Alaska Department of Transportation and Public Facilities

Let's Get Moving 2030

Technical Appendix

System Level Needs Analysis and Finance Analysis

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Let's Get Moving 2030

Alaska Statewide Long-Range Transportation Policy Plan

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I. Introduction and Organization

This document is the technical appendix to *Let's Get Moving 2030* Alaska's statewide long-range transportation plan. The technical appendix provides the detailed results and methodology employed to measure current needs and to forecast future system level needs analysis through the year 2030.

Guiding Principles

The long-range plan methodology is designed to meet the following guiding principles:

- Provide system-level information instead of project specific information to support project prioritization and policy decisions
- Address all modes of transportation
- Use available data and analysis as much as possible to ensure data validity and consistency of assumptions with other transportation plans
- Provide a realistic baseline quantification of the state's needs to inform policy and planning decisions

Document Organization

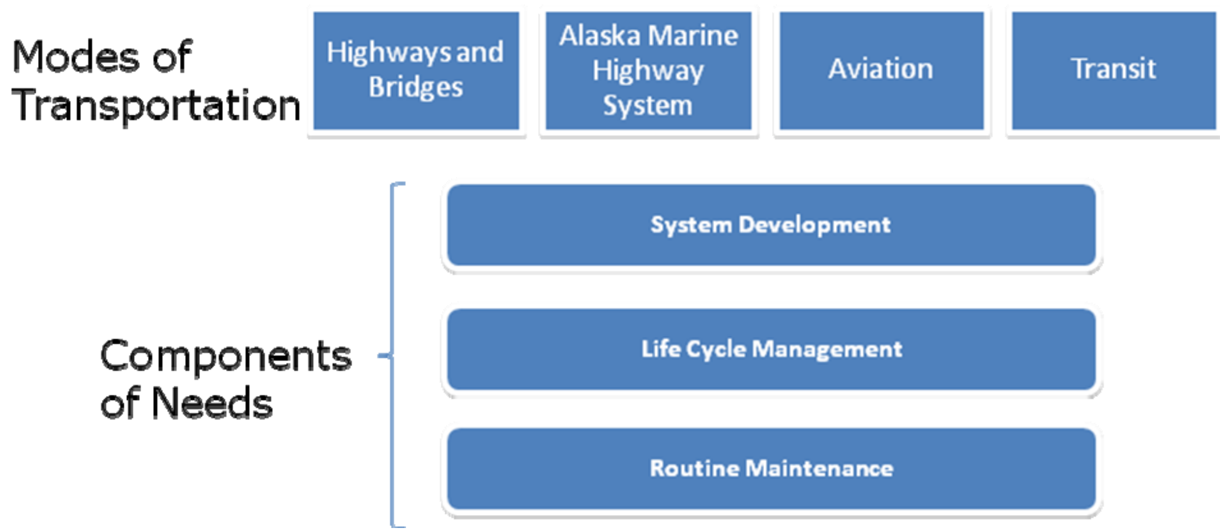
The document is divided into two sections: needs analysis, and revenue analysis.

Needs Analysis

Needs analysis for the different modes of transportation, and components of needs are presented in turn. For each component of needs the concepts and terminology used are defined, the analysis approach explained, current conditions described, and the system level needs through 2030 detailed.

The modes of transportation included in the analysis are highways and bridges, the Alaska Marine Highway System (AMHS), aviation, and transit. The three primary components of need are system development, life cycle management, and routine maintenance. The focus of the analysis is on modal components that are managed by the Alaska Department of Transportation and Public Facilities (ADOT&PF). Exhibit 1 below presents the overall organization of the needs analysis by mode and by component of need.

Exhibit 1: Needs Analysis – Overall Organization



Finance Analysis

The finance analysis section presents the overall revenue findings, analysis of historical revenues, and a forecast of revenues. The analysis explains the risks to future funding due to ADOT&PF's dependence on federal funds.

Modes of Transportation

The Alaska transportation system comprises of highways and bridges, the Alaska Marine Highway System (AMHS), aviation system (Airports), and the transit system. Alaskans have historically relied on marine system and aviation besides roads to meet their transportation needs. This situation still holds true, primarily due to the unique geography of the state.

An overview of the modes of transportation addressed in the plan follows:

Roads and Bridges

ADOT&PF is responsible for most of the roads and bridges in the state, except for some local roads that are classified as Community Transportation Program (CTP) roads. ADOT&PF's responsibility covers about 14,800 lane miles of road and about 1,000 bridges across the state. The number of miles of state-owned roads grew less than 2% between 1997 and 2005.

Airports

ADOT&PF is also responsible for about 250 airports. This does not include a few of the major airports such as Juneau International Airport, owned by the city, or the numerous private and community airports and landing strips across the state.

Alaska Marine Highway System

AMHS operates ferry vessels across the state serving about 30 coastal communities, some of which have no road access. These vessels transport people, freight, and vehicles. The system consists of a total of 11 vessels. The ferries' age ranges from 2 to 44 years old, with M/V Chenega being the newest addition in 2005, and M/V Taku, M/V Malaspina, and M/V Matanuska the oldest, all commissioned in 1963.

Transit

ADOT&PF provides planning and program management support for public transportation primarily through federal surface transportation funds. The public transportation is operated by each community's local government, or by a consortium of private non-profit agencies in league with local government. The communities of Anchorage, Juneau, and Fairbanks operate conventional fixed route bus systems, while several other communities and/or private-non-profit ventures operate demand-responsive service. Transit ridership statewide has been increasing over time. In 2006, a total of 6.5 million one-way trips were taken on transit systems in Alaska.

Components of Needs

Needs are grouped by mode because there are some aspects of need that are unique to each mode. For example, the life cycle management needs for roads are significantly different from the recertification and refurbishment needs for AMHS vessels.

To assess ADOT&PF's total needs, the needs are divided into three categories: system development, life cycle management, and routine maintenance. The needs for all state owned assets' (roads, bridges, airports, AMHS vessels, etc) can be broken down into the above mentioned components.

The three needs components are briefly explained below:

1. System Development

System development consists of further developing the system and adding new assets. This includes constructing new roads, new airports, expanding runways, or adding new vessels to the AMHS. System development aims to reduce congestion, to improve safety, to provide better connectivity to particular areas, or to enable economic development.

2. Life Cycle Management

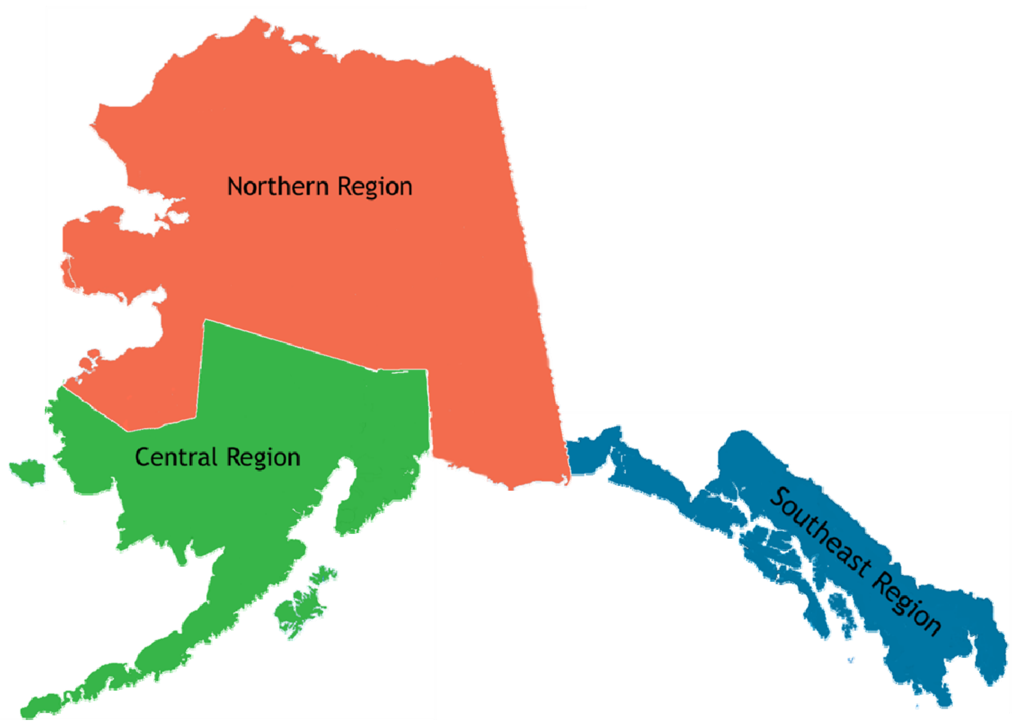
Life cycle management is generally defined as periodic rehabilitation work required to preserve the value of assets (roads, bridges, etc.). This does not include routine maintenance activities like patching potholes on roads, mowing activities, or ice removal from roads/airports. Life cycle management activities differ for highways, bridges, AMHS, and aviation; each requiring different treatments and treatment cycles.

3. Routine Maintenance

Routine maintenance refers to discrete activities that are performed on a yearly basis, typically seasonal in nature. Common routine maintenance activities include: snow and ice removal, pothole patching, minor crack sealing, striping, cleaning culverts, mowing and sign repair. Many of these activities are tightly related to the future condition of the state's transportation infrastructure and affects the timing and nature of preservation work or lifecycle management. These activities differ by mode of transportation and type of asset.

ADOT&PF Organization

ADOT&PF is divided into three regions for practical planning and organizational purposes – the Northern, Central, and Southeast regions. These regions are shown on the map following:



Needs Analysis Organization

Needs analysis for each mode is presented in the following sections and is organized as follows:

Concepts and definitions: This section explains the general concepts related to needs components, and provides definitions of terminology used in the technical analysis.

Analysis approach: This section describes the approach for needs analysis components and provides an overview of the models that were developed for the needs analysis. The section also explains which system elements were used for the analysis and what parts of the system were included or excluded from the analysis.

Current condition: This section describes the extent of the transportation system today, the current condition of the system, and the backlog of life cycle management needs.

System development needs: This section explains the system development needs for the mode.

Life cycle management needs: This section explains the life cycle management needs for the mode.

Routine maintenance needs: This section explains the routine maintenance needs for the mode.

Total modal needs: This section aggregates all needs and presents them through 2030, and in terms of annualized dollar amounts.

II. Needs Analysis: Highways and Bridges

Concepts and Definitions

1. Maintenance: Life Cycle Management and Routine Maintenance

After a road is built, different activities have to be performed on the road in order to provide acceptable service to users over the life of that roadway. These activities can be grouped into routine maintenance and life cycle management (pavement or bridge preservation). The timing and combination of these activities determine how soon a road will require rehabilitation or reconstruction. The following defines the terminology used in the analysis.

Pavement preservation: Pavement preservation treatments improve the overall condition of the road and retard the overall rate of deterioration. These treatments are relatively inexpensive when compared to reconstruction or rehabilitation. Common preventive maintenance treatments include crack sealing, chip sealing, microsurfacing, and diamond grinding.

Pavement rehabilitation: Pavement rehabilitation treatments are typically applied to roads when extensive deterioration has taken place that cannot be addressed through pavement preservation. Pavement rehabilitation treatments address the structural condition of the road and, in the worst case, requires reconstruction of the roadway.

Reconstruction backlog: The reconstruction backlog is the lane miles that need rehabilitation and cannot be effectively improved through preservation type treatments. Currently many of ADOT&PF's roads fall into this category and are considered part of the backlog.

Pavement preservation, rehabilitation, and reconstruction together comprise the life cycle management needs for the pavement portion of the highway system.

Proper life cycle management and routine maintenance ensure that the assets (roads/bridges) provide maximum value to the state. Proper life cycle management and routine maintenance increase the life of the assets by years, and decrease the cost to maintain them each year. Life cycle management, routine maintenance, and operating costs together constitute ADOT&PF's total cost of ownership. There is well established engineering science that can be used to show that with the appropriate levels of funding the total costs of ownership can be reduced.

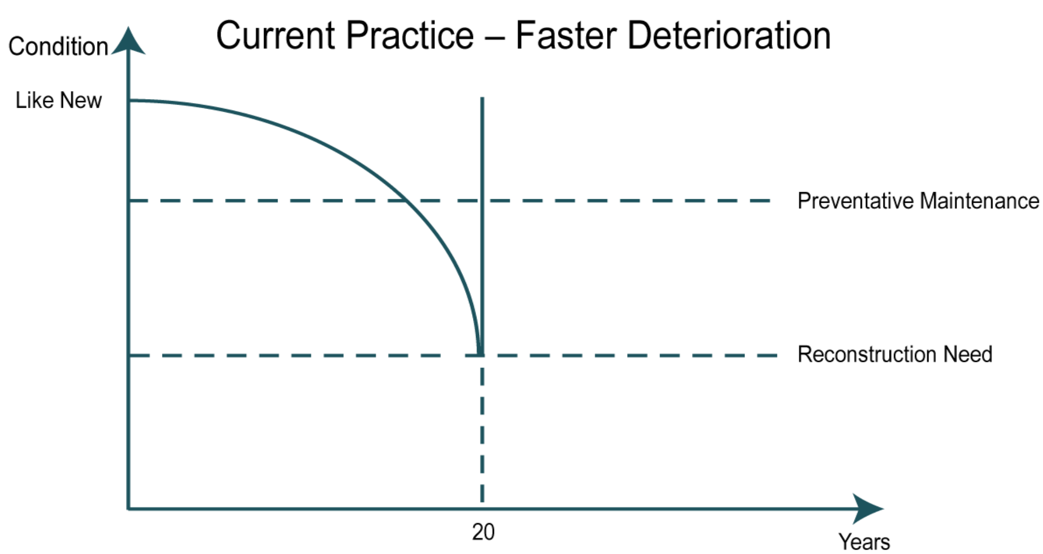
The relationship between routine maintenance, pavement preservation, and pavement rehabilitation/reconstruction is illustrated in the following exhibits.

- Exhibit 2 illustrates what happens when poor or suboptimal practices occur either due to lack of funds, prioritizing other work, or mismanagement. In this circumstance, routine maintenance is performed each year at the required level but no other treatments, like chip sealing or crack sealing, are performed at regular intervals. In this situation paved surfaces will deteriorate to the point of reconstruction (in approximately 20 years). The only possible treatment at that point to improve the condition will be reconstruction.

Exhibit 2: Maintenance Expenditures (Current Practice)

- Exhibit 3 illustrates a typical pavement deterioration curve absent periodic pavement preservation treatments. In this circumstance the pavement condition deteriorates until reconstruction is performed, at which point the condition changes to almost that of a new road.

Exhibit 3: Pavement Condition (Current Practice)



The situation illustrated in Exhibits 2 and 3 differs markedly from a best practice approach designed to reduce the life cycle management costs. Under such an approach, proper routine maintenance is performed every year and several pavement preservation activities are performed throughout the life cycle of the road extending its life to 30 years.

Exhibit 4 shows the optimal life cycle treatments for the Southeast region. As shown in the exhibit, crack sealing is performed at years 3 and 18; patching at years 5, 10, 20, and 25; chip seal at years 7 and 22; overlay at year 15, and reconstruction at year 30.

Exhibit 4: Life Cycle Management – Optimal Treatments (Southeast Region)

	Crack Sealing	Patching	Chip seal	Overlay	Reconstruction
Timing (Years)	3 18	5 10 20 25	7 22	15	30
Cost ($/Ln-mi)	$900	$750	$65,000	$225,000	$500,000

The optimal treatment cycle for Southeast region is shown in Exhibit 5 graphically, while the corresponding pavement condition is shown in Exhibit 6. The treatment cycle shown in Exhibit 6 ensures that the pavement condition does not deteriorate below the acceptable level, and reconstruction is not required as early as in the other two illustrations. In the optimal scenario, reconstruction is required at 30 years, reducing the average cost per lane mile to $64,000, thus providing the state with the maximum value versus the “worst first” illustration in Exhibit 2. The treatment cycles and timings shown below represent the optimal practice for the Southeast region, and differ for the other two regions.

Exhibit 5: Life Cycle Management Optimal Practice Expenditures (Southeast region)

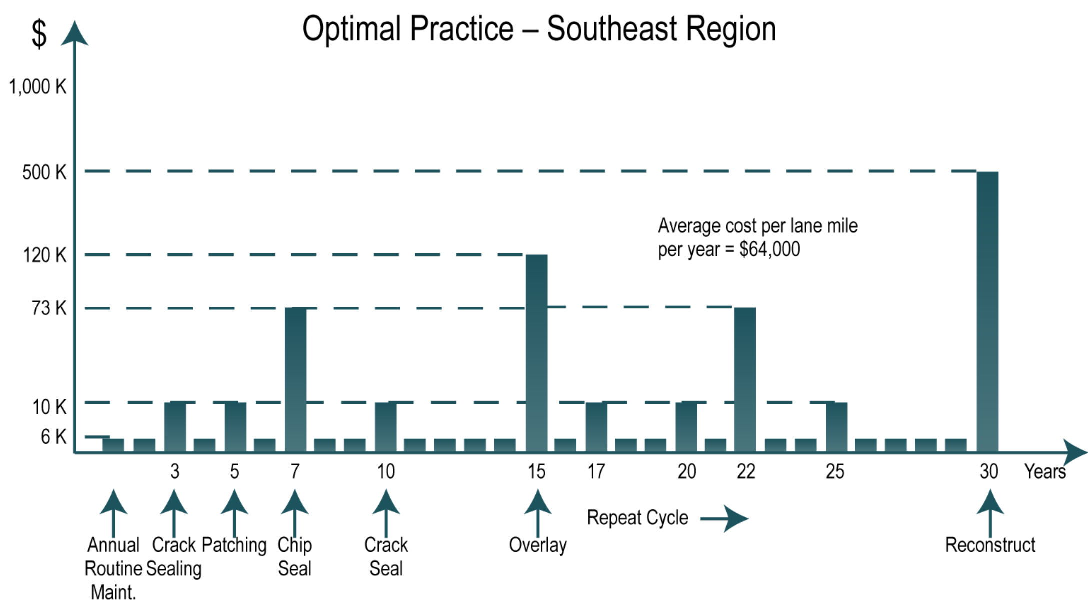
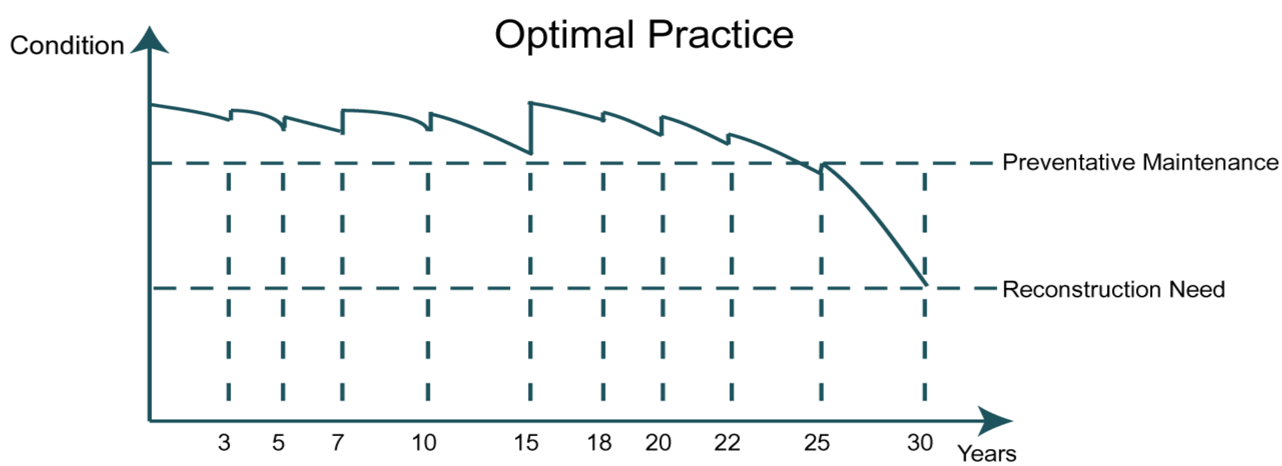


Exhibit 6: Life Cycle Management Optimal Practice Pavement Condition (Southeast region)



International Roughness Index (IRI)

ADOT&PF uses the International Roughness Index (IRI) and rutting as its two primary measures of road conditions. IRI is a measure recommended by the Federal Highways Administration (FHWA) and was developed by the World Bank in the 1980s. The index measures pavement roughness in terms of the number of inches per mile that a laser, mounted in a specialized van, jumps as it is driven across the highway. A lower IRI number indicates a smoother ride. The ADOT&PF threshold for IRI is 170 inches/mile on NHS roads, and 220 inches/mile on non-NHS roads.

Rutting

A rut is a depression or groove worn into a road or path by the travel of wheels or by erosion from flowing water. Pavement ruts are of concern for at least two reasons: Accumulated water in the ruts can penetrate the pavement and damage structural integrity and ruts affect driver safety (ruts can influence steering control). The picture below shows how rutting affects the leveling of a road:

Leveling course for Tudor Road; Anchorage, Alaska. Photo courtesy of Mohammed Javed Ahmed.

The ADOT&PF standard for rutting is 0.5 inches for both NHS and non-NHS roads.

Remaining Service Life (RSL)

Remaining Service Life (RSL) of a road is the time (usually in years) that a road will be in an acceptable condition before it requires treatments to improve its level of service. In other words, the RSL is the time at which either the IRI or rutting values fall below ADOT&PF standards. The time at which IRI and rutting values fall below standards are calculated by extrapolating historical IRI and rutting information. A road that is beyond its RSL is considered to be a part of the system life cycle management backlog and should be treated as soon as possible.

Functionally Obsolete Bridges

Functionally obsolete bridges are those bridges that were designed using older bridge design standards that are significantly different from current standards and/or the bridge does not meet current traffic demands. For example, if a bridge has narrower lanes and no shoulders in comparison to the roadway approaching the bridge it is considered functionally obsolete.

Facilities, including bridges, are designed to conform to the design standards in place at the time they are designed. Over time, improvements are made to the design requirements. As an example, a bridge designed in the 1930s would have shoulder widths in conformance with the design standards of the 1930s. However, the design standards have changed since the 1930s. Therefore, current design standards are based on different criteria and require wider bridge shoulders to meet current safety standards. The difference between the required, current-day shoulder width and the 1930s designed shoulder width represents a deficiency. The magnitude of these types of deficiencies determines whether the existing conditions cause the bridge to be classified as functionally obsolete.

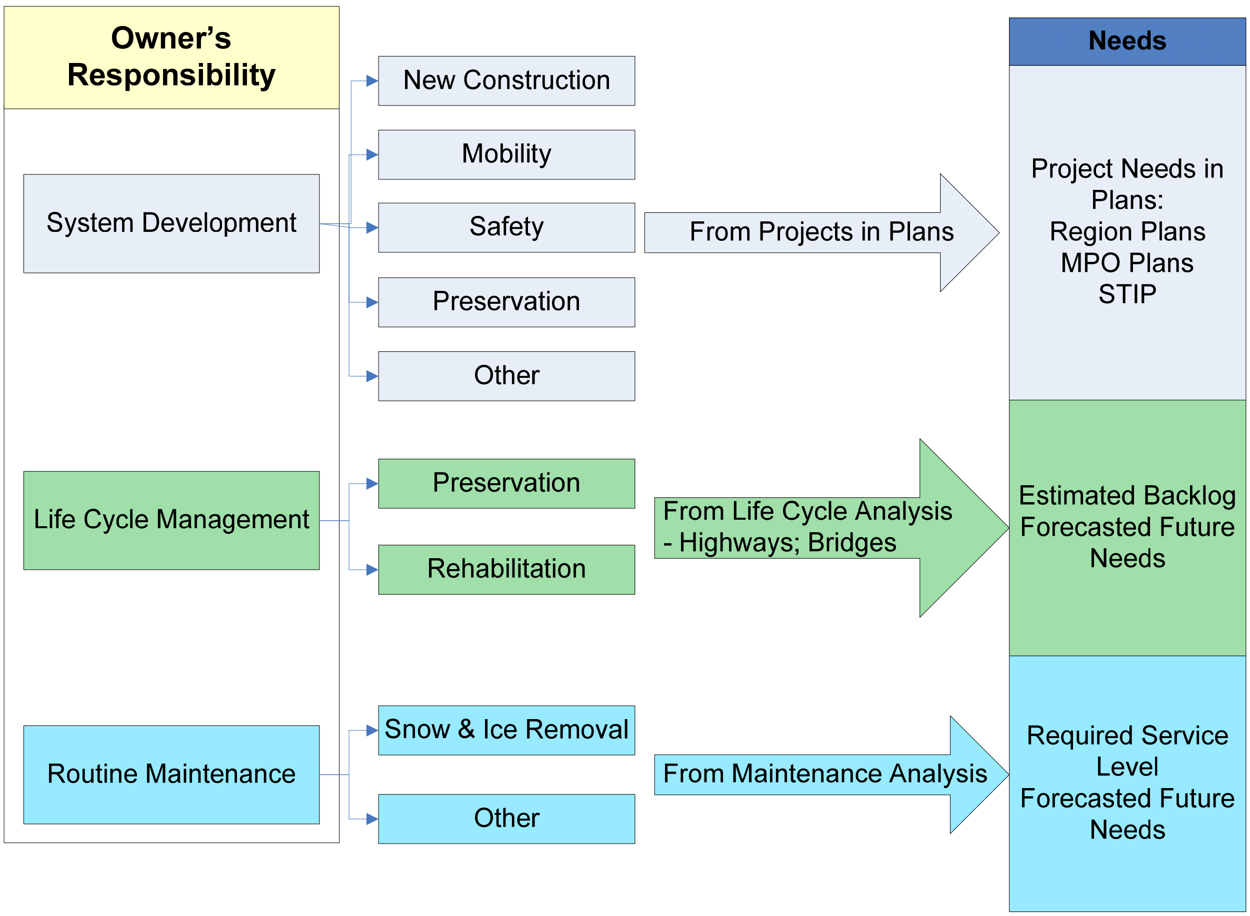
Structurally Deficient Bridges

Bridges are considered structurally deficient if significant load carrying elements are found to be in poor or worse condition due to deterioration and/or damage or if the adequacy of the waterway opening provided by the bridge is determined to be extremely insufficient to the point of causing intolerable traffic interruptions. The fact that a bridge is "deficient" does not immediately imply that it is likely to collapse or that it is unsafe. With hands-on inspection, unsafe conditions may be identified and, if the bridge is determined to be unsafe, the structure must be closed. A "deficient" bridge, when left open to traffic, typically requires significant maintenance and repair to remain in service and eventual rehabilitation or replacement to address deficiencies. In order to remain in service, structurally deficient bridges are often posted with weight limits to restrict the gross weight of vehicles using the bridges to less than the maximum weight typically allowed by statute.

