twenty one versions of the survey were created, each presenting different combinations of mode, travel time, frequency, directness, fare (\$5, \$10, or \$20 per one-way trip), and number of stops in Bangor. The Mode Shift Survey was conducted on five days in July, 2001 at Mount Desert Island locations that are major destinations for recreational travelers.

Alternatives Considered

Six transit service alternatives were conceptually defined to consider different modes, routes, vehicle technology, improvements within existing right-of-way and construction of new right-of-way:

- Alternative 1: Rail/Bus
- Alternative 2: Bus
- Alternative 3: Busway Bypass
- Alternative 4: Light Rail A (modified right-of-way between Brewer and Ellsworth)
- Alternative 5: Light Rail B (street running right-of-way between Bangor and Brewer)
- Alternative 6: Ferry

All of the alternatives begin at Bangor International Airport (BGR) and end in Bar Harbor. At BGR, connecting bus service would be used to transport passengers from the airport terminal to the BGR Intermodal Facility where rail service begins for Alternatives 4 and 5. For Alternative 1, bus service would continue to Brewer where rail service begins. For Alternatives 2 and 3, the same bus that picks up passengers at the airport terminal would first stop at the intermodal facility and then would continue on the prescribed route to Bar Harbor. Alternatives 1-5 include intermediate stops at the Bangor Waterfront, Brewer, Ellsworth, and the Hancock County-Bar Harbor Airport (BHB) Intermodal Facility. For Alternative 6, a connecting bus would be used to transport passengers from the airport terminal and the BGR Intermodal Facility to a ferry terminal in Bangor.

Connections to existing transportation services would be available at the proposed BGR Intermodal Facility to intercity and local bus service, at the proposed BHB Intermodal Facility to the Island Explorer bus, and at Bar Harbor with connections to the Island Explorer bus and Bay Ferries service to Nova Scotia. In addition, a connection to a new, proposed ferry service to Bar Harbor would be available at the proposed BHB Intermodal Facility. An intermodal facility is a station served by more than one mode of transportation (i.e. rail, bus, taxicabs, ferry) and allows passengers to transfer between these modes.

For all of the rail alternatives and the busway alternative, it was assumed that the Calais Branch between Brewer and Ellsworth would be used for transit service. The City of Bangor owns a piece of rail right-of-way that borders BGR and connects with the Guilford Transportation Industries (GTI) right-of-way at the Bangor Waterfront. It was assumed that rail service in Alternative 4 (and, to a lesser extent, Alternative 5) would use the GTI right-of-way between the Bangor Waterfront and the start of the Calais Branch in Brewer.

The table below summarizes the routes associated with Alternatives 1-6.

Table ES-1: Alternative Routes

Segment	Alternative 1 Rail/Bus	Alternative 2 Bus	Alternative 3 Busway Bypass	Alternative 4 Light Rail A	Alternative 5 Light Rail B	Alternative 6 Ferry
Bangor-Brewer	I-95/I-395 (Bus)	I-95/I-395	I-95/I-395	New track on GTI* ROW	New track via street	Penobscot River
Brewer-Ellsworth	Calais Branch (Rail)	Route 1A	Busway constructed on Calais Branch	Calais Branch (different track than Alt 1)	Calais Branch (same as Alt 1)	Eggmoggin Reach
Ellsworth-Trenton	Route 3 (Bus)	Route 3	Busway constructed in New ROW	New track same as Alt 5	New track same as Alt 4	Blue Hill Bay
Trenton-Bar Harbor	Route 3 (Bus)	Route 3	Route 3	Route 3	Route 3	Mount Desert Island

* GTI: Guilford Transportation Industries, the parent company of the Maine Central Railroad

The operating season for these alternatives was assumed to be from June 1st to October 15th. The operating season is designed to coincide with the peak summer and fall tourist season to potentially attract the greatest number of travelers to these services. For those alternatives that require transfers between modes, it was assumed that these would be timed transfers, meaning bus and rail vehicles are scheduled to meet at a specified time to reduce waiting time. Further, under these alternatives it was assumed that transfers between modes were free. Across all alternatives it was assumed that the fare would be five dollars (\$5) for an end-to-end trip and these services would provide six round trips.

