PRINCE WILLIAM SOUND AREA TRANSPORTATION PLAN

An Element of the Statewide Transportation Plan

Final Edition

Prepared for the

Alaska Department of Transportation and Public Facilities

Prepared by

Parsons Brinckerhoff

in association with

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July 2001

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PB 100 YEARS

STATE OF ALASKA

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
OFFICE OF THE COMMISSIONER

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July 15, 2001

Greetings:

Governor Knowles asked us to look at transportation in Prince William Sound and the Copper River area from a new perspective. Rather than focusing on whether to build a road along the Copper River to Cordova, he wanted us to consider the entire region, to look at transportation solutions broadly, and to consider all modes. The *Prince William Sound Transportation Plan* is the result of that consideration and endeavors to prioritize transportation investments in a way that works to the benefit of the entire region and is sustainable in the long-term.

What we did know when we began this process was that we would soon connect Whittier by road to the Seward Highway (now a reality), and that the aging AMHS ferry *Bartlett* was running with consistently full vehicle loads during the summer months. So we knew we needed to address the inter-modal connection at Whittier and solve a capacity shortfall. We also knew that there was a high degree of dissatisfaction in Cordova with the amount of ferry service received, and that *Bartlett* was operating at a loss. The *Prince William Sound Transportation Plan* concludes that a ferry system that connects the communities of Whittier, Valdez, and Cordova with dayboat service will meet the needs of the majority of residents, respond to capacity concerns and improve the financial outlook for ferry service in the region. The efficiencies achievable through the plan's recommendations make for a more sustainable transportation system in the long-term.

The plan was developed using an extensive public involvement process. This included an Advisory Committee made up of community leaders. Their interaction with one another enabled them to focus on transportation solutions that brought benefits to the entire region rather than only to their individual communities. Additionally we maintained a website on the plan where we responded to inquiries from the general public and provided technical documents for viewing by interested individuals. During the draft public review period, we visited communities in the region, presented the plan's recommendations, and responded to questions.

Creation of a viable day ferry service in Prince William Sound requires the purchase of a single 32-knot ferry, and the completion of several ferry terminal modifications. The plan recommends purchase of a second identical vessel 6-10 years following introduction of the first fast ferry.

This plan draws its authority from Alaska Statute 44.42.050 and is an element of the Statewide Transportation Plan as defined in 23 CFR 450.214. I am proud to hereby authorize the Prince William Sound Transportation Plan. It's your plan for a sound future.

Sincerely,

Joseph L. Perkins, P.E.
Commissioner

Advisory Committee

The Department gratefully acknowledges the significant individual and collective contributions of those who served on the Prince William Sound Transportation Plan Advisory Committee in the development of this plan.

Mayor Dale Bagley, Kenai Peninsula Borough
Mayor Bert Cottle, City of Valdez
David Cobb, Valdez, former mayor
Mayor Ed Zeine, City of Cordova
Mayor Ben Butler, City of Whittier
Bill Coumbe, Whittier, former mayor
Mayor Edgar Blatchford, City of Seward
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Cover photos:
Main Bay, Prince William Sound
Artist's rendering of "Sitka-class" fast-ferry (Derecktor Shipyards)

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Preface

This document presents the Prince William Sound (PWS) Area Transportation Plan, which culminates a three-year effort to define and select a blueprint for the region's transportation future in the coming decades. The Alaska Department of Transportation and Public Facilities (DOT&PF), as the State agency responsible for highways, ferries, airports and ports and harbors, undertook this effort to ensure that future investments in the region's transportation infrastructure are in the best overall public interest.

This plan is one of a series of regional, multi-modal transportation plans being undertaken for Alaskan communities. It forms part of the Statewide Transportation Plan and presents the project recommendations for the Prince William Sound region. This plan draws its authority from Alaska Statute 44.42.050, which requires DOT&PF to prepare plans for transportation facilities, and is also an element of the Federally-required Statewide Transportation Plan as defined in 23 CFR 450.214. The Federal requirement is important, as Federal transportation funds must be allocated consistent with transportation plans prepared following Federal guidelines.

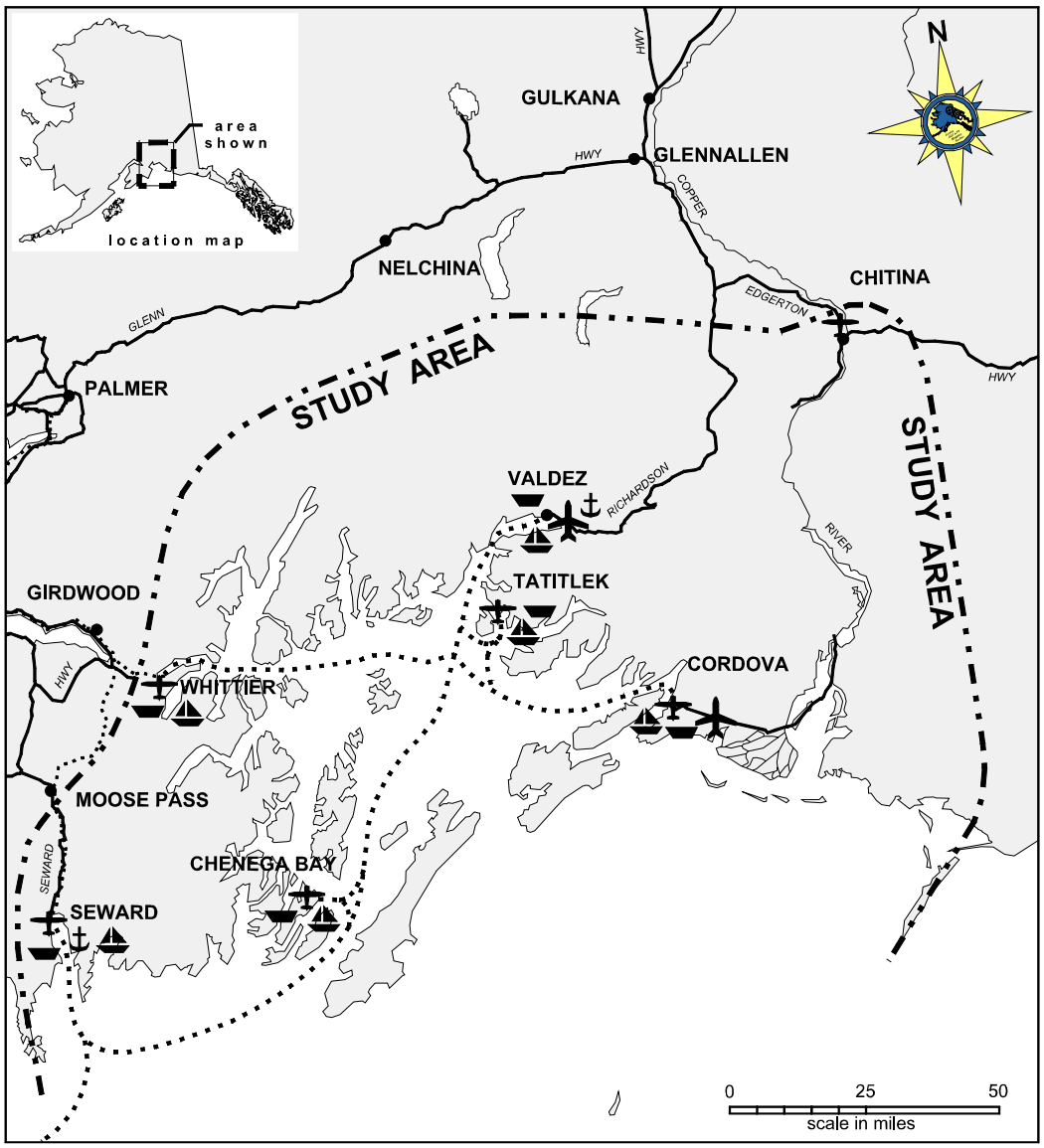
The PWS Area Transportation Plan is not about changing services and facilities for the sake of change. Rather, it reflects a broad-based effort that seeks to improve year-round mobility and access for residents, and to broaden and diversify the region's transportation network. This effort necessarily explored potential road, rail, aviation and marine transportation options. A transformation of the region's marine highway infrastructure emerged from the process as the best way to address the region's transportation needs during the upcoming 20-year timeframe.

The preferred alternative for the PWS Area Transportation Plan shares a similar finding with the Southeast Alaska Transportation Plan (completed in 1999), in that it finds that moving the Alaska Marine Highway System (AMHS) to a dayboat operating system is superior to the current operating concept. The high-speed vessels necessary to make the shift to dayboat operations provide technically feasible means of lowering operating costs while improving service levels and convenience. In so doing, they also increase AMHS revenues, thereby strengthening the system's financial sustainability. The importance of financial sustainability cannot be underestimated in light of the uncertainty and difficulty in securing the sizable State General Fund appropriations that are now required to fund transportation service in the region. Nevertheless, the plan did not set out to provide a mechanism for generating AMHS revenue. Service to communities has been the driving consideration all along.

Transportation is intrinsic to the region's economic vitality. Thus, mobility and access determine people's ability to explore their world and its possibilities. This transportation plan provides a means of improving the quality of life of the region's residents through improved mobility. At the same time, the plan provides a low-impact, focused path for transportation development, preserving the natural beauty of Prince William Sound and its surrounding areas for future generations to enjoy.

This document does not portray the sum total of the planning effort, but rather a summation of the findings and key processes. The supporting technical memoranda, prepared over the 3-year course, are numerous, each representing the findings up to the point when it was published. Due to the limited planning budget, the technical memoranda were not revised to bring them up-to-date. The documents can be accessed through DOT&PF's website (http://www.dot.state.ak.us) or can be sent in CD form upon written request.

Figure S.1 Existing Conditions



PRINCE WILLIAM SOUND REGION

Existing Transportation 2001

- State Maintained Regional Airports
- State Maintained CommunityAirfield (limited facilities)
- Alaska Railroad
- Alaska Marine Highway
- Road
- Commercial Marine Service Facilities
- Community Marine Service Facilities
- Fishing/Recreational Boat Moorage

Executive Summary

The key element of the Prince William Sound (PWS) Transportation Plan is the purchase of two new high-speed ferries, (one immediately and the second several years later), which would be deployed to serve Cordova, Whittier and Valdez with much greater frequency, capacity, and convenience than are now provided. The plan achieves these transportation service objectives without adding to present system operating costs, while dramatically improving transportation revenues. Under this proposal the *Bartlett* and the *Tustumena* would no longer provide service within Prince William Sound. The *Tustumena* would continue to provide service between the Kenai Peninsula and Southwest Alaska. The plan was arrived at through an iterative process that considered all transportation modes, eventually narrowing its focus to marine transportation. In the final analysis, the current system configuration (Final Alternative 1) was compared with three new ferry system concepts (Final Alternatives 2, 3 and 4). Final Alternative 3 (hence referred to as the "Preferred Alternative") outperformed the other concepts.

The (PWS) Transportation Plan, begun in May 1997, focuses on linking communities within the region to each other, to the rest of the state and to outside the state. The PWS area historically has provided two natural gateways to Alaska's interior via Thompson Pass near Valdez and via the Copper River valley. Completion of the Whittier Access Project, which provides direct auto and rail access from Anchorage to Whittier, further strengthens the region's gateway role. While the PWS area possesses tremendous strengths, chief among which are its beauty and natural resources, it also faces numerous transportation challenges.

There exist significant differences in mobility and access among the region's communities. Seward, for example, has direct connections to highway, air, rail, and the Alaska Marine Highway System (AMHS). On the other hand, Cordova, Chenega Bay and Tatitlek are wholly dependent on AMHS and air travel. This reliance is problematic in several respects. First, residents of communities with no overland access pay higher costs for goods and for travel.[1] Second, existing AMHS service upon which these residents are reliant is infrequent, irregularly scheduled, insufficient to meet demand during the summer peak, and inconvenient (e.g., midnight arrivals and departures). Third, the lack of access and mobility is a barrier to economic diversification.

Constraints upon the provision of lower-cost, more convenient, faster transportation alternatives include the area's challenging weather and topography, the predominance of State and Federal land ownership, the importance of conserving subsistence resources, and the value of preserving the area's natural resources.

Proposed Plan Elements

AMHS Improvements - The Preferred Alternative

In the Preferred Alternative, the State would initially purchase a new 32-knot, 30-vehicle high-speed ferry similar to the "Sitka class" vessel developed for Southeast Alaska service. This vessel, homeported in Cordova, would make alternating loops (one round trip per day) among the ports of Cordova, Valdez and Whittier year-round. A second identical vessel would be added 6-10 years into the plan's life. It would be homeported in Valdez and dedicated in peak season

[1] *Prince William Sound/Copper River Transportation Plan Transportation Needs and Deficiencies Technical Memorandum* prepared for the Alaska Department of Transportation and Public Facilities by Parsons Brinckerhoff, September 1999.

to service between Whittier and Valdez, where it could make one or two round trips per day. In the off-peak season, the second vessel would be used as a spare vessel, substituting for other fast ferries elsewhere in the AMHS system during maintenance periods. The operating concept is illustrated in Figures S.2 and S.3.

Figure S.2

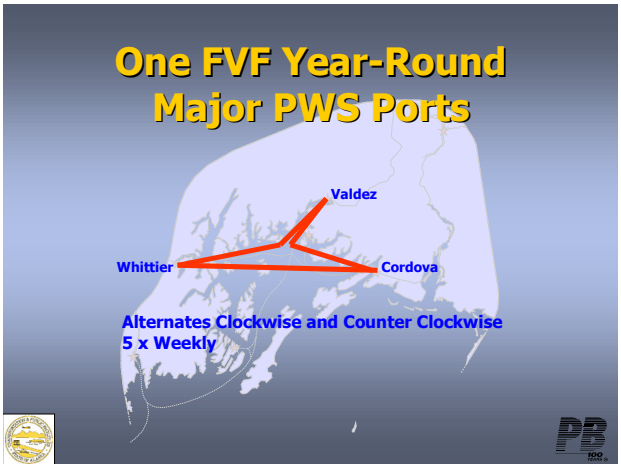
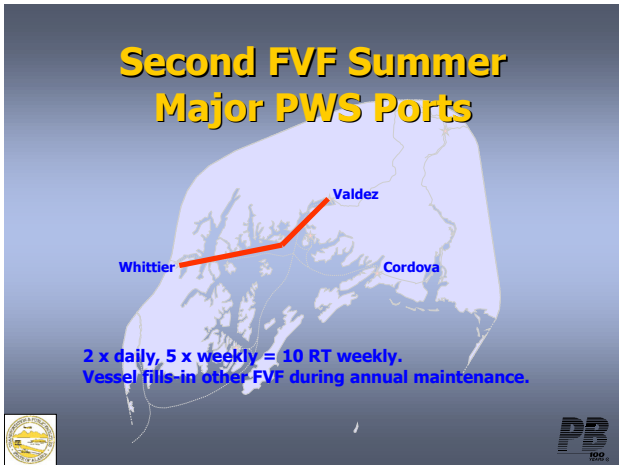


Figure S.3



The appeal of the Preferred Alternative is its cost-effectiveness. This proposal has operational costs slightly less than those projected with the exixting system, while the better service increases revenues significantly. If the existing AMHS services in Prince William Sound were to continue, the projected costs are about $6.3 million for the design year 2020. The Preferred Alternative, in comparison, is projected to cost about $6.1 million and generate revenues of $8.9 million for the 2020 design year.[2] Summary results of the final alternatives appear below in Table S.1.

Table S.1
Summary Statistics for the Final PWS Plan Alternatives

Final Alternative	MOE Score*	Capital Cost (including shoreside)	Operating Cost**	2020 Revenue Estimate	Operating Costs Minus Revenues
1 - Baseline	10	$59.0 M	$6.3 M	$3.37 M	– $2.97 million
2	35	$102.9 M	$5.5 M	$7.34 M	+ $1.84 million
3 - Preferred	**38**	**$114.0 M**	**$6.1 M**	**$8.92 M**	**+ $2.82 million**
4	38	$114.0 M	$6.1 M	$7.74 M	+ $1.64 million

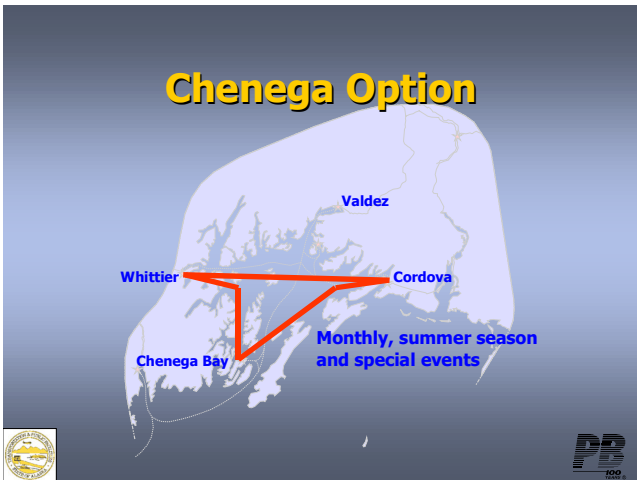
* Measures of effectiveness. See page 25.

**Note that these operating cost estimates do not take into account the full costs of operating amhs service. System management, shoreside facilities, risk management and reservation system costs, for instance, are not included. The reason for this omission is the difficulty in assigning systemwide costs to isolated elements of the AMHS, such as service between specified ports.

[2] Revenue projections for each alternative have been performed at a planning level. While they reflect the best estimates that can be developed given existing data, many uncertainties surround them. An earlier document, *Ferry Alternatives Revenue Analysis Technical Memorandum* (March 2000) should be referenced to gain an understanding of the revenue forecasts' assumptions, caveats, and limitations. Further, the operating cost estimates provided do not take into account the considerable systemwide costs borne by the AMHS (system management, risk management, and reservation system costs). The actual differences between projected revenues and costs are much lower. Systemwide costs were not rolled into the alternative-specific operating cost estimates because of the difficulty in allocating such costs among specific service routes.

"Whistle-stop" (the present-day practice) or scheduled service to Tatitlek is feasible, on legs between Valdez and Cordova. Several means of serving Chenega Bay are feasible; but it will likely be a scheduled service as opposed to a whistle-stop service currently provided. One option is to modify an occasional loop trip to serve Chenega Bay instead of Valdez (a Cordova – Chenega Bay – Whittier – Cordova loop or a Cordova – Whittier – Chenega Bay – Cordova loop). The structuring and frequency of this service would likely be determined through a combination of AMHS operational scheduling priorities and expressed community desires. Figure S.4 illustrates this option.

Figure S.4



In addition to the purchase of new ferries, the construction of homeport and shoreside facilities is needed. Terminal improvements for Cordova, Tatitlek and Chenega Bay are essential to the plan, and the Cordova terminal improvement must be in place before the high-speed ferry can begin service. A ferry maintenance facility needs to be constructed in Cordova to house spare parts and support overnight maintenance activity. A second maintenance facility will be needed later in Valdez to support the second high-speed vessel when it enters service.

The projected revenue stream for the Preferred Alternative is generated is by reconfiguring ferry operations in PWS to provide service that better meets the travel expectations of residents. Essential elements of this configuration are regular service, convenient and repeatable schedules, less time spent traveling, and availability of direct routes to desired destination. By incorporating these features, the ferry system becomes more attractive to potential customers and more seats are filled. Another critical element is increasing summertime vehicle capacity on the Whittier-Valdez route, which currently is not meeting demand. "Dayboat operations," the key feature of the Southeast Alaska Transportation Plan, provides the means for meeting these essential elements and keeping costs down. Like Southeast Alaska, the necessary ingredient for achieving dayboat operations in PWS is speed. Table S.2 illustrates the drop in travel times between communities with the plan implemented and Table S.3 compares vehicle capacity along trip segments.

Table S.2
Travel Times

Vehicle Travel Times between PWS communities (incl staging times)		
Community pair	Current system	Preferred Alternative
Cordova-Valdez	7.5 hrs	3.5 hrs
Cordova-Whittier	9 hrs	4.0 hrs
Cordova-Seward	13 hrs (direct)	7.0 hrs (via Whittier)
Seward-Valdez	13 hrs (direct)	6 hrs (via Whittier)
Seward-Whittier	2-3 hrs	2-3 hrs
Valdez-Whittier	8.8 hrs	3.5 hrs
Valdez-Anchorage	6 hrs	5 hrs
Chenega-Anchorage	13 hrs (via Valdez)	5 hrs

Table S.3
Vehicle Capacities

Vehicle Capacities between Communities					
From	To	Peak Season		Annual	
		Current	Plan	Current	Plan
Whittier	Valdez	1160	8908	2610	12070
Cordova	Whittier	348	1802	783	4964
Cordova	Valdez	580	1802	2522	4964

The number of ferry trips between ports also increases considerably with this plan. The Preferred Alternative offers by design year 2020 a three-fold annual increase in trip frequency between Cordova and Valdez, a four-fold increase between Whittier and Valdez, and a ten-fold increase between Cordova and Whittier over what the current system could provide. Tables S.4 and S.5 show the peak-season and off-season trip numbers for the Preferred Alternative.

Table S.4
Preferred Alternative
Peak-Season Trips

	Destination Port (Number of trips during the season)		
Port of Origin	Valdez	Cordova	Whittier
Valdez		105	263
Cordova	105		105
Whittier	263	105	

Table S.5
Preferred Alternative
Off-Season Trips

	Destination Port (Number of trips during the season)		
Port of Origin	Valdez	Cordova	Whittier
Valdez		186	93
Cordova	186		186
Whittier	93	186	

Surface Transportation Improvements

Significant roadway improvements in the Prince William Sound area are under way and planned, as shown in Table S.7. These include the recently completed Whittier Access Project and highway reconstruction and rehabilitation projects on the Seward and Richardson Highways. In addition, two other surface transportation alternatives were explored as part of this planning effort: a Copper River Highway alternative and a Copper River Railroad alternative.

Completion of the Copper River Highway linking Cordova to the Edgerton or Richardson Highways was examined during the development of the PWS Area Transportation Plan. The study team, in consultation with the PWS Area Transportation Plan Advisory Committee, determined that this project failed a fatal flaw screening on several grounds:

- Its very high capital costs relative to other surface transportation links;
- Its perceived potential adverse impacts on environmental and subsistence resources;
- The lack of strong support as to its desirability on the part of the communities that would be affected most directly by its implementation.