Analysis Approach

Exhibit 7 below shows the needs analysis approach for highways and bridges.

Exhibit 7: Highways and Bridges Needs Analysis Approach



ADOT&PF's responsibilities for highways and bridges are divided into three basic needs categories: system development, life cycle management, and routine maintenance.

These elements were further broken down as shown in exhibit above.

State owned roads are grouped according to whether they are on the National Highway System (NHS) or not on NHS. Other roads (Community Transportation Program (CTP) roads and local roads), bicycle and pedestrian trails, and sign/signal needs for both roads and bridges are not included in the analysis.

The analysis approach for each of the system elements is explained below:

System Development Needs Analysis Approach

System development needs for highways and bridges are divided into new construction, mobility, safety, preservation (reconstruction), and other needs. Roads and bridges were considered together for calculating system development needs.

System development needs for roads and bridges were arrived at by consolidating all system development needs that are identified and quantified in approved regional plans, MPO plans, and the Statewide Transportation Improvement Program (STIP). Plans that are in progress and are soon to be adopted were also included in the analysis.

Exhibit 8 below lists the regional and MPO plans that provide the source data for estimating system development needs.

Exhibit 8: Regional and MPO Plans That Define System Development Needs

Transportation Plan	Plan Created	End Year
Regional Plans		
Interior transportation plan + Corridor needs (From un-formalized plan)	-	2030
Northwest Alaska transportation plan	2004	2025
Prince William Sound transportation plan	2001	2025
Southwest Alaska transportation plan	2004	2025
Southeast Alaska transportation plan	2004	2025
Yukon-Kuskokwim Delta transportation plan	2002	2025
MPO and other plans		
Anchorage bowl transportation plan (AMATS)	2005	2025
Fairbanks MPO transportation plan (FMATS)	2005	2025
Mat-Su transportation plan	2006	2025
Parks highway plan	2006	2030
Statewide Transportation Improvement Program (STIP)	2006	2009

New construction projects are those conducted throughout the state with the intention of improving connectivity between communities and supporting economic development.

Mobility refers to any new projects/improvements that are primarily intended to increase mobility and reduce congestion. Safety projects are those that are conducted to improve safety on existing roads/bridges or corridors. Preservation projects refer to those projects specifically categorized as reconstruction or rehabilitation projects in the plans. Other needs category has been used to group together all needs that could not be easily categorized into the above categories. These consist of some improvement needs and other uncategorized needs from all the plans. Statewide system development needs are defined as the sum of the system development project needs identified in the listed plans and these address the various types of needs listed above.

Projects identified in the individual plans were compared against the STIP to ensure that there was no double counting. Since the plans were prepared between 2001 and 2006, each plan's costs were inflated to present the needs in today's dollars. An inflation factor of 10% per year was used to bring the plan costs up to today's dollars. This inflation factor was arrived at by analyzing construction cost increase data for the last five years for the state and comparative data around the country.

It has been assumed that due to rapid construction inflation in the recent years, projects in the plans will require a higher budget than planned, and the projects planned till 2025 will extend till 2030 due to these higher costs.

Life cycle management needs analysis approach

Life cycle management needs are primarily divided into the rehabilitation and preservation needs for existing assets.

The life cycle management for roads and bridges differ because of the components involved for each. For example, roads need to be milled and overlaid, patched, and then reconstructed during their life cycle. On the other hand, bridges need separate treatments for the superstructure, deck, and the substructure. The ADOT&PF bridge section maintains an inventory of bridges and all treatments performed on the bridges through their PONTIS bridge management system. Due to these differences, bridge life cycle management needs were separately analyzed from roads life cycle management needs. Paved and unpaved roads require different life cycle management related treatment cycles and were also addressed through separate analytical assumptions.

Roads – paved

First, the current conditions of the roads were determined using data from the ADOT&PF maintenance division. The current conditions were assessed by region and whether the roads were on or off the National Highway System (NHS). The road conditions were then compared to ADOT&PF standards to determine whether the roads met current standards or not. Since condition data for only about 70% of the system was available, it was assumed that roads that did not have conditions reported were in similar condition as the rest of the roads in the same group of roads. The road mileage and condition data is reported along with paved road needs.

Current standards for paved roads are a maximum IRI value of 170 inches/mile on NHS roads, and 220 inches/mile on non-NHS roads. The ADOT&PF standard for rutting is a maximum of 0.5 in for both NHS and non-NHS roads. Based on the IRI and rutting values, Remaining Service Life for the roads was calculated. Since the IRI, rutting and RSL values were estimates from 2005 data collection, a RSL of 0 means that in 2006, a rehabilitation or reconstruction treatment should have been done. A RSL of 1 indicates that the road should be treated in 2007. Road sections with a negative RSL are past due and are part of the backlog. Therefore all road sections with a negative or zero RSL were considered part of the backlog.

Life cycle management treatments, their corresponding timings, and unit costs for each treatment were determined specifically for each region through discussions with ADOT&PF's maintenance managers and then based on their professional judgment. This resulted in the development of an optimal treatment cycle for life cycle management on paved roads for each region, which formed the basis of the analysis model that was developed.

A specific treatment: High Float Surface Treatment (HFST) was identified as being used specifically in the Northern region on some of the roads that are susceptible to permafrost conditions. The timing of this treatment is different than other treatments, and hence was accounted for separately in the analysis. Regions provided only one unit cost for both NHS and non-NHS routes, but the model was built to allow using different costs by ADOT&PF in subsequent analysis. The goal of these treatments and their timings is to ensure that all roads meet ADOT&PF standards with the lowest lifecycle management costs. For each road asset, the current timing of the road within the life cycle was determined using its current condition and the year of construction of the road. This serves as an estimate of where the road is on the deterioration curves used in prior exhibits.

Based on this information, the road assets that required each type of treatment were determined by year. This helped develop the yearly cost for life cycle management of assets. An inflation factor of 3% was used for costs each year. It should be noted that these costs are averages as actual costs will depend on many factors like road width, thickness, traffic control required, etc.

Roads – unpaved

Unpaved road condition is not recorded by ADOT&PF, and hence, the threshold value approach to treatment timing used for paved roads does not apply to unpaved roads. Treatment cycles and costs for unpaved roads were determined through discussions with ADOT&PF maintenance managers based on their experience. The treatment cycles and costs used were the same for different system classifications and regions. Two treatments were identified for unpaved roads, and it is assumed that the work required on these roads will be evenly distributed throughout the life cycle. The two treatments are: adding dust palliatives every two years and adding surface material every ten years.

Bridges

First, the current conditions of the bridges were determined using data from the bridge management system. Since bridge deterioration is more dependent on the material types (concrete, steel, wood) and is different for the three primary bridge components (deck, superstructure, substructure), these components and material types were used to create deterioration models for bridges. The condition of each bridge was calculated as its Health Index (HI) – a weighted average of element conditions, with a value of 100% indicating a bridge or set of elements in the best defined condition state and a value of 0% indicating a bridge or set of elements in the worst state. Treatments, their associated costs, and trigger points for the treatments were determined through data from ADOT&PF's bridge management system and in concurrence with ADOT&PF staff members. ADOT&PF's goal for bridges included in the analysis is to ensure that none of the bridges are structurally deficient. The treatments required to achieve this goal each year were analyzed, and funding needs to achieve this goal were calculated till year 2030. These needs were then averaged per year to arrive at annualized needs.

Routine maintenance needs analysis approach

Routine maintenance needs for highways and bridges were divided into snow and ice removal needs and other routine maintenance needs. Snow and ice removal is one of the major activities performed by routine maintenance crews around the state. The routine maintenance on both roads and bridges is performed by the same crews, and are managed together by ADOT&PF.

Current expenditures were obtained from maintenance managers and used to calculate current expenditures per lane mile by region for NHS and non-NHS roads. An excel-based model was developed so that the needs can be revised easily in the future with updated costs per lane mile and/or number of lane miles in the state, as the road network further develops and/or revised cost data becomes available.

It was concluded through discussions with maintenance managers that the current funding level for routine maintenance is not sufficient to provide a level of service consistent with sound life cycle management practices. A detailed analysis of maintenance needs based on the cost of meeting a desired level of service was not conducted due to data availability constraints. We understand that ADOT&PF has work under way to establish maintenance level of service measures.

It was agreed upon by ADOT&PF maintenance managers that the funding level in 1983 was sufficient at that time, and has not kept up with inflation since then. Inflation during the time grew about 3.4%[1] per year, while the maintenance budget grew at about 0.7% per year. Maintenance needs are based on the conservative assumption that bringing the maintenance budget back up to its 1983 level adjusted for CPI measured inflation will help meet ADOT&PF's routine maintenance needs. This increase should be considered a conservative estimate since the number of lane miles, maintenance costs, and other factors have driven up costs to maintain highways and bridges over time. In recent years, materials, especially fuel and asphalt, have increased in cost at a higher rate than the CPI.

The needs per lane mile per region and road classification were calculated based on the assumption above to arrive at current routine maintenance needs. These needs were inflated at a rate of 3% per year till year 2030.

Current Condition

Highways

The state of Alaska, while being the largest state in terms of area, has one of the lowest miles of roads in the nation. The states that have lower road miles than Alaska are given below, along with their area rankings:

Delaware (49), District of Columbia (51), Hawaii (43), Rhode Island (51)

[1] Anchorage CPI – USDOL, Bureau of Labor Statistics

The primary reasons for the lack of road miles in Alaska are extreme weather, rugged terrain, low population density, and scattered islands in the state that make road construction very difficult and costly.

The state of Alaska has about 14,800 lane miles. This number does not account for all Community Transportation Program (CTP) roads in the state.

Out of the 14,800 lane miles, around 10,750 lane miles are paved. Exhibit 9 below presents the road mileage by each region (Northern, Central and Southeast) and by the highway system (NHS, Non-NHS). This data was obtained using data provided by ADOT&PF maintenance managers.

Exhibit 9: Road Mileage by Region and System Class

Region	System Class	Paved Lane Miles	Unpaved Lane Miles
Northern	NHS	3,825	423
Northern	Non NHS	1,403	2,714
Central	NHS	2,491	0
Central	Non NHS	1,711	760
Southeast	NHS	287	0
Southeast	Non NHS	1,041	166
Total	NHS	6,603	423
Total	Not NHS	4,155	3,640
Grand Total		**10,758**	**4,063**

As shown in the exhibit above, the Northern region has the highest number of lane miles, while the Southeast region has the least miles.

Condition data was not available for all roads, and it has been assumed that roads that do not have condition data available would be in similar condition as the rest of the roads in the same group (region and system class). Exhibit 10 shows the availability of condition data for road miles in column "Materials: Condition report" and actual road miles in column "Regional Information". The "difference" column presents the difference in terms of lane miles and in terms of percentages.

Exhibit 10: Availability of Condition Data by Lane Miles

		Materials: Condition Report (lane Miles)	Regional Information (lane miles)	Difference	
Northern	NHS	2,850	3,825	975	25%
	Non- NHS	451	1,403	952	68%
	Total	3,301	5,228	1,927	37%
Central	NHS	2,031	2,491	460	18%
	Non- NHS	814	1,711	897	52%
	Total	2,845	4,202	1,357	32%
Southeast	NHS	240	287	47	16%
	Non- NHS	748	1,041	293	28%
	Total	988	1,328	340	26%
	TOTAL	**7,134**	**10,758**	**3,624**	**33.7%**

Exhibit 11 below shows the current conditions of Alaska's roads in terms of rutting and IRI values. As explained in the section "Concepts and definitions", ADOT&PF uses FHWA recommended International Roughness Index (IRI) thresholds for pavement rehabilitation work. An IRI of 170 (inches per mile) or more on National Highway System (NHS) is considered below-standards and triggers pavement rehabilitation recommendations, while an IRI of 220 or above does the same for non-NHS roads.

A rut depth of 0.5 inches or more is considered sub-standard and triggers rehabilitation recommendations.

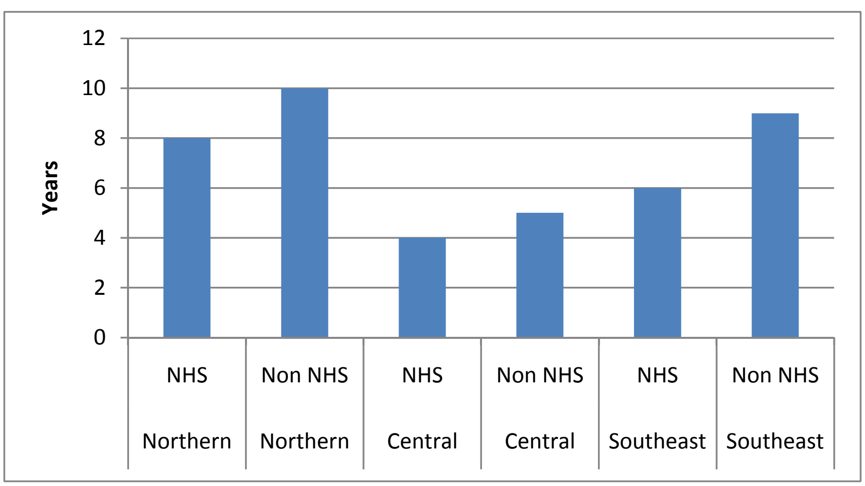
The Average Remaining Service Life (RSL) shown in Exhibit 11 is the number of years a road will be in service at acceptable level of service if no work is performed on the road. For example, for Northern region NHS roads, 20% of the roads report high IRI values (above ADOT&PF standards), while 1% report high rutting. The average RSL of Northern region NHS roads is 8 years.

Exhibit 11: Road Condition and Remaining Service Life (RSL)

Region	System Class	Lane Width <12	Lane Width >12	High IRI %	High Rutting %	IRI and Rutting %	Avg. RSL
Northern	NHS	45	1820	20%	1%	0%	8
Northern	Non NHS	158	1472	8%	1%	1%	10
Central	NHS	19	750	4%	23%	1%	4
Central	Non NHS	91	845	4%	26%	3%	5
Southeast	NHS	3	134	13%	8%	6%	6
Southeast	Non NHS	31	292	13%	5%	1%	9
Total	NHS	67	2703	13%	10%	1%	6
Total	Not NHS	280	2608	8%	12%	2%	8
Grand Total		**347**	**5312**	**11%**	**11%**	**1%**	**7**

Exhibit 12 below shows the average RSL by region and system type. It indicates that Central region NHS roads have the least average RSL, while Northern region non-NHS roads have the highest average RSL.

Exhibit 12: Remaining Service Life (RSL) - Years

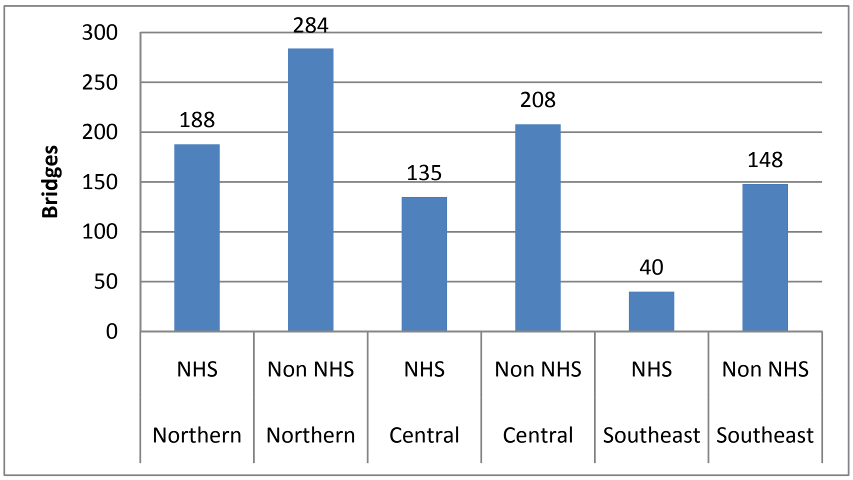


Bridges

ADOT&PF owns and maintains about 1,000 bridges across the state. Some 47% of these bridges are in the Northern region; about 36% are on the NHS, while the rest are off the NHS.

Exhibit 13 below shows the distribution of bridges across the state.

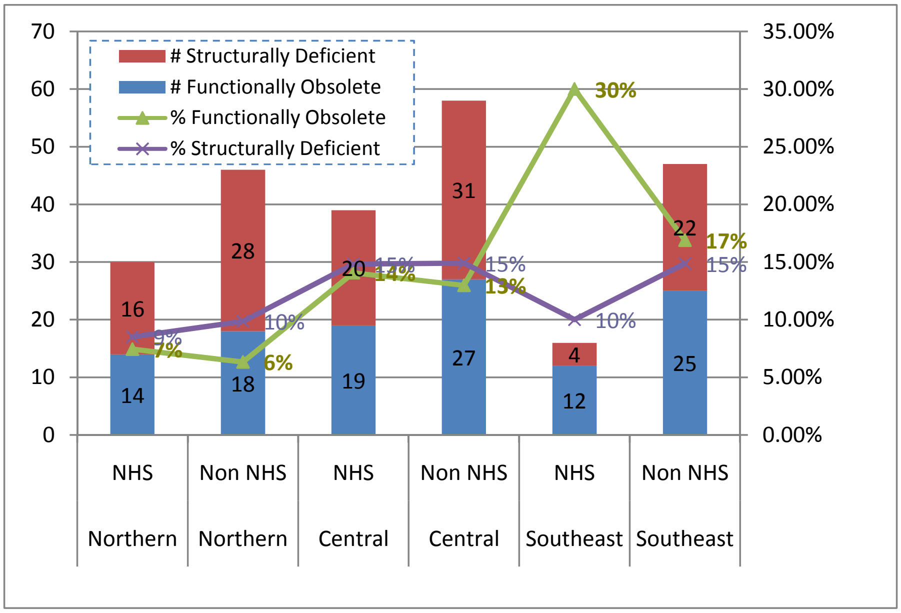
Exhibit 13: Bridges by ADOT&PF Region and by System



Of these bridges, about 11.5% of the bridges are functionally obsolete by FHWA standards, and about 12% of the bridges are structurally deficient. While some of the "functionally obsolete" bridges may still be considered functionally sufficient by ADOT&PF due to sparse traffic, the structurally deficient bridges are the ones that are more critical to address.

Exhibit 14, following, shows the distribution of structurally deficient and functionally obsolete bridges around the state. The left axis indicates the number for structurally deficient and functionally obsolete bridges shown as bars, while the right axis shows the percentage of structurally deficient and functionally obsolete bridges as shown by lines on the exhibit.

Exhibit 14: Structurally Deficient and Functionally Obsolete Bridges



System Development Needs

The system development needs from all approved regional and MPO plans, from yet to be approved plans, and the STIP are reported in Exhibit 15 below. These numbers have been adjusted to 2007 dollars to account for inflation since each plan's inception.

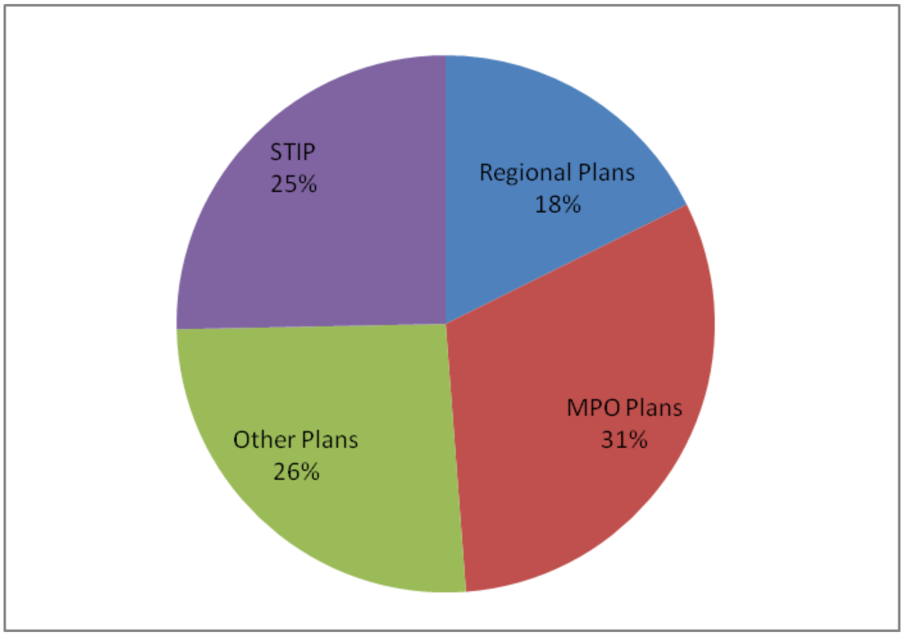
It is important to mention here that these numbers are estimates from plans, and the actual projects, scope, and costs may vary based on many factors that can only be determined through project-level planning.

Exhibit 15: System Development Needs Through 2030

Transportation Plans	System Development needs ($ millions)
Regional Plans	
Interior transportation plan + Corridor needs (From un-formalized plan)	$1,673 m
Northwest Alaska transportation plan	$605 m
Prince William Sound transportation plan	None
Southwest Alaska transportation plan	$189 m
Southeast Alaska transportation plan	$1,358 m
Yukon-Kuskokwim Delta transportation plan	$92 m
MPO and other plans	
Anchorage bowl transportation plan (AMATS)	$2,926 m
Fairbanks MPO transportation plan (FMATS)	$1,027 m
Mat-Su transportation plan	$1,320 m
Parks highway plan	$295 m
Statewide Transportation Improvement Program (STIP)	$3,215 m
Total	**$12,700 m**

Exhibit 16 presents the needs graphically:

Exhibit 16: System Development Needs



Life Cycle Management Needs

Life cycle management needs for paved roads, unpaved roads, and bridges were derived from the analysis models developed using the approach and assumptions outlined in the prior sections. These needs are reported below.

1. Paved Roads

Based on the Remaining Service Life (RSL) data available, it was determined that there is a current backlog of 2,426 lane miles that require immediate reconstruction. This represents 22% of the paved road system in the state.

Exhibit 17 below shows the treatment cycles, timings, and costs for paved road life cycle management that were determined for each region through discussions with ADOT&PF maintenance managers. For example, Northern region NHS roads require crack sealing at 5 and 15 years into their life at current costs of $4,752 per lane mile; patching at 7 and 17 years into their life cycle at current cost of $750 per lane mile; overlay at 10 years into the life cycle at the cost of $150,000 per lane mile, and rehabilitation/reconstruction at 20 years at the cost of $500,000 per lane mile. These treatments differ for roads treated using HFST in the Northern region, and the treatment cycle is shown in Exhibit 18.

Exhibit 17: Life Cycle Management Treatment Cycles

			Crack Sealing	Patching	Chip Seal	Patching	Overlay	Crack Sealing	Patching	Chip Seal	Patching	Rehab
Northern	Timing (Years)	NHS	5	7			10	15	17			20
		Non-NHS	5	7			10	15	17			20
	Cost ($/Ln-mi)		$4,752	$750	$53,856	$750	$150,000	$4,752	$750	$53,856	$750	$500,000
Central	Timing (Years)	NHS	3	4			7	10	11			14
		Non-NHS	3	5		8	10	13	15		18	20
	Cost ($/Ln-mi)		$2,600	$800		$2,600	$250,000	$2,600	$800		$2,600	$500,000
Southeast	Timing (Years)	NHS	3	5	7	10	15	18	20	22	25	30
		Non-NHS	3	5	5	10	15	18	20	20	25	30
	Cost $/Ln-mi)		$900	$750	$65,000	$750	$225,000	$900	$750	$65,000	$750	$500,000

As mentioned in the approach section earlier, High Float Surface Treatment (HFST) that is extensively used in the Northern region was separately accounted for and the timing and costs for HFST are shown in Exhibit 18 below.