Operating plans were created for each alternative in order to estimate travel time. Travel time is one parameter that heavily influences ridership. Other important parameters include cost, frequency, and directness (number of transfers required).

The table below compares key operating characteristics by alternative.

Table ES-2: Key Operating Characteristics by Alternative

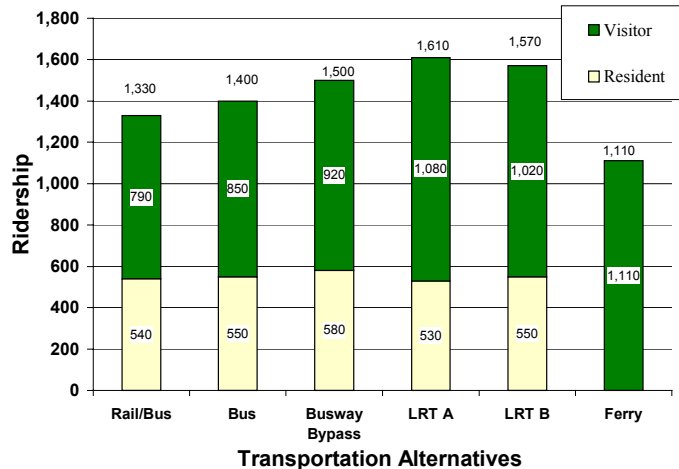
Alt.	Mode	Vehicle Type	Corridor Length (miles)	Number of Stops per Trip	Number of Transfers per Trip*	Average Operating Speed (MPH)	One-Way Trip Time (minutes)
1	Rail/Bus	Commuter Rail Rolling Stock and Motorcoach Bus	51.8	6	2	45 (rail)/ 42 (bus)	89
2	Bus	Motorcoach Bus	49.4	6	0	45	80
3	Bus	Motorcoach Bus	52.2	6	0	45 (hwy) 65 (busway)	65
4	Light Rail	Diesel Multiple Unit	51.4	6	2	45 (bus)/ 50 (LRT)	74
5	Light Rail	Diesel Multiple Unit	51.8	6	2	45 (bus)/ 40 (LRT)	86
6	Ferry	Catamaran	83.0	2	1	30 knots	144

*Transfer from BGR Terminal to BGR Intermodal Facility not included because it is common to all alternatives.

Ridership Forecasts

In the 2020 operating season, during the peak visitor month of August, daily demand for Bangor to Bar Harbor transit services would range from 1,110 to 1,610 trips per day (see chart below). July levels would be similar, with June and September levels at roughly 80% of the peak months. Total season ridership would range from 118,500 to 190,800 trips.

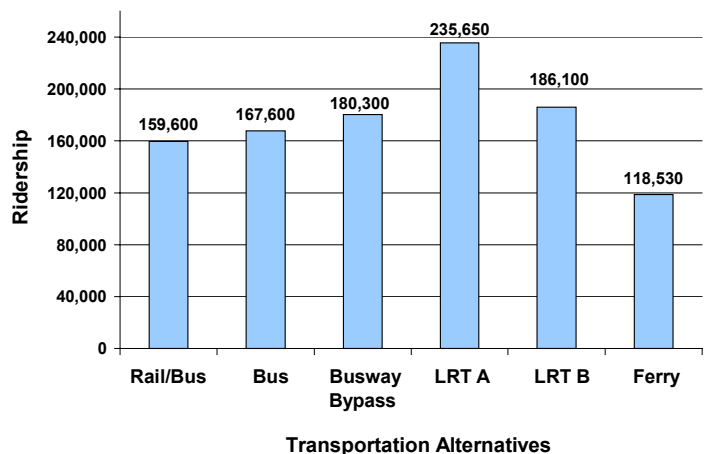
Average Daily Resident and Visitor Ridership by Alternative for August 2020



The highest ridership alternative would be Alternative 4, which is the “fast light rail” alternative. This alternative would provide the fastest service, and survey respondents indicated a preference for light rail over the bus alternatives. The lowest ridership alternative would be Alternative 6, the Ferry Alternative. While this alternative would appeal to visitors, the long travel time and lack of intermediate stops would discourage nearly all residents from using the service.