An alternative means of making an overland linkage between Cordova and the state's roadway network – a Copper River Railroad – was also explored. However, the railroad concept lacked a number of essential elements for successful railroad economics. These include: (1) high-yield resources that are available year round, (2) a substantial market for the resources at the other end of the line, (3) willing investors to assume the risk, (4) significant backhaul potential, and (5) suitable terrain. This alternative, like the Copper River Highway, failed to pass the fatal flaw screening. It is not an operationally feasible enterprise.

Port and Harbor Improvements

The State has a history of supporting critical port and harbor infrastructure, and has directly financed and constructed hundreds of facilities across Alaska. However, there is no annual program for regular construction and upgrade of these key intermodal facilities such as exists for highways and airports. Instead, prospective improvements are evaluated case-by-case through DOT&PF's ports and harbors program. Options for federal funding include U.S. Army Corps of Engineers support for navigation improvements (such as breakwater construction, erosion control and dredging) and special Congressional appropriation.

Several port and harbor improvement projects are currently programmed for the Prince William Sound area and listed in Table S.6. An emergent need identified during the planning process (indequate regional recreational boat mooring capacity) is addressed in Table S.7.

Aviation Improvements

The analysis of regional aviation needs revealed that there are no immediate required improvements for the regional aviation system serving the PWS area. Regional and local airline services are provided by the private sector and the State has no control over the amount, frequency or quality of service provided by the various private operators.

Capital improvements at the various PWS area airports are identified through individual airport master plans. Several improvements are currently programmed, as shown in Table S.6. Airport master plans will continue to be updated during the timeframe of the PWS Area Transportation Plan and these plans will identify additional capital improvements.

Completed System. Figure S.5 is a map of the region showing the implemented transportation system.

Table S.6
PWS Area Transportation Plan Capital Projects

Baseline Projects		
Location	**Description**	**Estimated Capital Cost**
Chenega Bay	Iktua Bay Trail Construction. Construct a trail from the Chenega Bay Airport to Iktua Bay	$450,000
Chitina	Edgerton Highway: Chitina Bike/Pedestrian Facility. Construct approximately two miles of bike path from One Mile Lake to Chitina (MP 32 to Trout Lake)	$500,000
Cordova	Copper River Highway, MP 0 – 10 Pedestrian/Bike Path. Build a pedestrian/bicycle facility along the Copper River Highway from downtown Cordova to the Scott River	$5,800,000
Cordova	Shepard Point Road. Construct approximately four miles of road from Orca Cannery to the deep-water port site at Shepard Point	$5,000,000
Seward	Harbor Pedestrian Pathway. Construct a pedestrian pathway between the Alaska Railroad Dock and the Iditarod Trail connection	$725,000
Seward	Seward Harbor Expansion	$9,493,000
Seward	Seward Airport Lighting Replacement	$350,000
Seward Highway	MP 0 to 8 Reconstruction and Pathway. Rehabilitate roadway, replace and lengthen three bridges over Resurrection River and construct separated pathway. Construct railroad grade separation at Stoney Creek Drive and a pedestrian grade separation near Port Avenue	$20,850,000
Seward Highway	MP 18 to 25.5 Reconstruction. Snow River to Trail River. Widen to include grade separated crossing at Crown Point, replace bridges, rehabilitate pavement and construct passing lanes	$18,000,000
Seward Highway	MP 25.5 to 30 Reconstruction. Trail River to Moose Pass. Rehabilitate roadway to include widening, resurfacing, and safety improvements as necessary	$10,125,000
Seward Highway	MP 30 to 36 Rehabilitation. Rehabilitate roadway and/or upgrade as needed.	$5,785,000
Seward Highway	MP 36 to 50 Rehabilitation. Rehabilitate surface, provide additional passing lanes, and widen through the avalanche area to provide more snow storage	$10,100,000
Seward Highway	MP 57 to 65 Rehabilitation. Rehabilitate pavement	$3,310,000
Tatitlek	Tatitlek Harbor Construction	$1,450,000
Valdez	Dayville Road and Bike Path. Construct a bike path along Dayville Road, from the Richardson Highway to the Alyeska Pipeline Terminal	$8,600,000
Valdez	Valdez Marine Improvements (new construction). Construct new ferry mooring structures in line with city dock, allowing joint use of dock	$7,000,000
Valdez	Ferry Terminal Replacement (new construction). Construct new ferry terminal building.	$2,100,000
Valdez	Valdez Uplands Improvement (new construction). Construct improved vehicle staging area for the ferry terminal.	$4,900,000
Valdez	Barge Landing Access. Improve access from the Richardson Highway to Port Valdez to provide landing craft with barge landing facility	$225,000

Table S.6 (cont)
PWS Area Transportation Plan Capital Projects

Valdez	Valdez Harbor Improvements	$2,319,000
Valdez	Valdez Airport Rehabilitation	$5,500,000
Whittier	Whittier Ferry Terminal Improvements	$7,000,000

Figure S.5 Plan Implementation

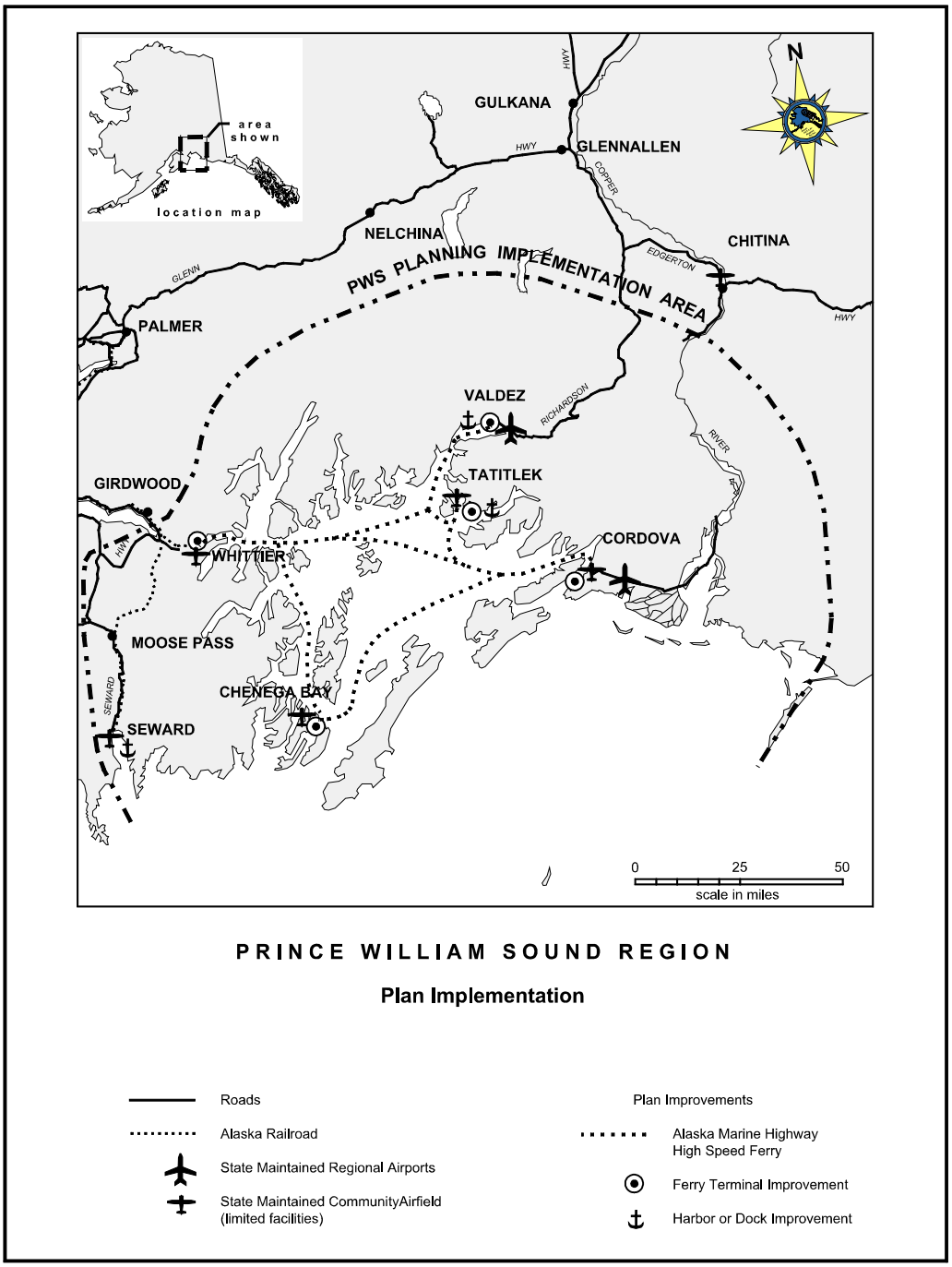


Table S.7
New Capital Projects from the PWS Transportation Plan

AMHS and Port Capital Projects		
AMHS Fleet	Acquire a new high-speed vessel to serve Prince William Sound year-round	$39,000,000
Chenega Bay	Chenega Bay Ferry Terminal Modifications	$3,400,000
Cordova	Cordova Ferry Terminal Modifications	$9,900,000
Cordova	Prince William Sound Ferry Maintenance Facility	$1,300,000
Tatitlek	Tatitlek Ferry Terminal Modifications	$3,400,000
PWS	Regional Small Boat Harbor Expansion Study	$200,000
AMHS Fleet	Acquire a second new high-speed vessel to serve Prince William Sound during peak season	$39,000,000
Airport Project		
Whittier	Whittier Airport Relocation Study. AIP-funded AMP to evaluate the need for a new "emergency use only" airport in Western Prince William Sound near Portage Pass	$225,000

Public Involvement in the PWS Area Transportation Plan

Public involvement and outreach has been the cornerstone of the PWS Area Transportation Plan. One of the first tasks in project mobilization was to assemble an Advisory Committee to help establish the goals and objectives of the plan, and to provide input throughout the planning process. Means established by the study team to ensure early and continuous public involvement have included the following deliverables and activities:

- *A Public Process Plan* was prepared for the Alaska Department of Transportation and Public Facilities by the Barton Group and Parsons Brinckerhoff, in October 1997.

- PWS Area Transportation Plan Advisory Committee Meetings were held on the following dates: October 3, 1997; April 3, 1998; June 10, 1998; December 9, 1998; February 9, 1999; November 4, 1999; and October 17, 2000.[3]
- Newsletters describing the purpose and goals of the PWS Transportation Plan were issued in August 1997 and June 1998.
- Two surveys were conducted to assess PWS area residents' transportation behavior and needs. The first, which focused specifically on the needs of communities whose mode choices are restricted to aviation and marine service (Cordova, Chenega Bay and Tatitlek), was a telephone survey administered in October 1998 by Northern Economics and Parsons Brinckerhoff.[4] The second survey was another telephone survey conducted in February

[3] The DOT&PF/consultant team is most grateful to the PWS/CR Area Transportation Plan Advisory Committee: Dale Bagley, Kenai Peninsula Borough; Dave Dengel, City of Valdez; Mike Anderson, City of Cordova; Art Koeninger, Community Improvement Association of Chitina; Ed Zeine, City of Cordova; Matt Rowly, City of Whittier; Sue Cogswell, PWS Economic Development Council; Bob Henrichs, Native Village of Eyak; Edgar Blatchford, City of Seward; Esther Ronne, Grouse Creek; Pete and Carol Ann Kompkoff, Native Village of Chenega; Gary Kompkoff, Native Village of Tatitlek; Gary Lehnhausen, Chugach National Forest; David Cobb, City of Valdez; Bruce Phelps, Department of Natural Resources; Scott Janke, City of Seward; Bill Coumbe, City of Whittier; Larry Dickerson, Copper Valley Development Council.

[4] *Cordova, Chenega Bay, and Tatitlek Ferry Use Survey*, prepared for the Alaska Department of Transportation and Public Facilities by Northern Economics and Parsons Brinckerhoff (October 1998).

2000 by Northern Economics. This was a survey of residents in Valdez and Cordova to determine how area residents would respond to proposed AMHS service alternatives and to hypothetical changes in ticket prices.[5]Additionally, a self-administered travel patterns questionnaire was developed and made available in communities in October 1997 to help generate local interest in the plan. It had a poor return rate and yielded little constructive information.

- A PWS Area Transportation Plan public involvement website, sponsored by DOT&PF, has been established and updated throughout the PWS Transportation Plan process. This website (http://www.dot.state.ak.us) includes a wide range of materials, including the technical products of this planning effort, project newsletters, a description of the regional transportation plan scope, and public comments received by DOT&PF regarding the plan's progress, findings, and direction. Also provided are the responses to these public comments provided by DOT&PF. The website also provides contact information for interested users.
- Department staff briefed the draft plan in the PWS communities, usually as an agenda item on the City Council meeting, per the following schedule:
  - Cordova Nov 15, 2000 6:30 PM
  - Seward Nov 20 7:00 PM, Nov 21, 2000 12:00 Noon
  - Valdez Dec 4, 2000 5:00 PM
  - Chenega Jan 4, 2001 11:00 AM
  - Whittier Jan 8, 2001 7:30 PM

The Context for the PWS Area Transportation Plan

The study team's first step in preparing the PWS Area Transportation Plan was to gain an understanding of the region's people, economy, and existing transportation infrastructure and travel patterns. To avoid any duplication of previous research, a literature review of existing studies and data resources was conducted.[6] Relying on available sources wherever possible, and conducting additional research where needed, the study team prepared a technical memorandum entitled *Prince William Sound/Copper River Area Transportation Plan Existing Conditions.*[7] Notable in this report is the fact that some area communities, i.e., Chitina, Seward, Valdez and Whittier, have roadway connections to the rest of Alaska and the continent, while others, i.e., Cordova, Chenega Bay and Tatitlek, are only accessible by aviation or marine modes.

The Planning Framework

The next step in the planning process was to develop a framework within which to identify, develop, and refine transportation alternatives to meet the area's needs through the 2020

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5 Survey results are reported in *Prince William Sound/Copper River Area Transportation Plan Ferry Alternatives Revenues Analysis Technical Memorandum*, prepared for the Alaska Department of Transportation by Northern Economics, Inc., Parsons Brinckerhoff, and The Glosten Associates, in association with HDR Alaska, Christopher Beck & Associates, and Ogden Beeman & Associates (March 2000).

6 *Prince William Sound/Copper River Area Transportation Plan Data Inventory Technical Memorandum*, prepared for the Alaska Department of Transportation and Public Facilities by Parsons Brinckerhoff in association with HDR Alaska, The Barton Group, Northern Economics, Inc., The Glosten Associates, and Ogden Beeman & Associates (September 1997).

7 *Prince William Sound/Copper River Area Transportation Plan Existing Conditions Technical Memorandum*, prepared for the Alaska Department of Transportation and Public Facilities by Parsons Brinckerhoff, HDR Alaska, Northern Economics Inc., The Glosten Associates and Ogden Beeman & Associates (July 1998).

planning horizon. Accordingly, the study team worked with the PWS Area Transportation Plan Advisory Committee to articulate the goals and objectives that would shape the plan. These goals and objectives formed the basis for the evaluation process and criteria established for this planning effort.[8]

Another key task at this phase of the planning effort was the development of transportation demand estimates by transportation mode and community, for both passenger and freight conveyance.[9] Informed by these forecasts, as well as other sources and the study team's own research, the study team worked with the PWS Area Transportation Plan Advisory Committee to identify the region's transportation needs and deficiencies, as well as opportunities to leverage existing regional strengths and resources.[10]

Alternatives Development

Work to develop alternatives for meeting the region's existing and anticipated transportation needs could begin once the study team understood the region's population, demographic trends, travel behavior, and values. Two sets of alternatives were developed: an initial set of alternatives; and a refined set of final alternatives.

The Initial Alternatives

Initial alternatives considered by the study team included the following:

- Extension of the Copper River Highway to the Edgerton or Richardson Highway;
- A Copper River railroad;
- Multiple means of reconfiguring ferry service in Prince William Sound to improve its frequency, capacity, and convenience;
- Aviation needs.

Although the initial set of alternatives included multiple transportation modes, marine alternatives have assumed center stage from early in the planning process. This focus stems from the area's demographic concentrations, challenging topography and weather, and from its value as an environmental and subsistence resource. . The plan emphasizes mobility for communities that do not currently have overland connections to the rest of the world, and enhancing the cross-connections between communities within the region. The limited populations not currently connected to the existing road system coupled with the costs of potential land-based solutions point to an improved ferry system as the likely most effective solution over the next 20 years. In fact, no overland solution would be sufficient for the region independent of ferry links. Highlights of the modal issues and alternatives considered follow.

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8 *Prince William Sound/Copper River Area Transportation Plan Evaluation Process and Criteria Technical Memorandum*, prepared for the Alaska Department of Transportation and Public Facilities by Parsons Brinckerhoff, in association with HDR Alaska, Northern Economics Inc., The Glosten Associates and Ogden Beeman & Associates (January 1999).

9 *Prince William Sound/Copper River Area Transportation Plan Travel Demand Estimates Technical Memorandum*, prepared for the Alaska Department of Transportation and Public Facilities by Parsons Brinckerhoff, Northern Economics, Inc., and Christopher Beck & Associates, in association with HDR Alaska, The Glosten Associates and Ogden Beeman & Associates (November 1999).

10 *Prince William Sound/Copper River Area Transportation Plan Transportation Needs and Deficiencies*, prepared for the Alaska Department of Transportation by Parsons Brinckerhoff, in association with Northern Economics, Inc., HDR Alaska, The Glosten Associates, Christopher Beck & Associates, and Ogden Beeman & Associates (September 1999).

Overland Alternatives (Copper River Highway and Copper River Railroad)

Cordova has no overland connection to the rest of Alaska's highway network. Two means of providing an overland link, one by rail and one by highway, were explored. The Copper River Highway has been studied in some detail on several occasions. The analysis conducted for this work focused on updating existing engineering and planning work. The purpose of including these two overland alternatives in this planning effort was to compare the costs, benefits, and impacts of overland linkages to those of marine linkages between communities like Cordova and the rest of the region and state.

The Copper River Highway. From 1911 until 1938, with the depletion of the Kennicott copper mine, a railroad operated between the Kennicott copper mines and Cordova. In the 1960s, the State of Alaska began building a road along the railroad right-of-way previously occupied by the Copper River and Northwestern Railroad. By 1964, construction crews had built the road north from Cordova as far as mile 59 at the Allen River. However, construction stopped following the Good Friday earthquake in 1964. The alternative explored here, and that has been studied in other planning efforts, would finish building the Copper River Highway – along one of three alternative routes:

- The Tasnuna River Route would follow the Tasnuna River Valley west for 23 miles, extend through Marshall Pass, and would meet the Richardson Highway at mile 22.5 near Thompson Pass. Capital costs for this route are estimated at $182 million and operating costs at $1.13 million per year.
- The Tiekel River Route would cross the Tasnuna River and continue north along the Copper River to the Tiekel River following the old Copper River and Northwestern railway bed from mile 82 to mile 101. At the confluence of the Tiekel River, this route would turn west, run through the Tiekel River Valley, and intersect the Richardson Highway at mile 46. Capital costs for this route are estimated at $206 million, and operating costs at $1.16 million per year.
- The Wood Canyon Route would follow the same path as the Tiekel route to mile 101. However, rather than following the Tiekel River Valley, this route would continue north along the west bank of the Copper River, through the Wood Canyon, and into Chitina following the original railroad route. Capital costs for this route are estimated at $237 million, and operating costs at $1.31 million per year.

Further consideration of the Copper River Highway was eliminated, in consultation with the PWS Area Transportation Plan Advisory Committee, on several bases:

- Its very high capital costs relative to other highway capital projects around the state;
- Its perceived potential impacts on environmental and subsistence resources;
- The lack of consensus as to its desirability on the part of the communities of Cordova and Chitina that would be affected most directly by its implementation;
- Its high additive effect on overall operating costs to the State without an appreciable offset in revenue generated;
- The continued need for some ferry service in PWS.

The Copper River Railroad. An alternative means of making an overland linkage between Cordova and the state's roadway network would be a Copper River railroad. As such, an alternative was explored to determine the costs, benefits, and feasibility of rail compared to roadway and marine modes. If rebuilt, a Copper River railroad would provide the residents of Cordova with another transportation option, which would increase the number of visitors to the area, and which would provide another means of shipping freight.

The idea of linking Cordova with rail is not new. Cordova was founded as a railroad town, providing a transshipment point for copper ore from the Kennicott copper mine heading to Tacoma to be smelted. The Copper River and Northwestern (CR and NW) Railroad was built as a private venture led by the Guggenheims and J.P. Morgan in 1908-1911 to access the rich copper deposits at Kennicott. The decision on the route's length was strictly economic. The copper mines could support the $20 million investment; the freight revenues of a railroad to Eagle could not support the additional amount needed for the longer route. The railroad route ran east from Cordova across the Copper River Delta to the Million Dollar Bridge, turning north along the Copper River Valley, and into Chitina. The Kennicott copper mine, and CR and NW Railroad that served it, were shut down in 1938 when the mines were depleted of high-grade ore.

In 1914 Congress authorized the Alaska Railroad. The Alaska Engineering Commission was promptly appointed by then-President Wilson to select a single route from two candidates: Seward north to the Matanuska Valley and the coal fields near Healy and on to Fairbanks, and the Copper River Valley to Eagle on the Yukon. The present route was chosen because of the coal and agricultural revenue potential, and because the Commission feared the government would have to purchase the Copper River and Northwestern from the Guggenheims (at a high price) to secure the right-of-way as far as Chitina.

The lessons of history are instructive here. Railroads are an expensive investment and carry with them heavy overhead, maintenance, and operating costs The essential element in the limited success of the CR and NW Railroad was a resource of high-grade mineral ore and a market for it enabled the railroad to operate profitably. That resource has been depleted. Without it, railroad operations are unsustainable.