Exhibit 18: Northern Region HFST Treatment Cycle

		Patching	Patching	HFST	Patching	HFST
HFST (Northern)	NHS	3		5	8	10
	Non-NHS	3		5	8	10
Cost ($/Ln-Mi)		$750		$47,520	$750	$60,192

It appears that currently funds spent on preservation are being applied in a "worst first" manner which means that the backlog will continue to grow. Our analysis indicates that the backlog will grow rapidly with a large number or roads reaching the end of their service life and require reconstruction between 2016 and 2025. A summary of life cycle needs are shown in Exhibit 19 below.

Exhibit 19: Summary of Life Cycle Needs ($Millions)

		Backlog ($ Millions)	Life Cycle Needs 2008 – 2030 ($ Millions)	Total ($ Millions)
Northern	NHS	$219	$2,564	$2,783
	Non-NHS	$51	$1,061	$1,112
Central	NHS	$230	$1,691	$1,921
	Non-NHS	$209	$1,277	$1,486
Southeast	NHS	$11	$187	$198
	Non-NHS	$30	$648	$678
Total	**NHS**	**$460**	**$4,442**	**$4,902**
	Non-NHS	**$290**	**$2,986**	**$3,275**
	Total	**$750**	**$7,428**	**$8,178**

The need number shown above does not include preservation work required on roads that are currently in the backlog after their immediate reconstruction needs are addressed. An inflation factor of 3% has been included in the future needs.

Exhibit 20 below presents the life cycle backlog needs (in $ millions) by region and by road classification. As seen in the exhibit, the Central region has the most backlog needs, followed by the Northern region and the Southeast region.

Exhibit 20: Life Cycle Backlog Needs by Region

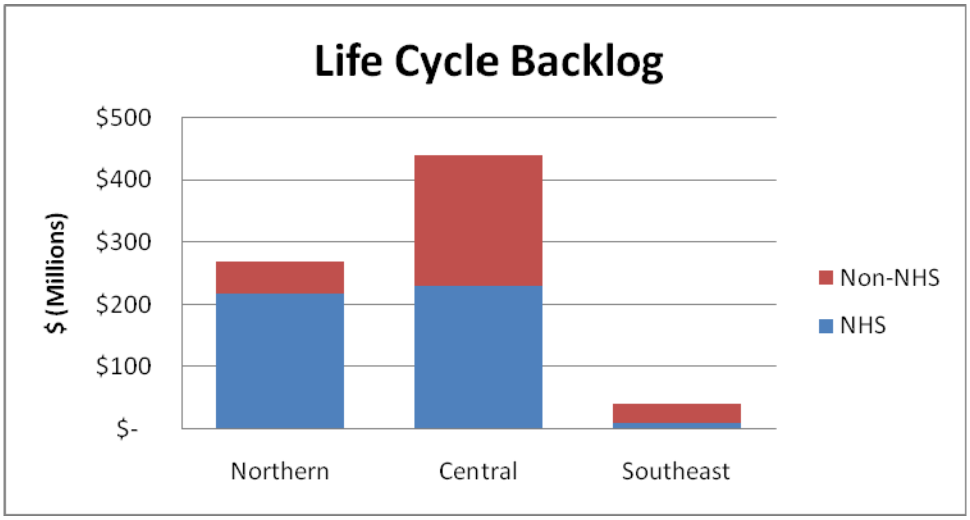
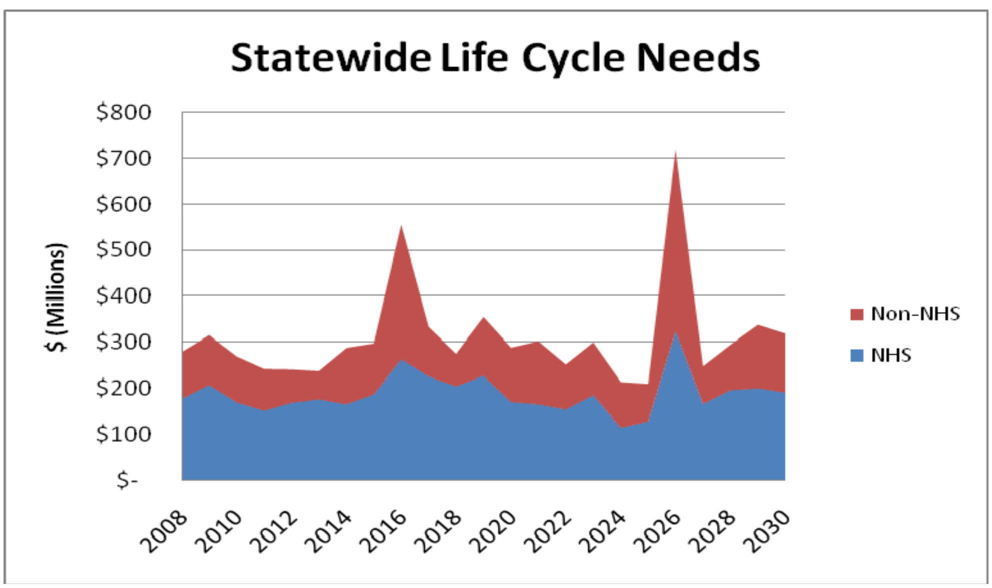


Exhibit 21 below shows the life cycle management needs throughout the state broken down by each region by year as derived from the needs analysis model.

Exhibit 21: Statewide Life Cycle Needs



As seen in Exhibit 21 above, the life cycle needs will spike in years 2017 and year 2027. This is due to the fact that a lot of roads will arrive at the end of their life cycle together, and were probably constructed around the same time.

Exhibit 22: Northern Region Life Cycle Needs

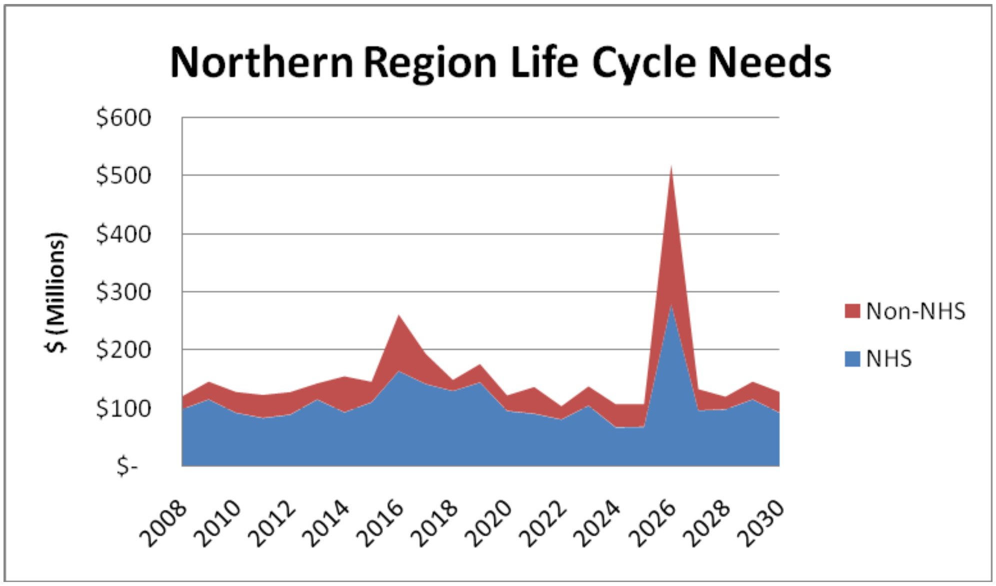


Exhibit 23: Central Region Life Cycle Needs

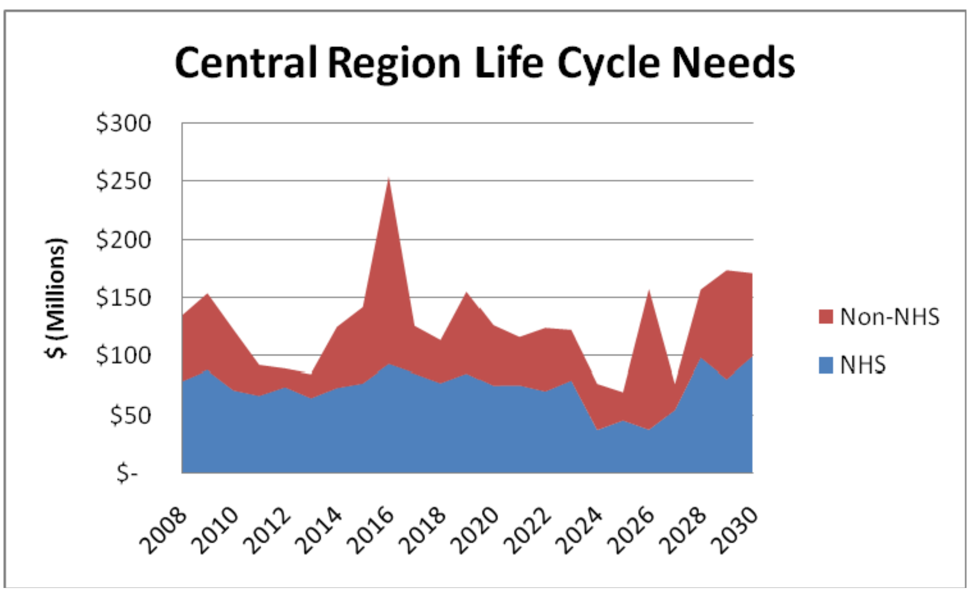
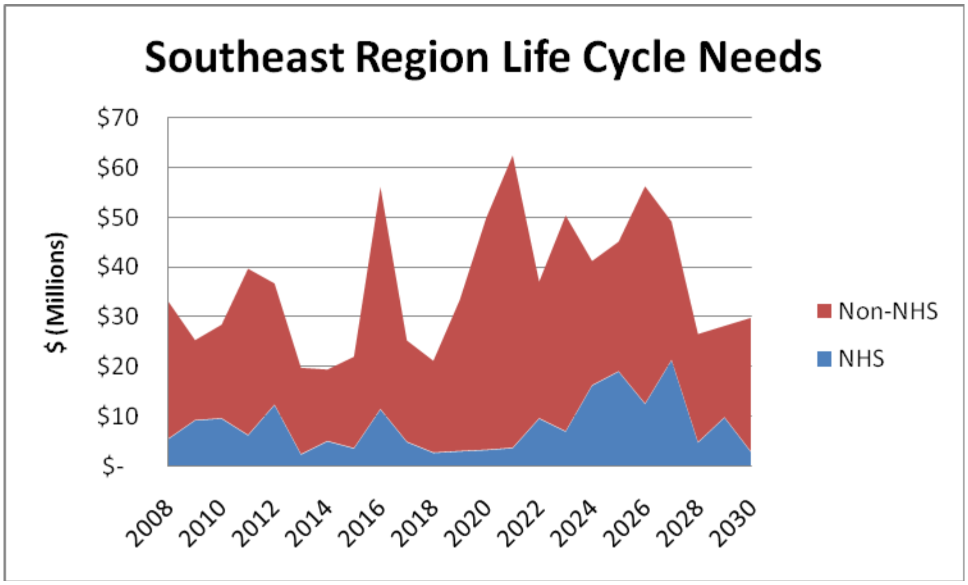


Exhibit 24: Southeast Region Life Cycle Needs



Implications
Alaska has large and rapidly growing life cycle management needs. Current pavement management practice appears to be "worst first", which means directing funds to the roads in the worst condition. Given the current funding levels, needs, and pavement management practice, the current backlog will keep growing.

2. Unpaved Roads

Unpaved road condition is not recorded by ADOT&PF, and hence, the threshold value approach to treatment timing used for paved roads does not apply to unpaved roads. Treatment cycles and costs for unpaved roads were determined through discussions with ADOT&PF maintenance managers based on their experience. The treatment cycles and costs used were the same for different system classifications and regions. Two treatments were identified for unpaved roads: new surface course material (every 10 years) and adding dust palliatives (every 2 years). It is assumed that work quantities will be evenly distributed throughout the life cycle. As mentioned earlier, only the Northern region has unpaved roads on the National Highway System (NHS)

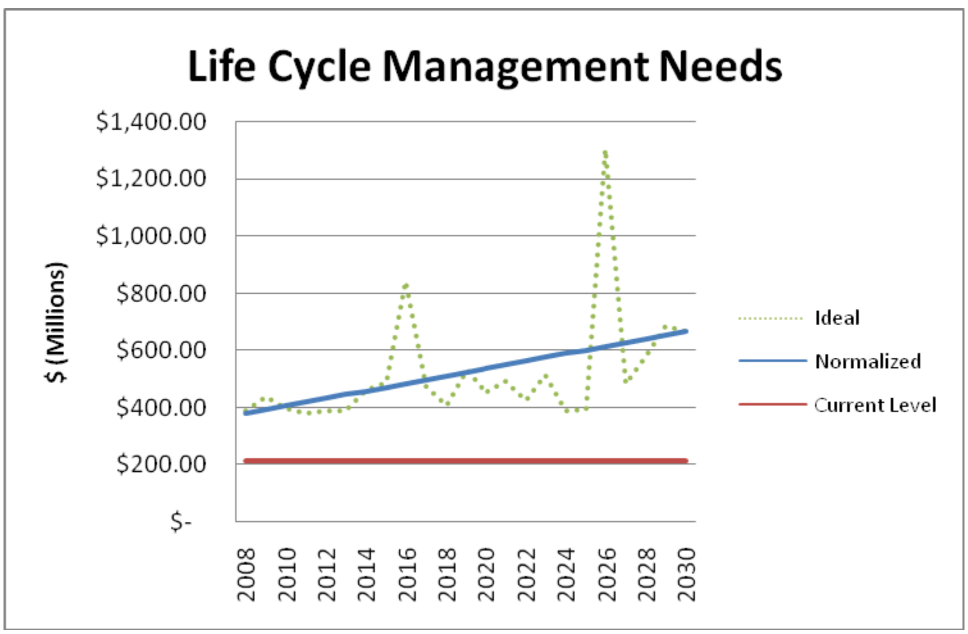
Exhibit 25: Unpaved Road Treatment Cycles

		Lane Miles	Surface Material ($/ln-mi)	Dust Palliative ($/ln-mi)	Miles Surface Material (every 10 yr)	Miles Dust (every 2 yr)	Need
Northern	NHS	423	$7,500	$4,000	42	212	$1,163,250
	Non-NHS	2,714	$7,500	$4,000	271	1357	$7,463,500
Central	Non-NHS	760	$7,500	$4,000	76	380	$2,090,000
Southeast	Non-NHS	166	$7,500	$4,000	17	83	$456,500
Total		4,063			406		$11,173,250

It is estimated that $11 M would be required every year for unpaved roads.

Paved and unpaved road needs were added together, and it was assumed that any strategy to address backlog would require funding and implementation over a number of years. Our analysis assumes that backlog is addressed over a period of 10 years. This information has been consolidated and presented in Exhibit 26 below.

Exhibit 26: Total Life Cycle Management Needs



The “ideal” line shows total needs as arrived at from the model, while the normalized line presents needs same needs growing consistently (without sudden spikes and drops). The red line on the graph shows the current level of funding. As seen here, there is a major gap between the current level and ideal/normalized level of funding.

The pictures below show some of the state roads in varying conditions and types of treatments required on these roads.

Robinson Loop Road – This road shows that crack sealing has been performed; patching may be the next maintenance treatment needed; the need for mill and overlay is not far off.

Squaw Creek Road – This is an unpaved road showing the need for fabric and surface course fill to help it last a while longer; the next step for this road is reconstruction.

Mackey Lake Road - This road is at a condition level where a full mill and overlay is the needed pavement treatment.

Mission Drive – This road shows that patching work has been performed; mill/overlay will be the next preservation treatment needed

.

Sterling highway – This section of the highway is in need of pothole patching

3. Bridge Life Cycle Management Needs

Bridge life cycle management needs differ by the components of the bridge, and by the type of material each component is made of. The most important components and common material types that were used in the analysis are shown below:

- Components
  - Deck
  - Superstructure
  - Substructure
- Material types
  - Concrete
  - Steel
  - Wood

ADOT&PF bridge treatment cycles as identified and used in the model are as follows:

- Bridge rehabilitation/replacement
- Deck repair

- Deck rehabilitation (rehab)
- Superstructure repair
- Superstructure rehab
- Substructure repair
- All combinations of the repair and rehab actions listed above

Action costs (specified in terms of dollars per square meters of deck) and effectiveness (specified in terms of the resulting HI) were determined based on the Pontis (ADOT&PF's bridge management software) models and/or observation of Pontis results. Also, the HI triggers used to trigger different actions were based on observation of when comparable actions were triggered in Pontis. Action effectiveness and triggers were specified as follows:

- Deck repair is triggered when the deck HI is less than 75%, and rehab is triggered when the HI is less than 50%.
- Superstructure repair is triggered when the superstructure HI is less than 75%, and rehab is triggered when the HI is less than 60%.
- Superstructure repair is triggered when the superstructure HI is less than 75%.
- Complete bridge rehab/replacement is triggered if either the bridge HI is less than 80%, the substructure HI is less than 65%, and/or both the deck and superstructure require rehab.
- Repair actions restore the HI to 80%, rehab restores the HI to 90% and complete bridge rehab/replacement restores the HI to 100%. The effect of an action on SR is determined by observing the reduction in effective age of the bridge from the HI curves, and then increasing the SR by 0.56% for each one year reduction in effective age.
- Once an action is taken on a bridge, any further actions are deferred for five years.

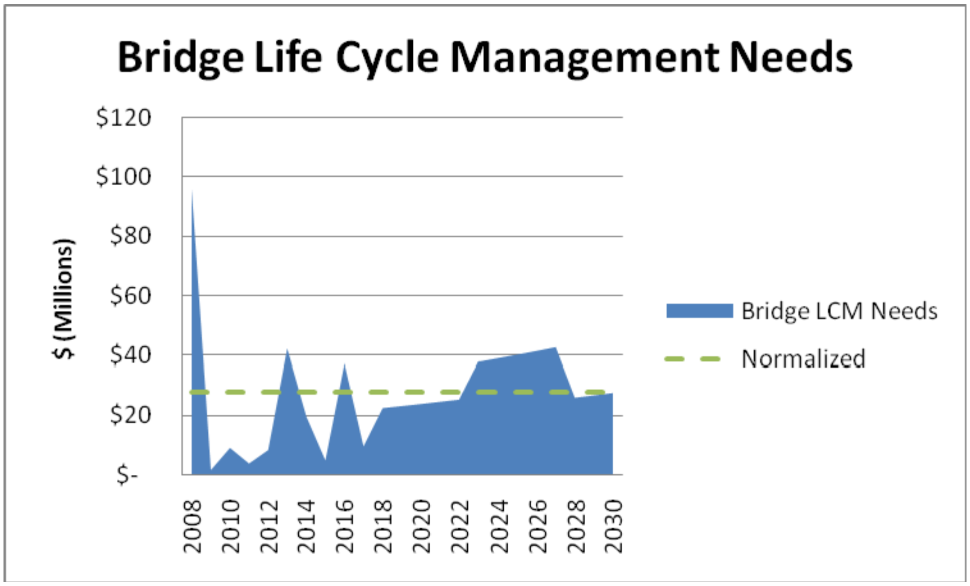
Action costs used in the spreadsheet model developed to support the needs analysis are detailed in Exhibit 27.

Exhibit 27: Bridge Action Costs

Action	Unit Cost ($/sqm)
DN	0.00
Repair Sub	267.00
Repair Super	228.00
Repair Super, Repair Sub	495.00
Rehab Super	1,644.00
Rehab Super, Repair Sub	1,911.00
Repair Deck	84.00
Repair Deck, Repair Sub	351.00
Repair Deck, Repair Super	312.00
Repair Deck, Repair Super, Repair Sub	579.00
Repair Deck, Rehab Super	1,728.00
Repair Deck, Rehab Super, Repair Sub	1,995.00
Rehab Deck	583.00
Rehab Deck, Repair Sub	850.00
Rehab Deck, Repair Super	811.00
Rehab Deck, Repair Super, Repair Sub	1,078.00
Rehab Deck, Rehab Super	2,227.00
Rehab Deck, Rehab Super, Repair Sub	2,494.00
Rehab/Repl	3,229.00

The goal for bridges has been set to ensure that there are no structurally deficient bridges in the state. Based on this goal, the model shows that bridge life cycle management needs are an average of $28 million per year over the next 23 years. The graph below shows the needs over the next 23 years.

Exhibit 28: Bridge Life Cycle Management Needs



Routine Maintenance Needs

Current routine maintenance expenditures per lane mile (for FY 2006) were provided by the regions. These expenditures include all activities funded through the General Fund which includes snow and ice activities. The expenditure per lane mile for each region was obtained by dividing annual expenditures by the number of lane miles to calculate current expenditures per lane mile in each region and by road classification (NHS/Non-NHS).

Exhibit 29 below shows the routine maintenance expenditures per lane mile in year 2006. A brief description of the expenditures follows the exhibit.

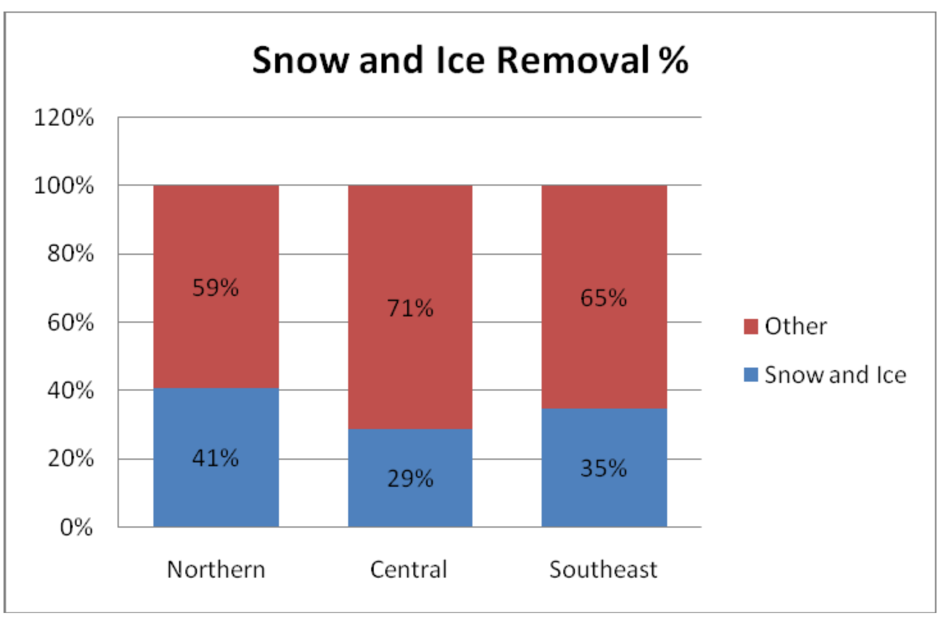
Exhibit 29: 2006 Maintenance Expenditure per Lane Mile

Region		NHS		Non-NHS	
		Paved	Unpaved	Paved	Unpaved
Northern	Annual exp	$8,856,700	$3,795,500	$4,136,800	$21,338,800
	Lane Miles	3,824.60	422.90	1,402.70	2,714.00
	$/Ln-mile	$2,316	$8,975	$2,949	$7,862
Central	Annual exp	$11,634,800	$ -	$7,996,000	$3,546,000
	Lane Miles	2,491.30		1,711.50	760.00
	$/Ln-mile	$4,670		$ 4,672	$4,666
Southeast	Annual exp	$2,107,608	$ -	$4,942,681	$394,661
	Lane Miles	287.10		1,040.80	166.00
	$/Ln-mile	$ 7,341	$ -	$4,749	$2,377

Routine maintenance expenditures per lane mile for Non-NHS, unpaved roads is $7,862 for a total of 2,714 lane miles. Expenditure per unpaved non-NHS lane mile is more than double the cost for paved roads at $2,949 for a total of 1,402 lane mile. This is largely due to the high cost of doing work in the remote areas of rural Alaska - The cost of getting equipment, materials, and labor transported to these remote areas. Also, if most of these unpaved roads were paved, the cost of maintaining them would probably be even higher.

Snow and ice control expenditures represent a significant portion of the expenditures as shown in Exhibit 30 below. This category includes all winter related activities.