Note: The LRT A bar in the Resident and Visitor Seasonal Ridership Table to the right includes 340 riders per day from the proposed Orono Shuttle. These riders would also be present for all other land based alternatives, increasing these bars by about 47,000 riders.

Resident and Visitor Seasonal Ridership



For all alternatives, summertime visitors to Bar Harbor represent the largest group of potential users of the proposed new transportation services. The large majority of visitor trips—80%—would be made by those who already visit Maine, and would use Bangor to Bar Harbor service if they were available. The remaining visitor trips would consist of new trips that would not otherwise be made if Bangor to Bar Harbor transit services were not available. Approximately one-third of these trips would be additional trips made by those who already visit Maine, and two-thirds would be made by those who have not visited Maine in the past three years.

As with total trips, Alternative 4/LRT A would attract the highest number of visitor trips, followed by Alternative 6/Ferry. Somewhat surprisingly, respondents to both the Visitor Induced Demand and Mode Shift surveys responded relatively positively to the ferry alternative in spite of the long (approximately 2.5 hour) travel time. This is the case presumably because the ferry trip would be considered as an attraction as well as transportation.

Alternative 1/Rail-Bus would attract the lowest number of visitors, largely because it would be the most inconvenient, requiring two transfers, and one of the slowest trip times. However, this alternative would carry among the highest number of resident riders, because most resident ridership would be concentrated at the ends of the corridor and most trips would be made on the Bangor to Brewer and Ellsworth to Bar Harbor segments of the bus services. There would be relatively little “end-to-end” ridership, and as a result, the inconvenience of a transfer at Brewer, Ellsworth, or Trenton would affect only a small number of riders. Resident ridership would be highest on Alternative 3/Busway Bypass, and in the same range for Alternative 4/LRT A. This is because regular riders would be more concerned than visitors with one-seat service and faster travel times.

Ridership for all of the alternatives was found to be sensitive to the availability of other transit services. For example, surveys showed that visitors who were aware of the Island Explorer would be more likely to use transit between Bangor and Bar Harbor than those who were not. Similarly, a light rail shuttle connecting Bangor and Orono would add 300-400 trips per day in the summer months to the ridership forecasts for the land-based alternatives.

Conclusion and Next Steps

This final report presents the thorough analysis that was performed to determine the potential for transit ridership in the Bangor to Trenton corridor. With this information in hand the Maine Department of Transportation is faced with the challenge of determining whether the results of these analyses provide enough information or show sufficient potential to make a determination about how to proceed with the next steps in the development of a transportation project.

While travel is significant in the corridor, the proposed transportation services attract only a small overall percentage of the travel market. This is because a large portion of the market will not be served directly by the proposed services. For instance, residents that live in Lamoine and work in Dedham could not use a service that does not stop in either town. From a visitor perspective, most visitors who travel with large or elderly parties and with gear would not find transit service convenient. The vast majority of visitors to the region use a private automobile to get to Maine, and it is unlikely that they will park that vehicle in Bangor and use the transit services when in reality the Bangor to Trenton trip, although congested, is a small fraction of their total trip.

However, the transportation alternatives would be successful in attracting up to 1,610 daily riders in the peak months and thus provide some relief to the existing travel situation as well as allow opportunities for growth. While some alternatives are attractive to residents, the visitor market is by far the primary market for use of these services. Visitors tend to be sensitive to travel time and service frequency, and thus modifications to these components of the alternatives could result in increased demand. In addition, when looked at in the context of an overall State plan of linked transportation services, the Bangor to Trenton corridor could result in even greater demand.

If Maine DOT believes that the proposed services offer an opportunity to the State, either alone or in conjunction with freight service, more detailed analyses would be required. This is especially true of the need to assess the physical and institutional feasibility of the alternatives, the cost (including environmental impacts) and benefits of the alternatives and also their implementability. In particular, the funding mechanisms of such a project, in the context of its ability to compete for federal dollars and in the context of the entire Maine Strategic Passenger Transportation Plan, should be investigated.

As a component of an overall transportation program, the Maine Department of Transportation could increase the attractiveness of transit service in this corridor by working with the National Park Service in prohibiting auto traffic in the park. Additionally, if the services are fully developed, a commitment to a program of extensive marketing of the services to the tourist community is highly recommended, as most visitors to Maine make their travel decisions before they leave home.