For planning purposes, rail was considered for passenger and auto-carrying service similar to the Whittier shuttle service provided prior to the road tunnel opening (435 passengers in coaches, plus 30 vehicles with their passengers). The railroad would extend between a station at Chitina and the proposed deep-water port at Shepard Point in Cordova, a route of 137 miles. Capital costs for this route were estimated at $306 million to $560 million, and operating costs at $3 million per year.[11]

Although a Copper River railroad alternative could transport freight to ships at a deep-water port at Shepard Point, the fundamental problem is that there are insufficient potential resources along this route to sustain (or even justify) rail operations. When the railroad route is considered in light of the existing rail and highway connections to the state's interior, it can only serve to

[11] Additional costs not reflected in these initial capital cost estimates would also be incurred. Specifically, for staffed depots at each end of the chosen route, and for a freight terminal at Shepard Point. The facilities at the either end would require power, water, and wastewater utility infrastructure. Overlayed on this are the organizational costs of a railroad, including marketing, personnel, safety, insurance, legal and risk management. Neither the cost associated with the proposed deepwater port at Shepard Point and related roadway, harbor, and infrastructure nor the costs of depots have been considered in this cost estimate. Their necessity, however, should not be overlooked.

drain off resources that make the economic operation of these other facilities sustainable. In short, it is an unnecessary and unsustainable extension of the state's rail network. As a rail option, it has other shortcomings:

- No potential investment/entrepeneurial interest (for reasons explained earlier).
- Difficult grade, alignments and safety considerations.

In addition, this alternative has in common with the Copper River Highway other major flaws:

- Its very high capital costs relative to demand;
- Its perceived potential impacts on the environment;
- Its failure to eliminate the need for ferry service in PWS.

Consequently, the Copper River railroad was dropped from further consideration, in consultation with the PWS Area Transportation Plan Advisory Committee.

Aviation

Whittier Airport. In August 1998, the City of Whittier issued a resolution regarding its concerns about whether it is necessary to retain existing airport facilities at Whittier. Although records concerning the amount and type of activity occurring at the airport are not kept, reports by local residents and air taxi operators indicate the airport is occasionally used to medevac local residents and fishers to hospitals in Anchorage. Otherwise, the airport serves small recreational aircraft and accommodates emergency landings by aircraft unable to transit Portage Pass because of weather, mechanical, or fuel problems. It is the only emergency airstrip on the Prince William Sound side of the pass.

The City and the port director have expressed concern that the airport's 14 CFR Part 77 Airspace constrains the City's ability to develop adjacent lands.[12] The City's resolution specifically states that the airport should not be expanded, presumably to avoid expanding the airport's Part 77 airspace. However, an airport in the Whittier area continues to be important to the safety of the regional airport system, particularly as recreational use of Prince William Sound is anticipated to increase with the completion of the Whittier Access Project. FAA staff have indicated verbally that the airport might not be considered eligible for AIP funding for capital improvements because of dangers posed by nearby mountains and the single approach to the runway.[13] Improving the existing airport to meet FAA design standards would be expensive, requiring the acquisition of about 78 acres and placement of a marine fill to extend the runway by about 800 feet into Passage Canal. The ability of the airport to continue to function in this role is in jeopardy, given the facility's questionable eligibility for FAA funding and anticipated pressures for the development of adjacent lands. DOT&PF considered the City's resolution and reported its recommendations in a memorandum dated August 4, 2000. These recommendations include the following:

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[12] Part 77 defines imaginary surfaces that the FAA uses to identify obstructions near an airport that could pose a danger to aircraft. Interest in developing land near the airport has increased significantly in light of the completion of the Whittier Access Project.

[13] *Whittier Airport—Abandonment Public Hearings*, Memorandum from John S. Tolley, Chief, Planning & Administrative Services DOT&PF, to John D. Horn, Regional Director, DOT&PF (November 1998).

- The lease for the existing airport site should be renewed for another five years, with an option to extend an additional five years.
- A small AIP-funded study should be initiated to evaluate the need for a new "emergency use only" airport in western Prince William Sound, near Portage Pass.
- A provision for periodic monitoring of the existing runway for debris removal should be made in conjunction with the contract to be negotiated for maintenance of the state highway that will connect the Whittier Marine Highway Terminal with the Whittier Tunnel.

Marine Ports and Harbors

The State is also constrained in terms of the extent to which it can shape the quality, capacity, and locations of marine ports and harbors. The difficulty in ports and harbors is even more pronounced than in the case of aviation, where a stable source of Federal funding, the FAA's Airport Improvement Program, is available. In contrast to aviation, ferry and highway modes, there is no Federal assistance program wherein funding is allocated to the states for port and harbor projects on an annual basis.[14] The lack of such a program is felt acutely in Alaska, where 90 percent of the population lives within ten miles of the coast or along a major river, and 30 per cent of the state's population is not connected to the road system. This situation is problematic because it severely limits investment in some of Alaska's arguably most important transportation infrastructure assets.

In terms of project selection at the state level, the State Harbor Engineer is the functional equivalent of the Project Evaluation Board for surface transport and aviation modes. The top-ranked projects are those that have or are likely to receive Federal funds from the U.S. Army Corps of Engineers (COE), based upon COE benefit-cost criteria. It is this subset of projects that is submitted to the Legislature each year during the budgeting process and recommended for State appropriation. In this way, the limited Federal funding drives port and harbor projects in Alaska, while projects ineligible for federal funds must rely upon local initiatives to secure public and private investment capital.

There is a well-documented need for additional boat moorage in Whittier; the waiting list in 1997 was nearly 740 vessels[15]. The volume of transient boats is expected to grow with the improved access to Whittier, and this translates to added demand in other PWS community harbors as well. A regional harbor study is recommended in order to assess demand to all PWS boat harbors, identify potentially feasible solutions, and develop funding partnerships.

AMHS Alternatives

Three categories of marine alternatives were explored initially: (1) those options that rely entirely upon vessels already owned and operated by the AMHS; (2) those that serve the area with new vessels; and, (3) those that rely upon a combination of existing AMHS vessels and new vessels. The initial AMHS alternatives are synopsized below.

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[14] The main source of funding for ports and harbors in Alaska is the U.S. Army Corps of Engineers (COE), which distributes the resources it is granted by Congress on a nationally competitive, project-by-project basis. The COE moreover, only develops projects; funding to actually implement projects must be granted by Congress on a line-item basis. In short, the State cannot plan on receiving any portion of the COE's support in a given year; nor can the State "flex" any COE funding; any and all funding is project-specific. As such, rather than being driven by any state prioritization or program, the Federal port and harbor funding process is driven by the COE's assessment of a project's merit, and by Congress's willingness to fund the COE's recommendations. This is problematic because worthy projects such as those involving major renewal or replacement will not advance over a project that attracts a sizable Federal contribution, even if the project is in question.

[15] *Harbor Improvement Technical Report: Whittier Alaska*. U.S. Army Corps of Engineers, February 1997, p. D-1-48.

Group 1: Service Provided with Existing Vessels

Alternative 1a. *Tustumena*: Prince William Sound ports of Cordova and Valdez are served by the *Tustumena* with slightly less than weekly service during the summer and somewhat more frequent service (approximately twice weekly) during the winter. The *Tustumena* connects to Seward on same frequency of service. The *Tustumena* offers whistle-stop service to Tatitlek and Chenega Bay.

Bartlett: The *Bartlett* serves the Prince William Sound ports of Cordova, Valdez, and Whittier with approximately daily service to Whittier and Valdez, and three times a week service to Cordova. *Bartlett* offers whistle-stop service to Tatitlek.

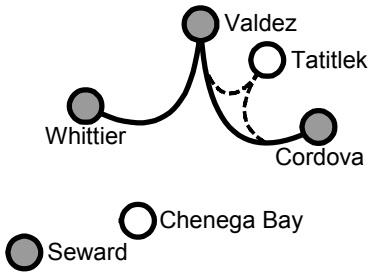
Alternative 1b. Existing Conditions, but Replace Bartlett with Aurora. This alternative is similar to Alternative 1a except that the *Bartlett* (Vehicle Capacity ≈ 29, Service Speed ≈ 13.6 kts.) would be replaced by the *Aurora* (Vehicle Capacity ≈ 34, Service Speed ≈ 14.5 kts.).

Alternative 1c. Increase Service from 34 to 45 Weeks per Year. Over the three-year period from 1996 to 1998 the *Bartlett* averaged 34 weeks of service annually (shown in Alternatives 1a and 1b). Expanding the *Bartlett's* service to 45 weeks, or the service of the *Aurora* acting as a replacement to the *Bartlett*, would compensate for eliminating *Tustumena* service to Prince William Sound, except that the Prince William Sound connection to Seward would be eliminated.

Group 2: Service Provided with New Vessels

Alternative 2a. Timed Transfer at Valdez. Imposing the restriction that new services be "dayboat" services (see p. S-19) for reasons of operating economics, this service would require two new vessels. Depending on the number of daily round trips, this service could be provided by two new high-powered conventional monohulls or two new high-speed vessels.[16]

The basic concept is that vessels are homeported at Whittier and Cordova. A voyage cycle begins with departures from both Whittier and Cordova, timed for near simultaneous arrival in Valdez. Traffic destined from Whittier to Cordova, or from Cordova to Whittier, changes vessels in Valdez. Vessels complete the round trip cycle by returning from Valdez to their respective homeports.

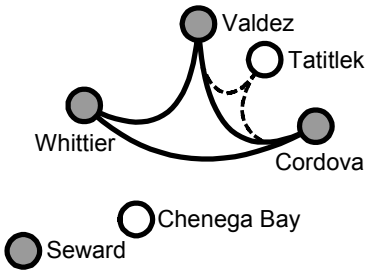


Alternative 2b

Alternative 2b. Dedicated Port Service by New High-Speed Vessel. A new high-speed vessel would sail daily from a homeport located at Whittier, Valdez, or Cordova. The vessel would operate as a dayboat, returning to its homeport within the confines of a 12- or 16-hour service day (with start-up and shutdown periods provided at the beginning and end of the service day).

The new high-speed vessel would provide whistle-stop service to Tatitlek.

[16] All analyses are based on the assumption of a 365-day a year service schedule. A more refined analysis would have to take into account the period each year during which a vessel would be out of service for maintenance.



Alternative 2c. Loop Service by New High-Speed Vessel. A new high-speed vessel would sail daily from a homeport located at Whittier, Valdez, or Cordova. The vessel would operate as a dayboat, returning to its homeport within the confines of a 12- to 16-hour service day (with start-up and shutdown periods provided at the beginning and end of the service day).

Service orders could be altered on different days.

Alternative 2c

Alternative 2d. Dedicated Port Service by Two New Vessels. Again imposing the restriction that new service be based on the dayboat concept (for reasons of operating economics), this plan would require two new vessels: a new high-powered conventional monohull and a new high-speed vessel.

- The new high-powered monohull would make a daily round trip between Cordova and Valdez. The vessel would operate as a dayboat, completing a round trip within a 12-hour service day.
- A new high-speed vessel will make two roundtrips per day between Valdez and Whittier. This vessel will also operate as a dayboat, either with one crew shift within the constraints of a 12-hour service day, or with two crew shifts and a mid-day crew change, within a 16-hour service day.
- Both vessel schedules could be arranged for a single daily transfer at Valdez.

Group 3: Service Provided via Combination of Existing and New Vessels

Alternative 3a. This is the only alternative in this group. This alternative would combine a new high-speed service such as that described as Alternative 2c (loop service) with service by an existing vessel, such as the *Aurora* (or *Bartlett*). In the postulated service, the *Aurora* (or *Bartlett*) would provide supplemental service six days a week between Whittier and Valdez during the summer season, and could provide service between Chenega Bay and Whittier one day a week.

Off-season variants on this alternative would be to revert to: *i*) Alternatives 1a or 1b (existing service or existing service with the *Aurora* assuming the *Bartlett's* current role); *ii*) Alternative 1c (*Aurora* only); or *iii*) a pure version of Alternative 2c (loop service) with no supplemental service from the *Aurora* (or *Bartlett*).

The Final Alternatives

Fatal Flaw Screening

The study team presented the initial alternatives to the PWS Area Transportation Plan Advisory Committee at several junctures in the alternatives development process. The study team, in consultation with the PWS Area Transportation Plan Advisory Committee, determined that the Copper River railroad and Copper River highway extension alternatives were fatally flawed (Table S.8). The fatal flaw analysis was conducted based on three criteria: operational feasibility (including environmental and subsistence constraints), financial feasibility (including economic factors), and community acceptability. A negative assessment in any of these three criteria

would constitute a fatal flaw. The Copper River Railroad and Copper River Highway alternatives were found to be fatally flawed on multiple grounds.

Table S.8
Fatal Flaw Screening Results

	Operationally Feasible	Financially Feasible	Acceptable to Affected Communities
Marine Alternatives			
Alternative 1a – Baseline	Y	Y	Y
Alternative 1b – Replace *Bartlett* with *Aurora*	Y	Y	Y
Alternative 1c – 45-Week Service *(Bartlett)*	Y	Y	Y
Alternative 1c – 45-Week Service (*Aurora*)	Y	Y	Y
Alternative 2a – Timed Transfer at Valdez	Y	Y	Y
Alternative 2b – Dedicated Port Service by New High-Speed Vessel	Y	Y	Y
Alternative 2c – Loop Service by New High-Speed Vessel	Y	Y	Y
Alternative 2d – Dedicated Port Service by Two New Vessels	Y	Y	Y
Alternative 3a – Combination of Existing Equipment and New High-Speed Vessel	Y	Y	Y
Overland Alternatives			
Copper River Highway	Y	N	N
Copper River Railroad	N	N	Not assessed

Dayboat concept outperforms 24-hour operations. The study team then evaluated the remaining initial alternatives according to the evaluation process and criteria established earlier in the planning process.[17] This initial evaluation revealed that the marine alternatives that provide "dayboat" service to the ports of Prince William Sound via high-performance craft, or fast ferries, ranked highest in terms of measures of effectiveness relative to cost. On dayboat service, the crew shift is restricted to no more than 12 hours, and the crew is presumed to return to their homeport at shift's end. Dayboat operations have significant cost advantages. Because crews return home at the end of their shift, labor costs are much lower. In addition, sleeping quarters are not required for crew or passengers.

[17] The evaluation process and criteria established for the Prince *William Sound* Area Transportation Plan were documented in deliverable entitled, *Prince William Sound/Copper River Area Transportation Plan Evaluation Process and Criteria*, prepared for the Alaska Department of Transportation and Public Facilities by Parsons Brinckerhoff (January 1999).

Although the final alternatives emerged from the initial alternatives, they include additional specifications and refinements that allowed the study team to make more discerning judgments regarding their relative merits and cost-effectiveness. First, the final alternatives entail separate peak and off-peak season schedules. This distinction allowed the study team to consider the feasibility of providing higher levels of service when demand is at its peak[18] and to allow lower levels of services (hence operating costs) during the off-peak, when demand is lower. Second, revenue forecasts for each alternative, including the baseline, were developed.[19] These forecasts, although prepared at the planning level only, allowed the study team to consider not only operating costs, but also offsetting revenues. The alternatives are fully documented in *Prince William Sound Copper River Area Transportation Plan Evaluation of Alternatives Technical Memorandum*.[20] The study team evaluated each of the final alternatives based upon their costs and revenue forecasts, ultimately arriving at a preferred alternative. Additionally, several measures of effectiveness (MOEs) were applied to numerically compare how well each alternative met the plan's goals and objectives:

- Improves intermodal transportation
- Improves travel time
- Improves service convenience
- Exploits backhaul potential
- Health and quality of life
- Regional economic development
- Environmental readiness

The final alternatives are summarized below. Each assumes a final system configuration anticipated for the Year 2020.

The Baseline Alternative – Final Alternative 1

The Baseline Alternative would simply entail the continuation of existing Alaska Marine Highway System (AMHS) service, vessels, and scheduling. Chief characteristics of this existing service follow.

Tustumena: The Prince William Sound ports of Cordova and Valdez are served by the *Tustumena* with slightly less than weekly service during the summer and somewhat more frequent service (approximately twice weekly) during the winter, when the *Bartlett* is out of service. The *Tustumena* connects to Seward on same frequency. The *Tustumena* offers whistle stop service to Tatitlek and Chenega Bay.

Bartlett. The *Bartlett* serves the Prince William Sound ports of Cordova, Valdez, and Whittier with approximately daily service to Whittier and Valdez, and three times a week service to Cordova. *Bartlett* offers whistle stop service to Tatitlek.

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[18] The peak period for plan purposes is defined as the 105-day period centered on July.

[19] *Prince William Sound/Copper River Area Transportation Plan Ferry Alternatives Revenues Analysis Technical Memorandum*, prepared for the Alaska Department of Transportation by Northern Economics, Inc., Parsons Brinckerhoff, and The Glosten Associates, in association with HDR Alaska, Christopher Beck & Associates, and Ogden Beeman & Associates (March 2000).

[20] *Prince William Sound/Copper River Area Transportation Plan Evaluation of Alternatives Technical Memorandum*, prepared for the Alaska Department of Transportation by Parsons Brinckerhoff, in association with Northern Economics, Inc., HDR Alaska, The Glosten Associates, Christopher Beck & Associates, and Ogden Beeman & Associates (May 2000).

Final Alternative 2

According to this alternative, the AMHS would no longer continue to operate the *Bartlett* or *Tustumena* in Prince William Sound. Instead, service would be provided by one new high-speed vessel and one new high-powered conventional vessel. The *Tustumena* would be released for service elsewhere in the system, presumably in Southwest Alaska.

The new high-speed vessel proposed corresponds to the Fast Vehicle Ferry (FVF) design currently under development for the Southeast Alaska Transportation Plan. This vessel would have an operating speed in the neighborhood of 32 knots and a nominal vehicle (car) capacity of 34. For comparison, the *Tustumena* has an operating speed of 13.3 knots and a vehicle (car) capacity of 36. Meanwhile, the *Bartlett* has an operating speed of 13.6 knots and a vehicle (car) capacity of 29. The new high-powered conventional vessel would operate more slowly, at 15.2 knots, but it would have the same vehicle capacity (34) as the proposed new high-speed vessel.

During the peak season (a 105-day period centered on July) the high-speed vessel would be dedicated to service between Whittier and Valdez, where it would make two round trips per day. Meanwhile, the new high-powered conventional vessel would make one round trip per day between Cordova and Valdez. Table S.9 provides sample schedules for peak and off-peak seasons. A timed transfer at Valdez would be provided. Whistle-stop or scheduled service to Tatitlek would be feasible. Chenega Bay would receive service on approximately the same service frequency as is now available. Several means of serving Chenega Bay would be feasible under this alternative. The details this service would be determined through the operational scheduling process.

During the off season, the high-powered conventional vessel would be laid up or utilized elsewhere in the system, and the new high-speed vessel would make a loop among Cordova, Valdez and Whittier five days a week. The loop would alternate between clockwise and counterclockwise operations. This alternative, the only one to involve a conventional high-powered vessel, would not provide a direct, peak-season linkage between Cordova and Whittier.

Table S.9
Sample AMHS Schedule
Final Alternative 2

Peak Season (Summer)

	VDZ-WHT	VDZ-CDV
New High-Speed Vessel	2 RT/Day	
New High-Powered Vessel		1 RT/Day

Off-Peak Season (Winter)

	CDV-VDZ-WHT	
New High-Speed Vessel	5 Loops/Week	
New High-Powered Vessel		Deployed elsewhere in AMHS system

Final Alternative 3 (Preferred Alternative)

According to this alternative, during the peak season, two new vessels, rather than the *Bartlett* and *Tustumena,* would provide service to the ports of Prince William Sound. As in final Alternative 2, *Tustumena* would be released for service, presumably in Southwest Alaska.

In this alternative, both new vessels would be high-speed vessels. During the peak season, one high-speed vessel would be dedicated to service between Whittier and Valdez, where it would make two round trips per day. The other high-speed vessel would make alternating loops (one round trip per day) among the ports of Cordova, Valdez and Whittier. The off-season variant would be the same as in Final Alternative 2, that is, one of the new vessels would be laid up or utilized elsewhere in the system, and the other would make a loop among Cordova, Valdez and Whittier five days a week. The direction of the loop could alternate. Table S.10 provides peak and off-peak sample schedules.

Whistle-stop or scheduled service to Tatitlek would be feasible. Chenega Bay would receive service on approximately the same service frequency as is now available. Several means of serving Chenega Bay would be feasible under this alternative; the details of this service would be determined through the operational scheduling process. Of the final alternatives, this alternative would provide the most capacity between Whittier and Valdez; it would also be expected to produce the greatest level of revenue.

Table S.10
Sample AMHS Schedule
Final Alternative 3 (Preferred)

Peak Season (Summer)

	VDZ-WHT	CDV-VDZ-WHT
New High-Speed Vessel #1	2 RT/Day	
New High-Speed Vessel #2		1 Loop/Day

Off-Peak Season (Winter)

	CDV-VDZ-WHT	
New High-Speed Vessel #1	5 Loops/Week	
New High-Speed Vessel #2		Deployed elsewhere in AMHS system

Final Alternative 4

Final Alternative 4, like Final Alternative 3, would involve the utilization of two new high-speed vessels, rather than the *Tustumena* or *Bartlett.* As in final Alternatives 2 and 3, *Tustumena* would be released for service, presumably in Southwest Alaska.

Each of the two new high-speed vessels would make a daily loop among Cordova, Whittier, and Valdez – one in each direction. Table S.11 provides peak and off-peak sample schedules. The off-season variant is the same as Final Alternative 3. Whistle-stop or scheduled service to Tatitlek would be feasible. Chenega Bay would receive service on approximately the same service frequency as is now available. Several means of serving Chenega Bay would be

feasible under this alternative; the details of this service would be determined through the operational scheduling process..

Of the final alternatives, Final Alternative 4 provides the greatest capacity between Cordova and Whittier. However, its revenue generation estimate is lower than that of the Preferred Alternative. This is because of the significantly higher traffic demand beween Whittier and Valdez during the peak season, and the ability of a ferry devoted to that link (as in the preferred Alternative) to add overall capacity through multiple trips.

Table S.11
Sample Summer AMHS Schedule
Final Alternative 4

Peak Season (Summer)

	CDV-VDZ-WHT	CDV-WHT-VDZ
New High-Speed Vessel #1 New High-Speed Vessel #2	1 Loop/Day (clockwise)	1 Loop/Day (counterclockwise)

Off-Peak Season (Winter)

	CDV-VDZ-WHT	
New High-Speed Vessel #1 New High-Speed Vessel #2	5 Loops/Week	Deployed elsewhere in AMHS system

The Context for the PWS Area Transportation Plan

Existing Conditions

PWS Area Boundaries

The Prince William Sound area, as defined for the purposes of this regional plan, encompasses the communities of Chenega Bay, Chitina, Cordova, Seward, Tatitlek, Valdez, and Whittier. The area boundary is a broad arc whose southwestern point is located on Seward, whose northernmost point is located on Chitina, and whose southeast point is located east of Cordova at Kayak Island's Cape Saint Elias. Earlier documents in the study included the nomenclature "Copper River" to convey that this corridor was being included within the scope of the plan, as indeed it was. However, the term has led some to erroneously assume that the Copper Valley region was part of the study. To alleviate this confusion, and to leave open the possibility of including the Copper Valley communities in a separate area transportation plan, the term "Copper River" has been dropped from the plan's title.