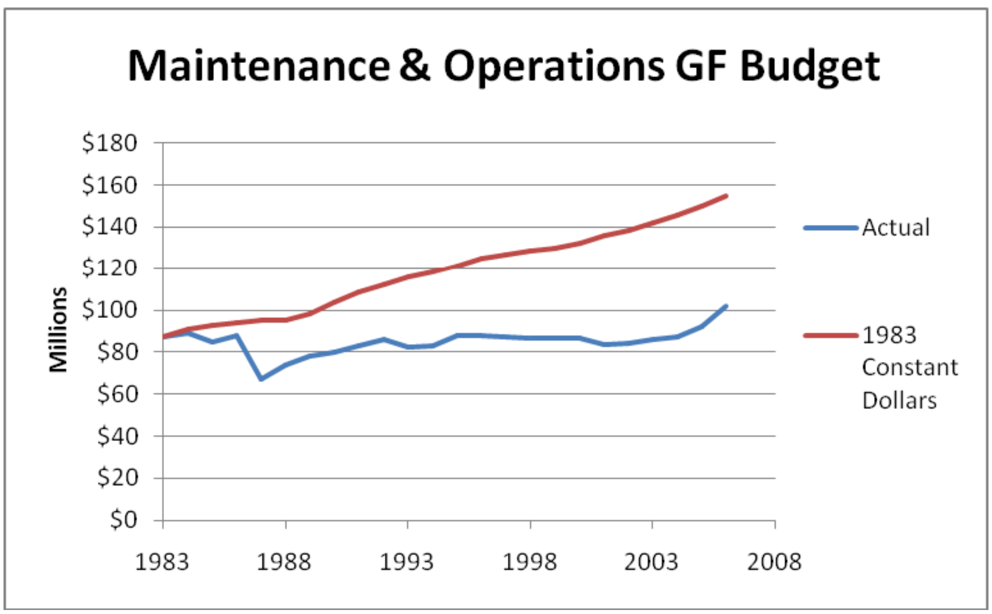
Exhibit 30: Snow and Ice Removal as Percentage of Routine Maintenance Expenditures by Region, 2006



As mentioned in the approach section, it was concluded through discussions with ADOT&PF maintenance managers that bringing the current funding level up to inflation-adjusted 1983 historical level funding provides a very conservative defensible estimate of defining adequate routine maintenance funding to provide level of service consistent with sound life cycle management practices. As a result, the 1983 funding level was inflated by Anchorage CPI value to arrive at the approximate level of funding required per lane mile by region and road classification.

No historical data for routine maintenance budget is available, but historical data for the general fund which includes both routine maintenance & operations is available and has been used to estimate the gap between needs and funding level. This information is presented in Exhibit 31 below.

Exhibit 31: Maintenance and Operations General Fund Budget



This gap should be considered a conservative estimate since the number of lane miles, maintenance costs, and other factors have driven up ADOT&PF's total and per-lane mile costs to maintain highways and bridges over time.

Exhibit 31 above shows the general fund maintenance budget from 1983 until 2005. The blue trend line represents the actual general fund maintenance budget as was distributed to the Maintenance Division. The red trend line represents the general fund maintenance budget adjusted for inflation using the Anchorage Consumer Price Index to better estimate the increased cost of performing the needed maintenance activities. This indicates a gap of 51.9% between required and current levels of funding. As a result, current routine maintenance expenditures were inflated by 51.9% to catch up to 1983 funding level. These needs were inflated at a rate of 3% per year till year 2030 to calculate routine maintenance needs.

Findings

The planning level analysis indicates that based on extremely conservative estimates the current routine maintenance is under funded by $35.6 million per year. In order to catch up with inflation it will be required to increase current routine maintenance expenditure levels by 51% in the first year and 3% thereafter.

Exhibit 32 below presents the estimated routine maintenance needs for FY 2007 by each region based on the analytical assumptions described above.

Exhibit 32: Routine Maintenance Needs (2007)

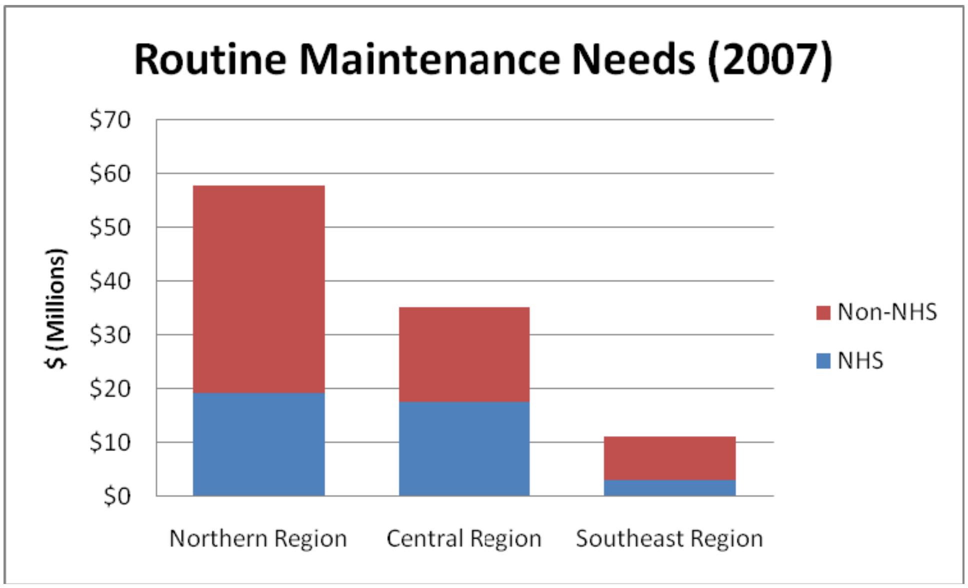
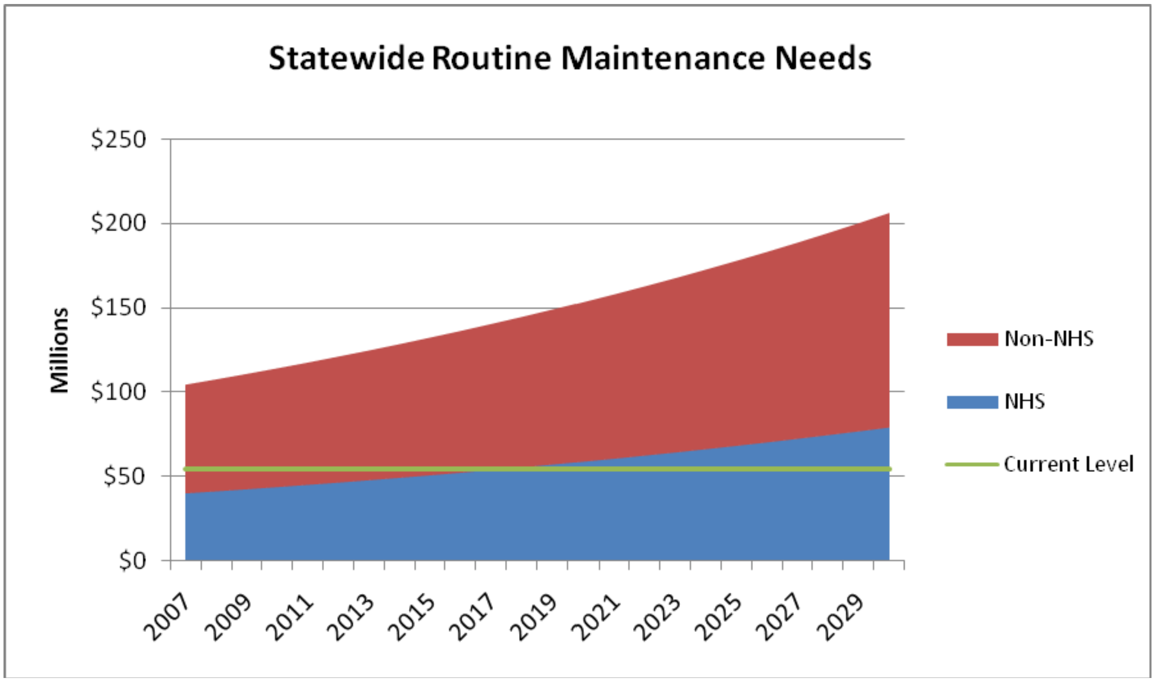


Exhibit 33 below estimates future needs till year 2030 assuming an annual inflation rate of 3%. This is a reasonable estimate as the bulk of the maintenance costs are labor and materials. It likely understates needs given the recent increases in fuel, asphalt, and steel which affects guardrail and sign costs. In the near future, condition data on a number of road assets will become available. This data can then be used to improve the model by analyzing each activity and determining the required amount of funding required to achieve an acceptable level of service (quality).

Exhibit 33: Statewide Routine Maintenance Needs



Implications of Current Situation

Underfunded road routine maintenance activities will accelerate pavement deterioration. As a result, the life cycle costs for that same pavement will also increase due to the higher cost of rehabilitation or rebuilding roads. The life cycle management program is financially constrained, so increased rehabilitation and rebuilding costs will cause the current backlog to continue to increase. Another implication of not properly funding routine maintenance activities is the impact on system objectives such as safety and mobility. For example, reduced frequency of snow and ice removal activities will impact mobility and could affect safety.

Total Highway and Bridge Needs

Exhibit 34 shows the consolidated needs for highways and bridges through 2030, and annualized needs for each year.

Exhibit 34: Total Highway and Bridge Needs

	Total Needs ($ Millions)	Annual Needs 2007 $ Millions
System Development	$12,699	$552
Life Cycle Management-Highways	$8,435	$367
Life Cycle Management-Bridges	$644	$28
Routine Maintenance	$2,402	$104
System Total (Annual) 2007 $ Millions		$1,051

III. Needs Analysis: Alaska Marine Highway System

Concepts and Definitions

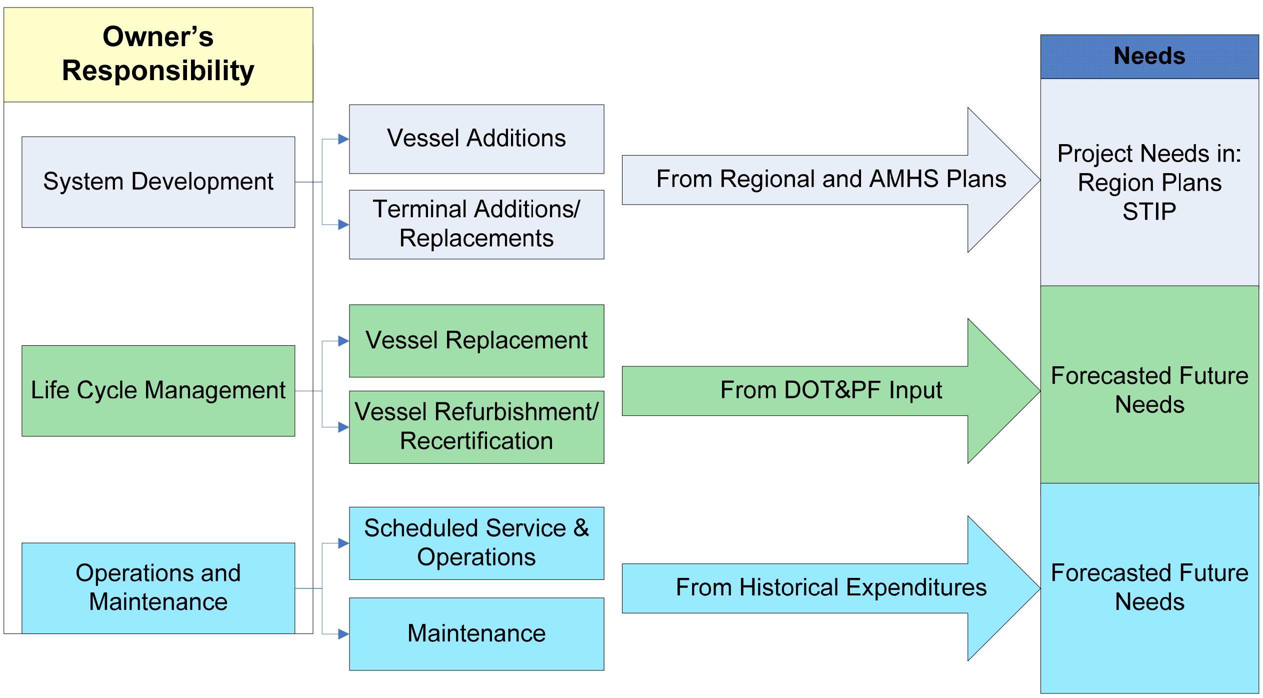
The principal necessity for the separate treatment of ferry and highway systems in transportation planning is found in their regulations, operating costs, and life cycle management needs.

Life cycle management for highways/bridges differs from AMHS primarily due to the differences in safety, service life, and operating standards for roads and marine vessels. State departments of transportation set their own safety and operating standards for highways, by and large, but the maritime safety and common carrier operations of ferries are regulated by federal authorities. The United States Coast Guard regulates ferry operations to ensure adequate safety on the vessels. As a result, it is still possible to drive on roads that are full of potholes/cracks that do not provide an expected/acceptable level of service, but it is not possible to ride on a ferry that does not meet US coast guard standards since it is unsafe and not allowed to operate by the US coast guard. The needs analysis specifically targets Alaska Marine Highway System, and does not include the non-state operated ferry systems. These ferry services form an integral part of the transportation infrastructure.

Analysis Approach

Exhibit 35 below shows the overall approach for analyzing AMHS needs.

Exhibit 35: Alaska Marine Highway System (AMHS) Needs Analysis Approach



As seen in the exhibit above, system development needs for AMHS are defined as vessel additions and terminal additions/replacements. The life cycle management needs for AMHS are very different than that for roads, and are composed of vessel replacements and vessel refurbishment/recertification.

ADOT&PF owned vessels and terminals' associated replacement, routine operations, and maintenance costs were included in the analysis. Ports and harbors are generally owned and operated by local agencies and other units of government and were not included in the analysis. In the past, the state has supported critical port and harbor infrastructure, and financed and constructed many facilities across Alaska. There is no annual state program for construction and upgrade of ports and harbors. ADOT&PF regional plans are multimodal and have identified priority port and harbor needs.

The analysis approach for each of the system elements is explained below:

System Development

Fleet addition needs for AMHS were arrived at by discussions with ADOT&PF staff and by looking at the additions planned in the Statewide Transportation Improvement Program (STIP). Large capital needs for vessel replacements are accounted for under life cycle management needs.

Terminal additions and replacement needs were arrived at by consolidating needs from regional plans and the STIP.

In looking at regional plans, it was noted that the Southeast Alaska plan is currently under revision. The currently approved plan contains many needs including those for new vessels and terminals; the plan needs are currently being reevaluated. It is anticipated that there will be no net new vessel needs in the updated plan, and as a result, the vessel needs for the Southeast region from the plan have not been included in this needs analysis under system development. The updated plan is anticipated to be available around June, 2008.

Life Cycle Management

Vessel replacement needs for AMHS were obtained from the 2006 AMHS fleet survey conducted by The Glosten Associates. The fleet survey details the conditions of each vessel, and explains the life expectancy and major maintenance cycles for the vessels.

Vessel refurbishments and recertification needs for AMHS were determined through discussions with AMHS staff members.

Operations and Maintenance

Operations and maintenance for AMHS includes scheduled service and operations, as well as regular maintenance activities' expenditures. The operations expenditures for AMHS depend on vessel schedules, increasing with increased service and vice versa. It was determined in consultation with AMHS staff that the current operations and maintenance funding levels are sufficient to address future maintenance needs. As a result, historical operations and maintenance expenditures for AMHS were analyzed, and future needs were calculated as average operations and maintenance expenditures for the last three years.

Current Condition

AMHS maintains and operates a fleet of 11 vessels. This includes five mainline ferries, five feeder vessels, and one local vessel. Exhibit 36 presents the vessel names, class, the year the vessel was commissioned, and the current age of the vessel.

Exhibit 36: AMHS Vessel Inventory

Vessel	Vessel Class	Year Commissioned	Age
Taku	Mainline	1963	44
Malaspina	Mainline	1963	44
Matanuska	Mainline	1963	44
Tustumena	Feeder	1964	43
LeConte	Feeder	1974	33
Columbia	Mainline	1974	33
Aurora	Feeder	1977	30
Kennicott	Mainline	1998	9
Lituya	Local	2004	3
Fairweather	Feeder	2004	3
Chenega	Feeder	2005	2

As indicated above, four of the vessels are over 40 years old, while three are between 30 and 35.

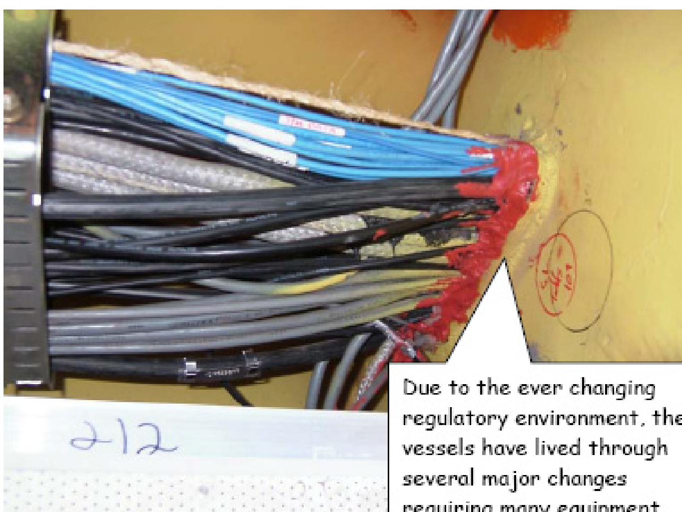
The condition for all vessels is available in detail in the AMHS fleet survey conducted in 2006 by The Glosten Associates. The fleet survey report assumes the vessel life expectancy at 64 years and that the vessels need to be repowered at mid-life, about 32 years. As the vessels get older, ADOT&PF estimates that the maintenance costs will increase significantly. ADOT&PF staff also believes that the 64 year life expectancy is optimistic and is heavily dependent of operating conditions.

Presented on the following pages are some of the examples of deteriorating conditions of many of the older vessels.


Since these types of piping systems can be spread throughout the ships structure, repairing the current leak is only the beginning. This could indicate that the integrity of the entire piping system is at the end of its life.
This green water mark indicates that there is or has been a leak somewhere above, within the ships structure.


The cables behind this bulkhead panel had lost their armor jacket and needed to be replaced along with the insulation, bulkhead paneling, steel deck, carpet and underlayment.

This steel plate was exposed after some loose bathroom tiles were found. The steel began its life as 3/8" plate. It has been reduced to less than a 1/16" and in some places, nothing at all.



Due to the ever changing regulatory environment, these vessels have lived through several major changes requiring many equipment additions. Finding room for it all makes for a challenging prospect.

System Development Needs

1. Fleet Additions

New vessels are currently being evaluated by AMHS but no official estimates are available at this time. Funding for these vessels is not currently identified. Examples of these vessels are: Southeast shuttle, Gateway shuttle, Mainliner, and a Southern gateway shuttle. A dayboat ferry is planned as a part of the Juneau access project, and is included in the surface links as a part of the project. Based on the discussions with the ADOT&PF planning staff, it has been assumed that there will be no increase in the service levels through fleet additions. There are no new vessels programmed in the STIP.

2. Terminal Additions and Replacements

Planned terminal additions and replacements are estimated at $230.7 million, and specified in the regional plans. The project needs from all regional plans are shown below:

Exhibit 37: Regional Plan Needs

Transportation Plan	Terminal Additions/Replacements ($ Millions)
Regional Plans	
Northwest Alaska transportation plan	None
Prince William Sound transportation plan	$ 29.1 m
Yukon-Kuskokwim Delta transportation plan	None
Southwest Alaska transportation plan	$ 15.8 m
Southeast Alaska transportation plan	$ 41.6 m
MPO Plans	
Fairbanks MPO transportation plan (FMATS)	None
Anchorage bowl transportation plan (AMATS)	None
Mat-Su transportation plan	None
Other Plans	
Parks highway plan	None
Interior transportation plan + Corridor needs (From un-formalized plan)	None
STIP	$ 144.2 m
Total	**$ 230.7 m**

It should be noted that this needs number is not constrained by funding, and the actual amount spent will depend on the budgeting constraints.

Life Cycle Management Needs

1. Vessel Replacements

It is determined in the 2006 fleet survey report that four vessels will need replacement by 2030. These are listed in Exhibit 38. The vessel replacement needs noted below are not conclusive but estimates based on available fleet survey reports.

Exhibit 38: AMHS Vessels Requiring Replacement by 2030

Vessel	Retirement Date	Estimated Replacement Costs
M/V Malaspina	Unknown	$150 m
M/V Matanuska	2020	$150 m
M/V Taku	2024	$150 m
M/V Tustumena	2028	$150 m

The above mentioned replacement costs are estimates from ADOT&PF staff and are subject to change at the time of replacement. These estimates are indicative of the large capital costs of vessel replacement.

2. Vessel Refurbishments and Recertifications

Vessel refurbishment and recertification involves activities necessary to keep the vessels safe and compliant with Safety of Life at Sea (SOLAS) standards. Refurbishments are also essential to keep the vessels attractive for consumers to use for their transportation needs. Examples of refurbishment activities include engine overhauls, hull repair/replacement, upgrades to vessel interiors, and overhauls to miscellaneous equipment. Some other examples, more specific to safety are: installation of Automated Ship Identification Systems (AIS), Voyage Data Recorders (VDRs), and fixed Local Area Fire Fighting (LAFF) systems.

Regular vessel refurbishment and recertification will require an average of $23 million per year according to ADOT&PF estimates.

Routine Maintenance Needs

Operations and Maintenance Plan

It is estimated that operations and maintenance needs will average $120 million a year. This needs number was arrived at by averaging the historical operations and maintenance costs over the last three years. This amount is budgeted to increase to about $131 million in FY 2007.

Total AMHS Needs

Exhibit 39 below shows the total AMHS needs till 2030 as well as annualized needs.

Exhibit 39: Alaska Marine Highway System (AMHS) Needs through 2030

Alaska Marine Highway System Needs		
	Total Needs ($ Millions)	**Annual Needs 2007 $ Millions**
System Development (Vessel Additions)	None Quantified	None Quantified
System Development (Terminal Additions/Replacement)	$230	$10
Life Cycle Management (Vessel Replacement)	$600	$26
Life Cycle Management (Vessel Refurbishment/Recertification)	$529	$23
Operations & Maintenance	$2,760	$120
System Total (Annual) 2007 $ Millions	**$179**	

Non-State Operated Ferry Services

A number of ferry services operate in Alaska that are not operated by the state. These services form an integral part of the transportation infrastructure in Alaska. These ferry services are not included in the needs analysis since Alaska DOT&PF does not fund these services, but are described below due to their importance to the transportation landscape in Alaska.

The non-state operated ferry services are explained below in brief:

1. Inter-Island Ferry Authority

The Inter-Island Ferry Authority (IFA) was formed in 1997 in recognition of the need for improved transportation to island communities in southern Southeast Alaska. The Prince of Wales Island communities of Craig, Klawock, Thorne Bay, and Coffman Cove joined in a coalition with Wrangell and Petersburg to create the IFA, which is a public corporation organized under Alaska's Municipal Port Authority Act.

The *M/V Prince of Wales* inaugurated daily scheduled service between Hollis and Ketchikan in January, 2002. A sister vessel, the *M/V Stikine* provides round-trip service from Coffman Cove to Wrangell and Petersburg. Service on the new "northern route" operates round trips three days per week. IFA vessels connect with the Alaska Marine Highway System at Ketchikan, Wrangell, and Petersburg.

IFA vessels are about 200 feet long, operate with a service speed of 15 knots, and are certificated for 170 passengers, with a vehicle capacity of 30 standard autos, or 15 autos and 10 - 28 foot semi-trailers. Food and beverage service is available in each vessel in the on-board restaurant.

Photo Credit: Interisland Ferry Authority

The creation of the Hollis-Ketchikan ferry service substantially improved service frequency between Prince of Wales Island and Ketchikan. Additionally, the locally-operated service replaced less-frequent AMHS service and has been able to cover its operating costs in the first years of operation. The Coffman Cove (north Prince of Wales Island) to Petersburg and Wrangell service is more lightly used and may require ongoing operating support.

2. Cook Inlet Ferry

The proposed Cook Inlet Ferry system will operate between Port MacKenzie in the Mat-Su Borough across Knik Arm of Cook Inlet to Anchorage. It is intended to shorten the trip for Mat-Su residents driving to Anchorage, and for Anchorage residents recreating in the Point MacKenzie/Little Susitna area and working in the Port MacKenzie industrial area. The ferry is being developed by the Mat-Su Borough and is intended to also enhance the Borough's efforts to develop the marine port and industrial complex at Port MacKenzie by shortening the connection between the port and suppliers and labor in Anchorage.

Artist's rendition of Cook Inlet Ferry (M/V Susitna)
Photo Credit: Mat-Su Borough

The ferry will hold about 20 vehicles and 114 passengers. Ferry transit times between the Mat-Su Borough and Anchorage are estimated to be about 25 minutes, including loading and unloading time. This will allow round trips every 60 to 90 minutes depending on season.

The vessel is being built in Ketchikan at Alaska Ship and Dry Dock and is funded by the Office of Naval Research. The vessel will demonstrate new naval technologies that may be used in the next generation of military littoral (coastal operations) watercraft. It is the world's first ship able to transition from a SWATH high-speed hull to a barge–and back.

The ferry system will include terminal buildings, parking, and ferry landings at Port MacKenzie and Ship Creek in Anchorage. The ferry terminal building at Port MacKenzie is complete and the landing is under design and expected to be complete in 2009. Siting and development of the Anchorage landing is ongoing. The ferry is scheduled to start operating as early as the summer of 2009.

The ferry is expected to cost approximately $50 million, much of which will be funded by the Office of Naval Research. The Federal Transit Administration is providing about $17 million for the terminal buildings and furnishings on board the ferry. Once the vessel has been launched and is complete, the Navy will use it to test a number of new vessel concepts being developed as part of the vessel design and then will turn the ferry over to the Borough for use as the Cook Inlet Ferry. The Navy will receive operations data for five years.

3. Kachemak Bay Ferry

The Seldovia Native Association is developing a locally-based ferry operation between Homer and Seldovia across Kachemak Bay. Although several vessel and service options have been studied, including car carrying ferries, the most recent proposal is for a summer-only day-tour boat. The proposed service is proceeding on the strength of more than $10 million in federal and state funds already earmarked to the Seldovia Native Corporation. There are a number of issues to work out before a vessel is built and the service started, including the fact that the Federally-supported service will compete with two private boats that currently offer similar service between Homer and Seldovia.

The AMHS currently provides limited service to Seldovia and unlike the IFA service developed for Prince of Wales Island, the Seldovia service is not proposed as a replacement for the AMHS service.

4. Cold Bay Ferry

The airport at King Cove is located adjacent to mountains and water. Topography precludes relocation of the airport. During the frequent bouts of bad weather the airport operations are suspended or limited for safety reasons. In order to improve all-weather access to medical care, the Aleutians East Borough proposed to construct a road connecting King Cove and the all-weather airport at the community of Cold Bay, located on the western side of Cold Bay. However, construction of a road would require crossing part of the Izembek National Wildlife Refuge and Wilderness.

After years of debate, the King Cove Health and Safety Act was passed by congress in 1998 which stipulated a road-marine link between King Cove and the Cold Bay airport. The Act included construction of a road from King Cove to a hovercraft terminal on the east shore of Cold Bay.

The hovercraft, Suna-X, transports passengers and freight from King Cove to Cold Bay

The Aleutians East Borough began hovercraft ferry service in August 2007. Passengers travel 17 miles from King Cove on a gravel road north to the hovercraft terminal located on the east shore of Cold Bay. The hovercraft ferries them across Cold Bay to a terminal located on the west side of the Bay that is connected by road to the Cold Bay airport.

The hovercraft is a newly built BHT130. It's about 90 feet long and 42 feet wide. It holds up to 47 passengers and can cruise at speeds up to 35 knots. The hovercraft propellers are ducted to increase static thrust and significantly decrease noise. The hovercraft is equipped to take emergency medical patients with roll-on roll-off capabilities to the Cold Bay airport for fast emergency transport to one of Anchorage's hospitals. With roll-on and roll-off capabilities, an ambulance can drive onto the hovercraft at King Cove and drive off at the Cold Bay airport, enhancing emergency transportation.

The fare is currently $76.00 per passenger each way. Freight is carried for sixteen cents per pound each way, and vehicles are charged six cents per pound. Service is provided seven days a week subject to weather conditions. Weather limitations include temperatures under 25 degrees and wind exceeding 40 mph.

IV. Needs Analysis: Aviation

Concepts and Definitions

General

Airport ground structures consist of three major components: runways, taxiways, and aprons. Aprons are used to park or store the aircrafts. Before take-off, aircrafts move to taxiways and then to runways for take-off.

A big difference between airport needs analysis and that for surface transportation is the importance of navigation aids and the direct relationship between a clear runway and a safe flight landing/take off.

Airport navigation aids consist primarily of lighting (Runway End Identifier Lights (REIL), and Precision Approach Path Indicator (PAPI) lighting system), besides other more modern navigation aids like radar systems and newer GPS-based navigation systems.

ADOT&PF uses Pavement Condition Index (PCI) as an indicator of condition for runways, taxiways, and aprons.

Pavement Condition Index (PCI)

The Pavement Condition Index is a numerical index between 0 and 100 is used to indicate the condition of airport pavement, where 100 represents an excellent pavement. This measure was developed by the U.S Army Corps of Engineers and is based on a visual survey of the pavement.

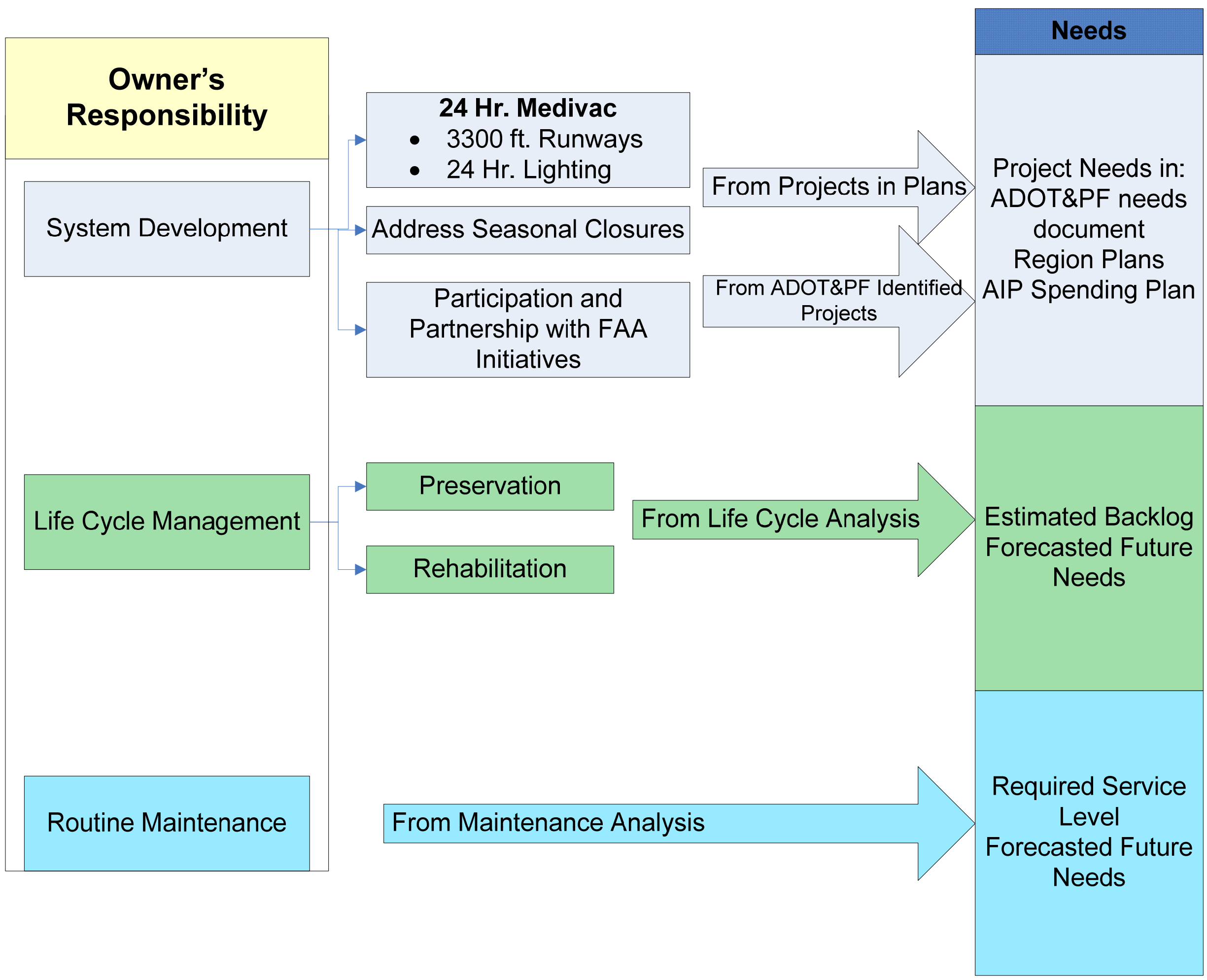
Life Cycle Management

Life cycle management for airports follows the same concepts as that for highways and bridges. The primary difference is that for airports the treatment cycles are different and the threshold limits for treatments are different for runways and for aprons & taxiways. Aprons and taxiways have a lower standard for treatment than runways, and it is therefore not necessary to treat them at the same frequency.

Analysis Approach

Exhibit 40 below highlights the overall approach for analyzing aviation needs. As with highways/bridges and AMHS, the needs are primarily divided into system development, life cycle management, and routine maintenance. Only the state-owned airports have been considered in this analysis, thereby excluding all municipal airports. The two exceptions to the state owned airports are Ted Stevens Anchorage International Airport and Fairbanks International airport, since these two airports have independent sources of revenues and do not require state funding for their operations and/or maintenance.

Exhibit 40: Aviation Needs Analysis Approach



The analysis approach for each of the system elements is explained below:

System Development

System development needs for aviation are composed of two primary components: needs from regional plans and strategic needs from ADOT&PF aviation goals. AKDOT&PF is initiating an aviation modal plan which will provide a more detailed and specific treatment of certain elements of airport needs.

Needs from regional plans and the Airport Improvement Program (AIP) are consolidated using similar methodology for highways/bridges and AMHS.

ADOT&PF Aviation Goals

ADOT&PF has established the following system level goals through its Aviation System Planning activities and identified a list of airports as priority airports:

Goal 1: 24-hour Medivac capability for targeted airports.

This goal requires that:

- Runways are adequate to support 24-hour operations by fixed wing aircraft. Runway dimensions of approximately 3,300' x 60' are recommended.
- Runway lighting is provided to support 24-hour operations by fixed wing aircraft. Where runway lighting is not available or practical to develop, helicopter landing zones have been identified and helicopter landing zone lighting will be provided.

Goal 2: Address seasonal closures impacting targeted airports.

A number of airports routinely experience seasonal closures due to wet/soft runways at time of spring thaw/break up. This plan goal is to make improvements to prevent seasonal closures.

Goal 3: Participation and Partnership with FAA Initiatives.

ADOT&PF partners with FAA to receive grants and deploy new technologies like NextGen.

Life Cycle Management

Life cycle management needs are primarily divided into rehabilitation and preservation needs on existing runways, aprons, or taxiways that are still in an acceptable condition.

The analysis approach for life cycle management needs for airports is similar to that for highways. The primary differences on highways and airports are: Use of different metrics used to measure condition, threshold levels that dictate preservation work, and the treatment cycles. The threshold levels are different for runways and for taxiways and aprons.

Life cycle management for airports was divided into paved airports and unpaved airport needs.

Paved Airports

Pavement Condition Index (PCI) data is used by ADOT&PF as an indicator of condition for paved airports. The guidelines for PCI goals as set by Alaska legislature are 70 for runways and 60 for taxiways and aprons.

Airport sections that currently fall below these standards/values are considered deficient and are part of the backlog – sections that need to be addressed as soon as possible. Life cycle management treatments, timings, and costs for each region were arrived at through discussions with the materials section and ADOT&PF maintenance managers. This information formed the basis of a spreadsheet analysis model created for airports life cycle management needs analysis. The PCI data for each airport component was used to estimate its timing within the life cycle. Unit costs of treatment were determined (square feet) and yearly cost of life cycle management was calculated. An inflation factor of 3% has been used for cost increases till year 2030. Airport area is reported in square feet through the airport pavement management system, and is reported in terms of lane miles by the AKDOT&PF maintenance section.

Unpaved Airports

Unpaved airport condition is not recorded by ADOT&PF, and hence, the threshold value approach to treatment timing used for paved airports does not apply to unpaved airports. Treatment cycles and costs for unpaved airports were determined through discussions with ADOT&PF maintenance managers based on their experience.

Accurate data in terms of square footage of unpaved airports is not available for central region, and the data used is an approximation by the regional staff. There are no unpaved state-owned airports reported in the Southeast region.

Two treatments were identified for unpaved airports: Adding dust palliatives every 3 years, and adding surface material every 10 years. Based on these cycles, and costs per square feet of these treatments, the total unpaved airport needs for unpaved airports were calculated. It is assumed that work required on these roads will be evenly distributed throughout the life cycle. Airport area for unpaved airports was reported by AKDOT&PF's region maintenance sections in terms of lane miles, and was converted to square feet for the analysis.

Routine Maintenance

Routine maintenance needs for airports are similar to that of highways, except that runways have a much longer life cycle. As in the case of roads, the methodology is based on the historical trends, current conditions, and a forecast of future needs that encompasses the entire airport life cycle including routine maintenance, preservation and rehabilitation, or reconstruction. The model estimates need by type of surface (paved or unpaved) and region to account for topographic and weather conditions.

Most recent expenditure data (FY2006) was used to compute the average routine maintenance cost per lane mile. As mentioned earlier, maintenance section reports airport area in terms of lane miles while airport pavement management system reports airport area in terms of square feet.

This cost includes snow and ice removal activities. Routine maintenance for airports is funded through the General Fund, as in the case of roads. Like roads, it was determined that bringing the maintenance budget back up to 1983 standards will help meet airport routine maintenance needs. The needs per lane mile per region and for both paved and unpaved airports were calculated based on the assumption above to arrive at current routine maintenance needs. These needs were inflated at a rate of 3% per year till year 2030.

Needs for terminals and related facilities, pavement needs for international airports, other airport master plan identified needs, and operating costs like law enforcement and water rescue were not included in the analysis. International airports (Anchorage, Fairbanks, and Juneau) are not included in the analysis since these airports' sources of revenues are different from other state owned airports. These international airports have independent sources of revenues (user fees, etc.) which offset their expenditures.

Current Condition

Alaskans rely heavily on airports as their primary and sometimes only mode of transportation. Alaska DOT&PF owns and maintains many of these airports around the state. The rest are private airports that are individually owned or community owned, operated, and maintained.

Exhibit 41 shows that there are approximately 250 state-owned airports, of which about 68% are unpaved.

Exhibit 41: State Owned Airports in Alaska

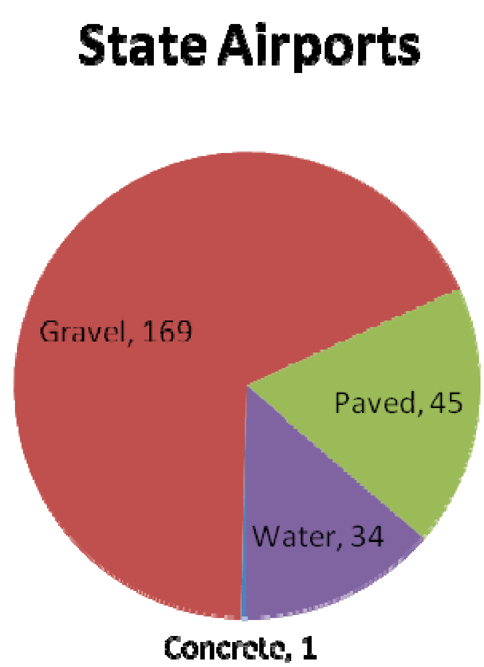
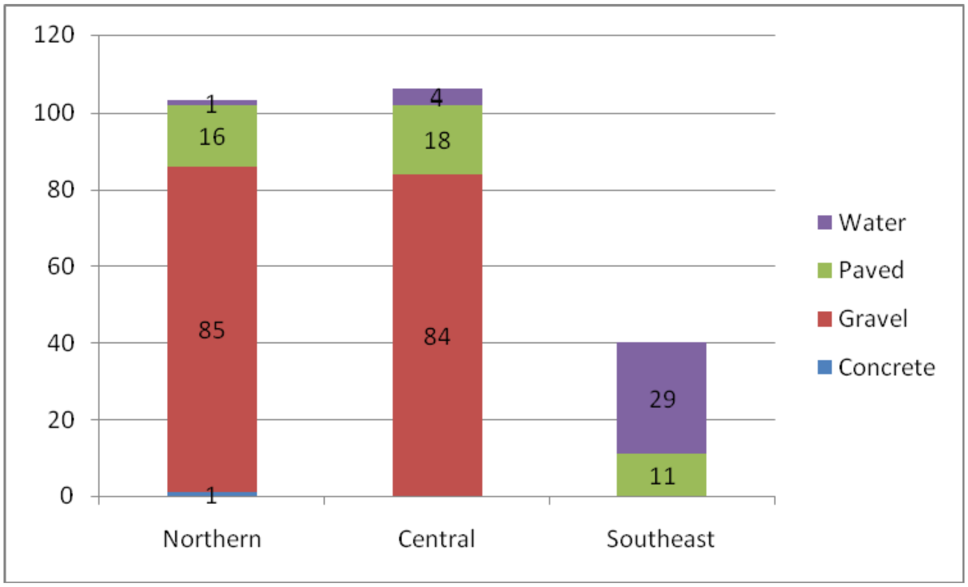


Exhibit 42 below shows the breakdown of airports by region.

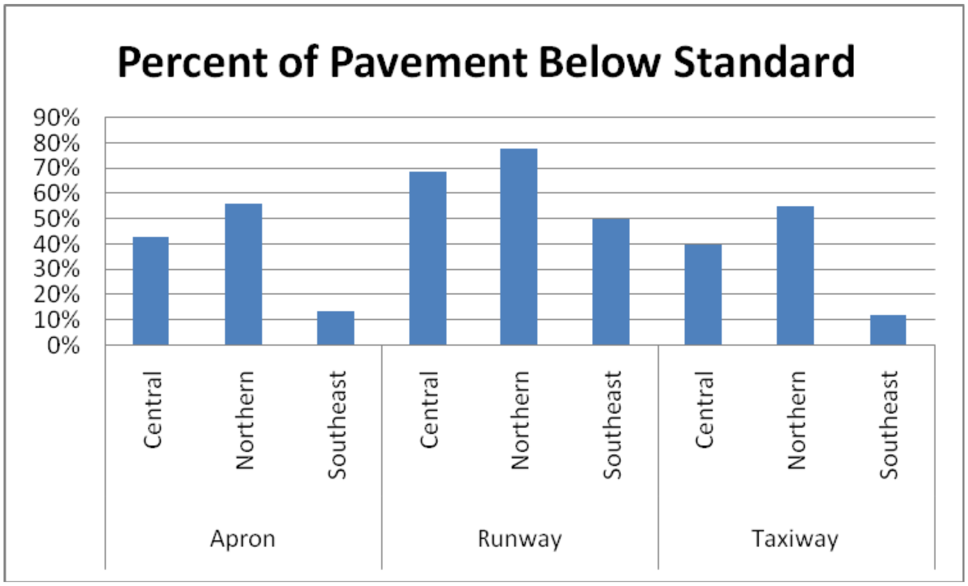
Exhibit 42: Airport Breakdown by Region



As shown in the exhibit above, the Northern region has 103 airports while the Central region has 106 airports.

Condition of paved airports is recorded as Pavement Condition Index (PCI) value. A value below 70 for runways triggers rehabilitation, while a value below 60 for aprons and taxiways triggers rehabilitation. Any runways, aprons, or taxiways that fall below the above mentioned standards are considered a part of the system backlog – pavements that need rehabilitation as soon as possible. Exhibit 43 below shows the percentage of pavement below the above mentioned standards. As seen in the exhibit, about 78% of all runways in Northern region fall below ADOT&PF standards, and are a part of the system backlog. Overall, more runways around the state fall below the standards, followed by aprons and taxiways.

Exhibit 43: Percentage of Pavement Below Standard



An average of 67% of runways fall below the threshold value, while only 41% of aprons fall below the threshold. An average of 36% of taxiways over the state fall below the PCI threshold of 60. This indicates that there is a significant backlog of airport pavements that need immediate rehabilitation work to maintain proper level of service.

Life cycle management and routine maintenance costs are addressed in detail later in the document.

System Development Needs

1. System Development

System development needs for aviation are derived from two sources: Regional plans and ADOT&PF aviation goals.

The system development needs as arrived from the regional plans are given below:

Exhibit 44: Regional Plan Needs

Transportation Plan	System Development needs ($ millions)
Regional Plans	
Interior transportation plan + Corridor needs (From un-formalized plan)	$717 m
Northwest Alaska transportation plan	None
Prince William Sound transportation plan	$.40 m
Southwest Alaska transportation plan	$170.5 m
Southeast Alaska transportation plan	None
Yukon-Kuskokwim Delta transportation plan	$390.8 m
Airport Improvement Program (AIP)	$1,102.8 m
Total	**$2,381.5 m**

Exhibit 45 below shows the improvement needs to meet ADOT&PF goals. These needs refer to projects that have not been completed at the time of the plan publication.

Exhibit 45: Goal-based Aviation Needs

Goals	Airports	Needs ($ Millions)
Goal 1: 24-hr Medivac capability	28	$310 m
Goal 2: Address seasonal closures	13	$123 m
Goal 3: Participation & partnership with FAA initiatives	-	Addressed through FAA grants
Total		**$433 m**

A total of 36 airports require capital improvements to meet both goals 1 and 2 (4 of these airports need improvements to meet both goals 1 and 2).

<u>Goal 1: 24-hour Medivac capability</u>

The total needs are about $310 million; $289 million for meeting runway length criteria and $21 million to meet the lighting needs.

Runway length needs

Of the 28 airports with planned 24-hour Medivac capability, 20 of those airports do not meet the 3300 foot runway standard.

Lighting needs

Of the 28 airports with planned 24-hour Medivac capability, all 28 airports require lighting upgrades. The cost for lighting fixes is expected to be around $21 million.

Goal 2: Address seasonal closures

Thirteen airports in Alaska experience seasonal closures due to heavy snow, heavy rain, damage from the coastal surf, or high winds. These effects cause damage to the runways such that landing safety is compromised and the runways must be shut down for various periods of time. Damage can include wet, soft runways as well as potholes caused by coastal winds during high tide season, and debris on the runway. Some runways are closed for 5 to 14 days during the season leading to unpredictable service. Improvements to address seasonal closures are expected to cost about $123 million.

Goal 3: Participation in and partnership with FAA initiatives.

ADOT&PF participates as a partner and grant recipient in the Federal Aviation Administration's NextGen Program. This is a program to accelerate the implementation of modern technology to improve safety.

The primary component of NextGen is Automatic Dependent Surveillance-Broadcast (ADS-B) - a digital alternative to radar that displays air traffic with a high degree of precision. The Capstone program in Alaska, which uses ADS-B in a non-radar environment, has resulted in a 40% drop in general aviation accidents. Other major components or technologies that are a part of the NextGen are: Required Navigation Performance (RNP), Safety Management System (SMS), and Continuous Descent Approach (CDA).

The goals for NextGen focus on significantly increasing the safety, security, and capacity of air transportation operations, thereby improving the overall economic well-being of the country. These benefits are achieved through a combination of new procedures, technologies and airfield infrastructure deployed to manage passenger, air cargo, general aviation, and air traffic operations.

More information about the NextGen program is available at http://www.faa.gov/about/office_org/headquarters_offices/ato/publications/oep/nextgenvision/ and at http://www.faa.gov/news/fact_sheets/news_story.cfm?newsId=8336

Exhibit 46 below shows the full list of airports that are planned to be improved under ADOT&PF aviation goals.