The Prince William Sound region provides an abundance of what draws visitors to Alaska: dramatic mountain peaks and glaciers, an intricate coastline, old growth rainforest, alpine meadows, frequently seen wildlife, and interesting small towns. Sections of the Chugach National Forest and Wrangell-Saint Elias National Pak extend into the area. For the most part, the area consists of undisturbed wilderness of unsurpassed natural beauty.

Population

The region's population centers are located on the shores of Prince William Sound, which is characterized by straits, passages, ports, coves, bays, arms and deep, narrow fjords. The area population has risen steadily, from about 4,500 in 1970 to approximately 12,200 in 1996.

Economy

Economic activity in the PWS area is diverse by Alaskan standards and varies by community. While Cordova is dominated by commercial fishing, Valdez's economic mainstay is the Trans-Alaska oil pipeline terminal. Meanwhile, Seward's economy, originally focused on commercial fishing, has steadily diversified to include a state prison, a coal export facility, and a marine sea life center. Whittier will likely remain economically tied to its role as a gateway to Prince William Sound, a role that will take on added prominence with the completion of the Whittier Access Project. Chenega Bay and Tatitlek are traditional, subsistence-based communities.

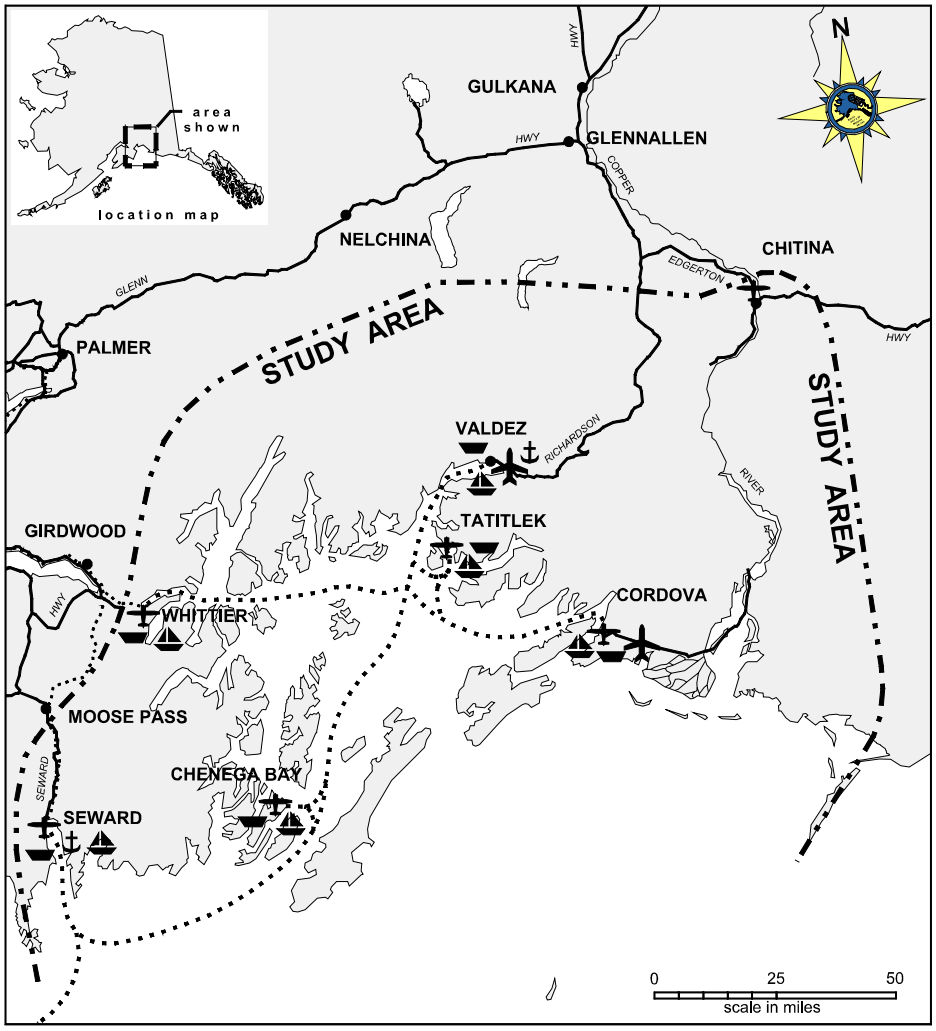
Seasonal Fluctuations in Employment

The PWS area is heavily affected by seasonal fluctuations in economic activity and employment. As in the rest of Alaska, a significant portion of the area's economic activity occurs during the summer. For instance, the summer red and pink salmon runs on the Copper River and in Prince William Sound are driving forces behind Cordova's fishing industry. Summer is also the preferred season for construction. In addition, sport fishing and tourism peak in the summer. Area employment may fall by 25 percent to 35 percent during winter months.

The Existing Transportation System

Existing transportation facilities and services are shown on Figure 1.

Figure 1
Existing Conditions



PRINCE WILLIAM SOUND REGION

Existing Transportation 2001

- State Maintained Regional Airports
- State Maintained CommunityAirfield (limited facilities)
- Alaska Railroad
- Alaska Marine Highway
- Road
- Commercial Marine Service Facilities
- Community Marine Service Facilities
- Fishing/Recreational Boat Moorage

Marine Transportation

Marine transportation is vital in the PWS area. Given the importance of Valdez as the terminus of the Trans-Alaska Pipeline, marine transportation also plays a major role in shipping petroleum products from Alaska in oil tankers.

Valdez and Seward are each equipped with commercial service facilities, the region's highest level of marine infrastructure. Commercial service facilities accommodate interstate and international cargo receipt and shipment and provide a minimum draft of -20'. Cordova, Chenega Bay, Tatitlek, Valdez and Whittier are each equipped with community service facilities, a lower level of capacity. Community service facilities, which are geared to accommodate community supply and people movement, have maximum drafts of under -20'. All of the ports mentioned in this paragraph provide berthing, offloading, and onloading facilities for the Alaska Marine Highway System (AMHS).

Alaska Marine Highway System. State-sponsored marine transportation services were originally established in Alaska to provide passenger, freight, and vehicle transportation services for Alaskan communities where highway facilities on land were not feasible.[21] In 1964, Alaska's Division of Marine Transportation began providing service to Southwest communities via the M/V *Tustumena.* Since then, the routing of this vessel has been coordinated with expanded service to the Southcentral areas (Prince William Sound) via the *Bartlett* (1970).

Two vessels, the *Bartlett* and the *Tustumena*, provide AMHS service to the ports of the PWS Area. The *Bartlett* serves Cordova, Valdez and Whittier with approximately daily service to Whittier and Valdez, and three times a week service to Cordova. The *Bartlett* also offers whistle stop service to Tatitlek. The *Tustumena* provides Cordova and Valdez with slightly less than weekly service during the summer and somewhat more frequent service (about twice weekly) during the winter. The *Tustumena* connects to Seward with the same frequency of service and offers whistle stop service to Tatitlek and Chenega Bay.

The chief disadvantages of existing ferry service include inconvenient sailings (e.g., on irregular schedules, and at odd hours, as in the middle of the night), relatively infrequent service to Cordova, which has no connection to the continental roadway network, and insufficient capacity during the peak season. A related disadvantage is the routing's relatively high operating costs relative to revenues.

Air Transportation

Air transportation is more critical in some PWS area communities than others. Communities that enjoy roadway access rely less heavily on air transport than do communities that lack roadway access. Where roadway access is poor or nonexistent, air transport is the key passenger and time-sensitive freight mode. At one end of the spectrum are communities like Seward, which enjoys road, rail, and air access to Anchorage. In Seward, the role of aviation in goods and freight movement is minor. At the opposite end of the spectrum is Cordova, which has no road connections to any other community, and where air transport is the primary means of conveying both goods and passengers.

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[21] "The mission of the Alaska Marine Highway System is to serve Alaskan communities by providing passenger, freight (van) and vehicle transportation among communities where development of a land highway system that would meet the social, educational, health and economic needs of Alaskans is not feasible. The system connects communities with each other, with regional centers, and with the continental road system. It is an integral part of Alaska's highway system, reaching many communities which would otherwise be effectively cut off from the rest of the state." (Alaska Marine Highway System, *Annual Traffic Volume Report*, pp. 1, March 1996).

Cordova and Valdez have the region's best-equipped airports, both capable of serving jet aircraft. Cordova has a 7,500-foot paved primary runway and a 1,900-foot crosswind runway. Valdez has the region's next longest paved runway, at 6,500 feet. Cordova offers precision approaches, while Valdez has a Localizer Directional Aid (LDA) to assist aircraft in approach and landing.

The remaining airports in the PWS area are listed below:

Community	Airport name	Length	Width	Surface
Boswell Bay	Boswell Bay	2,612	100	Gravel
Chenega Bay	Chenega Bay	3,000	75	Gravel
Chitina	Chitina	2,850	75	Gravel
Cordova	Cordova Municipal (Eyak Lake)	1,840 8,000	60 3,000	Gravel Water
Middleton Island	Middleton Island	1,500	125	Gravel
Perry Island	Perry Island	10,000	2,000	Water
Seward	Seward	2,279 4,240	75 100	Asphalt Asphalt
Tatitlek	Tatitlek	3,700	80	Gravel
Thompson Pass	Thompson Pass	2,530	90	Turf-gravel
Whittier	Whittier	1,480	58	Gravel

Among the chief issues in regional air transport are the cost and difficulty of moving from the region to points outside it, such as Anchorage, as well as travel between communities within the region.

Highways

Roadways connect Anchorage and the remainder of the Alaska road system at four key area locations: Seward, Whittier, Chitina, and Valdez. The region's major highways are the Seward Highway, the Richardson Highway, the Edgerton Highway, and the Whittier Access Road, which connect area communities to the continental road system. Another PWS area highway, the Copper River Highway, provides a connection between Cordova and the Copper River Delta.

Railways

The Alaska Railroad Corporation (ARRC) provides freight and passenger service on a total of 481 miles of mainline track in Alaska. The track between Anchorage and Seward runs 114.3 miles, and the Whittier spur adds another 11.5 miles. Seward and Whittier are the only communities in the area served by rail. The ARRC operates daily passenger service to Seward between mid-May and August. In addition to its passenger service, the ARRC runs approximately 20 freight trains per month on the Whittier route, as well as a rail-barge facility at Whittier. Seward is also served by several freight trains.

Potential Implications of Technological Advancements

An earlier technical memorandum in this regional planning effort considered technological advances related to transportation and their potential implications for the PWS area. Four broad areas were explored: Global Positioning Systems (GPS), tiltrotor aircraft, high-performance marine craft, and air cushion transport technology. Of these technologies, two were found to be most relevant for the area within the 2020 planning horizon: GPS and high-performance marine craft. Potential implications of these technologies are summarized in the following discussion.

Global Positioning Systems (GPS)

GPS represents one of the most important technological advances ever for improving air travel in Alaska. The GPS is a worldwide, satellite-based radio navigation system originally developed by the Department of Defense for military applications. A "constellation" of 24 satellites circles the earth, each satellite completing two orbits a day. The constellation ensures that any given user has access to between five and eight satellites from which to triangulate his or her position from any point on the earth at any given time.

The Federal Aviation Administration (FAA) is enhancing basic GPS service with improvements to make GPS the primary means of navigation for U.S. airspace – from take-off through precision approach and landing. Among GPS' chief advantages is that it greatly increases the user's flexibility in routing and operating aircraft. GPS provides greater flexibility in routing because of its greater accuracy in determining the plane's location. Aircraft currently follow directions from ground-based navigation aids, often in zigzag paths that waste time and fuel. Established air routes allow controllers to track planes' locations and to keep them at least three miles apart horizontally and 1,000 feet apart vertically. GPS advances, along with other technical improvements, will reduce or eliminate the need for aircraft to follow established routes, allowing pilots to choose the routes and altitudes that best suit the destination and flight conditions. This will improve safety and reduce fuel waste.

Implications for the PWS Area

Following the Flight 2000 initiative, on January 15, 1997, Vice-President Gore stated that up to 49 airports in Alaska would be recommended for Instrument Flight Rules (IFR) upgrade for GPS approaches. Due to topographic and runway length constraints, it is unlikely that DOT&PF would advocate for development of GPS IFR approaches at the Whittier Airport. Seward already has a GPS IFR approach established, although its use is limited to commercial aircraft. Cordova Airport has a GPS IFR approach established. Chenega Bay and Tatitlek are being considered for such approaches.

High-Performance Marine Craft ("Fast Ferries")

Over the past decade, high-performance marine craft, sometimes known as "fast ferries," have emerged as a viable transportation mode in markets worldwide. They have done so by demonstrating that they can compete successfully, both as passenger-only transportation elements and in carrying both vehicles and passengers. High-performance marine craft operations in general entail lower initial capital costs, potentially lower labor costs, but higher fuel and maintenance costs than conventional monohulls. They have advantages and disadvantages relative to conventional vessels *(*Table 1).

Table 1
Advantages and Disadvantages of High-Performance Marine Craft

Advantages	Disadvantages
1. Fast ferry implementation could allow more terminals to be served by fewer boats under existing service levels.	1. Fast ferries require approximately 3.5 times more fuel than conventional ferries with the same vehicle capacity.
2. Because of their speed, the number of arrivals and departures of fast ferries on a given route typically increases by a factor of two or more, resulting in more frequent service and higher passenger and vehicle carrying capacity.	2. Fast ferry operation requires more intensive management because of the high volume of passengers, the higher level of service provided, the general pace of operations, and the sensitivity of the highly stressed mechanical systems
3. Crewing costs are reduced because of (1) the lack of accommodation services required; and (2) route operation as day boats, which means that crews can go home at the end of the day.[22]	3. Fast ferries, which are comprised principally of aluminum, rather than steel, have service lives about half as long as conventional ferries (30 years compared to 50-60 for conventional ferries).

Implications for the PWS Area

With the advantages noted in Table 1, fast marine links between Cordova, Whittier, and Valdez could provide attractive vehicular access between those communities and Anchorage. Many of the disadvantages noted in Table 1 can be offset or partially offset. Using small vessels in a dayboat operation limits both fuel consumption and service hours (thereby prolonging years in service). Operational savings can be obtained through the use of technology (including ITS) to help automate many of the system's current management-intense functions, such as ticketing, reservations and fee computation, passenger manifest, transfers, and rebooking in case of nonsailing. The use of shore maintenance facilities and night maintenance crews to check systems and service the vessels before the next day's sailing can also reduce operations costs.

Statewide ITS and RWIS Developments and their Implications for the PWS Area

The Alaska Department of Transportation and Public Facilities (DOT&PF) has a project underway to develop a Statewide Deployment Strategy (SDS) for Intelligent Transportation Systems (ITS) in conjunction with a separate, but related Roadway Weather Information System (RWIS).[23] These complementary systems will be highly integrated to improve transportation system safety, efficiency, and cost-effectiveness in Alaska. Elements of these related systems will be applied to transportation facilities in the PWS area.

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[22] Claims regarding fast ferries' lower capital and operating costs must be qualified. While these claims are valid for routes that are too long for day boat service (i.e., >12 hours), when served by conventional displacement monohull vessels, they do not hold true where distances are short enough to operate a conventional vessel as a 'day boat,' in which case both capital and crewing costs are comparable to those of a high-performance vessel. The advantage claimed for high-speed ferries, that the "crew can go home at the end of the work day," is really an advantage of 'day boat' service. As such, that claimed advantage holds true for both conventional and high-performance ferries engaged in 'day boat' service. The true advantage of fast ferries is that they can operate as 'day boats' on longer routes because they can make the round trips faster, and under the 12-hour threshold that delimits the feasibility of such service.

[23] More information regarding the Alaska Department of Transportation and Public Facilities' SDS/RWIS effort is available at the following website: http://www.alaskaits.com.

What is ITS?

Intelligent Transportation Systems apply advanced sensor, computer, electronics, and communications technologies to transportation facilities and services. ITS can increase the transportation system's safety and efficiency, while providing users with timesaving information. ITS is not a single type of technology or management practice; rather, the term ITS serves as a broad umbrella under which many separate, but related technologies fall.

What is RWIS?

Recognizing the critical importance of weather information to transportation operations in the state, DOT&PF has set in motion a plan to implement a Roadway Weather Information System (RWIS) in concert with the SDS. Weather poses more danger and difficulty for transportation system operations in Alaska than anywhere else in the country. In recognition of the importance of weather information and forecasting, DOT&PF has moved to develop a Roadway Weather Information System (RWIS) in conjunction with its SDS. Although the standard ITS vernacular refers to "roadway" weather information, this effort will take a broader approach, encompassing marine and aviation needs as well. The main purpose of the RWIS developed as part of this effort will be to provide weather and pavement information to support maintenance and operations tasks--particularly snow and ice control.

What Types of Services do ITS and RWIS Encompass?

Among others, ITS and RWIS encompasses the following technologies and functions:

- **Traffic and transportation system management.** One example of an ITS-based traffic management technique involves the coordination of traffic signal operations in urban areas. In Prince William Sound, this application can be most readily applied to the regulation of traffic through the Whittier Tunnel, currently being done on a scheduled basis. In the future, ITS could enable this to be done on a demand basis, avoiding unnecessary waiting for the clock. Weather information can be integrated with traffic management technologies in order to set and communicate variable speed limits, based on environmental conditions.

- **Real-time traveler information** can improve intermodal coordination while providing travelers with timesaving, stress-reducing information. Automated location and tracking of ferries, for instance, is especially applicable to Alaska, where many tourists and residents rely on this mode. Existing ITS technologies can be used to provide real-time schedule and travel time information via media including the Internet, kiosks, the radio, and terminal reader boards and screens.

- **Commercial vehicle operations.** ITS can be applied to commercial vehicle operations to reduce costs to both shippers and regulatory agencies while improving public safety. These purposes can be accomplished by means of technologies that automate roadway safety inspections, allow trucks to be weighed in motion, and provide regulators with information regarding carriers' safety and compliance histories. Alaska currently has several efforts underway to improve commercial vehicle operations.

- **Incident management.** ITS innovations that support incident management include installation of cellular emergency call boxes, as well as Mayday systems. Both provide better means of linking endangered or at-risk motorists with emergency responders. Cellular emergency call boxes located along the roadway allow motorists to directly contact the nearest traffic operations or dispatch center, which can provide an immediate

response through communications with local police and other emergency responders. Meanwhile, Mayday systems rely on GPS-equipped vehicles, which can provide automatic notification to emergency responders of affected motorist's location and incident severity. Where incidents occur in rural areas response time is critical in protecting human life. Given the long distances between communities in Alaska, Mayday systems may be particularly applicable.

SDS/RWIS Implications for the PWS Area

Although the SDS/RWIS is still being planned, there are several likely implications for the PWS area, including the following:

- Elements of the SDS/RWIS will be applied on PWS area highways, including the Richardson and Seward highway corridors.

- Full-time digital communications network linking AMHS reservations, operations center, vessels and terminals to provide "real-time" vessel arrival and departure times, seating and car space availability and other operational information to employees, system managers, and the public are likely to become available.

- Weather roadway information systems designed to provide both "travel advisories" to the public and optimal snow and ice removal timing to maintenance forces will be developed. Marine weather information systems will be developed to aid in determing whether a ferry should sail, delay, restrict or cancel its scheduled run.

- Real-time public information about transportation system availability provided through one or more of the following media: Internet access; public message signs on highways, vessels, or terminals; local radio broadcasts; and personal digital assistants will become available.

- Automated or semi-automated vehicle weighing, sizing, and ticketing applications for vehicles entering terminal sites will become available.

Establishing the Planning Framework

Assessment of existing conditions, potential environmental issues, and transportation-related technological advances was an important step in establishing the context, or environment in which the PWS Area Transportation Plan would take shape. The next major phase of the project involved establishing the framework for the plan.

This framework included articulation of goals and objectives for the plan reflecting the perspectives of the region's stakeholders as well as the DOT&PF mission; development of travel demand forecasts by origin and destination for both freight and passengers; and identification of existing and predicted transportation system needs and deficiencies. Separate technical memoranda were prepared corresponding to these tasks. Highlights from these technical memoranda are provided in the following text for the reader's convenience.

Goals and Objectives

Goals and objectives for this regional plan were developed in consultation with the Prince William Sound Area Transportation Plan Advisory Committee. The goals and objectives established emphasize more convenient, safe, and efficient transportation based on reliable transportation revenue sources. As will be apparent in a later section describing the process and criteria developed for evaluating the initial and final alternatives emerging from this plan, these goals and objectives formed the basis of the evaluation criteria for this regional transportation plan. The established goals for the PWS Area Transportation Plan are listed in Table 2.

These goals and objectives helped to give direction to the overall planning Prince William Sound Area Transportation planning effort. A caveat to keep in mind is the fact that total devotion to any particular goal can only come at the expense of others. For instance, total focus on system convenience (Goal 1) could only be accomplished to the detriment of system efficiency (Goal 2), safety (Goal 4) and the protection of resources (Goal 7). For planning purposes, each individual goal or objective was viewed in the context of the entire list.

Table 2
PWS Area Transportation Plan Goals and Objectives

GOAL	ASSOCIATED OBJECTIVES	
Goal 1. Improve Transportation Convenience	• Improve connections and scheduling between transportation modes to reduce waiting times • Implement faster modes of transportation to reduce the time required to travel between communities • Improve connections between communities when it is warranted by both need and community support	• Provide mechanisms for the dissemination of current travel information so travelers can plan more convenient trips • Involve communities and stakeholders at all stages of schedule development for the AMHS
Goal 2. Enhance Transportation System Efficiency	• Provide regional transportation facilities and services in the most efficient and cost-effective way possible • Provide missing intermodal links which would enhance the efficiency of the transportation system • Minimize transportation system directional flow imbalance by identifying means to exploit backhaul potential • Improve connections and scheduling between transportation modes • Maximize occupancy/ridership per trip on existing facilities or services • Encourage the use of vehicles with flexible passenger/freight interchangeability • Implement appropriate instrumentation and technological advancements to enhance system efficiency • Provide mechanisms for the dissemination of current travel information so travelers can plan their trips more efficiently	• Build appropriate institutional relationships involving public and private sector users, providers and regulators of the PWS area intermodal transportation system for ongoing dialogue on the efficiency of the system • Explore options to increase competition in the provision of transportation services in the PWS area • Utilize equipment designed to serve specific travel markets in the most efficient manner • Use "life-cycle" financial analysis to determine the tradeoffs in capital investments to minimize ongoing operating and maintenance (M&O) costs • Utilize AMHS vessel data to identify those projects that will provide the maximum reduction in long-term M&O costs • Identify existing facilities or services not needed in the future
Goal 3. Secure Stable, Long-Term Transportation Funding	• Promote reliable revenue mechanism that provide adequate funding improvements to the existing transportation system • Encourage responsible public ownership that recognizes the value of facilities as well as the costs associated with owning them, and provides mechanisms to ensure that they are funded adequately, commensurate with need.	• Provide transportation services and facilities through local and regional partnerships that do not depend solely upon the allocation of funds through the Legislature • Use the Alaska Transportation Infrastructure Bank to provide loans to state and local governments for revenue-generating public highway projects
Goal 4. Improve Transportation System Safety and Reliability	• Implement fully the national Highway Safety Improvement Program • Identify solutions to safety problems in aviation; i.e., through improved weather information and navigational aids to aviation I • Implement appropriate instrumentation and technological advancements to enhance system reliability	• Improve connections and scheduling between transportation modes to enhance travel reliability
Goal 5. Enhance System Adaptability and Flexibility	• Prioritize transportation improvements based on long-term needs • Provide opportunities for making intermodal connections • Review and update master plans for regional class airports on a regular basis and for other airports as needed • Review and update the PWS Area Transportation Plan periodically as appropriate • Identify data collection needs and develop transportation system performance monitoring	• Encourage the use of vehicles with flexible passenger/freight interchangeability • Maintain or acquire right of way for potential future transportation uses • Implement appropriate instrumentation and technological advancements to enhance system flexibility • Provide mechanisms for the dissemination of current travel information so travelers can plan their trips more efficiently
Goal 6. Assure the Preservation of the Needed Transportation System	• Promote reliable revenue mechanisms that provide adequate funding for M&O of the existing and future transportation system • Implement institutional changes and provide training and skills development at the local government level to allow local M&O of selected transportation facilities	• Balance the amount of fees or revenue generated by specific facilities/services to the amount spent for the preservation, operation, and maintenance of those same facilities/services
Goal 7. Develop and Protect Economic and Subsistence Resources	• Increase access where desired and needed to facilitate economic development • Minimize environmental impacts of the transportation network • Maintain environmental integrity of PWS area and the value of wilderness areas • Manage access to subsistence sites • Improve access to marine launching sites or dock facilities	• Develop functional access plans that reflect local plans for economic development and local residents' needs • Use transportation infrastructure to enhance desired regional economic development • Include affected business interests in decisions about transportation system needs and investments
Goal 8. Provide Early, Meaningful and Continuous Public Involvement	• Follow the revised Public Involvement Procedure for the development of statewide plans and statewide capital improvement programs • Involve citizens and stakeholders groups, including affected business interests, in transportation decision making • Coordinate the nomination and selection of transportation projects with local governments	• Involve communities and stakeholders at all stages of schedule development for the AMHS • Give priority to projects where a preponderance of public records, including a resolution from the local elected body, shows support for the project

Travel Demand Forecasts

Passenger and freight travel demand forecasts were prepared for each transportation mode for the years 2010 and 2020. These demand forecasts were further refined as the most promising transportation alternatives emerged. The demand forecasts developed relied on population forecasts developed by Scott Goldsmith at the Institute of Social and Economic Research (ISER).[24] Reproduced in Table 3 are the population forecasts by community. The demand estimates also utilized employment projections as an independent variable in the model.

Table 3
PWS Area Existing Population and 2010 and 2020 Forecasts

	Existing	2010			2020		
Community	**2000**	**Low**	**Base**	**High**	**Low**	**Base**	**High**
Chenega Bay	86	88	92	100	86	95	106
Chitina	123	132	139	153	147	163	186
Cordova	2,466	2,593	2,772	3,113	2,773	3,172	3,655
Seward Area	4,660	4,798	5,109	5,703	5,214	5,927	6,784
Tatitlek	107	115	123	138	123	141	162
Valdez	4,036	4,442	4,743	8,030	4,798	5,485	7,905
Whittier	182	278	568	1,017	352	865	1,660
Other	88	94	100	112	100	114	130
PWS Area	**11,748**	**12,540**	**13,646**	**18,366**	**13,593**	**15,962**	**20,588**

In addition to the demand generated by PWS area residents, visitors comprise another very significant source of demand for transportation services and facilities. This rapidly growing source of transportation system demand is expected to jump to unprecedented levels with the completion of the Whittier Access Project. Given the importance of visitor demand, a special effort was undertaken to project this element of transportation demand specifically. As such, Christopher Beck and Associates, who specialize in tourism consulting, analyzed trends in demand and prepared visitor travel demand projections.[25] Table 4 summarizes these visitor growth projections for the PWS area, as well as the underlying assumptions upon which they are based.

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[24] Dr. Goldsmith's forecasts were presented in *Economic/Demographic Projections for Selected Regions in Alaska*, prepared for the Alaska Department of Transportation and Public Facilities (August 1997).

[25] *Prince William Sound/Copper River Area Transportation Plan Travel Demand Forecasts Technical Memorandum Revised Draft, Appendix A* "Prince William Sound/Copper River Area Tourism Growth Projections," Christopher Beck and Associates (November 1999).

Table 4
Summary of Visitor Travel Demand Projections and Underlying Assumptions

Scenario	Annual Growth Rate	Assumes
Low Growth Scenario	1%-2%	• Much less rapid rate of growth than recent years • Slowdowns in economic growth in Alaska, the Lower 48 and globally • Continued changes in national travel trends, including the shift toward vacations closer to home and of shorter duration • Stable state population • Continued improvements at competing destinations • Few changes in the area "tourism infrastructure," such as new access, accommodations, and attractions • Continued reductions in statewide tourism marketing
Medium Growth Scenario	3%-4%	• A pace of growth similar to what occurred in Alaska during the last half of the 1980s • Economic and population growth and improvements to tourism midway between the low and high growth scenarios
High Growth Scenario	6%-8%	• Sustained economic growth in Alaska, the Lower 48 and globally • Steady population growth in Alaska • Expansion of statewide regional cooperative marketing programs • Major new attractions in area communities, such as natural or cultural history centers, chairlifts/trams – commensurate increases in accommodations • New overnight and day use destinations outside area communities, such as lodges on Native and public lands • Improved ferry access in PWS, creating quick, convenient, daily service linking Whittier, Valdez and Cordova • Steady growth in visitors to the Copper River Basin and Wrangell St. Elias National Park • Completion of a tourism plan as part of the USFS Chugach Plan revision so that the Chugach Forest/PWS can accommodate substantial increases in tourism in some areas, without significantly disrupting the area's natural attractions (wildlife, scenery, sense of wilderness) and without displacing wilderness-oriented commercial and private users.

Summarized in Table 5 are the area-wide results for 2020 of the travel demand forecasting process. The full report, *Prince William Sound/Copper River Area Transportation Plan Travel Demand Forecasts Technical Memorandum Revised Draft* (November 1999) should be referenced for complete results (including the 2010 forecasts and separate forecasts by community), as well as an explanation of the underlying methodologies.

Table 5
Summary Results of Initial Travel Demand Forecasts (Area-Wide) by Mode for 2020

Transportation Mode	Existing	Low	Base	High
Aviation (Annual Person Trip Ends—i.e., enplanements plus departures)	100,534	114,299	130,475	175,637
Highways (Annual Vehicle Trips)*				
Whittier Road**	NA	600,000	850,000	1,200,000
Seward Highway	600,000	--	1,100,000	1,450,000
Richardson Highway	290,000	--	590,000	800,000
Edgerton Highway	100,000	--	240,000	375,000
Alaska Marine Highway System (Annual Person Trip Ends—embarkations plus debarkations)***	61,949	110,839	191,238	421,099
Freight (tons)				
Petroleum	81,724,000	25,401,900	51,679,200	81,831,400
Fish Product	37,100	29,400	37,100	41,600
Other Products, Including Mail	629,900	640,200	652,200	681,300

*Demand forecasts for area highways were developed by setting forth projections based on (1) trend linear growth; and (2) trend growth. The trend growth method provides higher forecasts; as such, the trend growth estimates are used to represent the high case, and the trend linear estimates are used to represent the base case. A low case is therefore not provided for the highway demand estimates.

**Demand estimates for the Whittier Road were not developed as part of this study effort. Rather, they were taken from the *Whittier Access Project – Viable Alternatives Report*, which as prepared for the Alaska Department of Transportation and Public Facilities in January 1994.

***These initial demand estimates were subsequently refined considerably, to take into account specific AMHS alternatives, variance by time of year, and demand elasticity as a function of various service parameters.

Purpose and Need

The observed dissatisfiers in Prince William Sound transportation coupled with the plan goals (articulated with the help of the plan's Advisory Committee) provided the starting point for the development of the Purpose and Need Statement for the Plan. The Purpose and Need Statement for a transportation project is the foundation statement describing what is to be improved and why. It serves as a very important screening tool in considering and reviewing transportation alternatives. Those alternatives that reasonably satisfy the Purpose and Need are considered viable solutions to the transportation issues at hand. Those alternatives that do not are rejected from further evaluation in the National Environmental Policy Act (NEPA) project development process.

Since state transportation projects are constructed to meet public travel needs, their primary purpose is to serve the *best overall public interest*. Accordingly, the process used to prepare the PWS Transportation Plan relied extensively upon the public expression of transportation needs. Rather than develop a statement of need from the expressions of transportation planners or engineers, or even selected stakeholders (which may not represent the best overall public interest) this plan began with a broad-based, very representative expression of transportation improvements desired by the public in this region.

The primary regional source for guidance came for the plan's Advisory Committee. The Committee was comprised of mayors, or their delegates, and tribal leaders from communities throughout the PWS region. These public officials provided a solid source of guidance on transportation concerns, ideas and issues related to the communities they represented.

A second source of this guidance was a survey of households from the roadless communities in the planning region (Cordova, Tatitlek, and Chenega Bay), completed in October 1998. Survey respondents were asked questions about their personal travel patterns and about transportation issues and priorities. This statistically valid sample of residents from these communities clearly indicated several discrepancies between desired transportation and the structure of existing transportation service.

A source of statewide guidance was provided through the *Customer Satisfaction Survey* about the state transportation department's services. This survey, conducted in June 1998 by the Dittman Research Corporation of Alaska, contained several questions about the Alaska Marine Highway System, and offered a statewide perspective on regional transportation. This survey was based on a statistically valid sample of 512 respondents.

Finally, direct public input received on the draft plan through public meetings, and several written communications from residents and organizations provided an important public expression of transportation need. The high level of support for the plan further supports the state's decision that this plan represents the *best overall public interest*.

Aside from simply serving the public interest, defining an operating strategy for the region's transportation system that meets the public's expectation is simply good business. Meeting these expectations should lead to increased ridership, adding to revenue and reducing the level of state support needed to sustain the ferry system. Many of the local leaders in the planning region noted the importance of a sustainable transportation system throughout the planning process. Based on these various sources of public input Purpose and Need Statement for this project was prepared.

Purpose and Need Statement for Prince William Sound Transportation Plan Improvements

To improve intra- and inter-regional connectivity by increasing transportation capacity to meet demand, improving transportation service and flexibility in several measures, and reducing total costs to users and the state.

The purpose and need concepts included in Table 6 collectively express the purpose and need of individual projects stemming from this regional transportation plan. Overall, the final transportation plan has largely met these public expressions of Purpose and Need.

Table 6
Purpose and Need for Transportation in Prince William Sound

Concept	Purpose and Need Strategy	Transportation Concept	Source of Public Expression
System Capacity	Provide capacity to meet the total transportation demand, in peak season and off-peak season.	Implement "scalable" system in which capacity can be added relatively easily on a link-by-link basis. Increase route carrying capacity, particularly for vehicles, during summer season. Use a more scalable system to adjust capacity to accommodate demand swings between winter and summer.	AMHS reservation system has noted that the ferry system frequently does not meet summer demand due to current capacity limitations. Winter service is frequently criticized due to low sailing frequencies.
Ferry Service	Regular, Repeatable Schedules	Offer ferry trips on a repeatable schedule. Structure the ferry system based on "point-to-point" routes that operate on a fixed, daily schedule.	Non-road Survey: This need is inferred from comments expressed in the survey about the desire for convenient time-of-day service and for more sailings. The Customer Survey also found that current ferry schedules and the inconvenient (non-waking hours) departure times are the two least satisfactory features of the AMHS. Advisory Committee Input: Comments received at meetings cited this need frequently.
Ferry Service	Frequency of Service	Increase number of port calls, particularly in ferry-dependent communities. Provide needed link capacity with smaller vessels, operating more frequently. Offer a more scalable system that allows better ability to match capacity to seasonal demand changes in different parts of the regional ferry system.	Non-road Survey: the desire for more sailings was cited in all communities among best ways to improve service. Public Input: Lack of service on many winter days is a major complaint of the current system, which is built around a single conventional vessel operating on through routes and serving both PWS and Kodiak-Kenai.

Table 6 (Con't)
Purpose and Need for Transportation in Prince William Sound

Ferry Service	Waking hour departures and arrivals	Dayboats, operating on 12-hour schedules can readily fit a schedule with vessels that depart and arrive during waking hours.	Customer Survey: the two items with the lowest level of public satisfaction were the ferry schedules and time of day of vessel departures. Advisory Committee Input: Comments heard during the planning process often cited problems with schedules and middle of the night arrivals/departures.
Ferry Service	Reduce overall travel time	Decrease travel time through any of the following methods: converting water links to road links, adding fast ferries, and avoiding tidal restrictions where possible.	Non-road Survey: nearly every community strongly supported faster trips and a preferred destination, which implies that total travel time is a major consideration in trip-making decisions.
Ferry Service	Roundtrips	Offer the opportunity to depart and return home from the same destination	Advisory Committee Input: The inability in some cases to make a roundtrip due to ferry routes was a cited as a strong disincentive to ferry use.
Transportation System Costs	Reduce overall costs to the public and state	Dayboats operate with fewer crewmembers, making operating costs lower. Employ existing and short extensions of new roads in order to reduce ferry route distances and thereby reduce customer costs since roads are less costly to use than are ferries. Increase ferry system ridership and fare revenue by making the system more attractive to users in terms of frequency, travel time and convenient time of day operations (increase overall level of trip making by residents and visitors). Decrease operating costs by using smaller, less costly ferries.	The Advisory Committee frequently expressed the need to reduce the level of user costs and state costs as a defining goal of the plan. The level of state support provided to operate the system has been reduced repeatedly by the state legislature, resulting in reduced ferry service levels. A more self-sufficient system is more sustainable, ensuring service over the long term.

Alternatives Development and Evaluation

The Alternatives Development Process

The development of transportation alternatives for the PWS Area Transportation Plan was an iterative process, the first step of which was development of a list of initial alternatives. This list was trimmed, added to, and refined in meetings between the PWS Area Transportation Plan Advisory Committee and the DOT&PF/consultant team.

The consultant team developed a set of initial alternatives based on consideration of multiple sources, including the following:

- The Transportation Plan's goals and objectives, documented in the *Prince William Sound/Copper River Area Transportation Plan Goals and Objectives Technical Memorandum* (July 1998);
- A review of PWS-related planning documents and studies[26];
- The Advisory Committee's ongoing comments and suggestions;
- Suggestions relayed by DOT&PF Statewide Planning based on November 7, 1998 meeting with Prince William Sound area mayors;
- Results of a survey administered to residents of Cordova, Chenega Bay, and Tatitlek[27];
- The consultant team's analysis of existing and potential service

A Note on the Focus on Marine Alternatives

In this regional transportation plan, the focus and bulk of the analyses are on marine alternatives. This focus is attributable to several factors, the most obvious of which is the area's geography. The PWS area's principal communities lie along the coast and islands of Prince William Sound and are more easily and directly connected by sea than over the area's mountainous terrain.

Another reason for this focus is the fact that DOT&PF has more direct control over marine service than it does over aviation. While the State owns and operates the Alaska Marine Highway System, it does not own or operate the airline system. What determines the levels and quality of service experienced in the region is primarily a function of the market in which the airline industry functions. As such, the State's role in air transportation focuses on the provision of airport facilities – their construction, maintenance and operations. While this duty represents a significant expenditure of funding and effort, the State remains limited in the extent to which it can induce airlines to serve communities at all; much less dictate schedules, fares, or routes.[28]

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[26] Among the documents reviewed were the following: *Whittier Access Project, Viable Alternatives Report*, January 1994; *Alaska Marine Highway System Master Plan*, July 1991; *Service Alternatives for AMHS Service in Prince William Sound*, February 1994; *Economic Impacts of the Copper River Highway*, ISER, June 1993; *Whittier Access Project Revised Draft EIS,* May 1995; *AMHS Fast Passenger Vehicle Ferry Optimization Study,* July 1995.

[27] *Cordova, Chenega Bay, and Tatitlek Ferry Use Survey, Draft Report*, prepared for the Alaska Department of Transportation and Public Facilities by Northern Economics and Parsons Brinckerhoff, in association with The Glosten Associates (October 1998).

[28] The Federal government, too, plays a role in ensuring that air service is available to communities in Prince William Sound, and other parts of the state and country, where it would not otherwise be profitable. Since airline deregulation in 1978, Congress has appropriated funding for the Essential Air Service (EAS) program, which provides private airlines with subsidies to serve specified communities at specified levels of service, for a negotiated subsidy. Without this subsidization, air service in the region would be lower.

Moreover, provision of marine service is less environmentally and socially sensitive than is the building of new highways. The State faces considerable environmental and community constraints when it comes to major new roadway building efforts. The Copper River Highway is a key case in point. This set of alternatives (one highway along any one of three possible routes) has been the subject of many studies and analyses. Inclusion of the Copper River Highway alternative in this planning effort will allow consideration of the extent to which some ferry service alternative, however configured, might compare – in terms of cost, reliability, convenience, level of service, and capacity – to a Copper River highway. In addition to the Copper River Highway alternative, yet another overland alternative was explored as part of this regional planning effort – a Copper River railroad.

Thus, while the very economic structure of the airline industry limits the State's ability to shape air service, and while environmental and social issues constrain the State's ability to build major overland infrastructure, the State has considerable influence over marine transportation. It is for this reason, among others, that marine alternatives figure so prominently in this set of options.

The Initial Alternatives

The initial transportation alternatives developed for the PWS Area Transportation Plan are summarized below for the reader's reference. [29]

Copper River Highway Alternative

Key Elements of the Alternative

- Build the Copper River Highway to Federal standards with a crushed gravel surface, two ten-foot lanes, and four-foot shoulders
- Three route alternatives, each of which shares the first 82 miles from Cordova: (1) Tasnuna Route; (2) Tiekel Route; (3) Wood Canyon Route
- The Copper River Basin is generally rugged, with numerous small streams having steep gradients and high sediment loads; as such, localized inundation, erosion damage, ice damage and heavy sediment deposition would pose maintenance issues
- Capital cost estimates for construction of the Copper River Highway range from $182 million to $237 million
- Annual maintenance costs are estimated at between $1.1 and $1.2 million per year; and the feasibility of year-round operations are uncertain
- A significant portion of Cordova's residents oppose this alternative
- Compared to marine alternatives, perceived potential environmental impacts are much greater

[29] These alternatives are fully documented in *Prince William Sound/Copper River Area Transportation Plan*, *Preliminary Transportation Alternatives Technical Memorandum*, prepared for the Alaska Department of Transportation and Public Facilities by Parsons Brinckerhoff, HDR Alaska, The Glosten Associates, and Ogden Beeman & Associates, in association with Northern Economics (February 1999).

Copper River Railroad Alternative

Key Elements of the Alternative

- Build a rail connection between Cordova and Chitina – alternative includes track work and stations
- Rebuild the abandoned rail track between Cordova and Chitina
- Rail line would require dozens of bridges and culverts – each of which would entail expensive design, construction, and maintenance costs
- Staffed depots at each end of selected route would require access to power, water, and wastewater utility infrastructure, which is not now available at these locations.
- Capital cost estimates for construction of the Copper River Railroad range from $291 million to $560 million
- Annual maintenance costs are estimated at between $2.8 and $3.0 million per year, not counting administrative costs.
- This railroad could theoretically transport freight to ships at the deep-water port at Shepard Point. However, it is difficult to envision sufficient demand for freight transport without extending to the Alaska rail system. The railroad concept lacks a number of essential elements for successful railroad economics. These include: (1) high-yield resources that are available year round, (2) a substantial market for the resources at the other end of the line, (3) willing investors to assume the risk, (4) significant backhaul potential, and (5) suitable terrain. In short, the concept is economically non-viable.

The Marine Alternatives

The marine alternatives developed for this effort fall into three categories: (1) alternatives that rely entirely upon vessels already owned and operated by the AMHS; (2) alternatives that serve the area with new vessels; and, (3) alternatives that rely upon a combination of existing AMHS vessels and new vessels. The initial alternatives include nine build alternatives and a baseline alternative, which represents existing conditions. The alternatives are structured around a set of variables that includes the following:

- ports of call
- vessel types and combinations
- patterns and direction of service
- schedule
- weeks per year of service
- convenience
- service frequency

A Note on Ports Served under the Initial Build Alternatives

The marine alternatives that are centered on the fast-ferry dayboat concept would not continue to provide AMHS service to Seward via Prince William Sound. A few words regarding the proposed discontinuation of service to Seward in conjunction with AMHS service in Prince William Sound are in order.

The completion of the Whittier Access Project weakens the case for continued AMHS service to Seward. Up until now, the Seward ferry has provided Prince William Sound residents with vehicular access to Anchorage and the Kenai Peninsula. However, opening the tunnel will provide a faster, cheaper means of connecting PWS communities with Anchorage and other areas outside the region. Further, AMHS traffic between Seward and other communities in Prince William Sound is comparatively low, with less than 3,000 annual passenger trips (not including trips between Seward and Southwest Alaska). This compares to over 28,000 annual AMHS passengers trips to and from Valdez (a community about the same size as Seward), nearly 12,000 annual passengers trips to and from Cordova (a community only 60 percent as large as Seward), and over 19,000 annual passenger trips to and from Whittier.