Exhibit 46: List of airports for ADOT&PF goals-related improvements

Airport	3300 Ft	Seasonal	24 hr - PAPI & REIL	Runway edge lighting	Total Cost
Akhiok	$3,500,000		$325,000	$550,000	$4,375,000
Akiachak	$16,000,000	$16,000,000	$500,000	$550,000	$33,050,000
Akutan	$44,000,000		$500,000	$550,000	$45,050,000
Ambler		$9,300,000			$9,300,000
Angoon	$30,000,000		$325,000	$550,000	$30,875,000
Atka		$14,300,000			$14,300,000
Chalkyitsik			$500,000	TBD	$500,000
Chignik	$1,400,000		$325,000	$350,000	$2,075,000
Chignik Lagoon			TBD	TBD	$0
Chignik Lake	$5,500,000		$325,000	$550,000	$6,375,000
Crooked Creek	$15,300,000		NA	$550,000	$15,850,000
False Pass	$15,000,000		$500,000	$500,000	$16,000,000
Golovin		$3,000,000			$3,000,000
Goodnews Bay	$11,400,000		$537,000	$400,000	$12,337,000
Huslia		$6,600,000			$6,600,000
Kongiganak	$20,000,000	$20,000,000	$500,000	$320,000	$40,820,000
Koyuk		$9,000,000			$9,000,000
Kwethluk			$500,000	TBD	$500,000
Kwigillingok	$3,450,000	$3,450,000	$500,000	$550,000	$7,950,000
Lime Village	$19,600,000		$500,000	$550,000	$20,650,000
Manokotak		$14,684,668			$14,684,668
McCarthy			TBD	TBD	$0
Nanwalek	$20,000,000	TBD	TBD	TBD	$20,000,000
Newtok	$23,000,000		TBD	TBD	$23,000,000
Nightmute		$15,113,303			$15,113,303
Nikolski			TBD	TBD	$0
Old Harbor	$10,000,000		$500,000	$500,000	$11,000,000
Ouzinkie	$17,200,000		$500,000	$600,000	$18,300,000
Platinum			$500,000	$431,000	$931,000
Port Alsworth			$325,000	$550,000	$875,000

Port Graham	$4,000,000		TBD	$550,000	$4,550,000
Red Devil		$1,500,000	$500,000	$550,000	$2,550,000
Savoonga		$10,200,000			$10,200,000
Stony River	$6,000,000		$500,000	$665,000	$7,165,000
Takotna	$11,900,000		$500,000	$440,000	$12,840,000
Tuluksak	$12,200,000		$500,000	$550,000	$13,250,000
Total	$289,450,000	$123,147,971	$9,662,000	$10,806,000	$433,065,971

Life Cycle Management Needs

1. Life Cycle Management – Paved Airports

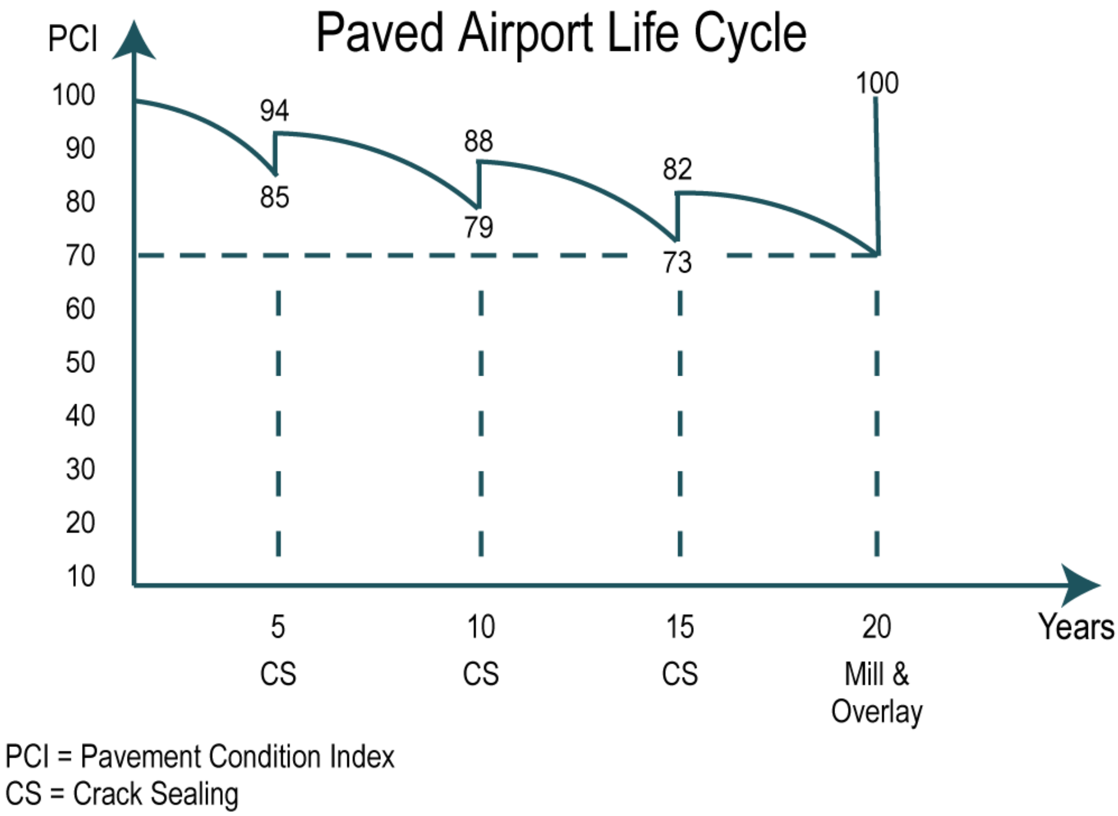
Three treatments were identified for paved airports: crack sealing, mill and overlay, and reconstruction. Exhibit 47 shows the life cycle treatments, timing, and costs that were developed and used in the model.

Exhibit 47: Paved Airports Life Cycle Management Treatments, Timings and Costs

		Crack sealing	Mill and Overlay	Reconstruction
Runways	**Timing**	Every 5 years	Year 20	Year 40
Taxiways and Aprons		Every 5 years	Year 24	Year 48
Cost/sqft		**$ 0.05**	**$ 4.73**	**$ 15.78**

The underlying assumption is that for runways, each year the PCI value will decrease 3 points, crack sealing will increase PCI by 9 points, and overlay and reconstruction will bring PCI back to 100. The assumption for taxiways and runways is the same till year 20, assuming that PCI value decreases faster from years 20 through 24. Exhibit 48 shows the change in runway pavement condition and the effect of treatments over the life cycle.

Exhibit 48: Change in Runway Pavement Condition Over the Life Cycle



Lifecycle management needs as calculated from the model are as shown in Exhibit 49 below:

Exhibit 49: Paved Airports Life Cycle Management Needs

		Backlog ($ Millions)	Life Cycle Needs 2007-2030 ($ Millions)	Total ($ Millions)
Northern	Runways	$100.9	$56.4	$157.3
	Taxiways & Aprons	$97.2	$31.6	$128.7
Central	Runways	$173.4	$104.9	$278.3
	Taxiways & Aprons	$187.9	$152.6	$340.6
Southeast	Runways	$65.8	$51.3	$117.1
	Taxiways & Aprons	$20.4	$87.7	$108.1
Statewide		**$645.5**	**$484.5**	**$1,130.0**

It is evident from the above numbers that backlog needs for airports are higher than the life cycle needs. This is due to the fact that about 67% of runways, 41% of aprons, and 36% of taxiways around the state fall under the system backlog.

Exhibit 50 through Exhibit 53 below present paved airport needs by year and by region.

Exhibit 50: Statewide Paved Airport Life Cycle Needs

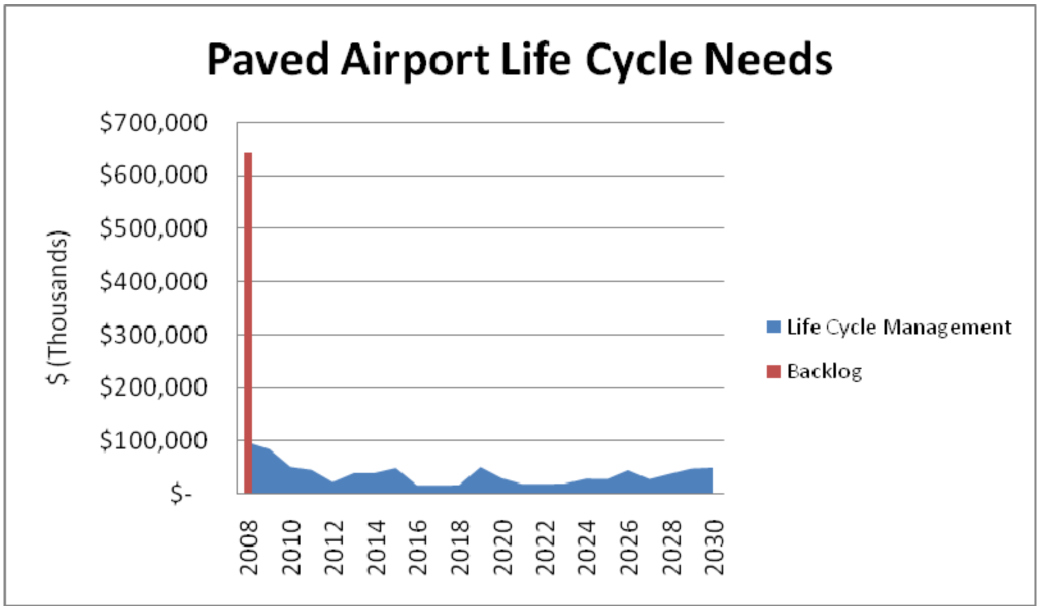


Exhibit 51: Northern Region Paved Airport Life Cycle Needs

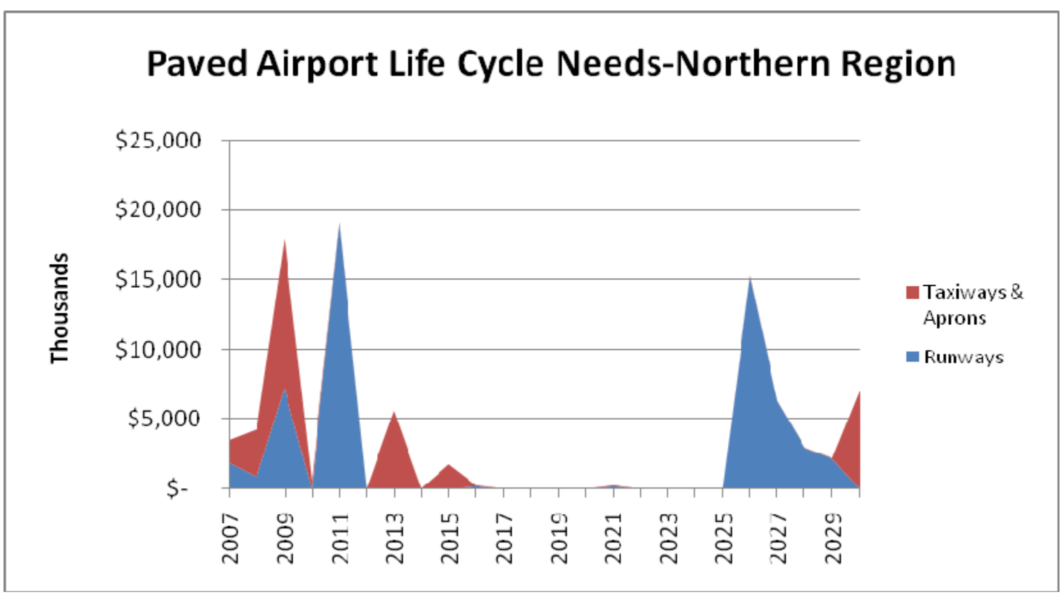


Exhibit 52: Central Region Paved Airport Life Cycle Needs

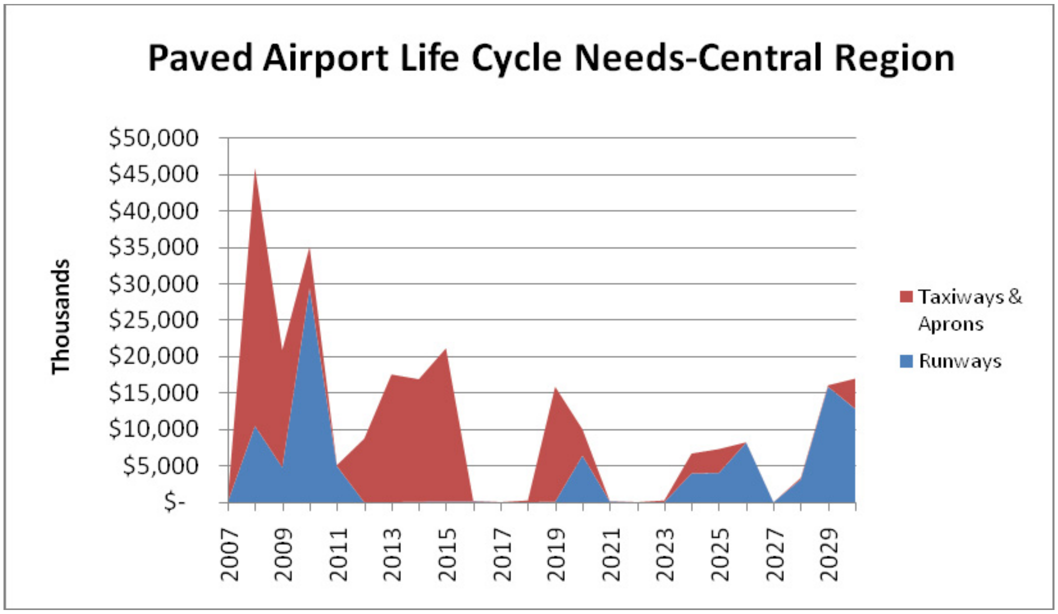
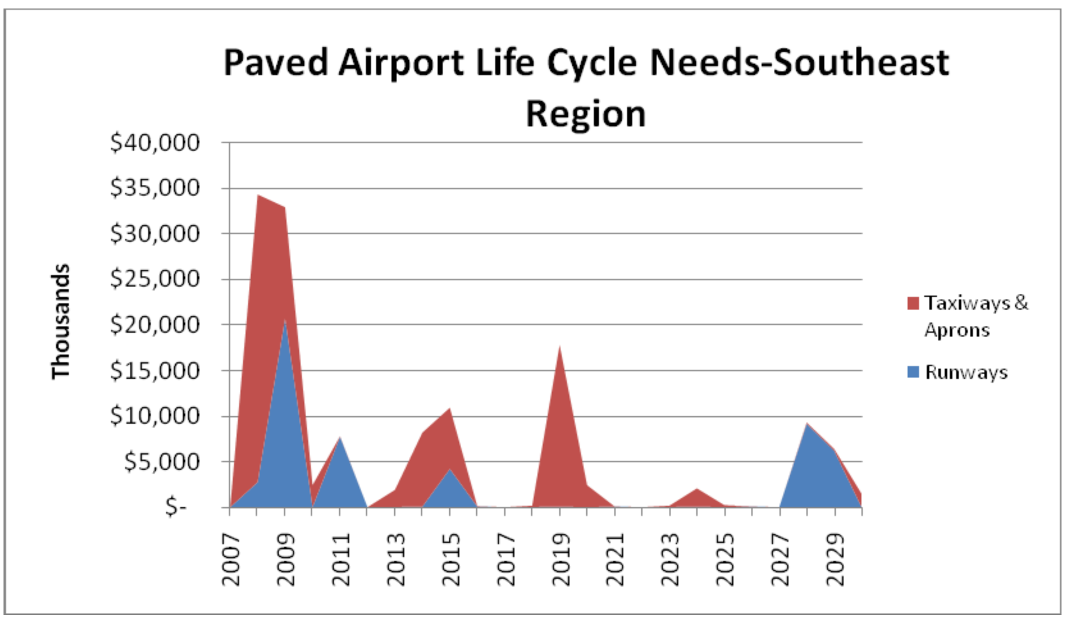


Exhibit 53: Southeast Region Paved Airport Life Cycle Needs



2. Life Cycle Management – Unpaved Airports

Two treatments were identified for unpaved airports: Adding dust palliatives every 3 years, and adding surface material every 10 years. It is assumed that work required on these airports will be evenly distributed throughout the life cycle. Based on these cycles and costs per square feet of these treatments, the total unpaved airport needs are given in Exhibit 54 below:

Exhibit 54: Unpaved Airports Statewide Life Cycle Management Needs.

	Airports		Surface Material	Dust Palliative ($/sq ft)	Surface Material (10 yr cycle)	Dust Palliative (3 yr cycle)	Need
	Number	Sq ft	($/sq ft)				
Northern	89	76,025,664	$0.19	$0.32	7,602,566	25,341,888	**$9,553,892**
Central	86	26,769,600	$0.19	$0.32	2,676,960	8,923,200	**$3,364,046**
Southeast	0	-			0	0	**$0**
Total		**102,795,264**			**10,279,526**	**34,265,088**	**$12,917,938**

Routine Maintenance Needs

1. Routine Maintenance – Paved/Unpaved Airports

As in the case of roads, the methodology is based on the historical trends, current conditions, and a forecast of future needs for routine maintenance. The model estimates need by type of surface (paved or unpaved) and region to account for topographic and weather conditions.

Current expenditure levels were obtained from each region by dividing annual expenditure by the number of lane miles and are shown in Exhibit 55 below.

Exhibit 55: Current Routine Maintenance Expenditures

		Airports	
		Paved	**Unpaved**
Northern Region	**Lane miles**	450	1,098
	$/Ln-mi	$ 14,890	$ 3,991
Central Region	**Lane miles**	453	423
	$/Ln-mi	$ 24,332	$ 4,250
Southeast Region	**Lane miles**	301	NA
	$/Ln-mi	$ 6,693	NA

Based on the above mentioned information, it was determined that routine maintenance for airports is underfunded by $13.4 million per year. As per surface transportation maintenance, this is a very conservative estimate. Exhibit 56 below shows the estimated routine maintenance needs till year 2030.

Exhibit 56: Statewide airport routine maintenance needs

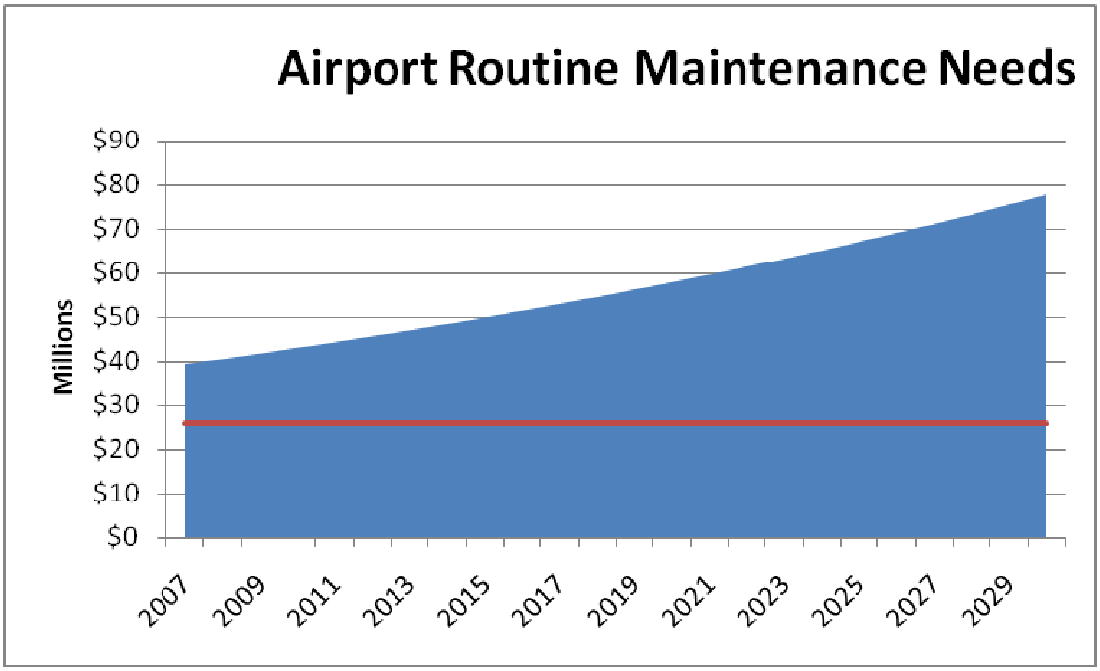


Exhibit 57 below shows the consolidated needs for airports till 2030, and annualized needs for each year.

Exhibit 57: Total Aviation Needs

	Total Needs ($ Millions)	Annual Needs (2007 $ Millions)
System Development	$2,814	$122
Life Cycle Management	$1,427	$62
Routine Maintenance	$905	$39
System Total (Annual–2007 $ Millions		**$224**

V. Total Modal Needs

Exhibit 58 below presents total statewide needs for all modes of transportation.

Exhibit 58: Total statewide modal needs

		Total Needs ($ Millions)	Annual Needs 2007 $ Millions	System Total (Annual) 2007 $ Millions
Highways/Bridges	System Development	$12,699	$552	**$1,051**
	Life Cycle Management-Highways	$8,435	$367	
	Life Cycle Management-Bridges	$644	$28	
	Routine Maintenance	$2,402	$104	
AMHS	System Development (Fleet Additions)	None Quantified	None Quantified	**$179**
	System Development (Terminal Additions/Replacement)	$230	$10	
	Life Cycle Management (Fleet Replacement)	$600	$26	
	Life Cycle Management (Fleet Refurbishment/Recertification)	$529	$23	
	Operations & Maintenance	$2,760	$120	
Aviation	System Development	$2,814	$123	**$224**
	Life Cycle Management	$1,427	$62	
	Routine Maintenance	$905	$39	
Statewide Total				**$1,429**

VI. Needs Analysis: Transit

ADOT&PF provides planning and program management support for public transportation. This is primarily through federal surface transportation funds. The public transportation is operated by each community's local government or by a consortium of private non-profit agencies in league with local government. The communities of Anchorage, Juneau, and Fairbanks operate conventional fixed route bus systems, while several other communities and/or private-non-profit ventures operate demand-responsive service. Exhibit 59 shows the system operator, the type of transit operated, and the number of vehicles operated by Alaska's primary transit systems during 2007.

Exhibit 59: Public Transportation Systems

Community	Operator	System Type	Number of Vehicles
Anchorage	Municipality of Anchorage	Fixed route and paratransit	60 buses 47 paratransit vans 51 vanpool vans
Juneau	City and Borough of Juneau	Fixed route and paratransit	16 buses 7 vans
Fairbanks	Fairbanks North Star Borough	Fixed route and paratransit	9 buses 11 vans
Palmer, Wasilla and the "Core Area"	Mat-Su Community Transit (MASCOT)	Paratransit	10 vans
Kenai and Soldotna	Central Area Transit Service (CARTS)	Paratransit	9 vans
Ketchikan	Ketchikan Gateway Borough	Fixed route and paratransit	6 buses
Bethel	City of Bethel	Paratransit	1 bus, 2 vans

Alaska's transit systems have evolved from primarily fixed-route systems 20 years ago to a combination of fixed-route and demand-responsive systems today. While the larger Alaskan cities continue to operate conventional fixed-route systems with paratransit systems for the elderly and riders with disabilities, a number of smaller communities have successfully started demand-responsive systems. Lacking the residential density and funding needed to operate fixed-route transit successfully, the evolution of coordinated transit systems combining public and private non-profit agency resources has allowed smaller communities in the state to initiate and operate transit successfully. The public/private system model uses some public resources along with vehicles and drivers provided by social service agencies to cost-effectively provide service to agency clients and the general public.

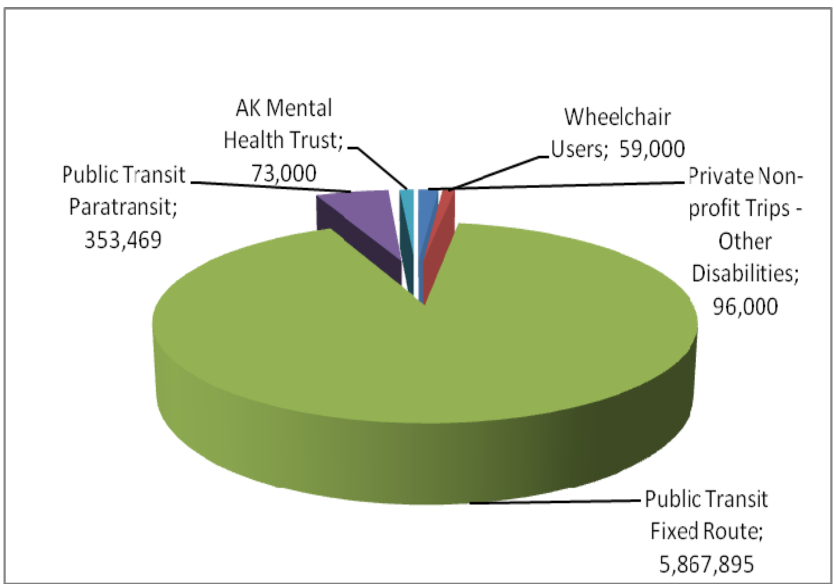
Capital Needs

The most recent Alaska Public Transportation Management System (APTMS) data indicates that over the next eight years overall transit capital needs include 85 fixed route buses, 280 paratransit vehicles, and 55 cars, trucks and other support vehicles, and a number of passenger and vehicle shelters.

In addition, population growth, traffic congestion, and the cost of capacity expansion has resulted in the prospect of system expansion in Anchorage. The system growth may take the form of regular fixed routes or possibly the start of a bus rapid transit system. More flexible, scalable, and an order of magnitude less expensive than light rail, bus rapid transit represents the next step for transit in Anchorage. The approximate value of the capital needs of all systems over the next ten to fifteen years in Alaska is $75 million.

Transit ridership statewide has been trending up. In 2006, a total of 6.5 million one-way trips were taken on transit systems in Alaska. Exhibit 60 displays the distribution of the trips taken.

Exhibit 60: Public Transportation Ridership, 2006



VII. Needs Analysis: Ports and Harbors

This section presents a preliminary needs analysis of ports and harbors in Alaska. A detailed needs analysis will be performed as a part of a comprehensive ports and harbors system plan.

System Development Needs

Local ports and harbors have no federal capital assistance program comparable to the highway and airport funding programs. Port and harbor facilities are difficult to develop because port and harbor projects are not part of the STIP or AIP process, and therefore cannot rely on a regularly planned federal funding program. These marine and riverine projects rely completely upon an annual legislative appropriation, which either funds the project completely or provides a portion of the matching funds for use with a federal program. There are two sources for federal port and harbor funds, either the Economic Development Agency (EDA) or the U.S. Army Corps of Engineers (USACE).

The EDA and the state have historically provided grants to local governments for the development of large commercial ports whose users are mostly commercial transportation carriers and very large vessels. Local governments then receive income from these ports through wharfage and service fees. Local governments use these fees to cover their M&O costs and any indebtedness. Direct state grants for new port construction, which come through legislative appropriation from the state general fund, have become increasingly uncommon and any future appropriation is uncertain and must be handled on a case-by-case basis. Recently constructed ports, like the Delong Mountain terminal at the Red Dog Mine, have been financed through local taxes and bonds and in some cases with private financing guaranteed by the Alaska Industrial Development and Export Authority.