Clearly, AMHS service to Seward benefits the city by bringing seasonal tourist traffic, and many visitors use this service to make a loop trip around Prince William Sound (in part by AMHS ferry and in part along the Glenn Highway). However, operation of this service requires a sizable subsidy from the State's general fund, and it is inconsistent with AMHS's objective to not duplicate roadway options, which must also be funded by the State. Nonetheless, continued service to Seward is provided under several of the initial marine alternatives described herein. However, the evaluation process documented herein revealed that these alternatives performed poorly in terms of their Measure of Effectiveness Score relative to cost. As such, these initial alternatives were not carried forward as final alternatives.

The State is investing significant capital in the roadway network that links Seward to Alaska's inland roadway system. Between FY 1997 and FY 2001, the State obligated nearly $28 million worth of improvements – including roadway rehabilitation, bridge work, widening, waysides and rail-highway grade separation – for that portion of the Seward Highway from Seward north to Whittier Access Road. These serve to greatly facilitate surface access between Seward and the PWS communities through Whittier. The State is also investing considerable resources in other highways in the PWS area. The State obligated nearly $90 million towards Whittier Access Tunnel and Road improvements since project inception in 1993, and the improvements on the Richardson Highway that lie within the planning area obligated from FY 1997 through FY 2001 total nearly $17 million.

Development of the Initial Marine Alternatives

In general, new vessels proposed in the build alternatives are conceived to be dayboats because their operating costs are generally lower. On dayboats, the crew shift is restricted to no more than 12 hours, and the crew is presumed to return to its homeport at shift's end. Service day models include an 8-hour service day, a 12-hour service day, and a 16-hour service day (with a crew change in the middle of the service day). The 16-hour service day with crew change would require that the vessel be capable of accomplishing a round trip (return to homeport) within eight hours. Service days are presumed to begin with a 30-minute start-up period before departure and to end with a 30-minute shutdown period following arrival. Start-up and shutdown may be accomplished in parallel with vehicle and passenger loading/unloading.

The approach to the development of the initial alternatives was to consider how much (auto-carrying) capacity and what level of service between specific ports could be provided at what cost. Capital costs and maintenance and operations (M&O) costs were calculated separately, at varying levels of service demand. For existing conditions, costs were calculated based on actual historical data of costs incurred. For new alternatives, which represent significant departures

from existing service patterns, the model developed for the *Whittier Access Marine Update*[30] was adapted for use in this effort. This complex model is broken into two subsections. The first projects acquisition costs, which are primarily a function of vehicle capacity and propulsion. The second projects detailed M&O costs, which include crew costs by position; fuel and lube oil; insurance; and personnel services (in short, everything the State accounts for, with the exception of capital recovery). The model was developed for vessels with service speeds of 30 to 42 knots, and capacities of 45 to 200 vehicles. Table 7 summarizes key aspects of each of the initial marine alternatives.

Photo: Whittier

[30] For a full description of this methodology, see the Glosten Associates' *Juneau Access Marine Update*, prepared for the Alaska Department of Transportation and Public Facilities (February 1999).

Table 7
Synopsis of Initial Marine Alternatives

	Vessels	Basic Parameters	Considerations/Disposition of Alternative
1a	Tustumena and Bartlett	• This is the no-build alternative; simply replicates existing conditions	• Provides means of Baseline comparison against build alternatives • *Bartlett* will require many capital improvements, so costs are significant • Existing capacity is constrained • Existing schedules are inconvenient
1b	*Tustumena* and *Aurora*	• Existing conditions, except that the *Aurora* replaces the *Bartlett*	• Developed because Aurora may be released from service in Southeast Alaska • *Aurora* has slightly more capacity than *Bartlett* and is somewhat faster • *Aurora* is a side-loading vessel, while *Bartlett* is a bow/stern loader. Valdez and Whittier have bow/stern loading terminals, which are suitable for the *Bartlett* only. If *Aurora* were shifted to service in Prince William Sound, vehicles would have to back off the ship at one end.
1c.1	Existing vessels, but provide 11 service weeks per year, using *Bartlett*	• Existing conditions, but use *Bartlett* to provide 45 weeks of service vs. current 34	• Would provide an increase in winter service levels by providing service to Whittier an additional 11 weeks per year • Provides additional capacity using existing vessels • Does not address need to increase capacity during peak • *Aurora* is a side-loading vessel, while *Bartlett* is a bow/stern loader. Valdez and Whittier have bow/stern loading terminals, which are suitable for the *Bartlett* only. If *Aurora* were shifted to service in Prince William Sound, vehicles would have to back off the ship at one end.
1c.2	Existing vessels, but provide 11 service weeks per year, using *Aurora*	• Existing conditions, but uses *Aurora* to provide 45 weeks of service vs. current 34	• Like 1c.1

Table 7 (continued)
Synopsis of Initial Marine Alternatives

2a	Two new vessels, either high-powered or high-speed	• New vessels homeported at Cordova, Valdez or Whittier • Daily timed transfer at Valdez	• Only means by which a "dayboat" concept could be implemented using conventional vessel technology • Although cost competitive with fast ferry alternatives, service levels are not as high, which affects revenue generation prospects
2b	One new high-speed vessel	• Dedicated port service; new high-speed vessel would sail daily among Cordova, Valdez, and Whittier; with direct links between Cordova and Valdez, and Valdez and Whittier	• No direct link between Cordova and Whittier • All three ports are served daily, on a consistent schedule • Alternative performs well in terms of service level and cost
2c	One new high-speed vessel	• Daily loop service among Cordova, Valdez and Whittier • Direction alternates day to day	• Unlike 2b, Cordova is directly linked with Whittier • A disadvantage is that an overnight layover would be required for the route without alternating service
2d	One new high-speed, one new high-powered vessel	• High-speed vessel provides two round trips per day between Whittier and Valdez • New high-powered vessel makes one daily roundtrip between Cordova and Valdez. • Timed transfer at Valdez feasible	• New high-powered vessel would have to have a service speed of at least 15.2 knots for Cordova-Valdez service element • Service between Whittier and Valdez would require a service speed of 36.8 knots
3a	One new high-speed vessel; *Bartlett* or *Aurora* to supplement	• One new high-speed vessel provides loop service among Cordova, Valdez and Whittier, supplemented by *Aurora* or *Bartlett* six days a week during peak season	• Represents the "do-everything" scenario (provides high capacity and two port calls per day o the Whittier origin-destination pair, except Chenega Bay, which is served once a week • Disadvantage is its very high cost

Fatal Flaw Screening

All of the initial alternatives were subjected to a fatal flaw screening. The alternatives were screened against three criteria: operational feasibility, financial feasibility and community acceptability. The results of this screening are contained in Table 8. The study team, in consultation with the PWS Area Transportation Plan Advisory Committee, determined that two of the initial alternatives, the Copper River Highway and the Copper River Railroad, were fatally flawed.

Table 8
Fatal Flaw Screening Results

	Operationally Feasible	Financially Feasible	Acceptable to Affected Communities
Marine Alternatives			
Alternative 1a – Baseline	Y	Y	Y
Alternative 1b – Replace *Bartlett* with *Aurora*	Y	Y	Y
Alternative 1c – 45-Week Service *(Bartlett)*	Y	Y	Y
Alternative 1c – 45-Week Service (*Aurora*)	Y	Y	Y
Alternative 2a – Timed Transfer at Valdez	Y	Y	Y
Alternative 2b – Dedicated Port Service by New High-Speed Vessel	Y	Y	Y
Alternative 2c – Loop Service by New High-Speed Vessel	Y	Y	Y
Alternative 2d – Dedicated Port Service by Two New Vessels	Y	Y	Y
Alternative 3a – Combination of Existing Equipment and New High-Speed Vessel	Y	Y	Y
Overland Alternatives			
Copper River Highway	Y	N	N
Copper River Railroad	N	N	Not assessed

Initial Alternatives Evaluation Process and Criteria

As noted above, the Copper River Railroad and Copper River Highway alternatives were removed from further consideration based on their failing the fatal flaw screening. Only the marine alternatives were carried forward for evaluation. The evaluation process and criteria used to determine which of the service concepts were most promising were described in a separate technical memorandum, the *Prince William Sound/Copper River Area Transportation Plan Evaluation Process and Criteria Technical Memorandum* (January 1999).

The alternatives were scored according to the weighted measures of effectiveness (MOEs) contained in Table 9. These MOEs integrate the goals and objectives set forth for the Prince William Sound Area Transportation Plan with the project evaluation standards used by DOT&PF to rank projects for the Statewide Transportation Improvement Plan (STIP).

To relate the resulting weighted MOE scores to each alternative's costs, a value index score was then calculated for each initial alternative. Value index scores for each initial alternative were calculated by dividing weighted MOE scores by a metric capturing each alternative's capital and operating costs for unit served. Costs per unit served were arrived at by dividing each alternative's costs by a travel demand estimate specially tailored to that alternative. These travel demand estimates were reported in a separate technical memorandum, *Prince William Sound/Copper River Area Transportation Plan Travel Demand Forecasts Revised Draft* (November 1999). The value index score took into account both capital and operating costs.[31]

The results of the evaluation of the initial alternatives, including both MOE and value index scores, are summarized in Table 10. Systematically comparing the effectiveness of each initial alternative to cost per unit served was useful in establishing several points:

- The three highest-ranking alternatives – 2d, 2b, and 2c – were all based on a service concept that would replace conventional AMHS vessels with new fast-ferry technology. The lowest ranking alternatives were those that attempt to improve service in Prince William Sound by redeploying existing vessels or by reconfiguring service schedules without adding new higher-speed vessels.

- The Baseline Alternative in fact entailed significant capital costs because of needed capital improvements for existing vessels, which are decades old.

- Replacing the *Bartlett* with the *Aurora* as a means of improving service in Prince William Sound provided no advantage in terms of benefit relative to cost. In fact, this alternative scored below the Baseline Alternative.

- While 3a, which would supplement an existing vessel with service by a new high-speed vessel scored higher than alternatives that had no new vessels, it did not score as high as did alternatives with two new vessels. Both capital and operating costs for this alternative were quite high.

[31] The MOE scoring and results are fully documented in *Prince William Sound/Copper River Area Transportation Plan Evaluation of Alternatives Technical Memorandum*, prepared for the Alaska Department of Transportation and Public Facilities by Parsons Brinckerhoff, in association with Northern Economics, Inc., The Glosten Associates, and Ogden Beeman & Associates (May 2000).

Table 9
MOEs, Weighting and Scoring Criteria for the Evaluation of Initial Alternatives

		Scoring Criteria				
MOE	**Weight**	**(5)**	**(3)**	**(0)**	**(-3)**	**(-5)**
1. Improves Intermodal Transportation	2	Greatly improves the connection between modes, and provides an increase in service.	Moderately improves the connection between modes, may provide service during more weeks of the year, and provides an increase in service.	Does not improve the connection between modes, and does not provide marked increase in service.	Moderately decreases the connection between modes and decreases service.	Greatly decreases the connection between modes and decreases service.
2. Improves Travel Time	3	Vessels operate at a higher speed, offering significant travel time savings over existing service.	Vessels operate at a higher speed, offering moderate travel time savings over existing service.	Project has no effect on travel time.	Project has moderate adverse impact on travel time over existing service.	Project has serious adverse impact on travel time over existing service.
3. Improves Service Convenience	3	Project provides a significant improvement in transportation service convenience, as measured through the number of port calls.	Project provides a moderate improvement in transportation service convenience, as measured through the number of port calls.	Project has little to no effect on transportation service convenience.	Project provides a moderate degradation in transportation service convenience, as measured through the number of port calls.	Project provides a significant degradation in transportation service convenience, as measured through the number of port calls.
4. Exploits backhaul potential	2	Van-carrying capacity times service frequency suggests a significant increase in potential freight movement.	Van-carrying capacity times service frequency suggests a moderate increase in potential freight movement.	Project offers no opportunity to exploit backhaul potential over existing conditions.	Van-carrying capacity times service frequency suggests a moderate decrease in potential freight movement.	Van-carrying capacity times service frequency suggests a significant decrease in potential freight movement.
5. Health and Quality of Life.	5	This project provides a significant contribution to improved health or quality of life, by significantly improving service to a relatively large population in the region.	This project provides a moderate contribution to improved health or quality of life, by moderately improving service to a relatively large population in the region.	Project will not affect quality of life issues	Project causes moderate degradation to health or quality of life to a relatively large population in the region by reducing some service.	Project causes significant degradation to health or quality of life to a relatively large population in the region by reducing service.
6. Enhances regional economic development	4	Significant economic benefits; endorsed as an economic development project by local, borough, or state government.	Expanded capacity or new access specifically built to support regional or local industrial, commercial, or resource development.	Does not provide economic opportunities or benefits or provides non-crucial benefit to existing economic activity.	N/A	N/A
7. Environmental Readiness	2	Environmental approval likely with Categorical Exclusion or already complete.	Environmental approval likely with Environmental Assessment or draft documents circulated.	Environmental approval likely with Environmental Impact Statement.	Environmental approval extremely difficult; 50/50 chance.	Environmental approval unlikely.

Table 10
Summary Results of the Evaluation of Initial Alternatives

	Total Weighted MOE Score (WT)	Total Capital Cost*	PV of Total Capital Cost	State Share (20%) of Total Capital Cost	Annual Operating Cost	PV of Annual Operating Cost (through 2020)	Annual Resident Demand Estimate	Resident Demand Estimate (through 2020)	Cost per Unit of Resident Demand (CU)	Value Index Score (WT/CU)* 100
Alternative 1a – Baseline	10	$28,995,695	$12,822,799	$2,564,560	$6,340,000	$68,697,243	19,341	386,827	$184	5.4
Alternative 1b – Replace *Bartlett* with *Aurora*	10	$42,061,695	$25,237,312	$5,047,462	$8,460,000	$91,668,561	19,342	386,836	$250	4.0
Alternative 1c – 45-Week Service *(Bartlett)*	7	$57,294,000	$26,702,941	$5,340,588	$5,600,000	$60,678,953	16,769	335,386	$197	3.6
Alternative 1c – 45-Week Service (*Aurora*)	7	$70,360,000	$39,117,455	$7,823,491	$8,160,000	$88,417,903	16,769	335,386	$287	2.4
Alternative 2a – Timed Transfer at Valdez	30	$84,700,000	$69,140,430	$13,828,086	$16,560,000	$160,958,387	36,558	731,160	$239	12.5
Alternative 2b – Dedicated Port Service by New High-Speed Vessel	28	$37,800,000	$30,856,060	$6,171,212	$7,660,000	$80,613,555	36,558	731,160	$119	**23.6**
Alternative 2c – Loop Service by New High-Speed Vessel	25	$45,500,000	$37,141,553	$7,428,311	$8,100,000	$84,585,659	29,603	592,063	$155	**16.1**
Alternative 2d – Dedicated Port Service by Two New Vessels	32	$71,900,000	$58,691,817	$11,738,363	$11,100,000	$111,668,187	46,626	932,529	$132	**24.2**
Alternative 3a – Combination of Existing Equipment and New High-Speed Vessel	29	$89,902,000	$66,257,653	$13,251,531	$14,100,000	$138,750,714	38,806	776,127	$196	14.8

* Does not include shoreside costs. Added shoreside costs were not developed for the initial alternatives, although they were developed for the final alternatives.

Conclusion

The results of the evaluation of the initial alternatives indicated that those alternatives that would serve the area with some combination of high-speed and high-powered new vessels should be carried forward for further analysis and evaluation at a more detailed level. The Baseline Alternative was also carried forward for comparison. The refinements performed to develop the initial alternatives into final alternatives included the following analyses:

- More sophisticated demand projections that took into account (1) the improved quality and convenience of service achievable through implementation of the dayboat service concept; and (2) seasonal peaking.

- Determination of each alternative's "scalability," or ability to flex its level of service according to demand by season.

- Estimation of each alternative's revenue-generating capacity, including the Baseline alternative.

Photo: Chenega Bay

The Final Alternatives

The initial alternatives that proved most promising were subjected to additional analyses and refinement. The results of these refinements are reflected in the final alternatives' service concepts and operating costs.

A major distinction between the initial and final alternatives is that the final alternatives contain separate peak and off-peak service concepts. (Although, it should be noted that each of the final alternatives shares a common off-peak service concept). The final alternatives differ in terms of how peak season service is configured. The rationale for separating service into these periods is to capture tourist traffic during the peak while providing a level of service in line with demand for the rest of the year. In so doing, operating cost estimates can be reduced compared to the initial alternatives. Revenue estimates developed by Northern Economics were also provided for each of the final alternatives as well as for the Baseline Alternative.

The Baseline Alternative – Final Alternative 1

The Baseline Alternative would simply entail the continuation of existing Alaska Marine Highway System (AMHS) service, vessels, and scheduling. Chief characteristics of this existing service follow.

Tustumena: The Prince William Sound ports of Cordova and Valdez are served by the *Tustumena* with slightly less than weekly service during the summer and somewhat more frequent service (approximately twice weekly) during the winter, when the *Bartlett* is out of service. The *Tustumena* connects to Seward on same frequency. The *Tustumena* offers whistle stop service to Tatitlek and Chenega Bay.

Bartlett. The *Bartlett* serves the Prince William Sound ports of Cordova, Valdez, and Whittier with approximately daily service to Whittier and Valdez, and three times a week service to Cordova. *Bartlett* offers whistle stop service to Tatitlek.

Final Alternative 2

With this alternative, the AMHS would no longer continue to operate the *Bartlett* or *Tustumena* in Prince William Sound. Instead, service would be provided by one new high-speed vessel and one new high-powered conventional vessel. The *Tustumena* would be released for service elsewhere in the system, presumably in Southwest Alaska.

The new high-speed vessel proposed corresponds to the Fast Vehicle Ferry (FVF) design currently under development for the Southeast Alaska Transportation Plan. This vessel would have an operating speed in the neighborhood of 32 knots and a nominal vehicle (car) capacity of 34. For comparison, the *Tustumena* has an operating speed of 13.3 knots and a vehicle (car) capacity of 36. Meanwhile, the *Bartlett* has an operating speed of 13.6 knots and a vehicle (car) capacity of 29. The new high-powered conventional vessel would operate more slowly, at 15.2 knots, but it would have the same vehicle capacity (34) as the proposed new high-speed vessel.

During the peak season (a 105-day period centered on July) the high-speed vessel would be dedicated to service between Whittier and Valdez, where it would make two round trips per day. Meanwhile, the new high-powered conventional vessel would make one round trip per day between Cordova and Valdez. A timed transfer at Valdez would be provided. Whistle-stop or scheduled service to Tatitlek would be feasible. Chenega Bay would receive service on approximately the same service frequency as is now available.

During the off season, the high-powered conventional vessel would be laid up or utilized elsewhere in the system, and the new high-speed vessel would make a loop among Cordova, Valdez and Whittier five days a week. The loop would alternate between clockwise and counterclockwise operations. This alternative, the only one to involve a conventional high-powered vessel, would not provide a direct, peak-season linkage between Cordova and Whittier.

Final Alternative 3 - Preferred Alternative

According to this alternative, during the peak season, two new vessels, rather than the *Bartlett* and *Tustumena,* would provide service to the ports of Prince William Sound. As in final Alternative 2, *Tustumena* would be released for service, presumably in Southwest Alaska.

In this alternative, both new vessels would be high-speed vessels. During the peak season, one high-speed vessel would be dedicated to service between Whittier and Valdez, where it would make two round trips per day. The other high-speed vessel would make alternating loops (one round trip per day) among the ports of Cordova, Valdez and Whittier. The off-season variant would be the same as in Final Alternative 2, that is, one of the new vessels would be laid up or utilized elsewhere in the system, and the other would make a loop among Cordova, Valdez and Whittier five days a week. The direction of the loop could alternate. Table S.10 provides peak and off-peak sample schedules.

Whistle-stop or scheduled service to Tatitlek would be feasible. Chenega Bay would receive service on approximately the same service frequency as is now available.

Final Alternative 4

Final Alternative 4, like Final Alternative 3, would involve the utilization of two new high-speed vessels, rather than the *Tustumena* or *Bartlett.* The *Tustumena* would be released for service elsewhere in the system, presumably in Southwest Alaska.

Each of the two new high-speed vessels would make a daily loop among Cordova, Whittier, and Valdez – one in each direction. The off-season variant is the same as Final Alternative 3. Whistle-stop or scheduled service to Tatitlek would be feasible. Chenega Bay would receive service on approximately the same service frequency as is now available.

Key Operational Comparisons among the Final Alternatives

Table 11 summarizes the capital and operating costs for each alternative broken down by service element. This table specifies what portion of the alternatives' operational costs is associated with each service element. For instance, this table shows that dedicated port service between Valdez and Whittier during the peak season is estimated to cost $1.6 million per year to operate. Meanwhile, dedicated port service between Cordova and Valdez is estimated to cost $1 million per year to operate.

Scoring of the Final Alternatives

Each of the final alternatives was subjected to the same MOE scoring process as was conducted for the initial alternatives. The results of this scoring are contained in Table 12.

Table 11
Final Alternatives Key Summary Statistics

Final Alt	Service Description	Daily RTs/Vessel	Vessels in Local System	Vessel Type	Service Speed (knots)	Car Capacity	Service Day Length	Annual Operating Cost $ million	2020 Revenue Projection $ million	2020 Revenues minus Operating Costs
1	Existing Conditions	NA	2	*Bartlett*	13.6	29	24	$4.20 M		
				Tustumena	13.3	36	24	$2.10 M		
								$6.30 M	**$3.37**	**-$2.97 M**
2	Dedicated Port: (V–W) (Peak Season)	2	1	New High-Speed	32.3	34	12	$1.6 M		
	Dedicated Port: (C–V) (Peak Season)	1	1	New High-Power	15.2	34	12	$1.0 M		
	Off-season	1	1	New High-Speed	30.8	34	12	$2.9 M		
			2					**$5.5 M**	**$7.34**	**$1.84 M**
3	Dedicated Port (V–W) (Peak Season)	2	1	New High-Speed	32.3	34	12	$1.6 M		
	Daily Counter Loop (e.g., C–V–W–C) 105 days per year (Peak Season)	1	1	New High-Speed	30.8	34	12	$1.6 M		
	Off-season	1	1	New High-Speed	30.8	34	12	$2.9 M		
			2					**$6.1 M**	**$8.92**	**$2.82 M**
4	Daily Loop (e.g., C–W–V–C) 105 days per year (Peak Season)	1	1	New High-Speed	30.8	34	12	$1.6 M		
	Daily Counter Loop (e.g., C–V–W–C) 105 days per year (Peak Season)	1	1	New High-Speed	30.8	34	12	$1.6 M		
	Off-season	1	1	New High-Speed	30.8	34	12	$2.9 M		
			2					**$6.1 M**	**$7.74**	**$1.64 M**

*Note that these operating cost estimates do not take into account the full costs of operating AMHS service. System management, shoreside facilities, risk management and reservation system costs, for instance, are not included. The reason for this omission is the difficulty in assigning systemwide costs to isolated elements of the AMHS, such as service between specified ports.