The USACE and the ADOT&PF, through local and state matching funds, has a harbor funding program which has developed most of Alaska's harbors since statehood. In a USACE project, the federal government pays for dredging channels and constructing the outer breakwaters. The state and local government split the cost of the inner harbor development (floats, docks, and dredging). A typical USACE project has a very long project development cycle. It takes an average of 10-15 years for a USACE harbor project to be constructed. The reason for this is that USACE distributes funding on a nationally competitive, project-by-project basis. USACE, moreover, only develops projects; funding depends on Congressional approval on a line-item basis. Thus, the state cannot plan on receiving any portion of USACE' support in any given year, nor can the state "flex" any Corps funding; all funding is appropriated on a project-specific basis. Rather than being driven by any state prioritization or program, the federal port and harbor funding process is driven by USACE's assessment of a project's merit, and by Congress' willingness to fund USACE's recommendations.

Implications

There has been a role reversal in terms of leadership and championing port and harbors development. ADOT&PF's role has been reduced to caretaker of ports and harbors in unincorporated areas of the state, whereas local government's role has increased since they own and control the majority of the state's waterfront infrastructure development. Local government doesn't have the regional planning expertise and in-house technical expertise to plan for and evaluate their port and harbor needs. Needs generally exceed local revenue sources. Only by seeking federal or state financial, technical and planning assistance, can local government prioritize their port and harbor facility needs.

Ports and Harbors: System development needs

State planning funds are needed to inventory the state's existing port and harbor facilities. In addition, ADOT&PF, in conjunction with the Denali Commission or the USACE, can assist local government with planning for future waterfront infrastructure development and reviewing the impact of climate change as it affects the coastal areas of western Alaska. The ADOT&PF should take a role in assisting local government with prioritizing their port and harbor needs and advocating for regional waterfront infrastructure development.

Ports and Harbors: Municipal Harbor Facility Grant Program

Although the transfer of ownership of port and harbor facilities is the most efficient way of preserving these assets, local government is still learning how to fiscally manage and provide the necessary maintenance that the ADOT&PF provided for previously. Local ownership maximizes local control and promotes fiscal and maintenance responsibility by the local users of the facility. In addition, local ownership strengthens the state's position that fees must cover all expenses, including capital replacement. This reduces the long term state burden to preserve and make improvements. Nevertheless, there remains a gap in funding for port and harbor projects promoted by local governments.

Implications

State municipal assistance has declined in recent years, and local governments find it difficult to raise fees, taxes, and finance bonds when their economies are slow. Unless a substantial external funding source emerges to support marine infrastructure development in Alaska, local governments need to define the appropriate level of local and state assistance required or reduce their expectations. Securing continued state assistance is the greatest single challenge for municipalities at this time. The state will only respond to the level of expectation required by local governments.

Ports and Harbors: Municipal Harbor Facility Grant Program needs

Continued legislative support and appropriation for this locally inspired program to recapitalize local government's investment in their port and harbor needs. Municipal Harbor Facility grant program needs are estimated to be $10 million per year.

Routine Maintenance Needs

ADOT&PF owns 28 port and harbor facilities in 24 different locations around the state. Most of these harbors are located in unorganized areas of south-central and southeast Alaska and are operated as harbors of refuge for commercial fishermen and recreational boaters. Capital replacement of these harbors and places of refuge remains a state responsibility.

ADOT&PF is responsible for preserving this infrastructure by reducing the backlog of deferred maintenance of about $27 million. Maintenance of this infrastructure is far "behind the curve"; as with highways and airports the level of funding has not been sufficient to protect the investment. But the situation is somewhat worse. Whereas aviation and highway fuel taxes provide about 50 and 33 percent, respectively, of the department's M&O costs each year, ADOT&PF doesn't receive any portion of the federal or state marine fuel taxes collected for ports and harbors maintenance.

Long term, transferring facilities to local ownership is an important way to minimize state costs and maximize local government control. Opportunities still exist for transferring up to 7 more harbors to local ownership with additional legislative appropriations.

Ports and Harbors: Routine Maintenance Needs

Continued legislative support and appropriation is necessary to reduce the backlog of deferred maintenance and address the public's and users safety needs. Total routine maintenance needs are approximated at $1 million per year.

VIII. Finance Analysis

The finance analysis section presents the findings and analysis conducted to evaluate recent trends in revenue applied to fund ADOT&PF maintenance and capital expenditures. The analysis includes forecast of future revenue and an assessment of the risks to ADOT&PF's revenue sources. The finance analysis is provided in the following sections:

- Overall findings
- Historical revenue analysis
- Revenue Forecast
  - Forecast of state motor fuel tax.
  - Prognosis of other unrestricted state revenues.
  - Analysis and forecast of future federal-aid highway funds.

Revenue Analysis: Overall Findings

- **Alaska has a very immediate transportation finance crisis.**
  - Economic activity is a primary generator of fuel consumption, and hence tax revenue, which will be subject to economic cycles
  - Alaska has no highway fund or dedicated transportation user fees
  - The General Fund is used primarily for state matches on federal funds and to subsidize AMHS operating costs
  - Prognosis for General Fund revenue beyond 2008 is not good as a source for highway funding. Alaska is running out of oil revenues and, without the gas pipeline (earliest 2015), state revenue will decline. Consequently, absent new revenue sources in the form of user fees other taxes, ADOT&PF will have to compete with other agencies for general fund revenue.
  - Federal trust fund is forecast to go into deficit in FY 2009. This means that future reauthorizations of federal surface transportation funding are not likely to provide a solution to Alaska's transportation funding needs.
  - Alaska receives the highest federal surface transportation and other transfers per capita of any state, so bears the highest risk of federal deficit reduction of any state.
  - Alaska's future ability to secure relatively high-levels of funding from the federal program is at risk as the state may not have the same political influence near term.

- **Finance strategies and mechanisms being pursued in the rest of the country have limited applicability in Alaska.**
  - User-fees have limited yield in the state due to high costs of highways, few users, and heavy industrial component.
  - National trends for revenue bonds and tolls, and ultimately VMT based charges, are not viable in the state due to high costs and few users.
  - Rest of the country is incrementally adding capacity to address congestion, while Alaska is building new corridors typically for economic development.

Historical Revenues Analysis

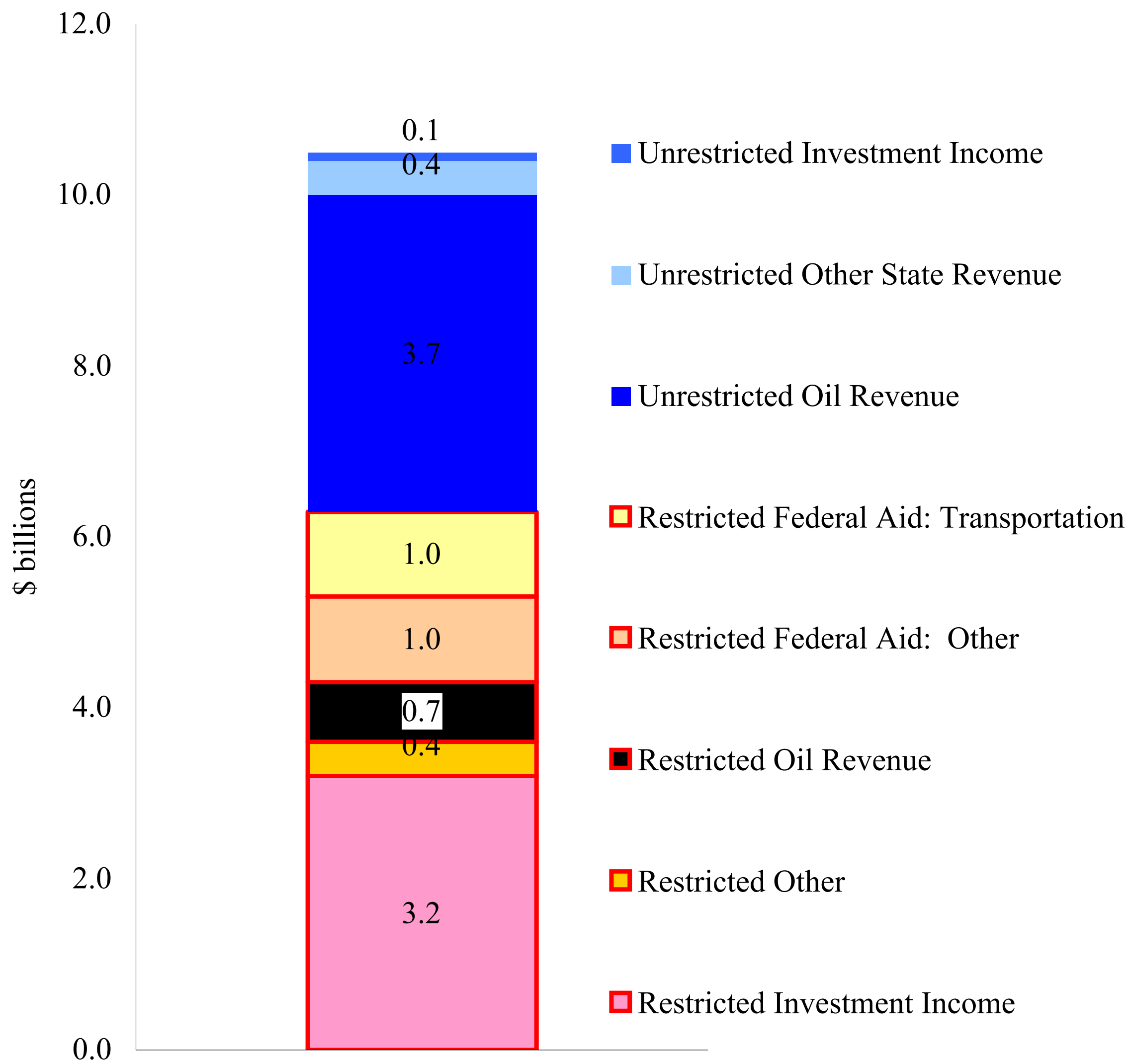
1. Motor Fuel Taxes in the Context of Alaska State Revenues

In the fiscal year 2006, Alaska collected about $42 million of motor fuel taxes; they made up less than 0.5% of Alaska's revenues from state and federal sources, which totaled about $10.5 billion in that year. This is not a revenue source dedicated to transportation and represents a small component of General Fund revenue.

As Exhibit 61 indicates, Alaska is heavily dependent on the oil sector: their taxes, royalties[2] and other payments to the state are over 40% of all revenues, state and federal, and over 50% of state revenues.

[2] The State of Alaska owns the sub-surface rights of the North Slope production area.

Exhibit 61 - State of Alaska Revenues, 2006



As this exhibit illustrates, about $6.3 billion of total revenues are restricted in their purpose: of that, about $1 billion was received by Alaska through federal aid transportation programs covering all modes of transportation. Only $4.2 billion of total revenues were unrestricted and available for General Fund expenditures, of which $3.7 billion – well over 80% - were oil sector revenues

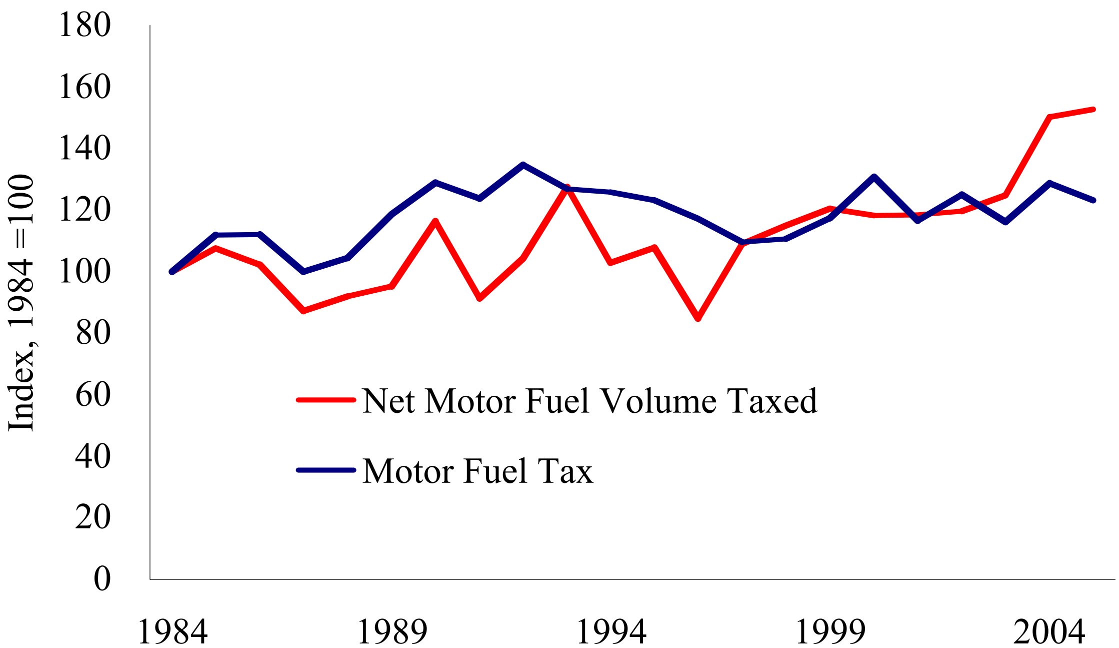
In terms of what existing sources of revenues may be available for highway funding, it is apparent that motor fuel tax revenues are not a significant source, nor is any unrestricted source other than the oil sector.

2. Historical Values of the Relevant Variables

Both Alaska and the United States collect taxes on gasoline and diesel fuel sold for highway use. For gasoline, that is the second- lowest tax rate of any state in the country, in which the average state tax rate is about 20 cents per gallon. The current rate was initially put in place in 1961, lowered to 7 cents per gallon in 1964 then increased again to 8 cents per gallon in 1970. In 1970, the average of state gas tax rates across the United States was about 7 cents per gallon. Had the 8 cents per gallon motor fuel tax of 1970 been increased to keep pace with inflation in Alaska[3], the current rate would be about 33 cents per gallon.

Historical motor fuel tax revenues[4] and taxable gallons sold are shown in the exhibits below.

Exhibit 62: Taxable Gallons and Tax Revenues

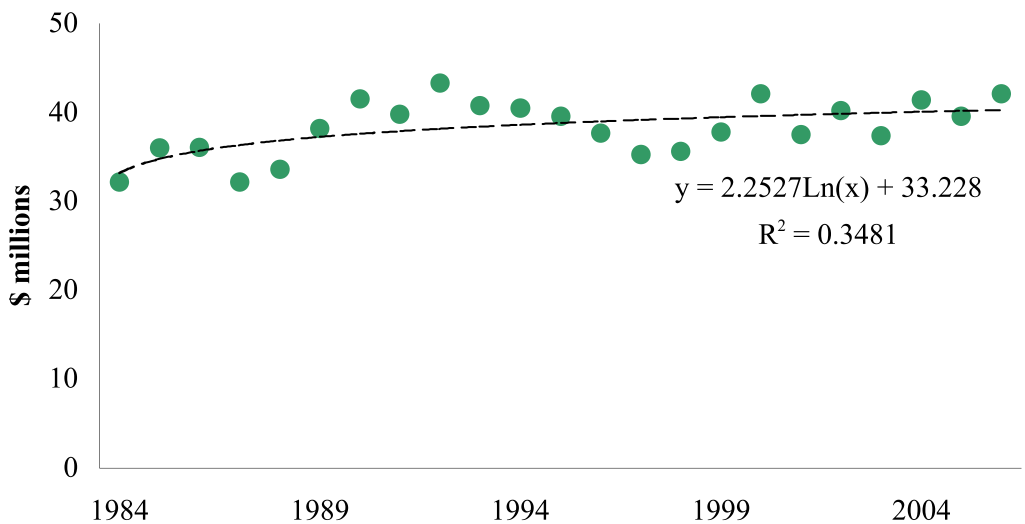


[3] Consumer Price Index for Anchorage. Bureau of Labor Statistics, http://almis.labor.state.ak.us/?PAGEID=67&SUBID=241

[4] Alaska Department of Revenue. Fall 2006 Revenue Sources Book. http://www.tax.state.ak.us/sourcesbook/GeneralFundUnrestrictedRevenueHistory.pdf

With a constant motor fuel tax rate, year-over-year changes in gallons taxed and revenues collected should coincide. The exhibit above shows that they do not. There are two possible explanations for the divergences: [1] Alaska's collection procedures introduce differences between the dates on which gasoline sales are recorded and the dates on which motor fuel tax revenues are accrued; and [2] the Federal Highway Administration and the Alaska Department of Revenue apply different definitions of what constitutes taxed fuel.

Exhibit 63: Motor Fuel Tax Revenues since 1984



Motor fuel tax revenues in Alaska have grown at an average rate of 2.25% annually since 1984. Year-over-year changes, however, are quite different than this average, with an increase of almost 14% from 1988 to 1989, and with negative growth in 10 years of the 21 years in the period.

Trend lines, such as that in the exhibit above, are poor predictors of tax revenues and taxed gallons of fuel in Alaska. To find better explanations these variations between 1984 and 2005 in motor fuel tax revenues, we must look to the behavioral variables. These variables are:

GAL = f(GPR, CPR, POP, HSI, GDP)

Where:

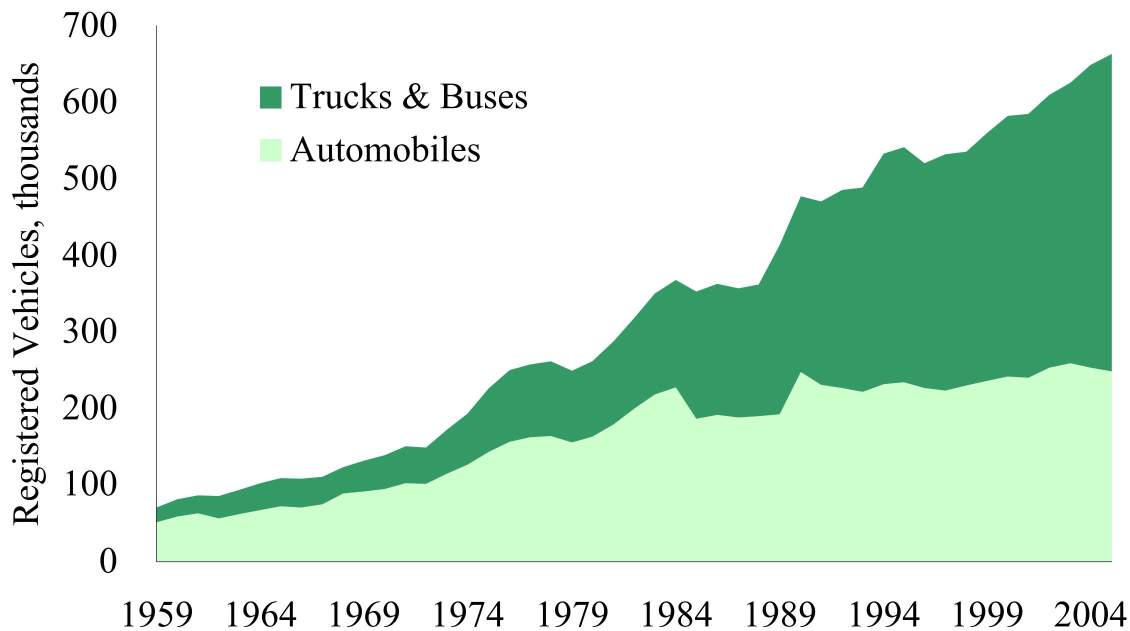
GAL =	Taxable gallons of fuel sold
GPR =	Retail price of fuel, including taxes.
CPR =	Purchase price of a new vehicle, including interest.
POP =	Population
HSI =	Household income
GDP =	Gross domestic product

Registered Vehicles, Vehicle Prices and Fuel Prices

Alaska runs on heavy equipment. In 2005 there were 38,000 commercial trucks and 204,000 pickup trucks registered in the state, representing 30% of all 810,000 registered vehicles[5]. Only, Kansas, Wyoming and Alabama have higher proportions of light and heavy trucks among their registered vehicles.[6] The state ranks second-highest in the nation for the intensity of diesel fuel use, and about double the national average, with highway-use diesel accounting for 43% of all highway-use fuels in 2004.[7]

Trucks have been predominant in Alaska's registered private and commercial vehicle fleet. Almost 80% of the growth in the fleet since 1989 is comprised of trucks[8].

Exhibit 64: Private and Commercial Vehicles, 1959 to 2005

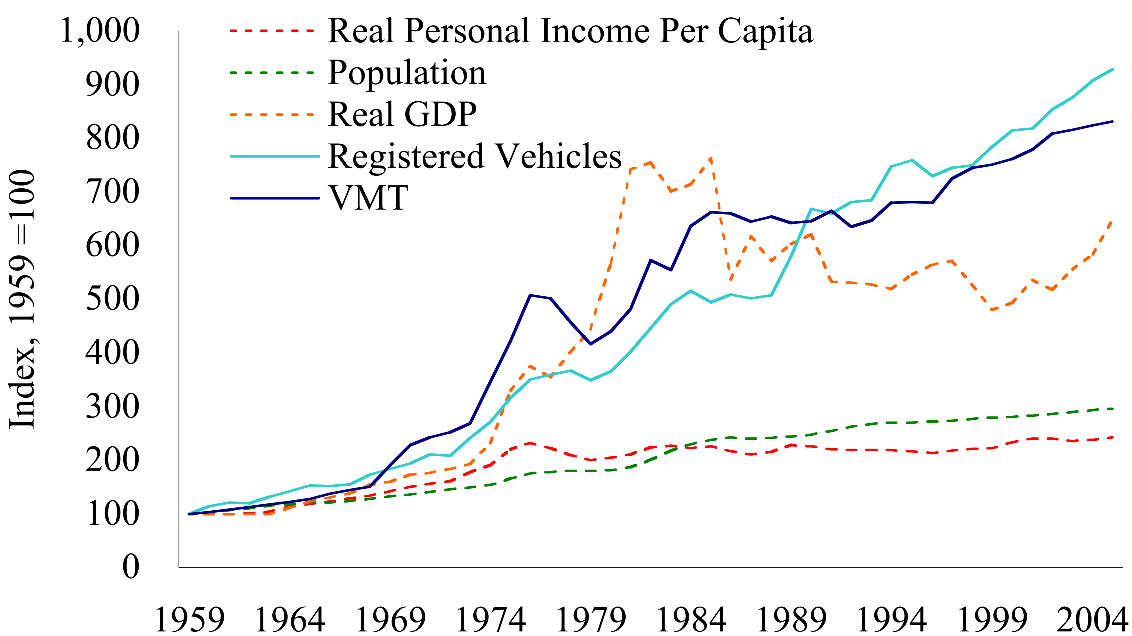


[5] http://www.state.ak.us/local/akpages/ADMIN/dmv/research/curreg05.htm . This total excludes over 53,000 registered snowmobiles.
[6] FHWA Motor Vehicle Statistics, 2004, Table MV-1. http://www.fhwa.dot.gov/policy/ohim/hs04/mv.htm
[7] Federal Highway Administration. Motor Fuel Statistics, 2004, Table MF-33SF. http://www.fhwa.dot.gov/policy/ohim/hs04/mf.htm. Wyoming ranked #1, at 52%, and Nebraska ranked #3, at 33%. Hawaii was the lowest, at 9%.
[8] Federal Highway Administration. Motor Vehicle Statistics. To 1995, Table MV201; from 1996: Annual Tables MV1

VMT

Vehicle-miles traveled on all functional classes of highway in Alaska have grown from about 600 million VMT in 1959 to over 5 billion VMT in 2005[9]. This is more than an eight-fold increase over less than 40 years in Alaska; the corresponding increase in the United States as whole was about four-fold: from about 700 million VMT in 1959 to about 3 billion VMT in 2005.

Exhibit 65: Growth in VMT and Registered Vehicles, 1959 to 2005



The sustained and high rate of growth in both VMT and the number of registered vehicles in Alaska has outstripped the growth rates of both the state's population and its gross domestic product, as seen in the exhibit above.

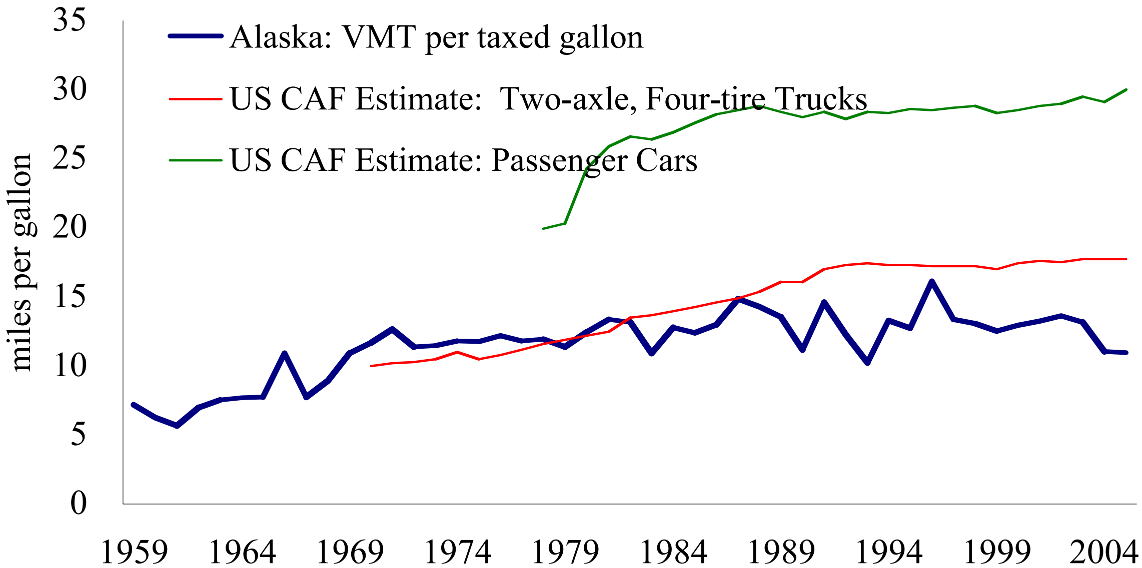
MPG

With its harsh climate and the propensity of its residents to purchase large pickup trucks, Alaska has not seen the same increases in fuel efficiency that other states have experienced.[10]

[9] Federal Highway Administration, Highway Statistics. To 1995, Historical Table VM202; and from 1996: Annual Table VM2.