Table 12
MOE Scores for Final Alternatives

FINAL ALTERNATIVE	MOE 1		MOE 2		MOE 3	
	Improves Intermodal Transportation	Weighted Score Weight = 2	Improves Travel Time	Weighted Score Weight = 3	Improves Service Convenience	Weighted Score Weight = 3
Alternative 1	0	0	0	0	0	0
Alternative 2	4	8	3	9	4	12
Alternative 3	4	8	4	12	5	15
Alternative 4	4	8	4	12	5	15

FINAL ALTERNATIVE	MOE 4		MOE 5		MOE 6		MOE 7		TOTAL
	Exploits Backhaul Potential	Weighted Score Weight = 2	Health and Quality of Life	Weighted Score Weight = 5	Enhances Regional Economic Develop	Weighted Score Weight = 4	Environmental Readiness	Weighted Score Weight = 2	
Alternative 1	0	0	0	0	0	0	5	10	**10**
Alternative 2	1	2	-1	-2	1	4	1	2	**35**
Alternative 3	1	2	-1	-5	1	4	1	2	**38**
Alternative 4	1	2	-1	-5	1	4	1	2	**38**

Discussion

Although each of the build alternatives scored significantly higher than the Baseline Alternative (the Baseline Alternative scored 10 compared to scores from 35 to 38 for the build alternatives), there is little difference between the build alternatives in terms of MOE scores alone. All of the build alternatives provide significantly higher levels of service to all Prince William Sound ports, and all provide much more convenient service insofar as sailings can be scheduled at consistent, convenient times of day compared to existing conditions. In terms of clarifying the distinctions between build alternatives it is helpful to consider the specific tradeoffs associated with each build alternative. Port calls to Cordova and revenue generation estimates are the build alternatives' most salient distinguishing characteristics.

Revenue Estimates for the Final Alternatives

Northern Economics developed revenue estimates for each of the marine build alternatives and for the Baseline no-build alternative. The methodology used in developing these estimates, as well as several important caveats regarding the level of confidence with which they should be used, are described in a report entitled *Prince William Sound/Copper River Area Transportation Plan: Ferry Alternatives Revenue Analysis*.[32] Table 13 contains summary revenue projections by year and alternative.

The most notable aspect of the revenue estimates is that implementing any of the build alternatives is expected to significantly increase AMHS revenues. Whereas 2020 revenues under existing conditions are forecast to reach $3.4 million total, the revenue estimates for Final Alternatives 2, 3, and 4, respectively, are: $7.3 million, $8.9 million, and $7.7 million.

Photo: Cordova

[32] Prepared for the Alaska Department of Transportation and Public Facilities by Northern Economics, Inc., in association with Parsons Brinckerhoff, The Glosten Associates, and Christopher Beck and Associates (March 2000).

Table 13
Estimated Annual Revenue by Rider Type, 1997–2020

Final Alternative	Year	Revenue Estimate ($ millions)		
		Passenger	Vehicle	Total
1	1997 [b]	1.5	0.7	**2.2**
	2005	2.1	1.0	**3.0**
	2010	2.1	1.0	**3.1**
	2015	2.2	1.1	**3.3**
	2020	2.3	1.1	**3.4**
2	1997 [a]	3.7	1.6	**5.3**
	2005	4.8	2.1	**6.9**
	2010	4.9	2.2	**7.1**
	2015	5.0	2.2	**7.2**
	2020	5.1	2.3	**7.3**
3	1997 [a]	4.2	1.8	**6.0**
	2005	5.7	2.5	**8.2**
	2010	5.9	2.6	**8.4**
	2015	6.1	2.6	**8.7**
	2020	6.2	2.7	**8.9**
4	1997 [a]	3.2	1.4	**4.6**
	2005	4.6	2.1	**6.7**
	2010	4.9	2.2	**7.0**
	2015	5.1	2.3	**7.4**
	2020	5.4	2.4	**7.7**

[a] Actual revenue

[b] Estimate of revenue that might have accrued if the alternative had been in place

The primary reason that revenue forecasts for the build alternatives are so much higher than for the no-build is that capacity is constrained under existing conditions. At the same time, increases in tourism and the completion of the Whittier Access Project are both expected to increase demand for ferry travel in Prince William Sound. Implementing a build alternative would allow the AMHS to capture these projected increases in demand. However, even current levels of demand during the peak period cannot be met given the existing level of service capacity.

Figure 2 illustrates this concept. The shaded area represents projected 2020 demand, whereas the lines below that crest reflect the portion of projected demand that could be met under the existing AMHS service configuration. The solid line reflecting the lowest level of demand depicts actual 1997 data; the other lines reflect projected demand that could be met in future years under existing AMHS service. What this figure shows is that under the existing service configuration, the AMHS would be able to meet projected rises in demand during the shoulder season, but not during the peak, because capacity is already constrained during the peak, which occurs in July.

Each of the build alternatives would allow the AMHS to capture a significant portion of the demand that is currently unmet because of capacity constraints.[33]

Figure 2
Estimated Monthly Ridership vs. Demand under Existing Service Configuration

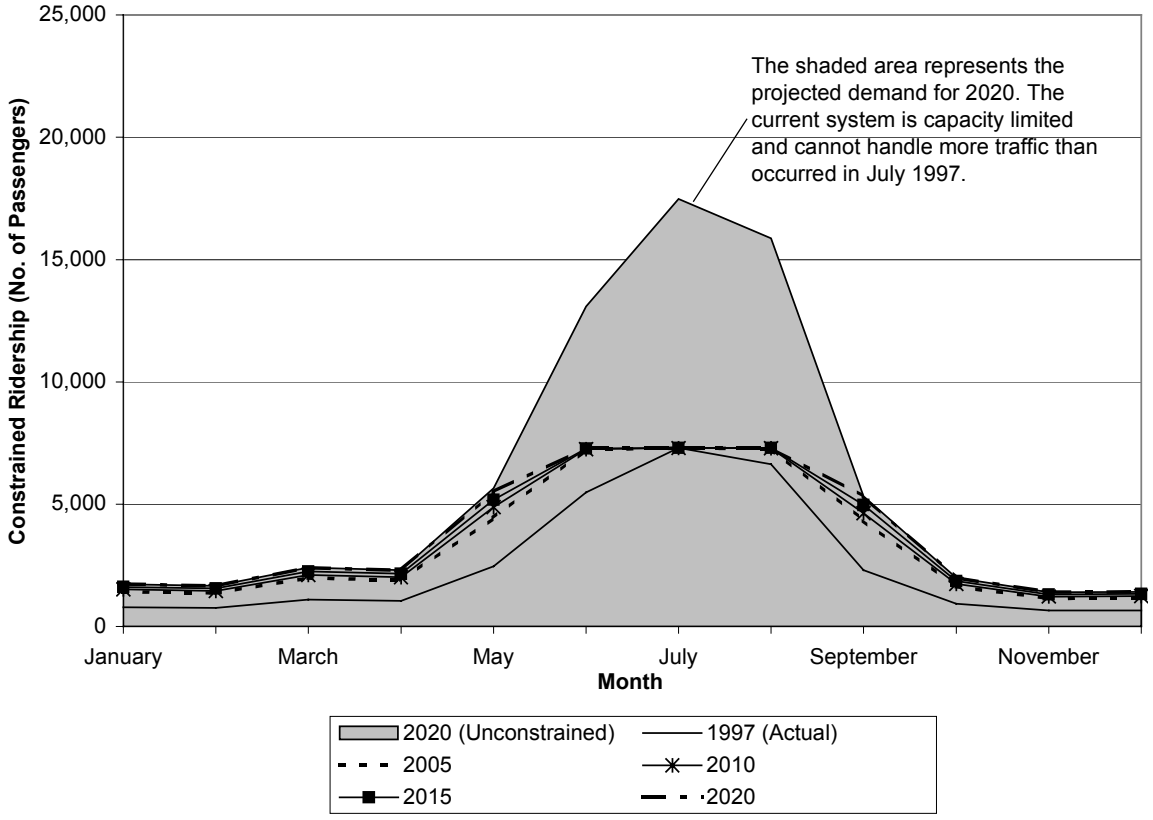

Table 14 relates operating costs to projected revenues.[34] Under the Baseline no-build alternative, revenues minus operating costs are estimated at -$2.97 million per year. Revenues minus operating costs for Final Alternative 2 are estimated at +$1.84 million; at + $2.82 million for Final Alternative 3; and at + $1.64 million for Final Alternative 4. These values are graphed in Figure 3.

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[33] In addition to limited ferry capacity, anecdotal evidence suggests that passenger (and vehicle) bookings are further constrained by "no-shows." AMHS currently does not overbook ridership similar to airline strategies and ridership is hindered accordingly. In addition, vehicle space on the ferry system is calculated using fixed vehicle sizes. (It is also important to note that potential riders make vehicle reservations by means of the telephone and the Internet. Some of these potential riders tend to overestimate their vehicle length.) These coefficients may be larger than the actual vehicle size. This would tend to restrict the number of vehicles on the ferry system to a greater extent than what can actually be accommodated

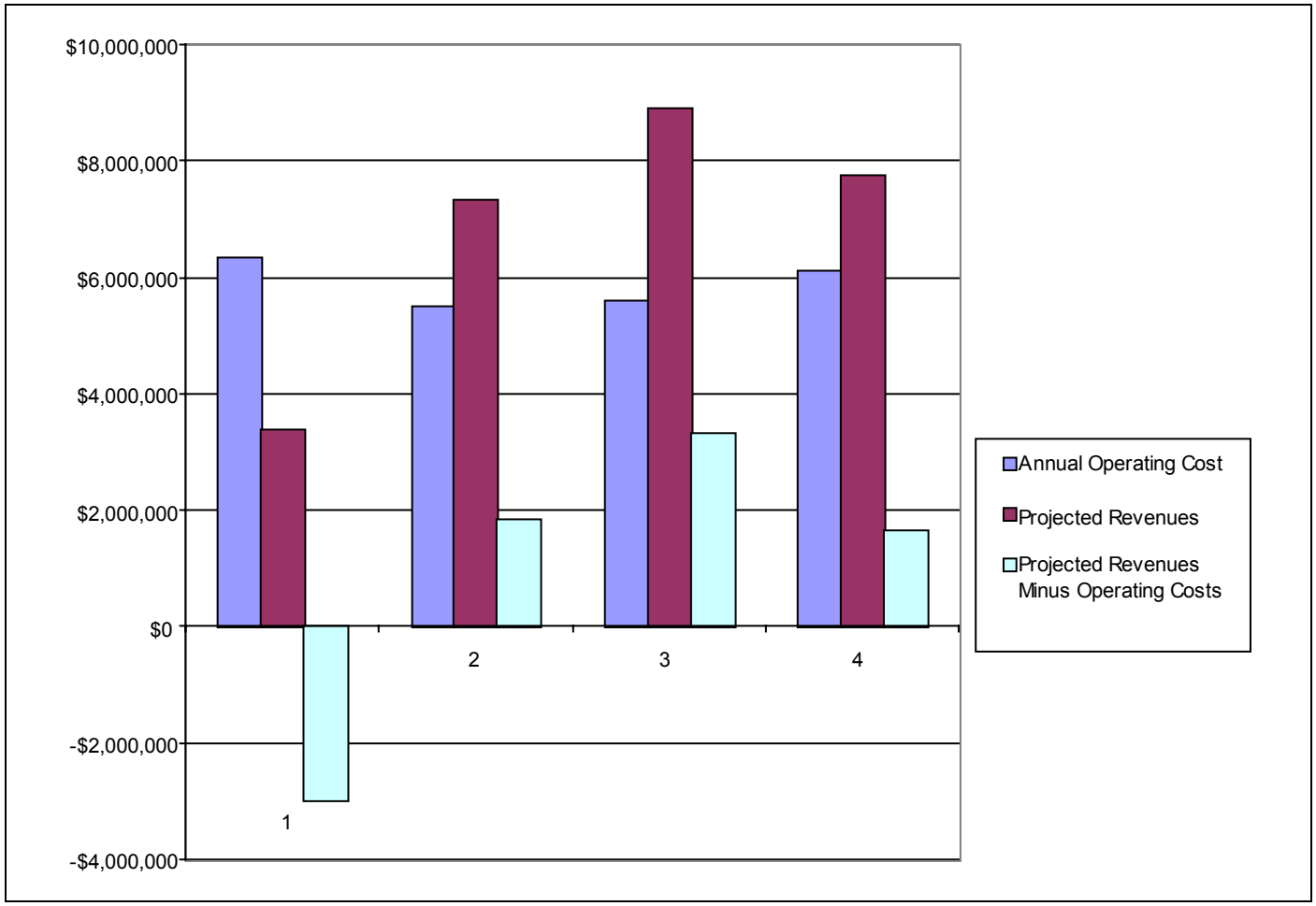
[34] As noted elsewhere in this report, these operating cost estimates do not take into account the full costs of operating AMHS service. System management, shoreside facilities, risk management and reservation system costs, for instance, are not included. The reason for this omission is the difficulty in assigning systemwide costs to isolated elements of the AMHS, such as service between specified ports.

Table 14
Operating Cost, Capital Cost, Revenue and MOE Comparison, Final Alternatives

Final Alternative	Total Capital Costs $ mil	Annual Operating Costs * $ mil	Projected Revenue $ mil	Subsidy Required $ mil	Revenue Surplus Over Operating Costs $ mil	Measures of Effectiveness Score
1	$59.0	$6.34	$3.37	$2.97	--	10
2	$95.9	$5.50	$7.34	--	$1.84	35
3	$114.0	$6.10	$8.92	--	$2.82	38
4	$114.0	$6.10	$7.74	--	$1.64	38

*Note that these operating cost estimates do not take into account the full costs of operating AMHS service. System management, shoreside facilities, risk management and reservation system costs, for instance, are not included. The reason for this omission is the difficulty in assigning systemwide costs to isolated elements of the AMHS, such as service between specified ports.

Figure 3
Final Alternatives: Operating Costs vs. Revenue Forecasts



Selection of a Preferred Alternative

The results of this analysis clearly point to selection of one of the three build alternatives, each of which would produce a much higher level of service to both residents and visitors while producing revenues that are projected (at a planning level) to substantially exceed operating costs.

Further, it is clear that Final Alternatives 3 and 4 are superior, in terms of both MOE score and revenue forecasts to Final Alternative 2. In addition, the fact that both Final Alternatives 3 and 4 would use the same combination of new vessels (two new fast ferries each), suggest that investing in this equipment may enable the system to generate higher revenues than would be possible under Final Alternative 2. This equipment could be described as more "fluid," or better allocated toward routes that may generate more revenue in the future. For example, passenger routing preference may change in the future due to the combined effects of many factors. Equipment that can be adapted to a wide variety of routing options would be better able to serve its constituency and capture revenues as conditions shift.

The differences between Final Alternatives 3 and 4 are operational. Because of the anticipated seasonal demand between Whittier and Valdez, Final Alternative 3 appears better-matched to overall demand, and thus superior in both improving service and in generating system revenue. As just noted, either alternative would require the purchase and operation of two new fast ferries. In terms of selecting a preferred alternative, it seems most reasonable to conclude the following:

- Two new fast ferries should be acquired, one immediately and the second in 6-10 years.
- The service configuration governing the deployment of these new vessels should balance the AMHS mission to provide basic transportation with opportunities to recoup costs and foster economic development. These decisions, which must take into account a multitude of factors beyond engineering concerns and demand estimates, are more appropriately made at the policy level.

Photo: Valdez

Potential Financial Resources

Federal Sources

Surface Transportation

The transportation system of the PWS area includes surface transport (rail, highway, and marine modes) and aviation. Federal monies from a multitude of separate programs and agencies are the single most important sources of funding for capital investments. Statewide, by far the largest portion of funding is provided for surface transportation, which was recently reauthorized as the Transportation Equity Act for the 21st Century, which is also known as TEA-21. TEA-21 contains funding authorization for the six-year period from 1998-2003.

TEA-21 encompasses programs administered by the Federal Highway Administration (FHWA), Federal Railroad Administration and the Federal Transit Administration (FTA). In 1996, it accounted for about 75 percent of Alaska's total Federal funding.

Federal Provisions for Ferry Boat Funding. One feature of TEA-21 of particular interest to the PWS area is its provision for ferry boat funding. Two developments in ferry boat funding (in addition to the existing FBD (327) program) under TEA-21 are noteworthy.

First, the Federal Highway Administration Ferry Boat Discretionary Program [1207] is intended to fund the construction of ferry boats and terminal facilities. This program continues funding from the Highway Trust Fund, and the Federal share remains at 80 percent. Of the $39 million authorized, $20 million per year is earmarked for the states of Alaska, New Jersey, and Washington. Alaska's earmark is $10 million per year, while Washington and New Jersey's shares are $5 million per year each. Alaska is also eligible to compete for the other $19 million that is available through the non-earmarked portion of the program. TEA-21 expands eligibility for ferry boats and terminals beyond those that are publicly owned to also include those that are publicly operated or those that are majority publicly owned and that provide "substantial" public benefit.

The second development is FTA's Transit Ferry Boat Program [3009(g)], under which a total of $14 million a year for FY 1999-2003 is authorized to be set aside from the New Starts program under Transit Capital Investment Grants and Loans for capital projects in Alaska or Hawaii. Hawaii is thought to be unlikely to qualify for this funding until at least 2002. It is likely that DOT&PF will be blending both FTA and FHWA funding for auto and passenger ferries. This blending of FTA and FHWA funding will make project development somewhat more complex insofar as two agencies' administrative requirements and criteria, rather than one, will have to be met. In any case, DOT&PF anticipates provisions for One-DOT and for continued dialogue between the state and federal transportation agencies to work toward resolving and streamlining these funding requirement issues.

Aviation

Federal aviation funding is disbursed under the Federal Aviation Administration's Airport Improvement Program (AIP). AIP funding in FFY 98 and 99 varied between $79 million and $81 million, with FFY 00 funding expected to close out at about the same level. A significant increase in AIP funding is expected to beginning in FFY 01. Aviation funding has accounted for about 21% of all Federal funding to Alaska in the past decade. Two other Federal programs, the

Essential Air service Program (EAS) administered by the FAA, and the Bypass mail program, administered by the U.S. Postal Service constitute two other important (although indirect) sources of support for Alaskan air service.

Ports and Harbors

Funding for ports and harbors is inadequate. This is because there is so little in the way of Federal resources devoted to this mode. While the U.S. Army Corps of Engineers (COE) funds some navigation projects, the overall levels are quite low, and compete on a national level. Most federal funding for these COE projects in Alaska comes through congressional earmark – even so, ports and harbors funding is nowhere near the levels provided for surface transportation or aviation. In all, funding for ports and harbors through the COE has comprised about 4% of Alaska's total Federal transportation funding in the past decade.

The State's Responsibility for Maintenance and Operations

While the Federal government is the major source transportation funding in Alaska, DOT&PF prioritizes, arranges, and administers the vast majority of capital projects. In addition, the State pays for maintenance and operations for State roadways, most Alaska airports, and the marine highway system. The resources necessary to accomplish these objectives are considerable. Despite the scale and complexity of DOT&PF's responsibilities, it is important to note that DOT&PF's autonomy is more limited than that of most State departments of transportation because Alaska dedicates no revenue source to transportation purposes.[35] In fact, any such dedication is constitutionally prohibited. As such, Alaska's Legislature retains an unusual degree of control over the State's transportation programs and priorities.

Whereas most states have established highway trust funds, supported by State gas taxes, motor vehicle excise taxes, licensing fees, and other transportation-related user fees, transportation projects and programs must compete each year for General Fund appropriations with other pressing social and infrastructure needs, including education, health, and utilities. State revenue shortfalls, resistance to increased taxes, and constant legislative scrutiny mean that the pressure is on DOT&PF as never before to find ways to reduce its operating costs, secure the State match for Federal funds, and meet growing demand for transportation facilities and services.

DOT&PF, along with other State agencies, is under particular duress given the State's $1 billion budget shortfalls for FY 1999 and 2000, due to the precipitous drop in worldwide oil prices. Dramatic increases in federal transportation spending under TEA-21 and AIR-21 have increased the demand for state capital matching dollars, driving a need to develop new sources of state transportation funds for both capital match and maintenance. About three-quarters of the State General Fund budget comes from oil taxes and royalties. To exacerbate matters, AMHS maintenance and operations costs are rising faster than inflation (due to new regulatory requirements, which require vessel upgrades and different crewing levels), and labor contracts (which dictate wages, benefits, and operating conditions).

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[35] Currently, the State's only source of dedicated revenue is the International Airport Revenue Fund, a sub-fund of the General Fund, which supports operation and maintenance of Alaska's two International Airports. There are other sub-funds that are typically used to support DOT&PF operating programs, including the AMHS Fund and Highway Equipment Working Capital Fund. However, these are not *dedicated* funding sources. Revenues from various fees, charges, and taxes go into the General Fund and are typically appropriated back to DOT&PF as program receipts with which to operate specific programs.

Implications for the PWS Area Transportation Plan

While the difficulty of securing State appropriations for AMHS maintenance and operations (M&O) is clear, Federal funding is more ample, and can be used to cover 80% to 90% of capital costs for ferry projects (the split depends on the funding source chosen in the STIP process). As noted earlier, TEA-21 provides additional funding opportunities for ferry surface transportation, a portion of which has been earmarked for Alaska.

Given the difficulty of securing stable M&O funding for ferries combined with the availability of Federal funding for capital expenditures, a clear strategy for transportation in the region involves making the most of federal capital funding to help significantly lower M&O costs. A necessary objective of this strategy is preserving or improving service and efficiency. This is precisely the type of solution whose feasibility has been demonstrated as the result of the analyses conducted as part of the Prince William Sound Area Transportation Plan.