[10] Energy Information Administration. Transportation Energy Data Book; Tables 4-02 and 4-17

Exhibit 66: Fuel Efficiency in Alaska and the US, 1959 to 2005



There are several differences in the data that require some caution in making direct comparisons of the Alaska data with the US CAFÉ estimates. The state data is estimated by dividing VMT by taxed fuel, thus excluding exempt fuel that is included in the VMT estimates. Also, the CAFÉ estimates are based on tests of sample vehicles rather than fuel consumption for the US vehicle fleet as a whole. The conclusion that the Alaska vehicle fleet has low fuel efficiency is still a reasonable one despite these differences.

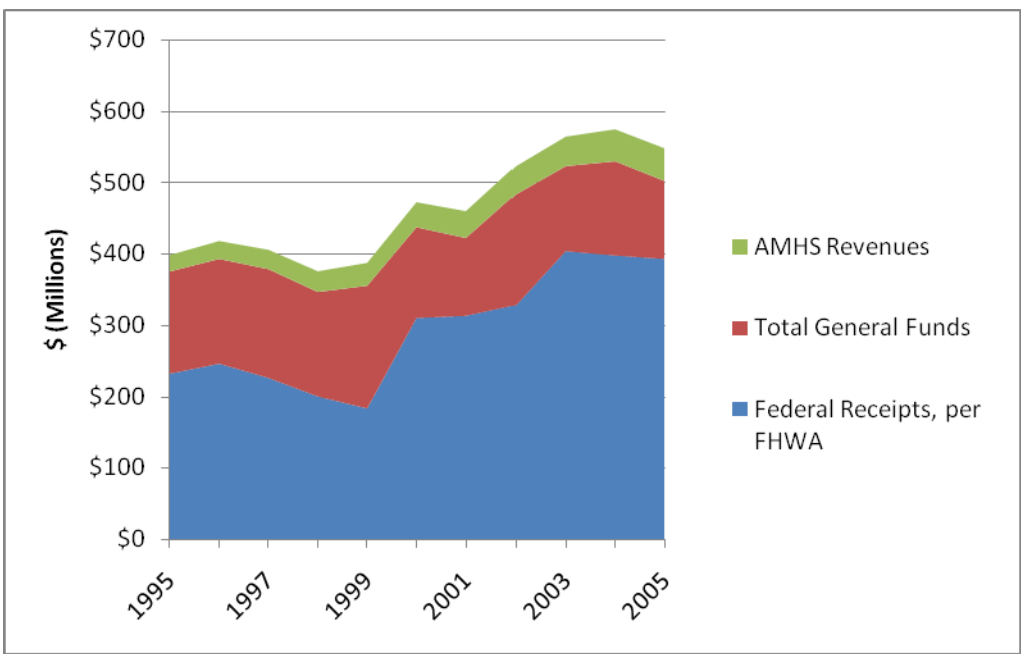
3. Historical Revenues

The historical revenues for ADOT&PF for highways/bridges and AMHS are shown in a tabular and graphical format on the next page. This does not include aviation revenues.

Exhibit 67: ADOT&PF Historical Revenues

	Federal Receipts, per FHWA	AMHS Revenues	General Fund Revenues
1995	$232	$23	$143
1996	$246	$25	$147
1997	$226	$27	$152
1998	$200	$29	$146
1999	$183	$32	$172
2000	$310	$35	$127
2001	$313	$38	$109
2002	$328	$39	$155
2003	$403	$41	$119
2004	$397	$45	$132
2005	$392	$46	$109

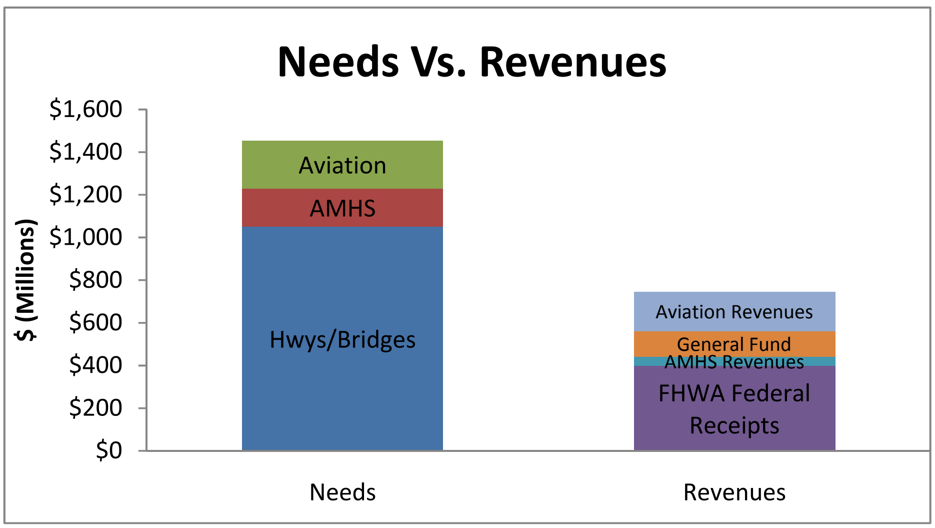
Exhibit 68: ADOT&PF Historical Revenues



As seen on the previous page, the state has historically been dependent on Federal funds to meet most of state needs, followed by general funds, while a small fraction of revenues comes from AMHS farebox. Aviation revenues for ADOT&PF are primarily in the form of Airport Improvement Program (AIP) revenues. These revenues average about $184 million a year, not including airports in the international airport system.

An average of 2003 to 2005 (the last year for which complete data is available) revenues was calculated to compare recent year revenues to future annualized needs. Exhibit 69 below presents the comparison to indicate the gap between needs and revenues.

Exhibit 69: ADOT&PF Needs vs. Revenues



Revenue Forecasts

Since unrestricted state revenues in the General Fund are available for transportation expenditures, the forecast of the motor fuel tax is accompanied by a prognosis for other revenues. It is important to emphasize here that receipts into the General Fund are not dedicated as transportation revenues, and only a part of the General Fund is allocated to ADOT&PF.

Forecast of Motor Fuel Tax Revenues

Exhibit 70: Forecasts of Taxable Gallons Sold, to 2020

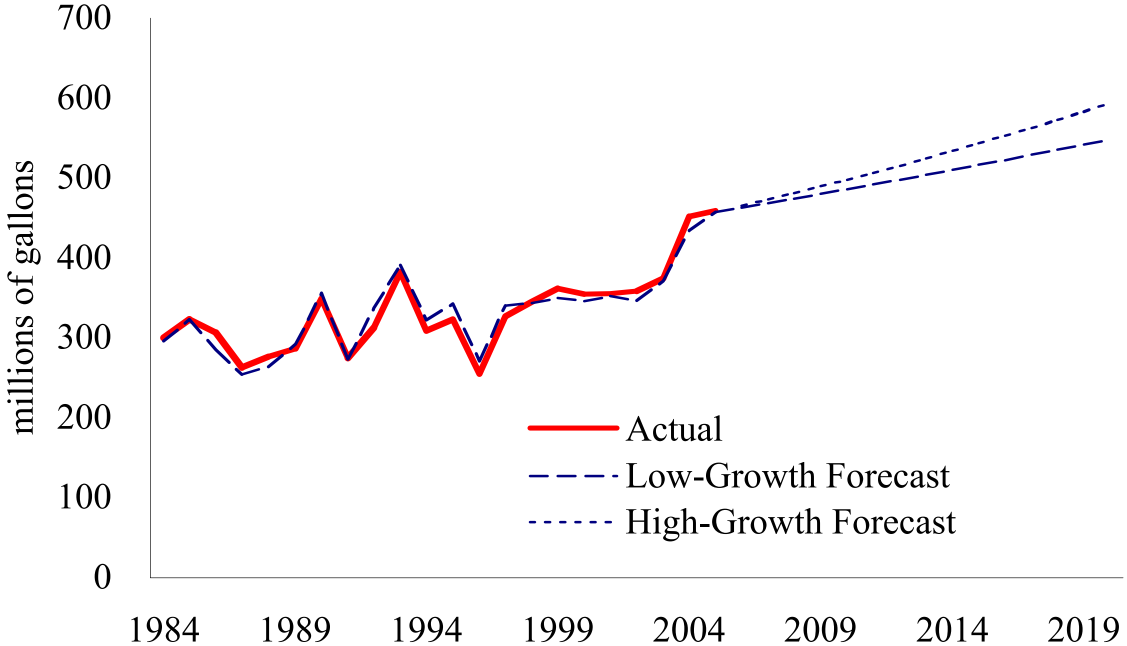


Exhibit 71: Forecasts of Motor Fuel Tax Receipts, to 2020

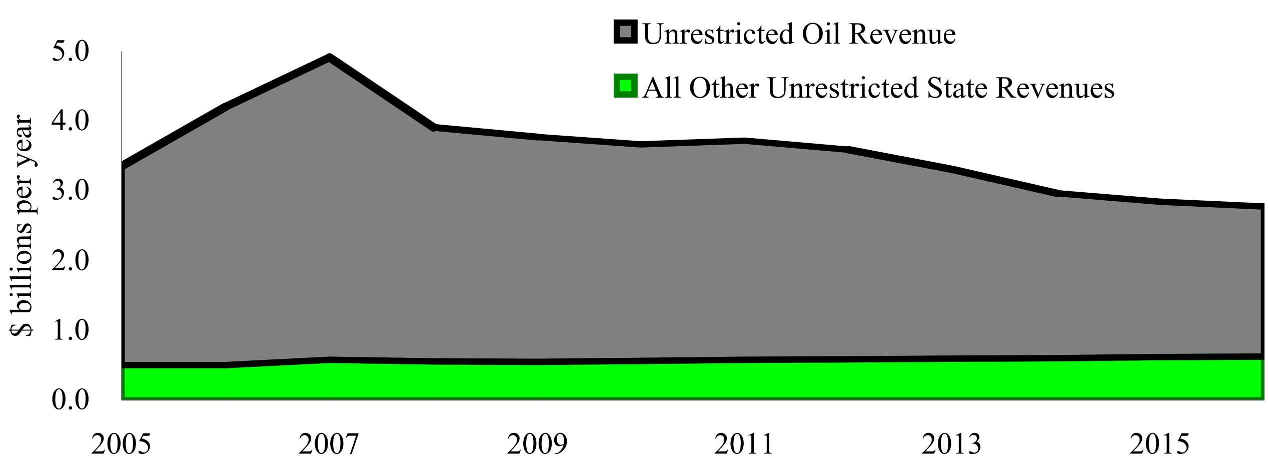
	Low-Growth Forecast	High-Growth Forecast
	$ millions	$ millions
2005	42	42
2006	40	40
2007	40	41
2008	41	42
2009	41	42
2010	42	43
2011	42	44
2012	43	44
2013	43	45
2014	44	46
2015	45	47

2016	45	48
2017	46	49
2018	46	49
2019	47	50
2020	47	51

Other Unrestricted State Revenues

The Tax Division of the Alaska Department of Revenue annually publishes a long-term forecast of the state's revenue sources. The current forecast,[11] consistent with the economic and demographic assumptions in the two sub-sections above, shows a prolonged and significant decrease in oil sector revenues after 2007, when high oil prices revert to more normal levels and can no longer offset the steady decline of production on the North Slope. While other revenues are forecast to increase, they represent such a small proportion of unrestricted revenues that they cannot stem the overall decrease.

Exhibit 72: Alaska Department of Revenue Fall 2006 Forecast



The forecast shown in the exhibit above is in nominal dollars. If construction costs were to continue to inflate at their lowest historical growth rate, the 2.1% per year that prevailed between 1980 and 2002[12], the purchasing power of the $2.8 billion of revenues that are forecast for 2016 would be equivalent to about $2.55 billion of 2006 dollars, which is about 53% of 2006 revenues of $4.2 billion. In 10 years, Alaska's unrestricted revenues will have about half of the purchasing power that they have now.

[11] Alaska Department of Revenue. Fall 2006 Revenue Sources Book. http://www.tax.state.ak.us/sourcesbook/2006/Fall2006/index.asp
[12] http://www.census.gov/const/C30/annindex.pdf. compiled from FHWA annual statistics

The forecast of unrestricted oil revenues assumed no additional revenues from the conversion of the royalty from a fraction of gross value to a fraction of producers' profits. The new Petroleum Profits Tax may ultimately provide for an increase of almost $1.5 billion dollars.[13] Since it is a new measure, however, the revenue forecast assumes that the change in basis is revenue-neutral.

Federal-Aid Highway Funds Forecast

The Federal Highway Administration (FHWA) in the U.S. Department of Transportation makes about $30 billion available each year to share in the costs of eligible and approved highway projects that are undertaken by state departments of transportation across the country.[14] These funds, which amount to over one-third of capital expenditures on highways in the United States by all levels of government[15], are raised from a federal excise tax of: 18.4¢/gal on gasoline and gasohol in highway use; and 24.4 ¢/gal on diesel in highway use; and various rates on the sale of tires, trucks, and trailers.[16]

1. Current Levels of Highway Federal Aid in Alaska

The federal transportation funds that flow through federal apportionments to Alaska for all modes of transportation are, nominally, about $1 billion per year. The highway portion of these amounted to some $385M obligated in 2005. However, these funds are reimbursements, not revenues, and they can vary widely from year to year.

The federal legislation that authorizes these reimbursements allows Alaska no flexibility as to how some of those funds can be programmed; the amount that must flow directly into such earmarked federal projects is at least $270 million but, again, varies significantly from year to year.

Forecast of Future Amounts of Federal Aid Funds

To forecast what funds may be available to Alaska for obligation, it is necessary to examine the future prospects for each of the measures that the U.S. Congress and the FHWA take to determine the availability of federal funds for obligation in each fiscal year. The assumptions in the forecast are arranged according to these measures in the sub-sections below.

Assumptions

We presume that the reader is acquainted, but not intimately familiar, with the ins and outs of the process by which the availability of funds is determined for the Federal-Aid Highway Program. To assist the reader in their acquaintance with the complex administration of this program, a basic description of the process and a glossary are appended.

[13] Gov. Palin "State of the State" address, 17 January 2007. http://gov.state.ak.us/news.php?id=66
[14] Federal Highway Administration. Highway Statistics, 2005: Table FE-10
[15] Federal Highway Administration. Highway Statistics, 2004: Table HF-2
[16] Federal Highway Administration. Highway Statistics, 2005: Table FE-10

Authorizations

With the passage of SAFETEA-LU, authorizing legislation is in place until 2009 and there is no threat that the availability of funds will be constrained by continuing resolutions before that time. We assume that, after 2009, successive authorizing bills will be passed such that continuing resolutions may be required but not so much as to constrain the funds available over periods of several years.

Appropriations and Obligation Limitations

Since over 90% of the Federal-Aid Highway Program consists of discretionary programs, we assume that growth rate in appropriations and obligation limitations will not exceed the growth rate in Federal Excise Taxes receipts into Highway Trust Fund. In other words, the federal aid funds available for obligation will be determined by the growth rates in motor fuel tax receipts that, in turn, are influenced by VMT, fleet fuel efficiency (CAFÉ), and the use of alternative fuels.

At about $30 billion, the Federal-Aid Highway Program represents about 1% of all U.S. government expenditures of about $2655 billion and about 4% of all discretionary program expenditures. The current federal deficit is about $250 billion, about, 10% of all government programs. We assume that the deficit must be eliminated by 2025 and, to accomplish this, Congress will reduce obligation limitations within the highway firewall by at least $2 billion per year, commencing in 2010.

Apportionments

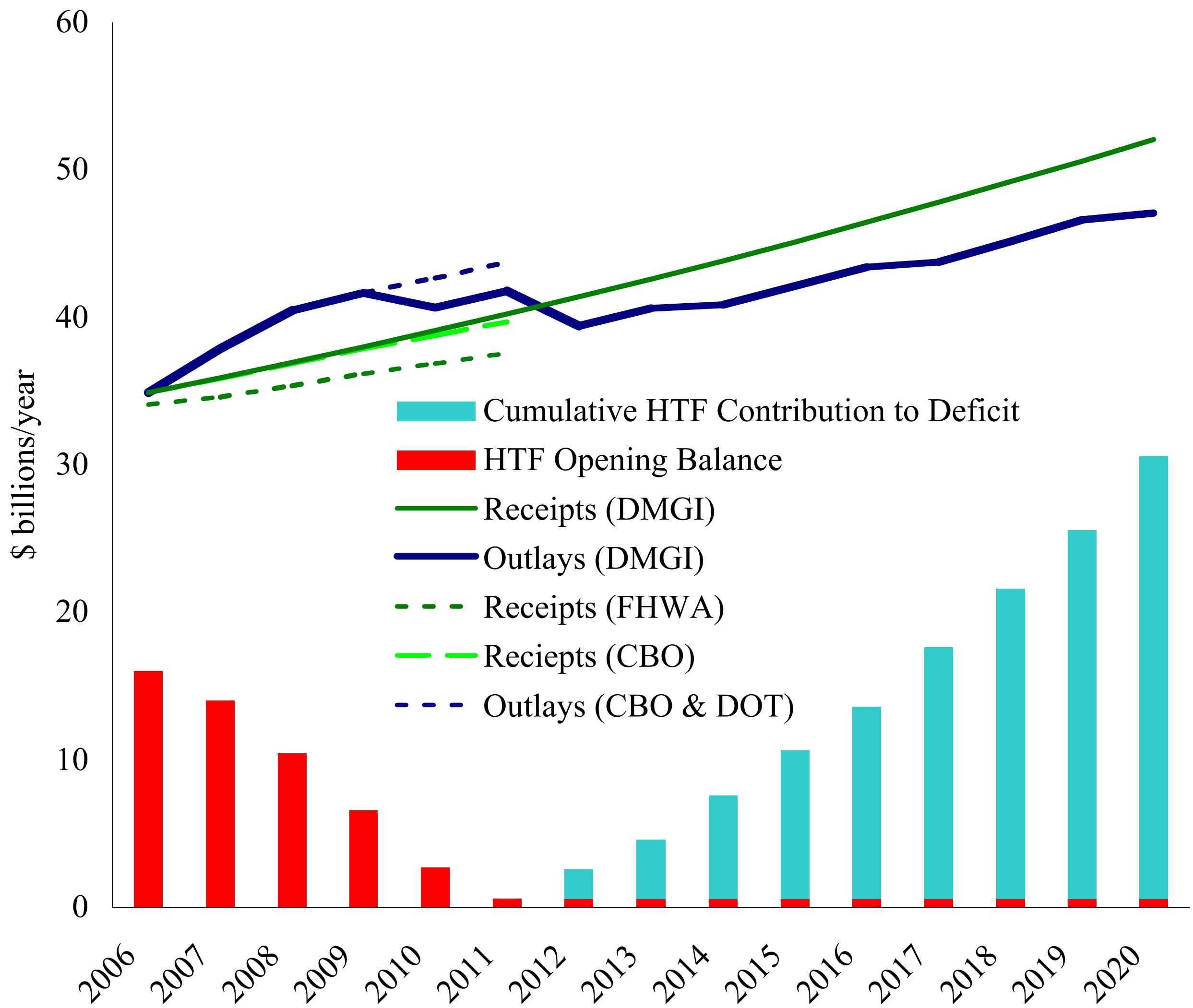
SAFETEA-LU requires that federal-aid provided to each state be no less than 90.5% of the federal excise taxes collected in that state. Alaska is a recipient state, currently receiving amounts of federal-aid that are about 500% of the amounts of Highway Trust Fund revenues that are collected in the state. This provision will not protect Alaska from reductions in federal aid.

We assume that outlays can reduce the cash balance in the HTF to zero but not below zero, such that the HTF barely complies with the Byrd Amendment in the long term after the firewalled reduction in outlays is transferred to the General Fund to reduce the deficit.

2. Forecasts for the Highway Trust Fund

The forecasts for the HTF are summarized in the graph below. Our forecast, (DMGI), is compared to the forecasts produced by the Congressional Budget Office (CBO) and the Administration (FHWA).

Exhibit 73: HTF Forecasts



With outlays from current commitments expected to exceed HTF receipts until 2009, the HTF cash balance will be eliminated in that period. Thereafter, new outlays are assumed to equal receipts less firewall reductions in obligation limitations that will generate a $30 billion surplus within the HTF by 2020. This surplus is assumed to be the HTF contribution to the operating deficit of the federal government; HTF cash balances are kept to negligible levels.

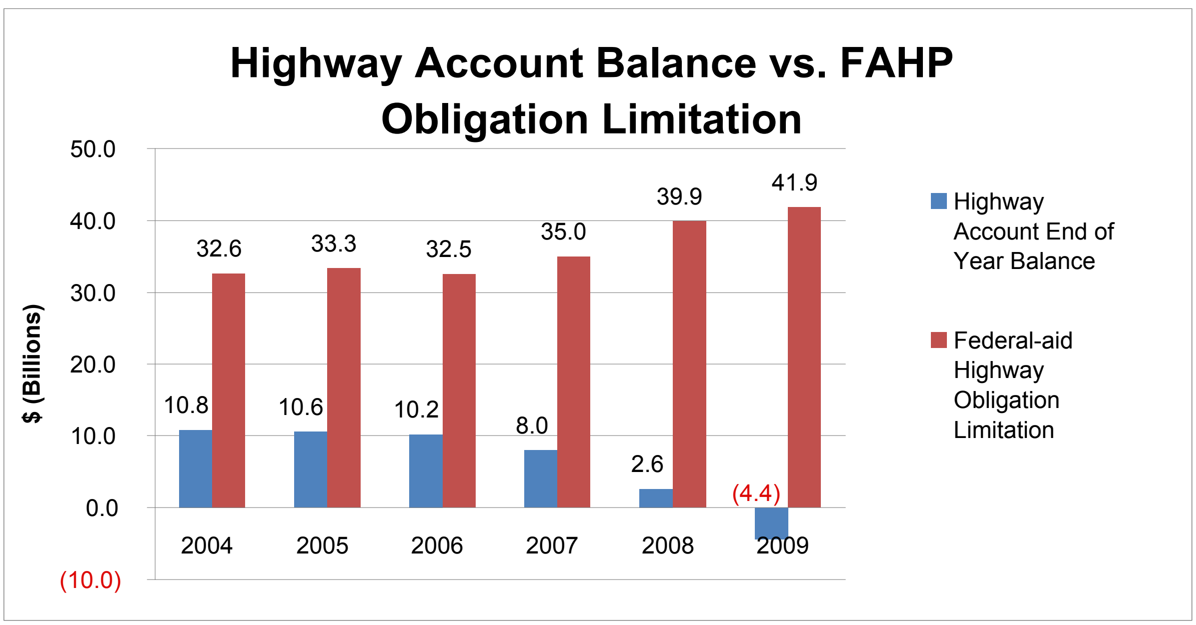
The result is that the capacity for new obligations across all states will remain stagnant from 2006 to about 2013, when about $3 billion of obligation availability will be added to federal aid highway programs each year.

Since the Highway Account forecast was completed in the spring of 2007, new information has become available:

- The Congressional Budget Office presented a new forecast of receipts and outlays from the Highway Trust Fund in October 2007 to the United States Congress[17]; and
- The U.S. Department of the Treasury released data on actual receipts and disbursements from the Highway Trust Fund during the federal fiscal year ended 20 September 2007[18].

We revise our forecasts of obligation limitations in the Highway Account and of the closing balance of the Highway Account portion of the Highway Trust Fund to incorporate the new information. In our revised forecast, the Highway Account deficit at the end of fiscal 2008/09, i.e. the end of the SAFETEA-LU authorization period, is increased from $2.3 billion to $4.4 billion.

Exhibit 74: Highway Trust Fund Revised Forecast



The forecast should be reviewed once again when the U.S. Department of Transportation releases the 2006 Highway Statistics data series.

[17] Sunshine, Robert A. Public Spending on Surface Transportation Infrastructure: Statement before the Committee on the Budget, U.S. House of Representatives. Congressional Budget Office, 25 October 2007.
[18] U.S. Department of the Treasury. 2007 Financial Report of the U.S. Government. 17 December 2007.

3. Risks to the Forecast for Alaska

The forecast assumes that the political ability of the Alaska delegation to Washington does not change nor does Alaska's share of apportionments. The forecast also assumes that other states have not succeeded in committing the Federal-Aid Highway Program beyond the next five years, i.e. all current obligations are reimbursed by 2011.