In short, the preferred alternative that emerges from the Prince William Sound Area Transportation Plan is one that accomplishes the following:

- Provides significantly higher levels of service (measured by frequency, capacity, travel time, and frequency);
- Provides higher levels of service and regional connectivity at vastly lower costs in terms of adverse environmental impacts compared to roadway and rail alternatives;
- Provides for economic diversification and development in the region by accommodating growing demand for visitor travel;
- Provides these significant improvements in residents' and visitors' quality of life at significantly lower costs to the State, which ultimately renders the solution stable and sustainable.

Plan Implementation Considerations

Editor's note: This section was added following review of the draft plan to address concerns that have been raised during the draft plan public review. Most of these concerns are related to the implementation of fast ferry service, and fit roughly into three general areas: Implementation sequence, Impacts on travel, and Public Involvement opportunity. Additionally, the implementation coordination of multiple area transportation plans is an issue that grows ever more complex for the department. This plan is published as the Southeast Alaska Transportation Plan enters its third year of implementation, and the Southwest Alaska Transportation Plan and Yukon-Kuskokwim Area Transportation Plan near completion. Finally implications of the fatal flaw screening for future transportation planning in the Copper River corridor bears clarification.

Ferry Service Improvements

Implementation Sequence

Ferries. The contract for purchasing the first of the "Sitka-class" fast vehicle ferries is expected to be approved in late 2001. As implied by the class name, the lead vessel is designated to fill the role described for it in *Addendum One to the Southeast Alaska Transportation Plan*.[36] The second vessel of this class is recommended for designation to service in PWS. Each vessel is expected to take approximately two years to build, and a high-speed ferry could begin service in PWS as early as Summer 2005. AMHS intends to put this first PWS high-speed vessel on a "reversing triangle" service route with Cordova as a homeport, then subsequently discontinue *Tustumena*'s routes in PWS. The second PWS high-speed ferry will likely not enter service prior to 2010, as several more high-speed ferries needed to fully implement the Southeast Alaska Transportation Plan have a greater benefit to the state and thus higher priority. However, the entry of a single high-speed ferry into PWS is sufficient to achieve dayboat efficiencies in the entire region, bringing immediate service benefits to the region and operations cost relief to AMHS.

AMHS plans to shift *Aurora* from Southeast Alaska to PWS, replacing *Bartlett*, once the new Inter-island Ferry Authority vessel *Prince of Wales* begins its Ketchikan-Hollis service in 2002 or 2003. The aging *Bartlett* can then be retired from service. Note that this event is independent of plan implementation. However, until such time as the second PWS high-speed ferry enters service, a conventional vessel can still be used to provide summer-only daily scheduled service between Whittier and Valdez (like Final Alternative 3) in addition to the year-round "reversing triangle" high-speed vessel service. AMHS anticipates that *Aurora* will be used to fulfill this service option.

A vessel suitability study (VSS) published in February 2001[37] assessed the Sitka-class FVF design for service in PWS. The VSS recommended additional provisions be made in the design contract to address vessel seakeeping in PWS, the higher snow load levels encountered in PWS relative to Southeast Alaska, and detection of floating ice. The VSS report summary is included as Appendix A of this document.

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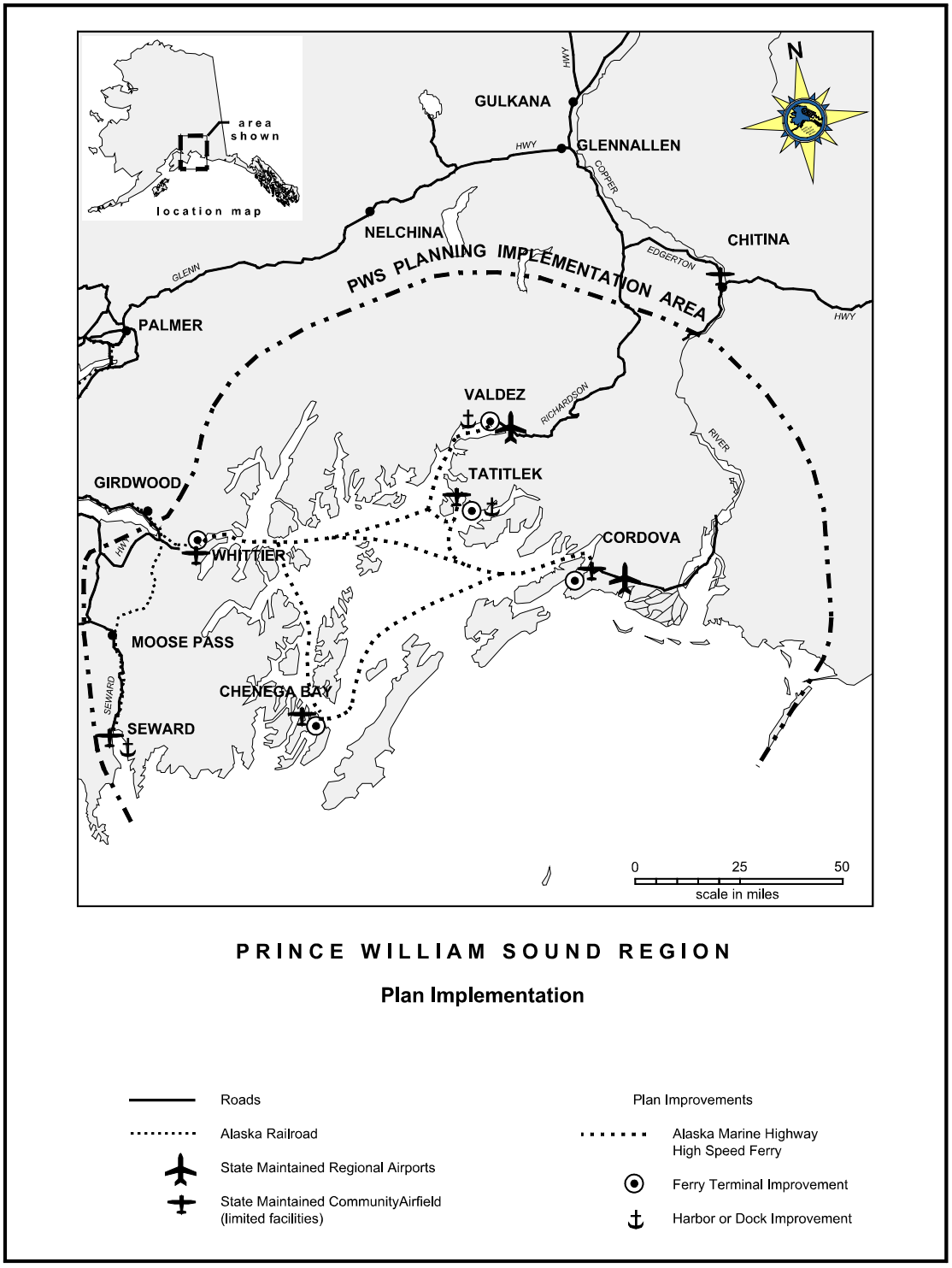
[36] *Addendum One to the SATP* can be downloaded from http://www.newwavesalaska.com

[37] Glosten Associates, Inc., *Vessel Suitability Study of "Sitka-Class" Fast Vehicle Ferry Operation in Prince William Sound*, February 2001.

Terminals. Several terminal improvements are needed to accommodate the high-speed vessels and facilitate stern- and side-to sequencing for rapid loading and unloading of vehicles at each successive stop. In order to operate the reversing triangle route, the vessel's overnight berth needs to be capable of loading and unloading in either configuration, while the other two

Figure 4 Plan Implementation



terminals along the route need only a single configuration, though different for each. Current plans call for the Cordova terminal to be dual-load capable, Whittier to be stern-load capable, and Valdez to be side-load capable.

Whittier and Valdez terminal improvements are needed in the near-term to permit *Aurora* to operate between those two ports, thus they are included in the baseline projects (Table S.7). Necessary requirements for high-speed ferry loading in accordance with the plan are included in these projects. Terminal improvements for Cordova, Tatitlek and Chenega Bay are unique and essential to the plan, and indeed the Cordova terminal improvement must be in place before the high-speed ferry can begin service.

Impacts on Travel

The addition of high-speed ferry service in Prince William Sound will bring some rather dramatic changes to the travel experience of those trying to get around Prince William Sound compared to the way they travel today. The two most obvious are the reduction in travel time and the regular service schedule, but there are other changes as well, unique to the new operating concept. There are also opportunities for the application of ITS technology to improve service.

Reduction in travel time. The information in Tables S.1 through S.6 is somewhat abstract, as it defines the parameters used in constructing the model used to assess the system's operating costs, demand, and revenue generation potential. To a typical user, the value of the system changes becomes more apparent when comparing the time it takes to make a trip from one location to another. PWS residents often cite Anchorage as the ultimate destination, and the ability to conveniently return from Anchorage after a visit there factors heavily in choice of travel arrangements. Table 15 illustrates comparitive surface (road and/or ferry) travel times between communities:

Table 15
Travel Times

Vehicle Travel Times between PWS communities (including staging times)		
Community pair	**Current system**	**Preferred Alternative**
Cordova-Valdez	7.5 hrs	3.5 hrs
Cordova-Whittier	9 hrs	4.0 hrs
Cordova-Seward	13 hrs (direct)	7.0 hrs (via Whittier)
Seward-Valdez	13 hrs (direct)	6 hrs (via Whittier)
Seward-Whittier	2-3 hrs	2-3 hrs
Valdez-Whittier	8.8 hrs	3.5 hrs
Valdez-Anchorage	6 hrs	5 hrs
Chenega-Anchorage	13 hrs (via Valdez)	5 hrs

The reduction in travel times, often by more than half from present day, is a dramatic improvement for the typical traveler. Note that even for Valdez, the ferry option to Anchorage via Whittier and the Seward Highway saves an hour over a vehicle-only trip taking the Richardson and Glenn Highways. This table also illustrates the reduction in travel time for a typical Seward-to-Valdez trip via Whittier over taking the *Tustumena* directly from Seward to Valdez.

Regular Service Schedule. Perhaps the most desirable improvement for users of the ferry system will be the regularity of schedule. Scheduled departures and arrivals will occur during the waking hours on a fixed schedule, much like an airline schedule. This will simplify trip planning for travelers, as well as giving them more flexility when arranging travel. It will also make possible the linking of other scheduled transportation services, such as community transit services, passenger train and or bus service, coincident with ferry arrivals and departures. Indeed, AMHS encourages these sorts of linkages, as they promote greater transportation efficiencies, benefitting the users as well as the providers of the services.

On a frequent service route, such as Cordova to Whittier for example, a business traveler might expect to depart Cordova in the morning and arrive in Whittier at around mid-day, then continue to Anchorage. After conducting business that afternoon and the next day, the traveler could anticipate a return voyage from Whittier to Cordova the next afternoon.

On a less frequent service route, such as Chenega Bay to Whittier, a resident might expect to catch an early afternoon ferry from Chenega Bay, arrive mid-afternoon in Whittier, spend 2 or 3 nights in Anchorage and then return from Whittier to Chenega Bay 3 or 4 days later.

The above examples are hypothetical, but they illustrate attractive schedule possibilities with plan implementation that are simply not possible with the present-day ferry system.

The "Sitka Class" Ferries. The new ferries being built for the Alaska Marine Highway System will be approximately 240 feet in length, 60 feet in width, and have a draft of 9 feet. They will have a service speed of 32 knots, but can achieve 35 knots at 90% power output. Built in compliance with the Americans with Disabilities Act (ADA) requirements and the International Maritime Organization (IMO) High-Speed Craft Code, the vessels are designed to carry up to 250 passengers and 30 Alaska-size cars plus up to 3 cargo vans with a combined maximum

Artist's rendering, courtesy of Nichols Boat Builders

weight of 90,000 pounds, or 35 cars and no cargo vans. Powered by four diesel engines and propelled by steerable waterjets, they are extremely responsive, capable of near instantaneous acceleration to service speed, and capable of slowing from 32 knots to a complete stop in less than two vessel lengths. Each vessel is operated by ten professionally trained crewmembers who will reside in the vessel's overnight port.

Because of the simplified loading concept using stern and side ramps, the need for long queuing is avoided, thus passengers will not need to arrive at the terminal nearly so early as is now the case in order to facilitate loading. In addition, the use of automation in ticketing and reservations is expected to dramatically speed up the check-in process. Intelligent transportation system technology employed on the ferries and at the terminals will enable those awaiting a vessel to view expected arrival time and be apprised of any delays. On the voyage itself, food service will be contracted out (similar to airlines) affording passengers a limited selection of hot and cold food and beverage items to choose from.

When the vessel completes its route for the day, a night crew will take over and perform cleaning and maintenance tasks, preparing the vessel for the next day's operations. These tasks include fueling, topping off fresh water, discharging sewage to shore system, restocking food and dry goods items, and cleaning the vessel.

Artist's rendering, courtesy of Derecktor Shipyards

Much public discussion has occurred and feedback received concerning high-speed ferries. AMHS has addressed the vast majority of these concerns in the Sitka Fast Vehicle Ferry Owners Requirements, the governing document for guiding the prospective vessel designs and performance specifications for the vessel. Concerns addressed have included:

Atmospheric emissions - The standards for these vessels are regulated by current requirements for marine diesel engines, which are much more stringent than those governing *Bartlett* and *Tustumena*.

Emissions to the water - Zero. All effluents will be discharged to shore systems at the end of each daily voyage.

Noise - Noise specifications in the contract will be tough - not to exceed 60db at 1000 feet from the vessel. This is comparable to existing fleet vessels.

Wake height and habitat disturbance - Concern has been expressed over fast ferry wakes, in part due to the highly negative publicity that Washington State Ferries had with perceived wake damage when introducing fast ferry service in Puget Sound. Wake height characteristics for the AMHS high-speed ferries is anticipated to be about 2.5 feet at service speed, 300 feet from the vessel. In Puget Sound, it was the impact of vessel wake on particular shoreline, man-made structures and vessel traffic that caused the most concern. In contrast, the PWS marine environment is one of open, wide passages and deep waters that tends to naturally minimize the effects of vessel wakes and bow waves. Even so, speed may need to be reduced at particular points in a voyage in order to safeguard particularly sensitive areas. Each vessel will be required to have a Coast Guard approved route operating manual, which will necessarily address all environmental concerns which can be mitigated through responsible operation, as well as navigation concerns. Opportunities for public involvement will be provided during the development of these manuals (see next page, "Public Involvement during Plan Implementation"). In many cases, judicious selection of vessel routes can almost completely eliminate the potential for damage or disturbance; selective speed reduction can accomplish the rest, with minimal impact on overall travel time. The other concern, of course, is the matter of irresponsible operation or human error. This is addressed through established high standards for AMHS masters and mates, which are achieved through rigorous training programs, operational experience and professional exchange, and periodic recertification requirements.

Intelligent Transportation Systems (ITS). The implemented system will feature several applications of ITS technology to improve level of service.

Current weather information and forecast data for all locations in the system will be immediately available on the vessel, enabling informed decisions to be made as to whether or not to sail in inclement weather. This will enable AMHS to announce a cancelled or delayed sailing several minutes or even hours before the scheduled departure, affording affected passengers time to make alternate travel plans.

High-speed ferries in general are weight-sensitive, and weighing of vehicles will be required to monitor the dispersal of weight throughout the vessel. ITS can simplify this process through the use of automatic weighing facilities that record vehicle weight during terminal check-in.

A vessel tracking system will be installed on all AMHS ferries, giving GPS-determined instantaneous location, direction and speed information on each vessel. A monitor at each terminal will display this information to viewers along with expected arrival time, delay information. These features will be part of completely new terminal facilities in Valdez and Whittier, as well as installed in existing terminals at other locations.

Coordination with other Area Transportation Plans

The PWS Transportation Plan is the second of the State's Area Transportation Plans to be completed, and there are currently three more area transportation plans in progress. There is some question as to the priorities between planning areas, and what the effect on each plan's implementation will be as each successive plan generates a new list of priority project recommendations.

DOT&PF has responsibility for the effective coordination of transportation infrastructure around the state, and for implementation of projects in a way that serves the overall public interest. In fact, the motivation to effectively carry out this responsibility was the driving force behind the area transportation plan concept - the desire to identify "high-impact" projects that contributed significantly to the overall regional and state infrastructure when built in the right way and in the

right sequence. In selecting the sequence of projects between area plans, DOT&PF leadership is guided by the same motivation - to act in the overall public interest. This means that the project(s) with the highest immediate benefit to the state will be implemented before projects with a somewhat longer-range payoff.

Why does this make the most sense? Ultimately, smart infrastructure investment around the state benefits all Alaskans. Prioritizing the higher-impact projects reinforces a healthy concept of infrastructure investment, and makes possible continued and possibly accelerated investment in the future. Not investing in this fashion leads to a less than optimal benefit to the state and jeopardizes future level of investment because it adds overall to state costs and denies potential state revenues. In a state where every community depends in large part on the availability of state funds, it directly benefits each region to see the state invest optimally.

The Prince William Sound Transportation Plan has generated a relatively small number of new projects - two high-speed vehicle ferries and the terminal facilities to support them. But it is important to grasp that the benefits to the state flow from the day that the first of those high-speed ferries begins operations in PWS. This single step immediately improves the AMHS cost vs. revenue picture, contributing additional financial flexibility, and lending supportive evidence and justification for the system changes needed to bring about full implementation of the Southeast Alaska Transportation Plan. Additionally, it permits restructuring of *Tustumena*'s routes, benefiting the Southwest Alaska region as well. For these reasons, DOT&PF leadership strongly recommends that the second of the new "Sitka-class" high-speed ferries be designated for PWS service.

Public Involvement during Plan Implementation

The PWS Transportation Plan provides a suggested template for transportation improvement in the region based upon expressed regional and state needs, goals, and objectives. It recommends a series of actions that, if taken together, will dramatically improve transportation in the region. Nevertheless, there remains considerable flexibility in the suggested actions as to how to best accomplish them, and opportunities for views, opinions and suggestions by the public to be expressed.

Individual projects involving the expenditure of federal transportation funds are subject to regulatory guidelines for environmental review specified through agency interpretation of the National Environmental Policy Act (NEPA). Some of these projects involving replacement or upgrades to existing facilities can be accomplished through categorical exclusion; others will likely involve a more detailed environmental assessment to determine if any potential impacts rise to the level of significance.

Additionally, AMHS will provide opportunities for public involvement during development of the vessel route operating manuals mentioned earlier.

Copper River Corridor Implications

The "fatal flaw" screening that eliminated the Copper River corridor options from further development in this planning effort has been criticized by some as faulty for drawing conclusions from incomplete study. The meaning of the screening bears clarification.

The "fatal flaw" screening was not intended to conclude anything about the long-term implications of the corridor. Rather it sought to identify critical factors that would seriously jeopardize the implementation of this option even if it were justifiable from a benefit-cost

perspective. In this sense, the screening was based on considerations that were primarily of a temporal nature, such as community acceptance, anticipated delay and add-on costs, technological limitations, etc. These factors may change in the future, and so the screening concludes nothing about the long-term transportation potential of this corridor. There are a number of valid reasons for a major transportation route along the Copper River corridor, as there are many valid reasons for not developing it. The "fatal flaw" screening says only that in practical terms, the present-day implementation potential is extremely low.

What the screening accomplished was to focus the plan's analysis efforts towards options that had a greater potential for implementation in the near term. The analysis of those options was considerable, but not without reward. This plan's recommendations are quite implementable, regionally supported, and clearly beneficial. Further study of the Copper River transportation corridor is possible with the commitment of more funding for this purpose, but the fatal flaw screening indicates that such a study would serve little purpose. Its likely outcome would be a time-consuming, highly detailed and very expensive report that has minimal hope of leading to tangible results in the near future.

APPENDIX A

VESSEL SUITABILITY STUDY
OF "SITKA-CLASS"
FAST VEHICLE FERRY OPERATION
IN PRINCE WILLIAM SOUND

SUMMARY

Prepared for

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File No. 97077A
1 February 2001

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VESSEL SUITABILITY STUDY OF "SITKA-CLASS" FAST VEHICLE FERRY OPERATION IN PRINCE WILLIAM SOUND

SUMMARY

The suitability of the AMHS "Sitka-class" fast vehicle ferry (FVF) has been reviewed for year-round service in Prince William Sound in accordance with the recommendations of the Prince William Sound transportation master plan. The review focused on seakeeping and passenger comfort, cold weather impacts on on-board systems, and issues associated with floating ice. The principal findings and recommendations are as follows:

Seakeeping and Passenger Comfort

The statistics of significant wave heights in Prince William Sound are comparable to those for Southeast Alaska (e.g., Chatham Strait), but the wave periods are longer, reflecting the penetration of ocean swells through Hinchenbrook Entrance into central Prince William Sound. The suitability of the "Sitka-class" FVF for year-round service in Prince William Sound depends on exposure time. FVF transit times between Prince William Sound ports exceed two hours but the crossings of the central sound are on the order of one hour. At two-hour exposure, indications are that both active trim tabs and T-foils would be necessary to meet passenger comfort goals, but at one-hour exposure active trim tabs alone would suffice. The "Sitka-class" FVF is to be delivered with active trim tabs and foundations for a possible future installation of T-foils. It is recommended that the design-build contractor awarded the FVF be commissioned to prepare a supplemental seakeeping and passenger motion sickness incidence report for operations on Prince William Sound.

Snow Loads

Snow loads at Valdez are 242% greater than those at Juneau and snow loads at Cordova are 43% greater than those at Juneau. It is recommended that the design-build contractor awarded the FVF be commissioned to prepare a supplemental report describing any changes necessary for the "Sitka-class" FVF to operate in the presence of these higher snow loads.

Air and Seawater Temperatures

Air and seawater temperature distributions are comparable to those in Southeast Alaska and consistent with the AMHS Owner Requirements for the FVF. There is no indication that there are any design impacts on the FVF from air or seawater temperatures in Prince William Sound.

Floating Ice

Compared to AMHS operations in Southeast Alaska there is a greater presence of floating glacial ice in Prince William Sound. The "Sitka-class" FVF will be provided with a marine infrared imaging system capable of detecting floating ice as well as two pairs of night vision binoculars. During development of the AMHS FVF Owner Requirements, forward scanning sonars were investigated as a possible means to detect floating glacial ice and other debris. The conclusion at that time was that, while there were promising technologies under development, none was close to proven or close to production. In consideration of the greater hazard represented by floating ice in Prince William Sound, before any FVF is introduced into year-round service there, it is suggested that forward scanning sonar technologies again be reviewed to determine if useful products are available.

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